Modular I/O Device Server

CIE-M10 User's Manual

Version 1.1

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Sollae Systems

http://www.sollae.co.kr

1 Contents

2 Product Briefs

2.1 Introduction

The need for the data communication system via Internet is rapidly increasing due to the development of Internet. In order to send and receive data via Internet, TCP/IP protocol must be used. Any machines that need an Internet connection must implement TCP/IP protocol. In order for any device to implement TCP/IP protocol, the machine must either be able to implement TCP/IP protocol by itself, have an open TCP/IP source implanted, or must use an OS that is capable of implementing the protocol. However, the above options require a great deal of time, cost, and effort to make it work.

CIE-M10 uses Modbus/TCP and HTTP to provide users with ability to control and monitor remote digital output ports and analog/digital input ports. Therefore, with CIE-M10, remote I/O ports can easily be controlled and monitored at the same time. Also, CIE-M10 provides the Macro functions to change automatically the output port values based on the value of input ports.

Not only that CIE-M10 can control and monitor digital I/O ports, it also provides with functions that can covert the serial data to TCP/IP data and vice versa. Therefore, one CIE-M10 can perform numerous functions at the same time.

Along with its strong TCP/IP/UDP functions, CIE-M10 also provides DHCP and PPPoE functions to be used in cable and xDSL networks. And it has DDNS (Dynamic DNS) function, so it can be used more easily in the internet.

It is also equipped with online debugging functions that will allow the users to quickly respond to the problems that might occur during the installation.

2.2 Components

- CIE-M10 body

3 Specification

3.1 Brief Specification

Power	Input Voltage	3.3V (±10%)
	Current Consumption	190 mA @ 3.3V without load
Size		64.4 mm x 40 mm x 17 mm
Weight		about 17 g
Interface	Input	Digital Input Ports – 8 Ports (3.3V CMOS) Analog Input Ports – 1 Port with 10bits ADC
	Output	Digital Output Ports – 8 Port (3.3V CMOS)
	Serial	1 x UART (300bps ~ 230400bps) with 3.3V CMOS RTS/CTS Flow Control
	Network	10Base-T/100Base-TX (RJ45)
Network		Ethernet 10/100M bits auto-sense Auto MDI/MDX(cable auto sensing)
Protocols		TCP, UDP, IP, ICMP, ARP, DHCP, PPPoE, Telnet DNS lookup, DDNS(Dynamic DNS), Modbus/TCP, HTTP RFC2217(Telnet COM Port Control Option)
Debugging		Online debugging function
RoHS		Compliant to RoHS
Communication Mode	I/O Ports	Modbus/TCP – Slave/Master, Passive/Active, Serial Web browser(HTTP) Macro Mode
	Serial Port	TCP Server/Client, AT emulation, UDP
Utilities	ezManager	Configuration Utility through LAN or Serial Socket Test Firmware/HTML uploading
	ezVSP	Virtual Serial – TCP/IP Driver for Windows

Table 3-1 Brief Specification

☞ *Firmware and Utility can be downloaded from our website. (http://www.eztcp.com)*

3.2 Hardware Interface

3.2.1 Dimension

CIE-M10 Dimension Unit: mm
PCB width: 1.6mm
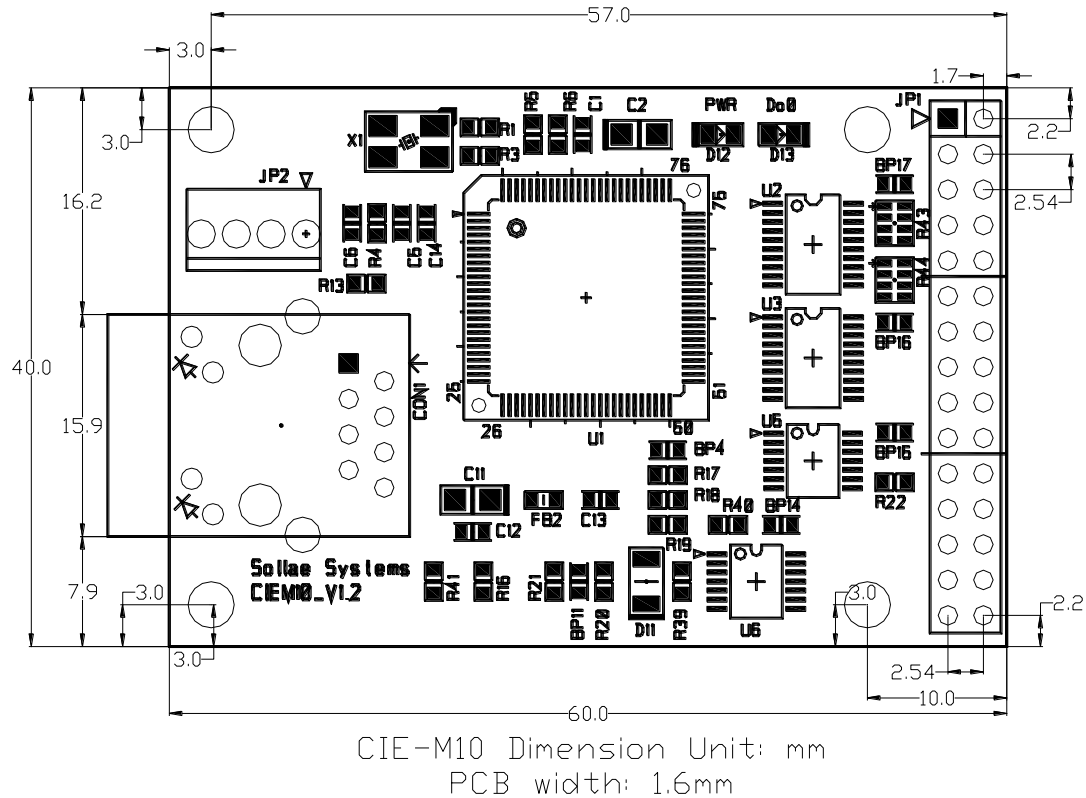
Figure 3-1 CIE-M10's Dimension

3.2.2 JP1 Port

JP1 is a user interface which is not populated by any connecters to be connected to user device with user's conector. The pitch is 2.54mm.

#	Name	Description	Dir.	Etc.
1	DI0	Digital Input Port 0	In	
2	DI1	Digital Input Port 1	In	
3	DI2	Digital Input Port 2	In	Min V_{IL}= -0.3V
4	DI3	Digital Input Port 3	In	Max V_{IL}= 0.8V
5	DI4	Digital Input Port 4	In	Min V_{IH}= 2.0V
6	DI5	Digital Input Port 5	In	Max V_{IH}= 5.5V
7	DI6	Digital Input Port 6	In	

8	DI7	Digital Input Port 7	In	
9	DO0	Digital Output Port 0	Out	Min V_{OH} = 2.9V, Max V_{OL} = 0.4V
10	DO1	Digital Output Port 1	Out	
11	DO2	Digital Output Port 2	Out	
12	DO3	Digital Output Port 3	Out	
13	DO4	Digital Output Port 4	Out	
14	DO5	Digital Output Port 5	Out	
15	DO6	Digital Output Port 6	Out	
16	DO7	Digital Output Port 7	Out	
17	GND	Ground	−	
18	GND	Ground	−	
19	ADVREF	ADC Reference Voltage (Input Voltage Range: 2.6V ~ 3.3V)	In	
20	ADC_IN0	Analog Input Port 0 (Input Voltage Range: 0V~ADVREF)	In	10bit ADC Conversion Time: 2.33us
21	RXD	Receive Data	In	
22	CTS	Clear To Send	In	
23	TXD	Transmit Data	Out	
24	RTS	Request To Send	Out	
25	RESET-	Reset(Active Low)	In	
26	ISP-	ISP Mode: Low when it boots up (Internally pulled-up, Active Low)	In	
27	VCC	Power Input (DC 3.3V)	−	
28	VCC	Power Input (DC 3.3V)	−	
29	GND	Ground	−	
30	GND	Ground	−	

Table 3-2 JP1 Specification

☞ *4 pin connector (JP2) will be removed after the first production.*

3.2.3 Analog Input Port

There is an analog input port in the CIE-M10. This port is connected to 10 bits ADC (Analog to Digital Converter). User should input 2.6V~3.3V to the ADVREF for reference voltage of the ADC. ADC_IN0 port is for user's analog sensors, its input voltage should be between 0V ~ ADVREF. The

ADC converts the input voltage of the ADC_IN0 (0V~ADVREF) to 0~1023 digital value.

User can read this value through Modbus/TCP and HTTP. User can read the ADC value from the address of (Digital Input Port Address + 4) with Modbus/TCP. When user read the ADC value with a web browser, user can read this value with $a0 variable.

3.2.4 Digital Input Port

CIE-M10's digital input ports can be applied variously with circuit configuration – for example: voltage input and Dry-Contact.

• Voltage Input Circuit

This circuit is to get a voltage from between the two input ports. If the voltage is high the value is 1, and if the voltage is low the value is 0.

The following is a circuit example with photo-coupler which isolates circuits electrically.
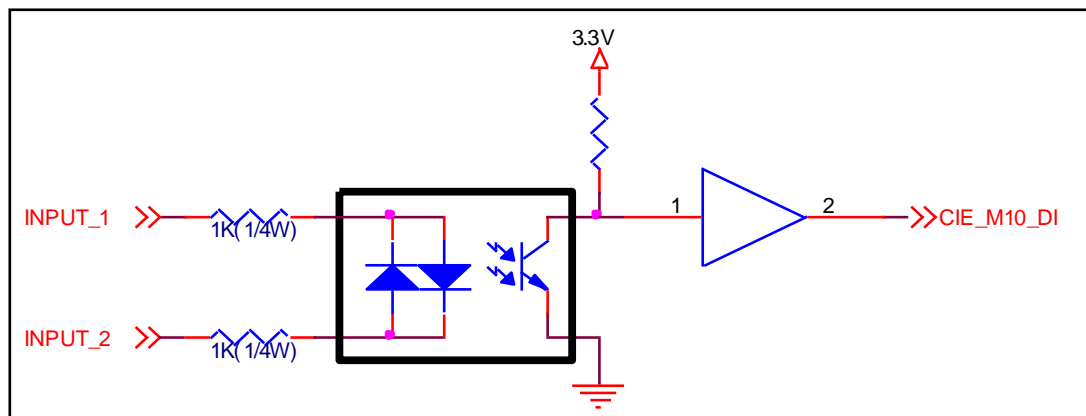
Figure 3-2 Voltage Input Interface Circuit

The [EXTERNAL INPUT 1] and [EXTERNAL INPUT 2] ports are user interface port. The working voltage is concluded by the photo-coupler and resistors.

• Dry-Contact Circuit

This circuit is to get a signal from mechanical switches or relays which provide just a mechanical contact. This circuit requires an additional DC power supplier which is isolated with CIE-M10's input power.
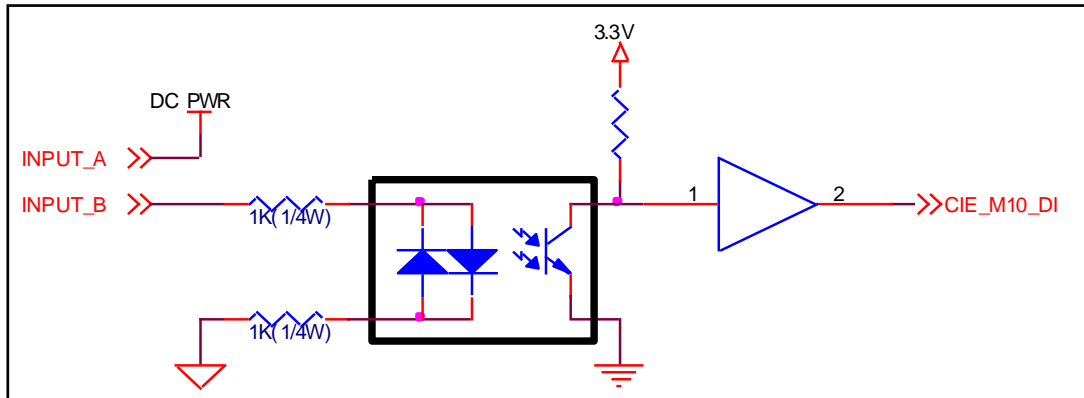
Figure 3-3 Dry-Contact Interface

3.2.5 Digital Output Port

The digital output ports can be interfaced with relays or SSR. The following is an example to interface to relays.
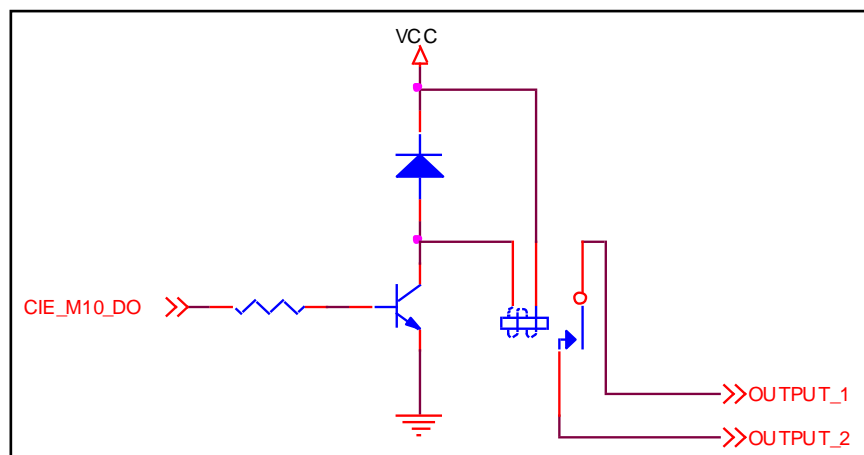
Figure 3-4 Relay Interface

3.2.6 Ethernet Port

User can control or monitor the CIE-M10's I/O port and serial port through the Ethernet (LAN) port which embeds 10M/100M auto-sensing function and auto MDI/MDIX.

3.2.7 Serial Port

There is a UART port which is CMOS-3.3V level. This port provides serial to TCP/IP converting function working independently with its I/O ports.

This port supports RTS/CTS flow control function. The RTS informs to the counter part that its receiving buffer is free and is ready to get data. And the CIE-M10 gets CTS information from the counter part's RTS.

Parameters	Supported Values
Baud rate	300 ~ 230,400 bps
Data bits	8, 7, 6, 5
Parity	None, Even, Odd, Mark, Space
Stop bit	1, 1.5, 2

Table 3-3 Supported Values of the Serial Port

● TX Interval

When CIE-M10 sends data to its serial port, there are intervals between data. It is for slow serial devices to give it enough time to process. The unit is byte.

● Telnet COM Port Control Option

CIE-M10 has Telnet COM Port Control Option function that is specified by RFC2217. If the Telnet COM Port Control Option is enabled, CIE-M10 sends the CTS control signal to the communication counter part, and CIE-M10 sets its serial port items(RTS, Baud rate, data bits, parity, stop bit) after getting information from the communication counter part.

☞ **For more information, please refer to our website. (http://www.eztcp.com)**

3.2.8 LED

There are 4 LEDs in the CIE-M10 as followed.

Mode	Name	Color	Status	Description
Common	PWR	Red	On	Power is on
	Do0	Green	On	When Digital Output Port 0 is 1
Normal Mode	STS_ACT	Yellow	Blink every 1 second	Static IP address or An IP address is assigned.
			Blink 4 times every	IP address isn't assigned.
			On	Modbus/TCP Connected
			Blink	Transmitting data to LAN
	LINK_ACT	Green	On	LAN link is established
			Blink	Receiving data from LAN
			Off	LAN link is not established
ISP Mode	STS_ACT	Yellow	Off	When CIE-M10 is in the ISP mode in which upload firmware and web pages
	LINK_ACT	Green	On/Off	

| Serial Configuration Mode | STS_ACT | Yellow | Blink every 1 second | CIE-M10 is in the ISP mode which Configures CIE-M10 through the serial port |
| | LINK_ACT | Green | On/Off | |

Table 3-4 LEDs

4 Getting Started

4.1 Test Operation

4.1.1 PC 's IP Address

Change PC's IP addresses as followed:

IP Address	10.1.0.2
Subnet Mask	255.0.0.0
Gateway IP address	-

Table 4-1 PC IP

4.1.2 Installing CIE-M10

CIE-M10's operating voltage is **DC 3.3V**. You have to use a stable power supplier.
Then the green LED of the RJ45 connector will blink.

4.1.3 Configuring CIE-M10

Using ezManager, change the settings of CIE-M10. Click [Search All] button on the ezManager window. Then, ezManager will search for every ezTCP on the local network.

When there is no found device, click [Windows Firewall] button on the ezManager window to check for firewall setting. If this setting is ON, the ezManager could not perform the search.

When CIE-M10 is found, the MAC address of CIE-M10 will be shown on the [Search List] window. (The MAC address is also written on the bottom of the product case.)

To configure it clearly, please press [Factory Reset] button to reset it with initial values.
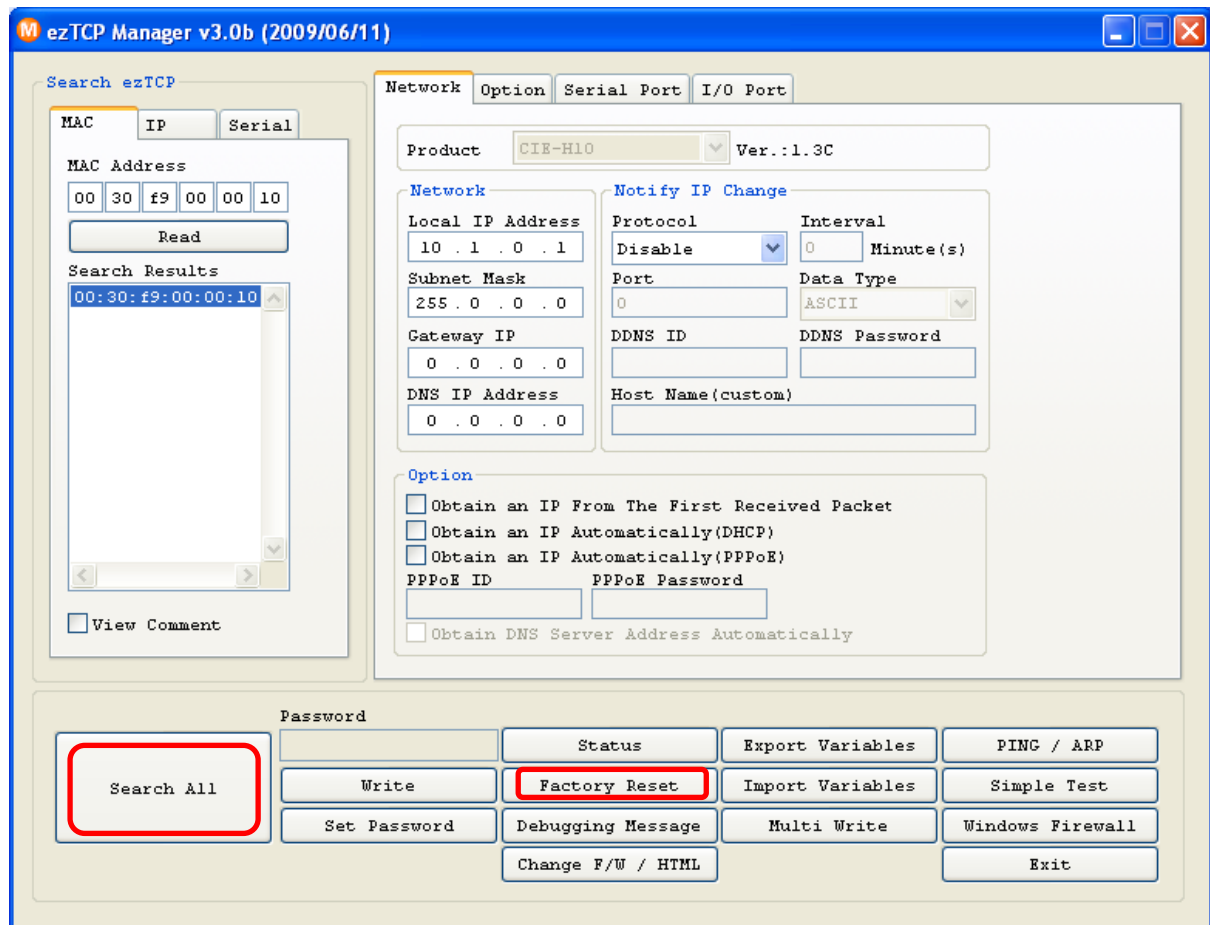
Figure 4-1 Configuring CIE-M10 with an ezManager

4.1.4 Testing Modbus/TCP

It is a test of CIE-M10 to perform control and monitor functions using Modbus/TCP. This test should be performed with Modbus/TCP program provided by Sollae Systems. You can check the digital output port 0 easily because it has an LED.

- Connecting a Modbus/TCP
  Connect the CIE-M10 with the [Connect] button.

- Checking Digital Output ports
  You can check the Modbus/TCP function by pressing the buttons in the "I/O Port".
  .
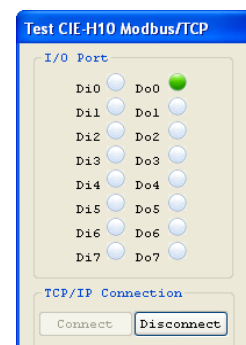
Figure 4-2 Testing Modbus/TCP

4.1.5 Testing with a Web browser (HTTP)

Start a web browser as shown below and write http:// and IP address in the address window to connect to the CIE-M10 web browser. It will allow users to monitor and control CIE-M10.

If you click the digital output buttons in the web page, then it toggles those and sends its digital and analog input port values to the web browser.
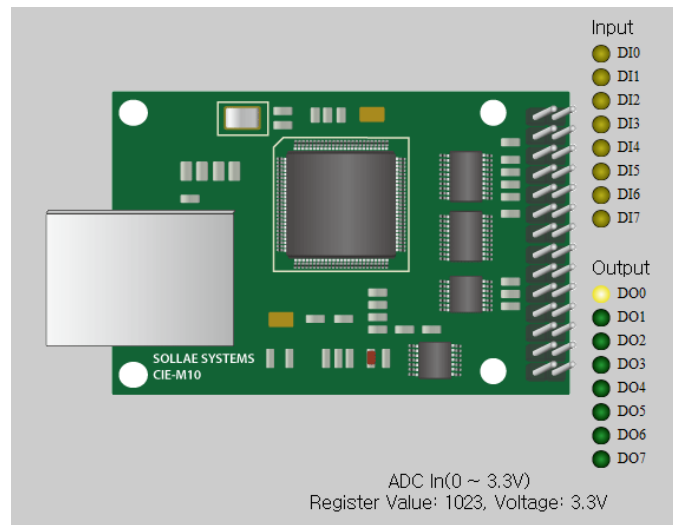
Figure 4-3 CIE-M10's default web page

5 Configuring Parameters

5.1 Parameters

To communicate with TCP/IP, user should set IP address related parameters. All parameters including IP address are set by ezManager which is supplied by Sollae Systems.

5.2 Configuring with ezManager

5.2.1 ezManager

The parameters of CIE-M10 (IP address, I/O ports, serial port and etc) can be configured by an application utility for Windows, ezManager. ezManager operates in Windows platform (Windows 98, 98SE, 2000, ME, XP, Vista). The following window is the window that pops up when the user starts ezManager for the first time.
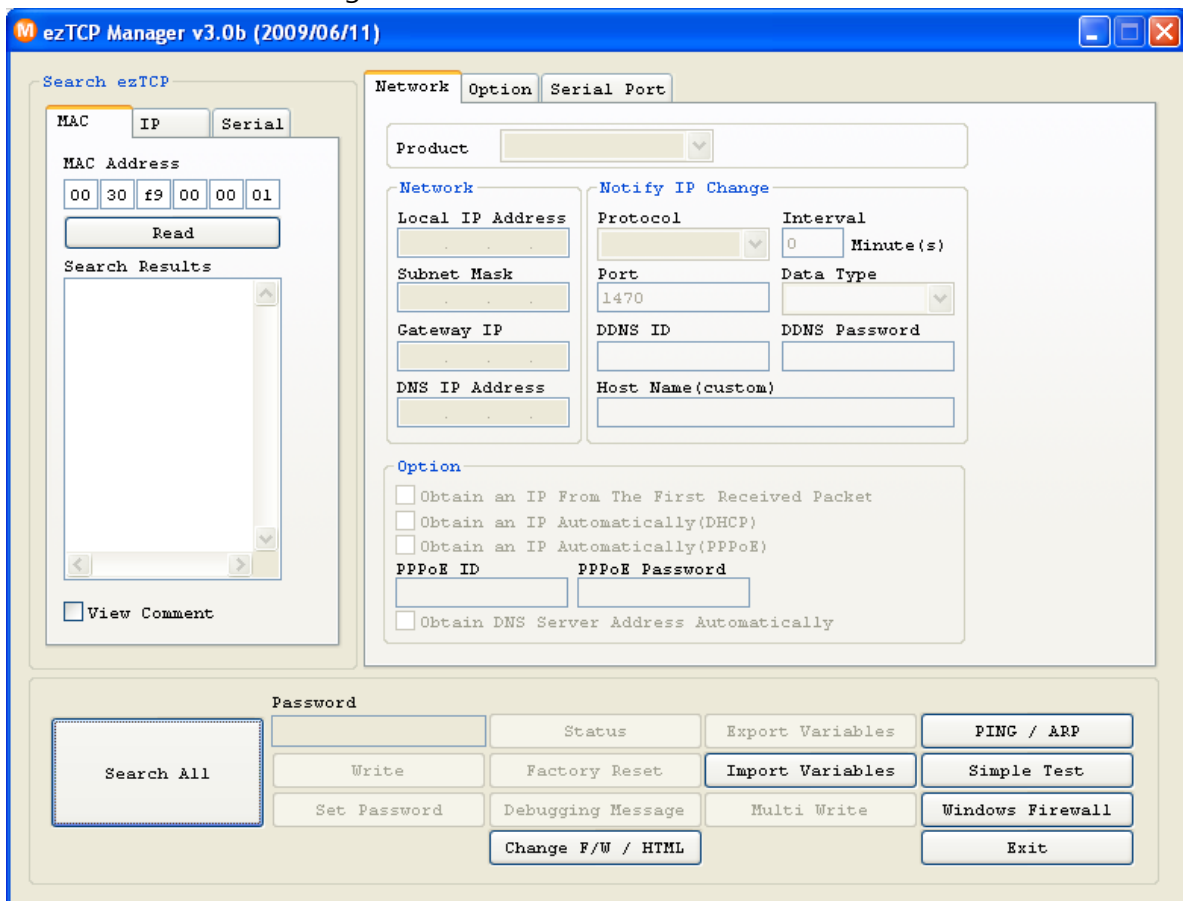
Figure 5-1 ezManager

5.2.2 Configuring Method with ezManager

There are [MAC], [IP], [Serial] tabs in the ezManager according to configuration method. Please refer to the following table.

	MAC	IP	Serial
Media	LAN	LAN	Serial
Method	UDP Broadcast	UDP Unicast	Serial Port
Identification	MAC Address	IP Address	COM Port
Properties	UDP port 50005	UDP Port 50005	115200/N/8/1

Table 5-1 Configuration Method with ezManager

5.2.3 ezManager Buttons

The followings are descriptions about buttons in the ezManager.

Search All	Search for all ezTCP series (including CIE-M10) connected to the local network. The MAC addresses of each ezTCP will be shown on the [Search Results] box. (The MAC address of CIE-M10 is written on the bottom of the product.) The setting values of each ezTCP will be shown on right side of [Search Results].
Read	Input 6 digit number written on the CIE-M10 to the MAC ADDRESS input box or Input CIE-M10's IP address in the IP address category on the IP tab. This will allow for the user to read setting parameters for a specific CIE-M10. When there are too many ezTCPs connected to the network and it is hard to find a desired ezTCP from the LIST box, this button may be conveniently used.
Write	After changing the settings, save the changes to ezTCP. CIE-M10 will automatically reset after the save. Therefore, pressing this button may cause system shutdown during normal use.
View Comment	If this check box is checked, ezManager displays CIE-M10's nick name which is set in the Comment.
Open	To read CIE-M10's parameters through serial port, open a serial port which is connected to the CIE-M10 in advance.
Read (Serial)	Reading parameters from CIE-M10 through the serial port.
Write (Serial)	Writing parameters to CIE-M10 through the serial port.
Set	CIE-M10 provides user authentication function in order to prevent other

Password	people from changing its settings. The authentication process is done using a password and this button will allow users to change the password. This password will be used when connected to the web (HTTP). The ID is 'admin' in this case.
Status	User can check the status of CIE-M10 during its operation. When the button is clicked, a new window will pop up and show operation time, current IP address, data amount via serial port and other information. Double-Clicking each devices of the [Search List] will also yield the same information.
Factory Reset	Resetting parameters of the CIE-M10
Debugging Message	This will be used to read debugging messages from CIE-M10. In order to use this function, activate [Debugging Message] option under [Option] tab. When the debugging is over, please deactivate the [Debugging Message] option to reduce network load. The debugging messages are transmitted to the LAN in shape of UDP broadcast.
Change F/W HTML	uploading new firmware or new html files in the ISP mode
Export Variables	Exporting the current parameters to a file
Import Variables	Importing a saved file to ezManager
Multi Write	Configuring multiple CIE-M10s
PING/ARP	Doing ping tests and managing ARP table
Simple Test	Doing tests of serial to TCP/IP converting function.
Windows Firewall	When the PC's firewall is activated, ezManager may not be operated properly. By clicking this button, the user can easily check their Windows firewall status.
Exit	Terminating the ezManager.

Table 5-2 ezManager Buttons

5.2.4 ezManager Parameters

Network	
Product	Product name and firmware version
Network	
Local IP Address	CIE-M10's IP Address
Subnet Mask	Subnet Mask of the network
Gateway IP	Gateway IP Address of the network
DNS IP Address	Name Server's IP Address
Option	
Obtain an IP From The First Received Packet	Obtaining an IP address in the first packet after CIE-M10 booted up and is used as CIE-M10's Local IP Address temporarily
Obtain an IP Automatically (DHCP)	DHCP Enabled
Obtain an IP Automatically (PPPoE)	PPPoE Enabled
PPPoE ID	PPPoE ID
PPPoE Password	PPPoE Password
Obtain DNS Server Address Automatically	When CIE-M10 gets IP addresses by DHCP or PPPoE, it gets DNS server IP address automatically.
Notify IP Change	
Protocol	DDNS(dyndns.org) – Using DDNS service of DynDNS TCP – Sending CIE-M10's IP to the host with TCP UDP – Sending CIE-M10's IP to the host with UCP
Interval	Interval to send IP address information (Unit: Minute)
DDNS ID	Account ID: when the Protocol is DDNS
DDNS Password	Account Password: when the Protocol is DDNS
Port	TCP or UDP port of the host (Protocol: TCP or UDP)
Data Type	Data Format (ASCII/HEX) (Protocol: TCP or UDP)
Host Name(custom)	DDNS: CIE-M10's host name which is registered in the DDNS server TCP or UDP: Host name or IP address to connect

Table 5-3 ezManager Network Tab

Option	
Option	
Telnet	Enable/Disable the Telnet login function
IP Address Search	Enable/Disable the IP Search Function in the IP tab of the ezManager
Debugging Message	Enable/Disable the Debugging Message Function
Comment	User Comment about the product (nick name)
ezTCP Firewall	
Allowed MAC Address	Only the host having the MAC address can connect to the CIE-M10
Allowed IP Range	Only the hosts having IP address range can connect to the CIE-M10. The range is calculated by making bitwise AND between Allowed IP Range and Network Mask.
Network Mask	(Example) Allowed IP Range: 192.168.1.1,Network Mask: 255.255.0.0 Bitwise AND: 192.168.0.0 Allowed IP hosts' address: 192.168.0.0~192.168.255.255
Apply to ezManager	If this option is enabled, only the host specified in the Allowed MAC address and IP range can access the CIE-M10 with ezManager,

Table 5-4 ezManager Option Tab

Serial Port	
Serial Port	
Serial Type	-
Baudrate	Baudrate (300bps~230,400bps)
Parity	Parity (NONE, EVEN, ODD, MARK, SPACE)
Data Bits	Length of the Data Bits (5, 6, 7, 8 bits)
Stop Bit	Stop Bit (1, 1.5, 2 bits)
Flow	Flow Control (NONE, RTS/CTS)
TX Interval	Interval between byte which outgoes from CIE-M10's the serial Port for slow serial devices 0 ~ 25 (Unit: Byte)
TCP/IP	
Communication Mode	Communication Mode of the Serial Port

Peer Address	COD – TCP Client: A host name or IP address to connect
	U2S – UDP: A host name of IP address to send UDP datagram
Peer Port	COD – TCP Client: A port number to connect
	U2S – UDP: A port number to send UDP datagram
Local Port	T2S – TCP Server: Local port to listen on as a TCP server
	U2S – UDP: Local port to receive UDP datagram
Event Byte	T2S – TCP Server: - 0: ignores data before the connection - Not 0: stores data before the connection and transmits it COD – TCP Client or U2S – UDP: - CIE-M10 tries to a make a TCP connection or transmits UDP data if the byte from its serial port is greater than this parameter
Timeout	TCP connection will be disconnected if there's no data communication during the Timeout (Unit: second)
Data Frame	CIE-M10 transmits data in its buffer if there's no incoming data from its serial port during the Data Frame time. (Unit: 10ms, Minimum Value: 4)
Telnet COM Port Control (RFC2217)	When this field is enabled, it sends not only serial port data but also serial port's control signal with telnet protocol. (RFC2217)
Disable TCP Transmission Delay	CIE-M10 stops TCP nagle timer to reduce delay when it send data to the remote host.
Create an ezVSP Port	Creating a new virtual serial port for ezVSP with proper parameters. (Supporting ezManager from 2.0j and ezVSP from 2.2h)

Table 5-5 ezManager Serial Tab

I/O Port – Basic Settings	
Web(HTTP)	Enable/Disable the web server to monitor and control the I/O ports with web browers
Web(HTTP) Port	Web server's port number (default: 80)
Size of Web(HTTP) Page	Size of user's web pages (80KB, 96KB, 112KB) 80KB is recommended
Modbus/TCP	

Modbus/TCP	Enable/Disable Modbus/TCP to monitor and control the I/O ports with Modbus/TCP
Notify Input Port Change	When its input port's value is changed, it sends response data without any master's query.
Master/Slave	Slave: When a master request a query to read and write, it outputs data its output port or sends its input port value Master: Write its input port data to the remote device's output ports. Reads the remote device's input port and reflects it its output port.
Poll Interval	Interval to sends queries to slave when it operates as a master (Unit: 1ms, Resolution: 10ms)
Unit ID	Modbus/TCP Unit ID
Input Port Base Address	Input Port Address (Reference Number) The difference between Input Port Base Address and Output Port Base Address should be over 8.
Out Port Base Address	Out Port Address (Reference Number) The difference between Input Port Base Address and Output Port Base Address should be over 8.
Passive Connection	Operates as a TCP server for Modbus/TCP
Active Connection	Operates as a TCP client for Modbus/TCP
Peer Address	A host name or IP address to make a TCP connection for Modbus/TCP
Peer Port	Passive Connection: TCP port number to listen to Active Connection: TCP port of the remote host to make a TCP connection

Table 5-6 ezManager I/O Port – Basic Settings Tab

I/O Port – I/O Port Option	
Digital Input	
Valid Time	The input signal should keep during the Valid Time to recognize it. (Unit: 1ms, Resolution: 10ms)
Digital Output	
Macro	Enable/Disable the Macro function
Do0 ~ Do7	Equations for macro function

Delay	CIE-M10 outputs data to its output ports after [Delay] time is expired. (Unit: 1ms, Resolution: 10ms)
Initial State	The initial values of its output ports when CIE-M10 boots up

Table 5-7 ezManager I/O Port – I/O Port Option Tab

I/O Port – I/O Port Comment	
Digital Input	
Di0 ~ Di7	Each digital input port name
Digital Output	
Do0 ~ Do7	Each digital output port name

Table 5-8 ezManager I/O Port – I/O Port Comment Tab

5.2.5 Example of ezManager Operation – MAC Address

The ezManager can be used to change IP address related settings of ezTCP. The Following example will show you how to read CIE-M10's setting values and change those settings. Please follow this procedure to change the setting values of CIE-M10.

● When ezManager's [Read], or [Search All] button is clicked, the following window will pop up.
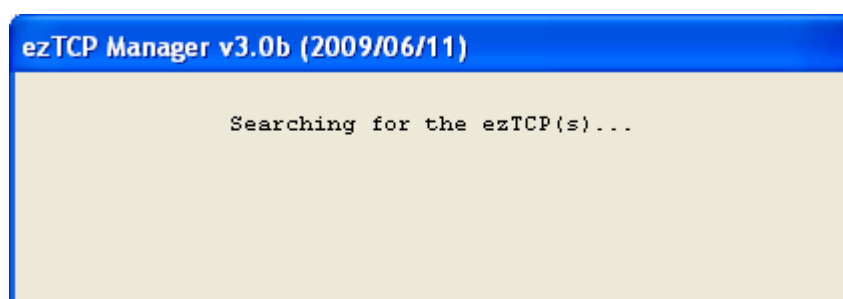
Figure 5-2 Searching ezTCP

● If 1 or more ezTCP is found, MAC address will be shown in the ezManager's [Search Result] box. Check to make sure that the MAC address shown in the [Search Result] window is as same as the MAC address written on the product's sticker. If there's no response, check the firewall in your PC.
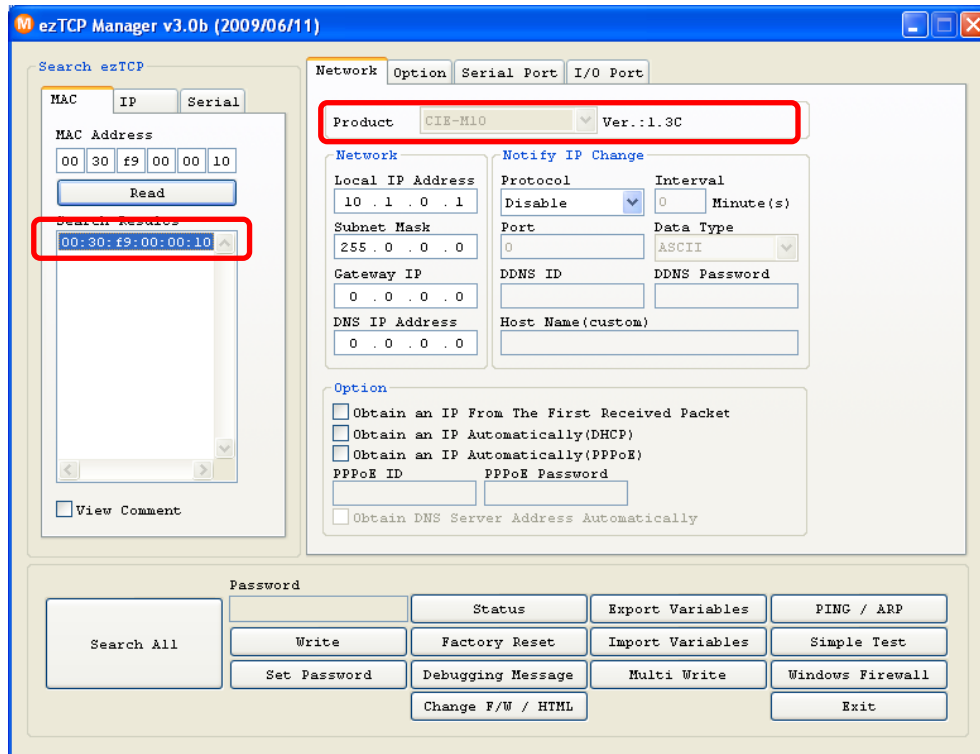
Figure 1-3 A CIE-M10 is found

- Configure proper IP address to CIE-M10. Please ask to your network administrator for the IP address information.

- **PING / ARP** Check the configuration with this button if the configuration is OK. The following is a screenshot of the ping test.
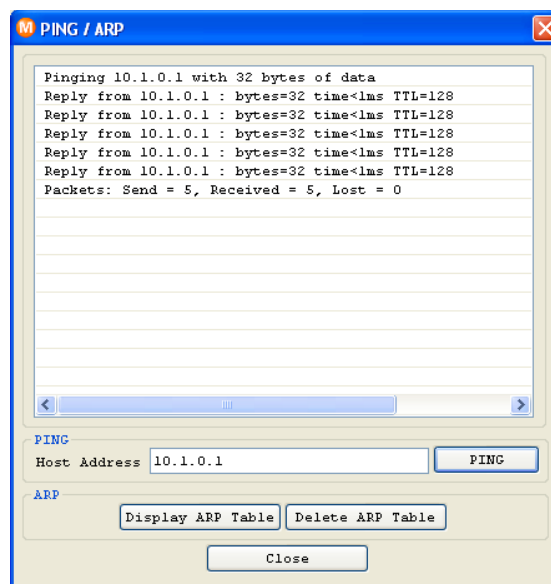
Figure 5-4 Ping test

6 Operation

6.1 Operation Mode

The following is a table of CIE-M10's operation mode.

Mode	How to enter	Function	Baudrate
Normal	ISP-: High or Open when it boots up	Normal	User defined
Serial Configuration	ISP- Low for 20ms~1,000ms in the Normal Mode	Configuring the CIE-M10 through serial port	115,200bps-None-8-1
ISP	1. ISP- Low when it boots up 2. ISP- Low more than 1 second	Uploading new firmware and user's web page	–

Table 6-1 ezTCP Operation Mode

6.1.1 Normal Mode

CIE-M10 operates normally in this mode.

If a CIE-M10's ISP- pin is high or open, it operates as Normal Mode.

☞ **Please refer to "7. Input / Output Ports" and "8. Serial Port" for more information.**

6.1.2 Serial Configuration Mode

User can set CIE-M10's parameters through its serial port in this mode. CIE-M10 enters into the Serial Configuration Mode by inputting low signal to the ISP- pin for 20ms ~ 1,000ms. User can configure CIE-M10 through the serial port with the ezManager in this mode.

The yellow LED of the RJ-45 connector blinks every 0.5 second and all security functions are disabled. So user can fix some problems because of security functions.

6.1.3 ISP Mode

User can upload new firmware and user's web page in the ISP mode. If the ISP pin is low when the CIE-M10 boots up, it enters into the ISP mode. And if the ISP pin is low more than 1 second in the Normal Mode, it enters into the ISP mode as well.

6.2 Uploading New Firmware

User can upload a new firmware to CIE-M10 through the Ethernet in the ISP mode with [Change F/W / HTML] menu in the ezManager.

● Run CIE-M10 as ISP Mode and connect it to the Ethernet. And press [Search All] to find the CIE-M10.

● After find the product, press [Change F/W / HTML] then the following windows will be open.
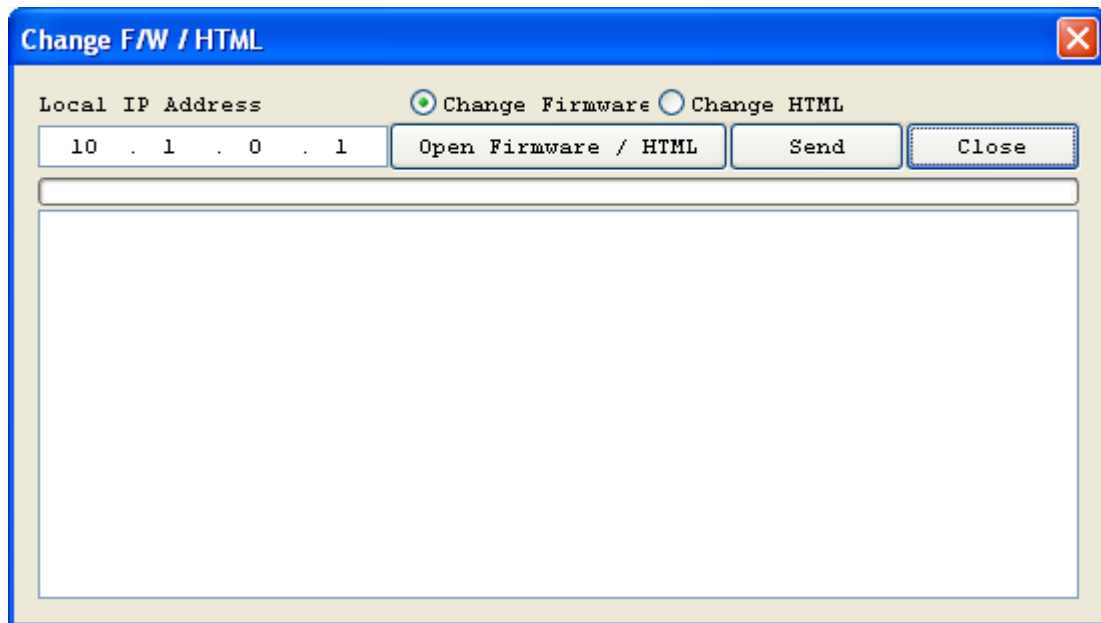
Figure 6-1 Change F/W / HTML Window

● Select a firmware with [Open Firmware / HTML] button or drag new firmware and drop into the window. And set the IP address as same as CIE-M10's IP address. Press the [Send] button then the ezManager will send the firmware to the CIE-M10.

● After completing to send new firmware, it will re-boot automatically.

6.3 Uploading New Web Pages

User can upload user's web pages to CIE-M10 through the Ethernet in the ISP mode with [Change F/W / HTML] menu in the ezManager.

● Run CIE-M10 as ISP Mode and connect it to the Ethernet. And press [Search All] to find the CIE-M10.

● After find the product, press [Change F/W / HTML] then the following windows will be open.

● Select web pages with [Open Firmware / HTML] button or drag and drop those into

the window. And set the IP address as same as CIE-M10's IP address. Press the [Send] button then the ezManager will send web pages to the CIE-M10.
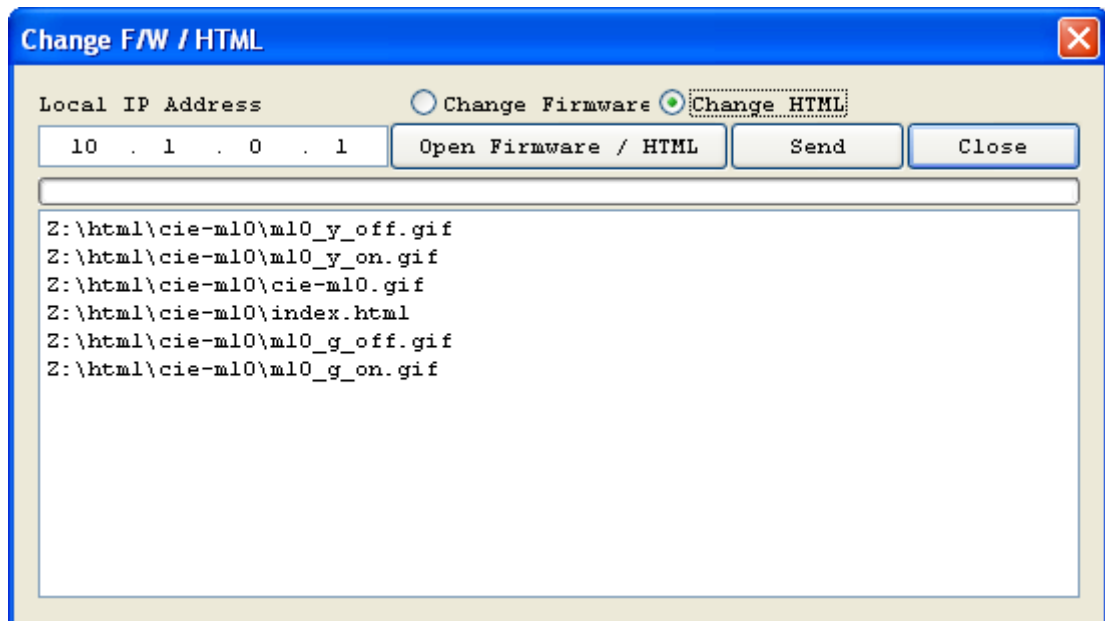
Figure 6-2 Uploading user's web pages

- After completing to send new firmware, it will re-boot automatically.

7 Input / Output Ports

There are 8 digital input ports, 1 analog input port and 8 digital output ports in the CIE-M10. User should make hardware interfaces to the CIE-m10 for user own purpose.

Those input and output ports are monitored or controlled three ways – Modbus/TCP, Macro, and HTTP.

Method	Description
Modbus/TCP	Modbus/TCP protocol is used to communicate with CIE-M10's I/O ports. When CIE-M10 is in Slave/Passive mode, it operates as a standard Modbus/TCP device. It can be operated as a master. A master outputs data after reading remote device's input ports and write to the remote device's output ports after reading its input ports. It can also establish TCP active connection.
Macro	It is a mode that allows the users automatically controls output port's value based on input port status by setting Macro values prior to CIE-M10 operation. During Macro operation, current status values may be read using HTTP or Modbus/TCP, but output values cannot be controlled.
HTTP	CIE-M10 can be controlled and monitored using web browsers. Connect to CIE-M10's IP address via web browser to access CIE-M10's control and monitor web page. This webpage shows current status values. User can upload user's own web pages into the CIE-M10 as well.

Table 7-1 Controlling the I/O port

7.1 Digital Input And Output Ports

7.1.1 Common Options
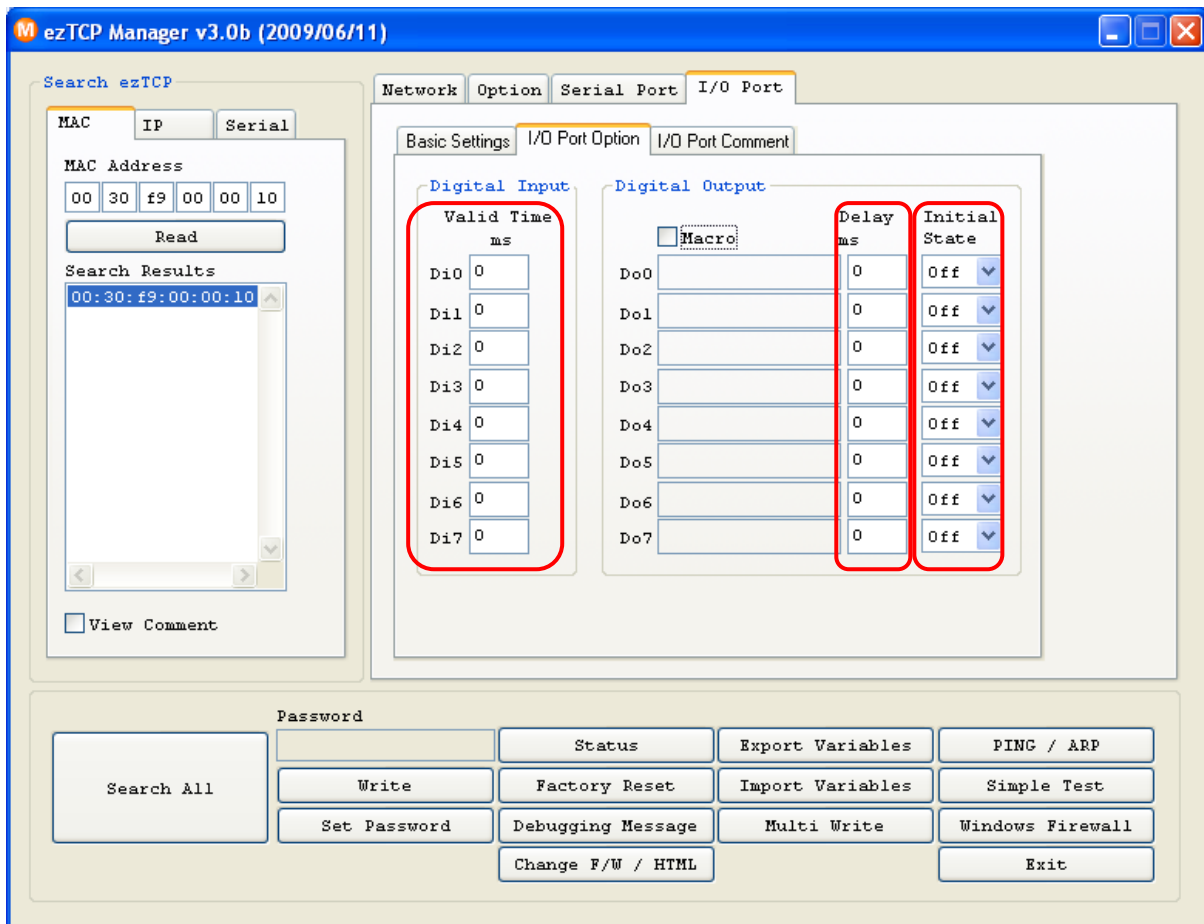
Figure 7-1 Digital Input / Output Ports Option

● Valid Time

CIE-M10 recognizes its digital input ports' signals only if the signal keeps a pre-specified time (Valid Time). If the signal doesn't remain for the pre-specified time(Valid Time), this signal will be ignored.

● Delay

CIE-M10 will output a value to the output port after waiting for [Delay] ms.

In order to do so, the signal value must last for [Delay] seconds. If the output value does not last for the [Delay] seconds, CIE-M10 will not send that signal to the output port.

If the [Delay] value is set as 0, CIE-M10 will send the output value to the output port immediately.

The [Delay] is used for Modbus/TCP, Macro, HTTP, and other functions provided by CIE-M10. The unit used for the [Delay] is 1ms. However, since the accuracy is only guaranteed

in 10ms, the designated values will round down in units of 10ms according to the designated values by the users

- Initial State
  User can set the initial state of the output ports. If it boots up, it sets the initial values to its output ports.

7.2 Modbus/TCP

7.2.1 Introduction

Modbus was announced to control PLCs (Programmable Logic Controller) which are used widely for factory automation by Modicon. It is a de-facto standard in industrial automation market now.

Modbus is divided by Master and Slave. Maters are usually programs which are working on the computers and slaves are usually devices which are controlled by masters.

Modbus is a protocol which communicates through serial lines (RS232, RS422, and RS485). But as Ethernet devices are increasing, Modbus/TCP which communicates over TCP/IP network was released.

7.2.2 Standard Modbus/TCP

Usually a master is a program which works on a computer and a slave is a device which is controlled by the master. If the master queries to the slave, the slave replies to the master.

The following is an example how to configure the CIE-M10 for the standard Modbus/TCP.
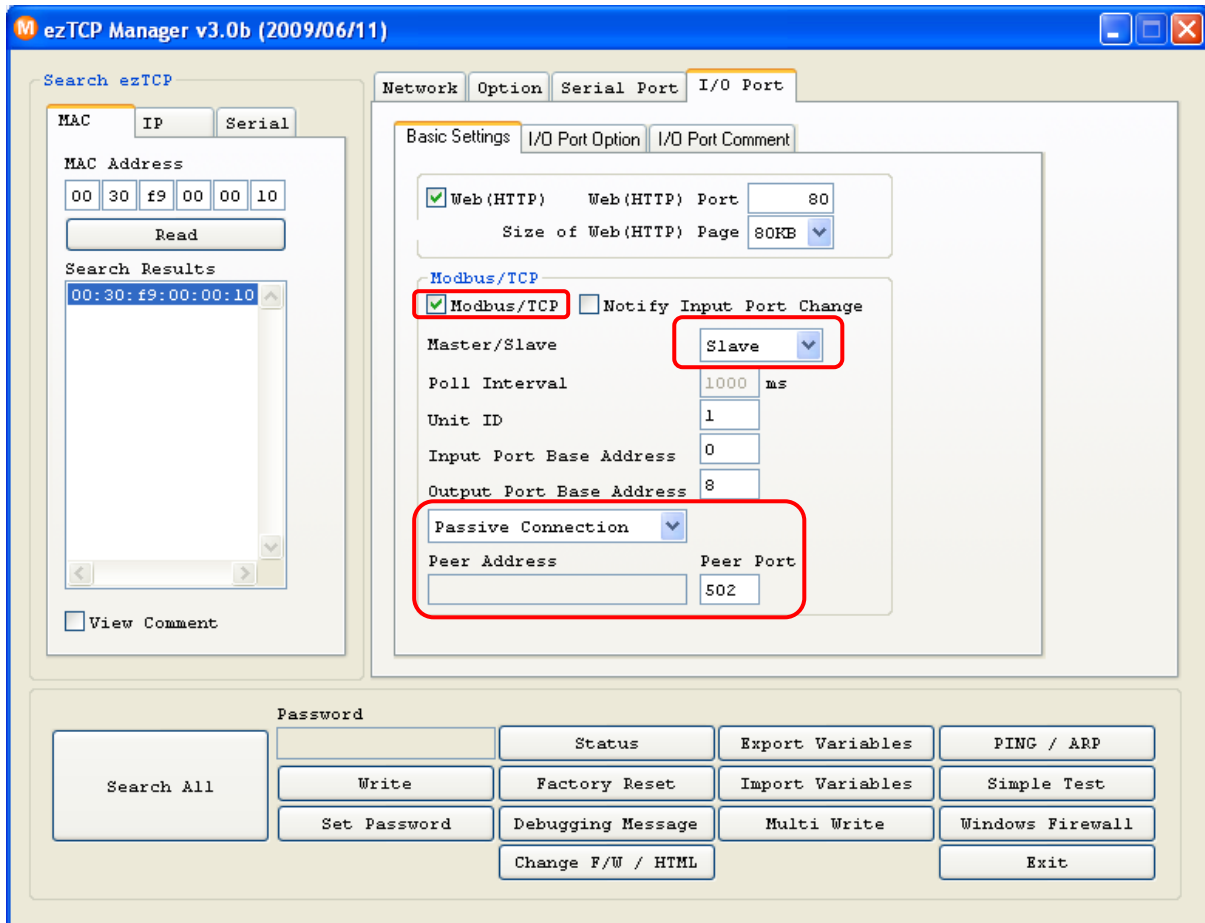
Figure 7-2 Configuration for standard Modbus/TCP

7.2.3 Modbus/TCP Protocol

CIE-M10 supports Read Multiple Registers (Function Code: 3) and Write Multiple Registers (Function Code: 16) among the Modbus/TCP's function codes. Read Multiple Registers is for reading the CIE-M10's input port value and Write Multiple Registers is for writing the CIE-M10's output ports.

Because CIE-M10 supports both Master and Slave mode and both active and passive TCP connection, it can adapted in various environments.

7.2.4 Configuring Modbus/TCP
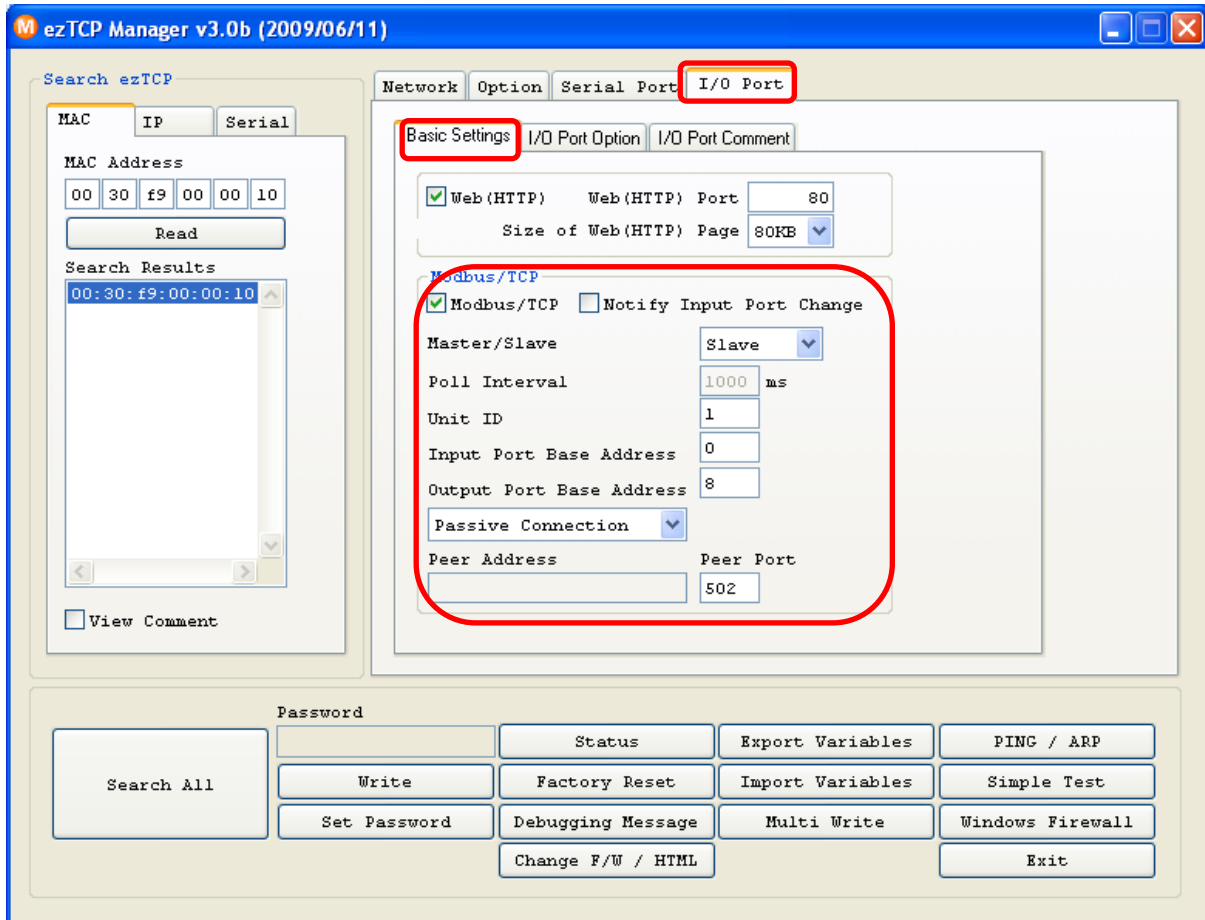
Figure 7-3 Configuring Modbus/TCP

● Modbus/TCP

CIE-M10's I/O ports are controlled by Modbus/TCP.

● Notify Input Port Change

When the CIE-M10's input port state is changed, it inform to the connected master with a reply packet. This is useful when user wants to know input ports' change as soon as possible.

This option is not standard so it is off in default.

● Master/Slave

User can choose the CIE-M10's operation mode. To operate as a standard, CIE-M10 should be a slave.

Please refer to following section for master mode..

● Poll Interval

When CIE-M10 operates as a master, CIE-M10 send queries to the slave every this

interval. (Unit: ms, minimum value: 10)

- Unit ID
  Slave: CIE-M10's unit ID
  Master: Slave's unit ID

- Input Port Base Address
  Slave: CIE-M10's input port address
  Master: Slave's input port address

- Output Port Base Address
  Slave: CIE-M10's output port address
  Master: Slave's output port address

  ☞ **The difference between Input Port Base Address and Output Port Base Address should be over 8.**

- Passive Connection / Active Connection
  This field is for specifying TCP connection method. The passive connection is a standard of Modbus/TCP. The CIE-M10 waits for a TCP connection from the master if the passive connection is selected.
  CIE-M10 also has an active TCP connection function to make a TCP connection to remote Modbus/TCP device.

- Peer Address
  When CIE-M10 makes an active TCP connection, Peer Address is the destination address to connect.

- Port
  Passive Connection: A port number to wait for a TCP connection from remote host.
  Active Connection: A port number to make a TCP connection to remote host

7.2.5 Mater Mode

A master outputs data after reading remote device's input ports and write to the remote device's output ports after reading its input ports. User can make a remote switch system with this mode.

7.2.6 Serialized Modbus/TCP

CIE-M10's I/O port can be accessed through the serial port with Modbus/TCP. The data is as same as data over TCP of Modbus/TCP.

To use this function, you have to set it as followed.
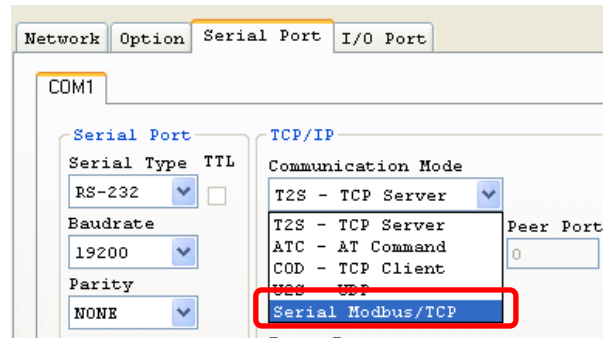
Figure 7-4 Enabling Serialized Modbus/TCP

7.3 Macro Mode

7.3.1 Introduction

CIE-M10 can operate by some macros (equations). CIE-M10 turns on or off automatically its output ports according to pre-defined equations.

Check Macro check box in ezManager to activate CIE-M10 macro mode.

7.3.2 Operators

The algorithm used in the Macro mode is Boolean Algebras. The AND, OR, NOT are used as operators. Parenthesis can also be used.

The priority of operators is in the following order: parenthesis > NOT > AND > OR.

Each operator is represented by the following symbols.

Operator	Symbol	Description
Parenthesis Open	(	Since calculations within the parenthesis have the highest priority, they will be calculated first. Parenthesis may be nested used.
Parenthesis Close	)	
NOT	/	Operand that follows NOT operator is toggled.
AND	*	If Operand values that surrounds AND operator all 1, the result value will be 1. If either one of them is 0, the result will be 0 as well.
OR	+	If Operand values that surrounds OR operator all 0, the result value will be 0. If either one of them is 1, the result will be 1

Table 7-2 Macro Operators

7.3.3 Operand

Operands used in macro mode are each input port. Each input port is designated with i0 ~ i7

symbol based on their sequence. The operand is case-insensitive.

7.3.4 Example of Equation

The following is a screenshot which has two equations.
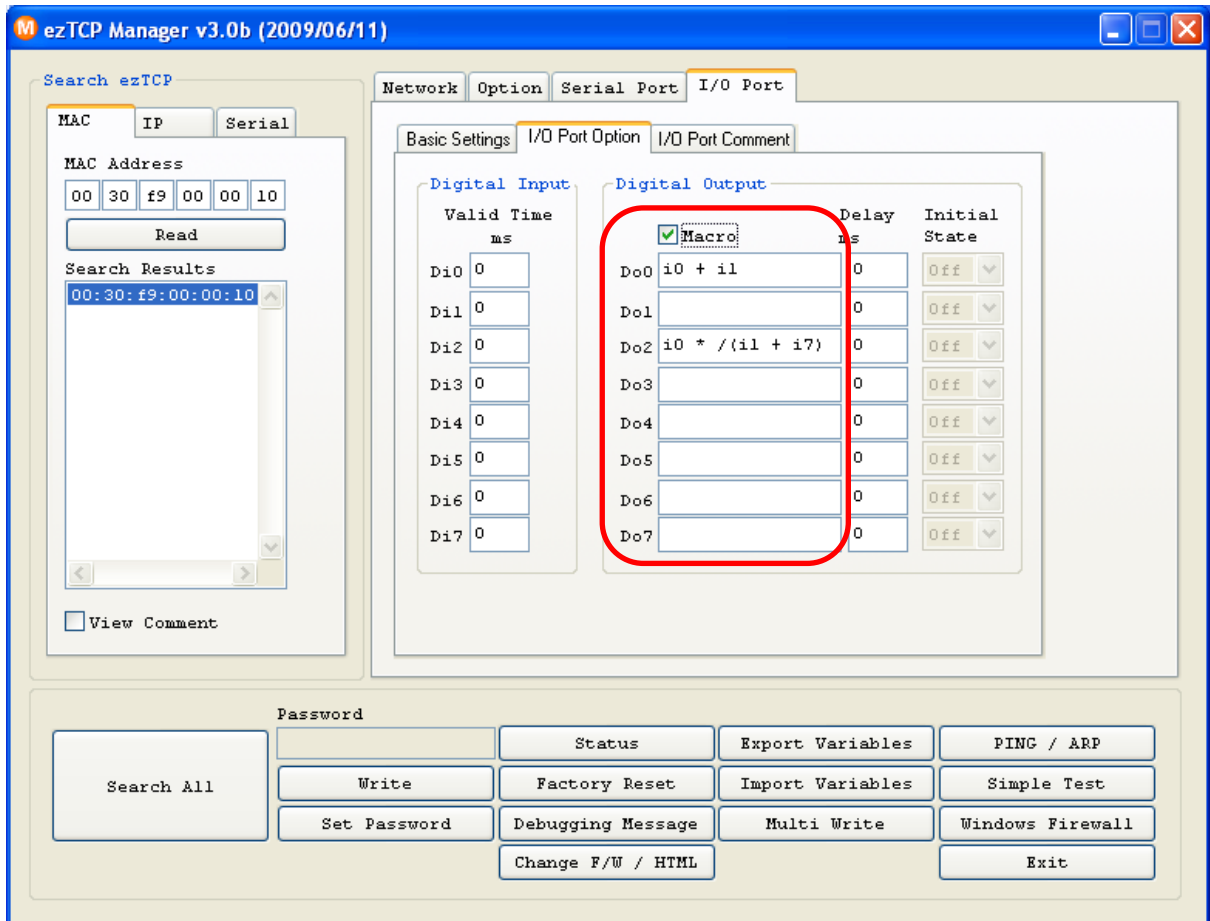
Figure 7-5 ezManager with Macro Equations

In this case, the equations for two output port are as the following.

Output Port	Equation	Description
Do0	i0 + i1	Perform OR for i0 and i1. Spaces in between two operands may be ignored
Do2	i0 * /(i1 + i7)	Perform NOT with value after performing OR for i1 and i7. Then, perform AND with that value and i0

Table 7-3 Examples of Macro Equations

Based on input values from three input ports, the output values are as the following.
Output ports that equations are not applied will be maintained as 0 (OFF).

Input Port			Output Ports							
i0	i1	i7	Do0	Do1	Do2	Do3	Do4	Do5	Do6	Do7
0	0	0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0	0
0	1	0	1	0	0	0	0	0	0	0
0	1	1	1	0	0	0	0	0	0	0
1	0	0	1	0	1	0	0	0	0	0
1	0	1	1	0	0	0	0	0	0	0
1	1	0	1	0	0	0	0	0	0	0
1	1	1	1	0	0	0	0	0	0	0

Table 7-4 Output Ports Values According to Input Ports Value

7.4 Web (HTTP)

When HTTP check box in ezManager is selected, CIE-M10 input/output port values may be monitored and controlled using web browser. User can upload user's web pages into the CIE-M10 as well.

7.4.1 Configuring Web Function
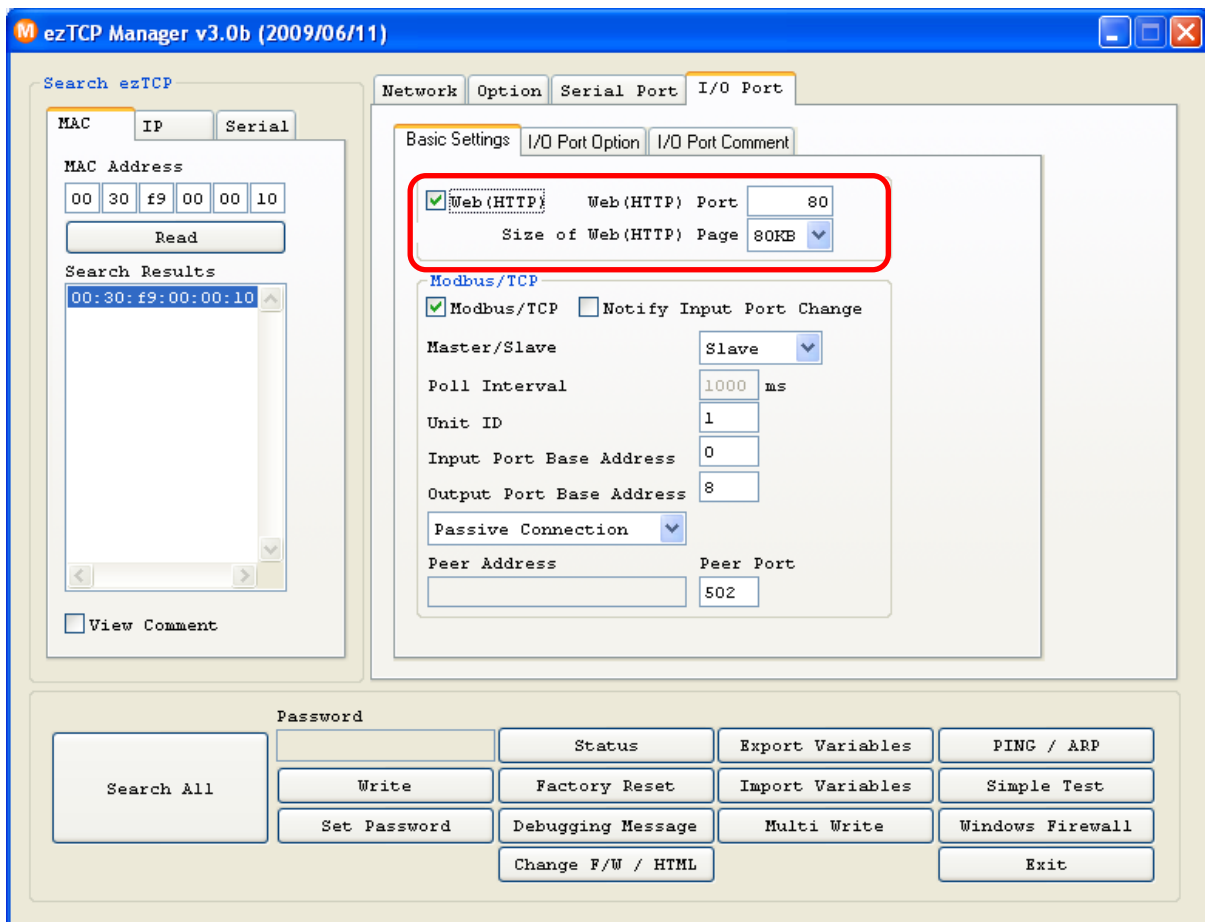
Figure 7-6 Enabling Web Function of the CIE-M10

- Web(HTTP)

  User can monitor and control the CIE-M10's input and output ports with web server.

- Web(HTTP) Port

  The default web port is 80. But changing web port is required in some cases. To access to the specific web port with web browser, add a colon(☺ and port number in the end of address in the web browser.

(example) http://10.1.0.1:8080

- Size of Web(HTTP) Page

  User can select user web page space size. But we are strongly recommend you to use 80KB because if you use others your web page might destroyed when you upload new firmware to the CIE-M10.

7.4.2 Security

If you set a password with the [Set Password] button, you have to enter the password when you login with web page. The ID is 'admin' in this case.

Figure 7-7 Login CIE-M10 with a web server

7.4.3 User Web Page

User can upload user specific web pages. For more information about it, please visit our web site's SUPPORT page.

8 Serial Port

8.1 Introduction

CIE-M10 provides RS232↔TCP/IP conversion function along with input/output port monitor and control function. Using this function, existing serial devices may be easily connected to the TCP/IP network. Also, TCP server, TCP client, AT command emulation, UDP, and many other devices are supported to provide various applications to the users.

8.2 Serial Communication Mode

CIE-M10 has 5 serial communication modes. The following chart is a brief explanation for each communication mode

Communication Mode	Protocol	Connection	Topology	Etc.
TCP Server	TCP	Passive	1:1	
AT Command	TCP	Active Passive	1:1	
TCP Client	TCP	Active	1:1	
UDP	UDP	-	1:N	
Serial Modbus/TCP	Modbus/ TCP	-	1:1	CIE-M10's I/O ports are controlled through the serial port with Modbus/TCP

Table 8-1 Communication Mode

8.3 TCP Server

T2S is the mode that CIE-M10's serial port operates as a server.

When TCP connection comes through previously designated [Local Port] from remote host, CIE-M10 will accept TCP connection. When CIE-M10 accepts the connection, TCP connection is established. After establishing connection, data that comes through serial port will be sent to the remote host after TCP/IP process, and TCP/IP data that comes from the remote host will be sent to the serial port after TCP/IP process to establish data communication.
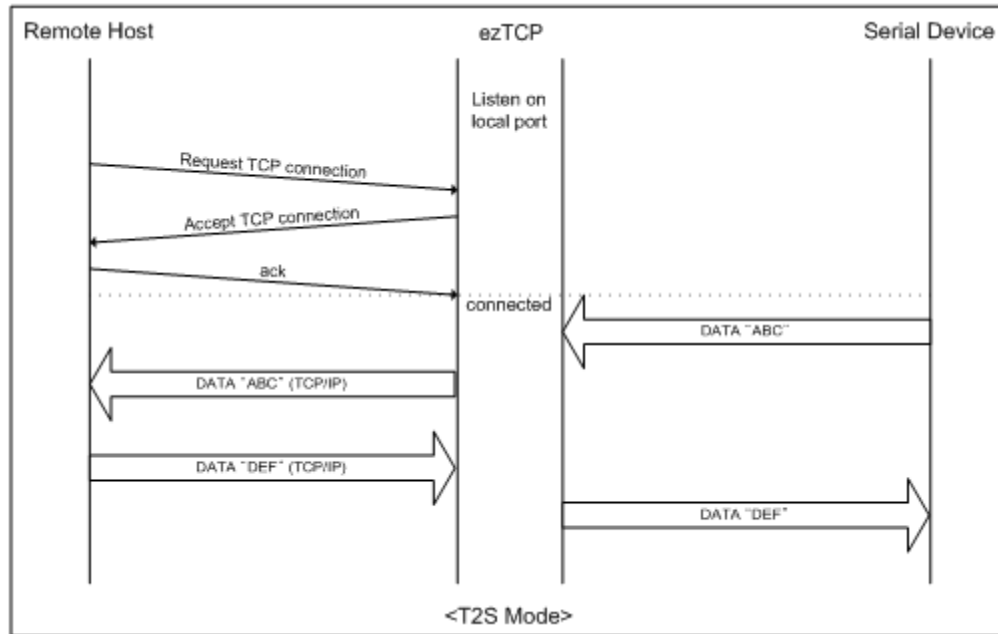
Figure 8-1 Description of TCP Server Mode

8.3.1 Connection

When remote host connects to CIE-M10, user devices that are connected to CIE-M10 can establish full duplex data communication with remote host.

8.3.2 Serial Data Before TCP Connection

Data before TCP connection will be handled based on the [Event Byte] settings. If it is 0, the data that comes to CIE-M10's serial port will be ignored. If it is not 0, the serial data before TCP connection will be temporarily saved to be sent to the host after the connection

8.3.3 Data Communication

When the TCP connection is established, the data communication in between the host and the serial device will be established. Then, CIE-M10 will send data according to the [Data Frame]. In other words, when the data comes through CIE-M10's serial port, it will be temporarily saved in the buffer. Then, when there is no incoming data during the designated [Data Frame], CIE-M10 will send the saved data. If the [Data Frame] is 0, CIE-M10 will send serial port's data immediately. The unit used for the [Date Frame] is 10m seconds.

8.3.4 Terminating Connection

When the connected host terminates the connection, or there is no data communication during the designated [Timeout], the TCP connection will be automatically terminated. The unit used for [Timeout] is 1 second.

8.4 TCP Client

COD mode is the mode that CIE-M10 operates as a client.

When previously configured [Event Byte] data comes through the serial port, CIE-M10 will try to connect to the pre-defined [Peer Address] and host's TCP port [Peer Port] via TCP connection. When the remote host accepts the TCP connection, the TCP connection will be established. After the connection is established, the data that comes through the serial port will be sent to the remote host after TCP/IP handling. The TCP/IP data that comes from the remote host will be sent to the serial port after TCP/IP handling to form data communication.
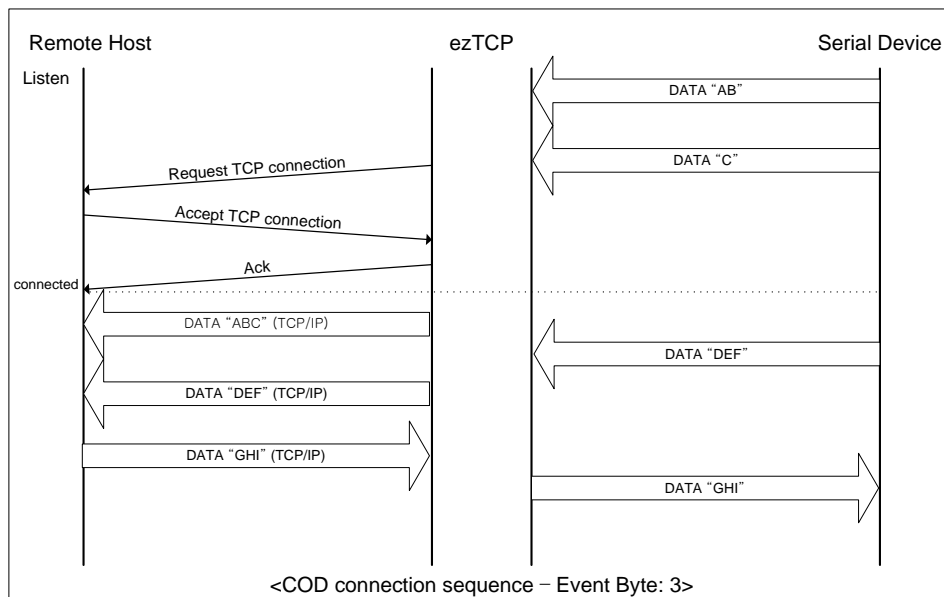
Figure 8-2 TCP Description of TCP Client Mode

8.4.1 Serial Data Before Connection

Data before TCP connection will be handled based on the [Event Byte] settings. If it is 0, it tries to make a TCP connection automatically when TCP connection is not established. The data that comes to CIE-M10's serial port before the TCP connection will be ignored.

If it is not 0, it tries to make a TCP connection after getting the specified size of data from the serial port and will send temporarily saved data to the host after the connection.

8.4.2 Data Communication

When the TCP connection is established, the data communication in between the host and the serial device will be established. Then, CIE-M10 will send data according to the [Data Frame]. In other words, when the data comes through CIE-M10's serial port, it will be temporarily saved in the buffer. Then, when there is no incoming data during the designated [Data Frame], CIE-M10

will send the saved data. If the [Data Frame] is 0, CIE-M10 will send serial port's data immediately. The unit used for the [Date Frame] is 10m seconds.

8.4.3 Terminating Connection

When the connected host terminates the connection, or there is no data communication during the designated [Timeout], the TCP connection will be automatically terminated. The unit used for [Timeout] is 1 second.

8.4.4 DNS

If you input an IP address in the [Peer Address], it tries to connect to the IP address. If you input the host name in the [Peer Address], it queries IP address to the DNS server which you have configured in the Network tab.

8.5 AT Command

ATC mode allows users to use AT commands to control CIE-M10 like modem control. In ATC mode, only TCP connection is allowed.

In ATC mode, AT commands can be used to change environmental factor values and IP address. Also, it allows users to establish and terminate TCP connection
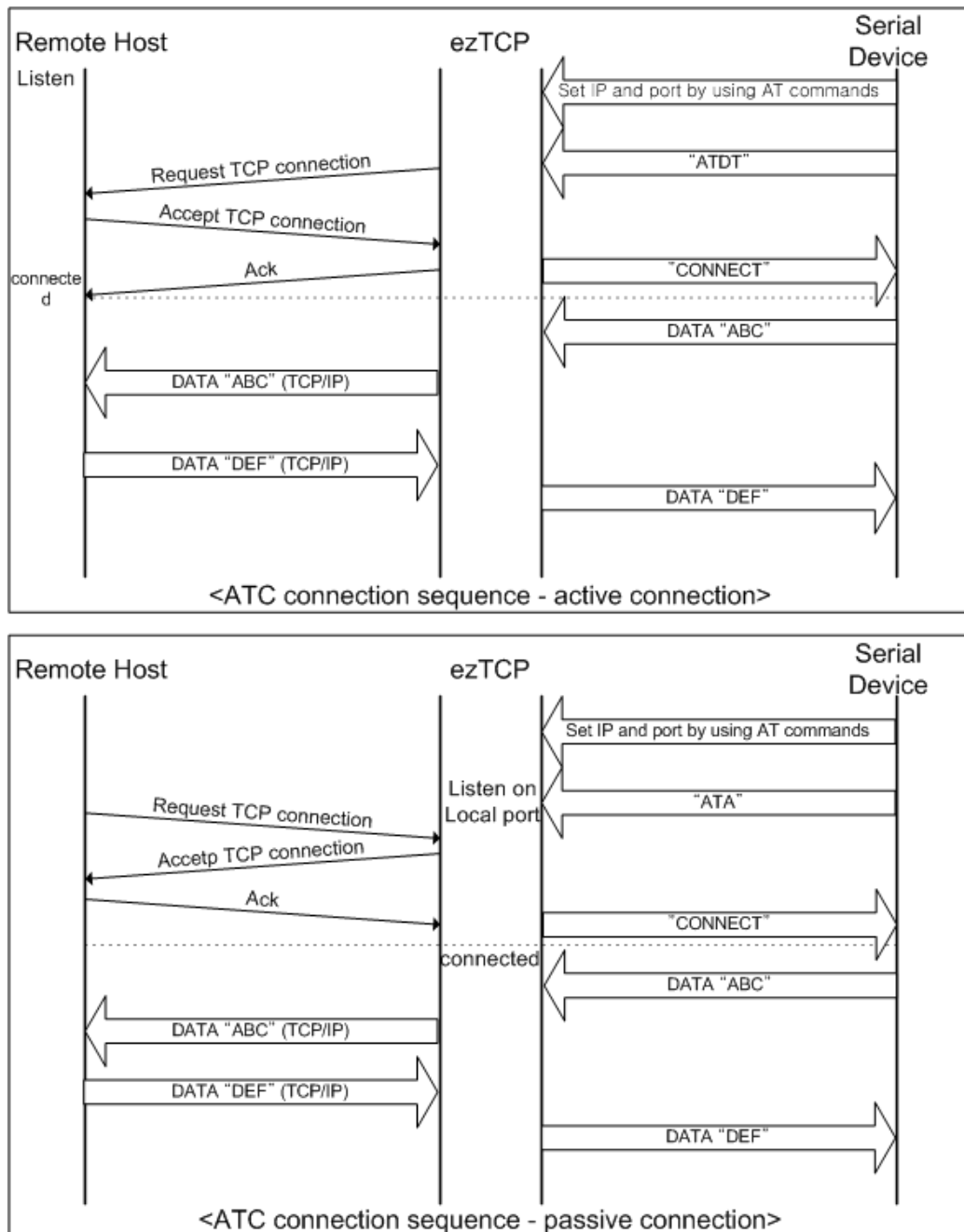
Figure 8-3 AT Command Mode

☞   *Please refer to the "9. AT Command Mode" for more information.*

8.6 UDP

U2S is a mode that performs UDP communication.

In UDP communication, data is sent in block units. Therefore, data that comes through CIE-M10's serial port must be classified in block units to send it elsewhere. The block unit classification process is performed as the following.

When the amount of received data via CIE-M10 serial port is as same as previously configured data byte count, [Event Byte], or the duration of the data exceeds [Data Frame], the incoming data will be recognized as one block.

Since UDP communication does not involve establishing connection, N: M communication may be performed using broadcast. Therefore, it can be conveniently in changing RS485 multi drop type network to Ethernet.
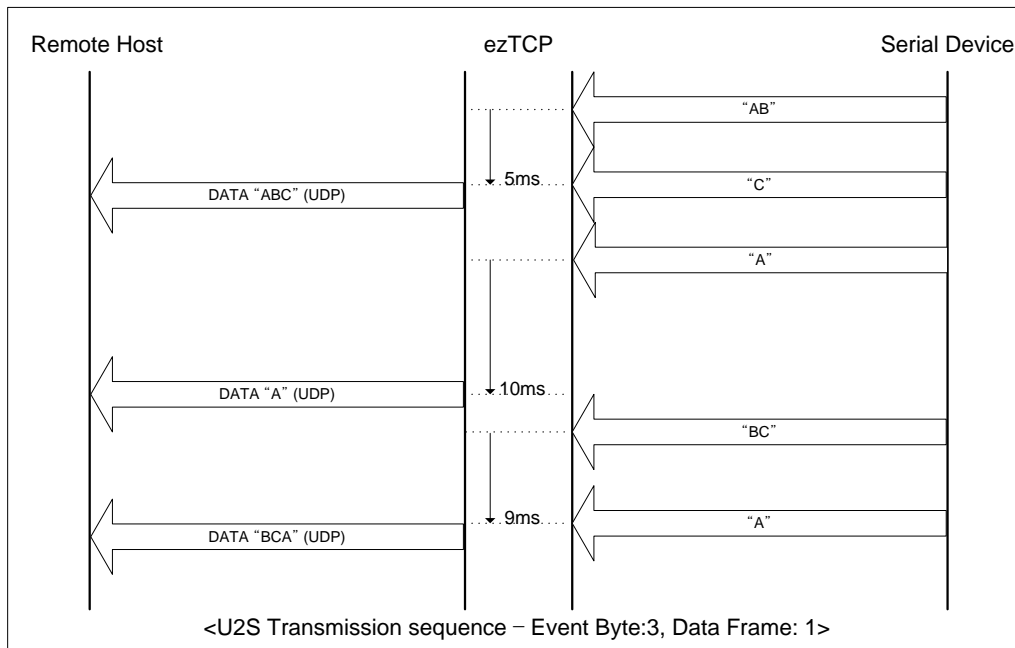
Figure 8-4 UDP Communication Mode

9   AT Command Mode

9.1 Introduction

In ATC mode, users can use AT commands to use CIE-M10's serial port flexibly. For example, AT+PRIP command can be used to designated an IP address and ATD command to establish connection to that IP address.

Therefore, multiple communications with different hosts can be established after one another.

Also, ATA command allows users to perform manual connection.

9.2 AT Command Format

9.2.1 Basic Command Format

AT Command starts with 'AT' and it ends with '<CR>'.

AT	Command	<CR>(0x0d)

Table 9-1 AT Command Format

9.2.2 Basic Response Format

<CR>(0x0d)	<LF>(0x0a)	Result Code	<CR>(0x0d)	<LF>(0x0a)

Table 9-2 Response Format

● Result Code

ATV1	ATV0	Description
OK	0	Command OK
CONNECT	1	TCP Connected
NO CARRIER	3	TCP Disconnected
ERROR	4	Command Error
Values	Values	Responses to queries (example: AT+PRIIP?)

Table 9-3 Result Code

9.2.3 Basic AT Commands

Com-	Description	Comments

mand		
A	Passive connection	Wait for connection request from the remote host (The remote host → CIE-M10)
D	Active connection	CIE-M10 connect to the remote host (CIE-M10 → The remote host)
E	Echo / No Echo	Decides whether to echo commands to serial port (E0 – No Echo, E1 – Echo)
H	Off hook	TCP Connection Close
I	Information	Returns the information of CIE-M10 ATI3: Firmware version ATI7: MAC address
O	Return Online	Go back On-line state from Command state
Q	Quiet Mode	Decides whether to return result codes (Q0: Displays result codes Q1: Disable response to serial port)
S	S Register	S2: Escape Code(default: 43) S3: Carriage Return Code(default: 13) S4: Line Feed Code(default: 10) S5: Backspace Code(default: 8) S12: Escape Code Guard Time(default: 50)
V	Selecting Result Code	V0 – Number V1 – String
Z	Reset	Reset

Figure 9-4 Basic AT Command

9.2.4 Example of Basic AT Commands

	Data		Description
	ATS12?<CR>	▶	Current Escape Code Guard Time?
◀	<CR><LF>50<CR><LF>		50(500ms)
◀	<CR><LF>OK<CR><LF>		Command OK
	ATS12=40<CR>	▶	Changing Escape Code Guard Time into 40(400ms)
◀	<CR><LF>OK<CR><LF>		Command OK
	ATI3<CR>	▶	Query Firmware Version

◄	`<CR><LF>Sollae Systems Co.,Ltd. ezTCP/LAN AT91 Rev.1.3B<CR><LF>`		
◄	`<CR><LF>OK<CR><LF>`		Command OK
	`ATI7<CR>`	►	Query MAC address
◄	`<CR><LF>00:30:F9:00:00:01<CR><LF>`		CIE-M10 MAC address
◄	`<CR><LF>OK<CR><LF>`		Command OK
	`ATV0<CR>`	►	Result code into numbers
◄	`<CR><LF>0<CR><LF>`		Command OK
	`ATQ1<CR>`	►	No result code
No Response from the CIE-M10			
	`ATZ<CR>`	►	Reset
◄	`<CR><LF>OK<CR><LF>`		Command OK

Table 9-5 Example of Basic AT Commands

9.2.5 Expanded AT Command Set

Command	Description	Comment
+PLIP	Local IP address	
+PSM	Subnet Mask	
+PGIP	Gateway IP address	
+PNIP	DNS Server IP address	
+PLP	Local Port	
+PRIP	Remote IP(IP)	
+PRHN	Remote host name	After getting the IP address from the name server, it saves the IP address "+PRIP" Cannot write it to flash memory with "+PWP"
+PRP	Peer Port	
+PTO	Timeout	
+PARP	Obtain IP address in the first received packet	ON: 1, OFF: 0
+PDC	Enabling DHCP	ON: 1, OFF: 0
+PPE	Enabling PPPoE	ON: 1, OFF: 0
+PPID	PPPoE ID	Maximum 32 bytes
+PPPW	PPPoE Password	Maximum 8 bytes
+PAN	Enabling "Obtain DNS IP	ON: 1, OFF: 0

	Address Automatically" option	
+PSC	To change Serial Configuration Mode	
+PWP	Write parameters to flash memory	All parameters save in SRAM so user has to use this command to save those in flash memory

Table 9-6 Extended AT Commands

9.2.6 Example Of The Extended AT Commands

	Data		Description
	AT+PLIP=192.168.1.200<CR>	▶	Setting Local IP Address
◀	<CR><LF>OK<CR><LF>		Command OK
	AT+PGIP=192.168.1.254<CR>	▶	Setting Gateway IP Address
◀	<CR><LF>OK<CR><LF>		Command OK
	AT+PSM=255.255.255.0<CR>	▶	Setting Subnet Mask
◀	<CR><LF>OK<CR><LF>		Command OK
	AT+PNIP=192.168.1.254<CR>	▶	Setting DNS IP address
◀	<CR><LF>OK<CR><LF>		Command OK
	AT+PLP=1470<CR>	▶	Setting Local Port
◀	<CR><LF>OK<CR><LF>		Command OK
	AT+PTO=10<CR>	▶	Setting Timeout
◀	<CR><LF>OK<CR><LF>		Command OK
	AT+PWP<CR>	▶	Write the parameters in the flash memory
◀	<CR><LF>OK<CR><LF>		Command OK
◀	<CR><LF>NO CARRIER<CR><LF>		System rebooted

Table 9-7 Example of the Extended AT Command

9.3 On-line State and Command State

The ezTCP can operate in either Command State or On-line State.

● Command State

The ezTCP is Command State right after power on. Incoming serial data is treated as AT command

● On-line State

When TCP connection is established, it automatically changes to On-line State.

All incoming serial data is sent to the remote host.

In On-line State, user cannot use AT commands. In order to use AT commands during TCP connection, user must change to Command State.

Command State	When TCP connection is not established, AT commands may be used.
On-line State	During TCP connection, all of the data are converted to TCP/IP format.

Table 9-8 State in the ATC Mode

9.3.1 Changing to Command State from On-line State

In order to change to Command State from On-line State, Escape Code (default: '+') must be sent 3 times according to the below sequence.

Communication Data1	Guard Time	+++	Guard Time	Communication Data2
	Over 500ms	Interval between '+': 0~500ms	Over 500ms	

Table 9-9 Escape Timing

The following is an example.

	Data		Description
	Data Communication (TCP Connected)		On-line state
	[Guard Time]+++[Guard Time]	▶	Trying to Change to Command state
◀	<CR><LF>OK<CR><LF>		Changing completed

Table 9-10 Example of State Changing

The escape characters (+++) are transmitted to the connected host.

9.3.2 Changing to On-line State from Command State

When the CIE-M10 is in Command State during TCP connection, user can change the state to On-line State by an 'ATO' command.

9.4 TCP Connection

9.4.1 Active Connection – Client

The following shows an example to connect a remote host as a client.

	Data		Description
	AT+PRHN="www.eztcp.com"<CR> or AT+PRIP=192.168.1.201<CR>	▶	Setting host name or IP address to connect
◀	<CR><LF>OK<CR><LF>		Command OK
	AT+PRP=1470<CR>	▶	Setting port number to connect
◀	<CR><LF>OK<CR><LF>		Command OK
	ATD<CR>	▶	Active connection command
Trying to make a TCP connection			
◀	<CR><LF>CONNECT<CR><LF>		TCP connection is established
Data communication			

Table 9-11 Example of Active Connection

☞ **The local port number is updated randomly when it receives ATD command for an active connection.**

9.4.2 Passive Connection – Server

The following shows an example to accept a TCP connection from a remote host.

	Data		Description
	AT+PLP=1470<CR>	▶	Setting Local Port
◀	<CR><LF>OK<CR><LF>		Command OK
	ATA<CR>	▶	Passive connection command
Waiting for a TCP connection from foreign host			
A Foreign host makes a TCP connection to the CIE-M10			
◀	<CR><LF>CONNECT<CR><LF>		TCP connection is established
Data Communication			

Table 9-12 TCP Example of Passive Connection

9.5 TCP Disconnection

9.5.1 Active Disconnection

	Data		Description
			Data Communication (TCP connected)
	[Guard Time]+++[Guard Time]	▶	Changing to Command mode
◀	<CR><LF>OK<CR><LF>		Changed to Command mode
	ATH<CR>	▶	Disconnecting the TCP connection
◀	<CR><LF>OK<CR><LF>		TCP connection is disconnected

Table 9-13 TCP Example of Active Disconnection

9.5.2 Passive Disconnection

The foreign host tries to disconnect the connection.

	Data		Description
			Data Communication (TCP connected)
			Foreign host tries to disconnect the connection
◀	<CR><LF>NO CARRIER<CR><LF>		TCP Disconnected

Table 9-14 Example of Passive Disconnection

10 Additional Functions

10.1   Security Function

10.1.1 Password

User can set a password to the CIE-M10 with the [Set Password] button in the ezManager.

Once a password is set to the CIE-M10 user should input it when he configures it with the ezManager. And user needs the password when he logs in with telnet and accesses it with web browser.

10.1.2 Access Control with MAC Address

User can restrict hosts with MAC address. If [Allowed MAC Address] in the Option tab, the only host which has the MAC address can access to the CIE-M10.

10.1.3 Access Control with IP Address

If [Allowed IP Range] is set in the Option tab, the hosts whose IP address is in the range can access the CIE-M10. The [Allowed IP Range] is defined by doing bitwise AND between IP address and the [Network Mask]. The followings are examples.

IP Address	Net Mask	Hosts can access to the CIE-M10
10.1.0.1	255.0.0.0	10.1.0.1 ~ 10.255.255.254
10.1.0.1	255.255.255.0	10.1.0.1 ~ 10.1.0.254
192.168.1.4	255.255.255.255	192.168.1.4

Table 10-1 Example of IP address range

10.1.4 Access Control from ezManager

If this option isn't set, ezManager in any host can read the parameters even though the [Allowed MAC Address] or the [Allowed IP Range] is set. If the [Apply To ezManager] is set, the above two options ([Allowed MAC Address and Allowed IP Range]) are adapted to the ezManager.

10.1.5 Disabling Security Functions

When user can't access to the CIE-M10 because of the security functions, user can solve the problem if user run it as ISP mode or Serial Configuration Mode. All security functions are disabled in those modes.

10.2   Managing TCP Sessions

User can disconnect TCP sessions with ezManager.

10.2.1 How To Disconnect TCP Sessions

User can manage TCP sessions in the [Status] menu of the ezManaser.
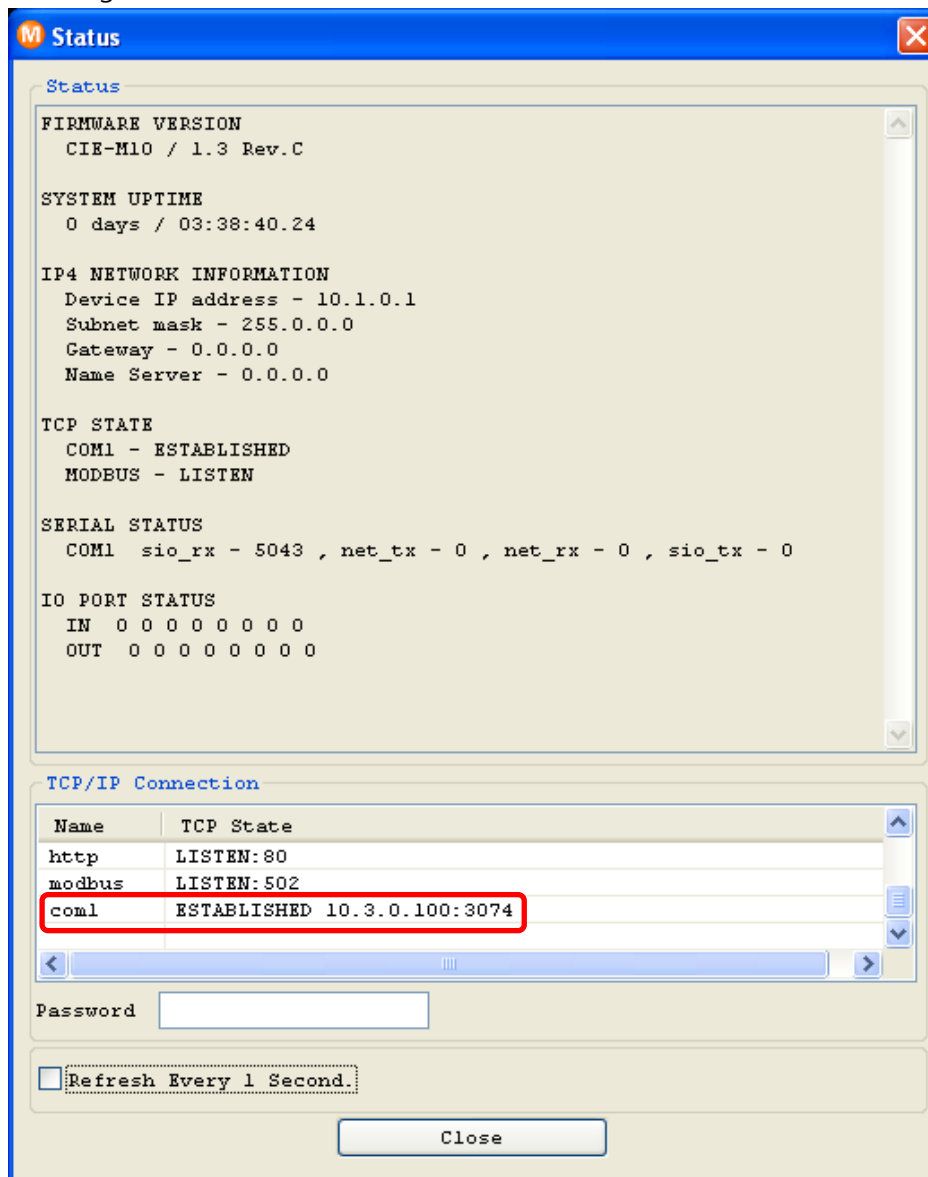
- Checking TCP sessions

Figure 10-1 Checking CP Sessions

- Click right button of mouse on the session to disconnect and press [Close this TCP Connection]. If a password is set in the CIE-M10, user should input the password.
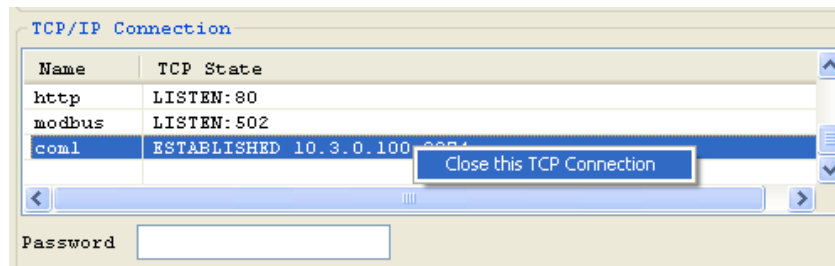
Figure 10-2 Disconnecting a TCP session

● The following table shows each session name.

Session Name	Description
tty	telnet, managing the CIE-M10 through a TCP session
http	web, monitoring and controlling through the web browsers
modbus	Modbus/TCP
com1	TCP session to convert from/to serial port to/from ethernet
iptrap	IP address notification / DDNS

Table 10-2 TCP Session Names

10.3　　IP Address Notification Function

When the CIE-M10 uses IP which is allocated dynamically, it is very hard for user to connect to it. This function is to notify its IP address to a server in order to user can connect to it. CIE-M10 supplies 3 methods for this function – DDNS, TCP, and UDP.

☞ *Please refer to application note about this function in our web site.*

10.4　　Telnet Function

User can login the CIE-M10 and check some information.

10.4.1 Commands For Telnet Console

● Checking network status
User can check network status with a "st net" command.

```
lsh>st net
proto    local address            peer address       sendq    state
-----  ----------------------  ----------------------  -----  -----------
TCP         10.1.0.1(    23)    10.3.0.100( 3082)      122 ESTABLISHED
TCP         10.1.0.1(    80)      0.0.0.0(    0)         0 LISTEN
TCP         10.1.0.1(    80)      0.0.0.0(    0)         0 LISTEN
TCP         10.1.0.1(    80)      0.0.0.0(    0)         0 LISTEN
TCP         10.1.0.1(    80)      0.0.0.0(    0)         0 LISTEN
TCP         10.1.0.1(   502)      0.0.0.0(    0)         0 LISTEN
TCP         10.1.0.1(  1470)      0.0.0.0(    0)         0 LISTEN
lsh>_
```

Figure 10-3 Checking the network status

- Checking serial port status

  User can check serial status with a "st sio" command. The "rx_count" is the total size that CIE-M10 receives from its serial port and the "tx_count" is the total size that CIE-M10 transmitted to its serial port.

```
lsh>st sio
port fmax rbmax rxbuf txbuf  rx_count   tx_count
---- ---- ----- ----- -----  --------   --------
com1   1    1     0     0        1          0
lsh>
```

Figure 10-4 Checking the serial port status

- Total Running Time

  User can check the total running time with a "st uptime" command.

```
lsh>st uptime
00:04:56.01 up 0 days
lsh>
```

Figure 10-5 Checking the total running time

11   Technical Support/Warranty /Precautions

11.1   Technical Support

If there are any questions regarding the product, please use FAQ or Q/A board in Sollae Systems' homepage. Also, feel free to contact us by email.

Customer support homepage address: http://www.eztcp.com/en/Support/support.php

Email address: support@sollae.co.kr

11.2   Warranty

11.2.1 Refund

If user demands refund within 2 weeks of purchase, the product will be refunded

11.2.2 Free A/S

If product malfunctions within 1 year of purchase, repair and product exchange will be done without charge.

11.2.3 Charged A/S

Products after 1 year of purchase or product malfunctions due to user's miss care will be repaired and exchanged with charge.

11.3   Precautions

● If the product is modified, it is no longer guaranteed.

● Specifications of the product may be changed without prior notice for performance improvement.

● If the product is used for functions that are not covered by the product, the product is no longer guaranteed as well.

● All kind of Reverse Engineering is prohibited.

● It prohibits the use of firmware and provided applications for other purpose.

● Do not use the product in extreme temperature or vibration conditions.

● Do not use the product in highly humid and oily environment.

● Do not use the product in combustible or corrosive gas environment.

● The product functions are not guaranteed in environments with too much noise.

● Do not use this product for special cases requiring high quality and reliability such as space - 56 -raveling, airplane, medicine, nuclear power, transportation, and other safety devices.

- If accidents or loss may occur using this product, Sollae Systems will not be liable for any compensation.

12 Modification History Of This Document

Date	Version	Description
2009.06.24.	1.0	Initial Release
2009.07.01	1.1	Add a notification about being removed JP2