Serial-Ethernet Module

CSE-M73G User Manual

Version 1.1

Sollae Systems Co., Ltd.

https://www.ezTCP.com

This symbol, found on your product or on its packaging, indicates that this product should not be treated as household waste when you wish to dispose of it. Instead, it should be handed over to an applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of this product. The recycling of materials will help to conserve natural resources. For more detailed information about the recycling of this product, please contact your local city office, household waste disposal service or the retail store where you purchased this product.

Contents

1 Overview

1.1 Overview

CSE-M73G lets the serial devices connect to the Internet. To communicate on the Internet, devices should use TCP/IP protocol, so CSE-M73G processes the converting serial data to TCP/IP.

CSE-M73G supports RS232, RS422, RS485 and 3.3V. The interfaces including the RJ45 connecter let users apply this module to their system easily.

1.2 Main Features

- Serial to Ethernet Module
- Pin-compatible design with CSE-M73 and CSE-M73A
- RJ45 connector embedded
- Multiple connection for multi-monitoring
- IPv4 / IPv6 dual-stack
- 1 x UART, available on RS232/RS422/RS485 extension
- Industrial temperature range (-40℃ ~ +85℃)
- Security options (SSL/TLS, IP filtering, Password)
- Separator settings for packet fragmentation

☞ *CSE-M73G is basically designed to be pin to pin compatible with CSE-M73 and CSE-M73A, but there are differences according to MCU characteristics. Therefore, be sure to run a compatibility test first when using the CSE-M73G as a replacement.*

1.3 Application Examples

- 1:1 Connection with a PC

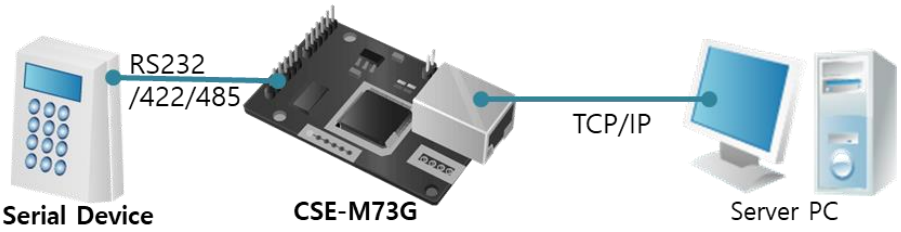


Figure 1-1 1:1 connection with a PC

- Applied to LANs

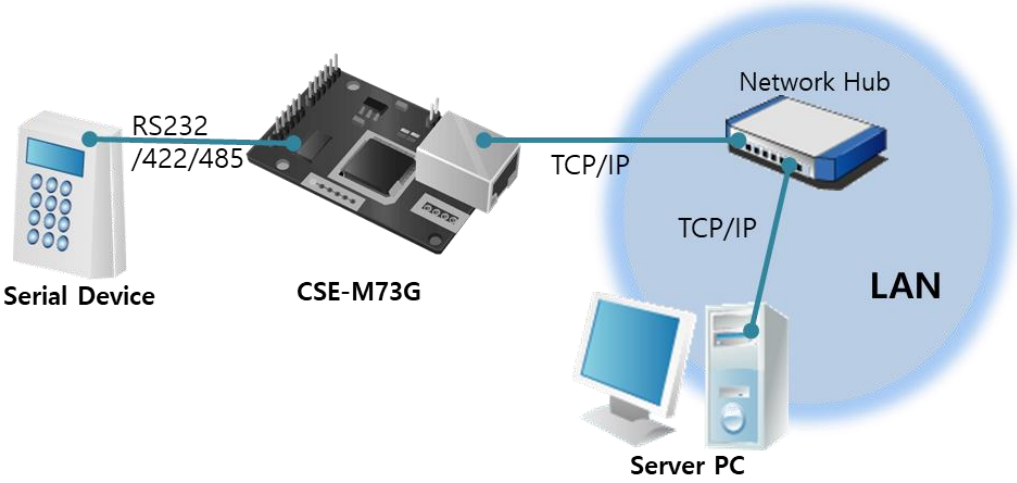


Figure 1-2 applied to LANs

- Applied to the Internet on Cable Networks

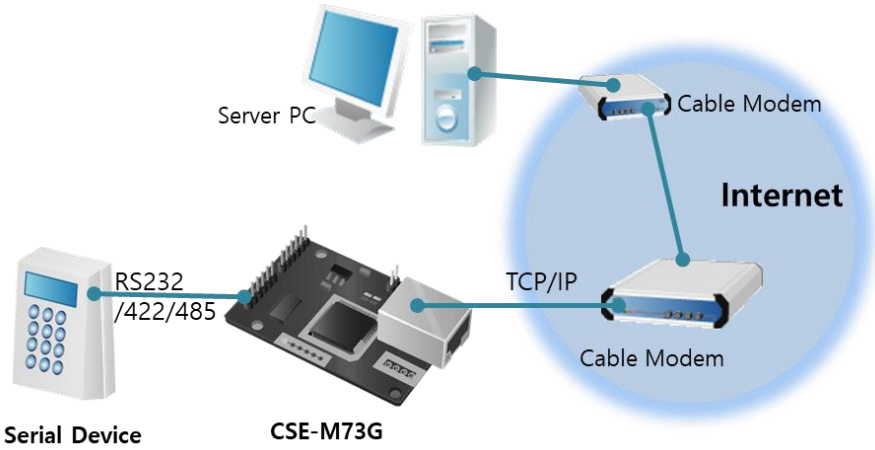


Figure 1-3 applied to the Internet on cable networks

- Applied to the Internet with an IP Share Router

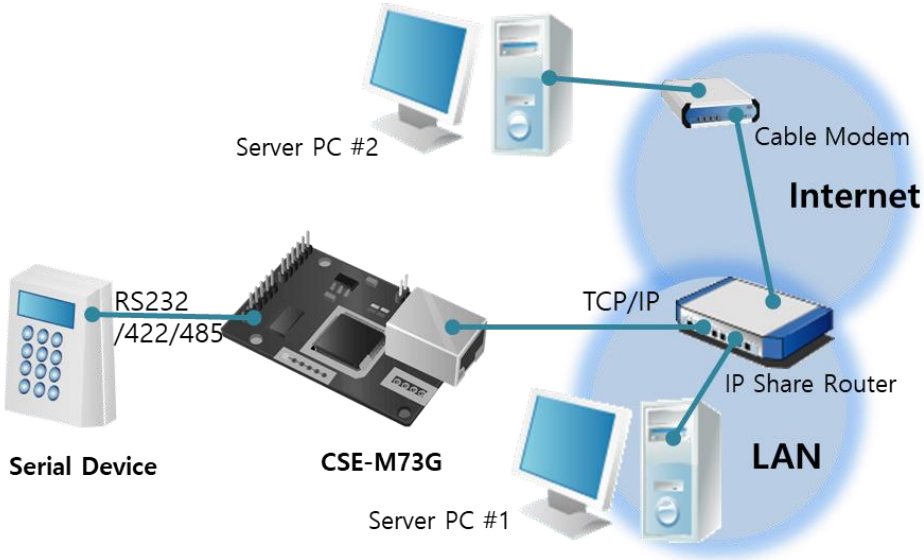


Figure 1-4 applied to the Internet with an IP share router

- An Example for Multiple Monitoring System

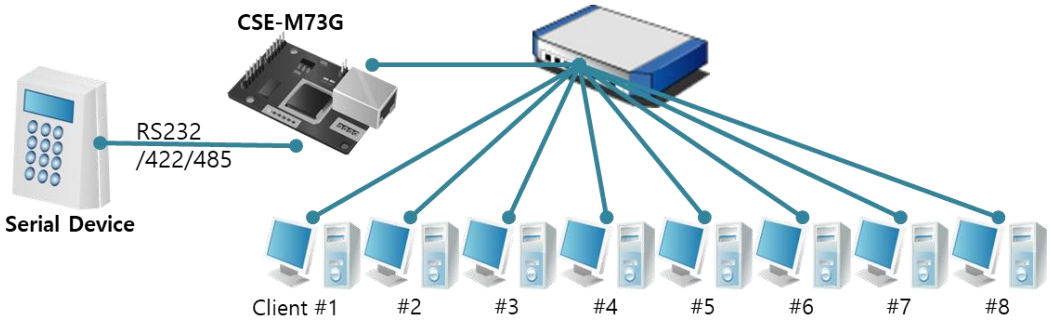


Figure 1-5 an example for multiple monitoring system

1.4 Specification

1.4.1 Hardware

Power	Input Voltage	DC 5V (±10%)
	Current	approximately 95mA (typical condition)
Dimension	64.3mm x 40mm x 17mm	
Weight	approximately 17g	
Serial Port	Serial	single serial port - RS232, RS422, RS485 or 3.3V (5V tolerant input) - 300bps ~ 230,400bps
	Network	Ethernet 10Base-T or 100Base-TX (Auto-Sensing) Auto MDI / MDIX cable auto-sense
Temperature	Operating/Storage : -40 ~ 85℃	
RoHS	RoHS Compliant	

Table 1-1 Hardware

1.4.2 Software

Protocol	TCP, UDP, IPv4/IPv6 dual stack, ICMPv6/TCPv6/UDPv6, ICMP, ARP, DHCP, PPPoE, DNS, DDNS(Dynamic DNS), Telnet, SSL, Telnet COM Port Control Option (RFC 2217)	
Operation mode	Normal	For Normal Data Communication
	ISP	For Upgrading F/W
	Serial Configuration	For Configuration via Serial
Communication mode	TCP Server	TCP Passive Connection
	TCP Client	TCP Active Connection
	AT Command	TCP Passive / Active Connection
	UDP	UDP – No Connection
Major Utilities	ezManager	Configuration Utility for MS Windows (Supports Downloading F/W)
	ezVSP	Serial to TCP/IP Virtual driver for MS Windows

Table 1-2 Software

1.5 Dimension

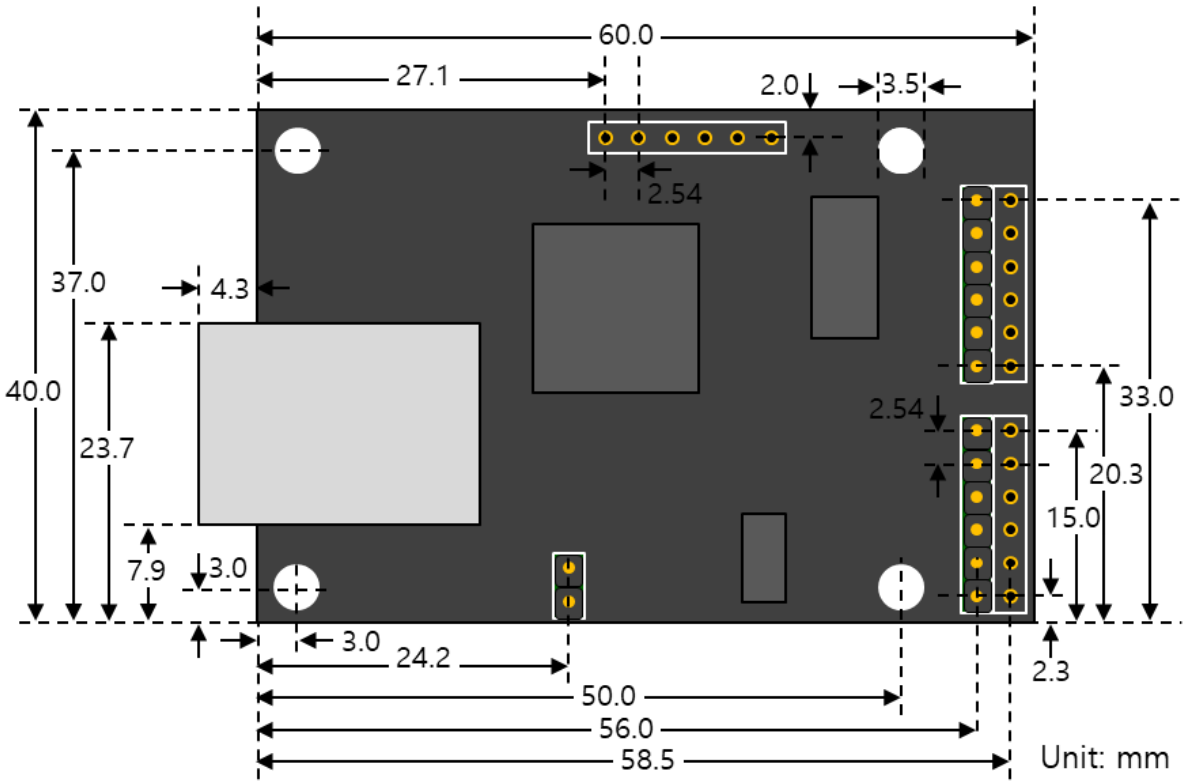


Figure 1-6 Dimension

☞ *The dimensions may have slight errors depending on the product condition.*

1.6 Interfaces

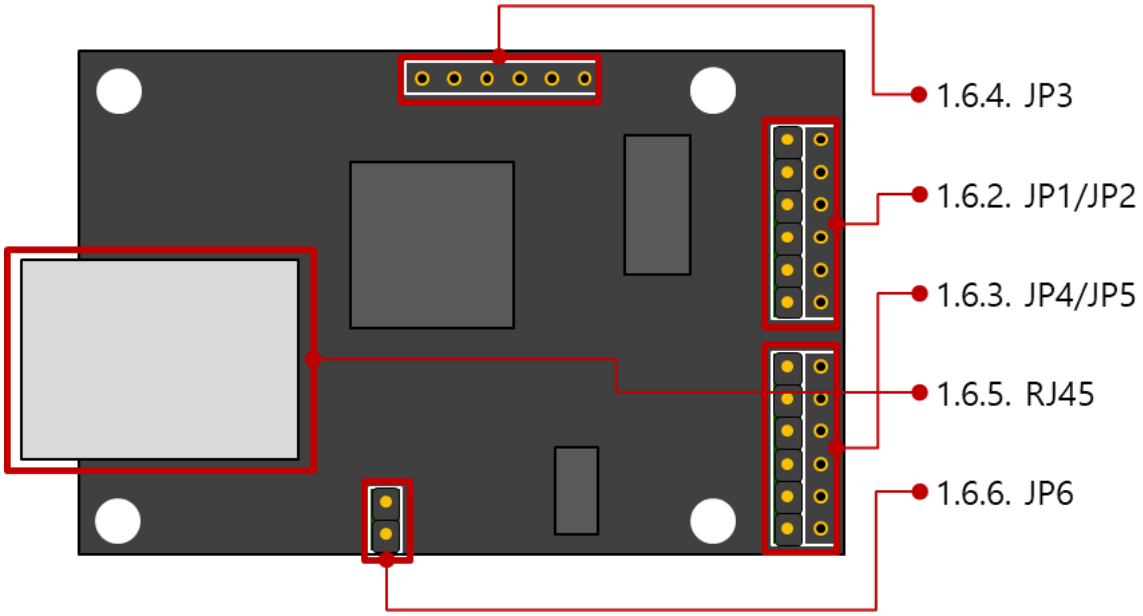


Figure 1-7 Interface

1.6.1 Serial Port Parameters

Parameter	Value
Number	1
Type	RS232, RS422, RS485 or 3.3V (5V tolerant input)
Baud rate	300 ~ 230,400 bps
Parity	NONE / EVEN / ODD / MARK / SPACE
Data bit	8 / 7
Stop bit	1 / 2
Flow control	NONE, RTS/CTS, Xon/Xoff

Table 1-3 Serial Port Parameters

☞ *7 data bits with NONE parity is not supported.*

☞ *Single idle bit is automatically added after every stop bit by the MCU function.*

1.6.2 JP1 / JP2: RS232

CSE-M73G has an RS232 port for serial device (300bps ~ 230,400bps). This port is interfaced with JP1 and JP2. It supports RTS/CTS hardware flow control and pins which have the same number of JP1 and JP2 are connected each other.

Number	Name	Description	Level	I/O	Etc.
1	VCC	DC 5V Power	-	-	required
2	RXD	Receive Data	RS232	IN	required
3	TXD	Transmit Data	RS232	OUT	required
4	GND	Ground	-	-	required
5	RTS	Request To Send	RS232	OUT	optional
6	CTS	Clear To Send	RS232	IN	optional

Table 1-4 pin assignment of the RS232 port

1.6.3 JP4 / JP5: RS422 and RS485

CSE-M73G has a port for RS422 or RS485. This port is interfaced with JP4 and JP5. The pins which have the same number of JP4 and JP5 are connected each other.

Number	Name	Description	Level	I/O	Etc.
1	VCC	DC 5V Power	-	-	required
2	TRX+	(RS422) Transmit Data +	RS422	OUT	required
		(RS485) Data +	RS485	I/O	required
3	TRX-	(RS422) Transmit Data -	RS422	OUT	required
		(RS485) Data -	RS485	I/O	required
4	GND	Ground	-	-	required
5	RX+	(RS422) Receive Data +	RS422	IN	required
6	RX-	(RS422) Receive Data -	RS422	IN	required

Table 1-5 pin assignment of the RS422/485 port

☞ *Note: CSE-M73G does not have terminal resistors.*

1.6.4 JP3: 3.3V UART

Number	Name	Description	Level	I/O	Etc.
1	VCC	DC 5V Power	-	-	required
2	RXD	Receive Data	3.3V	IN	required
3	TXD	Transmit Data	3.3V	OUT	required
4	GND	Ground	-	-	required
5	RTS	Request To Send	3.3V	OUT	optional
6	CTS	Clear To Send	3.3V	IN	optional

Table 1-6 pin assignment of the 3.3V UART port

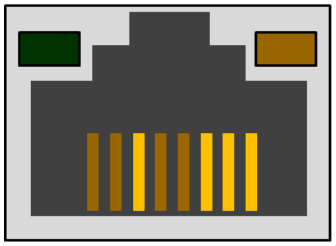
The electrical characteristics of JP3 are as follows:

Symbol	Description	Condition	Min	Max	Unit
V_{IH}	High-level input voltage	V_{DD}=2.6V, at 25℃	1.5	5.5	V
V_{IL}	Low-level input voltage		-0.3	0.9	V
V_{OH}	High-level output voltage		2.3	-	V
V_{OL}	Low-level output voltage		-	0.2	V

Table 1-7 I/O ports static characteristics

1.6.5 RJ45: Ethernet

The Ethernet port of CSE-M73G is support 10M/100Mbps and users can use both 1:1 cable and crossover cable. There is a built in RJ45 connector for interfacing Ethernet and its specifications are as follows:



#1 : Tx + (Out)
#2 : Tx – (Out)
#3 : Rx + (In)
#6 : Rx – (In)

Figure 1-8 Ethernet interface

1.6.6 JP6: ISP Jumper

You can change the operation mode of CSE-M73G to ISP or Serial Configuration mode by using this jumper.

1.6.7 Power

Input voltage is DC 5V for CSE-M73G. To supply power, all VCC and GND pins on JP1 ~ JP5 are available.

1.6.8 System LED

- RJ45

There are 2 LEDs in the RJ-45 connector. Each lamp shows the following status:

Mode	Color	Status	Description
Normal	Yellow	Blinks in every second	Obtaining an IP address
		Blinks 4 times at once	Without obtaining an IP address under DHCP or PPPoE network
		ON	On TCP connection
		Blinks shortly	Sending data to TCP
	Green	ON	Connecting with Ethernet
		OFF	Before connecting with Ethernet
		Blinks shortly	Receiving data from TCP
ISP	Both	OFF	In the ISP mode
Serial Configuration	Both	Blinks simultaneously	In the Serial Configuration mode

Table 1-8 Status of the system LED

- Power LED

Mode	Color	Status	Description
Common	Red	ON	Supplying the Power

Table 1-9 Power LED

2 Installation and Test

2.1 Installation

Before testing the CSE-M73G, you should connect both serial and Ethernet port to your PC. Please connect the Ethernet port to your PC directly or through a switching hub.

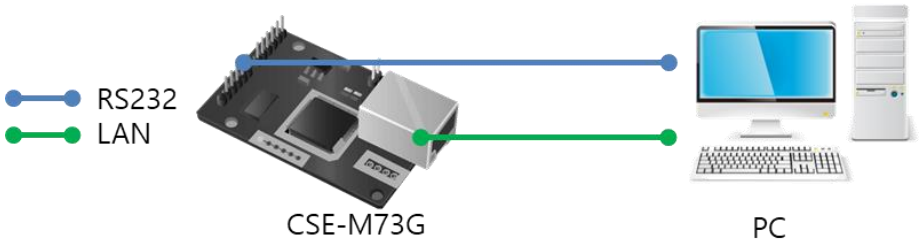


Figure 2-1 connection between M73G and a PC

2.1.1 Setting Network Aera

This step is for setting both CSE-M73G and users' PC to be located the same network. If only they are, the TCP connection between them can be established.

- Setting of the PC

  Set the IP address to the Ethernet adapter of the PC connected to the product as follows.

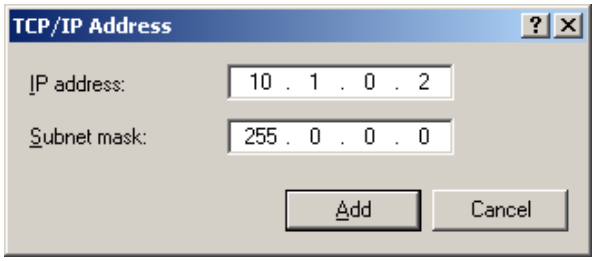


Figure 2-2 Setting IP address of the PC

- Setting of CSE-M73G

  CSE-M73G uses ezManager as it's a configuration program. The Simple Test is performed with the environmental variables of CSE-M73G set to their default values. The main environmental variables and their default values of CSE-M73G are as follows:

Name		Default Values
Network	Local IP Address	10.1.0.1
	Subnet Mask	255.0.0.0
Option	TELNET	Checked
	IP Address Search	Checked
Serial Port (COM1)	Serial Type	RS232
	Baud Rate	19,200bps
	Parity	NONE
	Data Bits	8
	Stop Bit	1
	Flow Control	NONE
	Communication mode	TCP Server
	Local Port	1470

Table 2-1 Default values of major parameters

2.2 Simple Test

If you press the [Simple Test] button, test program will be shown on your screen.

- Connecting to the CSE-M73G via LAN

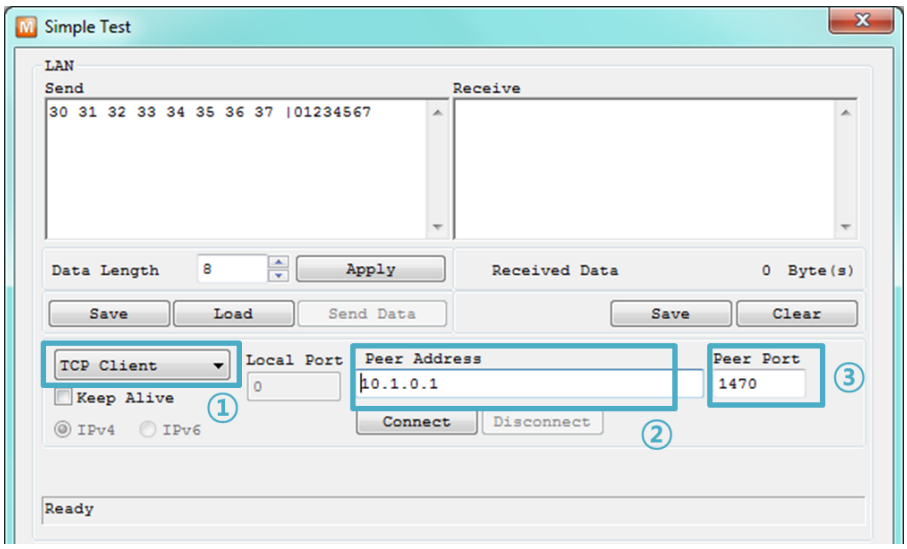


Figure 2-3 settings for TCP connection

① Select [TCP Client]

② Input correct IP address and port number of CSE-M73G

③ Clink the [Connect] button. (In case of TCP Server, it will be [Listen] button)

- Opening RS232 Port

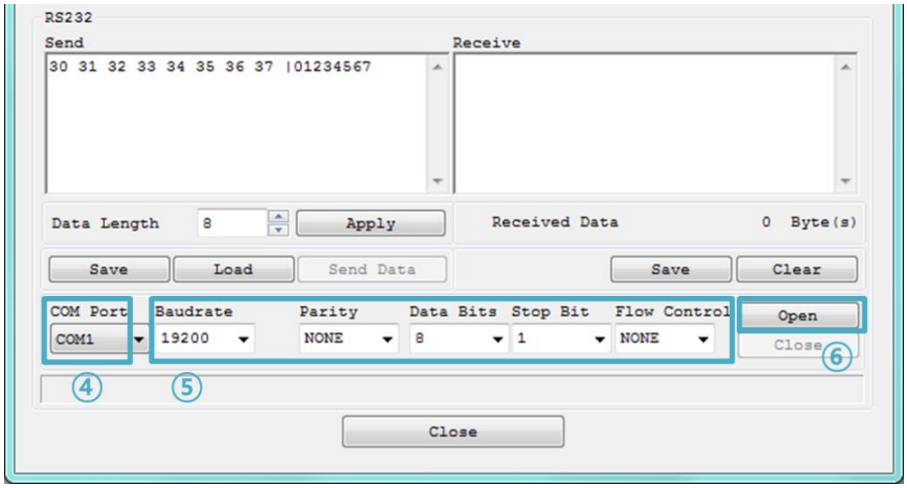


Figure 2-4 opening COM Port

④ Select COM port which the CSE-M73G is connected to

⑤ Make sure that all the parameters are the same with M73G

⑥ Press the [Open] button

- Confirm the TCP Connection and COM port status

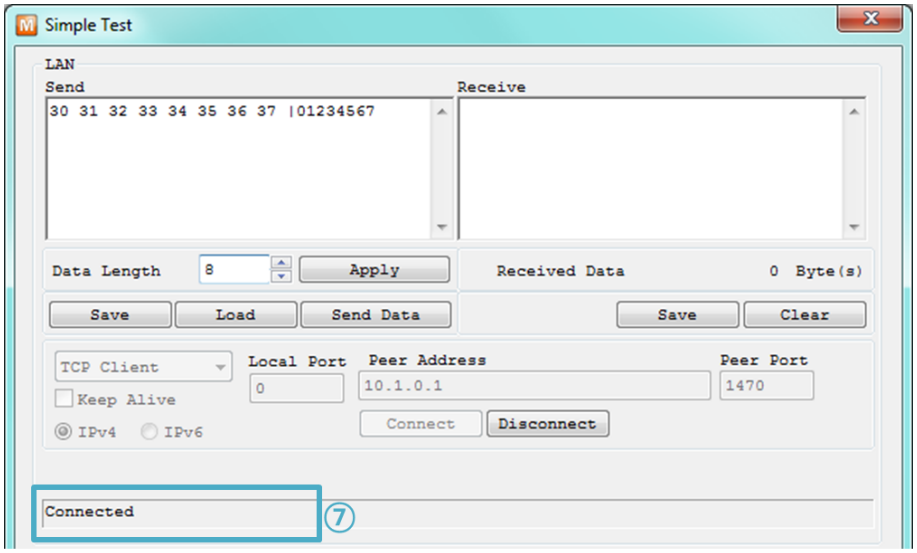


Figure 2-5 TCP Connected message

⑦ Check the message if the TCP connection is established

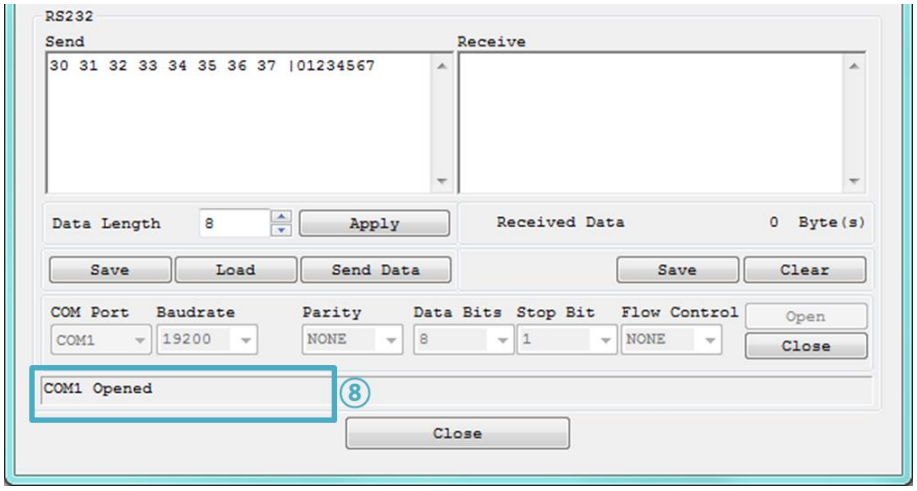


Figure 2-6 COM Port open message

⑧ Check the message if the COM port has been opened

- Data transmission test

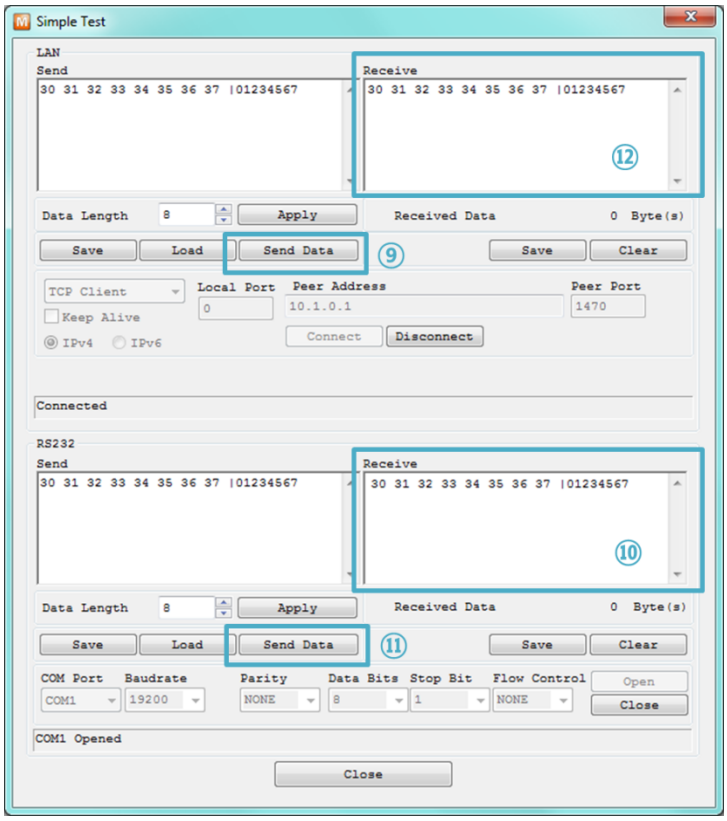


Figure 2-7 successful data transmission

⑨ Click the [Send data] on the LAN part

⑩ Check the data have been shown from the step ⑨

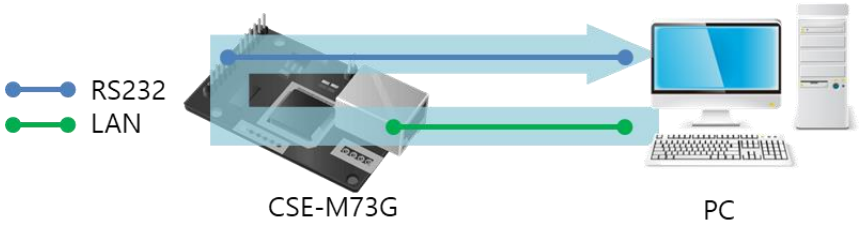


Figure 2-8 LAN → RS232

⑪ Press the [Send data] on the RS232 part

⑫ Check the data have been received from the step ⑪

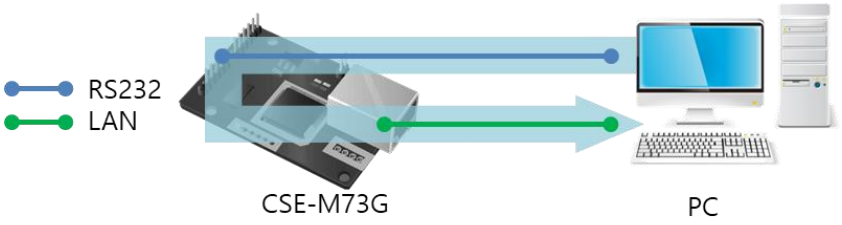


Figure 2-9 RS232 → LAN

3 Configuration

3.1 Configuration with ezManager

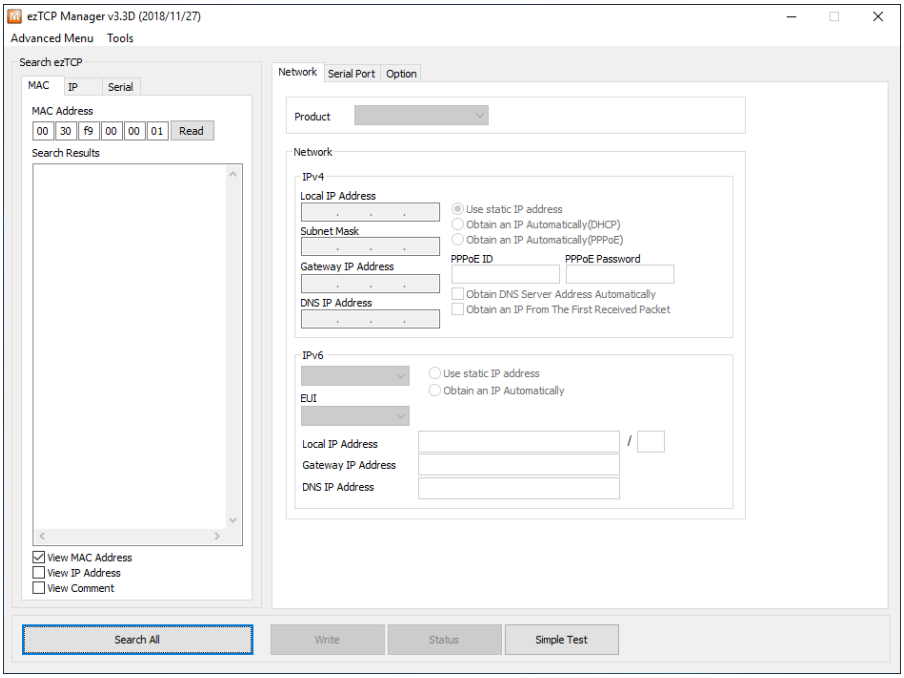


Figure 3-1 initial appearance of ezManager

3.1.1 Configuration via LAN

- Checklists

  Make sure the connection between your product and PC. If they are the same network, [MAC Address search] button can be used. If they aren't, only [IP Address search] is allowed to use.

- Procedures

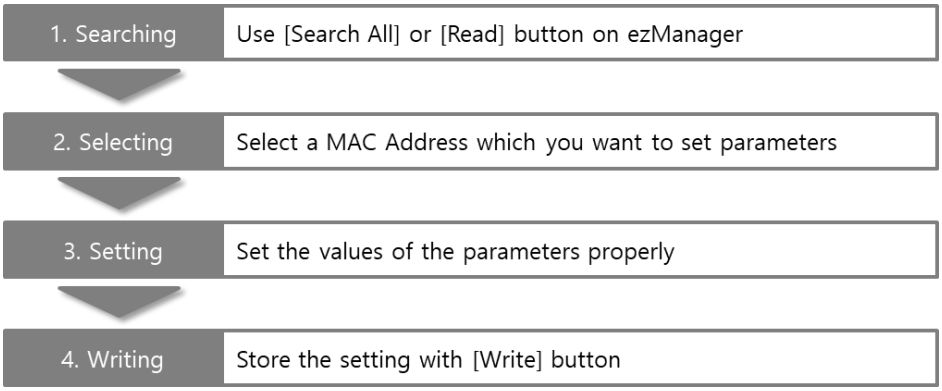


Figure 3-2 procedures for configuration via LAN

3.1.2 Configuration via Serial

- Checklists

  Make sure the connection between your PC and CSE-M73G using RS232 cross cable. To use this, CSE-M73G has to be operating in the [Serial Configuration] mode. By connecting the ISP jumper less than 1 second, you can enter the mode. After then, read the setting via [Serial] tab on ezManager.

- Procedures

1. Mode Switching	Change the mode to [Serial Configuration]
2. Reading	Read environmental parameters with [Read] button
3. Setting	Set the values of the parameters properly
4. Writing	Store the setting with [Write] button

Figure 3-3 procedures for configuration via Serial

- Step 2, Reading

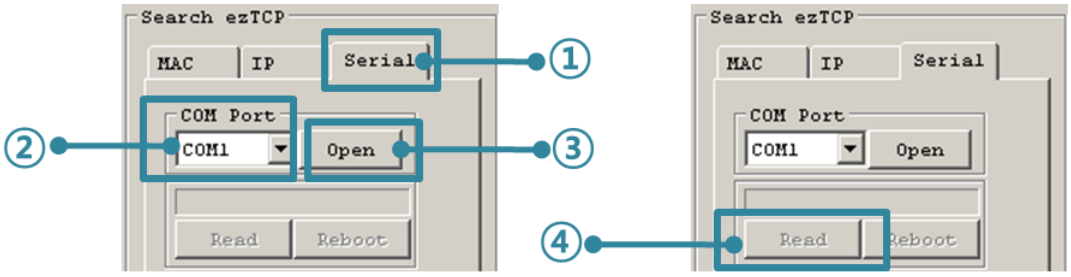


Figure 3-4 reading procedure via serial

① Choose the [Serial] tab

② Select the COM port which the M73G is connected with

③ Open the COM port with the [Open] button

④ Load the setting with [Read] button

3.2 AT command

In the AT command mode, you can change some parameters through the serial port.

- Checklists

  Make sure the connection between your PC and CSE-M73G using RS232 cross cable. To use this, CSE-M73G has to be set to [AT command] mode as its communication mode. This can be configured by ezManager.

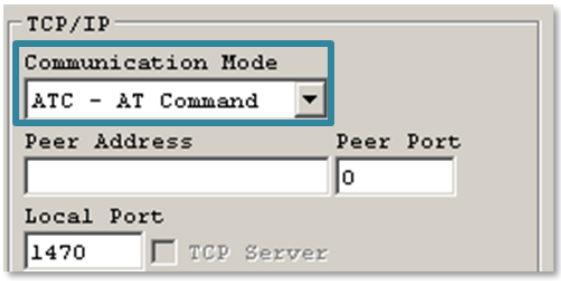


Figure 3-5 setting the communication mode to the AT command

- Procedures

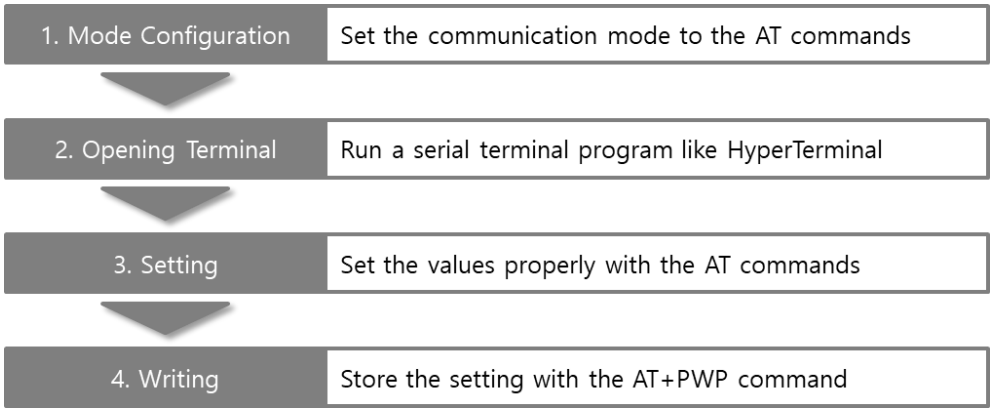


Figure 3-6 procedures for configuration with AT command

Division	Available parameters
IP Address related items	Local IP Address, DHCP, PPPoE, Subnet Mask, Gateway IP Address, DNS IP Address, ···
TCP connection related items	Local Port, Peer Address (IP Address or Host name), Peer Port, ···
Option	ESC code sending option, timeout, ···

Table 3-1 parameters which are available to change with AT command

☞ *Including above items, rest of parameters can be set by ezManager*

4 Operation Modes

4.1 What is the Operation Mode?

Each of three operation mode of CSE-M73G is defined for specific purpose, and those are followed.

- Normal mode
  This mode is for normal data communication and has 4 different connection modes. Configuring parameters is also available in this mode.
- Serial configuration mode
  This mode is for configuring environmental parameters through the RS232 port.
- ISP mode
  This mode is for upgrading firmware. In addition, you can set environmental parameters even though the security options like password are activated by entering this mode.

4.2 How to enter each mode

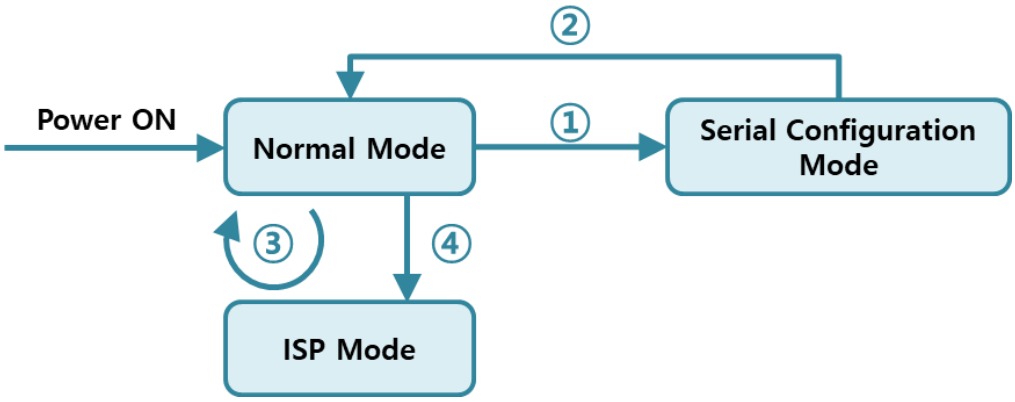


Figure 4-1 How to enter each mode

① Disconnect within 1 second after connecting the JP6 jumper
② Reset or “g 0” command
③ Transfer a firmware by ezManager
④ Put the ISP# pin into GND more than 1 second.

4.3 Comparison of each mode

Table 4-1 shows summaries of each mode

Name	Entering	Serial port
Normal	Supply the power.	Configured value
Serial Configuration	Connect the JP6 shortly between 10ms and 1s.	115200/N/8/1
ISP	Supply the power with connecting the JP6 or connect the JP6 over 1 sec, in other modes.	115200/N/8/1

Table 4-1 comparison of each mode

4.4 Normal Mode

In normal mode, there are four connection types to communication with a remote host.

- TCP Server
- TCP Client
- AT Command
- UDP

Name	Protocol	Connection	Modifying software of serial devices	Serial configuration	Topology
TCP Server	TCP	Passive	-	Unavailable	1:1
TCP Client		Active	-	Unavailable	1:1
AT Command		Either	Required	Available	1:1
UDP	UDP	-	-	Unavailable	N:M

Table 4-2 comparison of four communication modes

TCP is a type of protocol, which has a process of connection. The connection has to be one to one. The part who tries to make the connection is called TCP Client, and the other part is TCP Server. On the other hand, UDP has no connection process. Because of this, each of them can be send and receive data from multiple hosts.

4.5 Serial Configuration Mode

This is a mode for setting environmental parameters through RS232 port. If you can't use the Ethernet, this mode is only way to configure the values. Once entering this mode, use the [Read] button on the [Serial] tab of ezManager.

4.6 ISP Mode

You can enter this mode by connecting the ISP jumper over 1 second. There are two special purposes in this mode.

4.6.1 Upgrading Firmware

ISP mode is for upgrading firmware which is offered by us. The upgrade is implemented on Ethernet.

☞ *The details are followed in the "6.1 Upgrading Firmware".*

4.6.2 Revoking Serurity Options

CSE-M73G offers restriction methods for security like filtering password or MAC and IP address. In the ISP mode, you can revoke all of these. When you forgot the password, enter the ISP mode to solve the problem.

5 Communication Modes

5.1 TCP Server

In this mode, CSE-M73G functions as a TCP server. You can use this mode when the remote host is a TCP client. CSE-M73G listens to a TCP connection from remote host. Once a host tries to connect to CSE-M73G and the module responses that request. After the connection is established, CSE-M73G converts the raw data from the serial port to TCP/IP data and sends them to the network and vice versa.

5.1.1 Required parameters

- Local Port

  This is a server's port number which is used in the TCP connection.

5.1.2 Optional parameters

- Event Byte

  With setting event bytes, users can handle the serial data before a TCP connection is established.

Value	Description
0	CSE-M73G doesn't send the data
Otherwise	CSE-M73G sends the data right after a connection is established. 512 or under bytes are strongly recommended.

Table 5-1 Event Byte

- Timeout

  If there is no transmission of data for amount of time which is set to this parameter, CSE-M73G tries to terminate established TCP connection.

- Notify IP Change

  This function is for notifying information about changed IP address to a server. Not only the TCP/UDP protocol but Dynamic Domain Name Service (DDNS) can be used.

- Restriction of Access

  Users can block TCP connections from unauthorized hosts by using this option. Both IP and MAC address are available.

5.1.3 Examples

- A situation that [Event Byte] is set to 0.

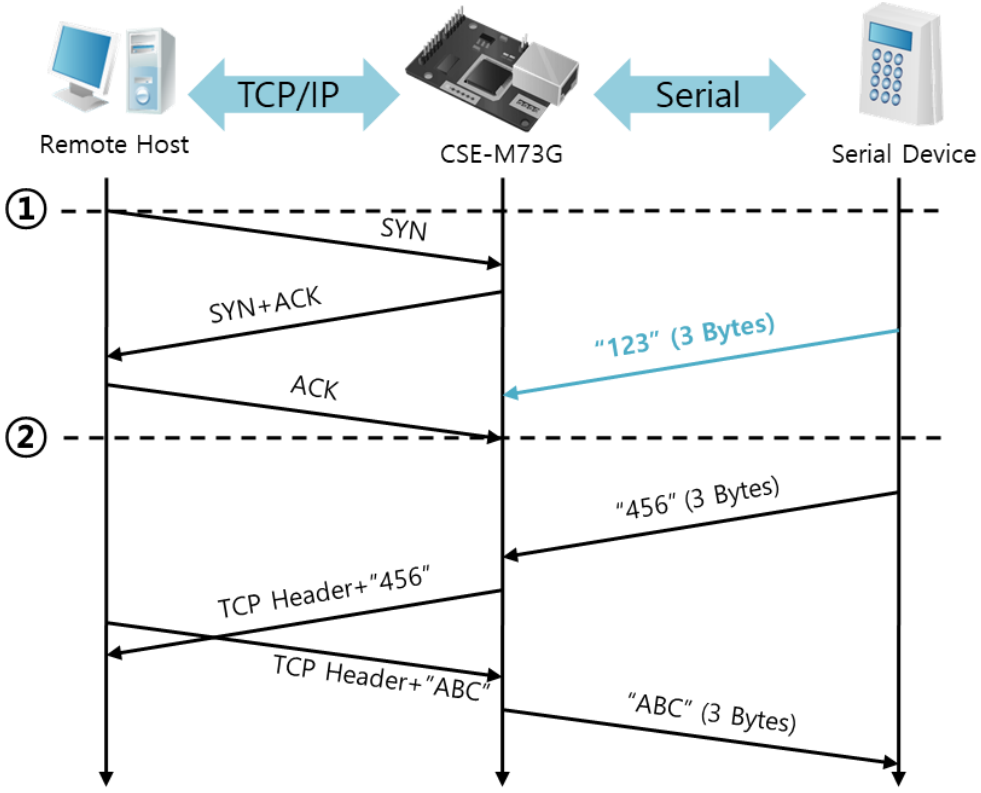


Figure 5-1 time chart for a situation that [Event Byte] is set to zero

Points	States
~	CSE-M73G is listening to connection requests
①	Remote host has sent a connection request (SYN) segment
~	Processes of the connection
②	The connection has been established
~	Data communication on both sides

Table 5-2 states of each point

Look at the blue arrow. The data “123” from the serial port had sent before the connection is established. In this case, the data wasn’t sent because of the [Event Byte] is set to 0

5.2 TCP Client

In this mode, CSE-M73G functions as a TCP client. You can use this mode when the remote host is a TCP server. CSE-M73G sends request segments to a remote host with [Peer Address] and [Peer Port]. Once a host is listening and works correctly, the connection will be established. After then, CSE-M73G converts the raw data from the serial port to TCP/IP data and sends them to the network and vice versa.

5.2.1 Required parameters

- Peer Address

  This item should be a domain name or an IP address of a remote host.

- Peer Port

  This item should be a port number of a remote host.

5.2.2 Optional paramters

- Event Byte

  CSE-M73G decides the time to send the connection request frame with this parameter.

Value	Description
0	CSE-M73G sends TCP connection request segment Right after it boots up
Otherwise	CSE-M73G sends the segment right after it received amount of data which is set to the [Event Byte] from the serial port 512 or under bytes are strongly recommended.

Table 5-3 the operation of Event Byte 1

In addition, users can handle the serial data before a TCP connection is established with this parameter.

Value	Description
0	CSE-M73G doesn't send the data
Otherwise	CSE-M73G sends the data right after a connection is established. 512 or under bytes are strongly recommended.

Table 5-4 the operation of Event Byte 2

- Timeout

  If there is no transmission of data for amount of time which is set to this parameter, CSE-M73G tries to terminate established TCP connection.

- TCP Server

  This check option enables the TCP server / client mode. In this mode, CSE-M73G can be operated as a TCP server or client without changing its setting.

- DNS IP Address

  [DNS IP Address] needs when you use host name instead of the IP address.

5.2.3 Examples

- A situation that [Event Byte] is set to 0.

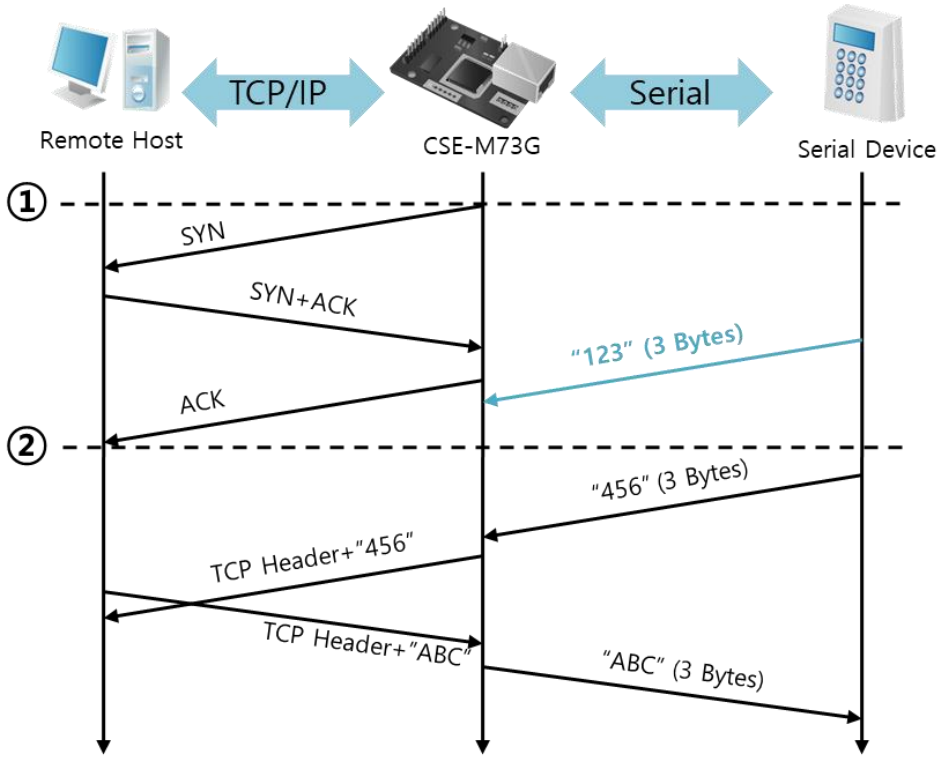


Figure 5-2 time chart for a situation that [Event Byte] is set to 0

Points	States
~	Before the power is supplied
①	Sends TCP connection request segment right after it boots up
~	Processes of the disconnection
②	The connection has been established
~	Data communication on both sides

Table 5-5 states of each point

Look at the blue arrow. The data “123” from the serial port had sent before the connection is established. In this case, the data wasn’t sent because of the [Event Byte] is set to 0.

5.3 AT Command

AT command is a mode which users' control CSE-M73G with AT command like controlling modem. In this mode, active and passive TCP connections are available. And users are allowed to configure some environmental parameters with extended commands.

5.3.1 Key parameters

The configuration should be implemented via the serial port of CSE-M73G.

Commands	Description	Examples
+PLIP	Local IP Address	at+plip=10.1.0.1<CR>
+PLP	Local Port	at+plp=1470<CR>
+PRIP	Peer IP Address	at+prip=10.1.0.2<CR>
+PRP	Peer Port	at+prp=1470<CR>
+PDC	DHCP	at+pdc=1 (ON)<CR>
+PPE	PPPoE	at+ppe=1 (ON)<CR>
+PTO	Timeout	at+pto=10<CR>
+PWP	Store setting	at+pwp<CR>

Table 5-6 some of extended commands for configuration

- Related items with IP Address and Local Port
  Local port can be set as well as IP address related parameters like IP Address, Subnet Mask and Gateway IP Address.
- Peer Address / Peer Port
  IP address and local port of a remote host are can be set.
- Type of assigning IP address: Manual, DHCP, PPPoE
  Not only manual setting, also automatic assigning protocol (DHCP, PPPoE) are available.
- Others
  Some of options including [Timeout] can be configured in this mode.

☞ *Refer to the "ATC – AT Command Mode" document for more details.*

5.4 UDP

This mode transmits/receives data without connection.

5.4.1 Required parameters

- Local Port
  This item is a port for receiving UDP datagram.
- Peer Address
  This item is a hostname or an IP address of a remote hosts.
- Peer Port
  This item is a port for transmitting UDP datagram.

☞ *If you set the value of [Peer Address] to nothing and set the value of [Peer Port] to 0, [dynamic update of peer host] function is activated. By using this function, CSE-M73G can communicate to multiple hosts without additional setting.*

5.4.2 Optional parameters

- Block Size (Byte)
  [Block Size (Byte)] means the size of a block in UDP mode. Its unit is byte. The size of bytes come into the serial port, CSE-M73G sends them as one block to the network. The maximum value could be 1460 bytes.
- Data Frame
  [Data Frame] means the time for gathering data to make one block. Its unit is 10ms. If there are no transmission during the time which is set to this value, CSE-M73G sends gathered data in the buffer as one block to the network. The maximum size of single block is 1460 bytes in IPv4 and 1200 bytes in IPv6.

☞ *Once one of the both parameters is sufficient, the block size is decided as the condition.*

5.4.3 Examples

- Block Size: 5 bytes / Data Frame: 1s (100 by 10ms)

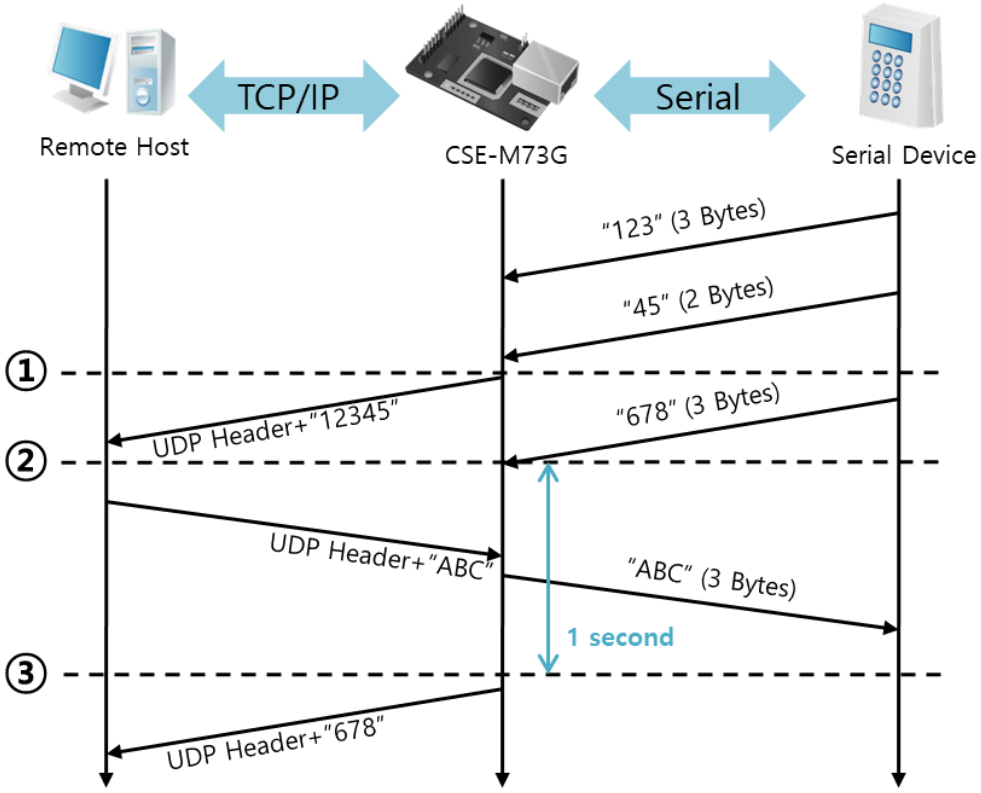


Figure 5-3 time chart for Block Size is 5 bytes, the data frame is 1s

Points	States
~	CSE-M73G is receiving data from the serial port
①	CSE-M73G Sends 5 bytes as one block based on the [Block Size]
~	Serial device sends data “678” to the CSE-M73G
②	Data “678” has arrived
~	CSE-M73G sends data from the remote host to the serial device
③	1 second has passed
~	CSE-M73G sends data “678” based on the [Data frame]

Table 5-7 states of each point

- Dynamic Update of Peer host

  This is a function that CSE-M73G automatically sets its peer host with information of the last packet which is received from network. In the packet, the source address and port number are used.

Parameters	Values
Peer Address	0 (None)
Peer Port	0

Table 5-8 setting for [dynamic update of peer host] function

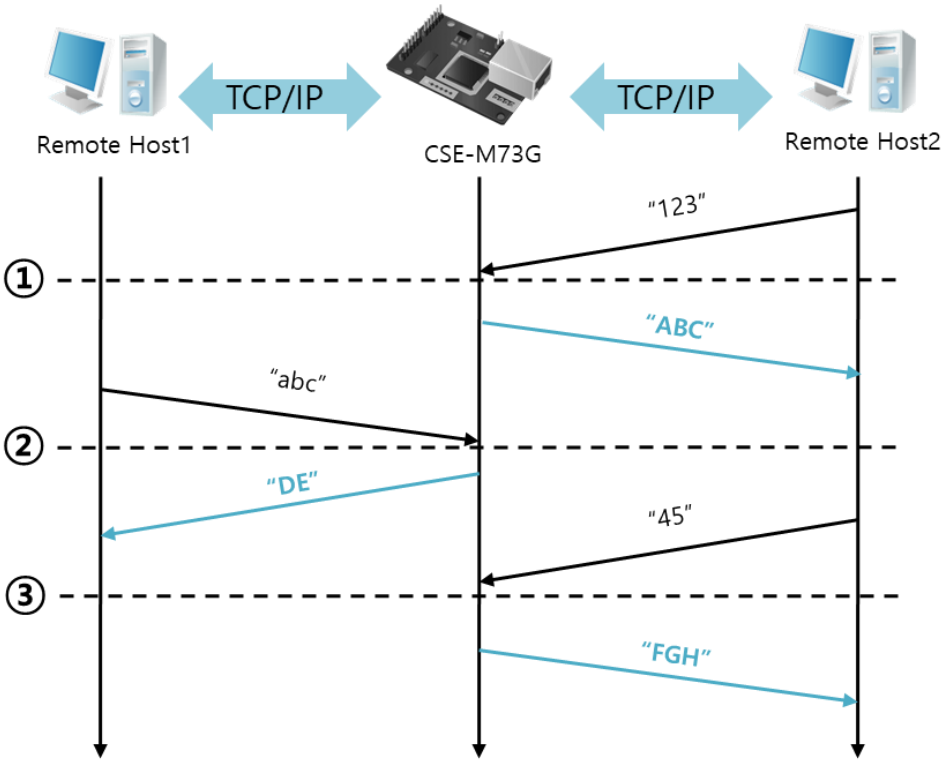


Figure 5-4 time chart for [dynamic update of peer host]

Points	States
~	Remote host 2 sends data to CSE-M73G
①	CSE-M73G sets host 2 to peer host
~	Remote host 1 sends data to CSE-M73G
②	CSE-M73G updates host 1 to peer host
~	Remote host 2 sends data again to CSE-M73G
③	CSE-M73G updates host 2 to peer host
~	CSE-M73G can communicate with remote host 2

Table 5-9 states of each point

☞ *The data "ABC", "DE", "FGH" are from the serial port of CSE-M73G in the Fig 5-11.*

6 System Management

6.1 Upgrading Firmware

6.1.1 Firmware

Firmware is a type of software for operation of CSE-M73G. If there are needs for adding function or fixing bugs, the firmware is modified and released. We recommend that users keep use the latest released firmware.

6.1.2 Processes

- Downloading the latest released firmware
  Download the newest firmware file. We update our homepage when a new firmware is released. You can find it on our website.
- Entering ISP mode
  Enter ISP mode to download firmware file to CSE-M73G.
- Run a TFTP client and ready to send the F/W file
  Run a TFTP client program. ezManager is equipped the client program. Click the [Change F/W / HTML] button.

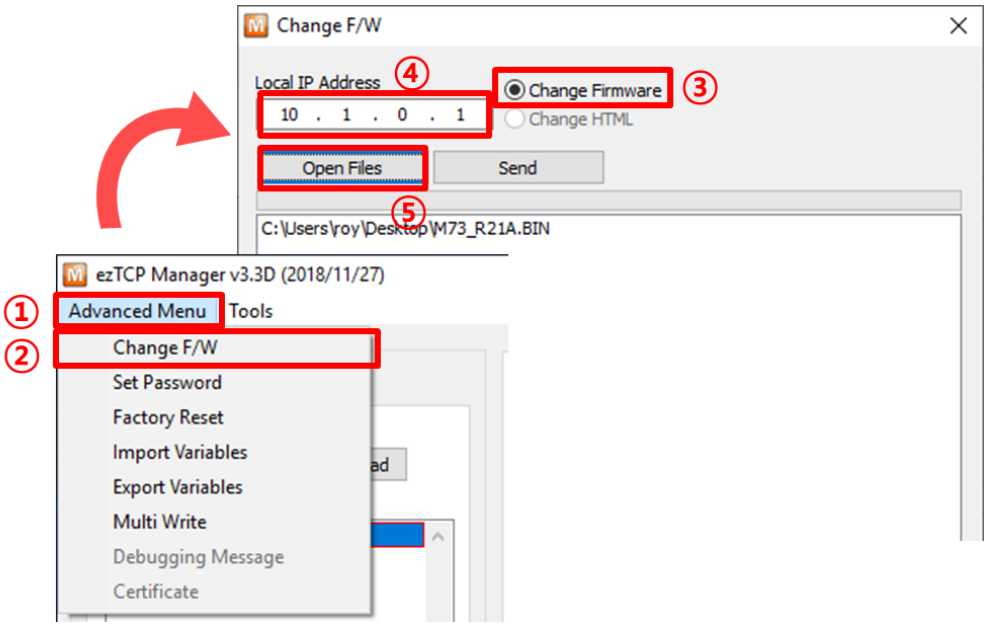


Figure 6-1 running TFTP client

① Click the [Advanced Menu].

② Click the [Change F/W] menu.

③ Select the [Change Firmware] radio button.

④ Input the IP address of CSE-M73G to the [Local IP Address] box.

⑤ Press the [Open Files] button and choose the firmware file.

- Checking firmware file and Sending

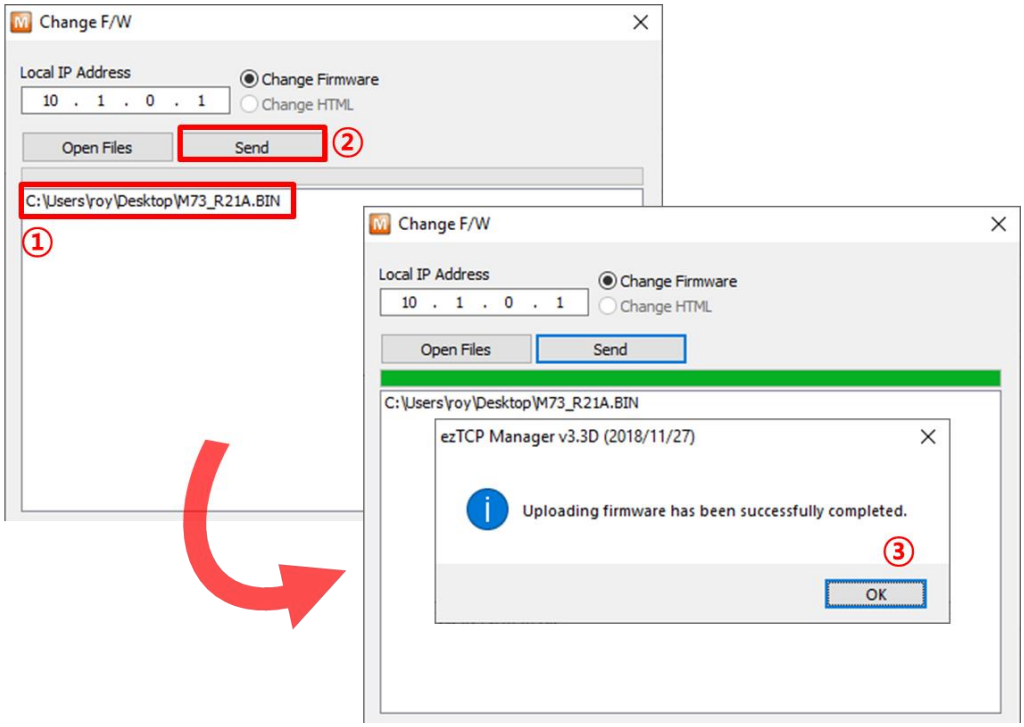


Figure 6-2 sending firmware file

① Check if the name and path of the firmware file are correct

② Click the [Send] button

③ Confirm the completed message

6.2 Status Monitoring

6.2.1 Using TELNET

Once the [TELNET] option is activated, users can remotely log in to CSE-M73G. If a password is set, users should input the password. If not, it uses “sollae” as its default TELNET password.

```
CSE-M73G Management Console v1.0A Sollae Systems
lsh>
```

Figure 6-3 log in to CSE-M73G on TELNET

Followed commands let users check each state.

Command	Option	Description	Usage
st	net	IPv4 Network Status	lsh>st net
	net6	IPv6 Network Status	lsh>st net6
	sio	Serial Port Status	lsh>st sio
	uptime	System Uptime	lsh>st uptime
sc	[OP1][OP2]	Session Control	lsh>sc com1 close
sd	[OP1][OP2]	Serial Data Capture	lsh>sd 100
		Serial Data Capturing Stops	lsh>sd 1 close
exit	-	Exit from the current session	Lsh>exit

Table 6-1 commands for checking states

- st net

  “st net” command displays present IPv4 network states of all sessions.

```
CSE-M73G Management Console v1.0A Sollae Systems
lsh>st net
proto  name       local address            peer address    sendq    state
-----  ------ ------------------------- ----------------- ----- ----------
TCP     tty          10.1.0.1(   23)      10.11.0.67(50904)  219  ESTABLISHED
TCP    com1           0.0.0.0( 1470)         0.0.0.0(    0)    0  LISTEN
lsh>
```

Figure 6-4 st net

- st net6

  "st net6" command displays present IPv6 network states of all sessions.

```
Lsh>st net6
proto  name            local/peer address          sendq        state
------ ----- ------------------------------------ ------ ----------------
TCP6    tty     fe80::230:f9ff:fe12:1002(   23)     127      ESTABLISHED
                fe80::f965:11c7:ea03:9987(55717)
lsh>
```

Figure 6-5 st net6

- st sio

  "st sio" command displays the number of bytes for the serial port.

```
Lsh>st sio
port fmax rbmax rxbuf txbuf rx_count tx_count
---- ---- ----- ----- ----- -------- --------
com1    0     0     0     0        0        0
com2    0     0     0     0        0        0
lsh>
```

Figure 6-6 st sio

- st uptime

  "st uptime" command shows amount of time since M73G boots up.

```
Lsh>st uptime
00:05:19.16 up 0 days
lsh>
```

Figure 6-7 st uptime

- sc

  "sc" command is used when users close a session. [OP1] means the name of session, and [OP2] should be "close".

```
Lsh>sc com1 close
com1: closed
lsh>
```

Figure 6-8 sc

☞ *The session name and the option of the "sc" command is always small letters.*

- sd

  “sd” command is for capturing serial data. [OP1] means name of the session, [OP2] means period, which has a 10ms unit, for the capture.

```
Lsh>sd 1 100
com1 dump start
com1 dump buffering time : 1000ms
lsh>tx1 => 30 31 32 33 34 35 36 37                    ¦ 01234567
rx1 <= 30 31 32 33 34 35 36 37                        ¦ 01234567
```

Figure 6-9 sd

How to stop capturing data on the serial port is as follows:

```
Lsh>sd 1 0
com1 dump stop
lsh>
```

Figure 6-10 stop sd

- exit

  This command is for exit the TELNET session.

```
Lsh>exit
```

Figure 6-11 exit

6.2.2 Using ezManager

Status of CSE-M73G can be monitored by [Status] button on ezManager. By using the [Refresh Every 1 Second] option in the status window, the status is automatically updated in every second.

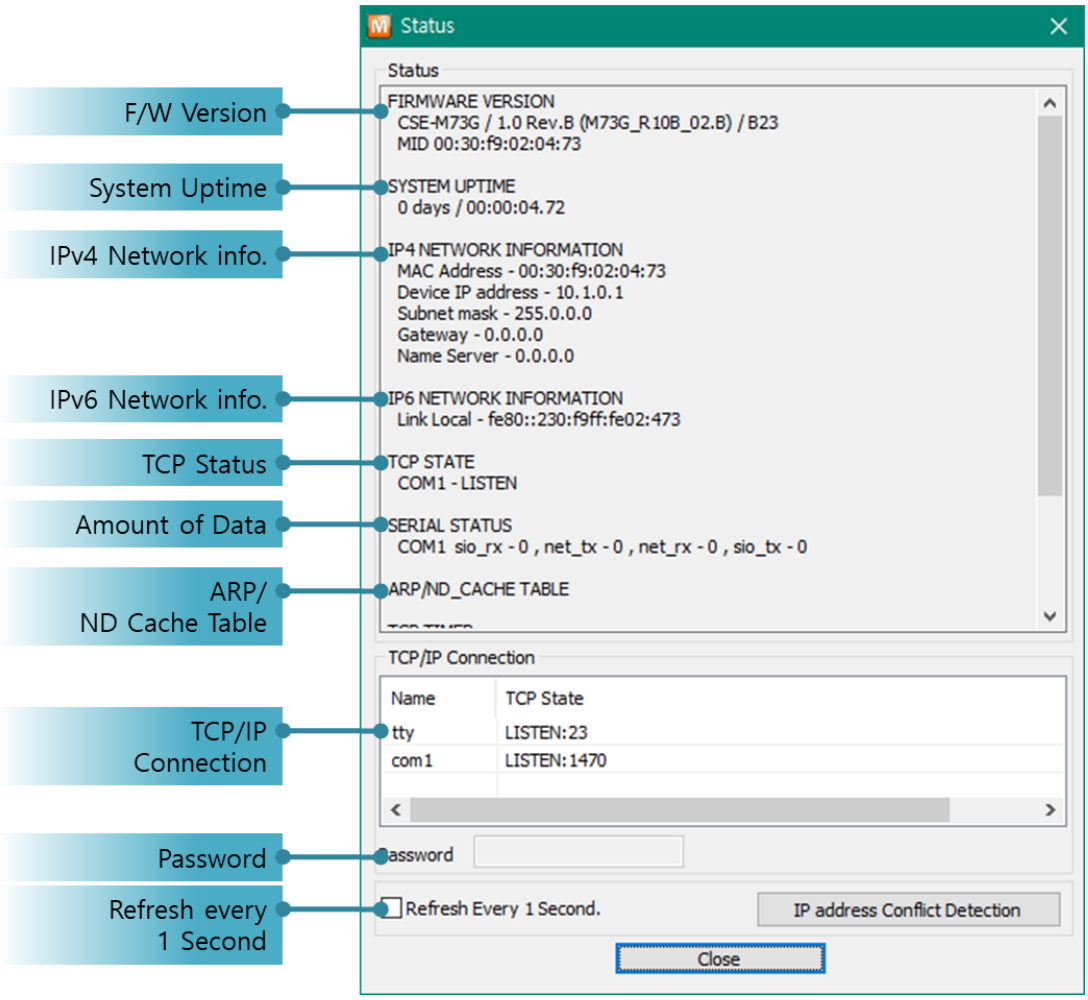


Figure 6-12 status window of ezManager

- FIRMWARE VERSION

  This shows the name of model, the version of firmware and the MAC address.

- SYSTEM UPTIME

  Amount of time is displayed since CSE-M73G boots up.

- IP4 NETWORK INFORMATION

  All information about related items with IPv4 Address is shown here.

- IP4 NETWORK INFORMATION

  All information about related items with IPv4 Address is shown here. This item is activated when the IPv6 is enabled.

- TCP STATE

  TCP status of each port is shown this section.

Message	Description
LISTEN	listening TCP connection
CLOSE	TCP connection is closed
SYN_SENT	Send “SYN” segment to make TCP connection
ESTABLISHED	When TCP connection is established
N/A	In UDP mode

Table 6-2 TCP STATE

- SERIAL STATUS

  Amount of data in every buffer is displayed. The unit is byte.

Buffer	Description
sio_rx	The number of data which is received from the COM port
net_tx	The number of data which is sent to the remote host
net_rx	The number of data which is received from the remote host
sio_tx	The number of data which is sent to the COM port

Table 6-3 SERIAL STATUS

- ARP/ND CACHE TABLE

  This part shows ARP table on CSE-M73G. When TCP connection is established or UDP data communication is performed, the information of IP and MAC address is automatically stored in the ARP table. This information is held for 1 minute. When 50 seconds is passed, CSE-M73G starts broadcasting the ARP packet again. If there is no response until the time is 0, the information is removed. If there is response, the time is updated 60 seconds again.

  In IPv6 case, it shows ND cache list. User can check by the ND cache messages. The messages are as follows.

Status	Description
INCOMPLETE	This means the device is standing by after it sends the request message, Neighbor Solicitation, to MAC and link local address of an opponent in the initial communication.
REACHABLE	This means the device has information about the opponent after it sends Neighbor Solicitation, and receives Neighbor Advertisement.
STALE	The device will change into STALE state after some time later reaching REACHABLE.
DELAY	The device will change into DELAY state if there is no response to Neighbor Solicitation. In this case, CSE-M73G will not be able to communicate with the device.
PROBE	CSE-M73G will resend the request message to the device in DELAY state. CSE-M73G will keep sending Neighbor Solicitation until it replies.

Table 6-4 5 States displayed on ND Cache table

- TCP/IP Connection

  In this section, the same information with TCP STATE is displayed with IP address and port number. A difference is that users can terminate TCP connection. When right click on a session, a small pop-up window is created.

- Password

  This text box is activated when CSE-M73G has a password. If users want to close TCP connection with right click of mouse on the session, this password has to be correctly filled.

- Refresh Every 1 Second.

  If this option is checked, ezManager send query in every second.

- IP address Conflict Detection

  By clicking this button, you can find devices which have the same IP address to yours on the network.

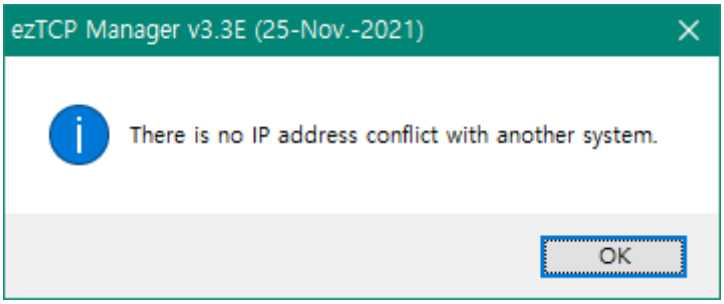


Figure 6-13 Without IP address conflict detection

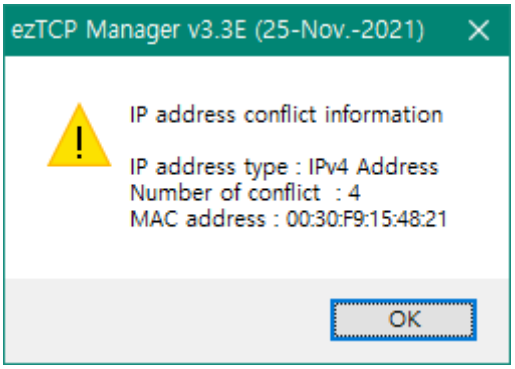


Figure 6-14 IP address conflict detection

7 Security

7.1 SSL

7.1.1 What is the SSL(Secure Socket Layer)?

SSL is cryptographic protocol that provides secure communication on the Internet. The SSL works over TCP.

7.1.2 How to set the SSL

- SSL Client

  You can use SSL as long as the [SSL] option is enabled on the [Option] tab.

Figure 7-1 Setting of Option

- SSL Server

  You have to create a certificate on your product. Refer to the following steps.

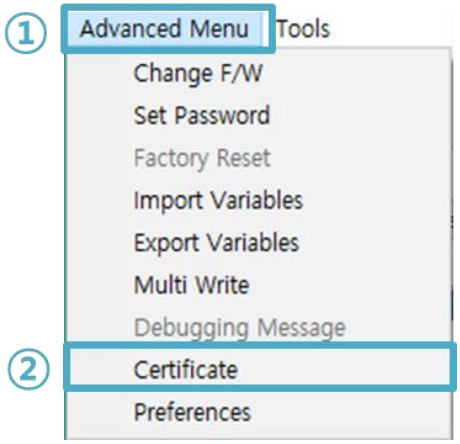


Figure 7-2 Create the certification

① Select [Advanced Menu] on ezManager.

② Click the [Certificate] menu.

③ Select the [Write self-signed certificate] and click the [OK] button.

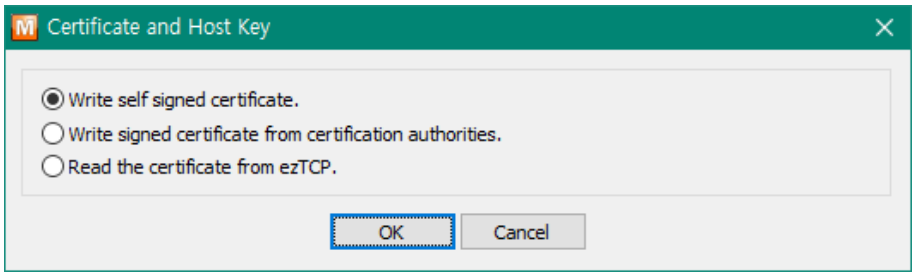


Figure 7-3 Create the RSA Key

④ Input the key length and information in [Self signed certificate]

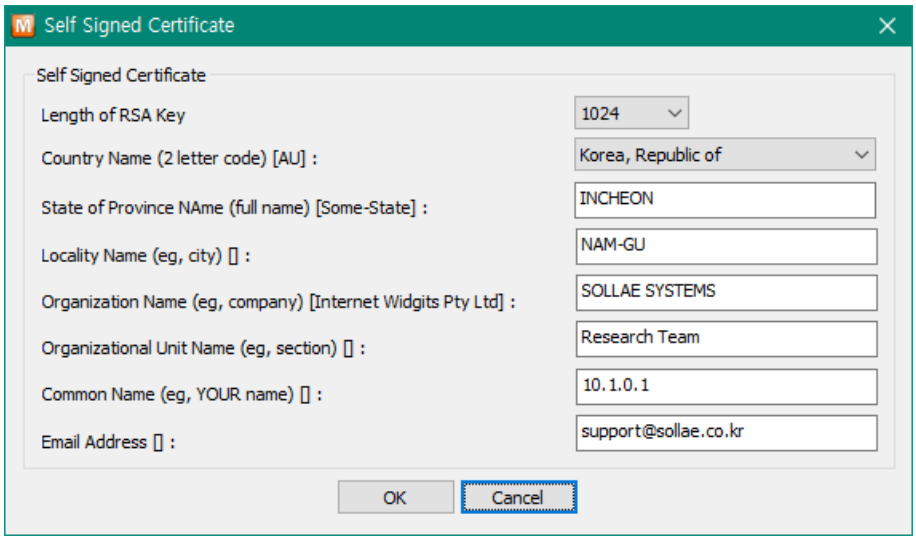


Figure 7-4 Input the information

⑤ Check a success message.

7.1.3 Restrictions

- SSL works only for IPv4.

7.2 Access Restriction

On the [Option] tab of ezManager, you can set access restriction function with MAC and IP address.

- Allowed MAC Address

  If this option has a valid value, the device which has the MAC address is only permitted to access.

- Allowed IP Address

  This is for qualifying hosts with IP address or range of IP addresses. The range is defined by multiplying [IP address] and [Network Mask] in bit unit.

- Examples for IPv4

IP Address	Network Mask	Allowed IP Address Range
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 7-1 examples of defining allowed IPv4 range

- Apply to ezManager

  [Apply to ezManager] is for applying above two restrictions to ezManager functions like [Search], [Read], [Write] and etc.

- Examples for IPv6

IPv6 Address	Prefix	Allowed IP Address Range
2001:DB8::100	64	2001:DB8::1 ~ 2001:DB8::FFFF:FFFF:FFFF:FFFF
2001:DB8::100	128	2001:DB8::100

Table 7-2 examples of defining allowed IPv6 range

7.2.1 Setting Password

A password can be used for protecting CSE-M73G from TELNET login or changing environmental parameters by hosts which are not qualified. The maximum length is 8 bytes of Alphabet or number.

☞ *When you want to revoke all of these restrictions, operate CSE-M73G as ISP mode. In the mode, all restrictions are removable and communication with ezManager is revoked.*

8 Additional Functions

8.1 RS422, 485 and 3.3V Communication

For the RS422 or RS485 communication, you have to use JP4 and 5 of CSE-M73G. When using 3.3V level, JP3 can be used. To change another mode, the [Serial Type] option should be changed on ezManager.

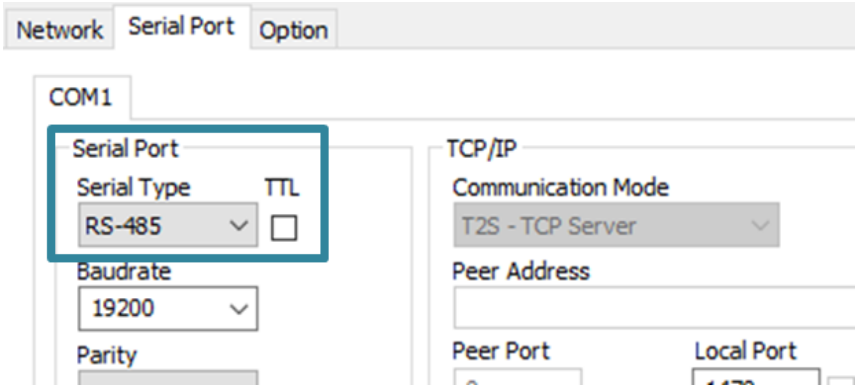


Figure 8-1 the [Serial Type] parameter

☞ *For reference, 3.3V communication is indicated as TTL in ezManager*

8.2 Notify IPv4 Change

CSE-M73G can be TCP server even though it assigned IP address automatically. Using [Notify IP Change] function, M73G sends its IP address with the host name to the designed server. There are 3 types- DDNS, TCP and UDP- for this service.

- Dynamic Domain Name Service (DDNS)

  CSE-M73G supports DDNS service offered by DynDNS to manage its changed IP address as a host name. Because of this, you have to make an account and create host names on the website of DynDNS before use this.

☞ *All about service usage of an account could be changed according to the policy of DynDNS.*

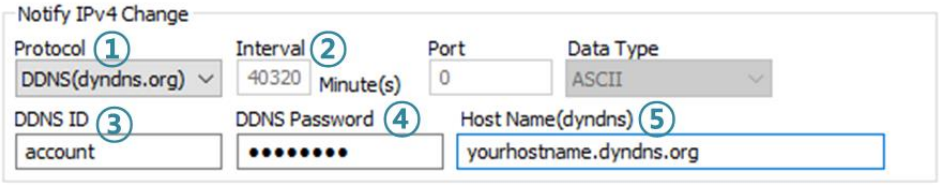


Figure 8-2 setting DDNS

① Select the [DDNS(dyndns.org)]

② 40,320 is a fixed value

③ Input the ID of DDNS account

④ Input the password of the account

⑤ Input a host name which you create on your account

- TCP/UDP

  In case you have an own server and want to manage the information about changed IP addresses, you allowed used TCP/UDP for using this option. The [Data Type] can be selected as ASCII or hexadecimal, and the [Interval] is available on configuration.

☞ *Please refer to "Notify IP Change" document for details.*

8.3 Sending MAC Address

[Sending MAC Address] is a function that CSE-M73G sends its MAC address to the remote host right after the connection is established. By using this function, a server can identify multiple devices with the information.

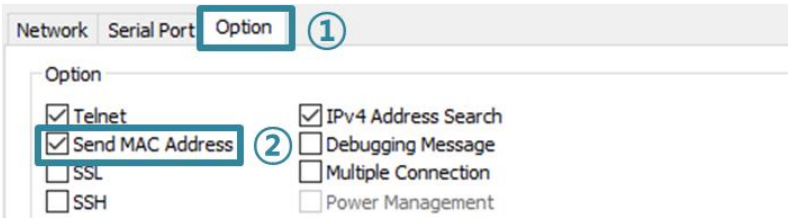


Figure 8-3 setting of Sending MAC Address function

① Move to the [Option] tab.

② Check the [Send MAC Address] option.

☞ *Please refer to the "MAC ID Function" document for details.*

8.4 TELNET COM port Control Option (RFC 2217)

This option is for sending and receiving serial port states between two devices. Users can send and receive control signals like RTS/CTS when the states are changed.

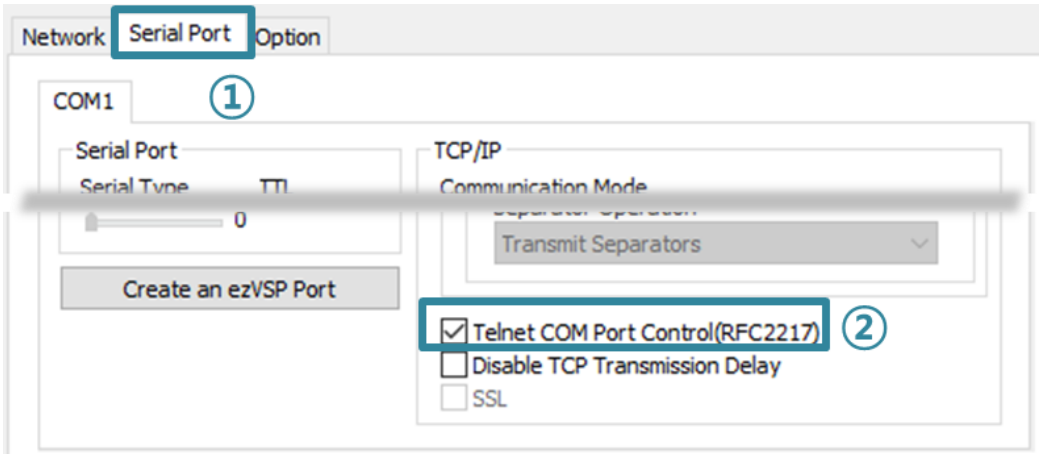


Figure 8-4 setting of TELNET COM Port Control option

① Move to the [Serial Port] tab.

② Check the [Telnet COM Port Control (RFC2217)] option.

☞ *If you want details about the [TELNET COM port Control Option], please refer to "Telnet COM Port Control Option" document.*

8.5 Separator

Using this function, you can control the length of network packets by specific characters.

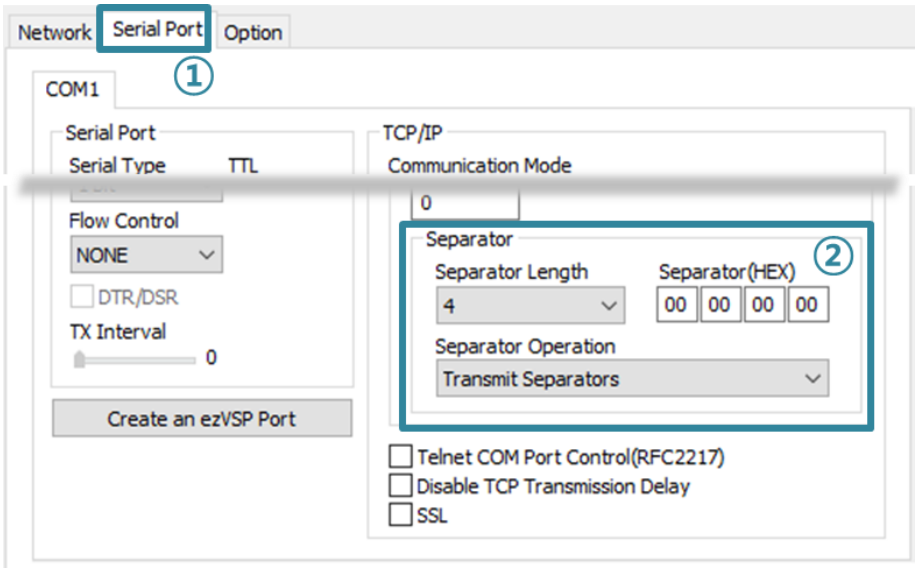


Figure 8-5 setting of Separator

① Move to the [Serial Port] tab.

② Set the separator.

separator	options
Length	select the length between 0 ~ 4 bytes
Operation	Transmit Separators without additional bytes
	Transmit Separators + 1 byte
	Transmit Separators + 2 bytes

Table 8-1 separator

8.6 Multiple Connection

[Multiple Connection] is for receiving and monitoring a device to multiple hosts in the same time. The maximum session number is 8 for the [Multiple Connection].

8.6.1 How to use

The option is available after activating the [Multiple Connection] on ezManager.

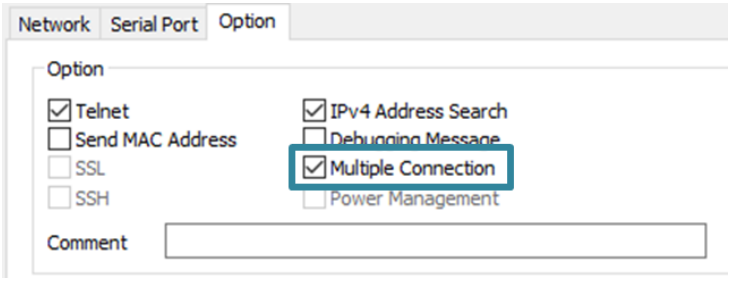


Figure 8-6 activation of the [Multiple Connection]

8.6.2 Diagram

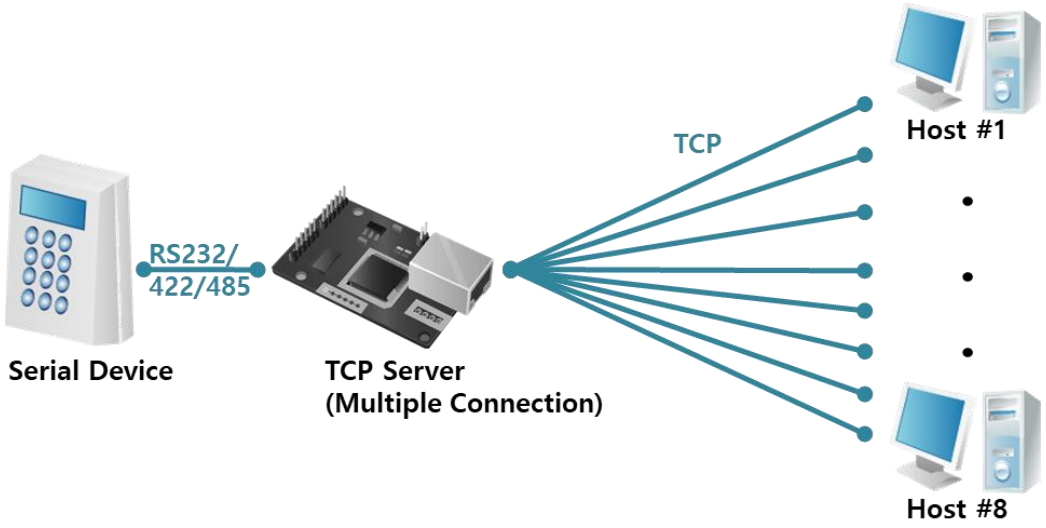


Figure 8-7 diagram for the [Multiple Connection]

- Data from each host are sent to the User's device via CSE-M73G
- Data from the User's device is sent to the all hosts(#1 ~ 8) via CSE-M73G

8.7 Factory Reset

It is a function physically initializes all the setting. You can save a setting to user-defined ENV region and use it as default values by the factory reset. However, if you do not use the region, Factory Reset uses a factory default by manufacturer as its default values.

- Using Factory Reset

  ① Connect the jumper of JP6 shortly (less than 1 second) and release it.

  ② Connect the jumper of JP6 again (over 10 seconds).

  ③ Factory Reset will be automatically implemented to default values.

  ④ Disconnect the two pins from GND.

  ⑤ Reboot.

- Setting custom default values

  ① Change the mode to Serial Configuration mode

  ② Save custom default values by ezManager or serial configuration commands

  ③ Input the command below

b	<SPACE>	3c5a	<CR>

  ④ After step ③, current values in the SRAM is saved in user-defined ENV region and the values will be always used for Factory Reset.

9 Self-Test in Trouble

When users are in trouble with CSE-M73G, make sure all the followed steps first.

9.1 Searching problem with ezManager

- Confirming types of configuration utility
  CSE-M73G can be configured by ezManager.
- Stopping Firewall operation
  Firewalls of personal computer or network block broadcast packets. Stop all the firewalls before searching CSE-M73G

☞ *Most of vaccine programs have firewall functions so it can cause some trouble to search CSE-M73G. Stop these programs before the searching.*

- Stable supply of the power
  Check if the power is supplied continually. If the power is constantly supplied, the red LED on the CSE-M73G's body will be ON.
- Connection with the network
  Make sure that the network connection is fine including Ethernet cable. In this step, we recommend that users connect CSE-M73G with PC directly or in the same network hub.
- Checking options of restriction
  In case that restriction of access is activated, the communication with ezManager can be impossible. When users are in this situation, make CSE-M73G operate in ISP mode.

9.2 Connection Problem over TCP/IP

- Checking parameters related with TCP/IP

  When CSE-M73G has a private network IP address, personal computer's IP address has to be the same sub network. Check if the IP address and local port number are correct. In case of a fixed IP address, the subnet mask, gateway IP address and DNS IP address should be configured.

TCP Server side	TCP Client side
Local IP Address, Local Port, Subnet Mask, Gateway IP Address, DNS IP Address, DDNS option	Local IP Address, Peer Address, Peer Port, Subnet Mask, Gateway IP Address, DNS IP Address,

Table 9-1 major parameters related with TCP/IP

- PING Test

  Confirm the connection over the network by PING test. If the CSE-M73G doesn't send any reply from the request, check the network environment.

- Firewall

  In case the networks which need strong security, the access may be denied by their firewall. Under this circumstance, users should ask the person in charge of their network to release ports which will be used. (Ex: TCP 1470, UDP 50005)

- Operation Mode

  TCP connection is not possible when CSE-M73G is operating in the ISP or Serial Configuration mode.

- Communication Mode

  To make TCP connection, both a server and client should exist. If there are only servers or clients, TCP connection can't be established.

- ezTCP Firewall

  When users set the ezTCP firewall with MAC and IP address, any hosts can't be reachable to it except for the hosts which have the allowed MAC and IP address. Inactivate the option or check the setting is correct.

- Checking the TCP status

  TCP is a protocol connected one to one without multiple connection function. Because of this, if a device is on TCP connection, other requests are denied. If users are in this situation, check the network status by connecting on TELNET or using ezManager.

9.3 Data Communication Problem on the Serial

- Connection of Pins

  Check if the connection of each pin is right. Using cables, users choose the right type of cable which is suitable for the device. Transmit Data (TXD) pin should be connected with Receive Data (RXD) pin. Look at the figure 8-1.

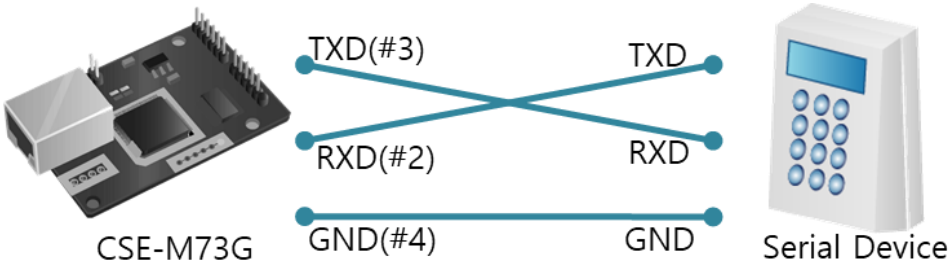


Figure 9-1 RS232 connection (JP1, 2)

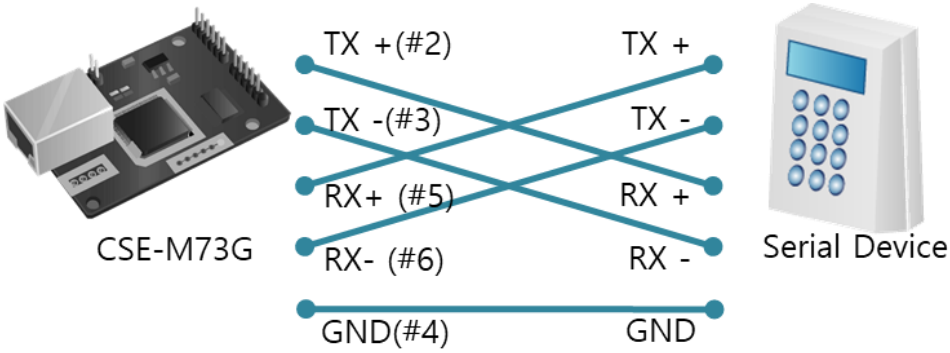


Figure 9-2 RS422 connection (JP4, 5)

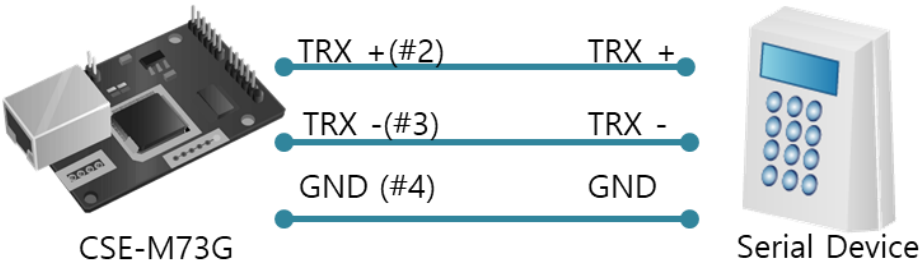


Figure 9-3 RS485 connection (jp4, 5)

- Setting parameters

  Check if all the serial port parameters like Baud Rate, Data bit, Stop bit and Parity are properly set.

☞ *Contact us if you have any questions about above steps or our products.*

10 Technical Support and Warranty

10.1 Technical Support

If you have any question regarding operation of the product, visit Customer Support FAQ corner and the message board on Sollae Systems' web site or send us an email at the following address:

- E-mail: support@eztcp.com
- Website: https://www.eztcp.com/

10.2 Warranty

10.2.1 Refund

Upon the customer's request to refund the product within two weeks after purchase, Sollae Systems will refund the product.

10.2.2 Free Repair Services

For product failures occurring within two years after purchase, Sollae Systems provides free repair services or exchange the product. However, if the product failure is due to user's fault, repair service fees will be charged or the product will be replaced at user's expense.

10.2.3 Charged Repair Services

For product failures occurring after the warranty period (two years) or resulting from user's fault, repair service fees will be charged and the product will be replaced at user's expense.

11 Precaution and Exemption from Liability

11.1 Precaution

- Sollae Systems is not responsible for product failures occurring due to user's alternation of the product.
- Specifications of the product are subject to change without prior notice for performance improvement.
- Sollae Systems does not guarantee successful operation of the product if the product was used under conditions deviating from the product specifications.
- Reverse engineering of firmware and applications provided by Sollae Systems is prohibited.
- Use of firmware and applications provided by Sollae Systems for purposes other than those for which they were designed is prohibited.
- Do not use the product in an extremely cold or hot place or in a place where vibration is severe.
- Do not use the product in an environment in which humidity is high or a lot of oil exists.
- Do not use the product where there is caustic or combustible gas.
- Sollae Systems does not guarantee normal operation of the product under the conditions a lot of noise exists.
- Do not use the product for a purpose that requires exceptional quality and reliability relating to user's injuries or accidents – aerospace, aviation, health care, nuclear power, transportation, and safety purposes.
- Sollae Systems is not responsible for any accident or damage occurring while using the product.

11.2 Exemption from Liability

11.2.1 English version

In no event shall Sollae Systems Co., Ltd. And its distributors be liable for any damages whatsoever (including, without limitation, damages for loss of profit, operating cost for commercial interruption, loss of information, or any other financial loss) from the use or inability to use the CSE-M73G even if Sollae Systems Co., Ltd. Or its distributors have been informed of such damages.

The CSE-M73G is not designed and not authorized for use in military applications, in nuclear applications, in airport applications or for use in applications involving explosives, or in medical applications, or for use in security alarm, or for use in a fire alarm, or in applications involving elevators, or in embedded applications in vehicles such as but not limited to cars, planes, trucks, boats, aircraft, helicopters, etc..

In the same way, the CSE-M73G is not designed, or intended, or authorized to test, develop, or be built into applications where failure could create a dangerous situation that may result in financial losses, damage to property, personal injury, or the death of people or animals. If you use the CSE-M73G voluntarily or involuntarily for such unauthorized applications, you agree to subtract Sollae Systems Co., Ltd. And its distributors from all liability for any claim for compensation.

Sollae Systems Co., Ltd. And its distributors entire liability and your exclusive remedy shall be Sollae Systems Co., Ltd. And its distributors option for the return of the price paid for, or repair, or replacement of the CSE-M73G.

Sollae Systems Co., Ltd. And its distributors disclaim all other warranties, either expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose, with respect to the CSE-M73G including accompanying written material, hardware and firmware.

11.2.2 French version

- Documentation

La documentation du boîtier CSE-M73G est conçue avec la plus grande attention. Tous les efforts ont été mis en œuvre pour éviter les anomalies. Toutefois, nous ne pouvons garantir que cette documentation soit à 100% exempt de toute erreur. Les informations présentes dans cette documentation sont données à titre indicatif. Les caractéristiques techniques peuvent changer à tout moment sans aucun préavis dans le but d'améliorer la qualité et les possibilités des produits.

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- Rappel sur l'évacuation des équipements électroniques usagés

Le symbole de la poubelle barré présent sur le boîtier CSE-M73G indique que vous ne pouvez pas vous débarrasser de ce dernier de la même façon que vos déchets courants. Au contraire, vous êtes responsable de l'évacuation du boîtier CSE-M73G lorsqu'il arrive en fin de vie (ou qu'il est hors d'usage) et à cet effet, vous êtes tenu de le remettre à un point de collecte agréé pour le recyclage des équipements électriques et électroniques usagés. Le tri, l'évacuation et le recyclage séparés de vos équipements usagés permettent de préserver les ressources naturelles et de s'assurer que ces équipements sont recyclés dans le respect de la santé humaine et de l'environnement. Pour plus d'informations sur les lieux de collecte des équipements électroniques usagés, contacter votre mairie ou votre service local de traitement des déchets.

12 History

Date	Version	Comments	Author
2023.02.08.	1.0	○ Created	Roy LEE
2023.02.09.	1.1	○ Corrected some errors	Roy LEE