

RS422/485 - Ethernet Converter

CSE-H55N2 User Manual

Version 1.7



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.

※ This equipment obtained certification by using 1.5M serial cable.

Note:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Contents

| | | |
|----------|--|---------------|
| 1 | Overview | - 5 - |
| 1.1 | Overview | - 5 - |
| 1.2 | Features | - 5 - |
| 1.3 | Application Examples | - 6 - |
| 1.4 | Specification | - 9 - |
| 1.4.1 | <i>Hardware</i> | - 9 - |
| 1.4.2 | <i>Software</i> | - 9 - |
| 1.5 | Interfaces | - 10 - |
| 1.5.1 | <i>Serial Interface</i> | - 10 - |
| 1.5.2 | <i>Ethernet Interface</i> | - 12 - |
| 1.5.3 | <i>Power</i> | - 13 - |
| 1.6 | System LED | - 14 - |
| 1.6.1 | <i>Function button</i> | - 15 - |
| 2 | Installation and Test..... | - 16 - |
| 2.1 | Installation | - 16 - |
| 2.1.1 | <i>Setting Network Area</i> | - 17 - |
| 2.2 | Simple Test | - 19 - |
| 3 | Configuration | - 22 - |
| 3.1 | Configuration with ezManager | - 22 - |
| 3.1.1 | <i>Configuration via LAN</i> | - 22 - |
| 3.1.2 | <i>Configuration via Serial</i> | - 23 - |
| 3.2 | AT command | - 24 - |
| 4 | Operation Modes | - 25 - |
| 4.1 | What is the Operation Mode? | - 25 - |
| 4.2 | How to entering each mode | - 25 - |
| 4.3 | Comparison of each mode | - 26 - |
| 4.4 | Normal Mode | - 26 - |
| 4.5 | Serial Configuration Mode | - 27 - |
| 4.6 | ISP Mode | - 27 - |
| 4.6.1 | <i>Upgrading Firmware</i> | - 27 - |
| 4.6.2 | <i>Revoking Security Options</i> | - 27 - |

| | | |
|------------|--|---------------|
| 5 | Communication Modes | - 28 - |
| 5.1 | TCP Server..... | - 28 - |
| 5.1.1 | <i>Key parameters</i> | - 28 - |
| 5.1.2 | <i>Examples</i> | - 29 - |
| 5.2 | TCP Client..... | - 32 - |
| 5.2.1 | <i>Key parameters</i> | - 32 - |
| 5.2.2 | <i>Examples</i> | - 33 - |
| 5.3 | AT Command..... | - 36 - |
| 5.3.1 | <i>Key parameters</i> | - 36 - |
| 5.3.2 | <i>Examples</i> | - 37 - |
| 5.4 | UDP..... | - 40 - |
| 5.4.1 | <i>Key parameters</i> | - 40 - |
| 5.4.2 | <i>Examples</i> | - 41 - |
| 6 | System Management | - 43 - |
| 6.1 | Upgrading Firmware..... | - 43 - |
| 6.1.1 | <i>Firmware</i> | - 43 - |
| 6.1.2 | <i>Processes</i> | - 43 - |
| 6.2 | Status Monitoring..... | - 45 - |
| 6.2.1 | <i>Using TELNET</i> | - 45 - |
| 6.2.2 | <i>Using ezManager</i> | - 48 - |
| 6.3 | Factory Reset..... | - 52 - |
| 6.3.1 | <i>Using Factory Reset</i> | - 52 - |
| 6.3.2 | <i>Setting custom default values</i> | - 53 - |
| 7 | Security Function | - 54 - |
| 7.1 | SSL | - 54 - |
| 7.1.1 | <i>What is the SSL(Secure Socket Layer)?</i> | - 54 - |
| 7.1.2 | <i>How to set the SSL</i> | - 54 - |
| 7.1.3 | <i>Restriction</i> | - 55 - |
| 7.2 | Access Restriction (ezTCP Firewall)..... | - 56 - |
| 7.2.1 | <i>Setting Password</i> | - 56 - |
| 8 | Additional Functions | - 57 - |
| 8.1 | Notify Ipv4 Change..... | - 57 - |
| 8.2 | Sending MAC Address..... | - 58 - |
| 8.3 | Multiple Connection..... | - 59 - |

| | | |
|------------|---|-------------|
| 8.3.1 | How to use..... | 59 - |
| 8.3.2 | Diagram..... | 59 - |
| 8.4 | Serial Port Tab Functions..... | 60 - |
| 8.4.1 | Disable TCP Transmission Delay - ①..... | 60 - |
| 8.4.2 | Separator - ②..... | 60 - |
| 8.4.1 | TCP Server / Client mode - ③..... | 61 - |
| 8.4.2 | Telnet COM Port Control(RFC2217) - ④..... | 61 - |
| 8.4.3 | Data Frame Interval - ⑤..... | 61 - |
| 9 | RS485/RS422 Interface..... | 62 - |
| 9.1 | About RS485/RS422 Network..... | 62 - |
| 9.2 | Configuring an RS485 Network..... | 62 - |
| 9.2.1 | Signal Ground..... | 62 - |
| 9.2.2 | Biasing Resistors..... | 63 - |
| 9.2.3 | Termination Resistors..... | 63 - |
| 9.3 | Configuring an RS422 Network..... | 63 - |
| 9.3.1 | 1:1 Configuration..... | 63 - |
| 9.3.2 | 1:N Configuration..... | 64 - |
| 9.3.3 | Signal Ground, Biasing and Termination Resistors..... | 64 - |
| 10 | Checklist in Trouble..... | 65 - |
| 10.1 | Searching problem with ezManager..... | 65 - |
| 10.2 | Connection Problem over TCP/IP..... | 66 - |
| 10.3 | Data Communication Problem over the Serial Port..... | 67 - |
| 11 | Technical Support and Warranty..... | 68 - |
| 11.1 | Technical Support..... | 68 - |
| 11.2 | Warranty..... | 68 - |
| 11.2.1 | Refund..... | 68 - |
| 11.2.2 | Free Repair Services..... | 68 - |
| 11.2.3 | Charged Repair Services..... | 68 - |
| 12 | Precaution and Exemption from Liability..... | 69 - |
| 12.1 | Precaution..... | 69 - |
| 12.2 | Exemption from Liability..... | 70 - |
| 12.2.1 | English version..... | 70 - |
| 12.2.2 | French version..... | 71 - |
| 13 | Revision History..... | 73 - |

1 Overview

1.1 Overview

Almost all communication devices including PC are using serial transmission. In this type, devices send and receive data in the order of each byte. The serial communication is quite simple to implement but has weaknesses like short distance and hard maintenance.

To overcome those weaknesses, we offer "Serial Networking Solution" which allows the serial devices to transmit/receive data over unlimited distance. CSE-H55N2 is one of "serial networking" devices which lets the serial devices to connect to the Internet by converting serial data to TCP/IP packet, and vice versa.

CSE-H55N2 is an upgrade version of CSE-H55N that has been designed to improve stability against noise and electrical damage on RS422/485 line. There is no change in its software

1.2 Features

- IPv4 / IPv6 dual stack
- Stateless / Stateful (DHCPv6) address auto-configuration
- RS422/RS485 (Terminal Block)
- Industrial temperature range (-40°C ~ +85°C)
- Variety of monitoring status (ezManager, TELNET)
- Security Protocols SSL/TLS
- Multiple connection for multi-monitoring

☞ ***Multiple connection is supported in firmware version 2.3A or later.***

1.3 Application Examples

- 1:1 Connection with a PC



Figure 1-1 1:1 connection with a PC

- Applied to LANs

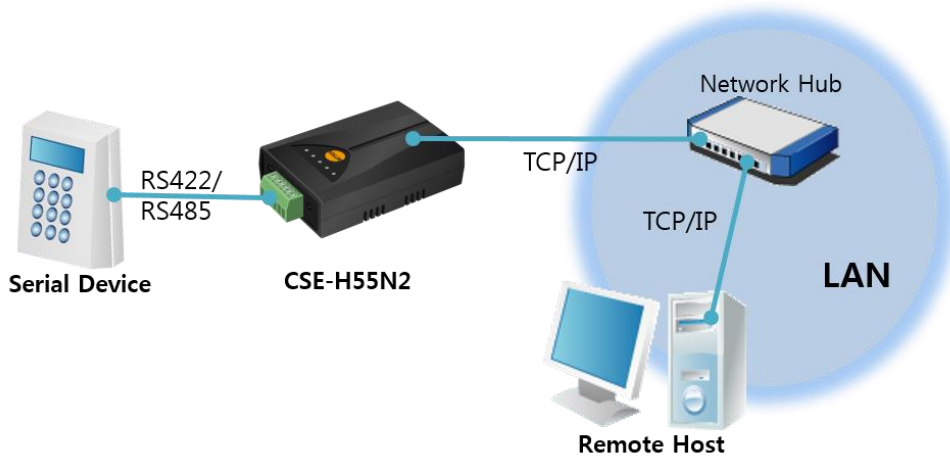


Figure 1-2 applied to LANs

- Applied to the Internet on Cable Networks

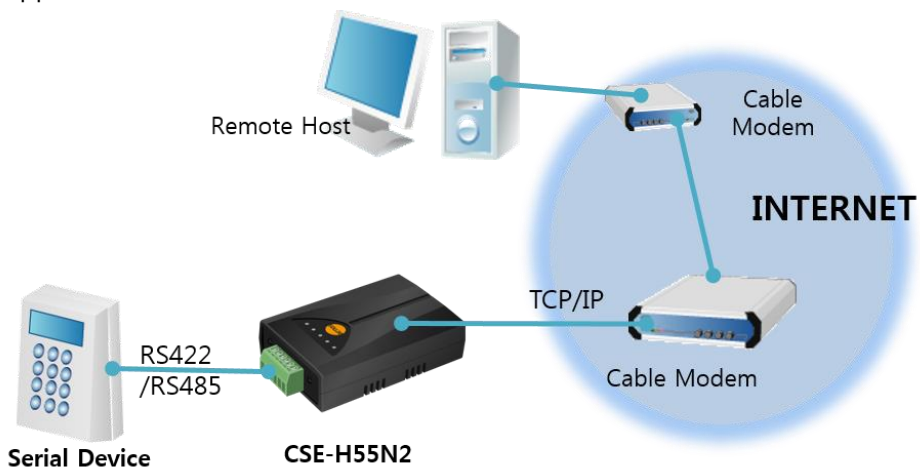


Figure 1-3 applied to the Internet on cable networks

- Applied to the Internet with an IP Share Router

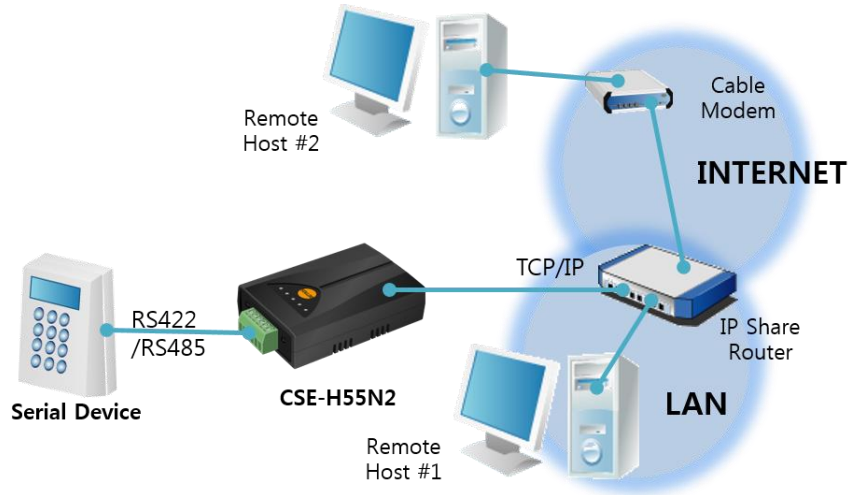


Figure 1-4 applied to the Internet with an IP share router

- Applied to a serial tunneling system

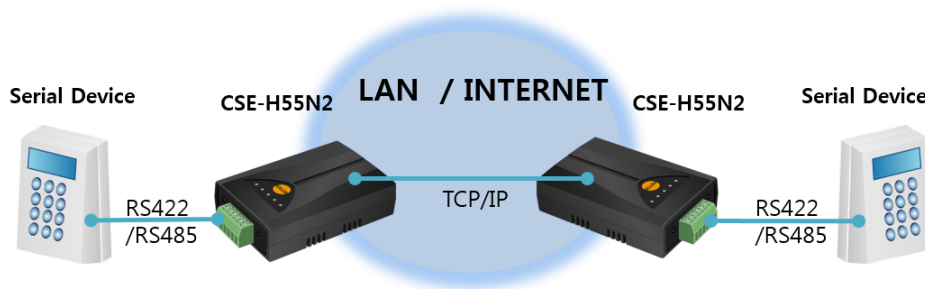


Figure 1-5 applied to a serial tunneling system

- Applied to a multi-drop network.

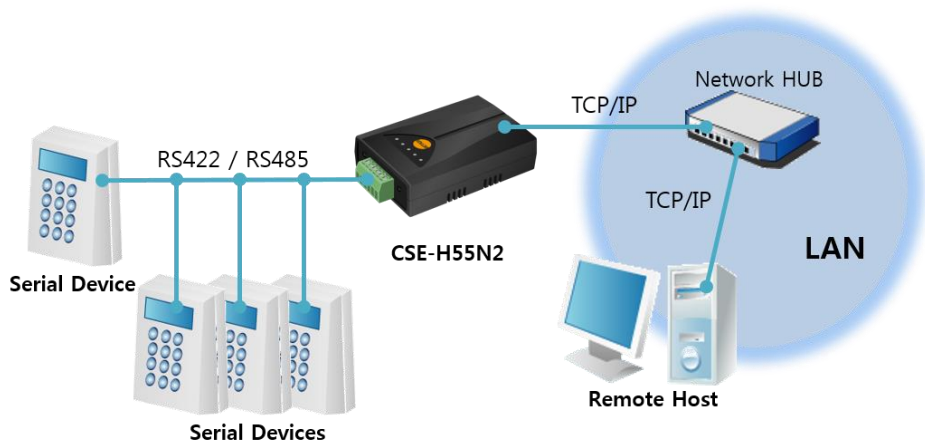


Figure 1-6 applied to a multi-drop network

- An Example for Multiple Monitoring System

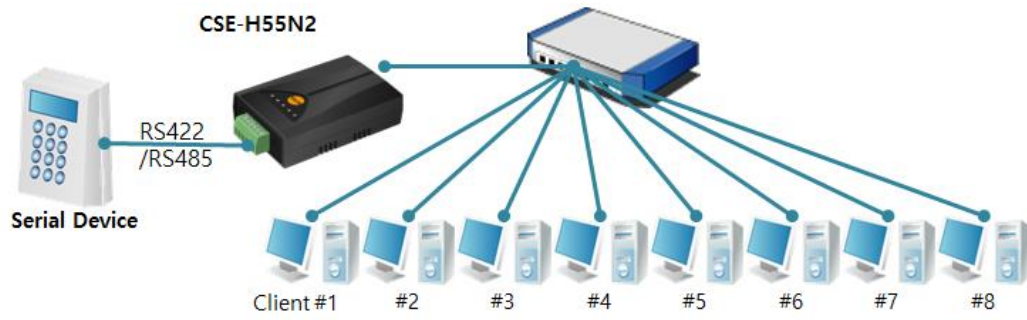


Figure 1-7 An Example for Multiple Monitoring System

1.4 Specification

1.4.1 Hardware

| | | |
|-------------|---|---|
| Power | Input Voltage | DC 5V (±10%) |
| | Current | 190mA typical |
| Dimension | 94mm x 57mm x 24mm | |
| Weight | About 64g | |
| Serial Port | Serial | RS422 / RS485 (Baud Rate: 300bps ~ 230,400bps) |
| | Network | 10 Base-T or 100 Base-TX Ethernet Auto-Sensing Auto MDI or MDIX cable Auto-Sensing |
| Temperature | Storage / Operating Temperature: -40 ~ 85°C | |
| Approval | KC, CE, FCC | |
| RoHS | RoHS Compliant | |

Table 1-1 Hardware specification

1.4.2 Software

| | | |
|--------------------|---|--|
| Protocol | TCP, UDP, IPv4/IPv6 dual stack, , ICMPv6/TCPv6/UDPv6 ICMP, ARP, DHCP, PPPoE, DNS, DDNS(Dynamic DNS), Telnet, SSL | |
| 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 |
| 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 specification

1.5 Interfaces

1.5.1 Serial Interface

CSE-H55N2 has a serial port for user serial device (300bps ~ 230,400bps). This port is interfaced with 6-pin terminal block and each pin should be fixed by a flat-head screwdriver driver.

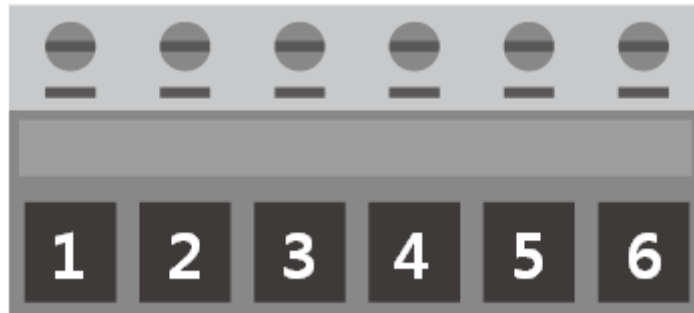


Figure 1-8 6 pins Terminal block

- Pin Assignment for RS-422

| Number | Name | Description | Level | I/O | Etc. |
|--------|------|-----------------|-------|-----|----------|
| 1 | TX + | Transmit Data + | RS422 | OUT | Required |
| 2 | TX - | Transmit Data - | | | |
| 3 | GND | Ground | - | - | Required |
| 4 | RX + | Receive Data + | RS422 | IN | Required |
| 5 | RX - | Receive Data - | | | |
| 6 | GND | Ground | - | - | Required |

Table 1-3 pin assignment of the RS422

- Pin Assignment for RS-485

| Number | Name | Description | Level | I/O | Etc. |
|--------|-------|---------------------------|-------|-----|----------|
| 1 | TRX + | Transmit / Receive Data + | RS485 | OUT | Required |
| 2 | TRX - | Transmit / Receive Data - | | IN | |
| 3 | GND | Ground | - | - | Required |
| 6 | GND | Ground | - | - | Required |

Table 1-4 pin assignment of the RS485

- Serial Port Parameters

| Parameter | Value |
|--------------|----------------------------------|
| Number | 1 |
| Type | RS422 / RS485 |
| Baud rate | 300 ~ 230,400 [bps] |
| Parity | NONE / EVEN / ODD / MARK / SPACE |
| Data bit | 8 / 7 |
| Stop bit | 1 / 1.5 / 2 |
| Flow control | NONE / RTS / CTS |

Table 1-5 serial port parameters

☞ ***When the 'Data bit' is set to 7, NONE parity cannot be used.***

1.5.2 Ethernet Interface

Since part of CSE-H55N2 network is composed of Ethernet, UTP cable may be connected. It will automatically sense 10Mbps or 100Mbps Ethernet and connect itself to network. It also provides auto MDI/MDIX function that can automatically sense 1:1 cable or cross over cable.



Figure 1-9 RJ45 the Ethernet interface

- RJ45 the Ethernet port interface

| Number | Name | Direction |
|--------|------|-----------|
| 1 | TX+ | Output |
| 2 | TX- | Output |
| 3 | RX+ | Input |
| 4 | - | - |
| 5 | - | - |
| 6 | RX- | Input |
| 7 | - | - |
| 8 | - | - |

Table 1-6 RJ45 the Ethernet port interface

- Status of the system RJ45 LED

| Color | LED status | Description |
|--------|------------|-------------------------------|
| Yellow | Off | 10 Mbps |
| | On | 100 Mbps |
| Green | On | Connecting with Ethernet |
| | Off | Not connecting with Ethernet. |
| | Blinking | Data is being transmitted |

Table 1-7 LED status on the RJ45 LED

1.5.3 Power

CSE-H55N2 can be powered by 5VDC source via power jack. The specifications of the power jack are as follows:

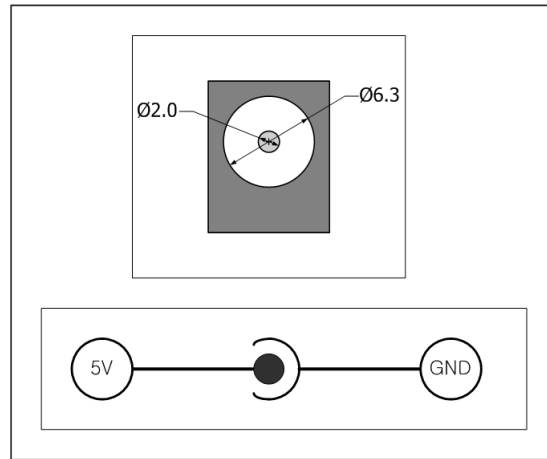


Figure 1-10 power jack

1.6 System LED

CSE-H55N2 has several lamps to show the current system status.

Each lamp shows the following status:

| Mode | Name | Color | Status | Description |
|---------------------------|------|--------|--------------------------|---|
| Common | PWR | Red | On | Supplying the power |
| | LINK | Green | On | Connecting with Ethernet |
| | RXD | Yellow | Blinking | Receiving data from the Ethernet |
| | TXD | Green | Blinking | Sending data to the Ethernet |
| Normal mode | STS | Yellow | Blinking in every second | Obtaining an IP address |
| | | | Blinking 4 times at once | Without obtaining an IP address via DHCP or PPPoE network |
| | | | On | Connecting with TCP |
| ISP mode | STS | Yellow | Off | Under ISP mode |
| Serial Configuration mode | STS | Yellow | Blinking simultaneously | Under Serial Configuration mode |
| | LINK | Green | | |
| | RXD | Yellow | | |
| | TXD | Green | | |

Table 1-8 LED status on the top panel

| Mode | Color | Status | Description |
|--------|--------|----------|-------------------------------------|
| Common | Yellow | Blinking | Receiving data from the serial port |
| | Green | Blinking | Sending data to the serial port |

Table 1-9 LED status on the front panel

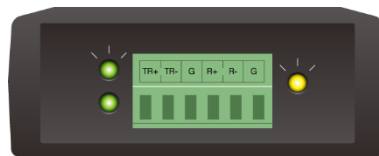


Figure 1-11 the front side panel

The green LED on the left side of RJ45 connector is connected to a LINK LED and the yellow LED on the right side indicates Ethernet speed. please refer to [Table1-7]

1.6.1 Function button

There is a switch, which is named function switch (or button) located on the side of the product. You can change the operation mode of CSE-H55N2 to ISP or Serial Configuration mode with this switch. And it is used for factory reset.



Figure 1-12 function switch

2 Installation and Test

2.1 Installation

Before testing CSE-H55N2, users should connect both serial and Ethernet port to a PC. To connect the RS232 port of your PC and CSE-H55N2 via serial, you need a RS232 to RS422/RS485 converter. It will be no problem that the Ethernet connection includes network hubs.

In case if your PC doesn't have a RS232 port, use a USB to RS232 cable.

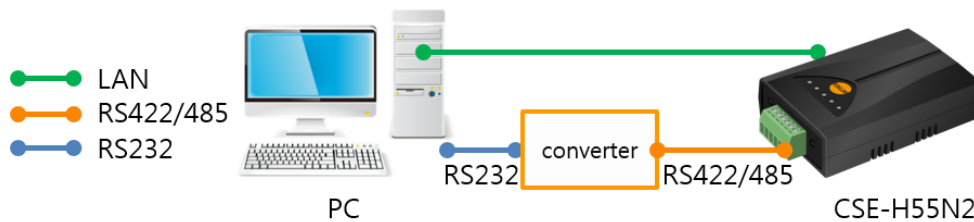


Figure 2-1 connection between CSE-H55N2 and a PC

2.1.1 Setting Network Area

This step is for setting both CSE-H55N2 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

Add or change the IP address of the network adapter on your PC like following.

Get into the menu of [Windows Control Panel] >> [Network Connections] >> [Properties of the Network Adapter – with right click of your mouse]. Then, you can show the properties of [Internet Protocol (TCP/IP)]. In there, press the [Advanced..] button for adding an IP Address like the below figure.

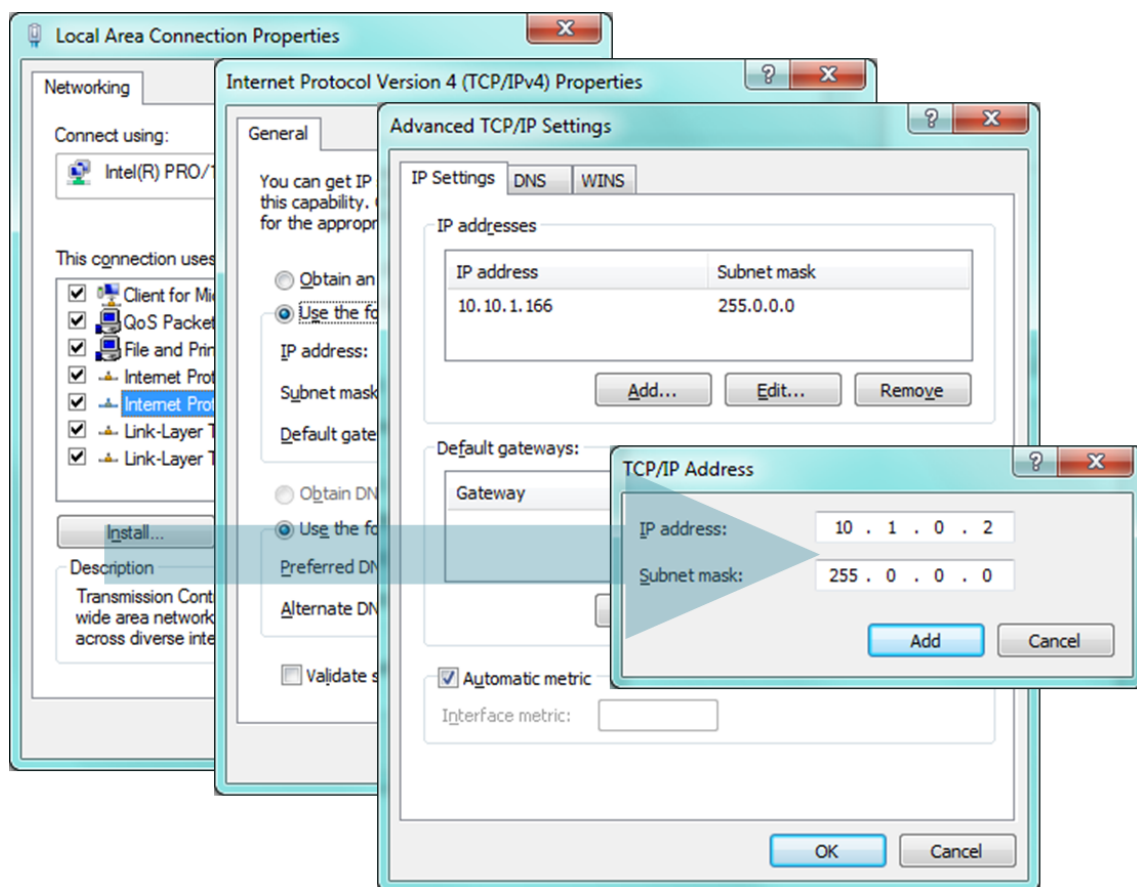


Figure 2-2 adding / changing the IP address of users' PC

- Setting of CSE-H55N2

CSE-H55N2 uses ezManager as it's a configuration program. ezManager is for MS Windows, and this is comfortable to use because it doesn't need installation. First, search your CSE-H55N2 via network. All the values of parameters are set the default values in the factory. To apply it to your system, proper values should be set via ezManager. Major parameters' default values are listed on below table. To implement this simple test, keep these values without any changes.

| Name | | Default Values |
|-----------------------|--------------------|----------------|
| Network | Local IP Address | 10.1.0.1 |
| | Subnet Mask | 255.0.0.0 |
| | IPv6 | Disable |
| Option | TELNET | Checked |
| | IP Address Search | Checked |
| Serial Port (COM1) | Serial Type | RS485 |
| | Baud Rate | 19,200bps |
| | Parity | NONE |
| | Data Bits | 8 |
| | Stop Bit | 1 |
| | Communication mode | TCP Server |
| | Local Port | 1470 |

Table 2-1 default values of Major parameters

☞ ***Refer to ezManager website for more details.***

2.2 Simple Test

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

- Connecting to the CSE-H55N2 via LAN

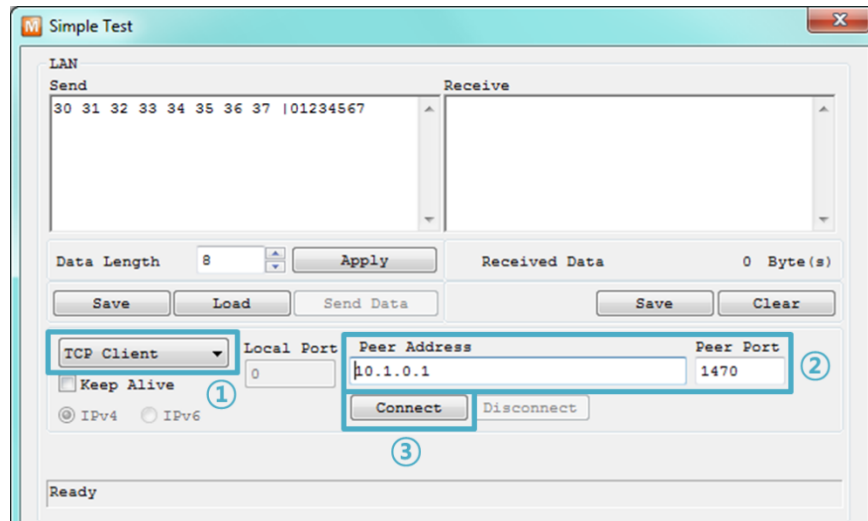


Figure 2-3 settings for TCP connection

- ① Select [TCP Client]
 - ② Input correct IP address and port number of CSE-H55N2
 - ③ Click the [Connect] button. (In case of TCP Server, it will be [Listen] button)
- Opening RS232 Port

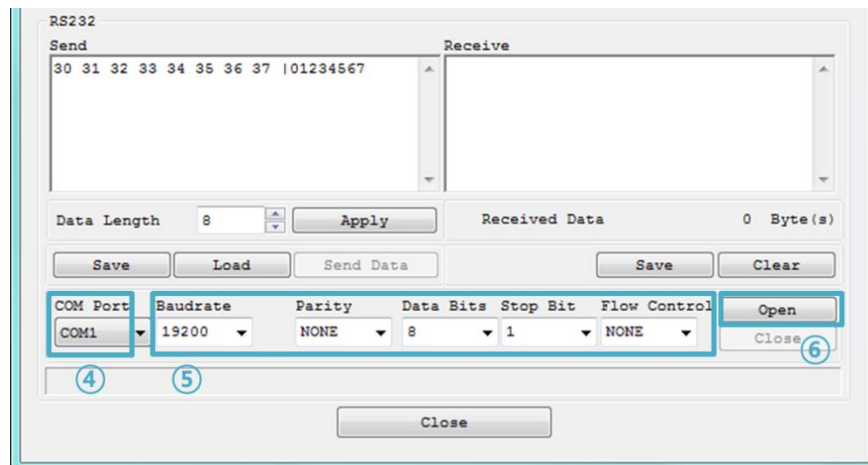


Figure 2-4 opening COM Port

- ④ Select COM port where the CSE-H55N2 is being connected.
- ⑤ Make sure that all the parameters are the same with CSE-H55N2.
- ⑥ Press the [Open] button

- Confirm the TCP Connection and COM port status

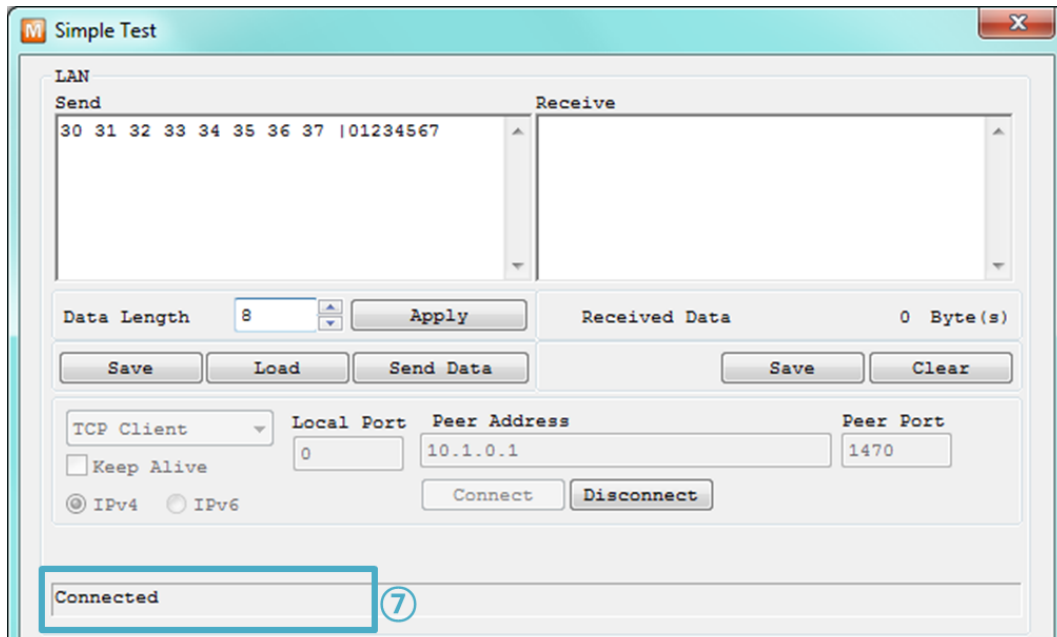


Figure 2-5 TCP Connected message

- ⑦ Check the message if the TCP connection has been established well.

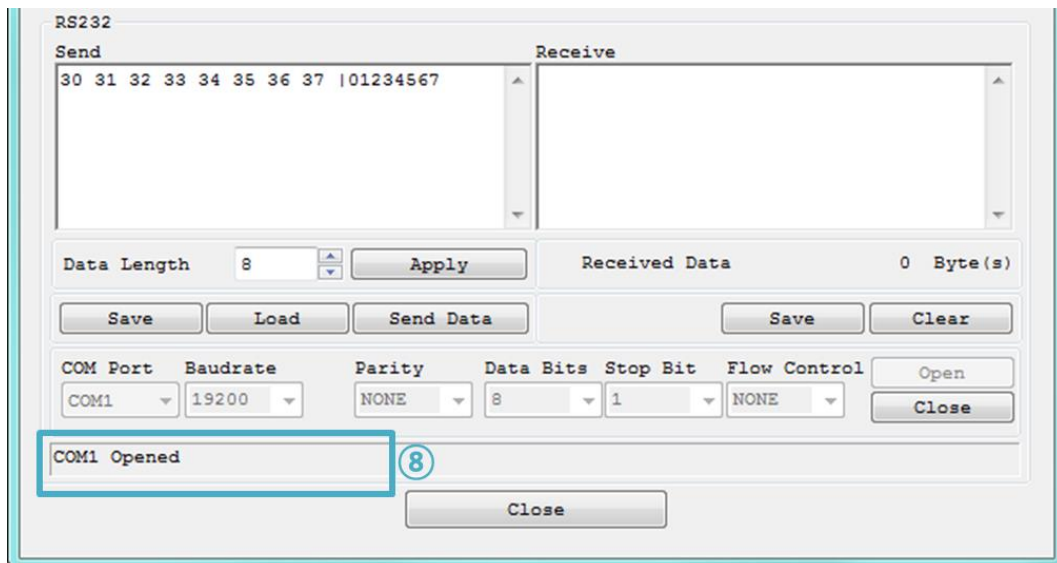


Figure 2-6 COM Port open message

- ⑧ Check the message if the COM port has been opened

- Data transmission test

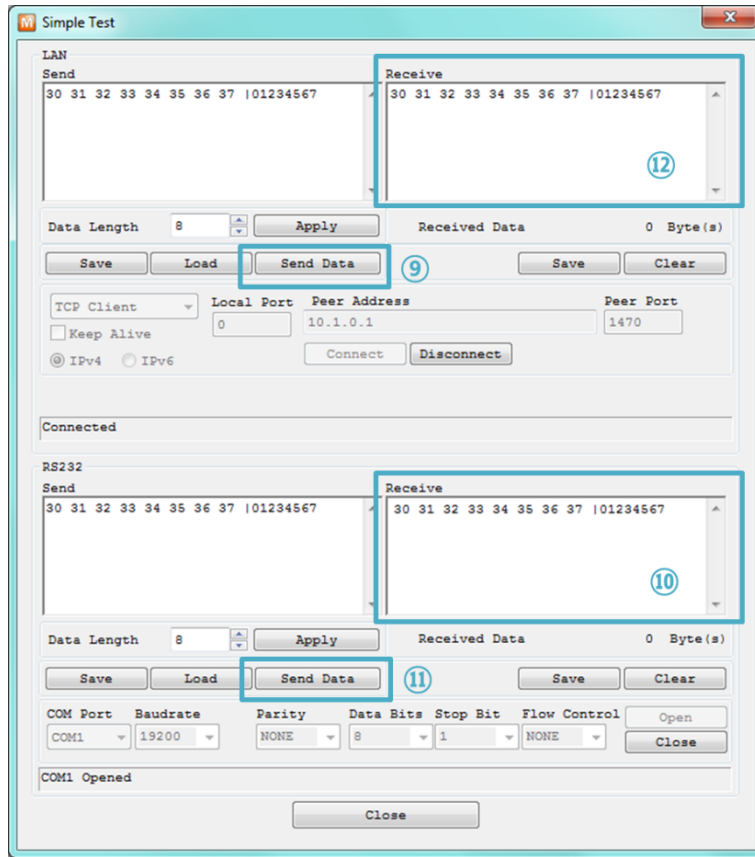


Figure 2-7 successful data transmission

- ⑨ Click the [Send data] on the LAN side.
- ⑩ Check the data have been shown from the step ⑨.

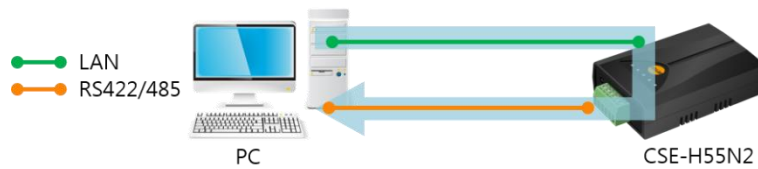


Figure 2-1 LAN → RS232

- ⑪ Press the [Send data] on the RS232 side.
- ⑫ Check the data from ⑪ has been received.

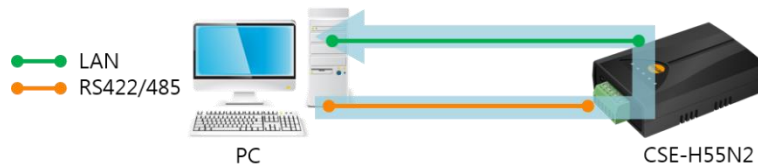


Figure 2-2 RS232 → LAN

3 Configuration

3.1 Configuration with ezManager

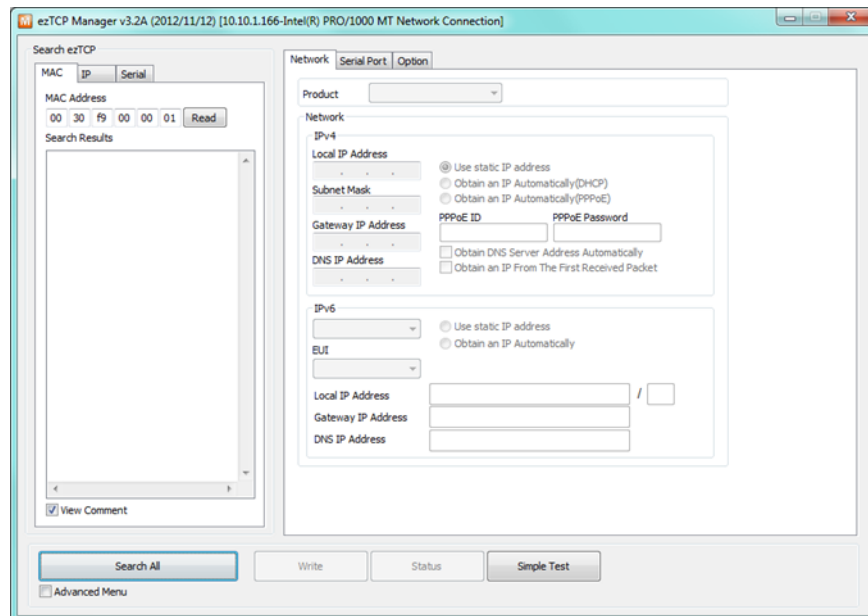


Figure 3-1 initial appearance of ezManager

3.1.1 Configuration via LAN

- Checklists

Make sure the connection between your PC and CSE-H55N2. 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

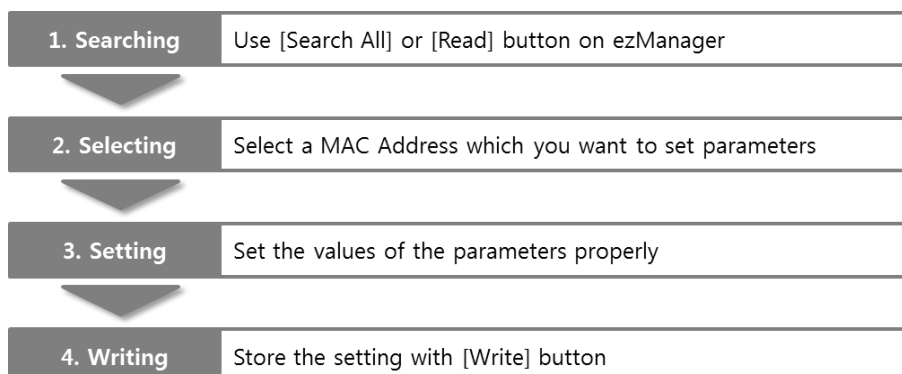


Figure 3-2 procedures for configuration via LAN

3.1.2 Configuration via Serial

- Checklists

To use serial configuration, COM port of PC should be connected with CSE-H55N2. Because CSE-H55N2 doesn't have a RS232 port, a RS232 to RS422/485 converter is needed. Of course, CSE-H55N2 should be in operation as [Serial Configuration Mode].

- Procedures

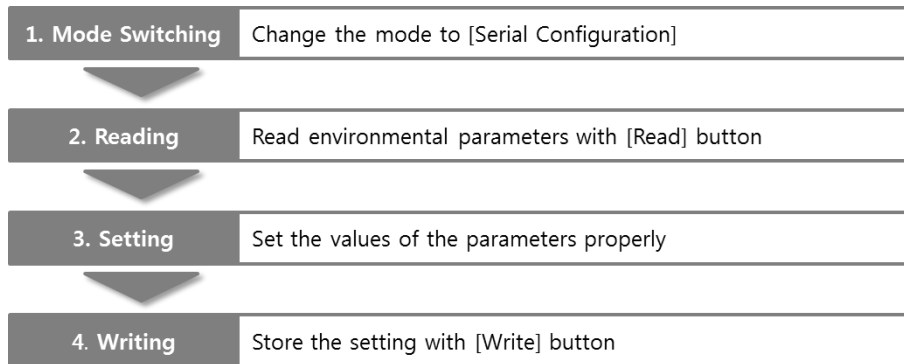


Figure 3-3 procedures for configuration via Serial

- Step 2, Reading

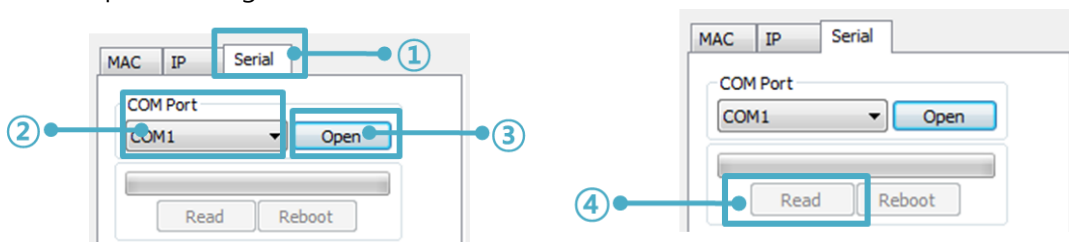


Figure 3-4 reading procedure via serial

- ① Choose the [Serial] tab
- ② Select the COM port which the CSE-H55N2 is connected with
- ③ Open the COM port with the [Open] button
- ④ Load the setting with [Read] button

☞ Refer to the [ezManager] manual on our website for details.

☞ You can download ezManager application for a smartphone on our website.

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-H55N2 using RS232 cross cable. To use this, CSE-H55N2 has to be set to [AT command] mode as its communication mode. This can be configured by ezManager.

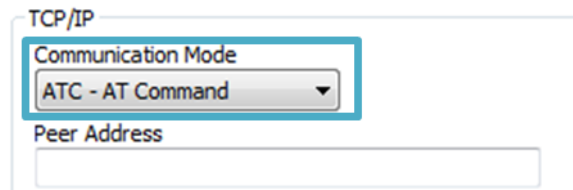


Figure 3-5 setting the communication mode to the AT command

- Procedures

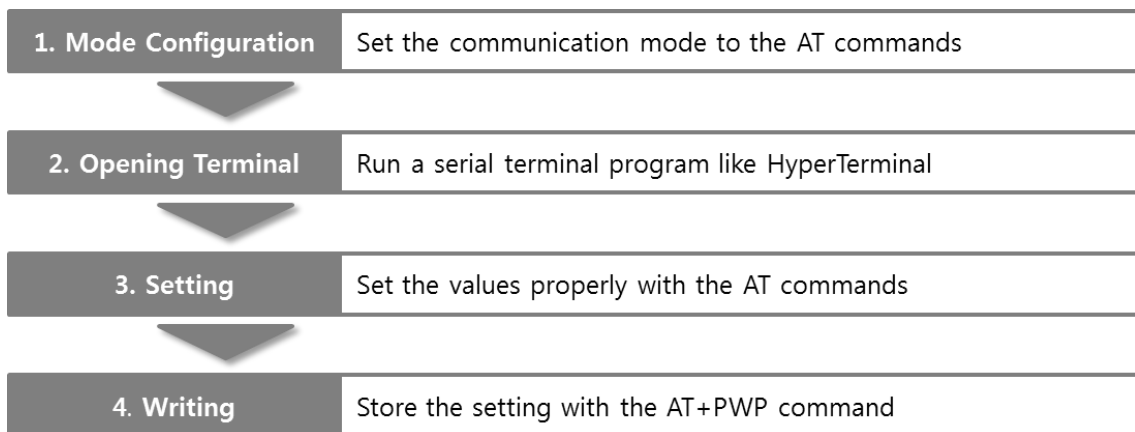


Figure 3-6 procedures for configuration with AT command

| 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, the 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-H55N2 is defined for specific purpose, and those are as follows

- 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 RS-422 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 entering each mode

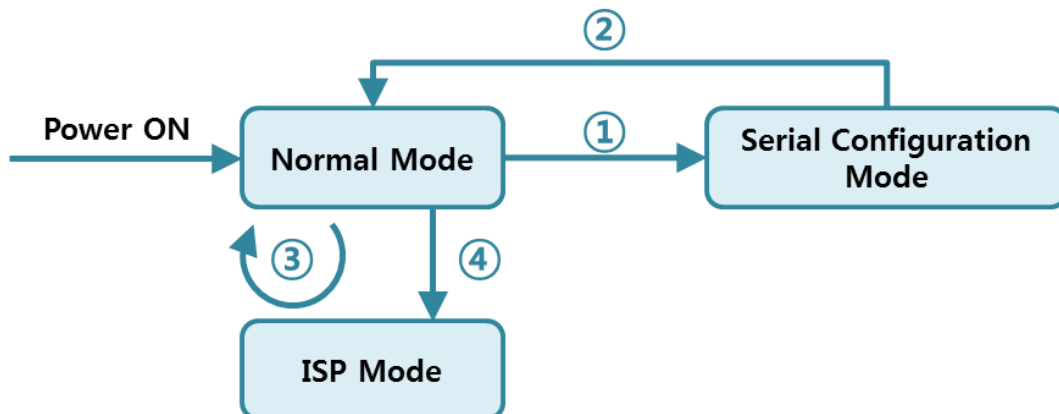


Figure 4-1 How to entering each mode

- ① Push the function button less than 1 second.
- ② Reset
- ③ Transfer a firmware by ezManager
- ④ Push the function button over than 1 second.

4.3 Comparison of each mode

| Name | Serial port | Serial type |
|----------------------|------------------|---------------|
| Normal | configured value | RS422 / RS485 |
| Serial Configuration | 115,200/N/8/1 | RS422 |
| ISP | - | - |

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.

| Mode | Description |
|------------|---|
| TCP Server | Wait for connection request from TCP clients (Passive Connection) |
| TCP Client | Send connection request to a TCP server (Active Connection) |
| AT Command | Control connections by AT commands (Active / Passive Connection) |
| UDP | Communicate in block units without connection |

Table 4-2 comparison of communication modes 1

| 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 4-3 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 mode is for setting environmental parameters through the serial port. ezManager has an interface for this mode. Use the [Read] button on the [Serial] tab.

4.6 ISP Mode

You can enter this mode by pressing the function button over 1 seconds. 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 done via Ethernet.

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

4.6.2 Revoking Security Options

CSE-H55N2 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.

☞ *When you change environment values in the ISP mode, the values may randomly change. After you change the environment, please quit the configuration and start the normal mode again to double check your new environment values.*

5 Communication Modes

5.1 TCP Server

In this mode, CSE-H55N2 listens to a TCP connection request from a remote host. Once a host tries connecting to CSE-H55N2, it accepts a connection. After the connection is established, CSE-H55N2 converts the raw data from the serial port to TCP/IP data and sends it to the network and vice versa.

5.1.1 Key parameters

- Local Port

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

- Event Byte

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

| Value | Description |
|-----------------------------|---|
| 0 | CSE-H55N2 doesn't send the data |
| Otherwise (512 or under) | CSE-H55N2 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 data for amount of the time, the connection would be terminated.

- Notify IP Change

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

- Access restriction

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

5.1.2 Examples

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

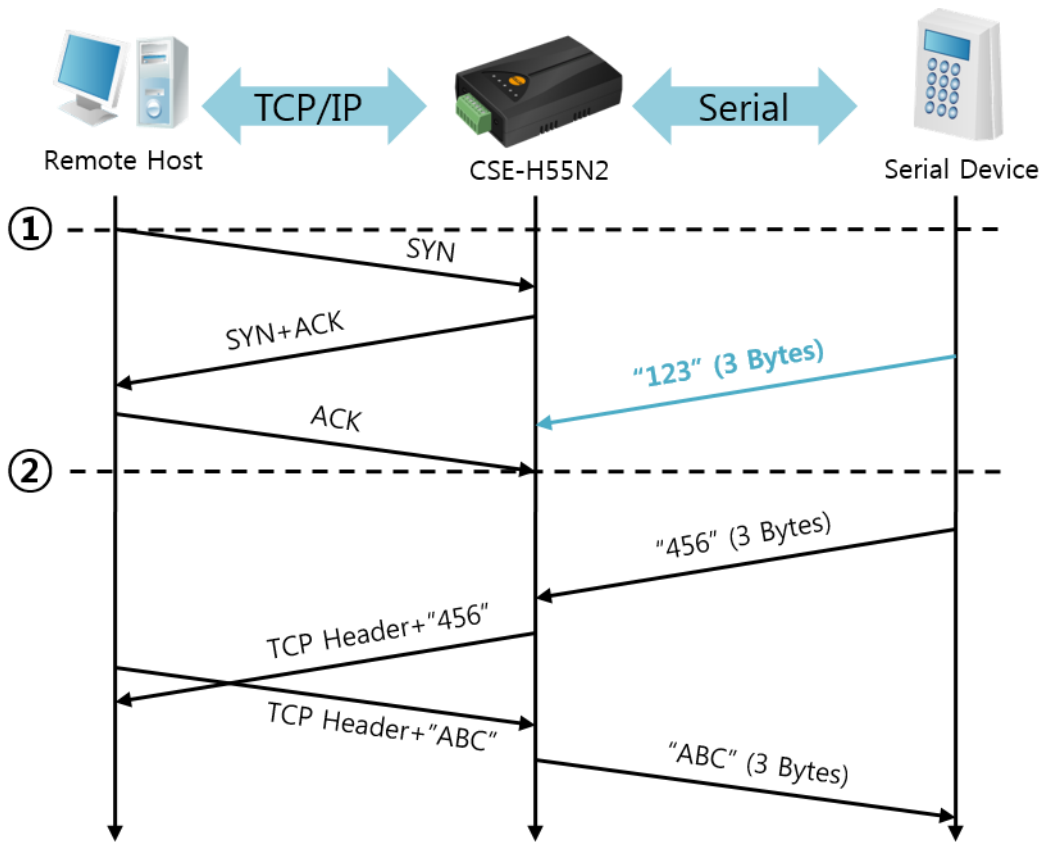


Figure 5-1 time chart

| Points | States |
|--------|--|
| ~ | CSE-H55N2 is listening to connection requests |
| ① | Remote host sends a connection request (SYN) segment |
| ~ | Processes of the connection |
| ② | The connection is established |
| ~ | Data communication is implemented on both side |

Table 5-2 states of each point

Look at the blue arrow. The data "123" is received from the serial port before establishing a connection. In this case, the data would not be sent to Ethernet port because of the [Event Byte] is set to 0.

- A situation that [Event Byte] is set to 1.

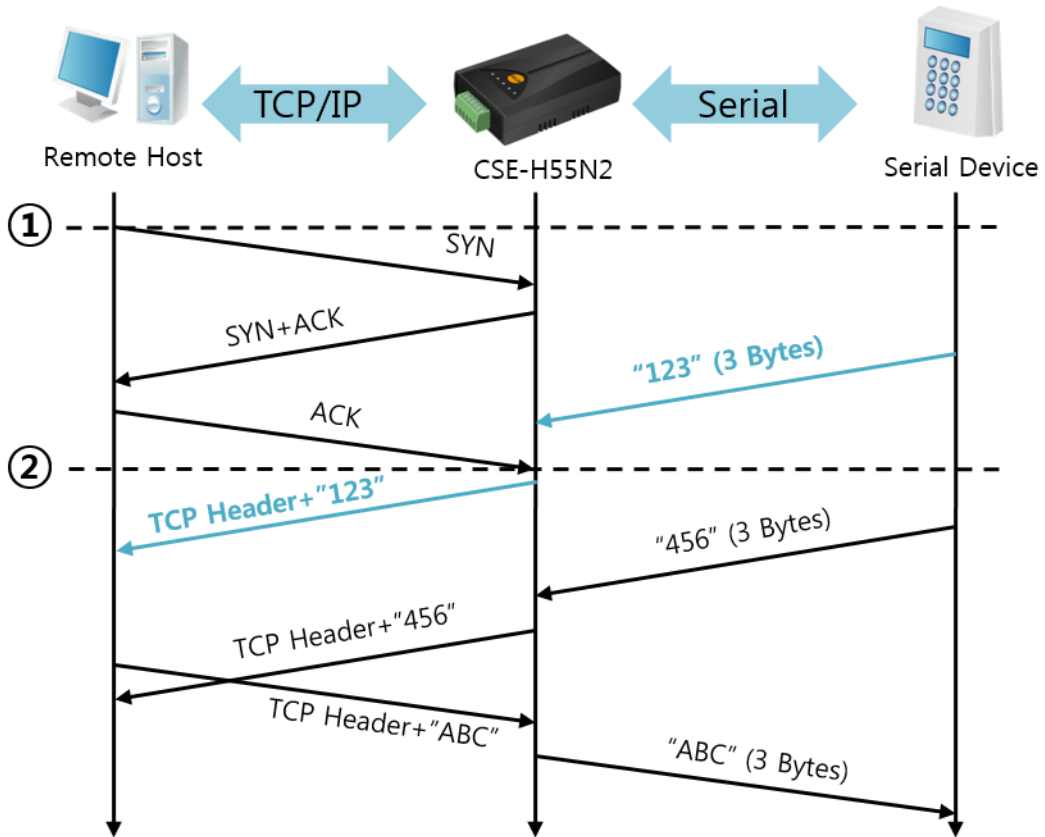


Figure 5-2 time chart

| Points | States |
|--------|--|
| ~ | CSE-H55N2 is listening to connection requests |
| ① | Remote host sends a connection request (SYN) segment |
| ~ | Processes of the connection |
| ② | The connection is established |
| ~ | Data communication is implemented on both sides |

Table 5-3 states of each point

As shown in figure 5-2, although the data "123" is received from serial port before establishing a connection, it is sent to Ethernet port right after establishing a connection because the value of [Event Byte] had been set to 1.

- A situation that [Timeout] is set to 5.

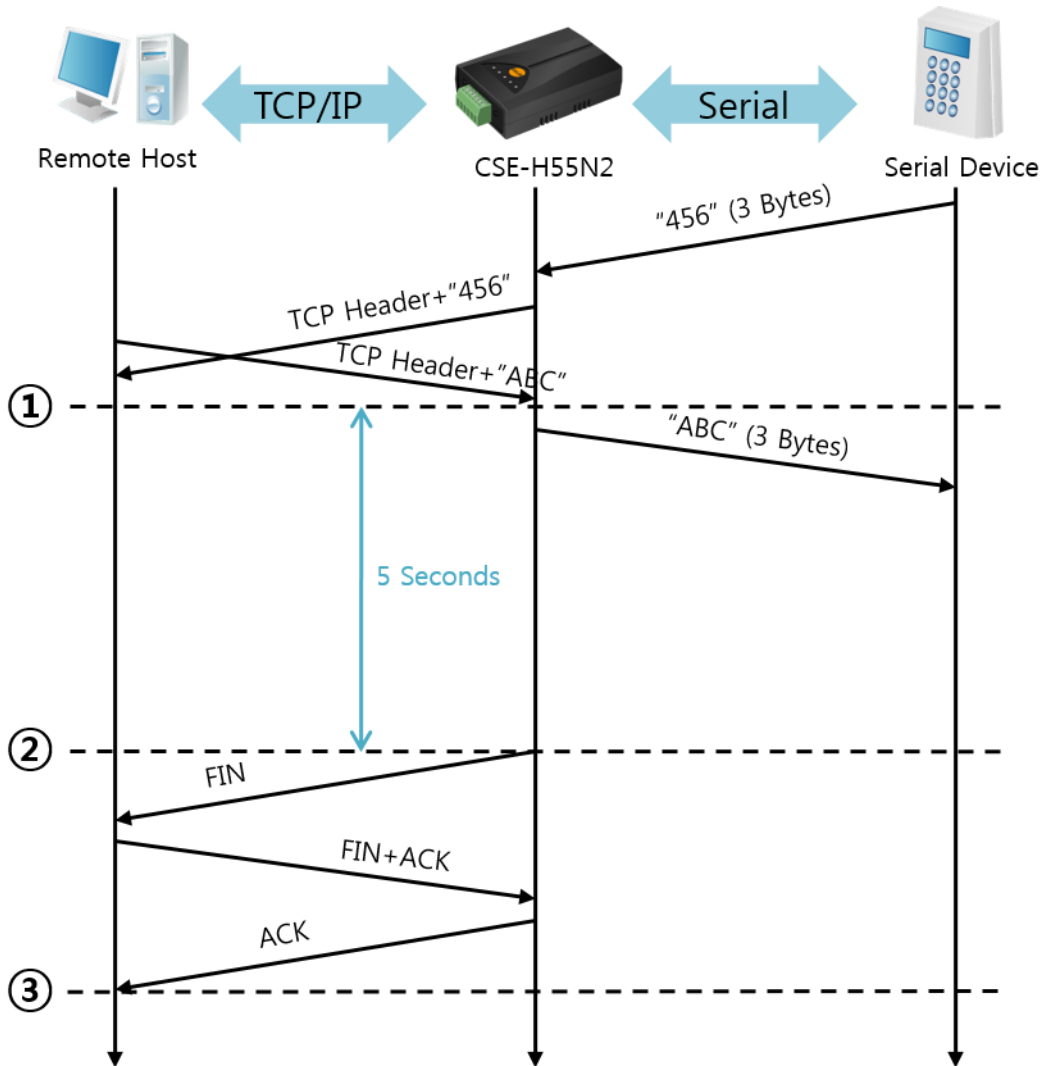


Figure 5-3 time chart

| Points | States |
|--------|---|
| ~ | Data communication on both sides |
| ① | The last segment arrives at the CSE-H55N2 |
| ~ | No data communication for 5 seconds |
| ② | CSE-H55N2 send disconnection request (Fin) to a remote host |
| ~ | Processes of the disconnection |
| ③ | The connection is terminated |
| ~ | CSE-H55N2 is listening to connection requests |

Table 5-4 states of each point

5.2 TCP Client

In this mode, CSE-H55N2 sends request segments to a TCP server with information of [Peer Address] and [Peer Port]. Once a host is listening, the connection will be established. After then, CSE-H55N2 converts the raw data from the serial port to TCP/IP data and sends them to the network and vice versa.

5.2.1 Key parameters

- Peer Address

This part is to put host name or IP address of TCP server.

- Peer Port

[Peer Port] is a port number of TCP server.

- Event Byte

This item can decide the point of time to send the connection request parameter.

| Value | Description |
|-----------------------------|--|
| 0 | Right after CSE-H55N2 boots up |
| Otherwise (512 or under) | right after the bytes set to [Event Byte] have been received from the serial port Setting to less than 512 bytes is strongly recommended. |

Table 5-5 the operation of Event Byte 1

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

| Value | Description |
|-----------------------------|--|
| 0 | CSE-H55N2 does not send the data |
| Otherwise (512 or under) | CSE-H55N2 sends the data right after a connection is established. Setting to less than 512 bytes is strongly recommended. |

Table 5-6 the operation of Event Byte 2

- Timeout

If there is no data transmission for amount of the time the connection would be terminated.

- TCP Server

This check option enables you to get to the TCP Server / Client mode. In this mode, CSE-H55N2 can be operated as a TCP server or client without changing its settings.

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

5.2.2 Examples

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

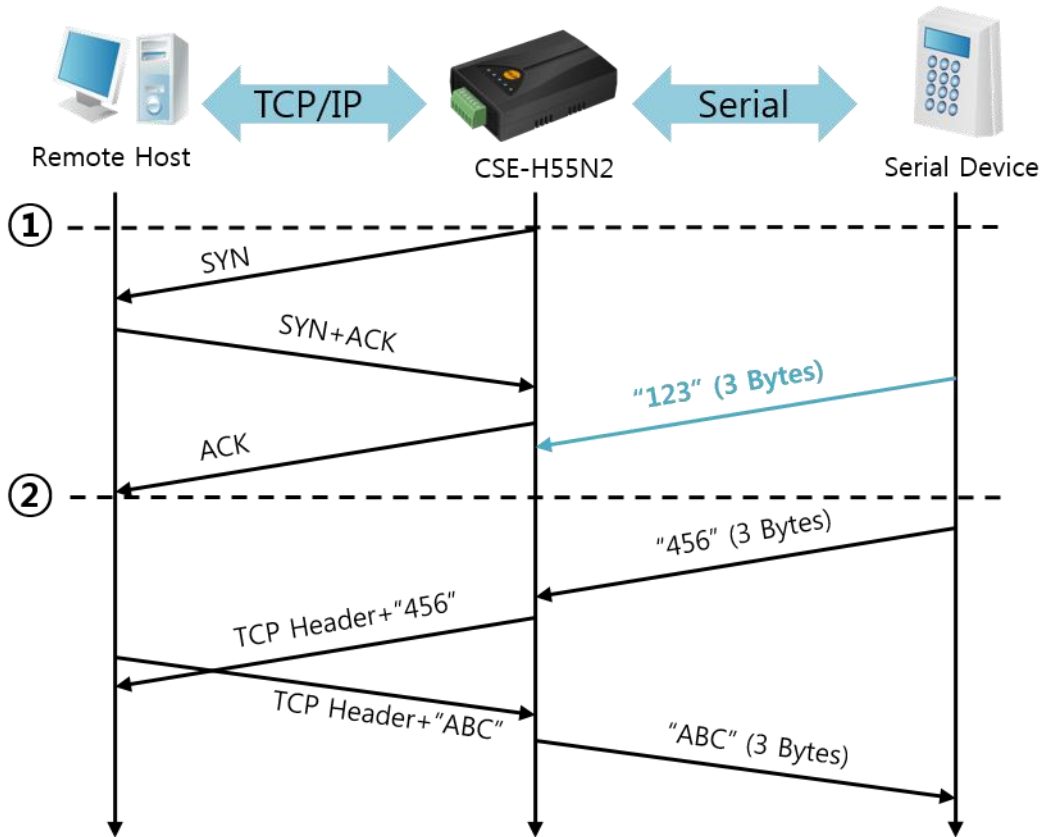


Figure 5-4 time chart

| Points | States |
|--------|--|
| ~ | Power is not supplied yet. |
| ① | CSE-H55N2 sends a connection request segment right after it boots up |
| ~ | Processes of TCP connection |
| ② | The connection is established. |
| ~ | Data communication on both sides |

Table 5-7 state of each point

Look at the blue arrow. The data "123" is received from the serial port before establishing a connection. In this case, the data would not be sent to Ethernet port because of the [Event Byte] is set to 0.

- A situation that [Event Byte] is set to 5.

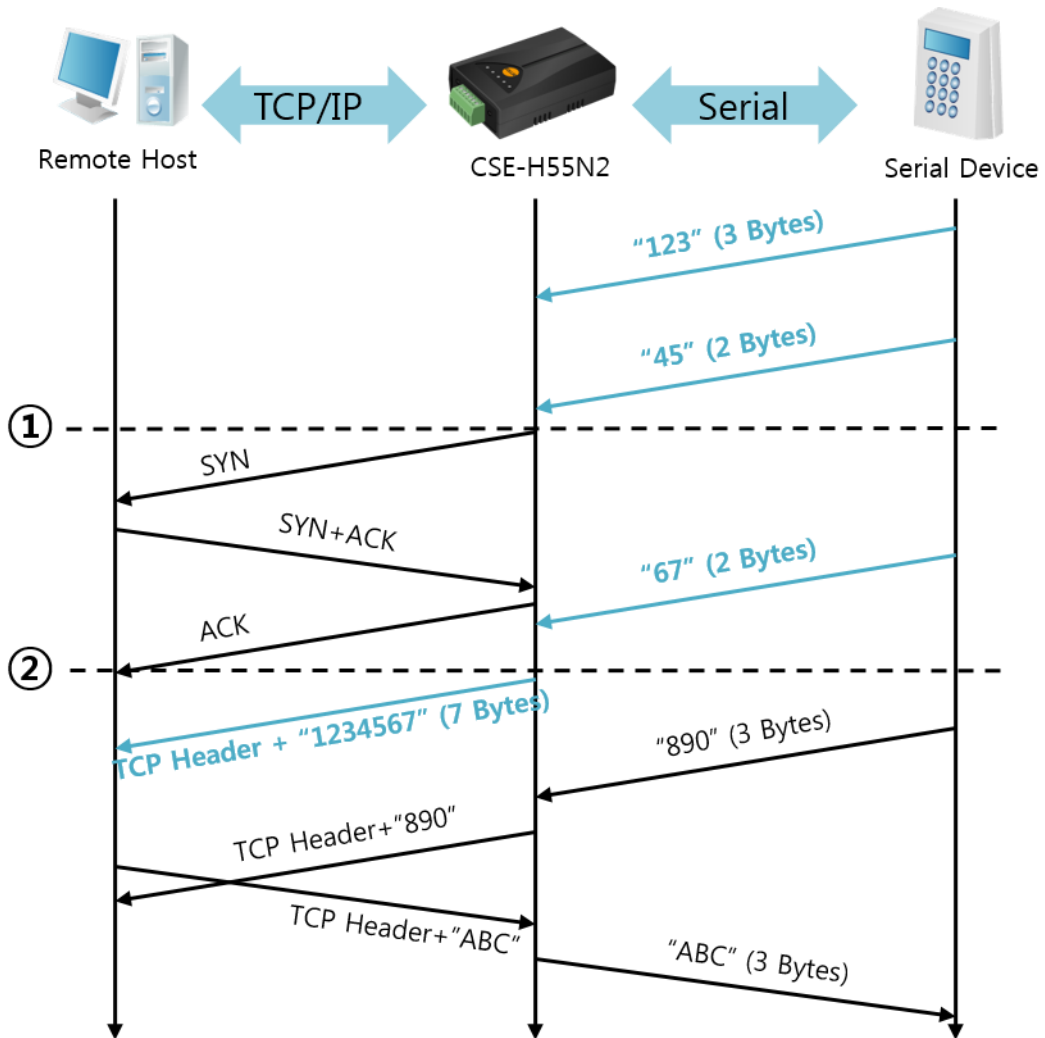


Figure 5-5 time chart

| Points | States |
|--------|---|
| ~ | CSE-H55N2 receives data from its serial port. |
| ① | CSE-H55N2 sends a connection request segment right after receiving 5 bytes. |
| ~ | Processes of the TCP connection |
| ② | The connection is established |
| ~ | The data "1234567" is transmitted to the remote host |

Table 5-8 states of each point

As shown in figure 5-5, CSE-H55N2 has sent a request segment right after the size of the serial data has been 5 bytes. Even though they arrived before the connection, the data "123", "45" and "67" was transmitted to the remote host because the [Event Byte] is set to 5.

- An activated [TCP Server] option

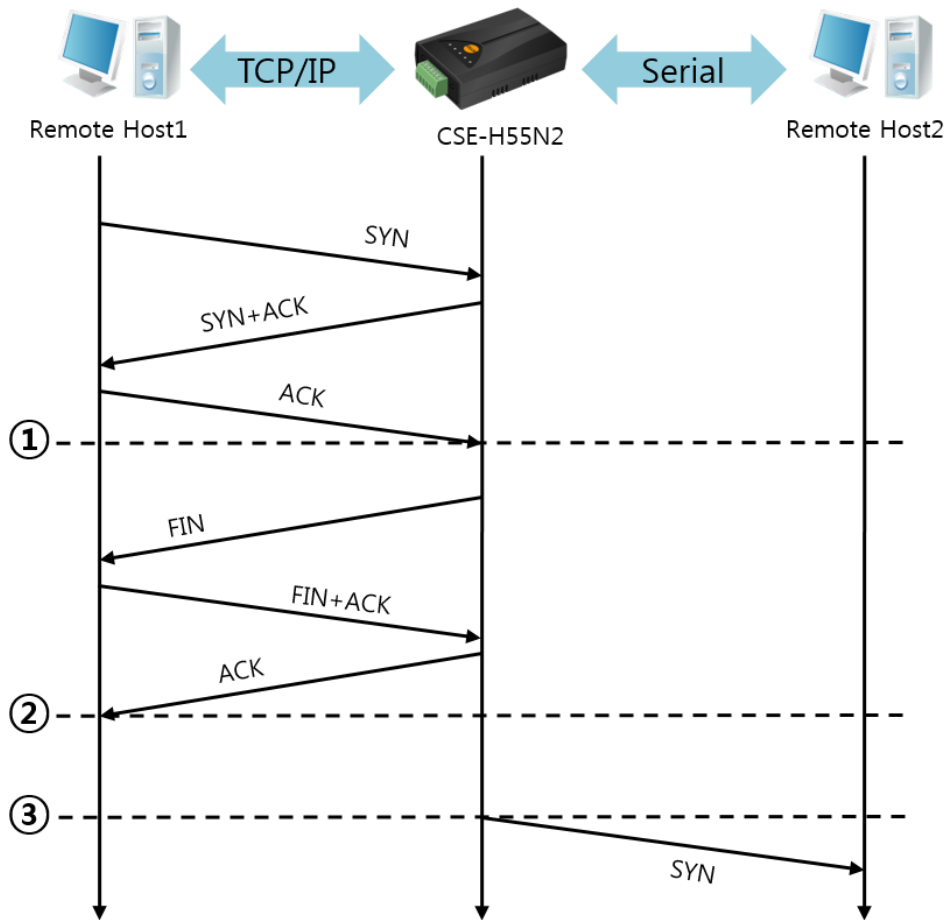


Figure 5-6 time chart for activating [TCP Server] option

| Points | States |
|--------|---|
| ~ | CSE-H55N2 is listening to connection requests |
| ① | The connection has been established |
| ~ | CSE-H55N2 is on line and processes of the disconnection |
| ② | The connection has been terminated |
| ~ | Both sides are offline |
| ③ | Sends TCP connection request segment |

Table 5-9 state description

The TCP Server / Client mode can be useful option by using [Event Byte] and [Timeout]. Note that only one TCP connection can be established at the same time, so users should consider setting [Timeout] properly.

☞ **Refer to the [TCP server/Client mode] manual on our website for details.**

5.3 AT Command

AT command is a mode which users control CSE-H55N2 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-H55N2

| 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 5-10 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.

5.3.2 Examples

- TCP Server – setting parameters and passive connection

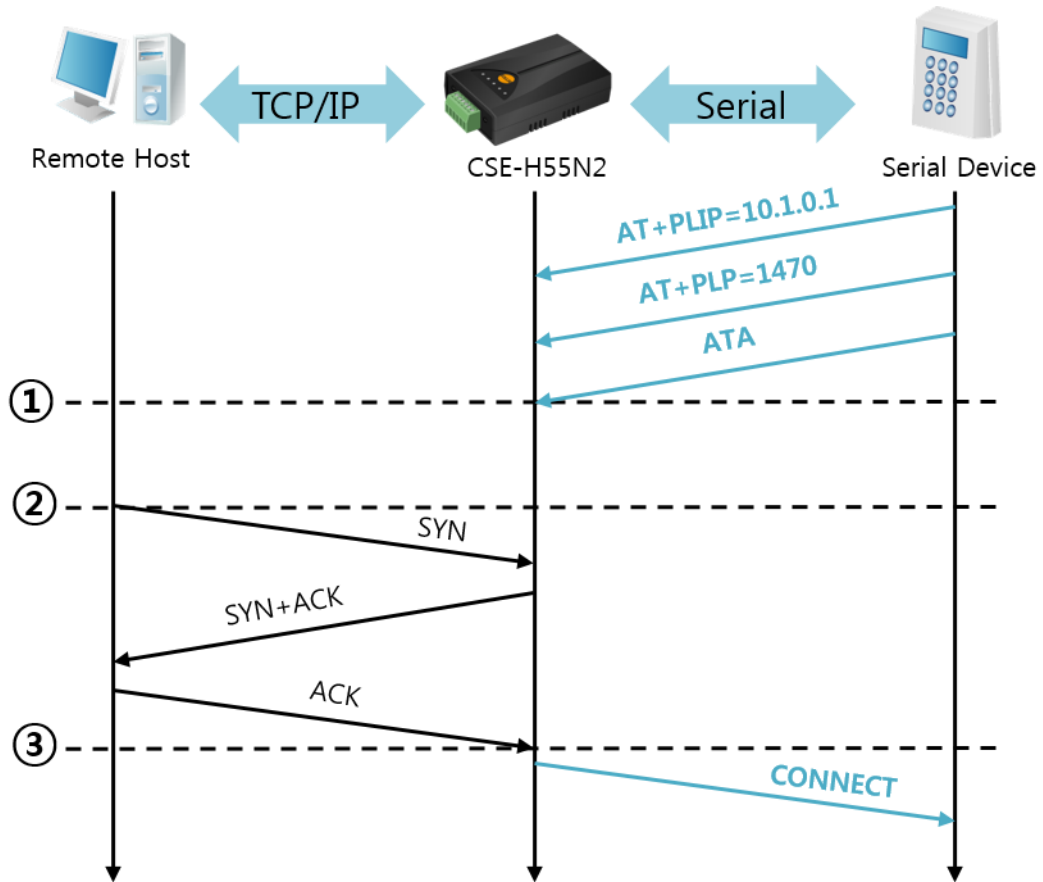


Figure 5-7 time chart

| Points | States |
|--------|--|
| ~ | configuring parameters with AT commands |
| ① | ATA command has arrived. |
| ~ | CSE-H55N2 listens to TCP connection requests. |
| ② | A remote host sends SYN segment to CSE-H55N2 |
| ~ | Processes of TCP connection |
| ③ | TCP connection is established |
| ~ | CSE-H55N2 sends "CONNECT" message to the serial port |

Table 5-11 state of each other

☞ Refer to the [At Command(ATC) Mode] document on our website for details.

- TCP Client – setting parameters and active connection

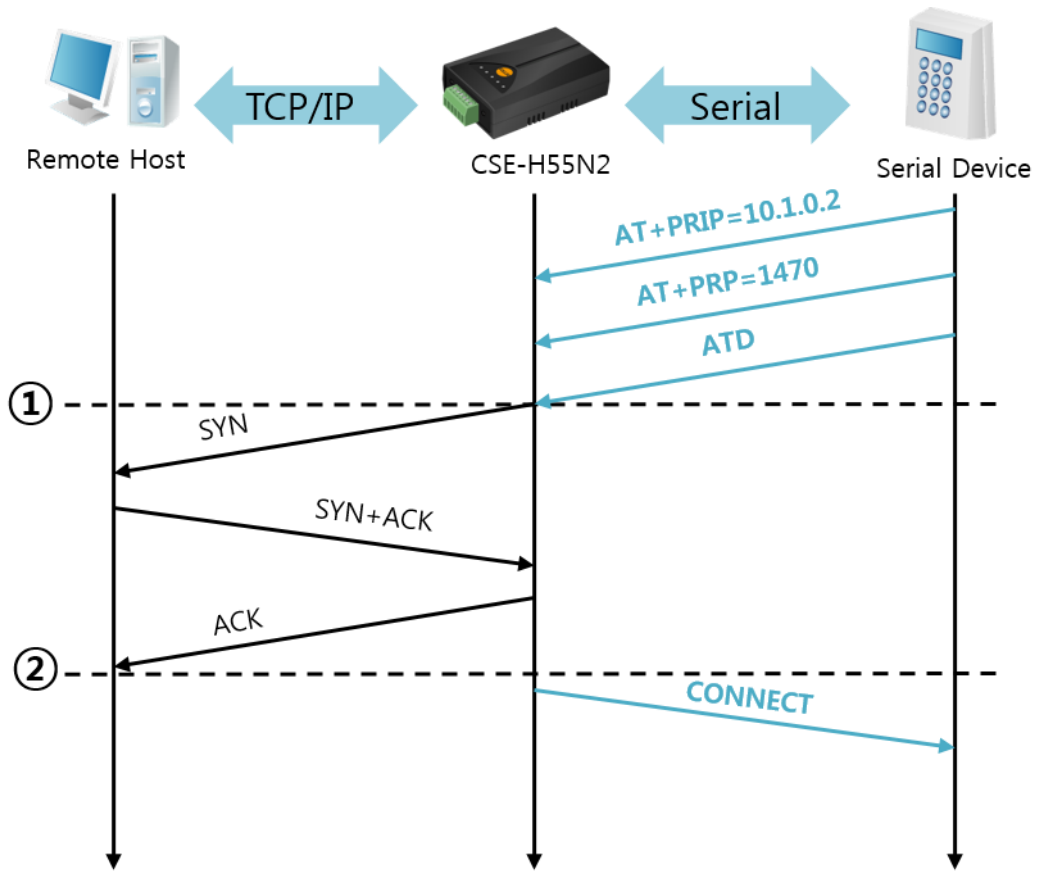


Figure 5-8 time chart

| Points | States |
|--------|---|
| ~ | configuring parameters with AT commands |
| ① | CSE-H55N2 sends a TCP connection request with the ATD command |
| ~ | Processes of TCP connection |
| ② | TCP connection is established |
| ~ | CSE-H55N2 sends "CONNECT" message to the serial port |

Table 5-12 state of each other

- Termination of online status – entering the AT command mode

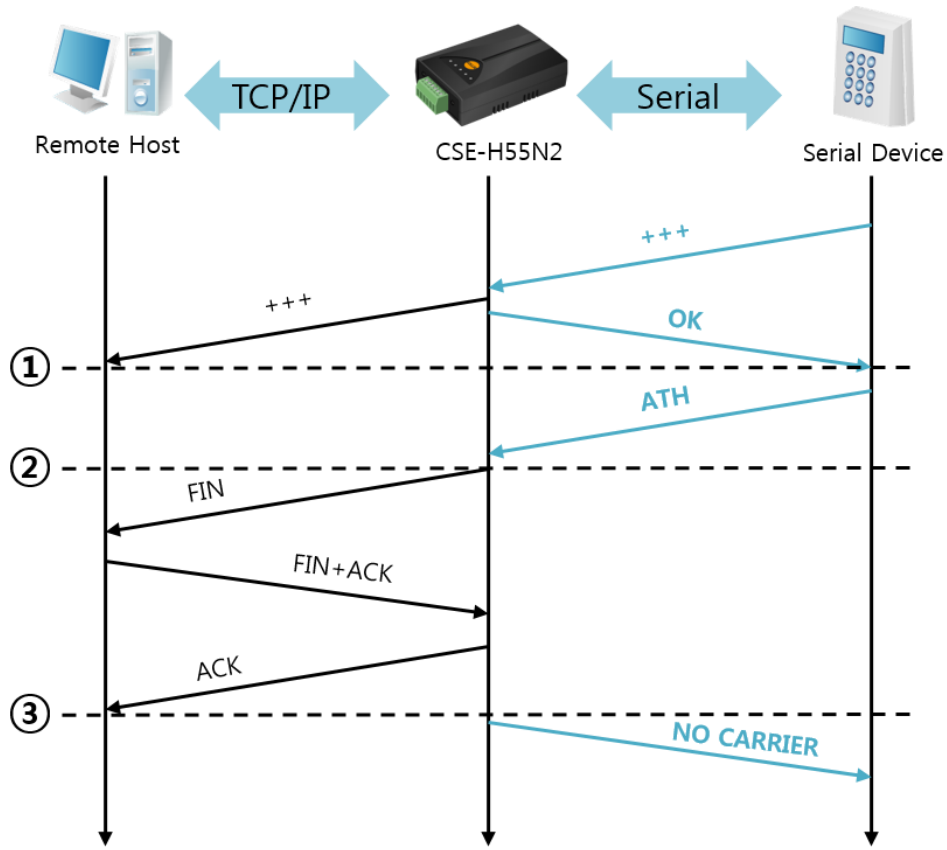


Figure 5-9 time chart

| Points | States |
|--------|--|
| ~ | TCP connection is on-line. |
| ① | The mode is changed to "command mode" after receiving "+++". |
| ~ | command mode (TCP connection is off-line) |
| ② | CSE-H55N2 sends FIN segment right after the "ATH" arrives. |
| ~ | Processes of TCP disconnection |
| ③ | TCP connection is terminated |
| ~ | CSE-H55N2 sends "NO CARRIER" with disconnection |

Table 5-13 states of each other

CSE-H55N2 changes the mode to AT command, when receiving "+++". In this state, the communication with remote host is unavailable because CSE-H55N2 processes only AT commands. Whenever you want to go back to on-line state, just give "ATO" command.

☞ **Refer to the [ATC mode] document on our website for details.**

5.4 UDP

UDP has no connection processes. In this mode, data is sent in block units. Therefore, data that comes through CSE-H55N2's serial port is collected in block units to send it elsewhere.

5.4.1 Key parameters

- Block Size(Byte)

[Block Size(Byte)] is to set the time to gather data in one block. Its unit is byte. If the data in configured size of the [Block Size(Byte)] comes into the serial port, CSE-H55N2 will send them as one block to the network. The maximum value could be 1460 bytes.

- Dynamic update of Peer host

If you set the value of [Peer Address] and [Peer Port] to 0, [dynamic update of peer host] function is activated. By using this function, CSE-H55N2 can communicate to multiple hosts without additional setting.

5.4.2 Examples

- Block Size: 5 bytes

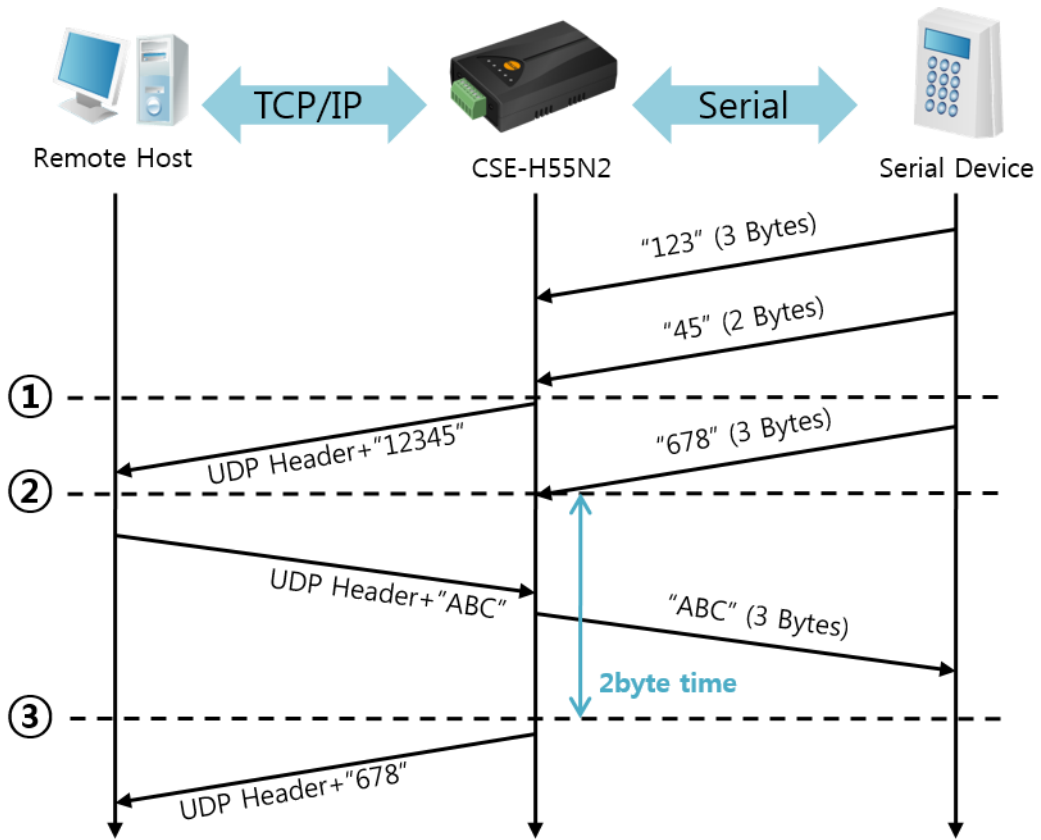


Figure 5-10 time chart

| Points | States |
|--------|--|
| ~ | CSE-H55N2 receives data from the serial port |
| ① | CSE-H55N2 sends 5 bytes as one block based on the [Event byte]. |
| ~ | Serial device sends data "678". |
| ② | The data "678" arrives. |
| ~ | CSE-H55N2 sends data from the remote host to the serial device |
| ③ | 2byte time has passed |
| ~ | CSE-H55N2 sends data "678" as one block based on the [Data frame]. |

Table 5-14 state of each point

- Dynamic Update of Peer host

This is a function that CSE-H55N2 automatically sets its peer host with information of the last packet received from network. The source address of the packet is set to the peer host.

| Parameters | Values |
|--------------|----------|
| Peer Address | 0 (None) |
| Peer Port | 0 |

Table 5-15 setting for [dynamic update of peer host] function

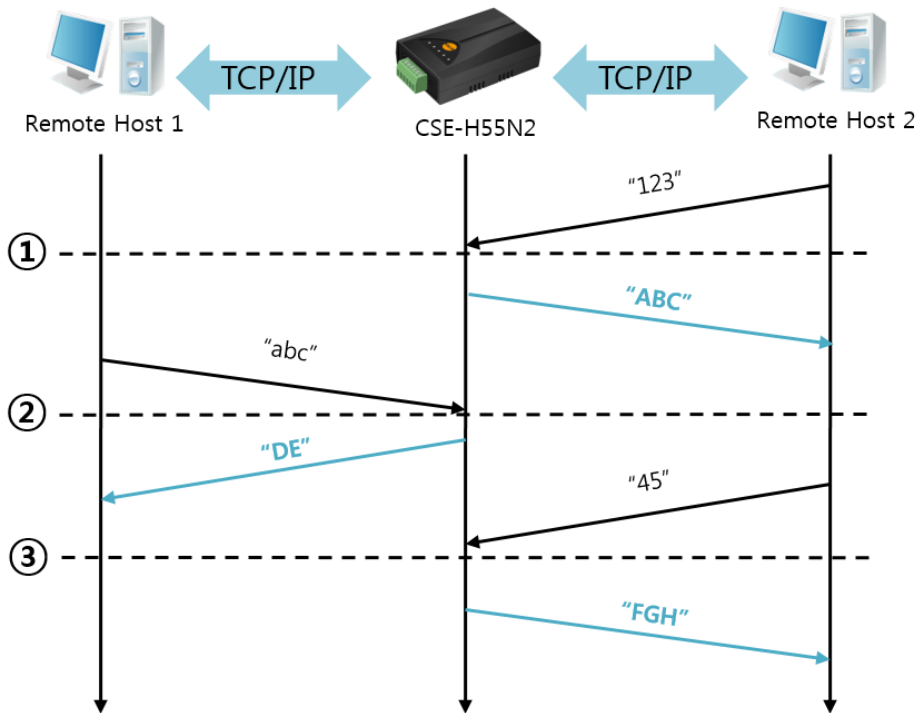


Figure 5-11 time chart

| Points | States |
|--------|--|
| ~ | Sending any UDP data to the network is impossible. |
| ① | UDP data arrives from Remote Host 2. |
| ~ | Send UDP data to Remote Host 2. |
| ② | UDP data arrives from Remote Host 1. |
| ~ | Send UDP data to Remote Host 1. |
| ③ | UDP data arrives from Remote Host 2. |
| ~ | Send UDP data to Remote Host 2. |

Table 5-16 state description

☞ *The data "ABC", "DE", "FGH" are from the serial port of CSE-H55N2 in the Figure 5-11*

6 System Management

6.1 Upgrading Firmware

6.1.1 Firmware

Firmware is a type of software for operation of CSE-H55N2. 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-H55N2.
- 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.

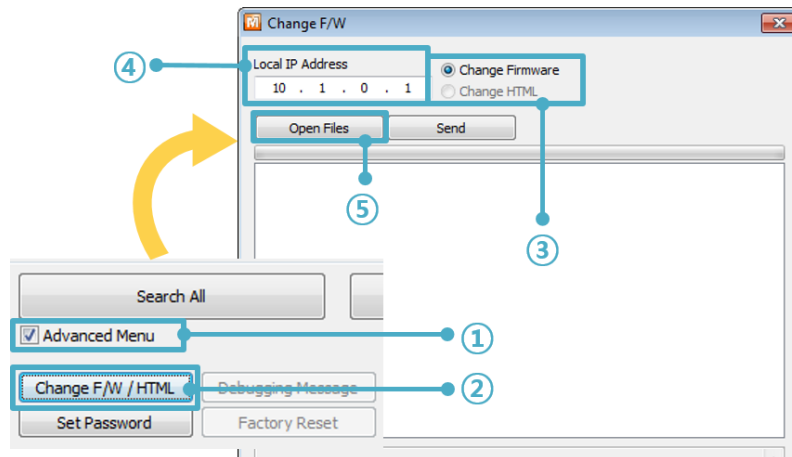


Figure 6-1 running TFTP client

- ① Check the [Advanced Menu] check box
 - ② Click the [Change F/W] button to run TFTP client
 - ③ Select the [Change Firmware] radio button
 - ④ Input the IP address of CSE-H55N2 to the [Local IP Address] text box
 - ⑤ Press the [Open Firmware / HTML] button and choose the firmware file
- Checking firmware file and Sending

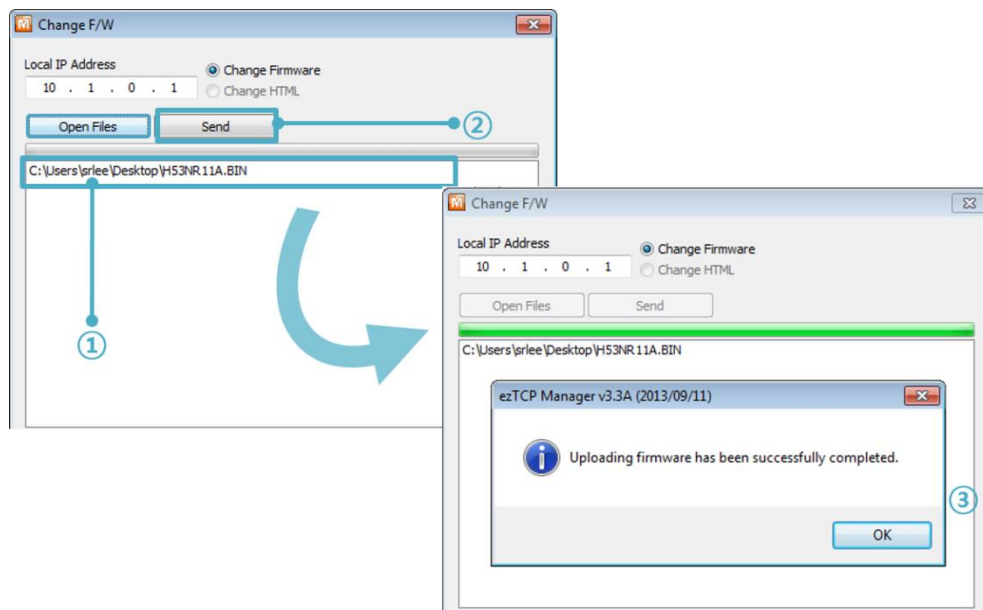


Figure 6-2 sending firmware file

- 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-H55N2. If a password is set, users should input the password.

- ☞ **Starting with firmware version 2.0A, you can login by entering the default password : "sollae"**

After that, messages from CSE-H55N2 appear like the below figure.

```
CSE-H55N Management Console v1.0E Sollae Systems
lsh>
```

Figure 6-3 log in to CSE-H55N2 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 1 100 |
| | | Serial Data Capturing Stop | lsh>sd 1 0 |
| exit | | Telnet Session Exit | lsh>exit |

Table 6-1 Commands for checking states

- st net

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

```
CSE-H55N Management Console v1.0E 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" command

- 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" command

- 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
lsh>
```

Figure 6-6 "st sio" command

- st uptime

"st uptime" command shows amount of time since CSE-H55N2 boots up.

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

Figure 6-7 "st uptime" command

- 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" command

- 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" serial data capture

Below is the example of how to stop capturing a serial data.

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

Figure 6-10 serial data capturing stops

- exit

"exit" command is used when users close Telnet session.

```
lsh>exit
```

Figure 6-11 "exit" command

- ☞ ***In case of the "sc" command you should use only lowercase letters.***
- ☞ ***You can download TCP Client application for smartphone on our website.***

6.2.2 Using ezManager

Status of CSE-H55N2 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

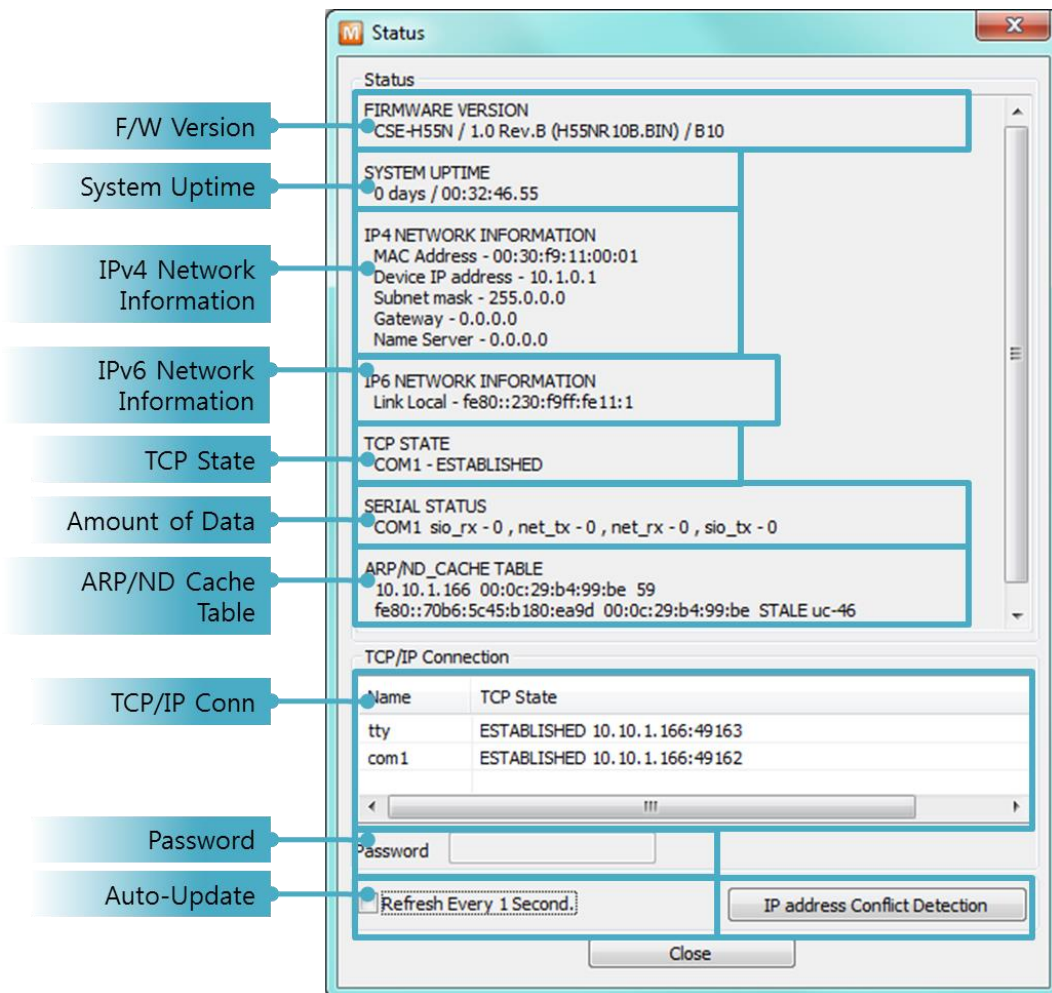


Figure 6-12 status window of ezManager

- **FIRMWARE VERSION**
The name of model name and the version of firmware are displayed here.
- **SYSTEM UPTIME**
Amount of time is displayed since CSE-H55N2 boots up.
- **IP4 NETWORK INFORMATION**
All information about related items with Ipv4 Address is shown here. It works even if the IP address is assigned from DHCP or PPPoE.

- IP6 NETWORK INFORMATION

All information about related items with IPv6 Address is shown here. It works even if the IP address is assigned from DHCP or PPPoE.

- 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-H55N2. 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-H55N2 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-H55N2 will not be able to communicate with the device. |
| PROBE | CSE-H55N2 will resend the request message to the device in DELAY state. CSE-H55N2 will keep sending Neighbor Solicitation until it replies. |

- 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-H55N2 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.

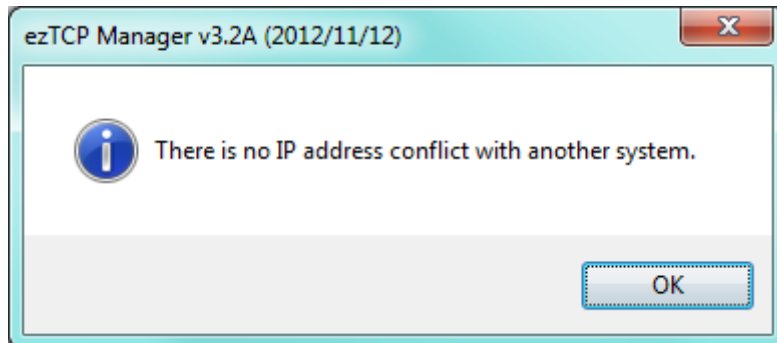


Figure 6-13 Without IP address conflict detection

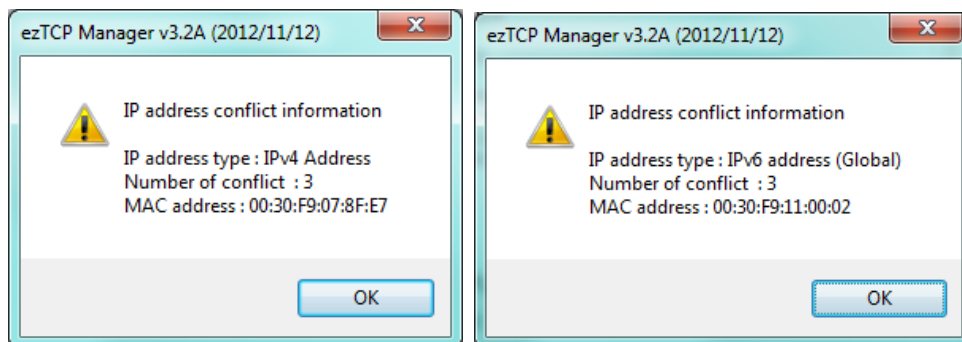


Figure 6-14 IP address conflict detection

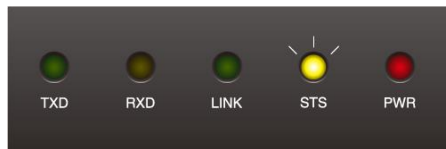
6.3 Factory Reset

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.

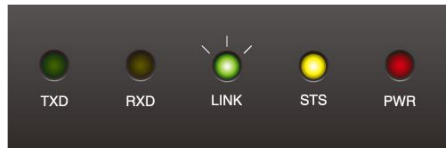
6.3.1 Using Factory Reset

- ① Push the function button less than 1 second
- ② Push the function button over 10 seconds
LED status is as follow pictures.

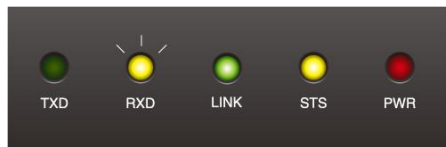
- STS ON



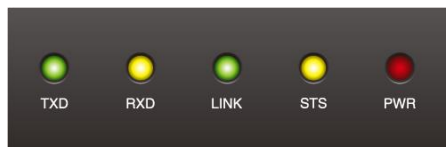
- LINK ON



- RXD ON



- TXD, RXD, LINK, STS, PWR are ON



- ③ TXD, RXD, LINK, STS are blinking



6.3.2 Setting custom default values

- ① Change the mode to Serial Configuration
- 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.

7 Security Function

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

To use SSL, you have to set the SSL-related parameters as the following steps. Set the [SSL] check box in the ezManager.

- ① Check the [SSL] of the [Option] tab of the ezManager.

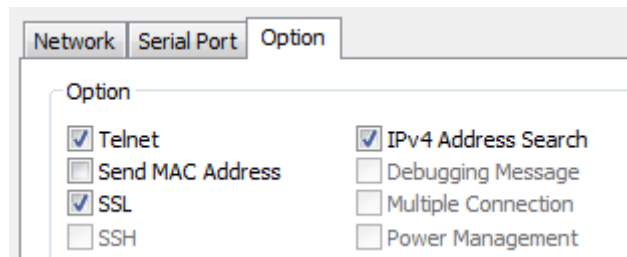


Figure 7-1 Setting of Option

- ② After check the [Advanced Menu] of the ezManager , Click the [Certificate].



Figure 7-2 Create the certification

- ③ Choice the [Write self signed certificate]

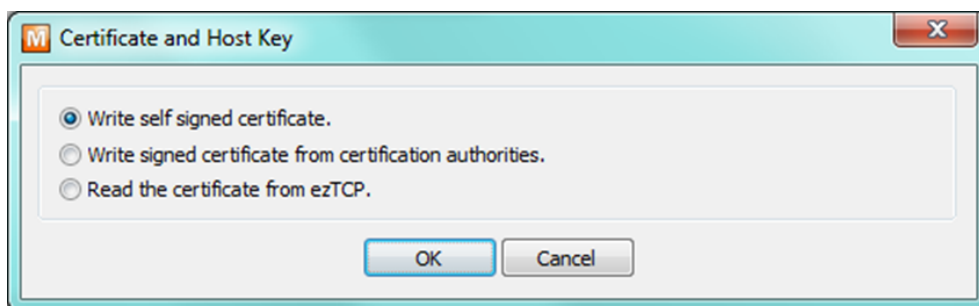


Figure 7-3 Create the RSA Key

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

Figure 7-4 Input the information

- ⑤ Check a success message.

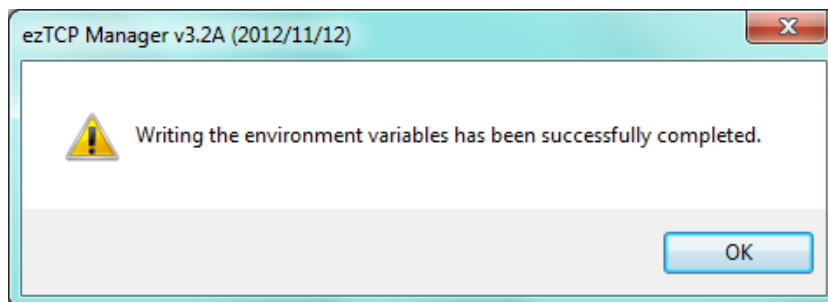


Figure 7-5 Check of success message

7.1.3 Restriction

- If user set the SSL with the CSE-H55N2, the other device have to set the SSL.
- Maximum baud rate of serial port is the 115,200bps.
- Cannot use SSL feature in IPv6.

7.2 Access Restriction (ezTCP Firewall)

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-H55N2 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-H55N2 as ISP mode. In the mode, all restrictions are removable and communication with ezManager is revoked.***

8 Additional Functions

8.1 Notify Ipv4 Change

CSE-H55N2 can be TCP server even though it assigned IP address automatically. Using [Notify IP Change] function, CSE-H55N2 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-H55N2 supports DDNS service offered by DynDNS. Therefore, you have to make an account and create host names on the website of DynDNS before you use.

- ☞ **All about service usage of an account could be changed according to the policy of DynDNS.**
- ☞ **DynDNS website: <https://dyn.com/dns/>**

Figure 8-1 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 ASCII or hexadecimal, and the [Interval] is available on configuration.

- ☞ **Refer to the [IP Change Notification] document on our website for details.**

8.2 Sending MAC Address

[Sending MAC Address] is a function that CSE-H55N2 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.

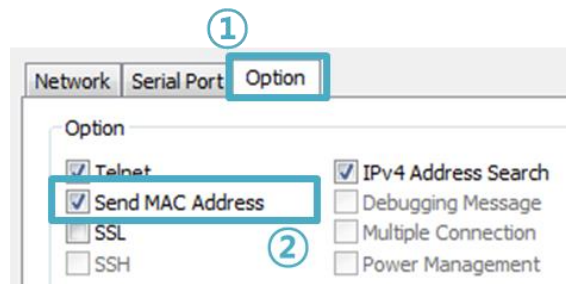


Figure 8-2 setting of Sending MAC Address function

- ① Move to the [Option] tab.
- ② Check the [Send MAC Address] option.

☞ ***You can use [Send MAC Address] and [SSL] at the same time.***

☞ ***Refer to the [Sending MAC Address Function] document on our website for details.***

8.3 Multiple Connection

☞ *Multiple connection is supported in firmware version 2.3A or later.*

[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].

8.3.1 How to use

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

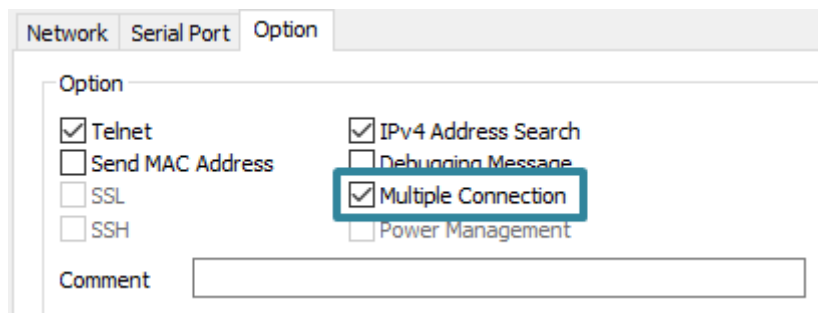


Figure 8-3 activation of the [Multiple Connection]

8.3.2 Diagram

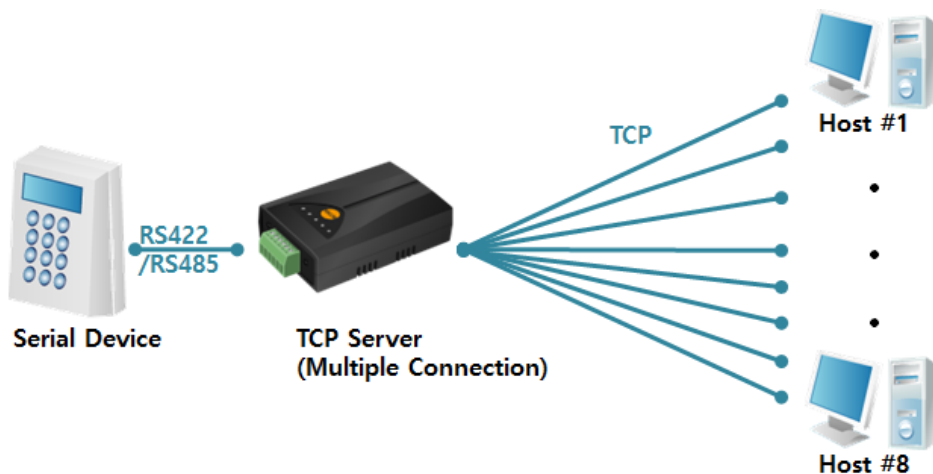


Figure 8-4 diagram for the [Multiple Connection]

- Data from each host are sent to the User's device via CSE-H55N2
- Data from the User's device is sent to the all hosts(#1 ~ 8) via CSE-H55N2

8.4 Serial Port Tab Functions

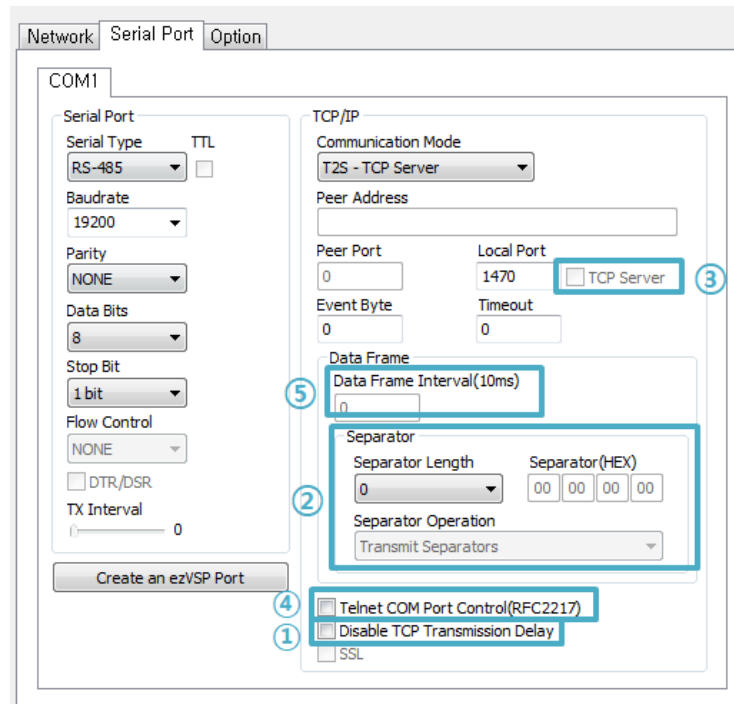


Figure 8-5 setting of Serial port tab functions

8.4.1 Disable TCP Transmission Delay - ①

The TCP Transmission delay function is a feature that delays TCP segment transmission for about 40ms for congestion control. This option determines whether the TCP transmission delay function is enabled or not. Enabling this option allows TCP segments to be transmitted quickly without delay.

8.4.2 Separator - ②

Using this function, you can control the length of network packets by specific characters. When you enable this function, the maximum packet size is 512 bytes.

| 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

8.4.1 TCP Server / Client mode - ③

This mode is available on TCP client mode only. In this mode, you do not need to change the mode for switching active or passive TCP connection. Note that the [Event Byte] option should be set to more than 1.

☞ ***Refer to the [TCP Server / Client mode] document on our website for details.***

8.4.2 Telnet COM Port Control(RFC2217) - ④

This option is for sending and receiving serial port states between two devices.

☞ ***Refer to the [Telnet COM Port Control Option] document on our website for details.***

8.4.3 Data Frame Interval - ⑤

Serial received data is transmitted over the network in frame units. When serial data is received continuously, frames are separated according to the maximum packet size that can be transmitted over the network. However, when serial data is received discontinuously, frames are separated by the interval set in this option. The setting unit is 10ms and the default value is 0. If the value of this option is 0, the time it takes to transmit 2 bytes at the set communication speed (Baudrate) is applied as the data frame interval.

☞ ***If you use this option in TCP, it may be affected by the transmission delay function. Therefore, if you want to use this option, please make sure to also enable the "[Disable TCP Transmission Delay]" option.***

9 RS485/RS422 Interface

9.1 About RS485/RS422 Network

The RS485 and the RS422 are the standards which communicate by differential voltage. These transmission distances are much longer comparing to the RS232. The RS485 is multi-driver/multi-receiver system but the RS422 is a single-driver/multi-receiver system.

9.2 Configuring an RS485 Network

The following is a general RS485 diagram.

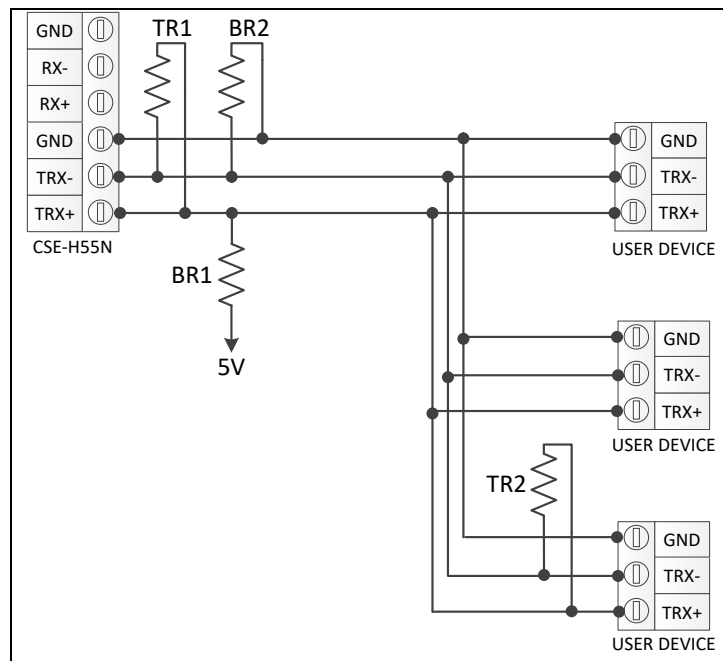


Figure 9-1 General RS485 Network

CSE-H55N2 built-in 3.9K Biasing resister (up to 32 nodes)

9.2.1 Signal Ground

Even though the RS485 is known as a “two-wire” configuration, an additional ground connection should be implemented.

If a signal ground is not used, there might be potential differences between nodes. And it could be electrical noise or damages the transceivers.

9.2.2 Biasing Resistors

Two biasing resistors (a pull-up resistor and a pull-down resistor) should be in the RS485 network to make differential voltage within the standard. (BR1 and BR2 are biasing resistors in the above picture)

In normal case, RS485 line drivers don't require any biasing resistors, but it makes some problems in some cases.

Generally 680 ohm resistors are used for the biasing resistors. If the biasing resistor is higher, power consumption is lower but delay is longer. And if the biasing resistor is lower, delay might be shorter but power consumption will be higher.

9.2.3 Termination Resistors

There should be two termination resistors in the ends of transmission line to prevent reflection waves when the cable is long or communication speed is fast. (TR1 and TR2 are termination resistors in the above picture.)

The resistors' resistance should be same to cable's characteristic impedance. Normal cable's characteristic impedance is 100 ohm or 120 ohm.

9.3 Configuring an RS422 Network

9.3.1 1:1 Configuration

The following is 1:1 configuration of RS422.

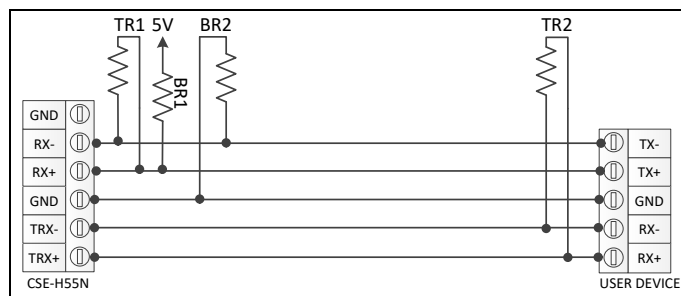


Figure 9-2 RS422 1:1 Configuration

9.3.2 1:N Configuration

The following is 1:N configuration of RS422.

When the CSE-H55N2 operates as RS422 mode, it can't be a slave because its driver is driving always.

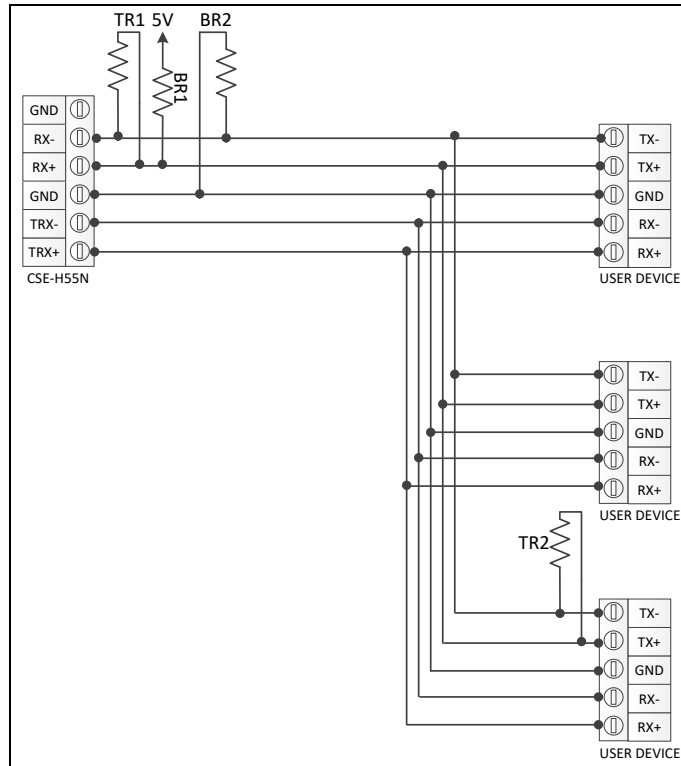


Figure 9-3 RS422 1:N Configuration

9.3.3 Signal Ground, Biasing and Termination Resistors

Like RS485, the RS422 requires signal ground connections, biasing resistors and termination resistors.

Please refer to the RS485 section for more information.

☞ **CSE-H55N2 built-in 3.9K Biasing resistor**

10 Checklist in Trouble

When users are in trouble with CSE-H55N2, make sure all the followed steps first.

10.1 Searching problem with ezManager

- Confirming types of configuration utility
CSE-H55N2 can be configured by ezManager.
- Stopping Firewall operation
Firewalls of personal computer or network block broadcast packets. Stop all the firewalls before searching CSE-H55N2

☞ ***Most of vaccine programs have firewall functions so it can cause some trouble to search CSE-H55N2. 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 PWR (Red) LED on the CSE-H55N2's body will be turned 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-H55N2 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-H55N2 operate in ISP mode.

10.2 Connection Problem over TCP/IP

- Checking parameters related with TCP/IP

When CSE-H55N2 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 | Local IP Address, Peer Address, Peer Port, Subnet Mask, Gateway IP Address, DNS IP Address, |

Table 10-1 major parameters related with TCP/IP

- PING Test

Confirm the connection over the network by PING test. If the CSE-H55N2 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-H55N2 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.

10.3 Data Communication Problem over the Serial Port

- 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. Each pin should be connected with the same polarity like the below figures.

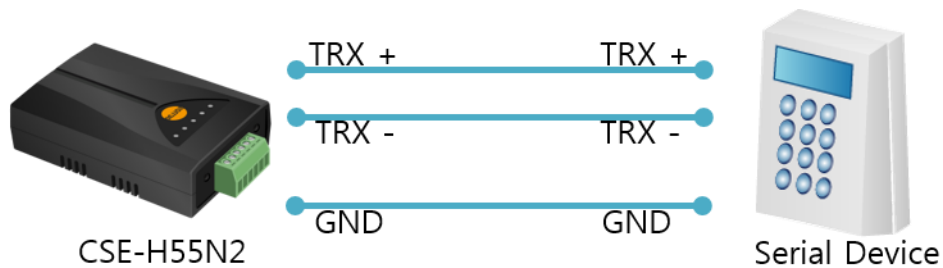


Figure 10-1 RS485 connection

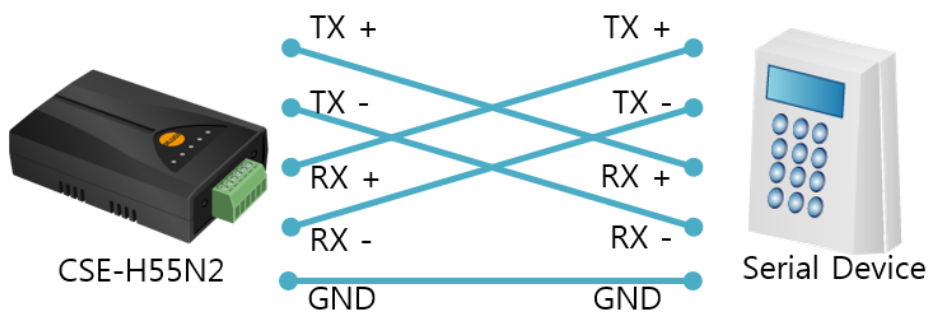


Figure 10-2 RS422 connection

☞ ***You must connect the Ground pin to your device when using RS422 or RS485 as well as RS232.***

- 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.***

11 Technical Support and Warranty

11.1 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 Address for Customer Support: <https://www.eztcp.com/en/support/>

11.2 Warranty

11.2.1 Refund

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

11.2.2 Free Repair Services

For product failures occurring within 2 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.

11.2.3 Charged Repair Services

For product failures occurring after the warranty period (2 years) or resulting from user's fault, repair service fees will be charged and the product will be replaced at user's expense.

12 Precaution and Exemption from Liability

12.1 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.

12.2 Exemption from Liability

12.2.1 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-H55N2 even if Sollae Systems Co., Ltd. Or its distributors have been informed of such damages.

The CSE-H55N2 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-H55N2 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-H55N2 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 distributor 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-H55N2.

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-H55N2 including accompanying written material, hardware and firmware.

12.2.2 French version

- Documentation

La documentation du boîtier CSE-H55N2 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.

- Copyright et appellations commerciales

Toutes les marques, les procédés, les références et les appellations commerciales des produits cités dans la documentation appartiennent à leur propriétaire et Fabricant respectif.

- Conditions d'utilisations et limite de responsabilité

En aucun cas Sollae Systems Co., Ltd. ou un de ses distributeurs ne pourra être tenu responsable de dommages quels qu'ils soient (intégrant, mais sans limitation, les dommages pour perte de bénéfice commercial, interruption d'exploitation commerciale, perte d'informations et de données à caractère commercial ou de toute autre perte financière) provenant de l'utilisation ou de l'incapacité à pouvoir utiliser le boîtier CSE-H55N2, même si Sollae Systems Co., Ltd. ou un de ses distributeurs a été informé de la possibilité de tels dommages.

Le boîtier CSE-H55N2 est exclusivement prévu pour un usage en intérieur, dans un environnement sec et non poussiéreux. Le boîtier CSE-H55N2 n'est pas prévu, ni autorisé pour être utilisé en extérieur, ni de façon embarquée dans des engins mobiles de quelque nature que ce soit (voiture, camion, train, avion, etc...), ni en milieu explosif, ni dans des enceintes nucléaires, ni dans des ascenseurs, ni dans des aéroports, ni dans des enceintes hospitaliers, ni pour des applications à caractère médical, ni dans des dispositifs de détection et d'alerte anti-intrusion, ni dans des dispositifs de détection et d'alerte anti-incendie, ni dans des dispositifs d'alarme GTC, ni pour des applications militaires.

De même, le boîtier CSE-H55N2 n'est pas conçu, ni destiné, ni autorisé pour expérimenter, développer ou être intégré au sein d'applications dans lesquelles une défaillance de celui-ci pourrait créer une situation dangereuse pouvant entraîner des pertes financières, des dégâts matériel, des blessures corporelles ou la mort de personnes ou d'animaux. Si vous utilisez le boîtier CSE-H55N2 volontairement ou involontairement pour de telles

applications non autorisées, vous vous engagez à soustraire Sollae Systems Co., Ltd. et ses distributeurs de toute responsabilité et de toute demande de dédommagement.

En cas de litige, l'entière responsabilité de Sollae Systems Co., Ltd. et de ses distributeurs vis-à-vis de votre recours durant la période de garantie se limitera exclusivement selon le choix de Sollae Systems Co., Ltd. et de ses distributeurs au remboursement de votre produit ou de sa réparation ou de son échange. Sollae Systems Co., Ltd. et ses distributeurs démentent toutes autres garanties, exprimées ou implicites.

Tous les boîtiers CSE-H55N2 sont testés avant expédition. Toute utilisation en dehors des spécifications et limites indiquées dans cette documentation ainsi que les court-circuit, les chocs, les utilisations non autorisées, pourront affecter la fiabilité, créer des dysfonctionnements et/ou la destruction du boîtier CSE-H55N2 sans que la responsabilité de Sollae Systems Co., Ltd. et de ses distributeurs ne puissent être mise en cause, ni que le boîtier CSE-H55N2 puisse être échangé au titre de la garantie.

- Rappel sur l'évacuation des équipements électroniques usagés

Le symbole de la poubelle barré présent sur le boîtier CSE-H55N2 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-H55N2 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.

13 Revision History

| Date | Version | Comments | Author |
|-------------|---------|---|-----------|
| 2016.08.01 | 1.0 | ○ First version has been released. | Sara Lee |
| 2016.10.20 | 1.1 | ○ Modify a figure 1-8. ○ Modify a description on 8.3.2 Separator. | Peter Lee |
| 2017.08.23 | 1.2 | ○ Modify descriptions of factory reset and telnet command ○ Correct some errors | Peter Lee |
| 2017.12.11 | 1.3 | ○ Correct some errors | Peter Lee |
| 2019.10.21 | 1.4 | ○ Modify descriptions of features | Peter Lee |
| 2022.07.28. | 1.5 | ○ Add a notification about FCC | Roy Lee |
| 2022.08.26. | 1.6 | ○ Updated URLs of websites ○ Removed the Components section ○ Removed the Related materials section | Roy Lee |
| 2023.03.21 | 1.7 | ○ Adds information on multiple connection ○ Improves descriptions of Data Frame Interval option ○ Improves descriptions of TCP Transmission Delay option ○ Corrects some errors and improve some expressions | Peter Lee |