Serial↔WLAN Converter

CSW-H85N User Manual

Version 1.0

Sollae Systems

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.

Contents

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1   Overview

1.1 Overview

Most industrial devices support standard serial communications, where callers transmit bitstreams to receivers in sequence. Although serial communication is known as simplicity, it is not widely used in modern computing environments due to its short distance and frequent maintenance requirements.

By providing an Internet connection to a serial communication device, the CSW-H85N can overcome this limitation. Especially with the TCP / IP stack and serial communication, the CSW-H85N converts serial data to TCP / IP data, and vice versa.

1.2 Features

- connect serial devices to IEEE 802.11b/g wireless LAN
- IPv4/IPv6 dual stack
- multi-monitoring (4 connections)
- SSL (Secure Socket Layer)
- Soft AP mode: support WEP and simple DHCP server
- various WLAN securities: WPA-PSK, WPA-Enterprise (EAP-TLS/TTLS, PEAP)
- 1 serial port for RS232, RS422 or RS485 interface
- RP-SMA connector for an external antenna
- stable embedded TCP/IP stack

1.3 Examples of Application

- 1:1 network with a PC

Figure 1-1 1:1 network with a PC

- 1:1 network with a PC through an AP
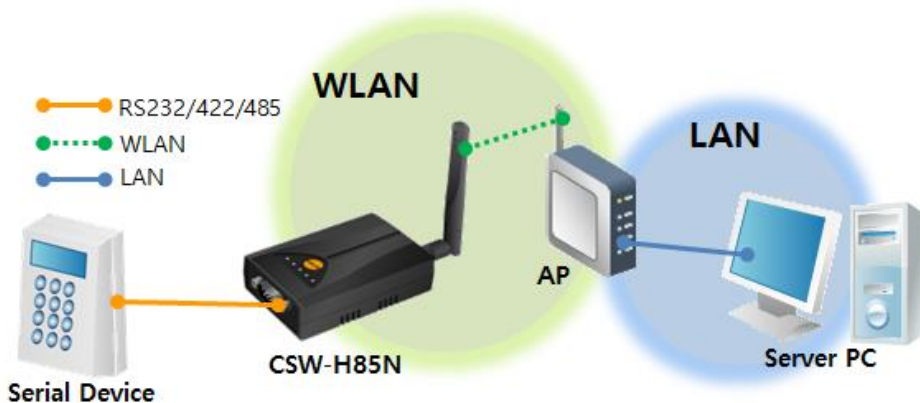
Figure 1-2 1:1 network with a PC through an AP

- Internet connection
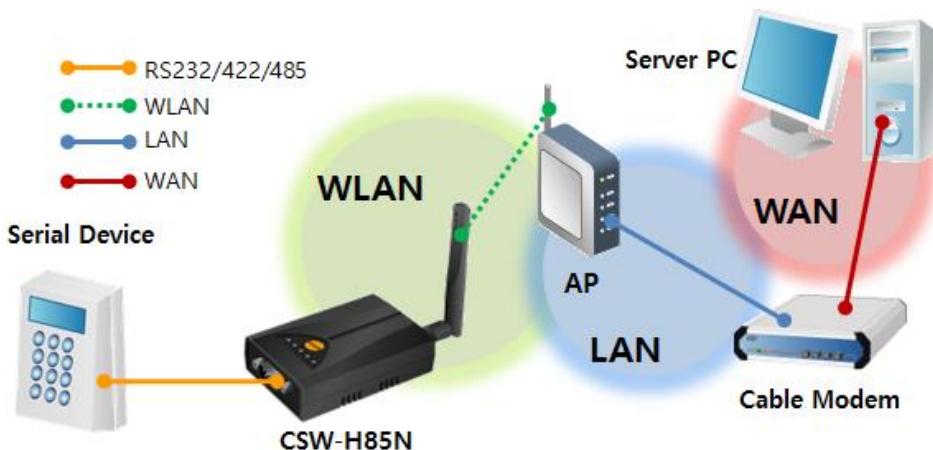
Figure 1-3 Internet connection

1.4 Components

- CSW-H85N's body

- 2dBi dipole antenna

- DVD, including utilities and documents (optional)

- DC 5V power adapter (optional)

- RS232 cable (optional)

1.5 Specification

1.5.1   Hardware

Power	Input Voltage	DC 5V (±0.5V)
	Current	typically, 210mA
Dimension	88.5㎜ x 57㎜ x 23㎜ (without an antenna)	
Weight	About 65g (without an antenna)	
Interface	Serial	1 x RS232/422/485 (Baud Rate: 300bps ~ 230,400bps)
	WLAN	2.4GHz Wireless LAN (IEEE 802.11b/g) with 2dBi dipole antenna (RP-SMA connector)
Temperature	Operating: -20 ~ 60℃ / Storage: -40 ~ 60℃	
Approval	CE	
RoHS	RoHS Compliant	

Table 1-1 hardware specification

1.5.2   Software

Protocol	IPv4/IPv6 dual stack, ARP, IP, ICMP/ICMPv6, TCP/TCPv6, UDP/UDPv6, TFTP, DHCP, DHCPv6, DNS, DDNS, TELNET, Telnet COM Port Control Option(RFC2217), WEP, WPA-PSK, WPA2-PSK, WPA-Enterprise (EAP-TLS, EAP-TTLS, PEAP)	
Operation mode	Normal	For Normal Data Communication
	ISP	For Upgrading F/W
	Serial Configuration	For Configuration via Serial or WLAN (Soft AP)
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
	ezVSP	Serial to TCP/IP Virtual driver for MS Windows

Table 1-2 software specification

1.6 Dimensions
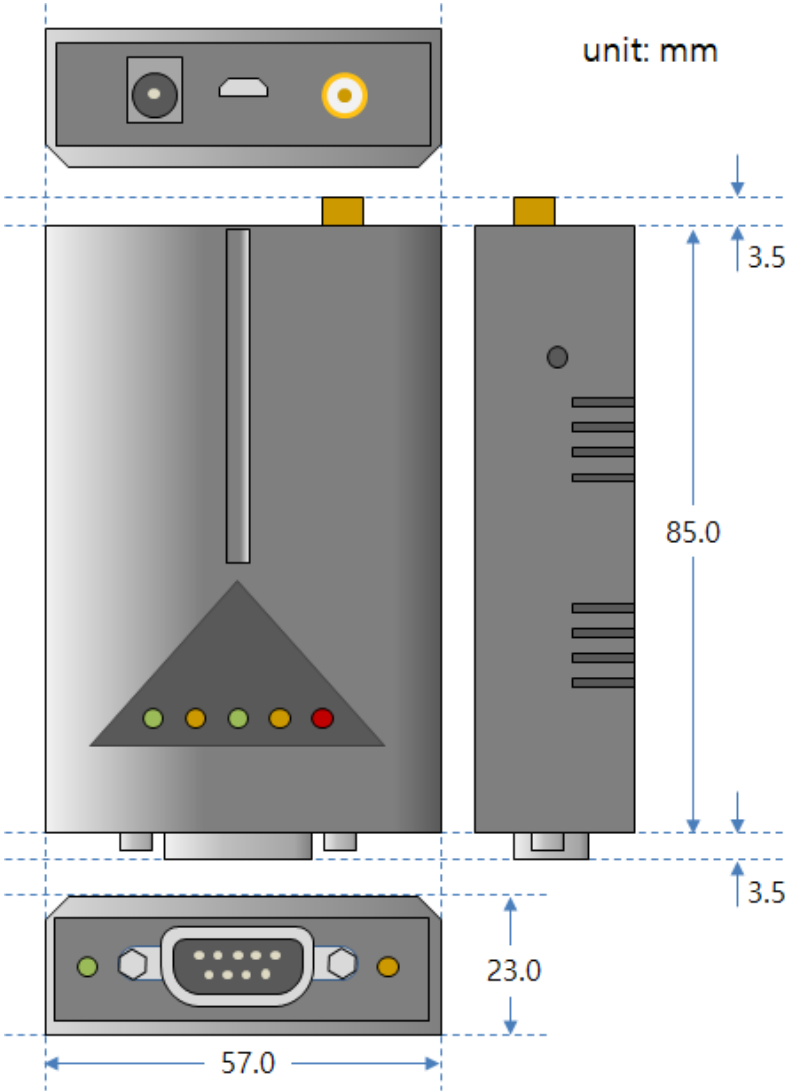
Figure 1-4 dimensions

☞ *Dimensions may vary according to a method of measurement.*

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1.7 Interface

1.7.1 Panel Layout

Micro USB

DC 5V Power

RP-SMA connector

Function Button

LED indicators

Serial Port
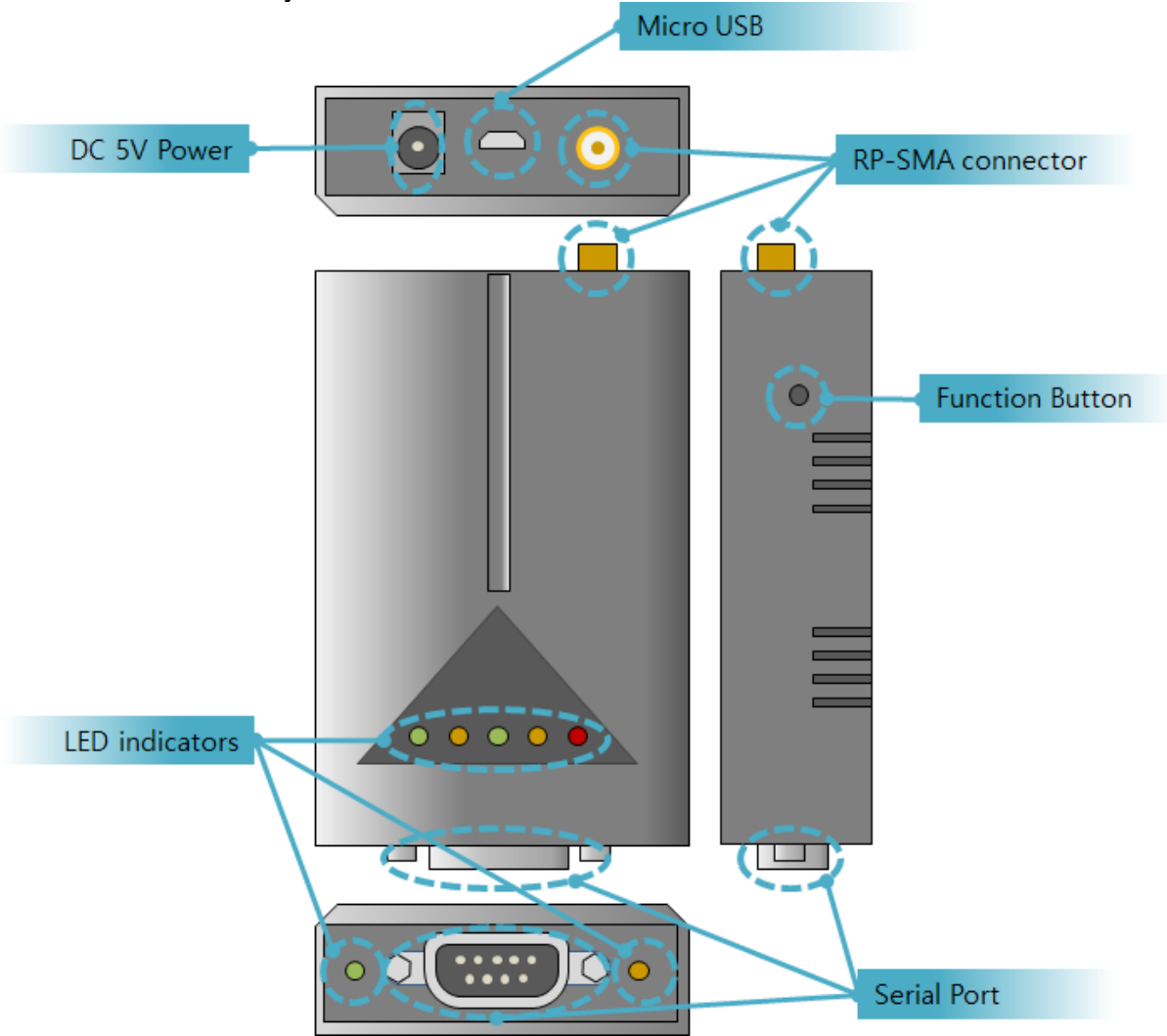
Figure 1-5 panel layout

1.7.2 Wireless LAN Interface

CSW-H85N is embedded with a wireless LAN module. An RP-SMA connector is interfaced for an external antenna.

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1.7.3   Serial Interface

CSW-H85N has D-SUB 9 pin male connector for connecting serial devices.
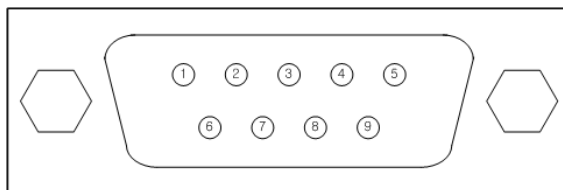
Figure 1-6 D-SUB 9 pin male connector

● Pin Assignment in RS232

Number	Name	Description	Level	I/O	Wiring
1	-	-	-	-	-
2	RXD	Receive Data	RS232	In	Required
3	TXD	Transmit Data	RS232	Out	Required
4	DTR	Data Terminal Ready	RS232	Out	Optional
5	GND	Ground	Ground	-	Required
6	DSR	Data Set Ready	RS232	In	Optional
7	RTS	Request To Send	RS232	Out	Optional
8	CTS	Clear To Send	RS232	In	Optional
9	-	-	-	-	-

Table 1-3 pin assignment in RS232

● Pin Assignment in RS422

Number	Name	Description	Level	I/O	Wiring
1	TX -	Transmit Data -	RS422	Out	Required
2	-	-	-	-	-
3	RX -	Receive Data -	RS422	In	Required
4	RX +	Receive Data +	RS422	In	Required
5	GND	Ground	Ground	-	Required
6	-	-	-	-	-
7	-	-	-	-	-
8	-	-	-	-	-
9	TX +	Transmit Data +	RS422	Out	Required

Table 1-4 pin assignment in RS422

● Pin Assignment in RS485

Number	Name	Description	Level	I/O	Wiring
1	TRX -	Data -	RS485	In/Out	Required
2	-	-	-	-	-
3	-	-	-	-	-
4	-	-	-	-	-
5	GND	Ground	Ground	-	Required
6	-	-	-	-	-
7	-	-	-	-	-
8	-	-	-	-	-
9	TRX +	Data +	RS485	In/Out	Required

Table 1-5 pin assignment in RS485

● Serial Port Parameters

Parameter	Value
Number	1
Type	RS232, RS422 or RS485
Baud rate	300 ~ 230,400 [bps]
Parity	NONE, EVEN, ODD, MARK or SPACE
Data bit	8 or 7 (7 data bit is only available on using Parity)
Stop bit	1, 1.5 or 2
Flow control	NONE, RTS/CTS or Xon/Xoff

Table 1-6 serial port parameters

1.7.4   Power

CSW-H85N requires DC5V power supply whose specification is as follows:
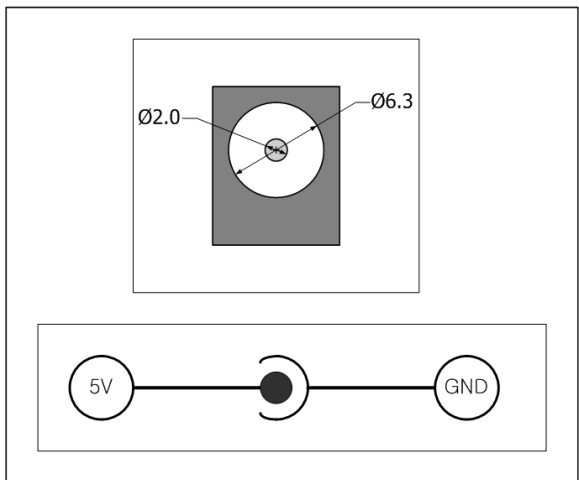
Figure 1-7 power connector

1.8 ETC.

1.8.1 LED indicators

There are 5 LED indicators on the top panel operating as follows:

Mode	Name	Color	Status	Description
Common	PWR	Red	On	Supplying the power
Normal mode	RXD	Yellow	Blinks	Receiving data from the WLAN
	TXD	Green	Blinks	Sending data to the WLAN
	STS	Yellow	Blinks in every second	Obtaining an IP address
			Blinks 4 times at once	Without obtaining an IP address by DHCP
			On	Establishing TCP connection
	LINK	Green	Blinks	Not connecting to the WLAN
			On	Connecting to the WLAN
ISP mode	STS	Yellow	Off	Operating in ISP mode
Serial Configuration mode	STS	Yellow	Blinks simultaneously	Operating in Serial Configuration mode
	LINK	Green		
	RXD	Yellow		
	TXD	Green		

Table 1-7 LED indicators on the top panel

There are two additional LED indicators on both sides of the serial port.

Mode	Name	Color	Status	Description
Normal mode	TX	Green	Blinks	Sending data to the Serial Port
	RX	Yellow	Blinks	Receiving data from the Serial Port

Table 1-8 LED indicators on both sides of the serial port

1.8.2   Function button

There is a function button on the side. Pressing this button changes the operation mode to Serial Configuration mode.

Figure 1-8 function button

1.8.3   Micro USB

This port is reserved for future use.

2 Installation and Test

2.1 WLAN Overview

CSW-H85N supports IEEE 802.11b/g standard, which is called Wi-Fi. It has three network topologies; Infrastructure, Ad-hoc and soft AP mode. You can set one of these topologies on the [Wireless LAN] tab of ezManager

☞ *You can download ezManager on our website.*
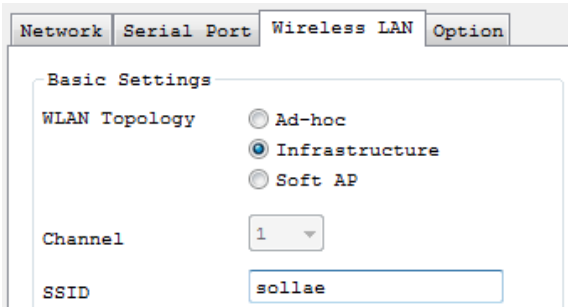
Figure 2-1 setting WLAN topology

2.1.1 WLAN mode: Infrastructure

In this mode, every wireless LAN station communicates through an Access Point (AP) so that all stations can be connected to Ethernet, because AP is able to interface witch both wireless LAN and wired LAN (Ethernet).
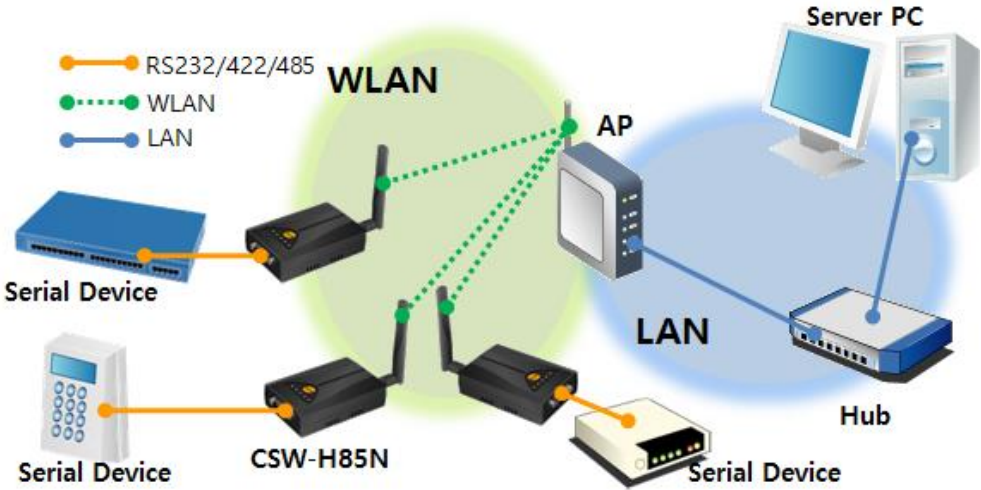
Figure 2-2 infrastructure mode

2.1.2　WLAN mode: Ad-hoc

Wireless LAN stations communicate each other without an AP in this mode. Therefore, you can easily make this network. It is suitable for the situation when there is no wired LAN requirement on a small-scale network. Usually, it is called peer-to-peer mode.
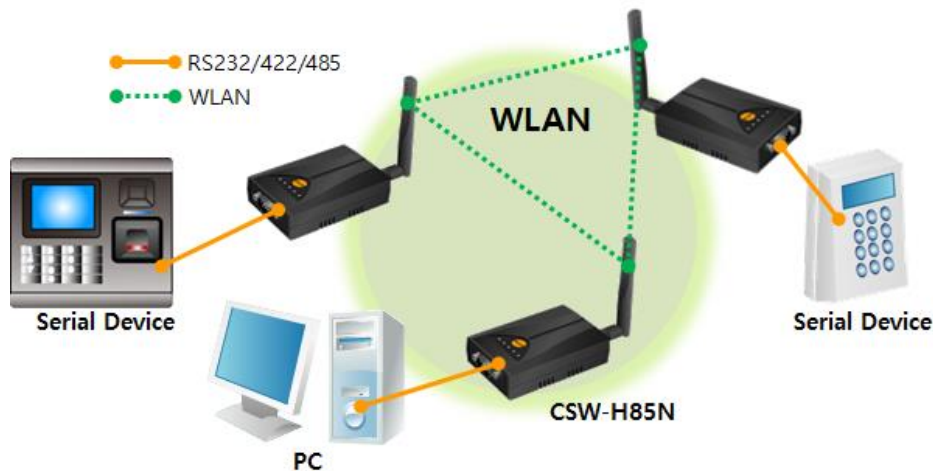
Figure 2-3 Ad-hoc mode

2.1.3　WLAN mode: Soft AP

Soft AP (Software embedded Access Point) is a mode that a wireless client can act as an AP through software embedded AP functions. Using this mode, a wireless client allows communicate with not only laptops and smart phone but also devices which don't have Ad-hoc function.

☞ **Caution: Even in the Soft AP mode, CSW-H85N does not work as a general Access Point. Note that the stations, which is connected to the Soft AP, cannot communicate each other through CSW-H85N. They are allowed to communicate with CSW-H85N only.**

CSW-H85N supports Soft AP function. While operating in this function, it has 10.1.0.1 as its IP address and assigns an IP address of 10.1.X.X to each of clients.

Figure 2-4 Soft AP mode

2.2 Installation

Before testing CSW-H85N, make sure that a connection between your PC and CSW-H85N is established via Serial and wireless LAN. This section is an example which is based on Infrastructure mode.
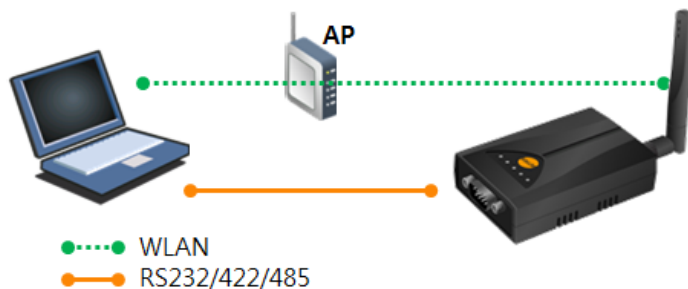
Figure 2-5 WLAN and RS232 connection with a laptop

2.2.1   Connect CSW-H85N to an AP

When you connect an AP or wireless LAN adapter to your PC, Wireless LAN link is not automatically established. Therefore, its parameters should be set on CSW-H85N beforehand.

- Setting by Serial

① Supplying Power to your CSW-H85N

② Make your CSW-H85N operate in the Serial Configuration mode
Press the function button shortly.

③ Reading current settings of CSW-H85N through the serial port
Open a COM port of [Serial] tab on ezManager and press [Read] button.
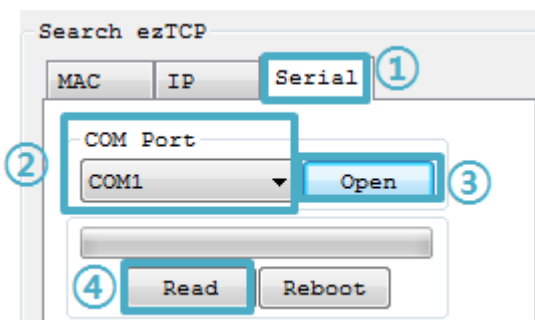
Figure 2-6 reading current settings of CSW-H85N through the serial port

④ Configuring Wireless LAN Parameters

Figure 2-7 [Wireless LAN] settings on ezManager

Check the [WLAN topology] is selected to [Infrastructure]. Input the SSID of your AP to the [SSID] item. Note that the SSID is case-sensitive. If your wireless network has a security option, input the passphrase to [Shared Key] item. After setting all, save the settings by clicking [Write] button. If your CSW-H85N is successfully connected to the AP, LINK LED on the top panel will be turned on.

● Setting by Soft AP

In case that you cannot use serial port, Soft AP function allow you to set those parameters as follows;

① Supplying Power to you CSW-H85N

② Make your CSW-H85N operate in the Serial Configuration mode

Soft AP is automatically activated when products are under Serial Configuration mode.

③ Connecting to Wi-Fi using Soft AP

Connect laptop or smartphone to Wi-Fi network made by product's Soft AP function. The SSID is "cfg_MAC Address". (e.g. cfg_0030f9000001)
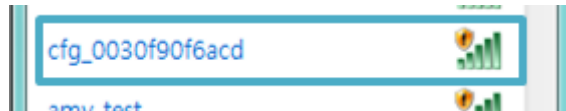
Figure 2-8 Connecting to Wi-Fi using Soft AP

④ Connecting to the CSW-H85N with a Web browser

Run a web browser and connect to 10.1.0.1. The setting parameters are the same with the setting by serial.
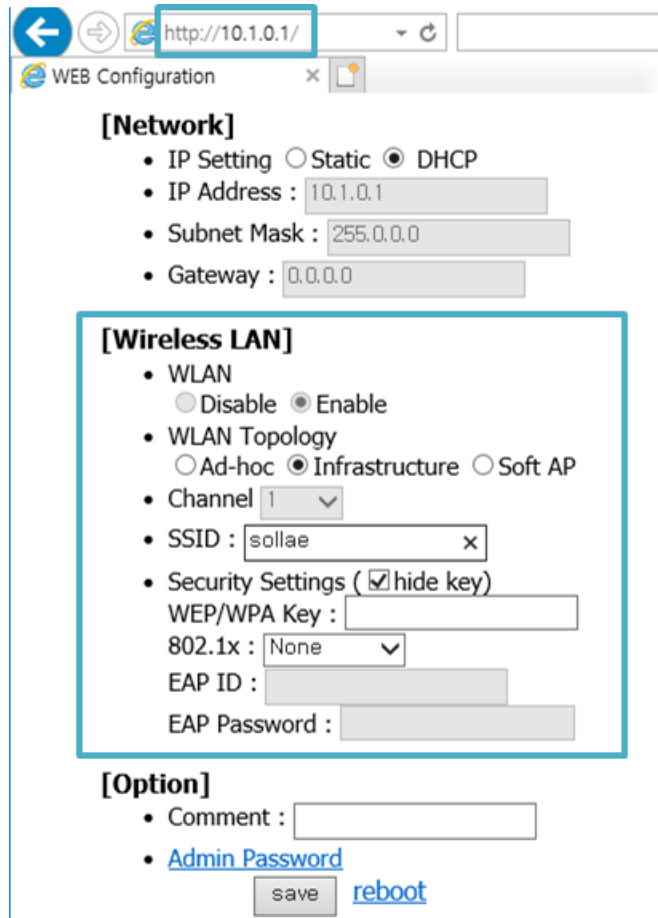
Figure 2-9 WEB configuration page

2.2.2   Setting Network Area

This procedure should be followed to make CSW-H85N and your PC located on the same network for a TCP connection.

● PC settings

Add or change the IP address of the network adapter on your PC like following.
Click [Windows Control Panel] >> [Network Connections] and [Properties of the Network Adapter]. Then, you can see the properties of [Internet Protocol (TCP/IP)]. Press the [Advanced] button and add an IP Address like the figure below.
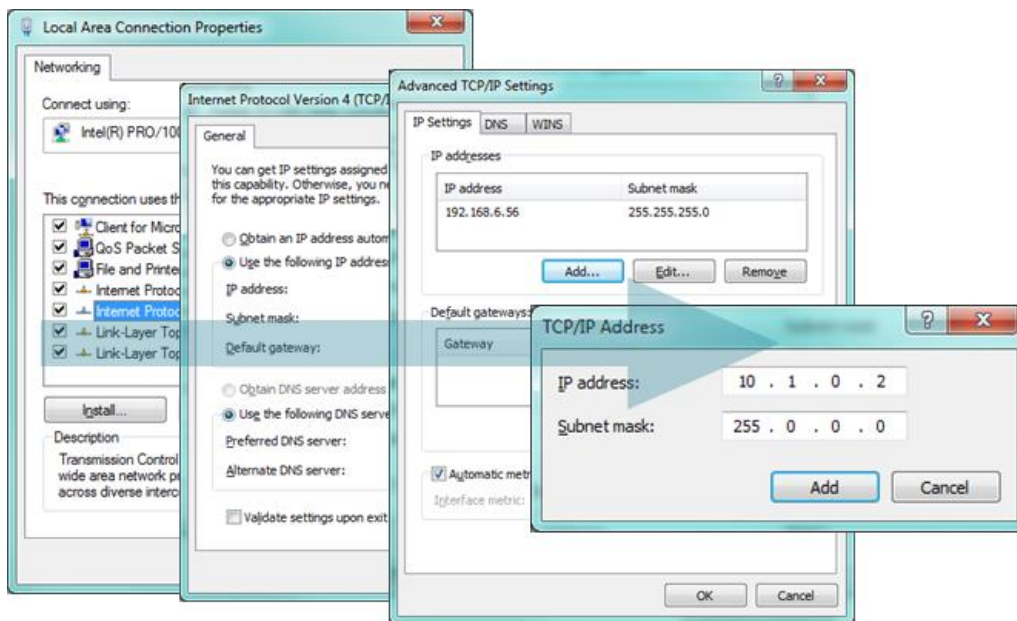
Figure 2-10 PC settings

● CSW-H85N settings

ezManager comes with CSW-H85N as a configuration tool. This software is easy to use and does not need installation since it operates on MS Windows. Search CSW-H85N via serial or WLAN and set all the values of parameters except for LAN parameters to the factory default.

Name		Default values
Network	Local IP Address	10.1.0.1
	Subnet Mask	255.0.0.0
	IPv6	Disabled
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
WLAN	Topology	Infrastructure
	SSID	sollae
	Security Settings	Disabled
Option	TELNET	Enabled
	IP Address Search	Enabled

Table 2-1 default values of major parameters

2.3 Simple Test

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

● Connecting to the CSW-H85N via LAN
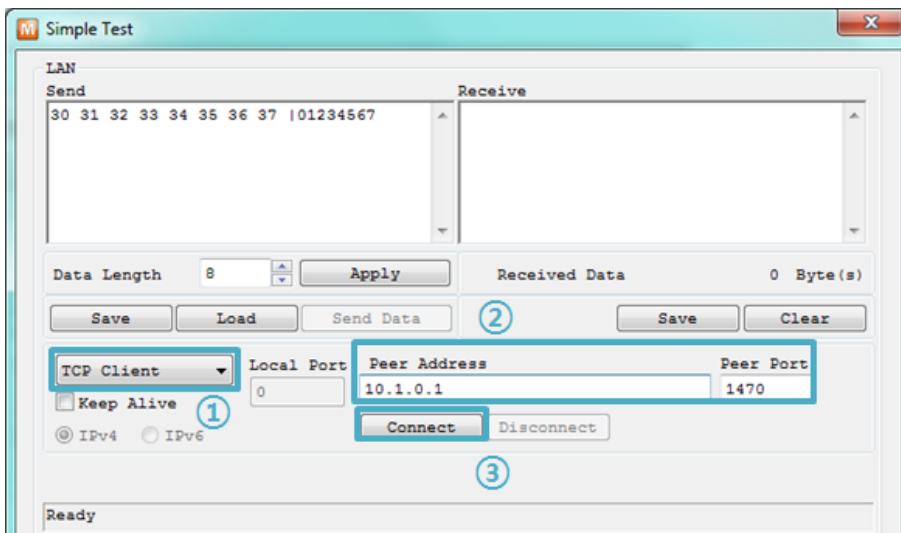
Figure 2-11 settings for TCP connection

① Select [TCP Client].

② Input correct IP address and port number of CSW-H85N.

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

● Opening RS232 Port
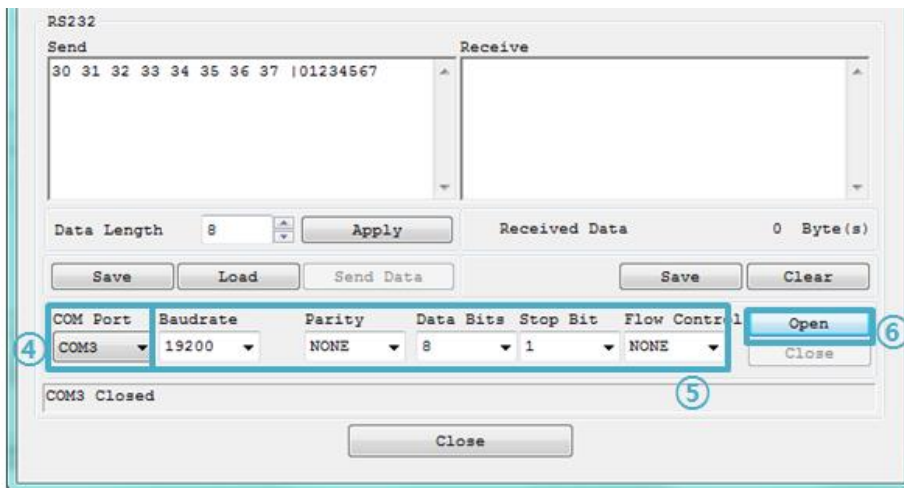
Figure 2-12 opening COM Port

④ Select COM port where CSW-H85N is being connected.

⑤ Make sure that all the parameters are the same with CSW-H85N.

⑥ Press the [Open] button.

● Confirm the TCP Connection and COM port status
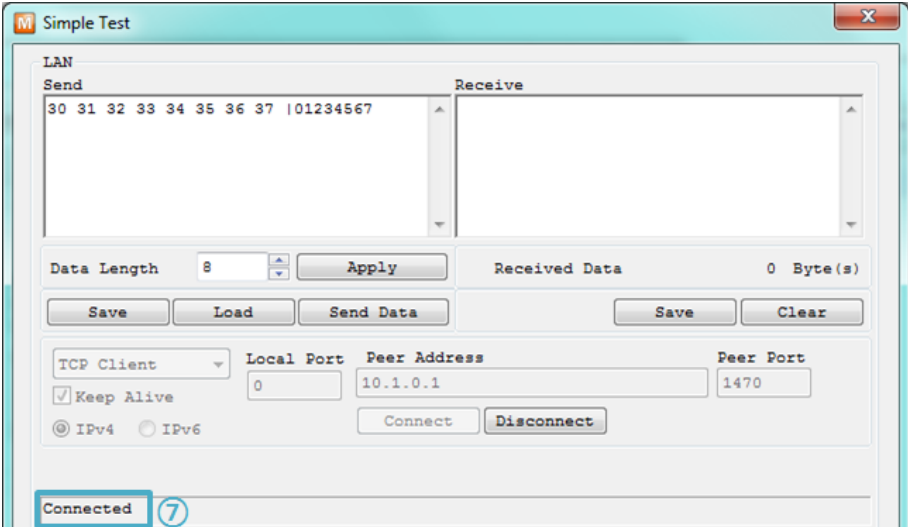
Figure 2-13 TCP connection message

⑦ Check the message if the TCP connection has been established well.
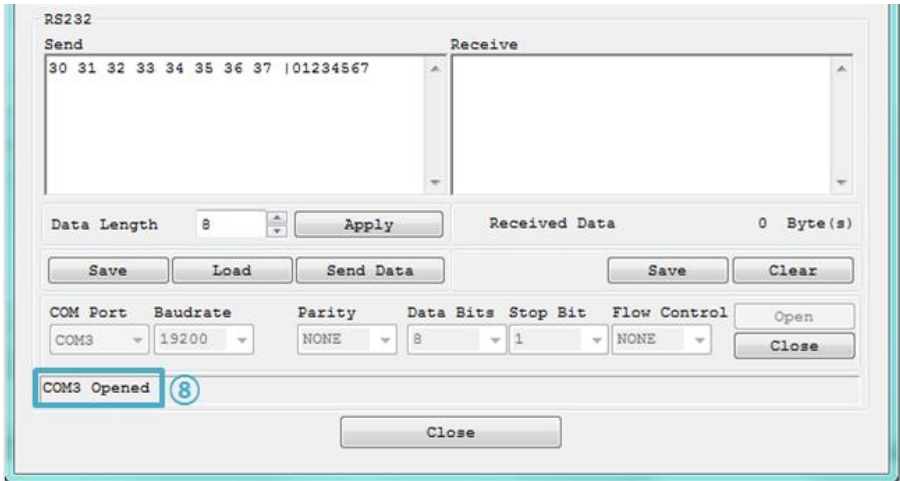
Figure 2-14 COM Port open message

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

● Data transmission test
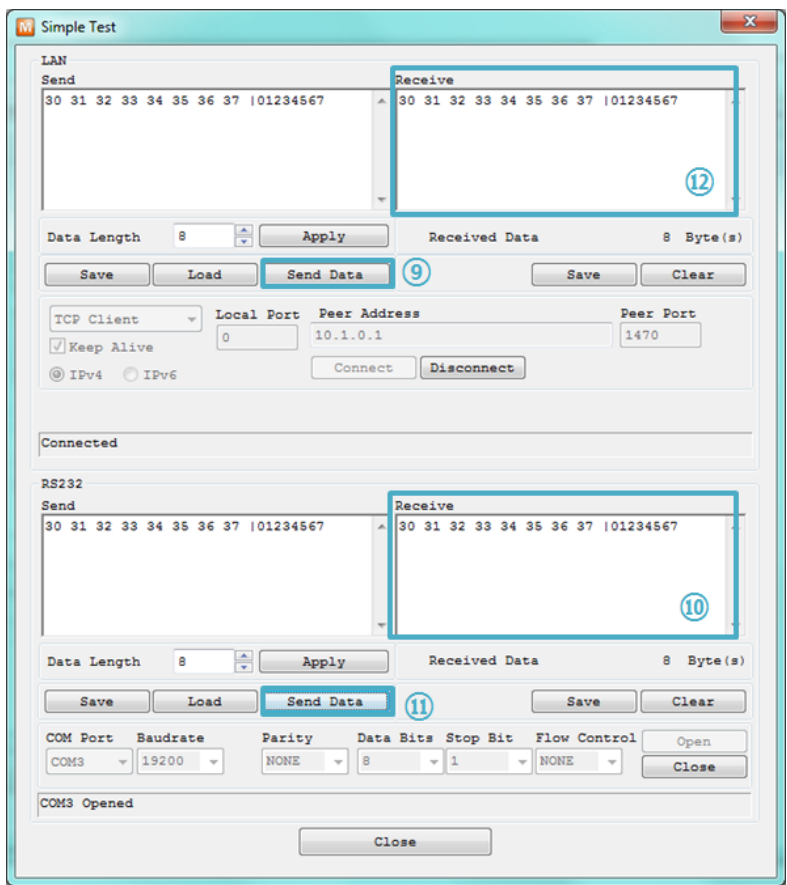
Figure 2-15 successful data transmission

⑨ Click [Send data] on the LAN side.

⑩ Check the data from ⑨ has been shown.
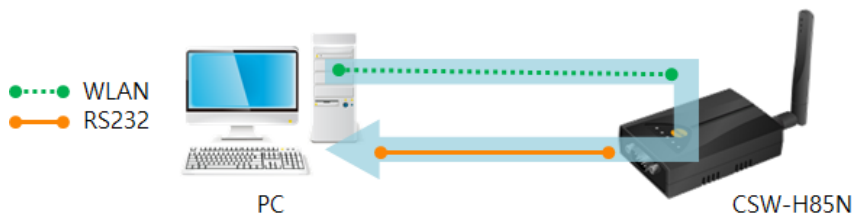
Figure 2-16 WLAN → RS232

⑪ Press [Send data] on the RS232 side.

⑫ Check the data from ⑪ has been received.
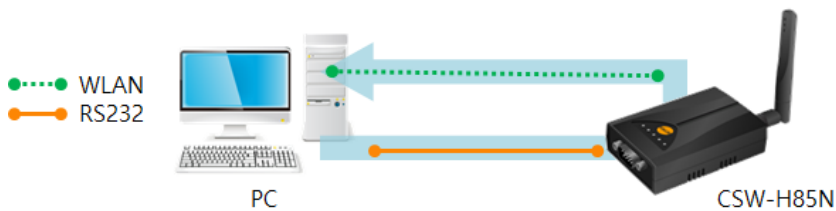
Figure 2-17 RS232 → WLAN

3 Configuration

3.1 Configuration with ezManager

3.1.1 Configuration via Serial

● Requirements

Make sure the connection between your PC and CSW-H85N using RS232 cross cable. To use this, CSW-H85N has to be operating in the Serial Configuration mode.

● Procedures

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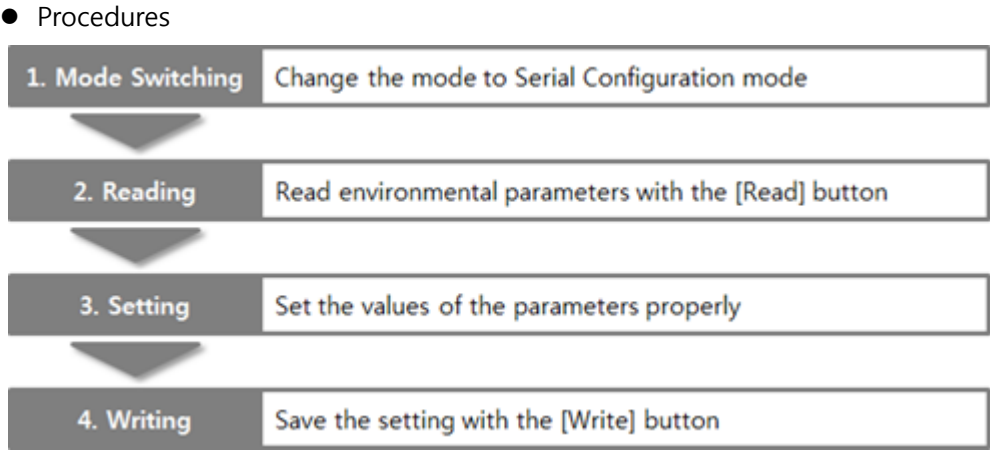
Figure 3-1 configuration via serial

3.1.2 Configuration via WLAN

If CSW-H85N is connected with your PC on wireless LAN, you can search and configure CSW-H85N with [MAC Address] and [IP Address] tab on ezManager.

● Requirements

CSW-H85N has to be connected to PC on the same network. Connect it to wireless network, using Ad-hoc, Infrastructure or Soft AP mode.

● Procedures

1. Searching	Use [Search All] or [Read] button on ezManager
2. Selecting	Select a MAC Address which you want to set parameters
3. Setting	Set the values of the parameters properly
4. Writing	Save the setting with [Write] button
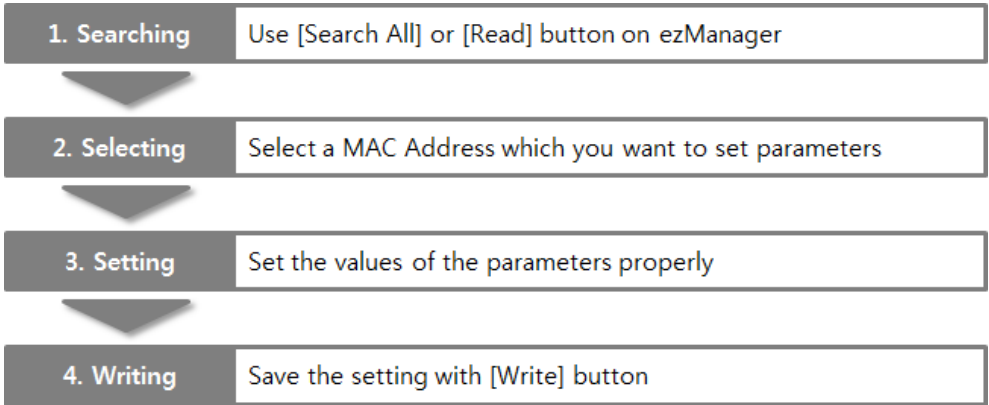
Figure 3-2 configuration via network

3.2 AT command

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

● Requirements

Make sure the connection between your PC and CSW-H85N using RS232 cross cable. To use this mode, CSW-H85N has to be set to [AT command] mode on ezManager.
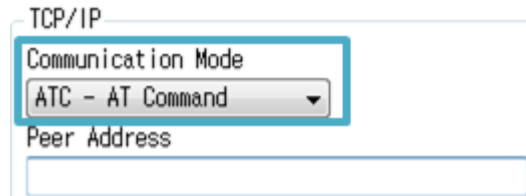
Figure 3-3 setting the communication mode to the AT command

● Procedures
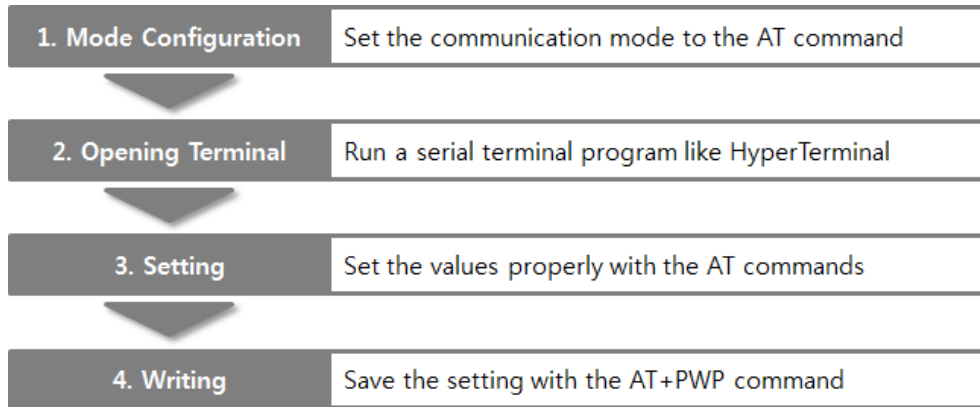
Figure 3-4 configuration procedures with AT commands

● Available settings

Items	Available parameters
Network	Local IP Address, DHCP, Subnet Mask, Gateway IP Address and etc.
TCP connection	Local Port, Peer Address (IP Address or Host name), and etc.
WLAN	WLAN Topology, SSID, Pass phrase and etc.
Option	ESC code sending option, timeout and etc.

Table 3-1 parameters which are configurable on the AT command

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3.3 WEB Configuration

Use a WEB browser for configuration.

● Requirements

Product should be operated in Serial Configuration mode, activating background Soft AP function. A WEB browser and Wireless LAN adaptor are required on your PC.

● Procedures

1. WEB browser	Run an WEB browser on your PC
2. Connection	Connect to the WEB server (http://10.1.0.1)
3. Configuration	Set the values of the parameters properly
4. Save	Save the setting with the [save] button
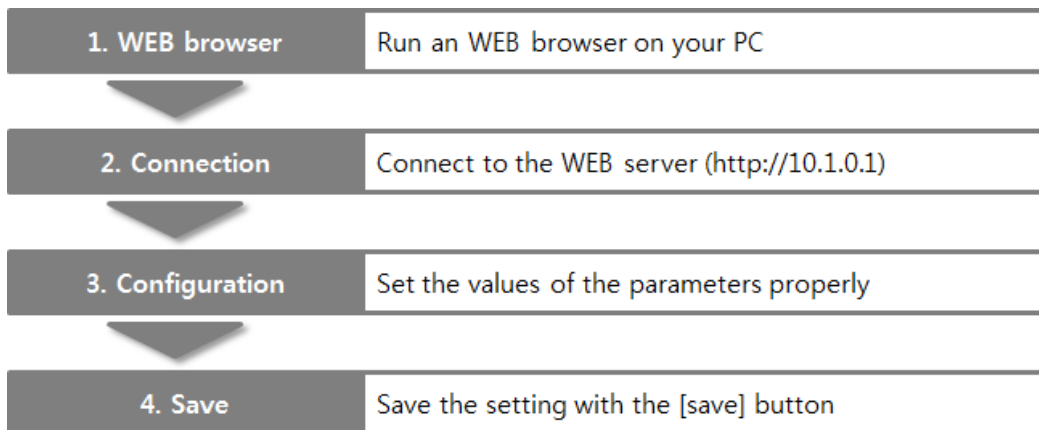
Figure 3-5 WEB configuration

● Available settings

Items	Available parameters
Network	IP Setting (Static / DHCP), IP Address, Subnet Mask and Gateway
WLAN	WLAN Topology, Channel, SSID and Security Settings
Option	Comment and Admin Password
etc.	Reboot

Table 3-2 available settings by WEB configuration

4   Operation Modes

4.1 What is the Operation Mode?

Each of three operation modes is defined for specific purpose as follows:

- Normal mode

  This mode is for normal data communication and there are 4 different connection modes. Configuring parameters is also available in this mode.

- Serial Configuration mode

  This mode is for configuring environmental parameters through the serial port. Background soft AP function is automatically activated in this mode.

- ISP mode

  This mode is only for changing firmware.

4.2 Changing modes
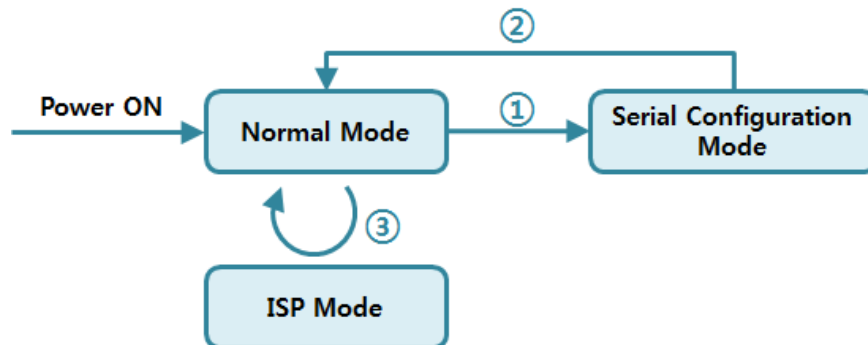
Figure 4-1 diagram for changing modes

① push the function button less than 1 second
② Reboot
③ Transfer a firmware by ezManager

4.3 Comparison with each mode

The table below shows comparison of each mode in serial port operation.

Name	Serial port	Serial type
Normal	configured value	RS232 / RS422 / RS485
Serial Configuration	115,200/N/8/1	RS232
ISP	115,200/N/8/1	RS232

Table 4-1 comparison of each mode

4.4 Normal mode

4.4.1 WLAN mode

CSW-H85N supports three types of WLAN mode.

WLAN mode	Description
Ad-hoc	WLAN is composed to only stations without an AP
Infrastructure	WLAN is composed to an AP and clients
Soft AP	AP acts both an AP and a client.

Table 4-2 comparison of WLAN mode 1

Required and available values for each WLAN mode are as follows:

WLAN mode	Channel	SSID	WEP	WPA
Ad-hoc	required	required	optional	not available
Infrastructure	not available	required	optional	optional
Soft AP	required	required	optional	not available

Table 4-3 comparison of WLAN mode 2

☞ **Soft AP is automatically activated on the background when CSW-H85N is in Serial Configuration mode with SSID of "cfg_[MAC Address]" format.**

4.4.2 Communication mode

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

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

Table 4-4 comparison of communication mode

Mode	Protocol	Connection	Requirements about Modifying S/W of serial devices	Serial configuration	Topology
TCP Server	TCP	Passive	N/A	N/A	1:1
TCP Client		Active	N/A	N/A	1:1
AT Command		Both	Required	Available	1:1
UDP	UDP	-	N/A	N/A	N:M

Table 4-5 comparison of communication mode

☞ **N/A: Not Applicable or Not Available.**

☞ **Note that CSW-H85N allows maximum 4 hosts in the TCP Server mode, if [Multiple Connection] is enabled.**

4.5 Serial Configuration mode

4.5.1 Configuring Parameters

This is a mode for setting environmental parameters through the serial port. If you cannot use the WLAN, this mode is only way to configure the parameters. Click the [Read] button on the [Serial] tab on ezManager after entering this mode.

☞ **Refer to the [Serial Management Protocol] document on our website for details.**

4.5.2 Revoking Serurity Options

CSW-H85N offers some security options like filtering with password or MAC and IP addresses. Some of these options may not allow you to access your product. In the serial configuration mode, you can revoke all of these options.

4.5.3 Background Soft AP

CSW-H85N activates Soft AP function in background regardless of the WLAN topology settings while operating under Serial Configuration mode.

4.6 ISP mode

Generally, ISP mode is only used by system for special purpose such as uploading a firmware.

5 Communication Modes

5.1 TCP Server

In this mode, CSW-H85N listens to a TCP connection request from remote hosts. Once a host tries connecting to CSW-H85N, it accepts a connection. After the connection is established, CSW-H85N 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	CSW-H85N does not send the data
Otherwise (512 or under)	CSW-H85N 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 can the TCP/UDP protocol be used, but Dynamic Domain Name Service (DDNS).

● 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.
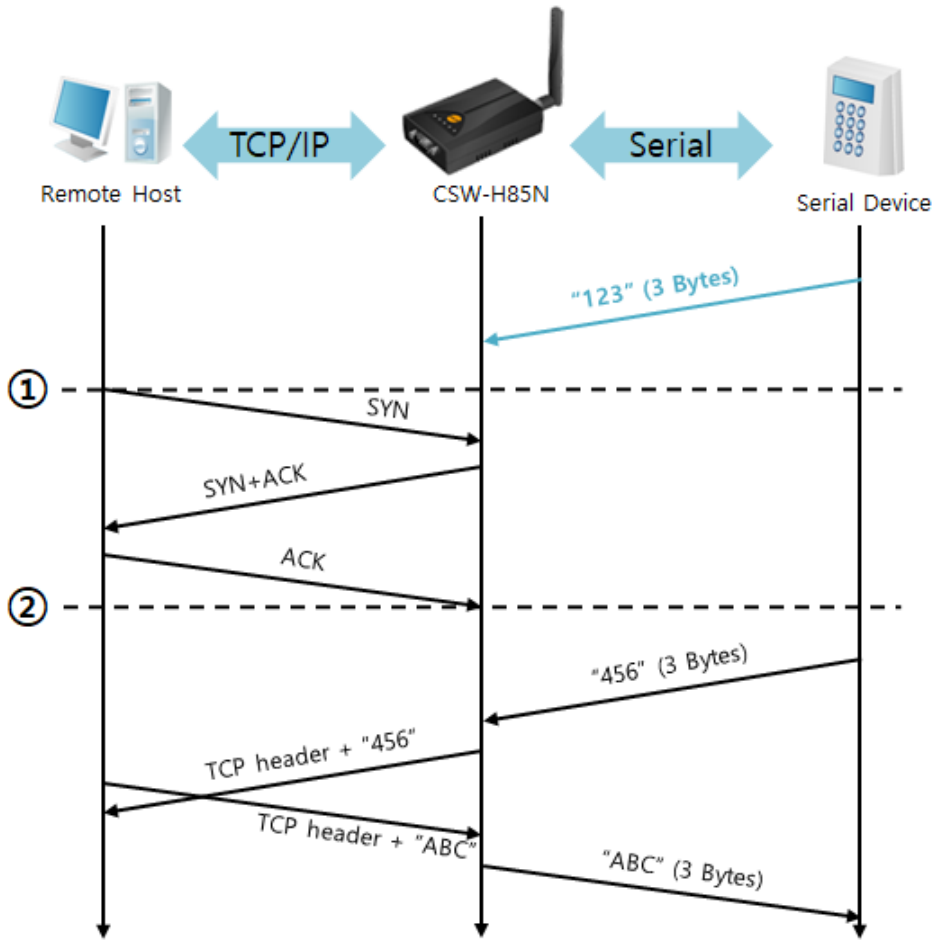
Figure 5-1 time chart

Time	States
~	CSW-H85N listens 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 5-2 states of each point

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

● A situation that [Event Byte] is set to 1
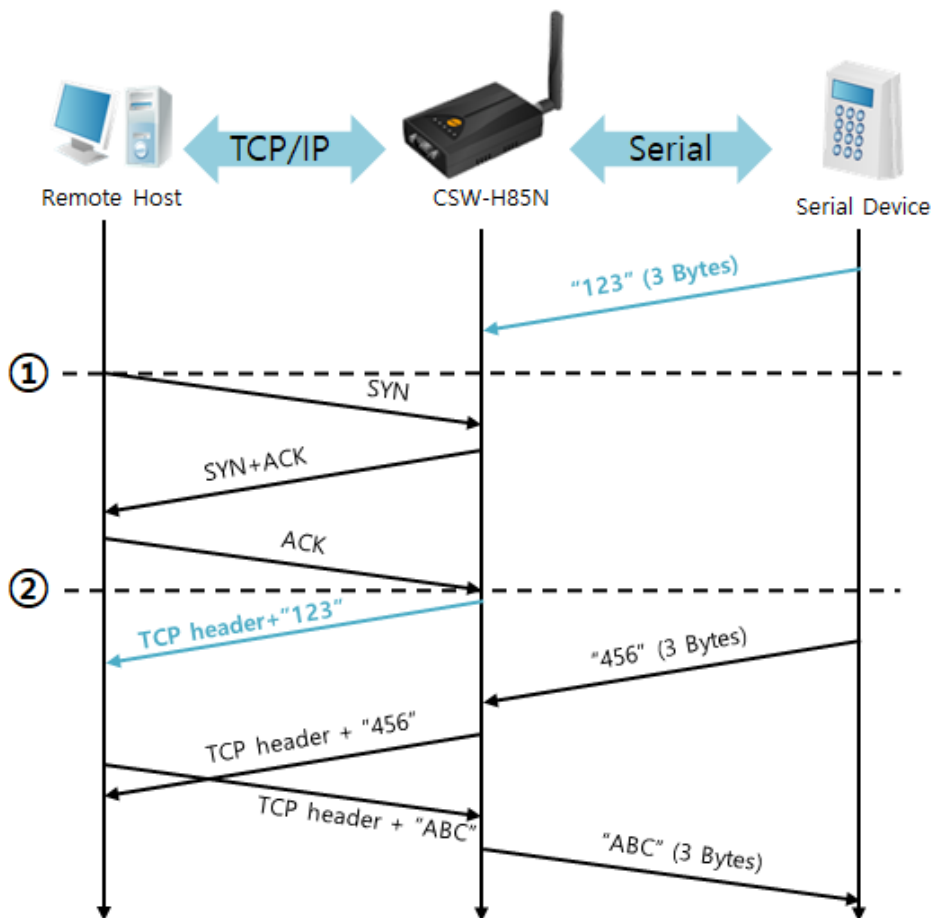
Figure 5-2 time chart

Time	States
~	CSW-H85N listens connection requests
①	Remote host sends 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 you can see, the data "123" has been sent right after establishing a connection because the value of [Event Byte] had been set to 1.

● A situation that [Timeout] is set to 5
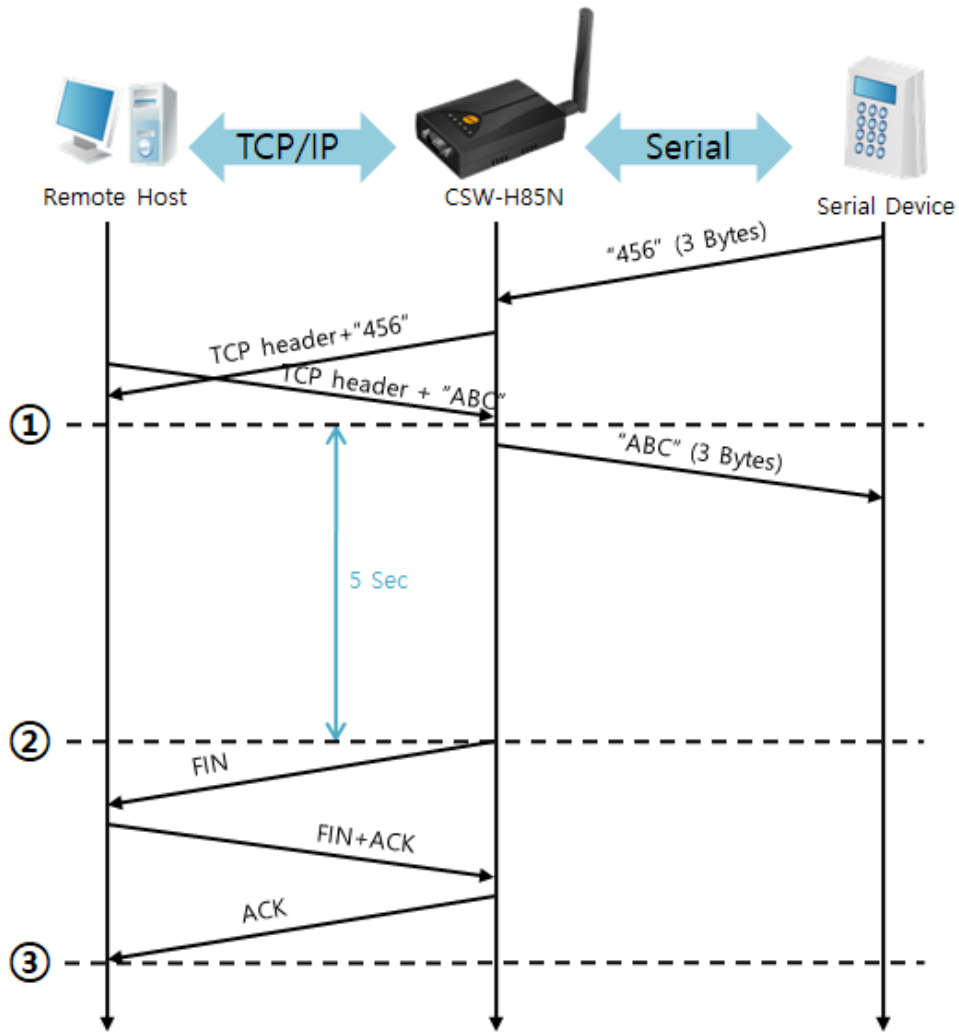
Figure 5-3 time chart

Time	States
~	Data communication on both sides
①	The last segment arrives at the CSW-H85N
~	No data communication for 5 seconds
②	CSW-H85N sends disconnection request (FIN) to a remote host
~	Processes of the disconnection
③	The connection is terminated
~	CSW-H85N listens connection requests

Table 5-4 states of each point

5.2 TCP Client

In this mode, CSW-H85N 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, CSW-H85N 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 item is an 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	The point of time to send request segment
0	right after CSW-H85N 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	CSW-H85N does not send the data
Otherwise (512 or under)	CSW-H85N 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, CSW-H85N can be operated as a TCP server or client without changing its settings.

● DNS IP Address

[DNS IP Address] is needed when you use a host name instead of an IP address.

5.2.2   Examples

● A situation that [Event Byte] is set to 0
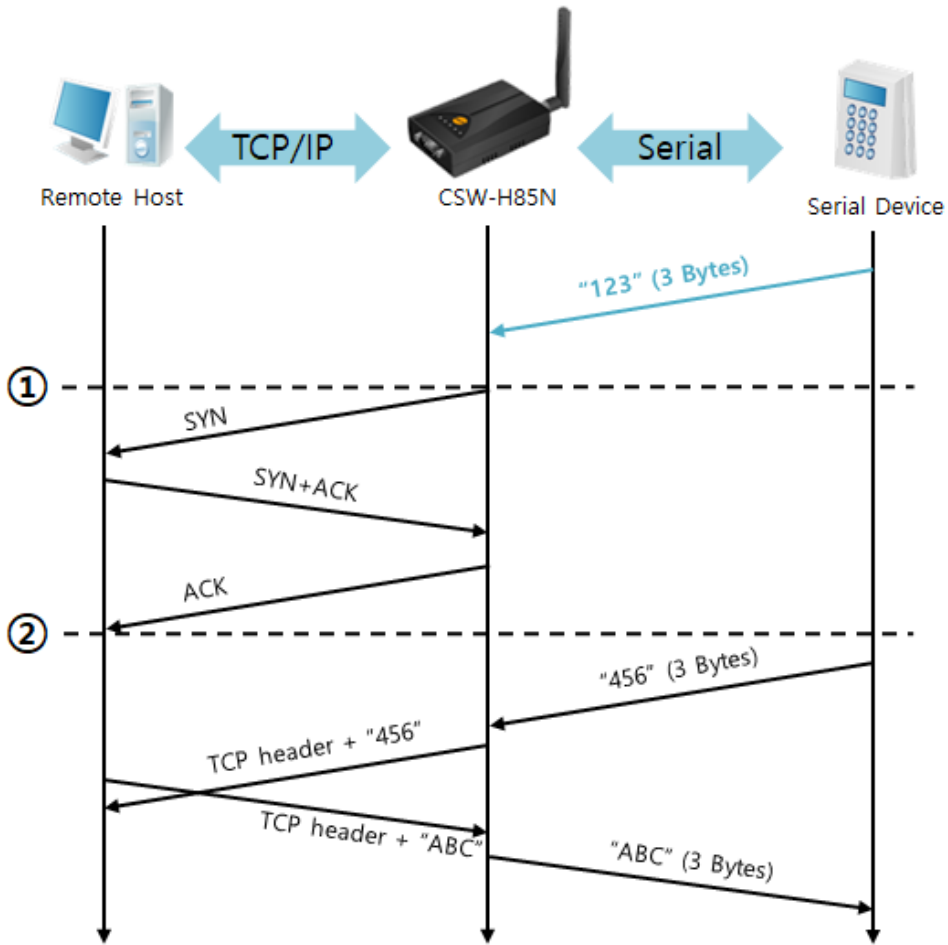
Figure 5-4 time chart

Time	States
~	Power is not supplied yet.
①	CSW-H85N 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 states of each point

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

● A situation that [Event Byte] is set to 1
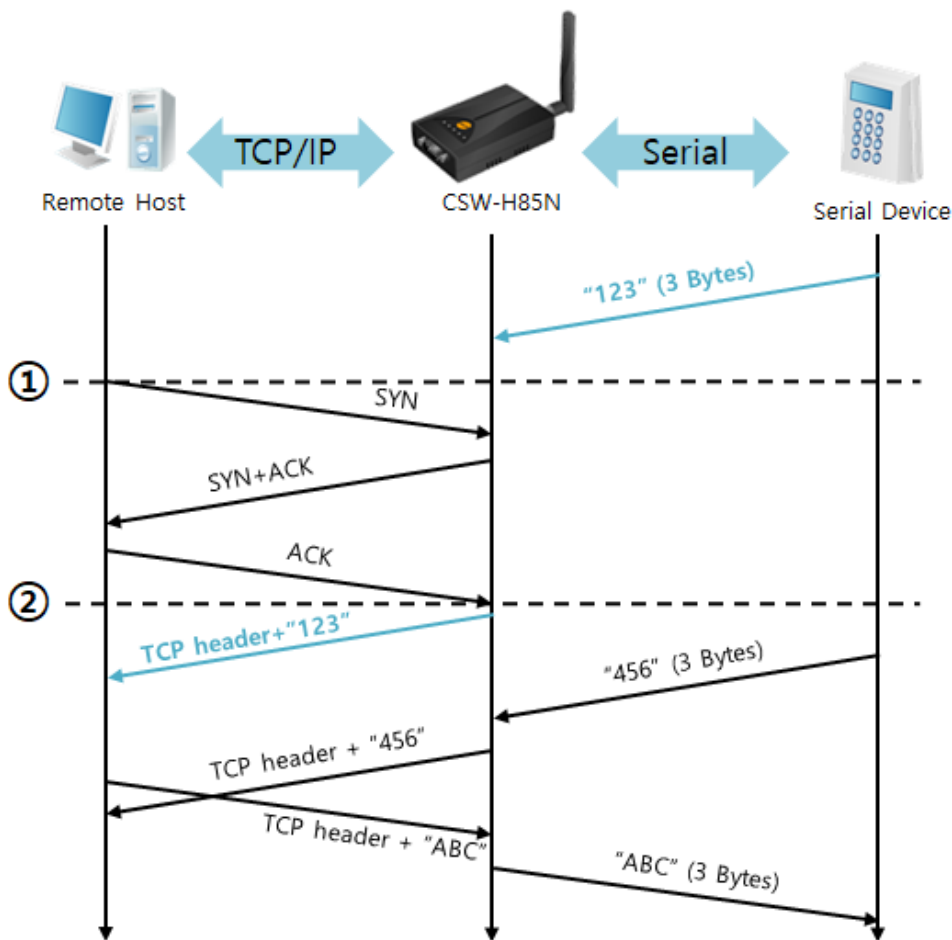
Figure 5-5 time chart

Time	States
~	CSW-H85N receives data from its serial port.
①	CSW-H85N sends a connection request segment right after receiving 1 byte.
~	processes of the TCP connection
②	The connection is established.
~	The data "123" is transmitted to the remote host.

Table 5-8 states of each point

As you can see, CSW-H85N has sent a request segment right after the size of the serial data has been 1 bytes. Even though they arrived before the connection, the data "123" was transmitted to the remote host because the [Event Byte] is set to 1.

● Activation of [TCP Server] option
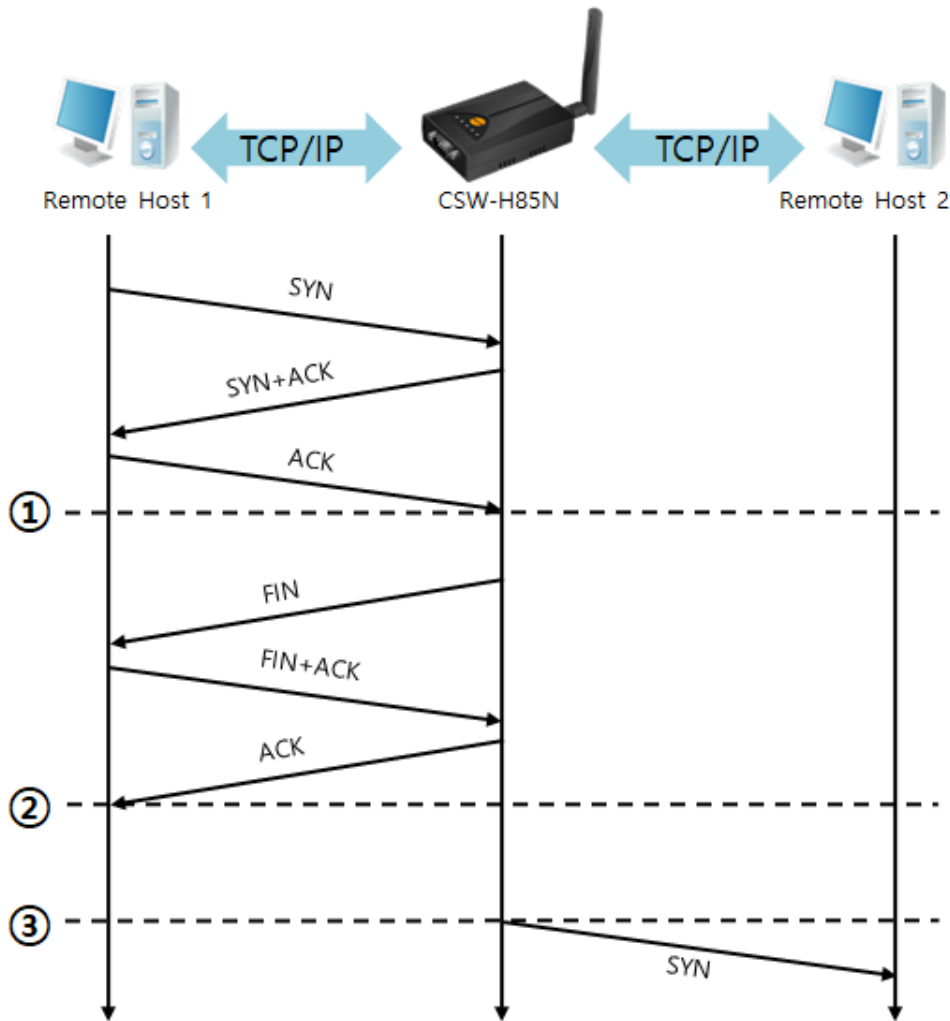
Figure 5-6 time chart

Time	States
~	CSW-H85N listens to connection requests
①	The connection has been established
~	CSW-H85N is online and processes of the disconnection
②	The connection is terminated
~	Both sides are offline
③	Sends TCP connection request segment

Table 5-9 states of each point

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.

5.3 AT Command

In AT command mode, you can control CSW-H85N with AT commands like a controlling modem. Active and passive TCP connections are available while UDP is not. And you are allowed to configure some environmental parameters with extended commands.

5.3.1 Key parameters

The configuration should be implemented via the serial port.

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<CR>
+PTO	Timeout	at+pto=10<CR>
+WCCT	WLAN Topology	at+wcct=1<CR>
+WSSID	SSID	at+wssid="sollae"<CR>
+PWP	Store setting	at+pwp<CR>

Table 5-10 some of extended AT commands for configuration

● Related items with an 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

An IP address and local port of a remote host are can be set.

● Type of assigning IP address: Manual, DHCP

Not only is manual setting available, but automatic assigning protocol (DHCP).

● WLAN parameters

WLAN Topology, SSID and antenna can be configured by the above commands.

● Others

Some of options including [Timeout] can be configured in this mode.

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

5.3.2   Examples

● TCP Server – setting parameters and passive connection
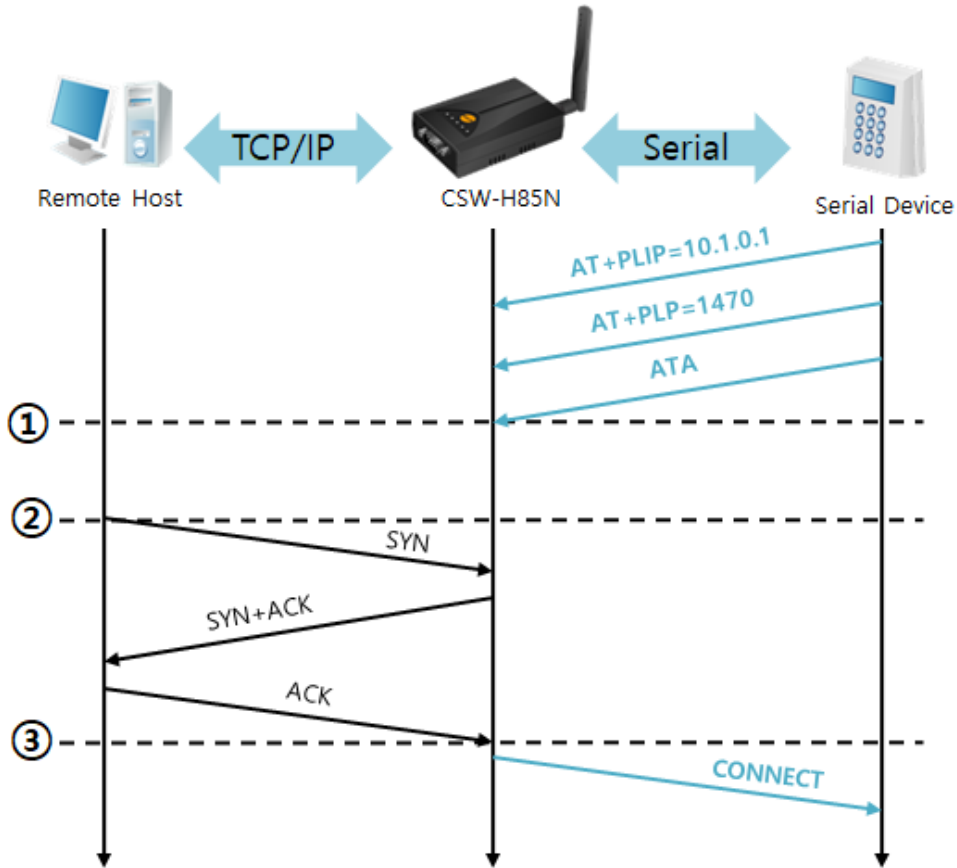
Figure 5-7 time chart

Time	States
~	configuring parameters with AT commands
①	ATA command has arrived.
~	CSW-H85N listens to TCP connection requests.
②	A remote host sends SYN segment to CSW-H85N.
~	processes of TCP connection
③	TCP connection is established.
~	CSW-H85N sends "CONNECT" message to the serial port.

Table 5-11 states of each point

☞ *Some of the response messages from the serial port of CSW-H85N are omitted on above figure.*

- TCP Client – setting parameters and active connection
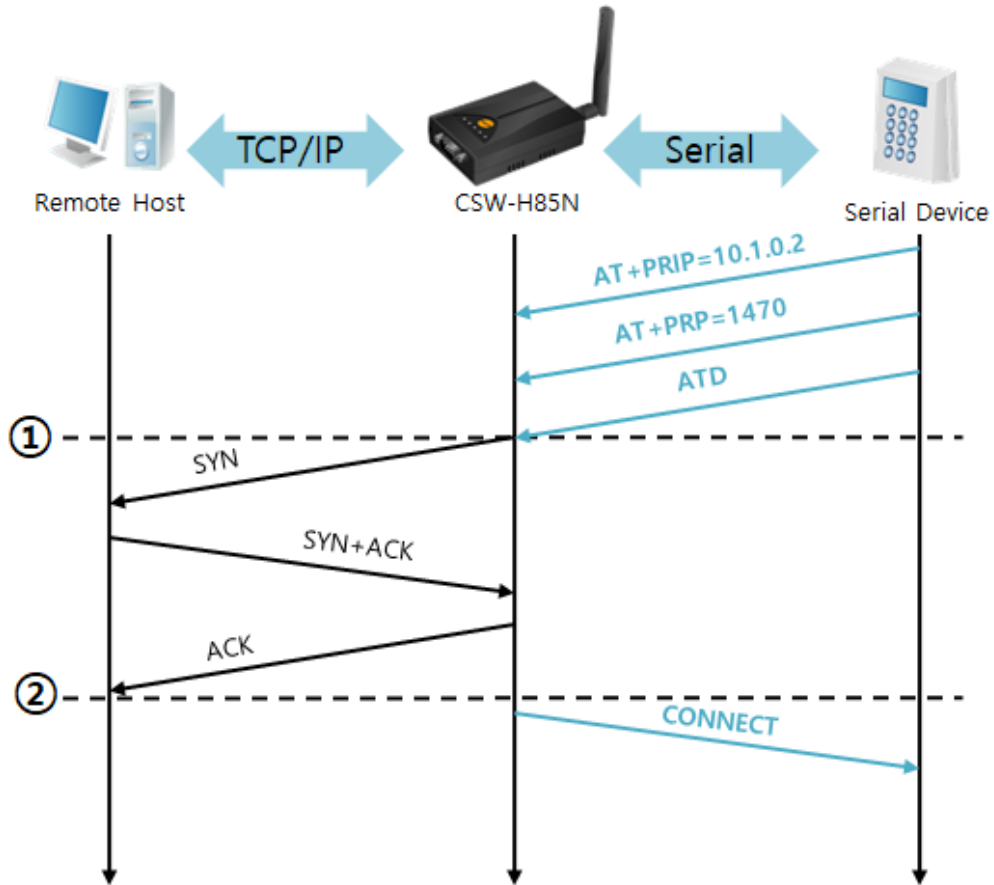
Figure 5-8 time chart

Time	States
~	configuring parameters with AT commands
①	CSW-H85N sends TCP connection request with the ATD command.
~	processes of TCP connection
②	TCP connection is established.
~	CSW-H85N sends "CONNECT" message to the serial port.

Table 5-12 states of each point

● Termination of online status – entering the AT command mode
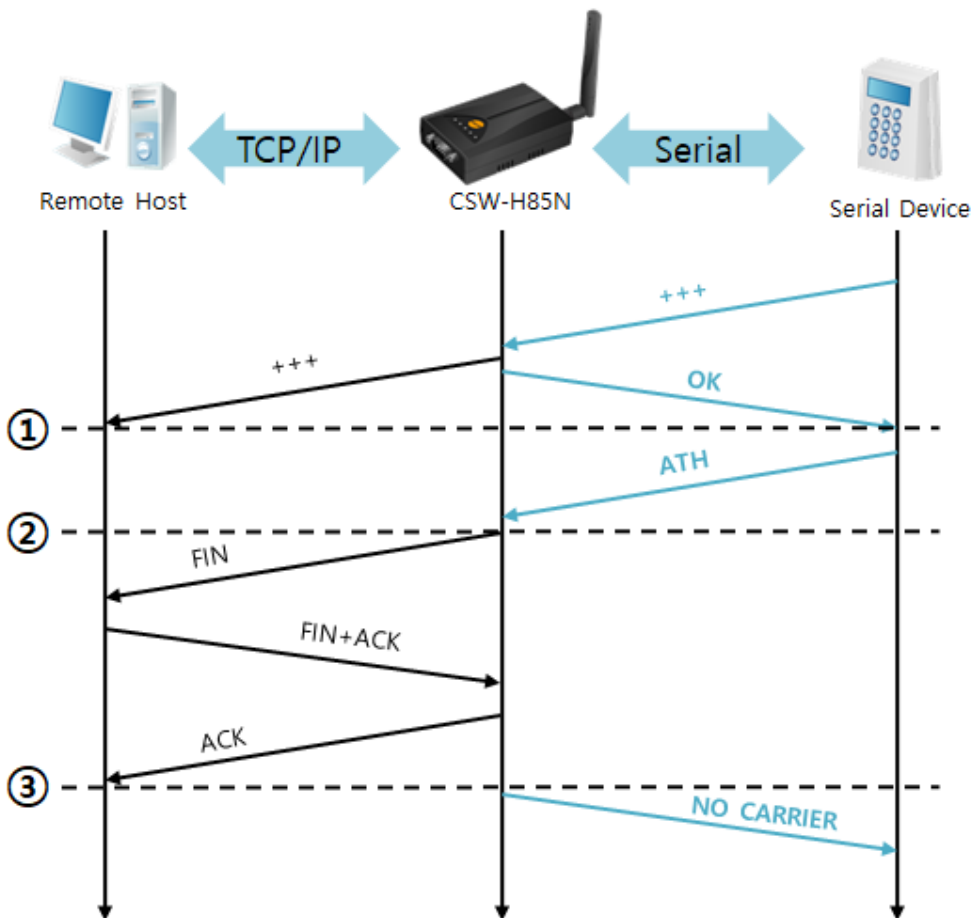
Figure 5-9 time chart

Time	States
~	TCP connection is on-line.
①	The mode is changed to "command mode" after receiving "+++".
~	command mode (TCP connection is off-line)
②	CSW-H85N sends FIN segment right after the "ATH" arrives.
~	processes of TCP disconnection
③	TCP connection is terminated
~	CSW-H85N sends "NO CARRIER" with disconnection.

Table 5-13 states of each point

CSW-H85N changes the mode to AT command, when receiving "+++". In this state, the communication with remote host is unavailable because CSW-H85N processes only AT commands. Whenever you want to go back to on-line state, just give "ATO" command.

5.4 UDP

UDP has no connection processes. In this mode, data is sent in block units. Therefore, data that comes through CSW-H85N's serial port is collected in block units to send it elsewhere.

5.4.1 Key parameters

- Block Size

  [Block Size] 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] comes into the serial port, CSW-H85N will send 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 is no data from the serial devices during the [Data Frame] time, CSW-H85N sends and receives data in the buffer as one block to the network.

☞ ***Once one of the two parameters, [Block Size] and [Data Frame], is sufficient, UDP packet block will be transmitted.***

- 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, CSW-H85N can communicate to multiple hosts without additional setting.

5.4.2 Examples

● Block Size: 5 bytes / Data Frame: 1sec
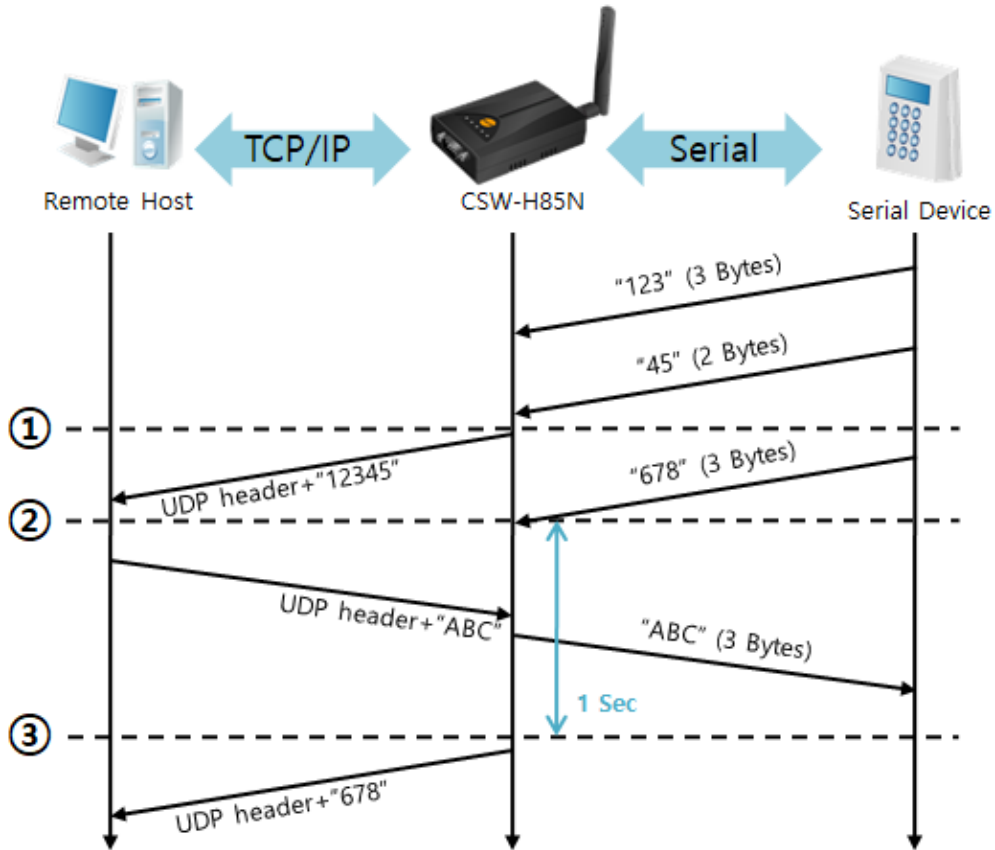
Figure 5-10 time chart

Time	States
~	CSW-H85N receives data from the serial port
①	CSW-H85N sends 5 bytes as one block based on the [Block Size].
~	Serial device sends data "678".
②	The data "678" arrives.
~	CSW-H85N sends data from the remote host to the serial device
③	1 second
~	CSW-H85N sends data "678" as one block based on the [Data Frame].

Table 5-14 states of each point

● Dynamic Update of Peer host

This is a function that CSW-H85N 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
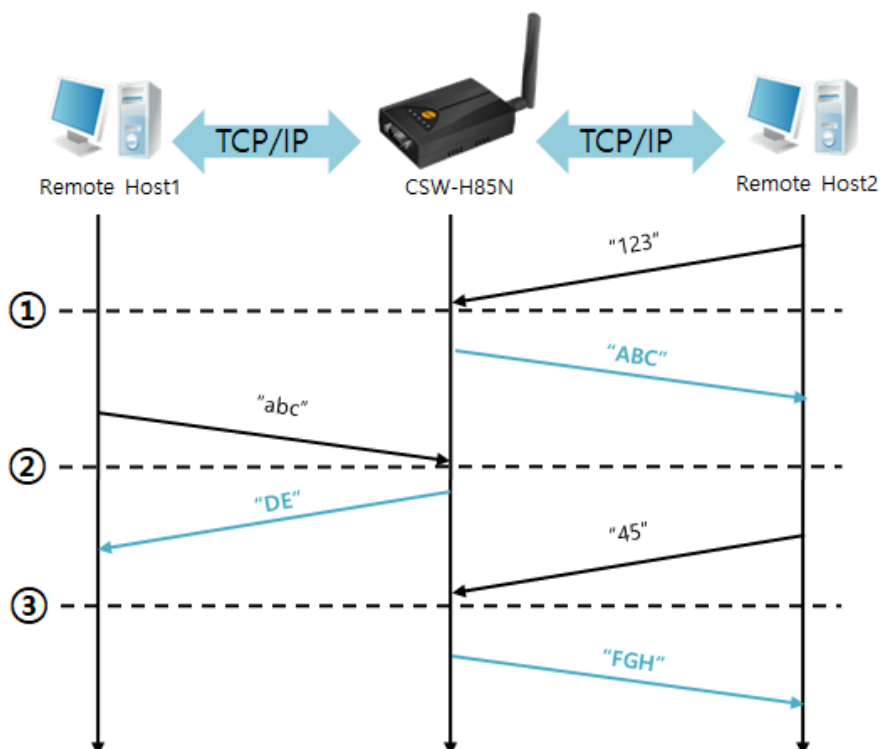
Figure 5-11 time chart

Time	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 states of each point

☞ *The data "ABC", "DE" and "FGH" are ones that come from the serial port of CSW-H85N in the above figure.*

6   System Management

6.1 Uploading Firmware

Firmware is a type of software to operate CSW-H85N. If there are needs for adding functions or fixing bugs, the firmware can be modified and released. That is why we always recommend using the latest firmware.

If you want to upload a firmware, visit our web site and download the latest firmware. You can use ezManager for uploading a Firmware.

6.1.1   Uploading a F/W by network

Connect your CSW-H85N to wireless network and make sure both PC and CSW-H85N are the same sub network. Then, you can search CSW-H85N by ezManager via network.

After that, follow the steps below.
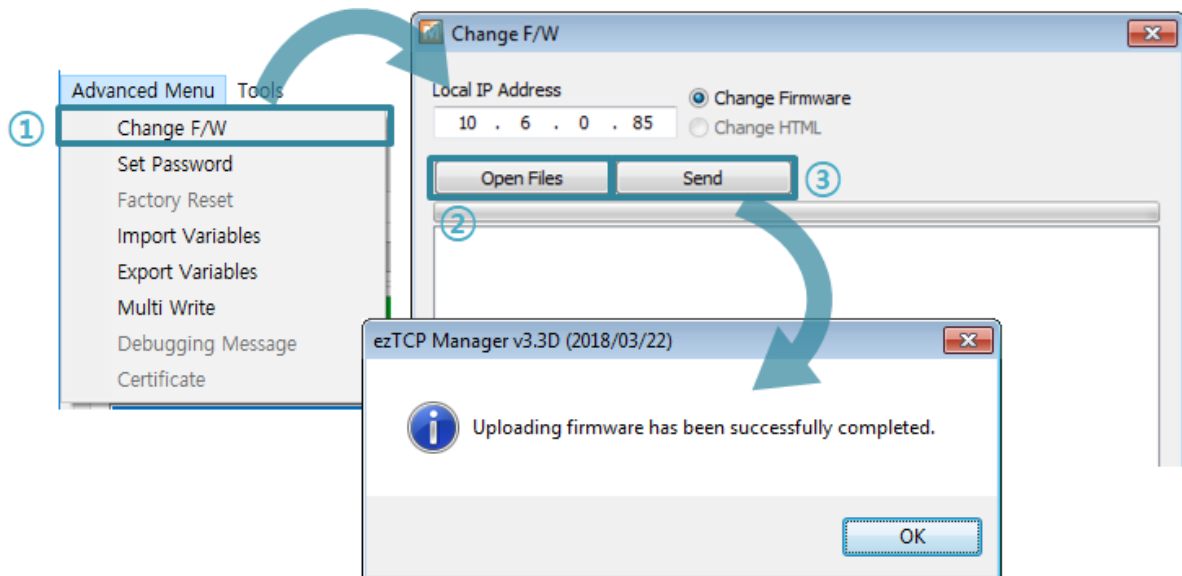
Figure 6-1 Uploading a F/W by network

① Select [Advanced Menu] > [Change F/W] menu of ezManager
② Click [Open Files] and select the firmware file.
③ Click the [Send] button.

6.1.2　Uploading F/W by Serial

Connect your CSW-H85N to a RS-232 port on your PC and follow the steps below.
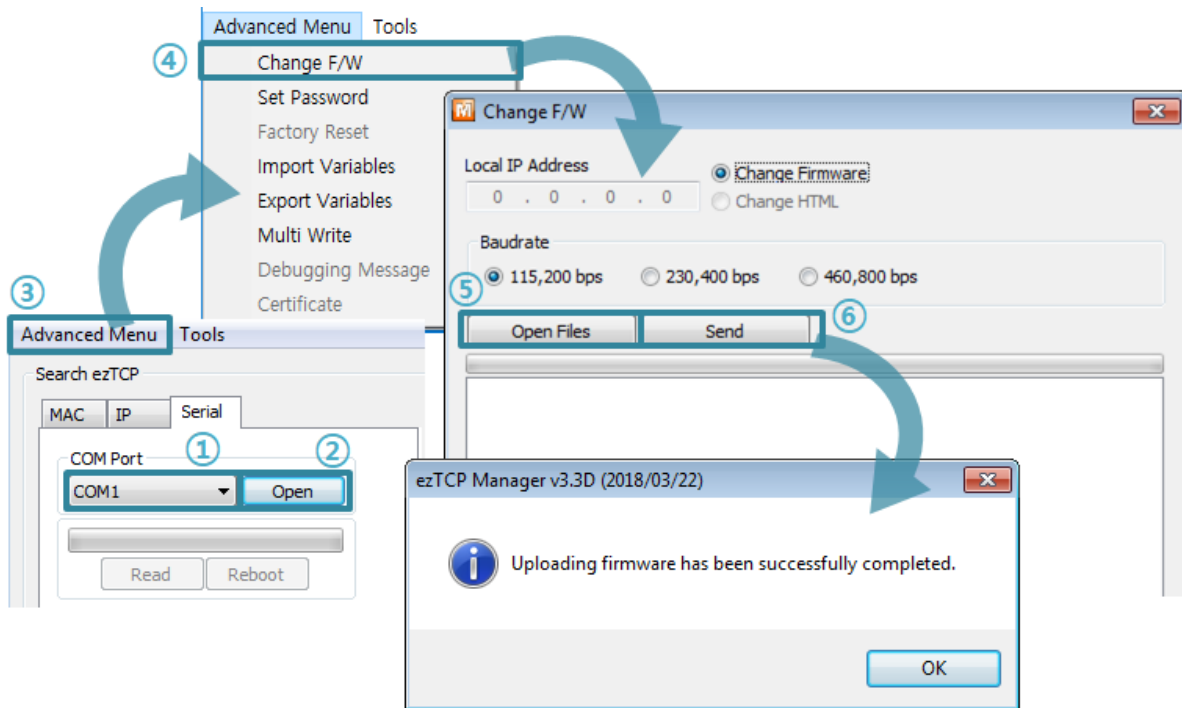
Figure 6-2 running Change F/W / HTML program for sending F/W file

① Select the COM port which is connected with your CSW-H85N.

② Press the [Open] button.

③ Click the [Advanced Menu].

④ Select the [Change F/W] menu.

⑤ Click the [Open] Files] button and select the firmware file.

⑥ Click the [Send] button.

CSW-H85N User Manual Ver. 1.0

6.2 Status Monitoring

6.2.1 TELNET

When the [TELNET] option is activated, you can remotely log in to CSW-H85N. The default password is "sollae". If you set a password, you have to log in with it.

```
CSW-H85N Management Console v1.0A Sollae Systems
password: ******
lsh>
```

Figure 6-3 log in to CSW-H85N via TELNET

The following commands help you check states of CSW-H85N

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
sd	[OP1][OP2]	Serial data Dumping	lsh>sd 1 100
		Stop Serial data dumping	lsh>sd 1 0
sc	[OP1][OP2]	Session Close	lsh>sc com1 close
exit	-	TELNET Session Close	lsh>exit

Table 6-1 commands for checking states

● st net

This command is displays current IPv4 network states of all sessions.

```
lsh>st net
proto  name      local address          peer address         sendq    state
-----  ------   ---------------------  ---------------------  -----  -----------
TCP     tty       10.6.0.170(   23)      10.6.0.50(50932)      219 ESTABLISHED
TCP     com1       0.0.0.0( 1470)         0.0.0.0(    0)        0 LISTEN
```

Figure 6-4 "st net" command

 - 51 - https://www.ezTCP.com

● st net6

If you enable IPv6, you can use this command to display current IPv6 network states of all sessions.

```
lsh>st net6
proto  name              local/peer address            sendq    state
-----  ------  --------------------------------------  -----  -----------
TCP6    com1          fe80::230:f9ff:fe00:686( 1470)      0 ESTABLISHED
                      fe80::ad74:b072:428f:4d3(50954)
```

Figure 6-5 "st net6" command

● st sio

This command is displays the number of bytes of the serial port.

```
lsh>st sio
port fmax rbmax rxbuf txbuf  rx_count   tx_count
---- ---- ----- ----- ----- ---------- ----------
com1   8    0     0     0         16         32
```

Figure 6-6 "st sio" command

● st uptime

This command displays system uptime since CSW-H85N has booted up.

```
lsh>st uptime
00:02:44.73 up 0 days
```

Figure 6-7 "st uptime" command

● sd

"sd" command is used when users close a session. [OP1] means the number of COM port, and [OP2] means period of capturing and printing messages with 10ms unit.

```
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 6-8 "sd" command

If you input 0 to the [OP2], it stops the capture.

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

Figure 6-9 stop capturing data

● sc

This command disconnects one of the current sessions. Input session name to [OP1] and "close" command to [OP2].

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

Figure 6-10 "sc" command

● exit

This command disconnects current TELNET session.

6.2.2   Status Window of ezManager

Status of CSW-H85N can be monitored by the [Status] button on ezManager. By using the [Refresh Every 1 Second] option in the window, the status will be automatically updated in every second.
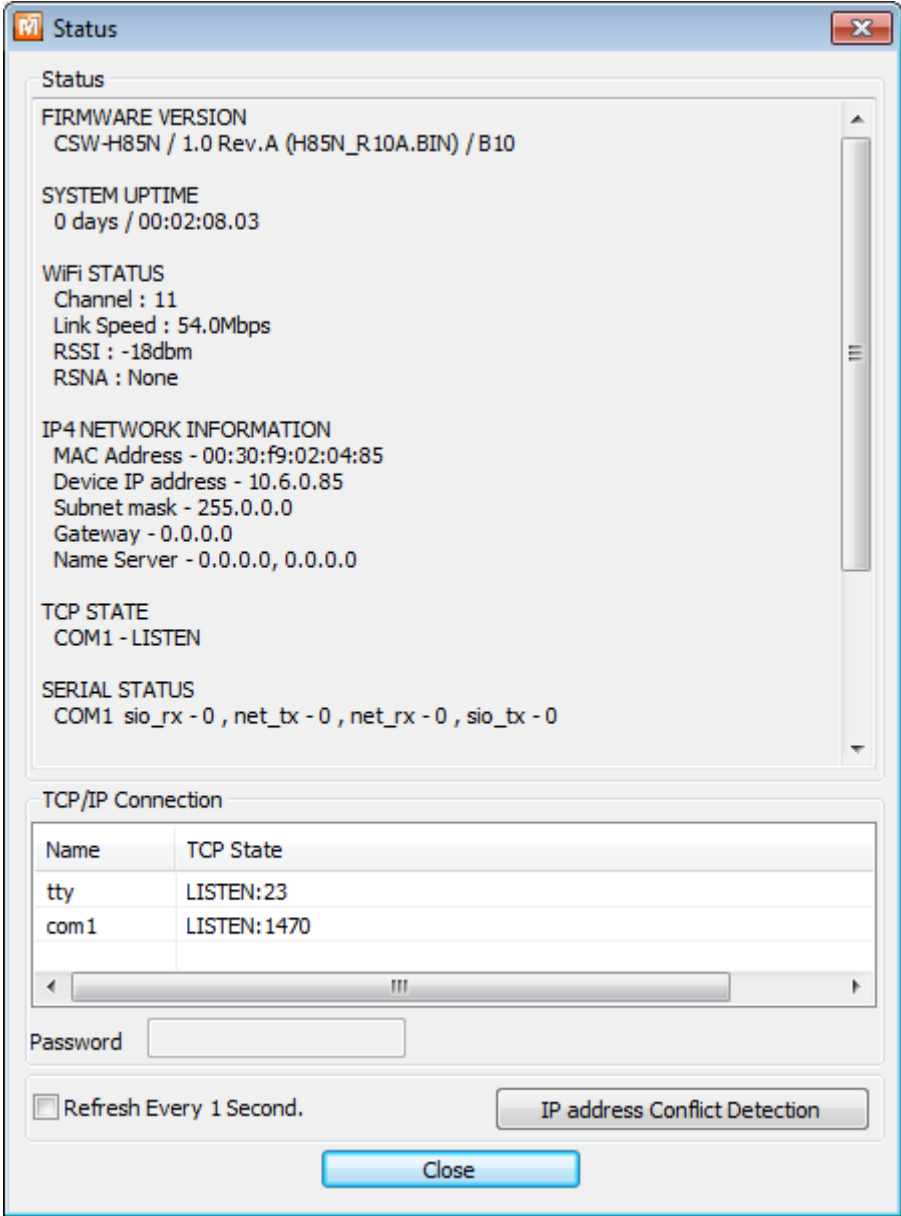
Figure 6-11 status window of ezManager

● FIRMWARE VERSION

The name of model and the version of firmware are displayed here.

● SYSTEM UPTIME

Amount of operating time since CSW-H85N has booted up is displayed.

● Wi-Fi Status

Status of Wireless LAN Channel is displayed.

Item	Description
Channel	Current channel (Frequency band)
Link Speed	Maximum data rate of the link (Unit: Mbps)
RSSI	Received Signal Strength Indication (Unit: dBm)
RSNA	Current authentication algorithm (WEP, TKIP, CCPM)

Table 6-2 Wi-Fi status

● IP4 NETWORK INFORMATION

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

● IP6 NETWORK INFORMATION

All information about related items with the IPv6 Address is shown here. This item will be shown only when IPv6 is enabled.

● TCP STATE

TCP status of each port is shown in this section.

Message	Description
LISTEN	The session is waiting for TCP connection.
CLOSE	TCP connection is closed.
SYN_SENT	The session is sending "SYN" segment to a TCP server.
ESTABLISHED	TCP connection is established.
N/A	in UDP mode

Table 6-3 TCP STATE

● Amount of data

Amount of data in each 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 6-4 SERIAL STATUS

● ARP Table / ND Cache Table

This part shows ARP table on CSW-H85N. When TCP connection is established or UDP data communication is performed, the information of IP and MAC address is automatically registered in the table. This information lasts for 1 minute so when 50 seconds has passed, CSW-H85N starts broadcasting the ARP packet in every second. If there is no response until the time is 0, the information is removed. Otherwise, the time is updated 60 seconds again.

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

State	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, CSW-H85N will not be able to communicate with the device.
PROBE	CSW-H85N will resend the request message to the device in DELAY state. CSW-H85N will keep sending Neighbor Solicitation until it replies.

Table 6-5 5 states of ND cache table

- TCP/IP Connection

  The same information with [TCP STATE] is displayed with an IP address and port number. A difference from [TCP STATE] is whether you can terminate TCP connection or not. When right click on a session, a small window will be popped up.

- Password

  This text box is activated when CSW-H85N has a password. If you want to close TCP connection on [TCP/IP Connection] list, input the password first.

- Refresh Every 1 Second.

  If this option is checked, ezManager sends queries 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.
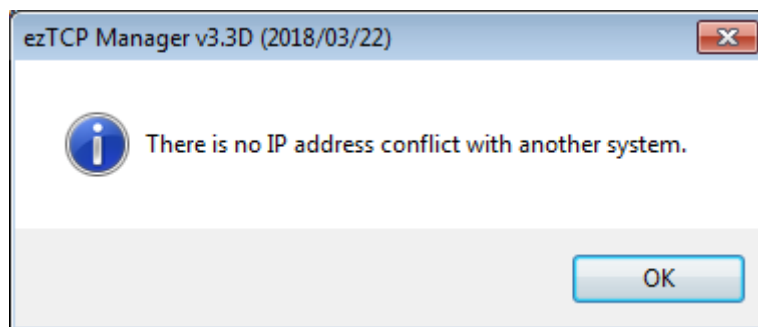
Figure 6-12 no confliction of IP addresses
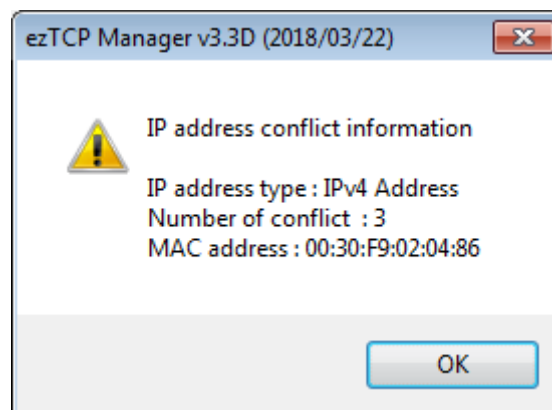
Figure 6-13 confliction of IP addresses

7   Security Functions

7.1 SSL

7.1.1   What is the SSL(Secure Socekt 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 works for SSL, you have to set the SSL-related parameters as the following steps. Set the [SSL] check box in the [Serial Port] tab of ezManager.
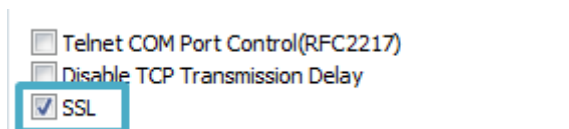
Figure 7-1 setting of SSL option

In TCP server mode, you can make a self-signed certification and write it.

①   Click the [Advanced Menu] → [Certificate] of the ezManager.
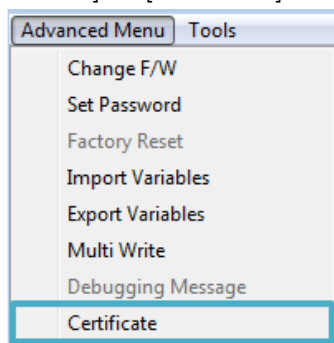
Figure 7-2 certificate menu

②   Select the [Write self-signed certificate] and click the [OK] button.
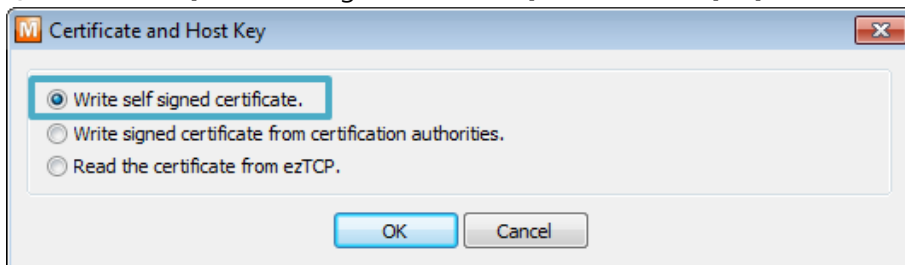
Figure 7-3 certificate and host key window

③ Click the [OK] button after checking the parameters
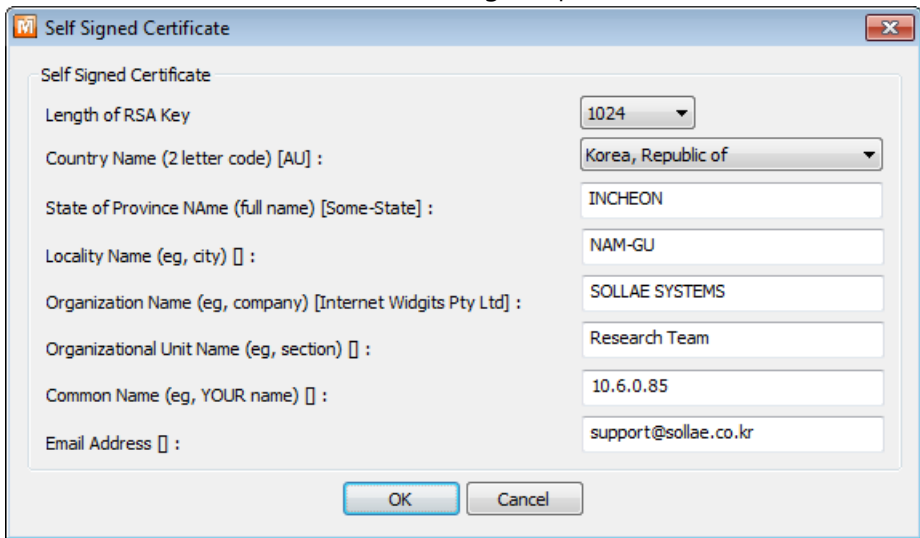
Figure 7-4 self-signed certificated

④ Check a success message.

7.1.3 Restriction of SSL

This function cannot be used simultaneously with IPv6, and the serial communication speed is limited to 115,200 bps. Since the certificate also has its own IP information, if the IP address is changed, a new certificate must be created.

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

7.3 Setting Password

A password can be used for protecting CSW-H85N from TELNET login or changing environmental parameters by hosts which are not qualified. The maximum length is 8 bytes of alphabet or number.

7.4 Wireless LAN Security

7.4.1 Using WEP

● AP settings

Set parameters such as authentication mode (open / shared) and key length (64 / 128) on your AP. If you do not know how to set AP's parameters, refer to the manual or ask the manufacturer.

● CSW-H85N settings

Input WEP Key, which is set on the AP, in [Shared Key] text box of [Security Settings] section on [WLAN] tab of ezManager.
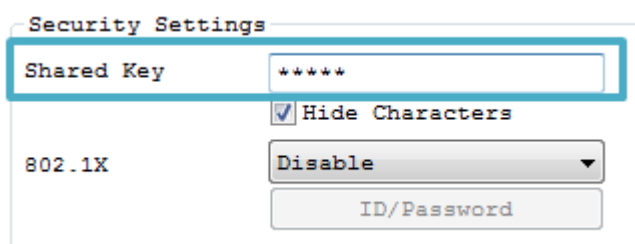
Figure 7-5 Shared Key settings

Type		Digit	Example
WEP64(64bits)	ASCII	5	abcde
	Hexadecimal	10	6162636465
WEP128(128bits)	ASCII	13	0123456789abc
	Hexadecimal	26	3031323334353637383916263

Table 7-3 WEP key settings

7.4.2 Using WPA-PSK

● AP settings

Set the WPA-PSK or WPA2-PSK and related parameters on your AP. If you do not know how to set AP's parameters, refer to the manual or ask the manufacturer.

● CSW-H85N settings

Input WPA-PSK Key, which is set on the AP, in [Shared Key] text box of [Security Settings] section on [WLAN] tab of ezManager. (See the Figure 7-5 Shared Key settings)

☞ *The length of Key for WPA-PSK should be 8 ~ 63 characters.*

7.4.3   Using WPA-Enterprise

● Configuration of the Access Point

Set the WPA-Enterprise for authentication and radius server to communicate. If you do not know how to set AP's parameters, refer to the manual or ask the manufacturer.

☞ **CSW-H85N supports EAP-TLS / TTLS and PEAP.**

● Configuration of the product

Select one of authentication protocols on 802.1X item in the Security Settings.

Protocol	required configurations
EAP-TLS	ID of radius server account, client certificate
EAP-TTLS	ID and passphrase of radius server account
PEAP	ID and passphrase of radius server account

Table 7-4 802.1X protocols

☞ **Caution: Maximum length is restricted to 32Bytes for ID and 16Bytes for password.**

● How to use EAP-TLS

In the case of EAP-TLS, a certificate is needed to save by ezManager.
The procedures are as follows:

① Configure the ID of radius server account
② Check the [Advanced Menu] > [Certificate] menu
③ Save the client certificate made by radius server
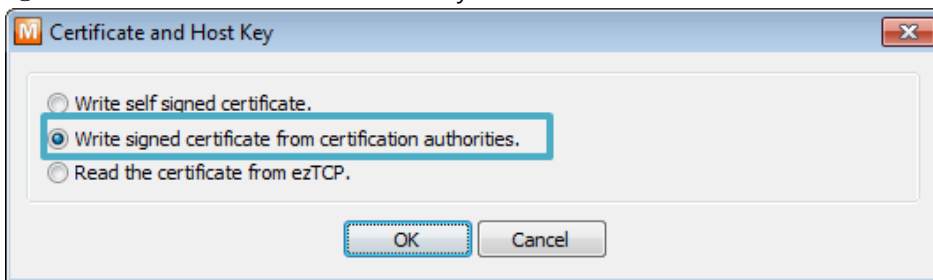
Figure 7-6 certificate and host key window

④ Input password for the certificate
⑤ Check the information of the certificate

8 Additional Functions

8.1 Notify IPv4 Change

CSW-H85N can be a TCP server even though its IPv4 address is automatically assigned. Using [Notify IP Change] function, CSW-H85N sends its IP address to the specific server. It is offered in 3 types of services, DDNS, TCP and UDP.

- Dynamic Domain Name Service (DDNS)

  CSW-H85N supports DDNS service offered by DynDNS. Therefore, you have to make an account and create host names at the DynDNS website before you use.

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

☞ *DynDNS website: http://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 your own server and want to manage the information about changed IP addresses, you are allowed to use TCP/UDP. Not only can you set the [Interval], but also use both ASCII and hexadecimal in [Data Type].

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

8.2 Multiple Connection

[Multiple Connection] is for receiving and monitoring a device to multiple hosts in the same time. The maximum session number is 4 for the [Multiple Connection].

8.2.1 How to use

The option is available after activating the [Multiple Connection] in the [Option] tab.

8.2.2 Diagram
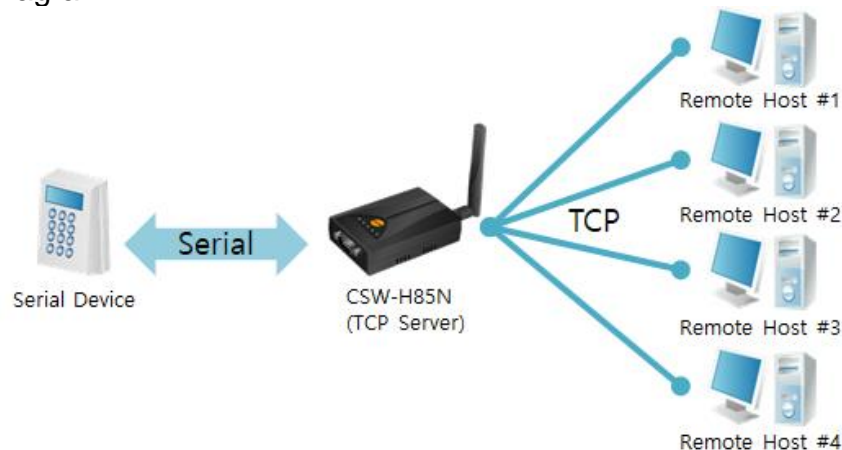
Fig 8-10 diagram for the [Multiple Connection]

- Data from each host is sent to the User's device via CSW-H85N

- Data from the User's device is sent to the all remote hosts via CSW-H85N

8.3 Sending MAC Address

[Sending MAC Address] is a function that the CSW-H85N sends its MAC address to the remote host right after a connection. By using this function, a server can identify multiple devices with the information.

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

8.4 TELNET COM port Control Option (RFC 2217)

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

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

8.5 Disable TCP Transmission Delay

If you use this option, CSW-H85N sends the data from the serial port to WLAN as quickly as possible.

8.6 Separator

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

8.7 TCP Server / Client mode

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.*

8.8 WLAN Advanced Settings

You can configure advanced settings for WLAN with this button. We recommend using the default values if you do not have any problem with it.

● PHY Mode

You have three options for PHY mode and those are [802.11], [802.11b] and [802.11b/g] mode.

● Short Preamble

Under good condition of WLAN environment, you can expect a slight improvement by enabling this option. Otherwise, you had batter to disable this option.

● Short Slot

Using this option, you can expect some improvement in WLAN performances. If you are in bad condition of WLAN environment, you had batter to disable this option.

● CTS Protection

Using this option, you can expect some improvement in WLAN performances under WLAN environment that both 802.11b and 11g devices are.

8.9 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 Push the function button shortly and make your product operate in the serial configuration mode.

② Push the function button again and do NOT release it. (keep the button pressed)

③ Factory Reset will be automatically implemented in few seconds and you will find the LEDs on the top panel are turned on in order.

④ After all LEDs are turned on, release the button.

⑤ Factory Reset is done.

● Setting custom default values

① Push the function button shortly and make your product operate in the 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   Checklist in Trouble

When you are in trouble with CSW-H85N, make sure all the following first.

9.1 Searching problem with ezManager

- Confirming configuration utility

    CSW-H85N should be configured by ezManager.

- Stopping Firewall operation

    A firewall on personal computer or network can block broadcast packets. Stop all the firewalls before searching CSW-H85N.

☞ *Most of vaccine applications have firewall functions so it can cause some trouble to search CSW-H85N. Stop these programs before searching.*

- Stable supply of the power

    Check if the power is supplied continually.

- Connection with the wireless network

    Check if the wireless link is established. After confirming that the status of LINK LED is ON, check the list of wireless LAN devices on the management page of the AP.

☞ *After booting up, it may take some time (a few seconds) to establish a wireless link according to the network condition.*

- Connection with the network

    Make sure that the network connection between the PC and AP. In this step, we recommend you to connect the AP with your PC directly or in the same network hub.

- Checking options of restriction

    In case that access restriction is activated, the communication with ezManager would be impossible. When you are in this situation, make CSW-H85N operate in the Serial Configuration mode to revoke the restriction.

9.2 Connection Problem over TCP/IP

● Connection with the wireless network

Check if the wireless link is fine.

● Checking parameters related with TCP/IP

When CSW-H85N has a private IP address, an IP address of a PC and CSW-H85N needs to be on the same network. Check if the IP address and local port number are correct. In the case of a fixed IP address related items such as 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, and etc.	Local IP Address, Peer Address, Peer Port, Subnet Mask, Gateway IP Address, DNS IP Address, and etc.

Table 9-1 major parameters related with TCP/IP

● PING Test

Confirm the connection over the network by PING test. If the CSW-H85N does not send any reply from the request, check the network environment.

● Network Firewall

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

● Operation Mode

TCP connection will not be established when CSW-H85N 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 cannot be established.

● ezTCP Firewall

When you set the ezTCP firewall with MAC and IP address, all hosts cannot be reachable except for the hosts have the allowed MAC and IP address. Inactivate the option or check the setting is correct for allowing specific hosts to access.

- Checking the TCP status

    Basically, TCP is a protocol connected one to one. Because of this, if a device is TCP on-line state, other requests are denied. If you are in this situation, check the network status by connecting on TELNET or using ezManager.

9.3 Data Communication Problem on the Serial Port

- Connection of Pins

    Check if each connection of pins is right. Refer to the chapter 1.7.3. to find out the pin assignment. In the case of using a cable, you should choose the right type of cable which is suitable for the device.

☞ *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.

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

10 Related Materials

10.1 Documents

You can find each document on our web site or included DVD in your package.

- Manual

- Datasheet

- CE certificate

- Declaration of RoHS Compliance

10.2 Applications for a Smart Phone

- ezManager (for iOS)

- ezManager Lite (for Android)

- TCP/IP Console (for iOS)

- TCP/IP Client (for Android)

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 CSW-H85N even if Sollae Systems Co., Ltd. or its distributors have been informed of such damages.

The CSW-H85N 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 CSW-H85N 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 CSW-H85N 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 CSW-H85N.

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 CSW-H85N including accompanying written material, hardware and firmware.

12.2.2 French version

● Documentation

La documentation du boîtier CSW-H85N 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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utilisez le boîtier CSW-H85N 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 CSW-H85N 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 CSW-H85N sans que la responsabilité de Sollae Systems Co., Ltd. et de ses distributeurs ne puissent être mise en cause, ni que le boîtier CSW-H85N 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 CSW-H85N 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 CSW-H85N 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	Description	Author
2018.03.30.	1.0	○ Initial release	Roy Lee