

EZL-200L User's Manual

Version 2.7



Sollae Systems



To all residents of the European Union

Important environmental information about this product

This symbol on this unit or the package indicates that disposal of this unit after its lifecycle could harm the environment. Do not dispose of the unit as unsorted municipal waste; it should be brought to a specialized company for recycling. It is your responsibility to return this unit to your local recycling service. Respect your local environmental regulation. If in doubt, contact your local waste disposal authorities.

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1. Overview

1.1. Overview

Along with the development of the Internet, the demand for data communication functions has increased recently. Data communication over the Internet requires using TCP/IP, the Internet communication protocol. That is to say, in order to connect a system to the Internet, TCP/IP protocol must be implemented. It is possible to implement TCP/IP by directly implementing the protocol, porting public TCP/IP, or using Operating System (OS). However, all these methods impose burdens on the developer in time, cost, and technology.

ezTCP series, a Serial ↔ TCP/IP protocol converter product group of Sollae Systems, enables you to use TCP/IP communication (the Internet communication) function simply by “connecting the cable to a serial port”. ezTCP sends data from the serial port to the Internet network after TCP/IP processing, and vice versa.

EZL-200L in ezTCP product group is a product that provides TCP/IP communication through Ethernet. In other words, like other ezTCP products, EZL-200L sends data from the serial port to the LAN after TCP/IP processing and vice versa.

It provides DHCP and PPPoE functions as well as TCP/UDP/IP, so that it can be applied to the cable network and the xDSL network.

EZL-200L is low-cost TCP/IP solution that is integrated highly and optimally in a small hardware.

1.2. Components

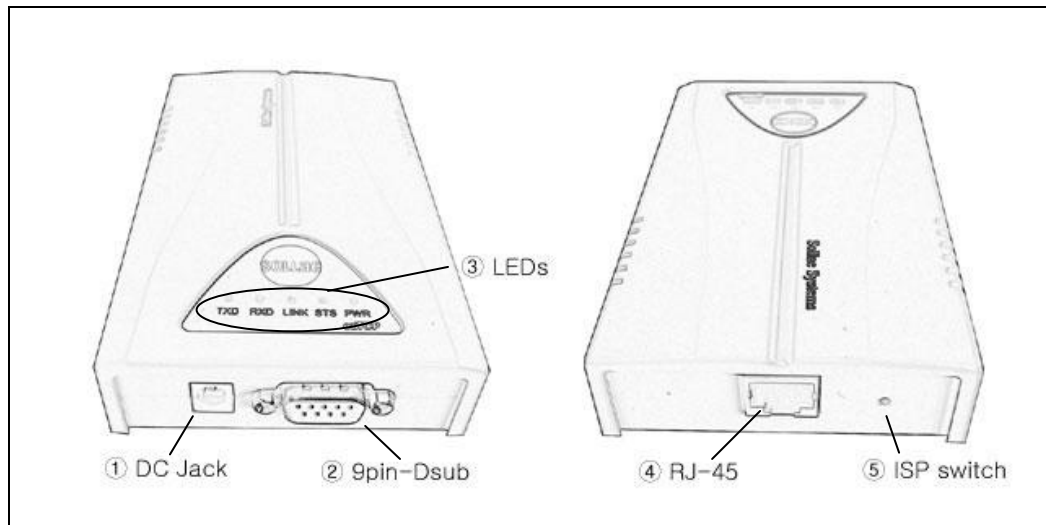
- EZL-200L Body
- 5V Power Adaptor
- RS232C cable

1.3. Specifications

Power	Input Voltage	5V ($\pm 10\%$)
	Current	78mA typical
Dimension	136mm x 83mm x 29mm	
Weight	About 140g	
Interface	Serial	9pin Dsub male
	Network	10Base-T
Serial Port	RS232 (1,200bps ~ 115,200bps)	
Network	10Base-T	
Protocols	TCP, UDP, IP, ICMP, ARP, DHCP, PPPoE	
Communi- cation Mode	T2S	TCP Server Mode
	COD	TCP Client Mode
	ATC	TCP Server/Client Mode (AT command emulation)
	U2S	UDP
Utilities	ezConfig	Configuration utility via LAN
	ezTerm	Socket test utility
	hotflash	Firmware download utility via TFTP

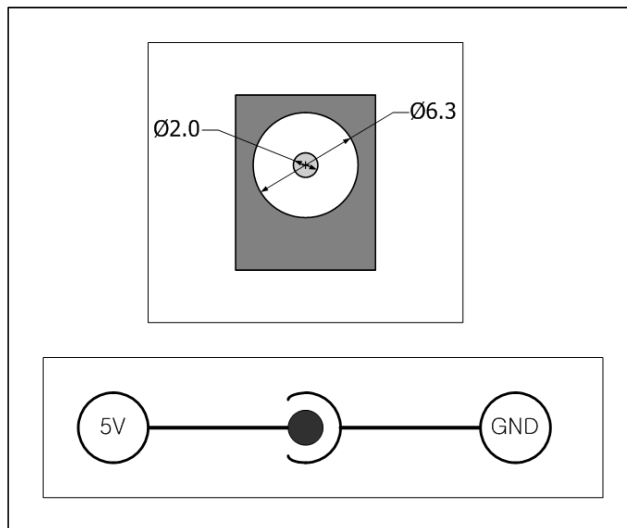
☞ *You can download free utilities and firmware from <http://www.eztcp.com>*

1.4. Interface



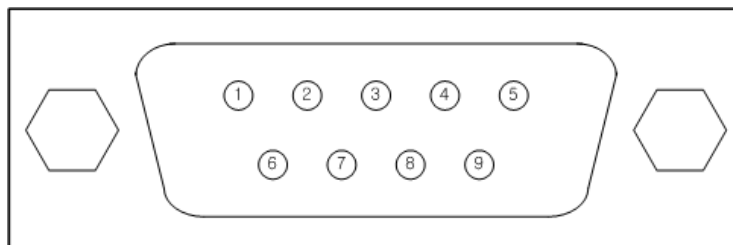
1.4.1. Power

DC 5V is used for EZL-200L and the specification is below:



1.4.2. Dsub Connector

The connector of serial port is 9 pin Dsub male. The specification is below:



● RS-232

#	name	description	level	Dir.	Etc.
1	-	-	-	-	-
2	RXD	Receive Data	RS232	Input	Mandatory
3	TXD	Transmit Data	RS232	Output	Mandatory
4	DTR	Data Terminal Ready	-	-	DTR/DSR loopback jumper
5	GND	Ground	Ground	-	Mandatory
6	DSR	Data Set Ready	-	-	DTR/DSR loopback jumper
7	RTS	Request To Send	RS232	Output	Optional
8	CTS	Clear To Send	RS232	Input	Optional
9	-	-	-	-	-

Pin 4 and pin 6 will be loop-backed when JP2 is on. JP2 is inside of EZL-200L.

1.4.3. LEDs

EZL-200L has 5 LEDs.

Each LED functions as follows:

Mode	Name	Color	LED Status	Description
Common	PWR	Red	ON	Power is supplied
	RXD	Yellow	Blinks	Receiving data from the LAN
	TXD	Green	Blinks	Transmitting data to the LAN
	LINK	Green	ON	Connected to network
Normal mode	STS	Yellow	Blinks in every sec	IP is allocated but TCP connection is not established
			Blinks 4 times /sec	IP is not allocated
			ON	TCP connection is established
ISP mode	STS	Yellow	Blinks rapidly	EZL-200L is in the ISP mode
Network Scan mode	STS	Yellow	Blinks twice at a time	Network traffic EZL-200L can be normally operated
			Blinks thrice at a time	Network traffic EZL-200L has a chance to can't be normally operated

1.4.4. Ethernet Interface

The interface of EZL-200L is 10Base-T. 1:1 cable should be used for connection with a HUB and cross-over cable should be used for connection with PC directly without any HUB.

1.4.5. Ethernet Address (MAC address)

Each piece of Ethernet equipment has unique hardware addresses, and EZL-200L also has factory-set hardware address (which is called MAC address). The address is printed in bottom of EZL-200L.

2. Installation and Test Run

2.1. Installation Method

You can install EZL-200L in the following steps:

Title	Item	Sub-item	Description
Checking the communication environment	Check items	IP address environment	3.1.
		Serial port settings	3.1.
		Application program to be used	4.
Connecting to the network	Check method	Check if LINK LED is ON.	1.4.4.
Configuring the environmental variables	Configuration method	Set by ezConfig, a utility program for configuration through the network.	3.2.
		Set by AT commands in ATC mode	6.
	Configuration items	IP address related items	3.1.
		Serial port related items	3.1.
		Communication mode (Decided depending on application program)	4.
Application to the field			

2.1.1. Checking the Communication Environment

Before installing EZL-200L, check the network environment where EZL-200L is to be installed, including the followings matters:

- IP address environment (local IP, subnet mask, gateway, etc.)
- Serial port items of the equipment to which EZL-200L is going to be connected (Baud Rate, Data Bits, Parity, Stop Bit)
- Application program protocol to be used (TCP/UDP, server/client, SSL, etc.)
- For application program protocol to be used, see “5. Normal Communication Mode”.

2.1.2. Connecting to the Network

Connect power to EZL-200L, and connect EZL-200L directly to the Ethernet port of the PC where test is to be performed with a cross-over Ethernet cable.

2.1.3. Configuring the Environmental Variables

When network connection is completed, configure the environmental variables such as IP address related items, serial port related items, and communication mode related items through the LAN using “ezConfig,” the environmental variable configuration program.

☞ *For environmental variable configuration, see “3. Setting IP Address and Environmental Variables.”*

2.2. Test

You can perform test run according to the following orders. The test run described here is based on the assumption that the IP address of the PC is set to 10.1.0.2.

2.2.1. Changing PC IP Address

You can change the IP address of your PC as follows:

IP Address	10.1.0.2
Subnet Mask	255.0.0.0
Gateway IP Address	0.0.0.0

2.2.2. Installation EZL-200L

Connect the supplied RS232 cable between your PC and EZL-200L, the LAN cable to the hub to which the PC is connected or directly to the PC with a cross-over cable, and the supplied EZL-200L power adapter to EZL-200L for power supply. If the LAN cable has been correctly connected when power is supplied, LINK LED turns on.

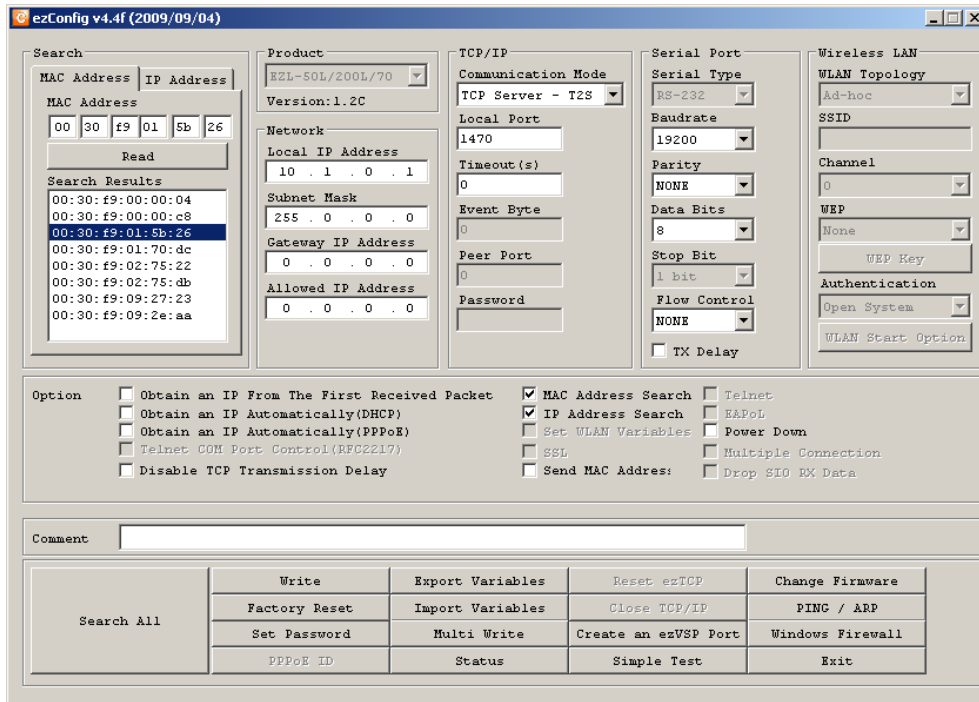
2.2.3. Configuring EZL-200L

Configure EZL-200L setting using ezConfig, the ezTCP configuration program, as follows.

Run ezConfig, and click [Search ezTCP] button in the ezConfig window. And, ezConfig program will search all ezTCPs on the local network.

When ezTCP is searched, MAC address of the ezTCP is displayed on the [Search List] window (The MAC address is indicated at the bottom of the product case).

Select the corresponding MAC address, and set the same as shown in the following figure and click [Write] button to save the settings.



2.2.4. Connecting to the PC Serial Port

Connect the serial port of your PC and that of EZL-200L, using the supplied serial communication cable. Then, run serial communication program such as Hyper Terminal and Teraterm. When the program is run, select the same serial port values as those set to EZL-200L [19,200bps, Data Bits: 8 bits, Stop Bit: 1 bit, Parity: None], which will finish the preparation for serial communication.

2.2.5. Communication Test

When the preparation for serial communication is finished, enter the following in the DOS window on your PC, to connect to TCP through Telnet program.

```
"Telnet 10.1.0.1 1470"
```

When TCP connection succeeds, STS LED of EZL-200L turns ON.

When the STS LED turns ON, enter "123" on the Telnet window, and "123" will appear on the hyper terminal. Enter "ABC" on the hyper terminal, and "ABC" will appear on the Telnet window. Otherwise, communication test fails.

3. Configuring IP Address and Environmental Variables

3.1. IP Address and Environmental Variables

For TCP/IP communication, you must set IP address related items. In addition, you have to set serial port related items (Baud Rate, Data Bits, Parity, Flow Control and etc) to EZL-200L.

You can set the IP address and the serial port related items by using ezConfig, the supplied configuration utility which allows you to configure your EZL-200L over the network, or by using AT commands in ATC mode.

	Item	Description
IP Address-related Items	Local IP Address	IP address of EZL-200L
	Subnet Mask	Subnet Mask
	Gateway IP Address	IP address of gateway
	Local Port	TCP listen port number in T2S mode Port number for waiting data in U2S mode
	Peer IP Address	IP address to connect/transmit in COD and U2S mode
	Peer Port	Port number to connect/transmit in COD and U2S mode
	Allowed IP Address	Allowed IP address in T2S mode
Serial Port	Baud Rate	1,200bps ~ 115,200bps
	Data Bits	7, 8
	Parity	None, Even, Odd, Mark, Space
	Stop Bit	1, 2
	Flow Control	NONE, RTS/CTS, XON/XOFF
Communication Mode	ezTCP Mode	Set communication Mode (T2S, ATC, COD, U2S)
Connect/Disconnect Event	Event Byte	Minimum number of bytes attempting to connect/transmit
	Timeout	Limit time to keep connection

Configuration Method Used	ezConfig	Enable ezConfig function.
	IP Address Search	Remote configuration function with UDP unicast
	Password	ezConfig password.
	ARP	Obtain an IP From the First Received Packet (ARP)
	Disable TCP Transmission Delay	Send serial data to the Ethernet with no delay
	Send MAC Address	Send the MAC address right after the connection is established
	Drop SIO RX Data	Does not send serial data which is received before the connection
Dynamic IP Address	DHCP	Select to receive EZL-200L IP address as DHCP.
	PPPoE	Select to receive EZL-200L IP address as PPPoE.
	PPPoE ID & Password	ID and password to be used for PPPoE

- Local IP Address

It represents the IP address of EZL-200L. If you set DHCP or PPPoE is set, an IP address is automatically allocated. So, you cannot set the local IP address.

- Subnet Mask

Set subnet mask of the network where EZL-200L is installed

- Gateway IP Address

Set the gateway IP address of the network where EZL-200L is installed.

- Allowed IP Address

It is a permitted IP address of foreign host when EZL-200L operates as a server (T2S mode). The only host that is written in this item can connect to EZL-200L. If Allowed IP Address is 0.0.0.0, all hosts can connect to the EZL-200L.

- Local Port

Port number, which is used as TCP port number waiting to be connected when EZL-200L operates as TCP server or as the port number waiting for UDP data when it operates in U2S mode.

- Peer Port

Local port number of the server to connect when EZL-200L operates as TCP client or to transmit UDP data when it operates as U2S

- Baud Rate

Select a serial port speed (1,200 bps ~ 115,200bps).

- Data Bits

Select a data bit length of the serial port (7 bits or 8 bits)

- Parity

Select a parity bit of the serial port (None, Even, Odd, Mark, Space).

- Stop Bit

Select a stop bit length of the serial port (1 bit or 2 bits).

- Flow Control

Select flow control for the serial port (None, RTS/CTS, XON/XOFF).

- ezTCP Mode

Select the communication mode of EZL-200L (T2S, ATC, COD and U2S).

- Event Byte

It decides a point of time to start connection when EZL-200L operates as COD. EZL-200L starts to connect to the host (Peer IP Address and Peer Port) of the designated host upon receiving as many data as specified by [Event Byte] from the serial port.

- Block size

Decide the size of UDP packet to be sent at a time when EZL-200L operates as U2S.
(Unit: Byte)

- Timeout (Unit: second)

When EZL-200L operates as TCP such as T2S, COD and ATC, connection is closed if data communication is not continued as long as the time set to this item unless this item is set to 0. The maximum value is 600 seconds.

- Block Interval

When EZL-200L operates as UDP like U2S, it transmits data in Block sizes by gathering data for the time set to this item (Unit: 10ms)

- MAC Address Search

You can use ezConfig utility only this item is enabled.

(If this item is not enabled, you cannot set EZL-200L using ezConfig. Therefore, it is recommended to enable this all the times.)

To enable ezConfig, set this item in ISP mode.

- IP Address Search

If this item is set, EZL-200L in other network can be configured by ezConfig. IP Address Search function is performed in the [IP ADDRESS] tab.

- Password

Set a password for configuring with ezConfig. If user forgot the password, the user can delete the password in ISP mode.

- Obtain an IP From the First Received Packet (ARP)

When this item is selected, EZL-200L uses the destination IP address of the first packet coming to its MAC address as its own IP address temporarily.

- Obtain an IP Automatically (DHCP)

Set to receive an IP address as DHCP.

- Obtain an IP Automatically (PPPoE)

Set to receive an IP address as PPPoE.

- TX Delay

Give delay to between each data on serial port. This option is useful to serial devices that have no buffer system or slow baud rate (delay: 200 μ s, maximum baud rate 19,200bps).

- Disable TCP Transmission Delay

Normally, EZL-200L does not send immediately after receiving data from its serial port. EZL-200L checks the serial buffer at regular Block Intervals. At that time, it sends the data to the network side, if there are data. However, when you use this option, EZL-200L sends data from serial port to the network immediately. Because of this, it may cause inefficiency with each TCP header when the data comes frequently.

- Send MAC Address

This option is for identifying multiple EZL-200L using MAC addresses. A MAC address is unique ID which is allowed only one network device. By using this option, EZL-200L sends its MAC address to the remote host right after the connection is established. Therefore, the server can distinguish each ezTCP using that information.

☞ *For the details of this option, please refer to the document which is named "Sending MAC Address Function" on our website.*

- Drop SIO RX Data

When EZL-200L is set TCP client mode, the data which is received from serial port before the connection is made will be transmitted to the network. Users can ignore these data by using this option. If this option is checked and [Event Byte] is set to zero (0), EZL-200L drops the data which is received before the connection. This means EZL-200L sends serial data after the connection is established.

- Comment

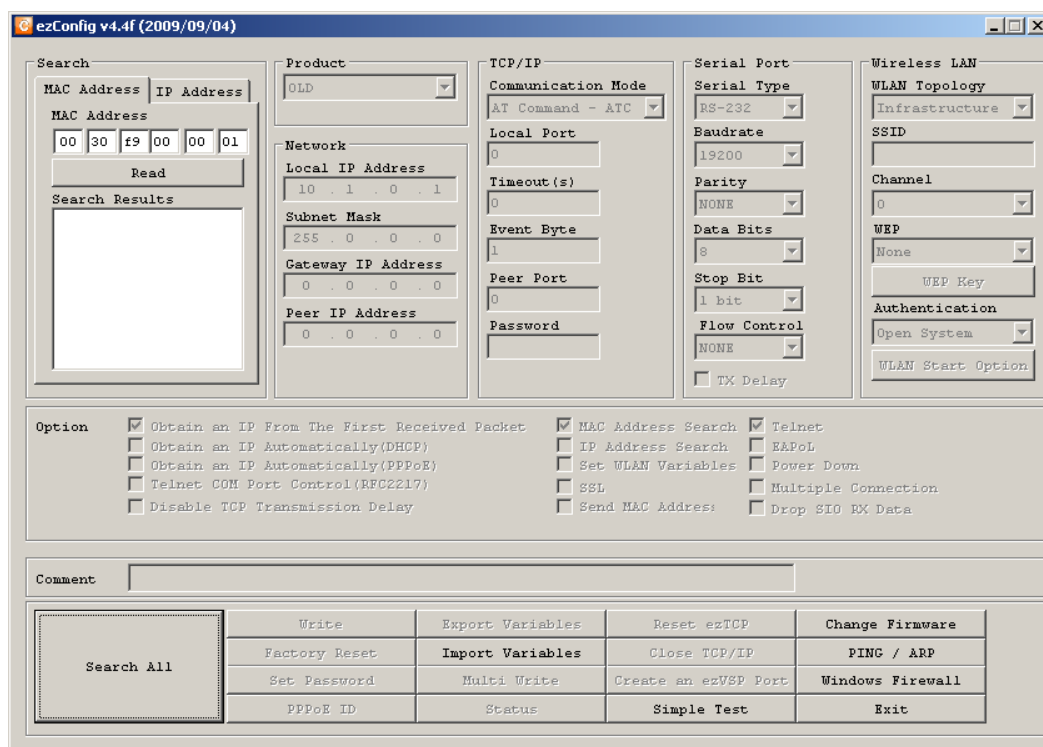
Store comments (maximum 32 bytes) of user on the product. This item helps the user distinguish each EZL-200L more easily.

3.2. Configuration by ezConfig

3.2.1. ezConfig Menu

The basic environmental variables (IP address related items, serial port items, and etc.) can be set by ezConfig which is an integrated management tool for Windows.

ezConfig can be operated in Microsoft Windows platform (Windows 98, 98 SE, 2000, ME, XP, Vista) but may malfunction in older OS versions. Following is the screen shot of ezConfig which is just launched.



ezConfig can set not only EZL-200L's environmental variables but also other ezTCP series.

ezConfig configures ezTCP by Ethernet, there are two way to configure.

The first way is UDP broadcast. When using UDP broadcast, user can search all ezTCPs in the same network without knowledge of IP address. But beware that it can be used in the 'same network'. This method performed in the [MAC Address] tab of ezConfig version above 4.0.

The second way is UDP unicast that communicates by IP address. As it configured with IP address, EZL-200L is configured any place if they are connected with network. This method performed in the [REMOET] tab of ezConfig version above 4.0.

(ezConfig below version 4.0 supports only UDP broadcast)

	MAC ADDRESS	IP ADDRESS
communication	UDP broadcast	UDP unicast (port: 50005)
search	With MAC address	with IP address
location	In the same network with EZL-200L	Can be used in a different network

☞ *For the details of buttons and functions, please refer to the document named “ezConfig user’s manual” on our web site.*

3.3. AT command

In ATC mode, the user can set environment variables through the serial port using AT command.

☞ *For more information, See “6. ATC Mode”.*

3.4. Setting IP Address-related Items by DHCP

Under environment with a network operating a DHCP server, DHCP protocol allows the user to automatically set the IP address, subnet mask, gateway, and name server of ezTCP. Using DHCP automatic setup function requires the user to check [DHCP] item on ezConfig.

3.5. Setting IP Address-related Items by PPPoE

PPPoE is used in most ADSL and VDSL. To use PPPoE function, PPPoE function should be enabled and PPPoE ID and PPPoE password should be configured. The local IP address of EZL-200L is assigned automatically in PPPoE environment.

☞ *Some ADSL or VDSL modem use DHCP. Please contact your ISP (Internet Service Provider).*

3.6. Initialization (Factory Reset)

You can set environment parameters of EZL-200L to its default values. When EZL-200L is Normal mode, press the ISP button shortly in a short period of time (between 20ms and 1 second) and then, you can see that Status LED blinks twice at once. This state is the Network Scan mode. After then, press the button again and keep the state over 10 seconds. If the Status LED blinks once at a second, it means EZL-200L had been reset and the environment parameters of EZL-200L had been initialized.

4. Operation Mode

4.1. Operation Mode Overview

4.1.1. Overview

EZL-200L can operate in one of three modes (normal, ISP and Network Scan). Normal mode is ordinary data communication mode; and ISP mode is used to download EZL-200L firmware through the Ethernet (TFTP); and Network Scan mode is used to check the fact that the environment is suitable for EZL-200L.

4.2. How to Initiate Each Operation Mode

4.2.1. How to Initiate Normal Mode

Normal mode is a mode in which EZL-200L performs its original functions. If you do not make any change in the default setting, EZL-200L usually operates in normal mode.

☞ *For more information, see “5. Normal Communication Mode”.*

4.2.2. How to Initiate ISP Mode

Supply power to EZL-200L with pressing the ISP button on the back of the product, or continue to press the ISP button during Normal mode. Then EZL-200L operates in ISP mode. During ISP mode, the STS LED of EZL-200L will be blink rapidly.

4.2.3. Entering Network Scan Mode

When EZL-200L is Normal mode, press the ISP button in a short period of time (between 20ms and 1 second) and then you can see that Status LED blinks twice at once. This state is the Network Scan mode. This mode is used to check the fact that the environment is suitable for EZL-200L.

☞ *For more information, see the application note about the Network Scan mode.*

4.2.4. Comparison of Operation Modes

The following table is the comparison of the above described operation modes.

Mode	How to Initiate	Description	Serial Port
Normal	-	Normal data communication mode T2S, ATC, COD, U2S	User setting
ISP	Supply power or reset with ISP-LOW	Download firmware through the Ethernet	19,200bps,N,8,1

4.3. Normal Communication Mode

Normal communication mode is suitable for the purpose of using EZL-200L.

Normal communication mode can be classified into four modes – T2S, ATC, COD, and U2S – each of which is described in the following table.

Communication Mode	Protocol	Connection	Need for User Equipment Software Modification	Configuration of Environmental Variables through Serial Port	Topology
T2S	TCP	Passive Connection	Not needed	Impossible	1:1
ATC	TCP	Active/Passive Connection	Needed	Possible	1:1
COD	TCP	Active Connection	Not needed	Impossible	1:1
U2S	UDP	No Connection	Not needed	Impossible	N:M

TCP protocol requires connection process. The connection is always established as 1:1 connection. At this time, the host waiting for connection (passive connection) is called a server and the one attempting to connect (active connection) is called a client.

On the other hand, UDP communicates by Block size unit without connection process. As UDP does not require connection, numbers of hosts can communicate at the same time.

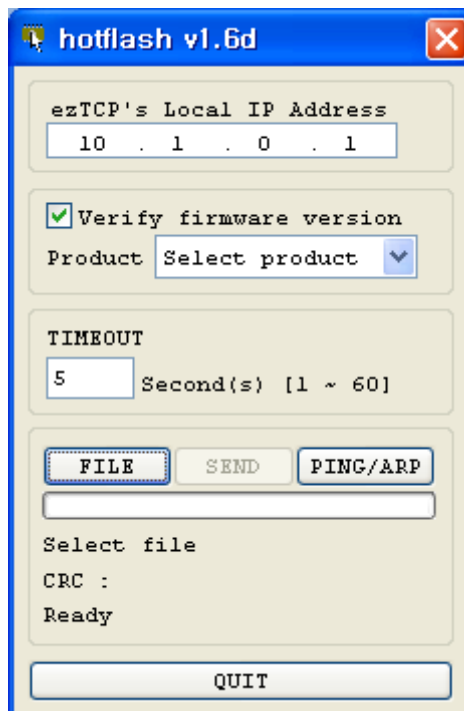
☞ *For more information on communication modes, refer to the next chapter.*

4.4. ISP Mode

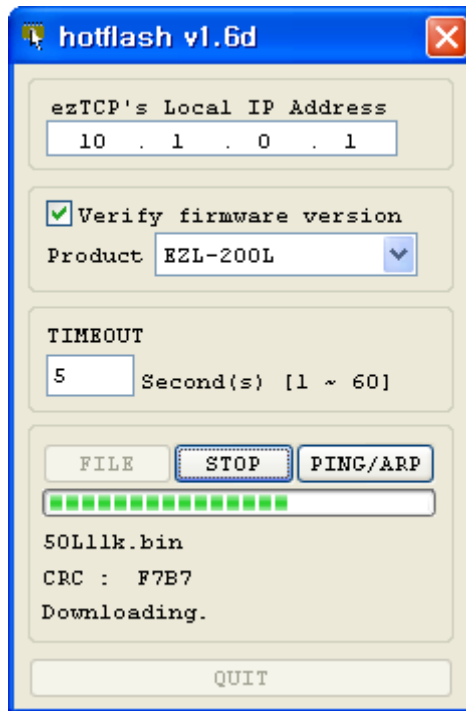
In ISP mode, you can download the latest firmware (EZL-200L operation software) provided by our company.

The following section describes how to download firmware in ISP mode.

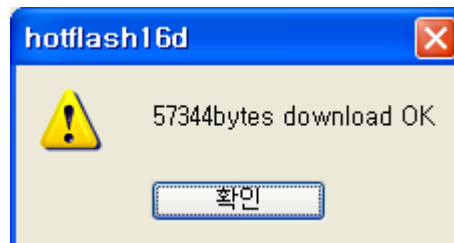
- Continue to press the ISP button on the back of the product. Then, the STS LED will be blink rapidly.
- Run hotflash that is supplied by Sollae Systems.



- Select a firmware [FILE] and [Product], and input the IP address of EZL-200L. After uncheck [Verify firmware version] option, press [SEND] button. Then the firmware will be transferred by Ethernet.



- After completion, a message that informs the firmware was downloaded successfully. And EZL-200L reboots automatically and run in Normal Mode. In Normal Mode, STS LED is blinked every 1 second.



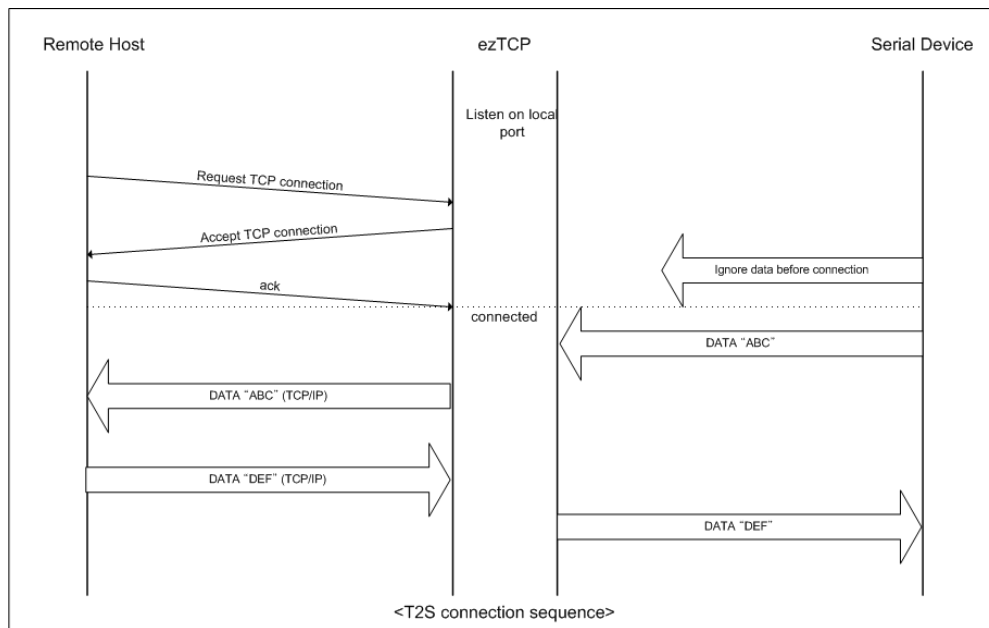
- After completion download, reset EZL-200L.

5. Normal Communication Mode

5.1. T2S – TCP Server

When a host connects to predefined local port, the EZL-200L accepts a TCP connection. When the EZL-200L accepts TCP connection, then the TCP connection is established. After connection is established, TCP/IP processing is performed on the data coming to the serial port, which is then transmitted to the remote host. And the TCP/IP data coming from the remote host is TCP/IP-processed and transmitted to the serial port to establish data communication. (Data coming to the serial port before TCP connection is established will be ignored.)

To limit the peer host, user should set [Allowed IP Address]. The only pre-defined host can be accessible. If [Allowed IP Address] is 0.0.0.0, any host can connect to EZL-200L.



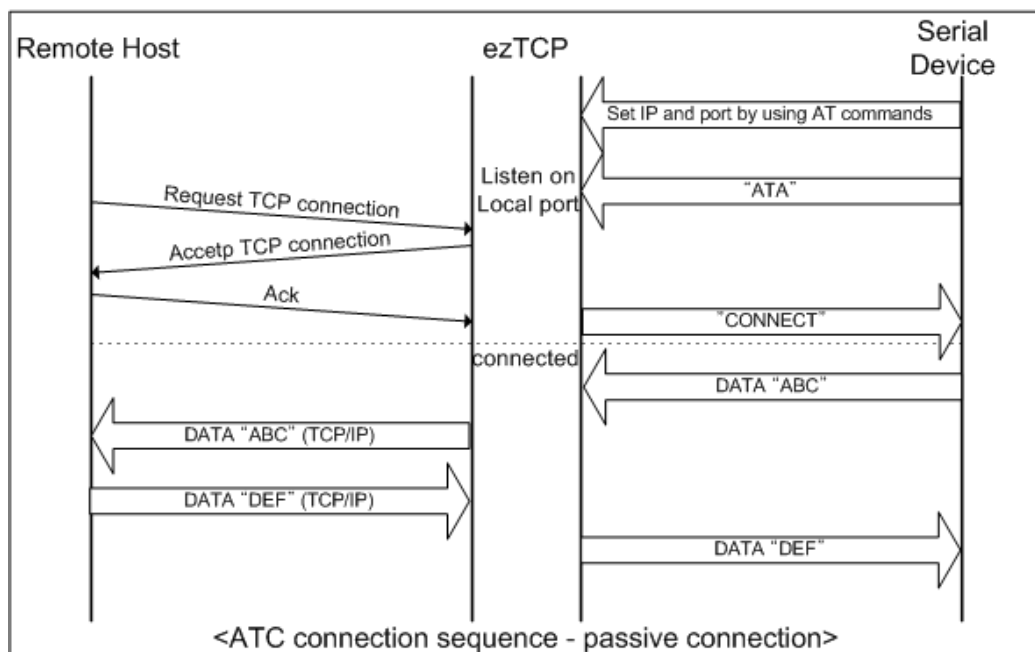
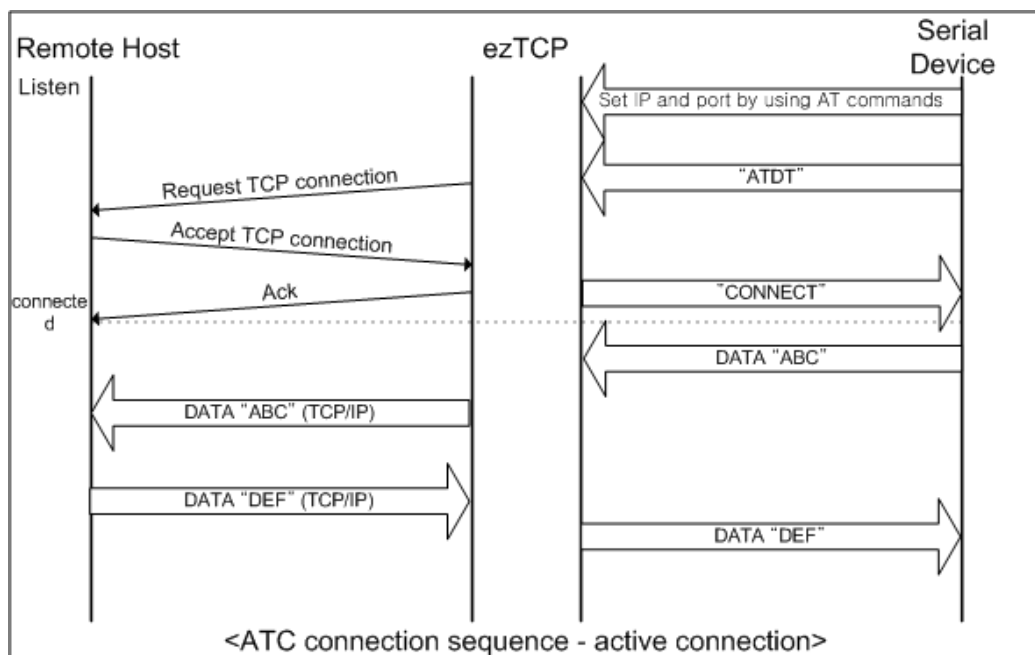
Set the following for T2S mode:

	Item	Description
IP Address Related Items	Local IP Address	IP address of EZL-200L
	Subnet Mask	Subnet Mask
	Gateway IP Address	IP address of Gateway
	Local Port	Port number for waiting to be connected
	Allowed IP Address	Allowed host to connect (if set to 0.0.0.0, any host can connect)
Serial Port	Baud Rate	Serial port speed (bps)
	Data Bits	Data Bits
	Parity	Parity
	Stop Bit	Stop Bit
	Flow Control	Flow control
Communication Mode	ezTCP Mode	Communication Mode (T2S(0))
Disconnection	Timeout	Limit time to keep connection
Configuration Method	ezConfig	Enable ezConfig function.
	Password	ezConfig password.
Dynamic IP	DHCP	Select to receive EZL-200L IP address as DHCP.
	PPPoE	Select to receive EZL-200L IP address as PPPoE.

5.2. ATC

In ATC mode, the user can control the EZL-200L in a similar way to controlling the modem using AT command. In ATC mode, only a TCP connection is possible and both the server and the client can be configured.

In ATC mode, the AT command allows the user to set environment variables including the IP address and control TCP connection and disconnection.



Set the following for ATC mode.

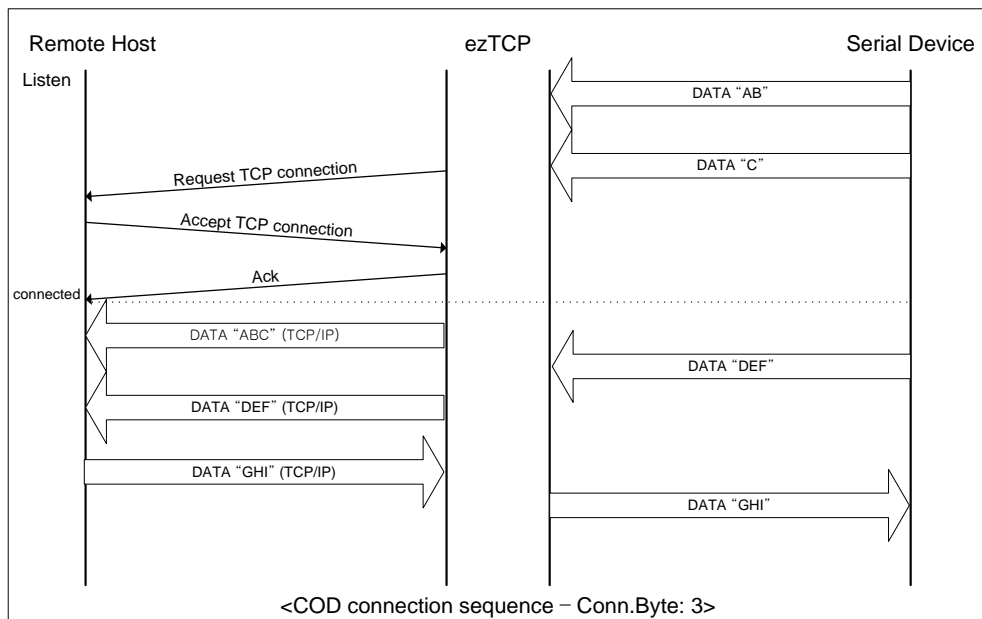
	Item	Description
IP Address Relate Items	Local IP Address	IP address of EZL-200L
	Subnet Mask	Subnet Mask
	Gateway IP Address	IP address of Gateway
	Local Port	Port number for waiting to be connected in Server mode
	Peer IP Address	Peer IP address to connect
	Peer Port	Peer port number to connect
Serial Port	Baud Rate	Serial port speed (bps)
	Data Bits	Data Bits
	Parity	Parity
	Stop Bit	Stop Bit
	Flow Control	Flow control
Communication Mode	ezTCP Mode	Communication mode(ATC(1))
Disconnection	Timeout	Limit time to keep connection
Configuration Method	ezConfig	Enable ezConfig function.
	Password	ezConfig password.
Dynamic IP	DHCP	Select to receive EZL-200L IP address as DHCP.
	PPPoE	Select to receive EZL-200L IP address as PPPoE.

 See "6. ATC Mode" for more information.

5.3. COD – TCP Client

In COD mode, the EZL-200L functions as a client.

When data of the pre-specified size [Event Byte] comes to the serial port, the EZL-200L attempts a TCP connection to the TCP port [Peer Port] of the preset host IP [Peer IP Address]. If the remote host accepts the TCP connection, TCP connection will be established. Data coming to the serial port after connection establishment is TCP/IP-processed and transmitted to the remote host. And, data coming from the remote host is TCP/IP-processed and transmitted to the serial port for data communication.



Set the following for COD mode.

	Item	Description
IP Address Related Item	Local IP Address	IP address of EZL-200L
	Subnet Mask	Subnet Mask
	Gateway IP Address	IP address of Gateway
	Peer IP Address	Peer IP address to connect
	Peer Port	Peer port number to connect
Serial Port	Baud Rate	Serial port speed (bps)
	Data Bits	Data Bits
	Parity	Parity
	Stop Bit	Stop Bit
	Flow Control	Flow control
Communication Mode	ezTCP Mode	Communication mode(COD(2))
Connection/ Disconnection	Event Byte	Bytes for starting to connect
	Timeout	Limit time to keep connection
Configuration Method	ezConfig	Enable ezConfig function.
	Password	ezConfig password
Dynamic IP Address	DHCP	Select to receive EZL-200L IP address as DHCP.
	PPPoE	Select to receive EZL-200L IP address as PPPoE.

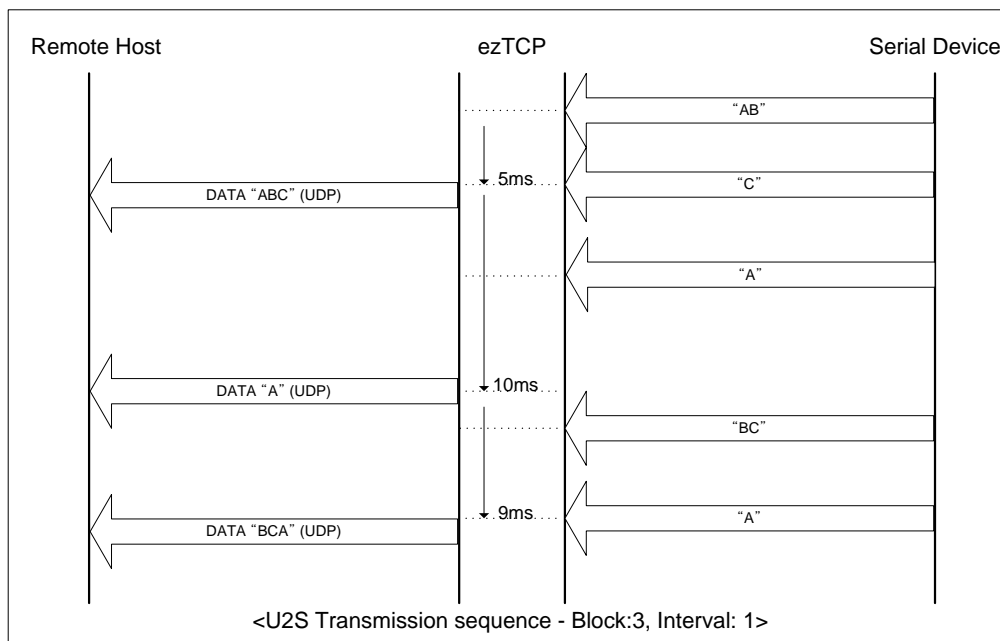
5.4. U2S - UDP

U2S mode allows for UDP communication.

In UDP mode, data are transmitted in Block sizes, which require dividing data coming to the serial port into Block sizes before transmitting data. A procedure for dividing data into Block sizes is as follows:

If data of pre-specified bytes [Block size] comes to the serial port of the ezTCP or if a specified period of time [Block Interval] elapses after first data reception, all data received for the same period is recognized as one Block size which is then transmitted to the UDP. The [Block Interval] unit is 10ms. If [Block Interval] is set to 2, the time period is between 20ms and 30ms.

Since UDP communication does not require a connection procedure, the user can establish N-to-M communication via multicast and broadcast.



Set the following for U2S mode.

	Item	Description
IP address Related Item	Local IP Address	IP address of EZL-200L
	Subnet Mask	Subnet Mask
	Gateway IP Address	IP address of Gateway
	Local Port	Port number for UDP data receiving
	Peer IP Address	Peer IP address to transmit
	Peer Port	Peer port number to transmit
Serial Port	Baud Rate	Serial port speed (bps)
	Data Bits	Data Bits
	Parity	Parity
	Stop Bit	Stop Bit
	Flow Control	Flow control
Communication Mode	ezTCP Mode	Communication mode(U2S(3))
Packets	Block size	UDP Block size to transmit (unit: byte)
	Block Interval	Data gathering time from serial port to transmit as UDP (unit:10ms)
Configuration Method	ezConfig	Enable ezConfig function.
	Password	ezConfig password.

In addition, if you set the peer IP address and peer port to 0, EZL-200L automatically use the source IP address and port information in the latest received UDP packet as the peer IP and port. This function is available on 1.2A or subsequently released firmware version.

6. ATC Mode

6.1. Overview

EZL-200L can be controlled by AT commands in ATC mode. For example, the peer host IP address can be set by AT+PRIP command and connect to the host by ATD command.

Therefore, EZL-200L communicates several hosts alternatively.

And also, it provides passive connection function by ATA command.

6.1.1. AT command format

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

AT command form is as the following

AT	Command	<CR>(0x0d)
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Result code for AT command is as the following

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

Result Code – default settings is the 'ATV1'.

ATV1	ATV0	Description
OK	0	Command OK
CONNECT	1	TCP Connected
NO CARRIER	3	TCP Disconnected
ERROR	4	Command Error
NO ANSWER	8	No response from the remote host(PING)
Setting values	Setting values	Query currently setting values (Example: 192.168.1.200 For AT+PRIP? Commands)

6.2. Basic AT Command Set (Example: ATA, ATD etc.)

Command	Description	Comments
A	Passive connection	Wait for connection request from the remote host (The remote host → EZL-200L)
D	Active connection	EZL-200L connects to the remote host (EZL-200L → The remote host)

E	Echo / No Echo	Decide whether to echo commands to serial port (E0 - No Echo, E1 - Echo)
H	Off hook	TCP Connection Close
I	Information	Returns the information of EZL-200L ATI3: Firmware version ATI7: MAC address
O	Return Online	Go back On-line state from Command state
Q	Quiet Mode	Decide whether to return result codes (Q0: Displays result codes Q1: Disable response to serial port)
S	S Register	S2: Escape Code(default: 43) S3: Carriage Return Code(default: 13) S4: Line Feed Code(default: 10) S5: Backspace Code(default: 8) S9: PING Test timeout(default: 6) S12: Escape Code Guard Time(default: 50)
V	Type of result codes	Result codes form (Numeric form - V0,Letter form - V1)
Z	Reset	Reset

6.3. Extended AT Command Set (Example: AT+PLIP etc.)

Command	Description	Comments
+PLIP	Local IP address	
+PSM	Subnet Mask	
+PGIP	Gateway IP address	default router
+PLP	(TCP)Listening Port	
+PTO	Time Out	
+PRIP	Remote host IP address	
+PRP	Remote host (TCP)port	
+PWP	Write Parameters to EEPROM	Save currently setting values
+PPNG	PING	PING Test
+PRC	Enable ezConfig function	ON: 1, OFF: 0
+PARP	Obtain an IP from the first received packet	ON: 1, OFF: 0

+PDC	Obtain an IP automatically (DHCP)	ON: 1, OFF: 0
+PSE	Set sending +++ Data	ON: 1, OFF: 0

When values for this category is changed, it must be saved with AT+PWP command.

6.4. On-line State and Command State

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

- Command State
The ezTCP is Command State right after power on. Incoming serial data is treated as AT command
- On-line State
When TCP connection is established, it automatically changes to On-line State. Incoming serial data is sent to the remote host.

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

 *For more details about state change, refer 6.4.1~2.*

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

6.4.1. Changing to Command State from On-line State

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

Users can decide to send +++ data or not with AT+PSE command.

From last sent data to first '+' input	More than 500ms
'+' input Block Interval	0~500ms
Delay time after last '+' input	More than 500ms

	Commands		Description
Data Communication (During TCP connection)			
	[guard time]+++[guard time]	▶	Change to Command State from On-line State
◀	<CR><LF>OK<CR><LF>		Conversion to Command State

			complete
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6.4.2. Changing to On-line State from Command State

When the device is changed to Command State from On-line State during TCP connection, ATO command is used to go back On-line State.

	Commands		Description
Data Communication (During TCP connection)			
	[guard time]+++[guard time]	▶	Change to Command State from On-line State
◀	<CR><LF>OK<CR><LF>		Command State
~ Command State(wait for user AT command) ~			
	ATO<CR>	▶	Go back On-line State
◀	<CR><LF>CONNECT<CR><LF>		On-line State

6.5. Configure with Basic AT Commands

	Commands		Description
	ATS2?<CR>	▶	Escape Code?
◀	<CR><LF>43<CR><LF>		'+'(=43 = 0x2b)
◀	<CR><LF>OK<CR><LF>		Command process OK
	ATS2=61<CR>	▶	Change the Escape Code to '='(= 61)
◀	<CR><LF>OK<CR><LF>		Command process OK
	ATS12=40<CR>	▶	Change the Escape Code Guard Time to 40(400ms)
◀	<CR><LF>OK<CR><LF>		Command process OK
	ATI3<CR>	▶	Return firmware version
◀	<CR><LF>Sollae Systems Co., Ltd. ezTCP/LAN ATmega Rev.1.1K<CR><LF>		
◀	<CR><LF>OK<CR><LF>		Command process OK
	ATI7<CR>	▶	Return the MAC address of EZL-200L
◀	<CR><LF>0:30:F9:0:0:1<CR><LF>		Return the MAC address of EZL-200L
◀	<CR><LF>OK<CR><LF>		Command process OK

	ATV0<CR>	▶	Return result code in Number
◀	<CR><LF>0<CR><LF>		Command process OK
	ATQ1<CR>	▶	No result code
No result code			
	ATZ<CR>	▶	Reset
◀	<CR><LF>OK<CR><LF>		Command process OK

6.6. Configure with Extended AT Commands

	Commands		Description
	AT+PLIP=192.168.1.200<CR>	▶	LOCAL IP address setting
◀	<CR><LF>OK<CR><LF>		Command process OK
	AT+PSM=255.255.255.0<CR>	▶	SUBNET MASK setting
◀	<CR><LF>OK<CR><LF>		Command process OK
	AT+PGIP=192.168.1.254<CR>	▶	GATEWAY IP address setting
◀	<CR><LF>OK<CR><LF>		Command process OK
	AT+PLP=1470<CR>	▶	LOCAL PORT setting
◀	<CR><LF>OK<CR><LF>		Command process OK
	AT+PTO=10<CR>	▶	TIME OUT setting
◀	<CR><LF>OK<CR><LF>		Command process OK
	AT+PWP<CR>	▶	Save setting values to EEPROM (Saved even after reset)
◀	<CR><LF>OK<CR><LF>		Command process OK
◀	<CR><LF>NO CARRIER<CR><LF>		System reset

6.7. Example for TCP Connection

6.7.1. Example for Active Connection – TCP Client

The ezTCP operates as TCP client like COD(2) ezTCP Mode. The below is the process of connecting to TCP server (IP address: 192.168.1.201, Port number: 1470)

	Commands		Description
	AT+PRIP=192.168.1.201<CR>	▶	Setting the remote IP address to

			connect
◀	<CR><LF>OK<CR><LF>		Command process OK
	AT+PRP=1470<CR>	▶	Setting the remote Port number to connect
◀	<CR><LF>OK<CR><LF>		Command process OK
	ATDT<CR>	▶	Connecting to the remote host
Attempt connection to the remote host			
◀	<CR><LF>CONNECT<CR><LF>		TCP connection success
Data Communication			

6.7.2. Example for passive Connection – TCP Server

The ezTCP operates as TCP server like T2S(0) ezTCP Mode. The below is the example of setting as TCP server on 1470 port.

	Commands		Description
	AT+PLP=1470<CR>	▶	Set LOCAL PORT to listen
◀	<CR><LF>OK<CR><LF>		Command process OK
	ATA<CR>	▶	Wait for connection request
Wait for connection request from the remote host			
The remote host connects to EZL-200L			
◀	<CR><LF>CONNECT<CR><LF>		TCP Connection OK
Data Communication			

6.8. Example for TCP Disconnection

6.8.1. Example for Active Disconnection

When EZL-200L attempts to close the connection,

	Commands		Description
Data Communication (During TCP connection)			
	[guard time]+++[guard time]	▶	Change to Command State from On-line State
◀	<CR><LF>OK<CR><LF>		Changed to Command State
	ATH<CR>	▶	Close TCP connection

◀	<CR><LF>OK<CR><LF>	Command process OK
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6.8.2. Example for passive disconnection

When the remote host attempts to close the connection,

	Commands		Description
Data Communication (During TCP connection)			
The remote host attempts to close the connection			
◀	<CR><LF>NO CARRIER<CR><LF>		TCP connection is closed

6.9. Example of PING Test

	Commands		Description
	AT+PLIP=192.168.1.200<CR>	▶	LOCAL IP address setting
◀	<CR><LF>OK<CR><LF>		Command process OK
	AT+PSM=255.255.255.0<CR>	▶	SUBNET MASK setting
◀	<CR><LF>OK<CR><LF>		Command process OK
	AT+PGIP=192.168.1.254<CR>	▶	GATEWAY IP address setting
◀	<CR><LF>OK<CR><LF>		Command process OK
	AT+PPNG=218.49.xxx.xxx<CR>	▶	Start PING Test
◀	<CR><LF>NO ANSWER<CR><LF>		No response from the remote host
	ATS9=3<CR>	▶	Change timeout of PING Test 6s (default setting) -> 3s
◀	<CR><LF>OK<CR><LF>		Command process OK
	AT+PPNG=218.49.xxx.xxx<CR>	▶	Start PING Test
◀	<CR><LF>OK<CR><LF>		Receive the response from the remote host

7. Technical Support, Warranty, and Precautions

7.1. Technical Support

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

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

Email address: support@sollae.co.kr

7.2. Warranty

7.2.1. Refund

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

7.2.2. Free A/S

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

7.2.3. Charged A/S

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

7.3. Precautions

- If the product is modified, it is no longer guaranteed.
- Specifications of the product may be changed without prior notice.
- If the product is used for functions that are not covered by the product, the product is no longer guaranteed as well.
- All kind of Reverse Engineering is prohibited.
- It prohibits the use of firmware and provided applications for other purpose.
- Do not use the product in extreme temperature or vibration conditions.
- Do not use the product in highly humid and oily environment.
- Do not use the product in combustible or corrosive gas environment.
- The product functions are not guaranteed in environments with too much noise.
- Do not use this product for special cases requiring high quality and reliability such as space, raveling, airplane, medicine, nuclear power, transportation, and other safety devices.
- If accidents or loss may occur using this product, Sollae Systems will not be liable for any compensation.

8. Ordering Information

EZL-200L-SE	EZL-200L 5V Power Adapter(CE) 1.5m Serial Cross cable CD-ROM with configuration tools and document
EZL-200L-SU	EZL-200L 5V Power Adapter(UL) 1.5m Serial Cross cable CD-ROM with configuration tools and document

9. Revision History

Date	Version	Comments	Author
Aug.09.2005	1.3	○ Initial Release	
Dec.26.2005	1.4	○ Added Revision History ○ Added Trash Mark for WEEE	
Sep.19.2007	1.5	○ Correct Some Expressions ○ Correct Some Screenshots	
May.28.2008	1.6	○ Add AT Command(+ppng) ○ Modify T2S, ATC, COD, U2S description ○ Correct Some Expressions and Screenshots ○ Add Ordering Information	
Oct.27.2008	1.8	○ Add features description(Slow TX, Reset, Close TCP) ○ Add ezConfig button description ○ Modify Ordering Information ○ Modify RXD LED ○ Add description of ATC active/passive connection ○ Correct Some Expressions and Screenshots	
Nov.11.2008	1.9	○ Slow TX → TX Delay ○ Add “Create ezVSP’s port” button description ○ Correct Screenshots of ezConfig	
Feb.18.2009	2.0	○ Add description about U2S echo ○ Add description about Initialization(Factory reset) ○ Add description about Network Scan mode. ○ Correct Some Expressions	
Mar.31.2009	2.1	○ Modify the table of 1.4.3 LEDs ○ Modify 7.1 Technical Support ○ Correct descriptions of ATC mode	
Apr.22.2009	2.2	○ Modify the table of 1.4.3 LEDs	
Sep.23.2009	2.3	○ Modified related figure with ezConfig (4.4f) ○ Add descriptions of 3 functions including Send MAC Address ○ Remove the description about button of ezConfig ○ Add the description of AT+PSE command	

		<input type="radio"/> Correct some expressions <input type="radio"/> Added Mark and Space parity	
Jan.15.2010	2.4	<input type="radio"/> The option of 2 stop bits has been added	Roy LEE
Mar.26.2010	2.5	<input type="radio"/> Some wrong expressions have been corrected	Roy LEE
Apr.14.2010	2.7	<input type="radio"/> Description of timeout option has been added	Roy LEE