Application Note

ezTCP/PPP Special Commands

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Contents

1 Introduction

1.1 Terminology

- Protocol
  A protocol is the set of rules for communication between network nodes.
- Node
  A node is a device which is a connection point of network or Internet.

1.2 PPP (Point-to-Point Protocol)

PPP(Point-to-Point Protocol) is a data-link layer protocol for simple links which transport packets between two nodes. It can provide authentication of these links, packet compression, error detection and etc.

PPP is a full-duplex protocol that can be used over various physical media, including serial cable (dial-up modem), radio links (GPRS/CDMA/HSDPA modem, TRS), fiber optic and etc. EZP-250 has serial interface for PPP and EZU-100/CSP-H50 has USB interface for it.

1.3 PPP connection

1.3.1 LCP (Link Control Protocol)

LCP is used to initiate connections by configuration and negotiation between two nodes (such as the encapsulation format, the maximum packet size, authentication method, and etc. PPP use HDLC(High-Level Data Link Control)-like framing.

1.3.2 Authentication

LCP also provides authentication of the peer (endpoint of links). The ezTCP supports PAP and CHAP authentication.

1.3.3 NCP (Network Control Protocol)

NCP is used to configure network-layer protocols between links. PPP permits various network-layer protocols, including IP(Internet Protocol), IPX(Internetwork Packet Exchange) and AppleTalk. IP uses the IPCP(Internet Protocol Control Protocol), and IPX uses IPXCP(Internetwork Packet Exchange Control Protocol). The ezTCP uses IPCP for NCP negotiation because it is TCP/IP ↔ serial converting product.

1.4 SO Command

"SO"(Set Option) command provides specific setting for PPP connection and TCP/IP communication of the ezTCP. It means users can make an optimizing setting for their system such as ISP service and TCP/IP communication implementation.

1.5 Debugging Command

The ezTCP can provide an easy debugging environment, when user designs own system including ezTCP. User can monitor and get debugging logs by using debugging command.

1.6 Available Product

- EZP-250
- EZU-100
- CSP-H50

2 Setting

2.1 Basic Information

2.1.1 Definition of expression

expression	Hex	Description
<ESC>	-	Escape Character of ezTCP Default value is '!'(0x21)
<CR>	0x0d	Carriage Return
<LF>	0x0a	Line Feed
<SP>	0x20	Space
< OR>	-	Reference of SO command
<OP>	-	Data for reference of SO command
<OF>	-	Flag for debugging command

2.1.2 Basic command format

It is similar to other normal command. Refer to the below.

- The command starts with <ESC> and it ends with <CR>. It is not upper/lower case sensitive.
- All setting values will be reset after ezTCP is rebooted.

2.2 SO command

2.2.1 SO command format

Escape Character	Command		<SP>	<OR>	<SP>	<OP>	<CR>
0x21	0x53	0x4f	0x20	'0' ~ 'D'	0x20	value	0x0d
'!'	'S'	'O'	' '		' '		

ASCII value from '0' to 'D' is available for <OR> field. And the value of <OP> field depends on <OR>. The details refer to "2.2.2 setting item".

2.2.2 Setting item

Step	Name	Description	Reference	Value of <OP>
LCP	PLTO	LCP TimeOut	0	Word(decimal)
	PLTC	LCP Timeout Count	1	Byte(decimal)
	PETO	LCP Echo TimeOut	2	Word(decimal)
	PETC	LCP Echo Timeout Count	3	Byte(decimal)
TCP	TMSS	TCP MSS	4	unused
	TCTO	TCP Connect TimeOut	5	Word(decimal)
	TWTO	TCP time-Wait TimeOut	6	unused
	PWIN	TCP Pseudo WINdow size	7	Word(decimal)
LCP	PPPF	PPP Flag	8	Byte(hexadecimal)
IPCP	IPCP	IPCP flag	9	Byte(hexadecimal)
인증	AUTH	AUTHentication	a	Byte(hexadecimal)
LCP	PILT	Initial LCP Timeout	b	Word(decimal)
TCP	TKTO	TCP Keep-alive TimeOut	c	Word(decimal)
	TRTO	TCP Retransmission TimeOut	d	Word(decimal)

2.2.3 Command Description

0. PLTO

   Set a LCP timeout. If the reply for LCP request of the ezTCP is not received within LCP timeout during LCP negotiation, the ezTCP will retransmit that LCP request.

   unit: 10ms / default: 200 (2 sec)

   (Example of use) !so 0 100<CR>

   LCP timeout: 1 sec

1. PLTC

   Set a maximum number of LCP retransmission. If no reply is received after sending out the maximum number of LCP request from the ezTCP, the ezTCP give up LCP negotiation and close that PPP connection.

   default: 4 (maximum number 4)

   (Example of use) !so 1 6<CR>

   A maximum number of LCP retransmission: 6

2. PETO
   Set an interval of sending LCP Echo request. LCP Echo is used to check if the PPP link is alive between PPP peers.
   Unit: 10ms / default: 400 (4 sec)
   (Example of use) !so 2 1000<CR>
   LCP echo timeout: 10 sec

3. PETC
   Set a maximum number of sending LCP Echo without response from peer. If no reply is received after sending out the maximum number of LCP Echo request from the ezTCP, the ezTCP will close that PPP link automatically.
   default: 4 (maximum number 4)
   (Example of use) !so 3 6<CR>
   A maximum number of sending LCP Echo request: 6

4. TMSS
   This is the unused reference.

5. TCTO
   When the ezTCP is received user command "!TO", it tries to connect to the pre-set host. The ezTCP keep trying to connect until the "TCTO" time is expired. If the connection is not established within the "TCTO" time, the ezTCP will stop trying to connect to the pre-set host.
   Unit: 10ms / default: 500 (5 sec)
   (Example of use) !so 5 1000
   Set the time of connection trying in 10 sec

6. TWTO
   This is the unused reference.

7. PWIN
   When two TCP hosts exchange a data, they notify the amount of data (called as "receive TCP Window") which they currently can accept for reliable communication. If "PWIN" is set, the ezTCP always uses it for its "receive TCP Window" regardless of real "receive TCP Window". This option can be apply to slow PPP link but need to receive a data in bulk. The default maximum "receive TCP Window" size is 511 bytes.
   Unit: byte / default: 0 (don't use "PWIN")
   (Example of use) !so 7 1460
   The ezTCP always uses 1460 for its "receive TCP Windows'.

8. PPPF
   This is a special option for LCP negotiation. Please contact our support team directly.

9. IPCP
   This is a special option for NCP negotiation. Please contact our support team directly.

a. AUTH
   This is a special option for user authentication. Please contact our support team directly.

b. PILT
   Set a LCP timeout for first retransmission of LCP request. That is, LCP timeout set from "PLTO" is applied to second and subsequent retransmissions.
   Unit: 10ms / default: 400 (4 sec)
   (Example of use) !so b 500<CR>
   First LCP timeout: 5 sec

c. TKTO
   Set an interval of sending TCP Keep-Alive packet. TCP Keep-Alive is used to check if the TCP connection is alive between TCP server and client. If no reply is received after sending out 6 TCP Keep-Alive, the ezTCP will close that TCP connection automatically.
   Unit: 10ms / default: 1000 (10 sec)
   (Example of use) !so c 1000<CR>
   TCP Keep-Alive timeout: 10 sec

d. TRTO
   TCP uses retransmission (after a timeout occurs) to ensure delivery of data. It is one of ways which provides reliable data transfer. The "TRTO" option set a value for this retransmission timeout. If retransmission timeout is too short, the data communication might be inefficient because if often occurs unnecessary retransmission.
   Unit: 10ms / default: 200 (2 sec)
   (Example of use) !so d 300<CR>
   Retransmission timeout: 3 sec

2.3 Debugging command

There are two types of a debugging command, L1/L0 and X1/X0. The command L1/L0 is related PPP link and X1/X0 is related TCP/IP communication.

2.3.1 L1/L0 command format

- L1 command

Escape Character	Command		<SP>	<OF>	<CR>
0x21	0x4C	0x31	0x20	Enable debug flags (4 bytes)	0x0d
'!'	'L'	'1'	' '		

- L0 command

Escape Character	Command		<SP>	<OF>	<CR>
0x21	0x4C	0x30	0x20	Disable debug flags (4 bytes)	0x0d
'!'	'L'	'0'	' '		

The <OF> field is hexadecimal represent 16 bits. The details refer to "2.3.2 L1/L0 debug flags".

2.3.2 L1/L0 debug flags

Name	Flag	Description
HDLC	0001	HDLC framing debugging
LCP	0002	LCP negotiation debugging
IPCP	0004	IPCP negotiation debugging
AUTH	0008	User authentication debugging
TRACE	0010	Show the details of connection / disconnection
VJ COMP	0020	VJ compression protocol debugging
USB	0040	USB communication debugging
IPV4	0100	IP protocol debugging
TCP	0800	TCP protocol debugging
TELNET	1000	TELNET protocol debugging

EZP-250 cannot use USB flag because it has serial interface for modem.

2.3.3 X1/X0 command format

- X1 command

Escape Character	Command		<SP>	<OF>	<CR>
0x21	0x58	0x31	0x20	Enable debug flags (2 bytes)	0x0d
'!'	'X'	'1'	' '		

- X0 command

Escape Character	명령어		<SP>	<OF>	<CR>
0x21	0x58	0x30	0x20	Disable debug flags (2 bytes)	0x0d
'!'	'X'	'0'	' '		

The <OF> field is hexadecimal represent 8 bits. The details refer to "2.3.4 X1/X0 debug flags".

2.3.4 X1/X0 debug flags

Name	Flag	Description	Result code
TCP SENT	01	the number of bytes (TCP data) that the ezTCP sent	950
TCP RCVD	02	the number of bytes (TCP data) that the ezTCP received	951
TCP ACK	04	the number of bytes (TCP ACK) that the remote host sent	952
UDP SENT	08	the number of bytes (UDP data) that the ezTCP sent	953
UDP RCVD	10	the number of bytes (UDP data) that the ezTCP received	954

2.3.5 Result code for the debugging command

The ezTCP use user serial port (MT2 side of the ezTCP) for debugging messages. Therefore all debug flags should be disabled for normal operation of the ezTCP.

- For L1/L0

  Please contact our support team directly.

- For X1/X0

Escape Character	Result code	<SP>	Bytes Count	<CR>
0x21	Refer to "2.3.4" (3 bytes)	0x20	The number of bytes (ASCII format)	0x0d
'!'		' '		

3 Revision History

Date	Version	Comments	Author
22. Apr. 2009	1.0	○ Initial Release	
13. Aug. 2010	1.1	○ Default values of PETO and TKTO have been changed. ○ Basic style has been changed.	Roy