

OPTIONAL KIT
FOR MULTI PROTOCOL ANALYZER
LE-8200/LE-8200A

LAN (2ch) Communications Expansion Kit

OP-SB89E

Instruction Manual

Instruction

Thank you for your purchase of OP-SB89E.

To use it correctly, you are advised to read and understand this instruction manual thoroughly. Keep this together with the warranty card. If you encounter any problems, you will find helpful information in this manual.

NOTICE

It is prohibited to reprint or duplicate any part or the whole of this instruction manual without prior permission from LINEEYE.

The content of this instruction manual and specifications of the products are subject to change without any notice.

This instruction manual has been designed and edited with great care to give you all necessary information. If you have any questions, feel free to send your inquiries to LINEEYE.

LINEEYE makes no warranty or guarantee, either expressed or implied with respect to its quality, performance, merchantability, or fitness for a particular purpose. LINEEYE shall not be liable for direct, in-direct, special, incidental, or consequential damages resulting from any defect in the product. The warranty and remedies set forth above are exclusive and in lieu of all others.

USER LIMITATION

This product is not intended to be incorporated into systems that require extremely high reliability and safety, such as aerospace equipment, trunk communication equipment, nuclear power control equipment, and medical equipment related to life support. Therefore, do not use for those purposes.

Safety Information

Read this first !!

Here, for users of the products, the important notice to prevent hazard to the human and to prevent damage to the property. And it describes safe and right way to use the products. Before using, please read the main contents after you understand the following Warning and Caution.

 **Warning** There is a possibility of accidents, such as a death or a serious injury, may occur.

 **Caution** There is a possibility of accidents, such as a injury , and property damage may occur.

Warning



- Stop using the analyzer immediately when smoke or smells emanate from itself.
Continuous use may result in an electric shock, a burn and/ or fire.
- Stop using the analyzer when a liquid or foreign substance get into the analyzer.
This may result in an electrick shock or fire.
→ Immediately switch off the analyzer and unplug it.
- Do not disassemble, modify or repair analyzer.
This may result in a injury, an electric shock, fire, explosion and/ or a breakdown due to overheating.
- Do not leave the analyzer in the following conditions.
Strong magnetic field, static electricity or dusty place.
Temperature and humidity above the specification.
Place tends to have dew condensation.
Not flat, or shaking place.
Place affected by direct sun or near the fire or where the hot air is.
Place with leaking water or electricity.
- Do not touch the circuit of the interface board soon after the measurement. The semiconductors such as pulse trans, PHY, and FPGA will be very hot and may cause burn.

■■ Contents ■■

Instruction	1
NOTICE	1
USER LIMITATION.....	1
Safety Information	2
Read this first !!.....	2
Chapter 1 Before Using the Product	5
1.1 Unpacking	5
1.2 Outline.....	5
Chapter 2 Basic Operation	6
2.1 Preparation Before Measuring	6
2.1.1 Installation of Firmware.....	6
2.1.2 Inserting the Interface Board.....	7
2.1.3 Line State Sheet	7
2.2 Ports of the Interface Expansion Board	8
2.3 Line State LED	8
2.4 Functions.....	9
Chapter 3 Online Monitor Function.....	10
3.1 Connection	10
3.2 TAP Function	10
3.3 Filter Setup.....	11
3.4 Time Stamp Configuration.....	15
3.5 Start and Stop Measurement	16
3.6 Display	16
3.7 Print Out The Data	18
3.8 Retrieval Function.....	20
3.9 Data Conversion Software	22
3.10 Trigger Setup.....	23
Chapter 4. Delay Time Measurement Function	25
4.1 Port Selection to Measure	25

4.2 Start and Stop Measurement	26
Chapter 5 Statistic Function	27
5.1 Connection	27
5.2 Frame Counters	27
5.3 TREND Setup	28
5.4 Start and Stop Measurement	28
5.5 Display	29
Chapter 6 Packet Generator Function	30
6.1 Connection	30
6.2 Registration of Packets to Transmit	30
6.3 Number of Transmissions Setup	36
6.4 Interface Setup	36
6.5 Start and Stop Testing	36
6.6 Test Result	37
Chapter 7 PING Function	38
7.1 Connection	38
7.2 Interface Setup	38
7.3 Network Setup	38
7.4 PING Setup	39
7.5 Start and Stop Testing	39
7.6 Display	40
Chapter 8 Port Blink Function	41
8.1 Connection	41
8.2 Searching Hub port	41
Chapter 9 Maintenance	42
9.1 Troubleshooting	42
9.2 Diagnostics(Self check)	42
Chapter 10 Specification	43

Chapter 1 Before Using the Product

1.1 Unpacking

When you unpack the product, make sure of the following:

- The product has not been damaged during transportation.
- You have received all standard accessories listed below.

<input checked="" type="checkbox"/> Interface Board	1
<input checked="" type="checkbox"/> CD-ROM (firmware etc.)	1
<input checked="" type="checkbox"/> Line State Sheet E	1
<input checked="" type="checkbox"/> LAN cable (straight,3m)	1
<input checked="" type="checkbox"/> Instruction Manual (This book)	1
<input checked="" type="checkbox"/> Warranty Card	1

Please contact your LINEEYE distributors if you find any damage to the product caused by transportation, or if there are accessories lacking.

1.2 Outline

OP-SB89E is a LAN analyzer with 4 LAN port. The model is an expansion board with which you can monitor not only an Ethernet LAN (IEEE802.3) but also a real time Ethernet such as EtherCAT.

Applicable Analyzer : LE-8200A, LE-8200

It has multiple functions such as Online Monitor Function, Delay Time Measurement Function, Statistic Function, Packet Generator Function, and PING Function.

< Caution >

OP-SB89E consumes much electricity as it uses 4 LAN ports. When monitoring please make sure to use AC adapter and backup the measured data to a storage device.

Chapter 2 Basic Operation

2.1 Preparation Before Measuring

Before starting measurement, install the OP-SB89E firmware and change the interface expansion board and line state sheet.

2.1.1 Installation of Firmware

Install the OP-SB89E firmware, which is recorded in the CD-ROM. Follow the instructions below.

1) Connection to the analyzer

Connect the AUX port of the analyzer with the COM port of a PC, or connect USB port of the analyzer with that of the PC.

<Attention>

To use the USB port of the analyzer, you need to install the USB driver. The driver is in the attached CD-ROM.

 For the detail of the install, please refer to the manual of the analyzer.

2) Configuration of analyzer

Use the AC adapter to run the analyzer.

For COM port connection, set AUX conditions as below.

Speed: 115200/230400

Data bit: 8

Parity: None

X-control: Off

(Speed should be the same setting in respect of that of the transferring software "le8firm".)

3) Invoking of the firmware loader

Turn off the power of analyzer. Turn on the power again while pressing [Shift]+[File]. The firmware loader will be executed.

4) Executing the transferring software "le8firm"

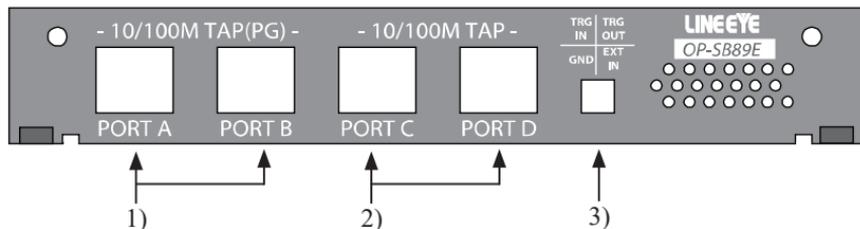
Open the file "le8firm.exe" in the attached CD-ROM.

5) Transfer the firmware

i) Select "USB/Serial Port" from "Method".

ii) Click [Next]

2.2 Ports of the Interface Expansion Board



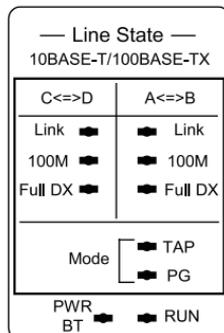
- 1) PORT A and B These ports turn to be fail safe taps when using in Online Monitor Function, Delay Time Measurement Function, Statistic Function. I turn to be LAN ports of 10BASE-T/100BASE-TX when using in Packet Generator Function, PING Function, and Port Blink Function
- 2) PORT C and D These ports turn to be fail safe taps when using in Online Monitor Function, Delay Time Measurement Function, Statistic Function.
- 3) External Input Terminal It automatically stops the on-line monitoring when the external signal connected to the TRG IN terminal becomes "L (TTL)" level.

- Use the cables attached with the analyzer (TRGOUT and EXT IN are not in use).
- External signal trigger is available when "Trigger" is "On" and "Factor" is "TRGIN" which can be set from "Top menu" -> [2]"Trigger".

2.3 Line State LED

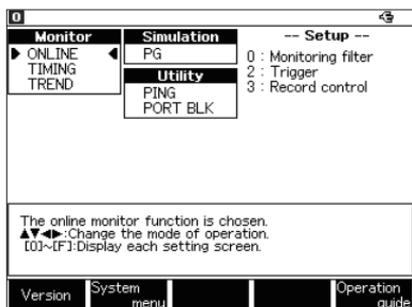
Line State LEDs of an analyzer have different meanings depending on the expansion boards. Change the line state sheet to the one attached with OPSB89E to understand the meanings of LEDs when using OP-SB89E.

LED		Monitor
Link	ON	PORT Link-up
	OFF	PORT Link-down
	Blinking	PORT Receiving data
100M	ON	100 Base-TX connection
	OFF	10 Base-T connection
Full DX	ON	Full Duplex connection
	OFF	Half Duplex connection
Mode(TAP)	ON	The port functions as a fail-safe tap
Mode(PG)	ON	The port functions as a LAN port



2.4 Functions

Press [Menu] and select the function by [▲] [▼] [▲] [▼] keys.



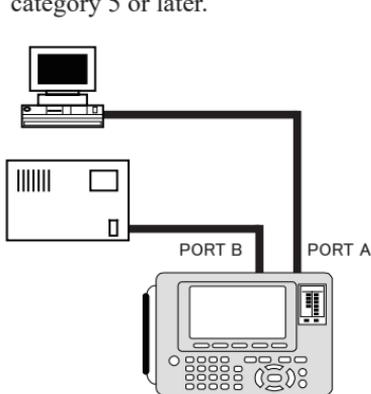
- ONLINE : On-line Monitor function
- TIMING : Delay Time Measurement Function
- TREND : Statistic function
- PG : Packet Generator function
- PING : PING function
- PORT BLK : Port Blinking function

Chapter 3 Online Monitor Function

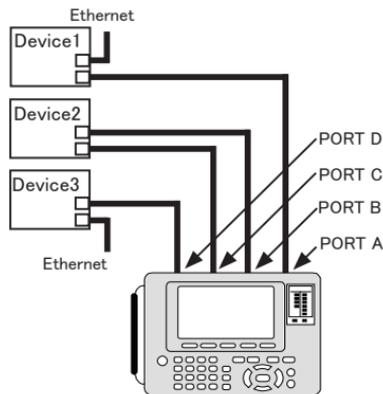
ONLINE monitor function is to capture LAN frames passing over a network along with time stamp information of the frame and record it into the Buffer memory.

3.1 Connection

Connect the LAN cables (in which the communication data between the target devices run) with each port as follows. When you need additional cables for branch connection, use the attached LAN cable or a straight cable of the category 5 or later.



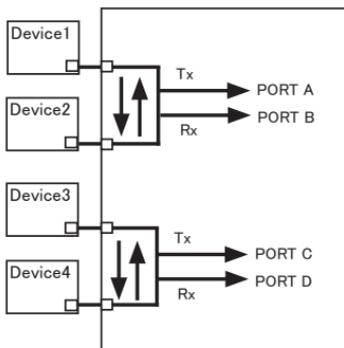
When you monitor 2 ports of 100BASE-TX/10BASE-T.



When you monitor 4 ports of EtherCAT etc.

3.2 TAP Function

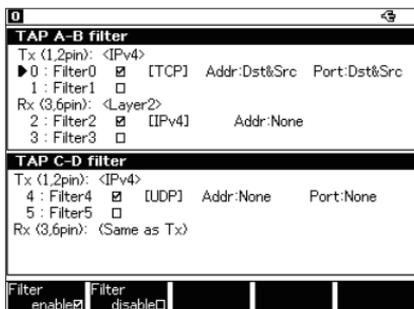
The connection will be the hardware TAP connection as follows when using in online monitoring. It obtains frames without affecting the communication between the devices.



It registers Tx (1,2 pins) between TAP A and B as PORT A, Rx (3,6 pins) between TAP A and B as PORT B, Tx (1,2 pins) between TAP C and D as PORT C, and Rx (3,6 pins) between TAP C and D as PORT D.

3.3 Filter Setup

Set the filter conditions from top menu -> [0]“Configuration”.



You can set two filters for each TAP A-B and TAP C-D. Press [0] “Filter0” first to configure the filter for TAP A-B. Press [4] “Filter4” first to configure the filter for TAP C-D.

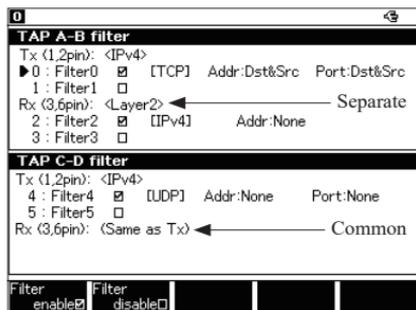
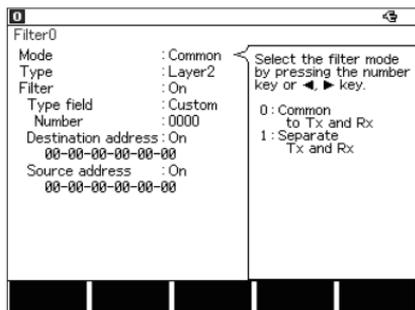
■ Mode

Select the filter configuration mode for Rx (only Tx side filter has the setting).

Common : Applies the configuration of Tx.

Separate : Applies the configuration of Rx.

☰ The configuration for Rx is available when you select Separate.



■ Type

Select the filter type.

Layer2 : Layer 2 field

IPv4 : IP(Version4) field

■ Filter

Select valid/invalid of the filter.

☰ When the filter of smaller number is Off, the filter of larger number also turns to be Off.

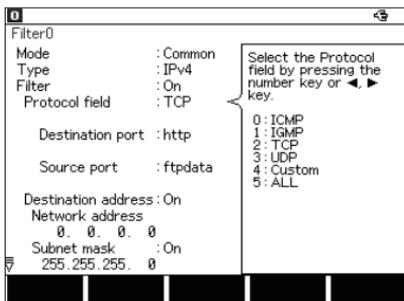
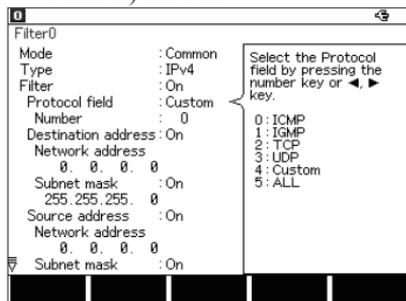
e.g.) When the filter 1 is Off, the filter 2 also turns to be Off.

<IPv4>

Set the conditions of IP header for IPv4 frame.

■ Protocol field

Select the protocol field from ICMP, IGMP, TCP, UDP, Custom (specify the number) and All.



■ Number

Input the protocol number, in the case of the selecting "Custom" at "Protocol field".

■ Destination Port

Input the destination port number when TCP or UDP is selected in the Protocol field.

■ Source Port

Input the source port number when TCP or UDP is selected in the Protocol field.

 If the option is added to the IP header of the frame, the function of "Source Port" and "Destination Port" will not work properly.

■ Destination address

On : Input the IP address of destination in the "Network Address" and "Subnet Address".

Off : Not specify.

■ Source address

On : Input the IP address of source in the "Network address" and "Subnet Address".

Off : Not specify.

■ Network Address

Input the IP address (host address) of destination/source.

■ Subnet Mask

On : Input the Subnet mask of destination/source.

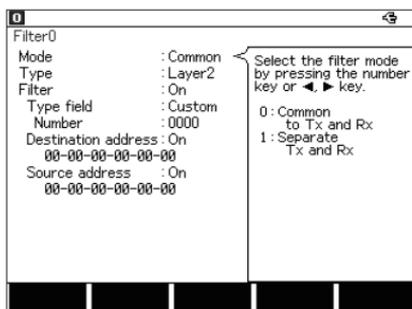
Inputted Network Address and Subnet Mask will be calculated. Then, the result will be the target network address.

Off : Not specify.

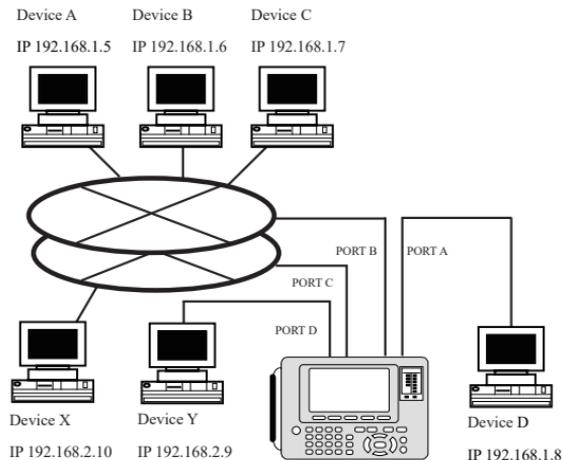
<Layer2>

Set the conditions of MAC header for target frame.

- Type field
Select the type field from IPv4, ARP, NetBIOS, IPv6, Custom (specify the number) and All.
- Number
Input the type number, in the case of the selecting "Custom" at "Type field".
- Destination Filter
On : Input the MAC address of destination.
Off : Not specify.
- Source Filter
On : Input the MAC address of Source.
Off : Not specify.



[Example of IPv4 setting]



- Monitoring example of TCP/IP frames between Device A and D by filtering.

Filter0	
Mode	:Common
Filter type	:IPv4
Filter	:On
Protocol field	:TCP
Destination port	:ALL
Source port	:ALL
Destination address	:On
Network Address	
192.168.1.5	
Subnet mask	:Off
Source address	:On
Network address	
192.168.1.8	
Subnet mask	:Off

Filter1	
Mode	:Common
Filter type	:IPv4
Filter	:On
Protocol field	:TCP
Destination port	:ALL
Source port	:ALL
Destination address	:On
Network Address	
192.168.1.8	
Subnet mask	:Off
Source address	:On
Network address	
192.168.1.5	
Subnet mask	:Off

The filter 0 is configured to monitor TCP frames sent from the device D to device A and the filter 1 is configured to monitor TCP frames sent from the device A to device D. Configures this setting between TAP A-B.

- An example of the configuration to monitor only the UDP protocol communication between the devices X and Y which belong to the network address “192.168.2”.

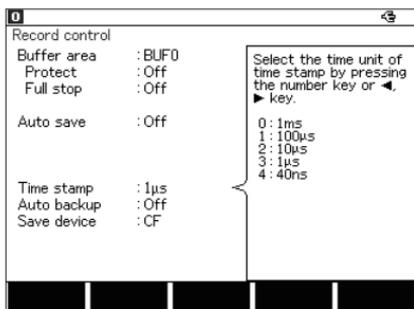
Filter4	
Mode	:Common
Type	:IPv4
Filter	:On
Protocol field	:UDP
Destination Port	:ALL
Source Port	:ALL
Destination address	:On
Network address	
192.168.2.0	
Subnet mask	:On
255.255.255.0	
Source address	:On
Network Address	
192.168.2.0	
Subnet mask	:On
255.255.255.0	

Filter5	
Mode	:Common
Type	:IPv4
Filter	:Off

It is configured by filter 4 to monitor only the frames of UDP protocol which have “192.16.2” for the network address part of both source IP and destination IP.

3.4 Time Stamp Configuration

From top menu, press[3]:“Record control”.



■ Time stamp

It records time stamps of when packets received. Time resolution can be selected from 1ms/100us/10us/1us/40ns.

3.5 Start and Stop Measurement

Starting measurement

By pressing [Run], “Now Measuring” message shows and it starts capturing data into the buffer. The reception state of packets can be confirmed by blinking of LEDs of Link A and Link B.

Time	Ch	In	S	M	S	P	Source	Destination	Protocol/St.
11:31:27.356	B	0	0	0	0	0	0.0.0.0	0.0.0.0	TCP
11:31:27.356	C	0	0	0	0	0	0.0.0.0	0.0.0.0	TCP
11:31:27.356	D	192	168	5	100		192.168.5.200	192.168.5.200	IP
11:31:27.356	A	74	27	EA	49	5C	15	FF-FF-FF-FF-FF-FF	ARP
11:31:27.356	D	192	168	0	12		192.168.0.255	192.168.0.255	UDP
11:31:27.356	A	192	168	5	100		192.168.5.200	192.168.5.200	IP
11:31:27.356	D	0	0	0	0	0	0.0.0.0	0.0.0.0	IP
11:31:27.356	A	192	168	0	12		192.168.0.12	192.168.0.255	UDP
11:31:27.356	B	11	11	22	22	22	22	11-11-11-11-11-11	[5555]
11:31:27.356	C	11	11	22	22	22	22	11-11-11-11-11-11	[5555]
11:31:27.356	B	AA	AA	AA	AA	AA	AA	AA-AA-AA-AA-AA-AA	[AAAA]
11:31:27.356	C	AA	AA	AA	AA	AA	AA	AA-AA-AA-AA-AA-AA	[AAAA]
11:31:27.356	D	74	27	EA	49	5C	15	FF-FF-FF-FF-FF-FF	ARP
11:31:27.356	A	0	0	0	0	0	0.0.0.0	0.0.0.0	IP

Stop measurement

Press [Stop] to finish the measurement. Or it also stops measurement when the trigger condition has been met.

After stopping measurement, the latest data shows in the screen

3.6 Display

Press [Data] key. “Frame display” can be changed to “Detailed display”.

■Frame display

It displays the LAN frames with the time stamp information on the screen.

- 1)Time stamp
- 2)Receiving port
- 3)Source address
- 4)Destination address
- 5)Protocol

Time	Ch	In	S	M	S	P	Source	Destination	Protocol/St.
11:31:27.356	B	0	0	0	0	0	0.0.0.0	0.0.0.0	TCP
11:31:27.356	C	0	0	0	0	0	0.0.0.0	0.0.0.0	TCP
11:31:27.356	D	192	168	5	100		192.168.5.200	192.168.5.200	IP
11:31:27.356	A	74	27	EA	49	5C	15	FF-FF-FF-FF-FF-FF	ARP
11:31:27.356	D	192	168	0	12		192.168.0.12	192.168.0.255	UDP
11:31:27.356	A	192	168	5	100		192.168.5.200	192.168.5.200	IP
11:31:27.356	D	0	0	0	0	0	0.0.0.0	0.0.0.0	IP
11:31:27.356	A	192	168	0	12		192.168.0.12	192.168.0.255	UDP
11:31:27.356	B	11	11	22	22	22	22	11-11-11-11-11-11	[5555]
11:31:27.356	C	11	11	22	22	22	22	11-11-11-11-11-11	[5555]
11:31:27.356	B	AA	AA	AA	AA	AA	AA	AA-AA-AA-AA-AA-AA	[AAAA]
11:31:27.356	C	AA	AA	AA	AA	AA	AA	AA-AA-AA-AA-AA-AA	[AAAA]
11:31:27.356	D	74	27	EA	49	5C	15	FF-FF-FF-FF-FF-FF	ARP
11:31:27.356	A	0	0	0	0	0	0.0.0.0	0.0.0.0	IP

[F1]:change the time unit

“Time(s)”

second

“Time(m:s:μs)”

minute: second: μsecond

“Time(y-m-d)”

date of the measurement

“Δ Time(s)”

elapsed time from the last frame

The meanings of receiving ports are as follows.

A: Tx frame between TAP A-B

B: Rx frame between TAP A-B

C: Tx frame between TAP C-D

D: Rx frame between TAP C-D

Press [▲][▼][PageUp][PageDown] keys for scrolling.

■ Detailed display

Display the details of the frame, which is displayed on the top of the Frame Display.

[F3] key : The translation view can be changed to the HEX dump view.

● Translation view

Time (h:m:s.ms)	P	Source	Destination	Protocol/St.
16:33:21.279	B	02-01-05-2E-B5-5C	01-01-05-01-00-00	EC:BWR

Ethernet II
 Destination: 01-01-05-01-00-00
 Source: 02-01-05-2E-B5-5C
 Type: 0x88a4
 FCS: 57 1B F6 0F
 EtherCAT
 Length: 13
 Type: EtherCAT DLPDUs (1)
 PDU 1
 Command: Broadcast Write (0x08)
 Index: 0x80
 Position: 0x0005
 Offset: 0x0101
 Length: 1
 Circulating: Not circulating

Change time display

The target frame for translation display

[PageUp][PageDown] key:
Scroll the target frame.

Contents of the protocol on the translation view

[▲][▼] key:
Scroll the contents on the translation view.

Refer to the specifications of each protocol to understand the contents of the protocol.

● HEX dump view

Time (h:m:s.ms)	P	Source	Destination	Protocol/St.
16:33:15.445	A	0.0.0.0	255.255.255.255	DHCP

0000: FF FF FF FF FF FF 00 01 05 31 14 2A 08 00 45 00
 0010: 01 01 48 00 33 00 00 80 11 39 73 00 00 00 00 FF FF
 0020: FF FF 00 44 00 43 01 34 A5 F1 01 01 06 00 6A 59
 0030: E5 0F 00 00 80 00 00 00 00 00 00 00 00 00 00 00
 0040: 00 00 00 00 00 00 00 01 05 31 14 2A 00 00 00 00
 0050: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 0060: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 0070: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 0080: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 0090: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 00A0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 00B0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 00C0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 00D0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
 00E0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Change time display

The target frame for dump view.

[PageUp][PageDown] key:
Scroll the target frame.

Contents of the Ethernet frames on the HEX dump view.

[▲][▼] key :
Scroll the contents on the dump view.

It is possible that there is some capturing loss for a large amount of data("Overrun" will be displayed in the screen.).When opening "Auto Save" log data, the packet right above the "Overrun" may be broken off midway, in that case, it can not be displayed correctly.

Time (h:m:s.ms)	P	Source	Destination	Protocol/St.
13:47:692791	C	00-80-0C-00-02-01	AA-41-42-43-44-45	
13:47:692798	A	00-80-0C-00-02-01	AA-41-42-43-44-45	
13:47:692798	C	00-80-0C-00-02-01	AA-41-42-43-44-45	
13:47:692804	A	00-80-0C-00-02-01	AA-41-42-43-44-45	
13:47:692804	C	00-80-0C-00-02-01	AA-41-42-43-44-45	
13:47:692811	A	00-80-0C-00-02-01	AA-41-42-43-44-45	
13:47:692818	A	00-80-0C-00-02-01	AA-41-42-43-44-45	
13:47:692818	C	00-80-0C-00-02-01	AA-41-42-43-44-45	
13:47:692825	A	00-80-0C-00-02-01	AA-41-42-43-44-45	
13:47:692825	C	00-80-0C-00-02-01	AA-41-42-43-44-45	
13:47:692831	A	00-80-0C-00-02-01	AA-41-42-43-44-45	
13:47:692831	C	00-80-0C-00-02-01	AA-41-42-43-44-45	
--Overrun--				
13:47:692836	C	00-80-0C-00-02-01	AA-41-42-43-44-45	

Change time display

Broken off Data packet can not be displayed correctly.

"Overrun" display

3.7 Print Out The Data

Recorded data can be printed as it is displayed (formatted) on the screen.
Operation : Press [Print] and then input the number of page ([0]-[9]). Press [Enter]

 Refer to the manual of analyzer "Printing function" for more details.

- Example of Frame display

```
==[LE-8200]====[2017-04-21 11:20:10]==>
* Model      : LE-8200      *
* Version    : 1.00        *
* Extension  : OP-SB89E    *
* Serial No. : XXXXXXXX    *
* Start time : 2017-04-21 11:18:24 *
* Stop time  : 2017-04-21 11:19:32 *
----->
* PROTOCOL: LAN          *
=====>

--Date-----Time-----Source-----Destination-----Protocol--
2013-02-21 11:18:34.779400 192.168.0.200 192.168.0.255 UDP
2013-02-21 11:18:35.789400 192.168.0.9 192.168.0.60 TCP
2013-02-21 11:18:35.790600 192.168.0.60 192.168.0.9 TCP
2013-02-21 11:18:35.790700 192.168.0.9 192.168.0.60 TCP
2013-02-21 11:18:35.801500 192.168.0.60 192.168.0.9 TCP
2013-02-21 11:18:35.801700 192.168.0.9 192.168.0.60 TCP
2013-02-21 11:18:35.812600 192.168.0.60 192.168.0.9 TCP
2013-02-21 11:18:35.813000 192.168.0.9 192.168.0.60 TCP
2013-02-21 11:18:35.824500 192.168.0.60 192.168.0.9 TCP
2013-02-21 11:18:35.825000 192.168.0.9 192.168.0.60 TCP
2013-02-21 11:18:35.835600 192.168.0.60 192.168.0.9 TCP
2013-02-21 11:18:35.886500 192.168.0.60 192.168.0.9 TCP
2013-02-21 11:18:35.937600 192.168.0.60 192.168.0.9 TCP
2013-02-21 11:18:35.988500 192.168.0.60 192.168.0.9 TCP
2013-02-21 11:18:36.039500 192.168.0.60 192.168.0.9 TCP
2013-02-21 11:18:36.090500 192.168.0.60 192.168.0.9 TCP
2013-02-21 11:18:39.287100 192.168.0.254 239.255.255.250 UDP
2013-02-21 11:18:39.375000 192.168.0.254 239.255.255.250 UDP
```

• Example of Detailed display (translation display)

```

*=[LE-8200]=====[2017-04-21 11:22:26]=*
* Model      : LE-8200      *
* Version    : 1.00        *
* Extension  : OP-SB89E     *
* Serial No. : XXXXXXXX    *
* Start time : 2017-04-21 11:18:24 *
* Stop time  : 2017-04-21 11:19:32 *
*-----*
* PROTOCOL: LAN            *
*-----*

-----Date-----Time-----Source-----Destination-----Protocol-----
2013-02-21 11:18:35.801700 192.168.0.9      192.168.0.60    TCP
Ethernet II
Destination: 00-XX-XX-XX-XX-XX
Source: 00-XX-XX-XX-XX-XX
Type: IP (0x0800)
Internet Protocol
Version: 4
Header length: 20
Service type: 0x00
Total length: 118
Identification: 0xe67e (59006)
Flags: 0x02
Fragment offset: 0
Time to live: 128
Protocol: TCP (0x06)
Header checksum: 0x926d - correct
Source: 192.168.0.9
Destination: 192.168.0.60
Transmission Control Protocol
Source port: 1379
Destination port: 10001
Sequence number: 3636082329
Acknowledgment number: 2557373185
Data offset: 20
Flags: -AP--- (0x18)
Window: 65529
Checksum: 0x8223 - correct
Data
Length: 78
000: 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 11 12 13
010: 14 15 16 17 18 19 1A 1B 1C 1D 1E 1F 20 21 22 23
020: 24 25 26 27 28 29 2A 2B 2C 2D 2E 2F 30 31 32 33
030: 34 35 36 37 38 39 3A 3B 3C 3D 3E 3F 40 41 42 43
040: 44 45 46 47 48 49 4A 4B 4C 4D 4E 4F 50 51
-----Date-----Time-----Source-----Destination-----Protocol-----
2013-02-21 11:18:35.812600 192.168.0.60    192.168.0.9    TCP
Ethernet II

```

3.8 Retrieval Function

The retrieval function enables you to find the specific data.

Press [F5] "Find setup" for setting the retrieval conditions. Press [F5] for forward search, or press [Shift] + [F5] for backward search. (While displaying on the Data display, press [E] for forward search or [F] for backward search.)

Time (m:s.ms)	P	Source	Destination	Protocol-St.
53:36.939378	A	192.168.0.1	192.168.0.2	exp-1
53:36.939502	A	192.168.0.2	192.168.0.1	exp-1
53:36.939625	A	192.168.0.1	192.168.0.2	FCS error
53:36.939749	A	192.168.0.2	192.168.0.1	FCS error

Change time display | Find setup

Press [F5] "Find setup" for setting the retrieval conditions.

Search

Search Type : Layer2
Type field : IPv4

Destination Addr : On
00-00-00-00-00-00
Source Addr : On
00-00-00-00-00-00

Action : Display

Select the Search type by pressing the number key or ◀, ▶ key.
0: Layer2
1: IPv4

Forward search

■ Search Type

Select the protocol type to retrieve.

Layer2 : Layer 2 field.

IPv4 : IP(Version4) field.

Search

Search Type : IPv4
Protocol field : TCP

Destination Port : ALL
Source Port : ALL

Destination Addr : On
0. 0. 0. 0
Subnet Mask : On
255.255.255. 0
Source Addr : On
0. 0. 0. 0

Select on/off of retrieval on Source by pressing the number key or ◀, ▶ key.
0: Off
1: On

Forward search

<Layer2>

Set the conditions of MAC header for target frame.

■ Type field

Select the type field from IPv4, ARP, NetBIOS, IPv6, Custom (specify the number) and ALL.

 Any value can be set to the type field at "Custom".

 All type fields are the retrieval object at "ALL".

■ Number

Input the type number, in the case of the selecting "Custom" at "Type field".

■ Destination Addr

On : Input the MAC address of destination.

Off : Not specify.

■ Source Addr

On : Input the MAC address of source.

Off : Not specify.

<IPv4>

Set the conditions of IP header of Ipv4 frame.

■ Protocol field

Select the protocol field from ICMP, IGMP, TCP, UDP, Custom (specify the number) and All.

 Any value can be set to the protocol field at "Custom".

 All protocol fields are the retrieval object at "ALL".

■ Number

Input the protocol number, in the case of the selecting "Custom" at "Protocol field".

■ Destination Port

Select the destination port number from ftpdata, ftpctrl, telnet, smtp, http, pop3, ECAT(EtherCAT), Custom (specify the number) and All, in the case of selecting "TCP" or "UDP" at "Protocol field".

■ Source Port

Select the source port number from ftpdata, ftpctrl, telnet, smtp, http, pop3, ECAT(EtherCAT), Custom (specify the number) and All, in the case of selecting "TCP" or "UDP" at "Protocol field".

■ Number

Input the port number, in the case of selecting "Custom" at "Destination Port" or "Source Port".

■ Destination Addr

On : Input the IP address of destination.

Off : Not specify.

■ Source Addr

On : Input the IP address of source.

Off : Not specify.

■ Subnet Mask

On : Input the Subnet mask of destination/source.

Inputted Network Address and Subnet Mask will be calculated.

Then, the result will be the target network address.

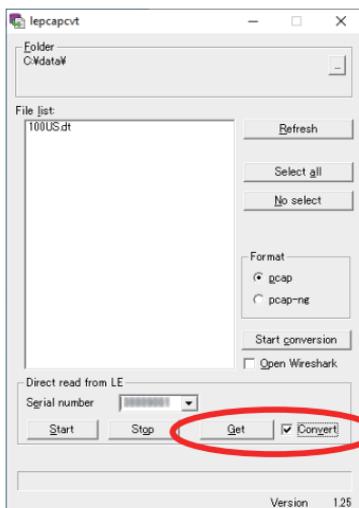
Off : Not specify.

3.9 Data Conversion Software

You can convert captured data to a pcap format file to use it in Wireshark/Ethereal by using a conversion software in the attached CD-ROM.

- 1). Copy "lepcapcvt.exe" file in the attached CD to an appropriate folder of the PC.
- 2). Connect Analyzer with the PC by a USB cable.
- 3). Capture communication data by ONLINE monitor function. ([RUN]-> [STOP])
- 4). Double-click the "lepcapcvt.exe" file to run it.
- 5). Check the box of "Convert".
- 6). Click "Get" to take measurement data into the PC and name the file.
- 7). A .pcap file of the same name will be made.

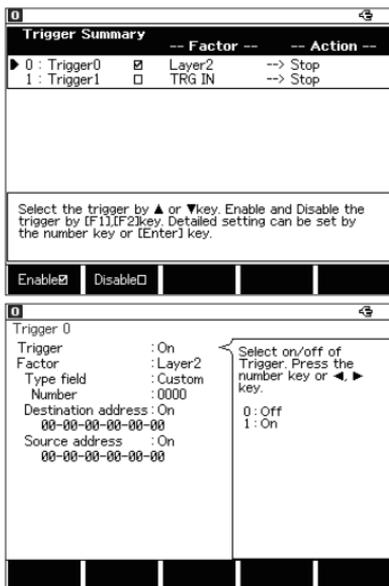
 For more details of conversion software, refer to the "readme.txt" in the CD-ROM of the product.



3.10 Trigger Setup

From top menu, press[2]“Trigger” and select Trigger 0 (auto stop by specified frame) or Trigger 1 (auto stop by coincident of external input level with specified level).

At the display of summary, you can set On/Off of the trigger and can move to trigger configuration by pressing “0” or “1” keys. Set conditions of trigger at the configuration.



■ Trigger

On : Valid

Off : Invalid

■ Factor

Select the type of frames at Trigger 0.

Layer2 : Layer2 field

IPv4 : IP (Version4) field

< Layer 2 >

Configuration of the MAC header of specified frames

■ Type field

Select the type field from IPv4, ARP, NetBIOS, IPv6, ECAT(EtherCAT), Custom(specified number), or ALL(without specifying).

■ Number

Enter a type number when you have chosen “Custom” at Type field.

■ Destination address

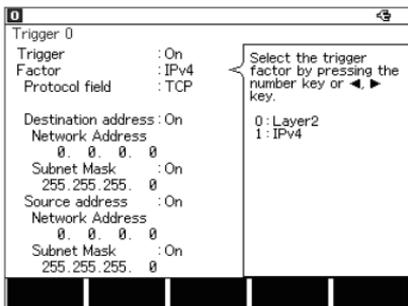
On : Enter the MAC address of the destination.

Off : Not specified

■ Source address

On : Enter the MAC address of the source.

Off : Not specified



< IPv4 >

Configuration of the IP header of IPv4 frames

■ Protocol field

Select the protocol field from ICMP, IGMP, TCP, UDP, Custom(specified number), or ALL(without specifying).

■ Number

Enter a protocol number when you have chosen “Custom” at Protocol field.

■ Destination address

On : Set IP address of the destination by Network address and Subnet Mask.

Off : Not specified

■ Source address

On : Set IP address of the source by Network address and Subnet Mask.

Off : Not specified

■ Network address

Enter the IP addresses (Host addresses) of the destination and the source.

■ Subnet Mask

On : Enter the Subnet Masks of the destination and the source.

The Network address led by logical conjunction of the Subnet Mask and the Network address will be the scope.

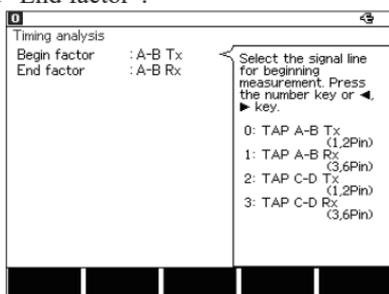
Off : Not specified

Chapter 4. Delay Time Measurement Function

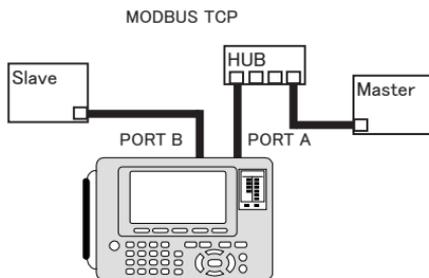
Delay Time Measurement Function is a function to measure a time gap between the receiving timings of the ports judging from the send/receive time of LAN communication frames on the network. This function is useful for evaluation of real-time Ethernet devices.

4.1 Port Selection to Measure

Press [6]”Timing options” from the top menu and select the ports to measure the time gap. It measures the time gap between the ports specified by “Begin factor” and “End factor”.

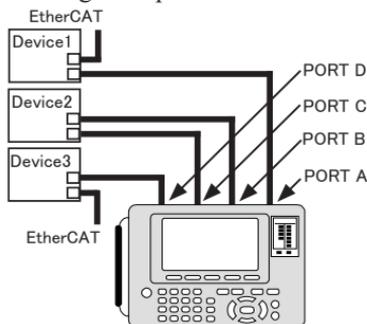


< Setting example1 >



Connect it with a Modbus TCP, configure the layer 2 filter, and set “A-B Tx” to Begin factor and “A-B Rx” to End factor. By this setting you can measure the response time of the Slave against the command from the Master.

< Setting example2 >



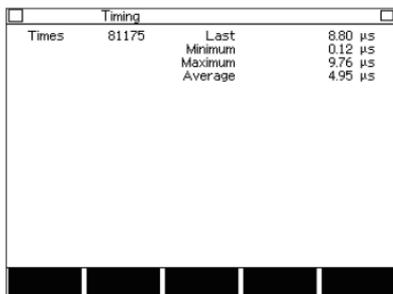
Connect it with an EtherCAT, configure the layer 2 filter, and set “A-B Tx” to Begin factor and “C-D Tx” to End factor. By this setting you can measure the processing (response) time of the Device 2 of EtherCAT.

4.2 Start and Stop Measurement

Start measurement

Press [Run] to start the measurement and display the time gap in real time.

Press [F5] to temporarily stop updating the display.



The screenshot shows a window titled "Timing" with a table of statistics. The table has two columns: the left column lists the metric and the right column shows the value. The metrics and their values are: Times (81175), Last (8.80 μs), Minimum (0.12 μs), Maximum (9.76 μs), and Average (4.95 μs). Below the table, there is a horizontal bar chart with five black segments of varying widths, representing individual time gap measurements.

Metric	Value
Times	81175
Last	8.80 μs
Minimum	0.12 μs
Maximum	9.76 μs
Average	4.95 μs

- Times
Means how much times measured
- Last
Means the latest time gap.
- Minimum
Means the minimum time gap
- Maximum
Means the maximum time gap
- Average
Means the average of the time gaps during the measurement

Stop measurement

Press [Stop] to finish the measurement.

Chapter 5 Statistic Function

The statistic function is a useful feature to analyze the network traffic and the frequency of the particular frames. To use this function, select [TREND] from the top menu.

5.1 Connection

Connect the target devices to the Port A and Port B of OP-SB89G.

 Refer to the "3.1 Connection" .

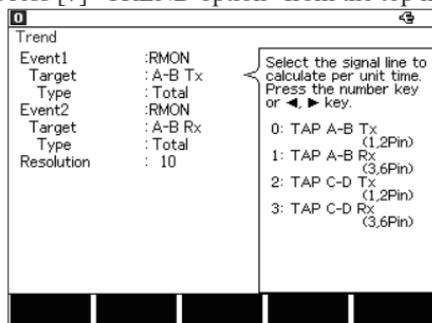
5.2 Frame Counters

Start the measurement. Following frames are counted separately by transmission and reception. Select two kinds of frames for statistical analysis.

Total	: Total number of receiving frames
Good	: Number of normal frames
Broadcast	: Number of broadcasts
Multicast	: Number of multicasts
Pause	: Number of pause frames
0-63(Length1)	: Number of 0 to 63 byte packets
64(Length2)	: Number of 64 byte packets
65-127(Length3)	: Number of 65 to 127 byte packets
128-255(Length4)	: Number of 128 to 255 byte packets
256-511(Length5)	: Number of 256 to 511 byte packets
512-1023(Length6)	: Number of 512 to 1023 byte packets
1024-1518(Length7)	: Number of 1024 to 1518 byte packets
1519-Over(Length8)	: Number of 1519 byte packets and above
CRC error	: Number of CRC errors
Alignment error	: Number of alignment errors
Fragment error	: Number of fragment errors

5.3 TREND Setup

Press [7] "TREND option" from the top menu.



■Target

Select the target from transmission line and reception line.

A : The send signal of Tx between TAP A-B

B : The receive signal of Rx between TAP A-B

C : The send signal of Tx between TAP C-D

D : The receive signal of Rx between TAP C-D

■Type

Select the target frame counter.

[F5]:Scroll the guide message.

■Resolution

Enter the calculation cycle (horizontal resolution of statistical chart) in the range of 1 to 240 minutes (in minutes).

5.4 Start and Stop Measurement

■Start measurement

Press [Run] to start measuring.

■Stop measurement

Press [Stop] to stop measuring.

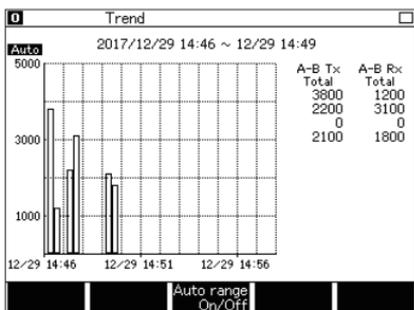
The analyzer will stop measuring automatically after 2000 times of statistics.

5.5 Display

Press [Data] to switch the type of display in the order of "Trend"(Graph) and "Counter" display.

■Graph display

Counted values are shown in histogram by unit time of statistics.



[F3] : Auto-ranging ON / OFF
When the auto-ranging is "On", "Auto" is shown at the upper left of the display.

The range of vertical axis will be adjusted automatically.

[F1] : Range up

[F2] : Range down

When the auto-ranging is "Off", it is able to change the calculating cycle (resolution) of vertical axis.

After the measurement, scroll the window by [▲], [▼], [PageUp], [PageDown] keys.

■Counter display

It shows the total numbers of each counter frame.

TAP A-B	Total	Tx (1.2Pin)	Rx (3.6Pin)
Good	10400	2000	2000
Broadcast	7800	680	660
Multicast	2600	0	0
Pause	0	0	0
0-63 (Length1)	0	0	0
64 (Length2)	7800	0	0
65-127 (Length3)	2600	660	660
128-255 (Length4)	0	660	660
256-511 (Length5)	0	0	0
512-1023 (Length6)	0	680	680
1024-1518 (Length7)	0	0	0
1519-Over (Length8)	0	0	0
CRC error	0	0	0
Alignment error	0	0	0
Fragment error	0	0	0

Maximum number of counts :
4,294,967,295

[F1]: Change the counter display
Press to change the displays of TAP A-B and TAP C-D.

[F5]: Temporarily stops updating the display
Press to stop/restart the updating of the display

Chapter 6 Packet Generator Function

You can transmit any packet by Packet Generator function. To use this function, select [PG] from top menu.

6.1 Connection

The PORT A is a MDI-X port and the PORT B is a MDI port. Normally use a straight cable when connecting with the PORT A and use a cross cable when connecting with the PORT B.

6.2 Registration of Packets to Transmit

By pressing [9]”Data send table” from top menu, data table summary of packets shows. The data table has 16 tables of No.0 – No.F, and you can select whether include its table or not when transmitting packets by selecting “F1” (includes the packet) or “F2” (not include) for each table. By “F4” the display switches in the order of "Data table Summary" -> "Frame Gap Setup".

■ Display of Data Table Summary (frame gap and dump)

Data table Summary			Remain 14776 byte		
No.	FrameGap	Length	No.	FrameGap	Length
0 : <input type="checkbox"/>	96	68	8 : <input type="checkbox"/>	96	0
1 : <input type="checkbox"/>	96	68	9 : <input type="checkbox"/>	96	0
2 : <input type="checkbox"/>	96	72	A : <input type="checkbox"/>	96	0
3 : <input checked="" type="checkbox"/>	96	1016	B : <input type="checkbox"/>	96	0
4 : <input type="checkbox"/>	96	0	C : <input type="checkbox"/>	96	0
5 : <input type="checkbox"/>	96	0	D : <input type="checkbox"/>	96	0
6 : <input type="checkbox"/>	96	0	E : <input type="checkbox"/>	96	0
7 : <input type="checkbox"/>	96	0	F : <input type="checkbox"/>	96	0

Display the first 10 data in the data table.
Edit by [0]~[F] key. (select by ▲▼◀▶ key.
Then press [Enter])

Enable Disable PG option Change Inputmode

Data table Summary		Remain 14776 byte	
No.	Frame Data	No.	Frame Data
0 :	<input type="checkbox"/> 0000000000E8E0B77E	8 :	<input type="checkbox"/>
1 :	<input type="checkbox"/> 0000000000E8E0B77E	9 :	<input type="checkbox"/>
2 :	<input type="checkbox"/> 0000000000E8E0B77E	A :	<input type="checkbox"/>
3 :	<input checked="" type="checkbox"/> 8ECC0102030401010100	B :	<input type="checkbox"/>
4 :	<input type="checkbox"/>	C :	<input type="checkbox"/>
5 :	<input type="checkbox"/>	D :	<input type="checkbox"/>
6 :	<input type="checkbox"/>	E :	<input type="checkbox"/>
7 :	<input type="checkbox"/>	F :	<input type="checkbox"/>

Display the first 10 data in the data table.
Edit by [0]~[F] key. (select by ▲▼◀▶ key.
Then press [Enter])

Enable Disable PG option Change Inputmode

■ Display of Frame Gap Setup

Data table Summary			Remain 14776 byte				
No.	FrameGap	Length	No.	FrameGap	Length		
0	<input type="checkbox"/>	96	68	8	<input type="checkbox"/>	96	0
1	<input type="checkbox"/>	96	68	9	<input type="checkbox"/>	96	0
2	<input type="checkbox"/>	96	72	A	<input type="checkbox"/>	96	0
3	<input checked="" type="checkbox"/>	96	1016	B	<input type="checkbox"/>	96	0
4	<input type="checkbox"/>	96	0	C	<input type="checkbox"/>	96	0
5	<input type="checkbox"/>	96	0	D	<input type="checkbox"/>	96	0
6	<input type="checkbox"/>	96	0	E	<input type="checkbox"/>	96	0
7	<input type="checkbox"/>	96	0	F	<input type="checkbox"/>	96	0

Display the first 10 data in the data table.
Edit by [0]~[F] key. (select by ▲▼◀▶ key.
Then press [Enter])

Enable Disable PG option Change Inputmode

Data table0		Remain 14776 byte
FrameGap	:	96

Set the FrameGap by pressing the number key or ▲ key.
Range: 96~4294967288
Default: 96

< Registration of Frame Gap >

1. Move the cursor and push "Enter" at frame gap display or push "0" - "F".
2. Set a bit number of frame gap.
3. Then return to the data table summary by "Menu".

📖 Frame gap should be multiples of 8.

■ Data Table Summary (Packet Dump)

Data table Summary		Remain 14776 byte	
No.	Frame Data	No.	Frame Data
0	<input type="checkbox"/>	8	<input type="checkbox"/>
1	<input type="checkbox"/>	9	<input type="checkbox"/>
2	<input type="checkbox"/>	A	<input type="checkbox"/>
3	<input checked="" type="checkbox"/>	B	<input type="checkbox"/>
4	<input type="checkbox"/>	C	<input type="checkbox"/>
5	<input type="checkbox"/>	D	<input type="checkbox"/>
6	<input type="checkbox"/>	E	<input type="checkbox"/>
7	<input type="checkbox"/>	F	<input type="checkbox"/>

Display the first 10 data in the data table.
Edit by [0]~[F] key. (select by ▲▼◀▶ key.
Then press [Enter])

Enable Disable PG option Change Inputmode

Data table 0		Remain 14776 byte
		Position 13
0	00 00 00 00 00 00 00 E8	87 7e 86 60 81 00 00 00
1	40 fa cf 01 00 0e 00 01	00 00 20 00 08 20 00 00
2	ff ff ff ff 00 00 00 00	00 00 00 00 00 00 00 00
3	00 00 00 00 00 00 00 00	00 00 00 00 0c e7 f1 de
4	5a 42 11 84	
5	00 50 00	
6	00 60 00	
7	00 70 00	
8	00 80 00	

Edit by [0]~[F],▲▼◀▶ key.
[Del]:Delete
[Enter]:select the range

Protocol

< Registration of data tables >

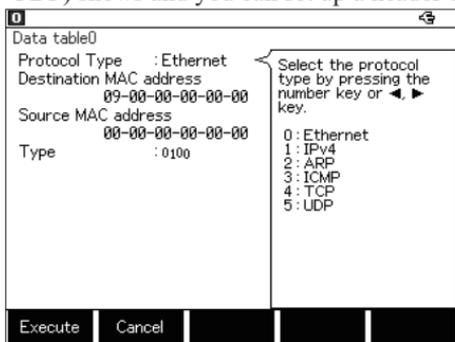
1. Move the cursor and push "Enter" at data table summary display or push "0" - "F".
2. Registered data tables show. Then register tables you want to. "Remain" means remaining capacity to register and "Position" means the location of cursor.
3. Then return to the data table summary by "Menu".

- 📖 Tables should be registered in hex.
- 📖 A Packet can be up to 16KB.
- 📖 Register a packet without FCS.

■ Protocol Setup

Protocol Setup display shows by pushing “F2” at the data table summary display.

Configuration of the selected protocol type (Ethernet, IPv4, ARP, ICMP, TCP, UDP) shows and you can set up a header of the protocol.



MAC address of the source and of the destination and the frame type show depending on the protocol and the register data. Push “F1” to overwrite the data by the relevant values inputted at the protocol setup display, then the data table registration display of the table shows. Push “F2” or “Menu” to return to the data table registration display.

< Protocol Type >

Protocol type display follows following rules.

Ethernet When the header of Ethernet is less than 15.

ARP When the header of Ethernet is 15 or more and the type field of Ethernet is 806h.

ICMP When the header of Ethernet is 15 or more and the type field of Ethernet is 800h and the protocol field is 1.

TCP When the header of Ethernet is 15 or more and the type field of Ethernet is 800h and the protocol field is 6.

UDP When the header of Ethernet is 15 or more and the type field of Ethernet is 800h and the protocol field is 17.

In other cases the protocol is shown as “Ethernet”.

If table data is insufficient or does not exist, default values complement it.

The table below shows the items of the protocols.

To overwrite values of the items, edit the values of the items which you want to change and push “F1”.

(For the further details of items of the protocols, refer to standards of the protocols.)

Item	Default Value	Input Value	Remark
< Ethernet >			
Destination MAC address	00-00-00-00-00-00	Hex	
Source MAC address	00-00-00-00-00-00	Hex	
Type	0000	Hex	
< IPv4 >			
Destination MAC address	00-00-00-00-00-00	Hex	
Source MAC address	00-00-00-00-00-00	Hex	
Type	0800	Hex	Fixed (cannot overwrite)
Version	45	Decimal	Fixed (cannot overwrite)
Header length	0	Decimal	
TOS	00	Hex	
Total length	0	Decimal	
ID	0000	Hex	
Flags	0	Decimal	
Fragment offset	0	Decimal	
TTL	0	Decimal	
Protocol	0	Decimal	
Checksum	0000	Hex	*1
Source IP address	0.0.0.0	Decimal	
Destination IP address	0.0.0.0	Decimal	
< ARP >			
Destination MAC address	00-00-00-00-00-00	Hex	
Source MAC address	00-00-00-00-00-00	Hex	
Type	0806	Hex	Fixed (cannot overwrite)
Hardware type	0001	Hex	Fixed (cannot overwrite)
Protocol type	0800	Hex	Fixed (cannot overwrite)
Hardware length	6	Decimal	Fixed (cannot overwrite)
Protocol length	4	Decimal	Fixed (cannot overwrite)
Operation code	0000	Hex	
Source MAC Address	00-00-00-00-00-00	Hex	
Source IP address	0.0.0.0	Decimal	
Destination MAC address	00-00-00-00-00-00	Hex	
Destination IP address	0.0.0.0	Decimal	

Item	Default Value	Input Value	Remark
< ICMP >			
Destination MAC address	00-00-00-00-00-00	Hex	
Source MAC Address	00-00-00-00-00-00	Hex	
Type	0800	Hex	Fixed (cannot overwrite)
Version	4	Decimal	Fixed (cannot overwrite)
Header length	5	Decimal	Fixed (cannot overwrite)
TOS	00	Hex	
Total length	0	Decimal	
ID	0000	Hex	
Flags	0	Decimal	
Fragment offset	0	Decimal	
TTL	0	Decimal	
Protocol	1	Hex	Fixed (cannot overwrite)
Checksum	0000	Hex	*1
Source IP address	0.0.0.0	Decimal	
Destination IP address	0.0.0.0	Decimal	
Type	0	Decimal	
Code	0	Decimal	
Checksum	0000	Hex	*1
< TCP >			
Destination MAC address	00-00-00-00-00-00	Hex	
Source MAC address	00-00-00-00-00-00	Hex	
Type	0800	Hex	Fixed (cannot overwrite)
Version	4	Decimal	Fixed (cannot overwrite)
Header length	5	Decimal	Fixed (cannot overwrite)
TOS	00	Hex	
Total length	0	Decimal	
ID	0000	Hex	
Flags	0	Decimal	
Fragment offset	0	Decimal	
TTL	0	Decimal	
Protocol	6	Decimal	Fixed (cannot overwrite)
Checksum	0000	Hex	*1
Source IP address	0.0.0.0	Decimal	
Destination IP address	0.0.0.0	Decimal	
Source port	0	Decimal	
Destination port	0	Decimal	
Sequence number	0	Decimal	
ACK number	0	Decimal	
PSH	0	Decimal	
RST	0	Decimal	
FIN	0	Decimal	

Item	Default Value	Input Value	Remark
Window	0	Decimal	
Checksum	0000	Hex	*1
Urgent pointer	0	Decimal	
< UDP >			
Destination MAC address	00-00-00-00-00-00	Hex	
Source MAC address	00-00-00-00-00-00	Hex	
Type	0800	Hex	Fixed (cannot overwrite)
Version	4	Decimal	Fixed (cannot overwrite)
Header length	5	Decimal	Fixed (cannot overwrite)
TOS	00	Hex	
Total length	0	Decimal	
ID	0000	Hex	
Flags	0	Decimal	
Fragment offset	0	Decimal	
TTL	0	Decimal	
Protocol	17	Decimal	Fixed (cannot overwrite)
Checksum	0000	Hex	*1
Source IP address	0.0.0.0	Decimal	
Destination IP address	0.0.0.0	Decimal	
Source port	0	Decimal	
Destination port	0	Decimal	
Length	0	Decimal	
Checksum	0000	Hex	*1

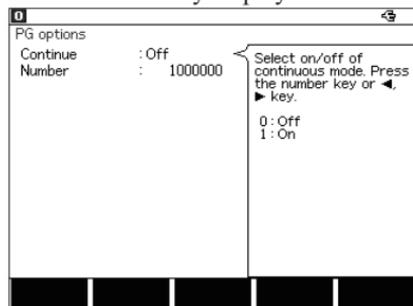
***1 Checksum calculation**

Checksums of IP frame, ICMP, TCP, UDP can be automatically calculated by pushing “F4”.

 If field value (which means length) and number of data of payload and padding do not correspond, calculation will be incorrect.

6.3 Number of Transmissions Setup

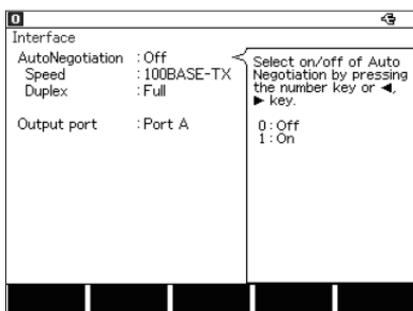
Move to PG setup display by [A]"PG options" from top menu or by "F3" from Data Table Summary display.



- Continue
 - On : Transmit continuously
 - Off : Transmit for specified number of times
- Number
 - Number of times to transmit packets

6.4 Interface Setup

Press [1]"Interface" to configure items such as ON/OFF of the auto negotiation.



- AutoNegotiation
 - On : Auto negotiation is valid
 - Off : Auto negotiation is invalid
- Speed
 - Select the communication speed from 100BASE-Tx or 10BASE-T when the auto negotiation is off.
- Duplex
 - Select from full duplex (Full) or half duplex (Half) when the auto negotiation is off.

- Output port

Select the port (from which the packet is sent) from Port A or Port B.

6.5 Start and Stop Testing

Press [Run] to start linking based on the configuration of interface. Press "F1" after LED of Link A has started lighting. Then it transmits the tables checked at Data Table Summary display. It stops transmitting packets when it reaches the specified number of times or by [Stop] key.

6.6 Test Result

Press [Run] to start testing and it shows the result of packet transmission.

Press [Stop] to stop testing.

	Tx	Rx
Total	5974	176497
Good		176497
Broadcast		88273
Multicast		88224
Pause		0
0-63 (Length1)		0
64 (Length2)		88273
65-127 (Length3)		44134
128-255 (Length4)		0
256-511 (Length5)		0
512-1023 (Length6)		44090
1024-1518 (Length7)		0
1519-Over (Length8)		0
CRC error		0
Alignment error		0
Fragment error		0

< Tx Packet >

Total : Number of transmitted frames

< Rx Packet >

Total : Number of received frames

Good : Number of normal frames

Broadcast : Number of broadcasts

Multicast : Number of multicasts

Pause : Number of pause frames

- 0-63(Length1) : Number of packets of 0-63Byte
- 64(Length2) : Number of packets of 64Byte
- 65-127(Length3) : Number of frames of 65-127Byte
- 128-255(Length4) : Number of frames of 128-255Byte
- 256-511(Length5) : Number of frames of 256-511Byte
- 512-1023(Length6) : Number of frames of 512-1023Byte
- 1024-1518(Length7) : Number of frames of 1024-1518Byte
- 1519-Over(Length8) : Number of frames of 1518Byte or more.
- CRC error : Number of CRC errors
- Alignment error : Number of alignment errors
- Fragment error : Number of fragment error

Chapter 7 PING Function

It is able to confirm the linking to the network by transmitting the PING commands. To use this function, select [PING] from the top menu.

7.1 Connection

Connect the LAN port of a target device with Port A of OP-SB89E.
Port A of OP-SB89E is AutoMDI/MDI-X.

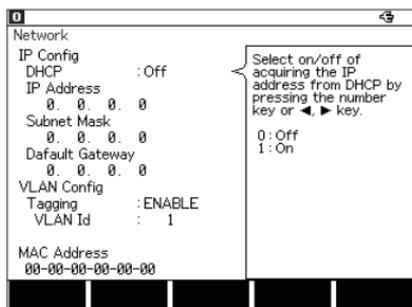
7.2 Interface Setup

Press [1] "Interface" from the top menu.
 Refer to the "Chapter 3. Online Monitor".

7.3 Network Setup

Press [F] "Network" from the top menu then configure the network connection.

If connecting to the existing network of under the practical operations, consult with your network administrator discreetly and configure the following IP address.



■DHCP

Select "On" to connect to the DHCP server and obtain the IP address automatically.
Select "Off" to set the existing IP address.

■IP Address

Enter the IP address of OP-SB89G.

■Subnet Mask

Enter the subnet mask.

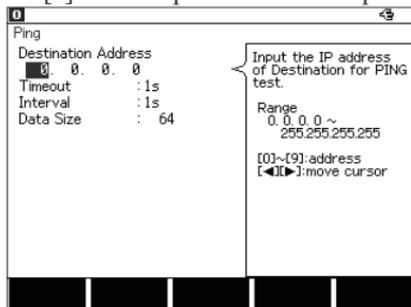
■Default Gateway

To communicate over the router, enter the IP address of the router. (Enter "0.0.0.0" if unnecessary).

- Tagging
Select "Enable" to use the VLAN tags.
- VLAN Id
Enter the ID number of the VLAN tag.
- MAC Address
The MAC address of the OP-SB89G will be displayed.

7.4 PING Setup

Press [8] "PING option" from the top menu.



- Destination Address
Enter the IP address of destination.
- Timeout
Select the timeout limit of ping response.
- Interval
Select the interval of repeating the ping request.
- Data Size
Enter the data size of ping request packet (ICMP).

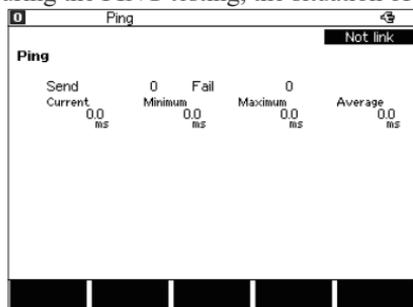
 For the normal testing, it is not necessary to change the default value (64).

7.5 Start and Stop Testing

By pressing [Run], Port A and Port B work as LAN ports, instead of TAP ports. Then, the analyzer joins the target network and starts the PING testing. The analyzer will stop testing automatically and disconnect from the network after transmitting PING commands about 30,000 times. Press [Stop] to stop testing manually.

7.6 Display

During the PING testing, the situation of test will be described as following.



Send : Number of times transmitted
Fail : Number of times failed
Current : Latest response time (ms)
Minimum : Minimum response time (ms)
Maximum : Maximum response time (ms)
Average : Average response time (ms)

When the Ping commands cannot be transmitted successfully, following message will appear in the upper right of the display.

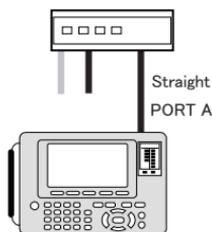
- DHCP failed : Fail to acquire the IP address from the DHCP server.
- Arp failed : Fail to find the Host.
- Not link : Fail to link to the network.
- Link lost : Fail to link during the transmission.
-  Cannot record these data and results.

Chapter 8 Port Blink Function

You can see which port of the hub is connected with PORT A or PORT B by making the link LED of the port of hub (which is connected with the PORT A or B) blink.

8.1 Connection

Plug the LAN cable connected to the HUB into the Port A.



8.2 Searching Hub port

By pressing [Run], it repeats linking and non-linking of Port A with 2 seconds of intervals. You can find which port of the HUB is connected to the Port A of OP-SB89G by the link LED of the HUB blinking at the same interval.

To stop blinking, press [Stop].

-  The blinking interval could be different by the response time of the HUB.
-  If unplug the cable during the test, blinking may be stopped. In this case, press [Stop] and [Run] again.

Chapter 9 Maintenance

9.1 Troubleshooting

Problem	Cause/Remedy	
Unable to monitor	Cause	1) The cable connection is wrong. 2) The "Interface" setting is incorrect. 3) The filter setting at "Configuration" is not appropriate for the target situation.
	Remedy	1) Check the cable type (cross or straight). 2) Set "On" to "AutoNegotiation" at "Interface". 3) Adapt the filter setting at "Configuration" to the target situation. (If the filtering is unnecessary, set "Off" to "Filter 1".)
Unable to use PING	Cause	Invalid configuration
	Remedy	Adapt the configuration of "PING options" and "Network" to the target network environment. Consult with the administrator of the target network.
Unable to make power off	Cause	Unexpected events have been happened.
	Remedy	Press and hold the power key for a while.

9.2 Diagnostics(Self check)

Operates the self-diagnosis test

Press [F2] -> [6] from the top menu to show the Diagnosis display.

Read the instructions and press [F1] to run the self-diagnosis.

-  Try to use this function if wondering the product malfunction.
-  When the keyboard image shows on the display, press all keys one by one and change its colors on the display

Chapter 10 Specification

Interface	Port A, B, C, D *1; 10BASE-T/100BASE-TX
Monitor Function	Measure and log LAN frames transferred between ports A - B and ports C - D. Frame size: 60byte - 9Kbyte, Time stamp (13 digits, Resolution: 1ms, 100μs, 10μs, 1μs ,40ns can be specified), Auto stop by external signal trigger
Recording Frame	Max. 48,000 - 1,048,000 frames (equivalent to 100Mbyte)*2
Translation	Translatable protocol: IPv4, ARP, ICMP, TCP, UDP, DHCP, EtherCAT A software to convert the log file to pcap format is attached.*3
Filter Function	Monitoring of specified frames.
Auto save Function	Saves the captured data automatically into the external memory as communication log files.
Retrieval Function	Searches the specified frame and count it.
Delay time measurement function	Measures the time lag between the receiving timings of specified ports in μs unit.(Current, Max, Min, and Average delay times are displayed.)
Statistic Function	This function keeps statistics of 2 kinds of frame counters by specified interval, and display it in a graph. It is possible to display all the frame counter values in real-time.
PG function	Up to 16 types of arbitrary packets can be sent from port A or port B for the specified number of times or continuously. Frame gap can be specified for each packet (wire-rate output is also available).
PING function	It sends a PING command from port A or port B for about 30,000 times and displays the response count and response time. You can specify the command transmission interval (10ms, 50ms, 100ms, 500ms, 1s), timeout time (10ms, 50ms, 100ms, 500ms, 1s, 5s, 10s), and payload length (0 to 900).
Port Blink function	Make periodically blink the link LED of the hub connected with the board.
Accessories	Interface expansion board, Line state sheet E, LAN cable, Utility CD.

*1 Tap circuit between Port A and B is fail-safe tap circuit.

*2 When monitoring it records frames with additional information of 12 byte per 1 frame.

*3 The software to convert to pcap file works on Windows 7/8.1/10 PCs.

There is a registration page on our web site.
(<https://www.lineeye.com>)
Please register your product for further support.
We will provide you the firmware update information
and sales information etc.

LINE EYE CO., LTD.

4F., Marufuku Bldg., 39-1Karahashi Nishihiragaki-cho, Minami-ku,
Kyoto, 601-8468 Japan

Phone: 81-75-693-0161 Fax: 81-75-693-0163

URL <https://www.lineeye.com> Email :info@lineeye.co.jp