

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

LAN Communications Expansion Kit

OP-SB89G

Instruction Manual

Instruction

Thank you for your purchase of OP-SB89G.

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	
	<ul style="list-style-type: none">• 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.
	<ul style="list-style-type: none">• Stop using the analyzer when a liquid or foreign substance get into the analyzer. This may result in an electric shock or fire. → Immediately switch off the analyzer and unplug it.
	<ul style="list-style-type: none">• 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.
	<ul style="list-style-type: none">• Do not put the analyzer in fire or heat them. This may result in a injury and fire due to overheating or explosion.

⚠ Warning

	<ul style="list-style-type: none">• 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.
	<ul style="list-style-type: none">• Do not connect the LAN cables to the OP-SB89G before connecting it to the analyzer. The LAN cable supporting PoE will transmit the high voltage, it will cause the electric shock and the product malfunction.
	<ul style="list-style-type: none">• Do not touch the parts of this interface board. There are high voltage area when the cable supplying the PoE power connected to this board. It will cause the electric shock, fire and the product malfunction.
	<ul style="list-style-type: none">• Do not touch the circuit of the interface board soon after using. Pulse transformers, PHYs, and FPGAs on the board heat up extremely and it may burn yourself.

■■ Contents ■■

Instruction	1
NOTICE	1
USER LIMITATION.....	1
Safety Information	2
Read this first !!.....	2
Chapter 1 Before Using the Product	6
1.1 Unpacking	6
1.2 Overview	6
Chapter 2 Basic Operation	7
2.1 Preparation Before Measuring	7
2.1.1 Installation of Firmware.....	7
2.1.2 Inserting the Interface Board.....	8
2.1.3 Line State Sheet	9
2.2 Ports of the Interface Expansion Board	9
2.3 Line State LED	10
2.4 Functions.....	11
Chapter 3 Online Monitor Function.....	12
3.1 Connection	12
3.2 Interface Setup	13
3.3 Filter Setup.....	16
3.4 Time Stamp Configuration.....	19
3.5 Start and Stop Measurement	19
3.6 Display	20
3.7 Retrieval Function.....	23
3.8 Data Conversion Software	25
3.9 Trigger Setup.....	26
Chapter 4. PoE (Power over Ethernet) Measurement Function.....	28
4.1 Connection	28
4.2 PoE Setup.....	28

4.3 Start and Stop Measurement	29
4.4 Display	29
Chapter 5 Statistic Function.....	32
5.1 Connection	32
5.2 Interface Setup	32
5.3 Frame Counters	32
5.4 TREND Setup	33
5.5 Start and Stop Measurement	33
5.6 Display	34
Chapter 6 Packet Generator Function	35
6.1 Connection	35
6.2 Registration of Packets to Transmit	35
6.3 Number of Transmissions Setup	40
6.4 Interface Setup	40
6.5 Start and Stop Testing	40
6.6 Test Result.....	41
Chapter 7 PING Function	42
7.1 Connection	42
7.2 Interface Setup	42
7.3 Network Setup	42
7.4 PING Setup	43
7.5 Start and Stop Testing	43
7.6 Display	44
Chapter 8 Port Blink Function	45
8.1 Connection	45
8.2 Searching Hub port	45
Chapter 9 Maintenance	46
9.1 Troubleshooting	46
9.2 Diagnostics(Self check)	46
Chapter 10 Specification	47

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	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 Overview

OP-SB89G is an interface expansion board for LE-8200A/LE-8200. This board provides measurement of Ethernet LAN (IEEE802.3) communication adding to measurement of PoE (IEEE802.3af) and PoE+(IEEE802.3at). It has many functions such as On-Line Monitor, PoE/PoE+ Measurement, Statistic function, PG function, and PING function.

Please use AC adapter when you use OP-SB89G because it consumes many electricity to treat 1000BASE-T. And please make it a rule to backup the monitored data to a storage device.

Chapter 2 Basic Operation

2.1 Preparation Before Measuring

Before starting measurement, install the OP-SB89G firmware and change the interface expansion board and line state sheet.

2.1.1 Installation of Firmware

Install the OP-SB89G 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 detailed installation procedure, please refer to the LE-8200/LE-8200A instruction manual.

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]
 - iii) Click [Select] and select the firmware "OPSB89G.FW2".
 - iv) Click [Start]. "Complete" will appear on the window.
 - v) Click [Close].
- 6) Reboot the analyzer
"Firmware write succeeded" message appears when completing the firmware transfer, then turn off the power and change the board to OP-SB89G board. Then reboot the analyzer to run the firmware.

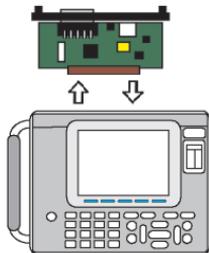
<Attention>

Do not turn off the power of the analyzer while installing the firmware. That will cause the problems (cannot turn on the power) and need to send back the product to LINEEYE.

- Firmware for the standard board and other expansion boards.
Once a firmware of the boards have installed, the analyzer with the board automatically run the proper firmware when turning on power.

2.1.2 Inserting the Interface Board

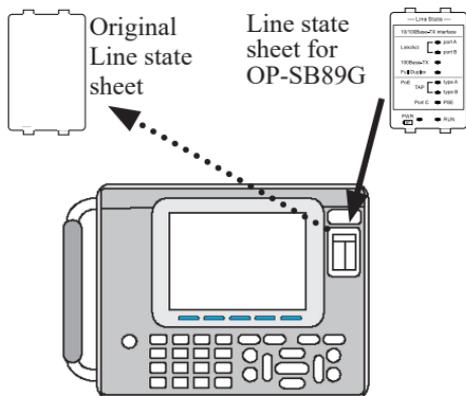
To exchange the interface board inserted in an analyzer to an OP-SB89G board, follow the instructions.



- 1) Turn off the analyzer.
- 2) Screw off M3 screws on the expansion slot of analyzer.
- 3) Remove the board pulling the handles of board.
- 4) Insert the interface expansion board (OP-SB89G) into the slot completely.
- 5) Screw it on using M3 screws.

2.1.3 Line State Sheet

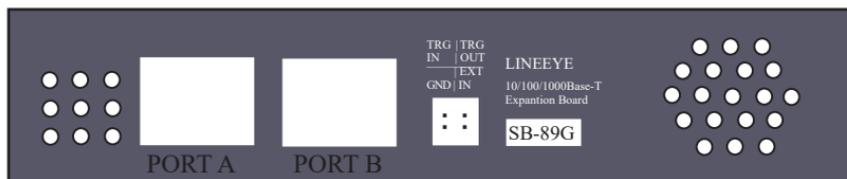
Change the line state sheet to that of OP-SB89G.



- 1) Remove the original line state sheet.
- 2) Fit the line state sheet of OP-SB89G instead of the removed one.

 Take care not to lose the detached sheet.

2.2 Ports of the Interface Expansion Board



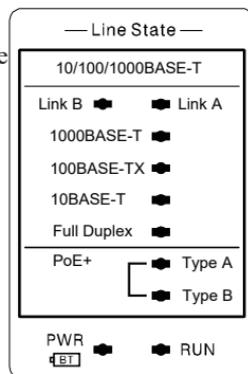
- 1) PORT A, B
Fail-safe TAP when using On-line monitor, PoE/PoE+ measurement, Statistic analysis function. LAN port of 10BASE-T/100BASE-TX/1000BASE-T when using PING, Port blinking, PG function.
- 2) External Input Terminal
It automatically stops the on-line monitoring when the external signal connected 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 OPSB89G to understand the meanings of LEDs when using OP-SB89G.

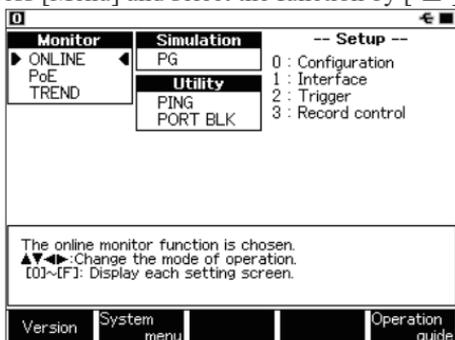


LED		Monitor	PG
Link A	ON	PORT A Link-up	
	OFF	PORT A Link-down	
	Blinking	PORT A Receiving data	
Link B	ON	PORT A Link-up	-
	OFF	PORT A Link-down	-
	Blinking	PORT A Receiving data	-
1000BASE-T	ON	1000 Base-T connection	
	OFF	-	
100Base-TX	ON	100 Base-TX connection	
	OFF	-	
10BASE-T	ON	10 Base-T connection	
	OFF	-	
Full Duplex	ON	Full Duplex connection	
	OFF	Half Duplex connection	
PoE TAP type A	ON	PoE Alternative A detected	-
	OFF	PoE Alternative A not detected	
PoE TAP type B	ON	PoE Alternative B detected	
	OFF	PoE Alternative B not detected	

When both Port A and Port B or one of them is not lighting, communications settings of the devices are not corresponding or do not correspond with the setting of the analyzer. Please confirm those settings.

2.4 Functions

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



- ONLINE : On-line Monitor function
- PoE : PoE/PoE+ Measurement function
- TREND : Statistic function
- PG : Packet Generator function
- PING : PING function
- PORT BLK : Port Blinking function

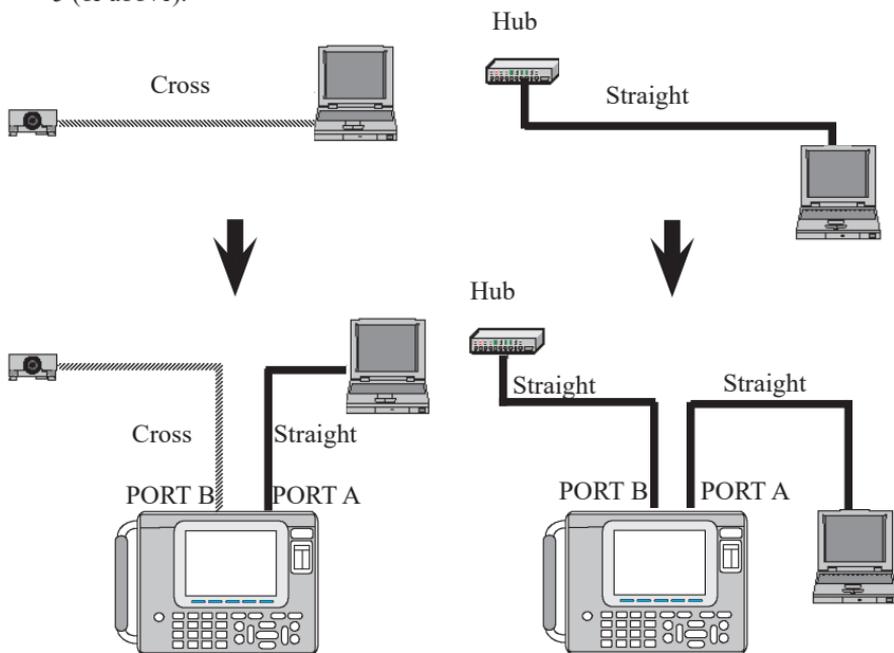
Chapter 3 Online Monitor Function

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 to the PortA and PortB as followings.

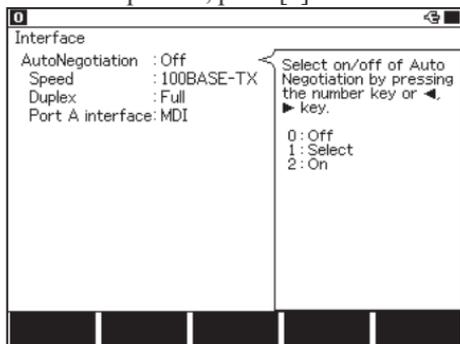
Use the LAN cables which come with the analyzer or straight cables of category 5 (or above).



Note: When using by TAP mode, the analyzer captures packets which reach Port A and Port B, and resend those packets to the other port. In the case that the analyzer turns off while using, the fail-safe mode of the analyzer changes the interconnection of the analyzer and reconnect the devices directly. However, in this case, the network is interrupted for a moment.

3.2 Interface Setup

From the top menu, press [1]"Interface". Select the appropriate interface.



■ AutoNegotiation

Select On/Off of Auto Negotiation. When the devices connected to the ports are compatible with Auto Negotiation, select "On" or "Select". When you want to use by fix, select "Off".

<Off>

No Auto Negotiation setting. Select the same "Speed" and "Duplex" as ones of measurement target devices. Auto-MDI/MDIX will be off.

If selected configurations are not correct, analyzer cannot measure data correctly.

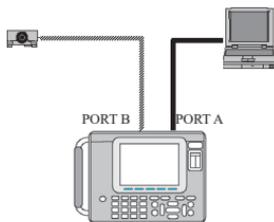
<Select>

Auto Negotiation setting. Of the Duplex, Set the combination of the highest priorities of Speed and Duplex that are common to two devices connected to the port of Analyzer.

If selected configurations are not correct, analyzer cannot measure data correctly.

100BASE-TX Full AUTO

1000BASE-T Full AUTO



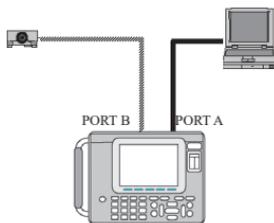
< Setting example 1 >

In this case (left), configurations are as follows.

AutoNegotiation : Select
Speed : 100BASE-TX
Duplex : Full

10BASE-T Half FIX

1000BASE-T Full AUTO



< Setting example 2 >

In this case (left), configurations are as follows.

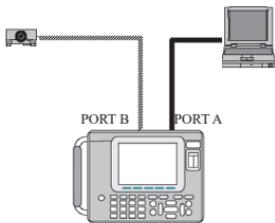
AutoNegotiation : Select
Speed : 10BASE-TX
Duplex : Half

<On>

Auto Negotiation setting. Up to a maximum of Speed and Duplex selected in Interface setting, Link Speed and Duplex will be automatically set.

Priorities 1)1000M full duplex -> 2)100M full duplex -> 3)100M half duplex -> 4)10M full duplex -> 5)10M half duplex

1000BASE-T Full AUTO 1000BASE-T Full AUTO



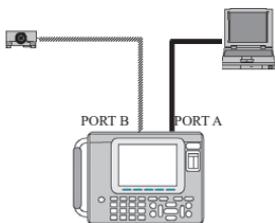
< Setting example 1 >

In this case(left) , configurations are as follows:

AutoNegotiation : On
Speed : 1000BASE-T
Duplex : Full

Analyzer will link in the "1000BASE-T Full".

100BASE-TX Full AUTO 1000BASE-T Full AUTO



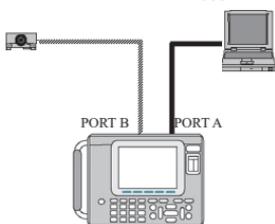
< Setting example 2 >

In this case(left) , configurations are as follows:

AutoNegotiation : On
Speed : 1000BASE-T
Duplex : Full

Analyzer will adjust the link speed automatically and link in the "100BASE-TX Full".

1000BASE-T Full AUTO 1000BASE-T Full AUTO



< Setting example 3 >

In this case(left) , configurations are as follows:

AutoNegotiation : On
Speed : 100BASE-TX
Duplex : Full

Analyzer will adjust the link speed according to the setting, and link in the "100BASE-TX Full".

■ Speed

Select "10BASE-T" or "100BASE-TX" or "1000BASE-T".

■ Duplex

Select "Half (duplex)" or "Full (duplex)".

■ Port A interface

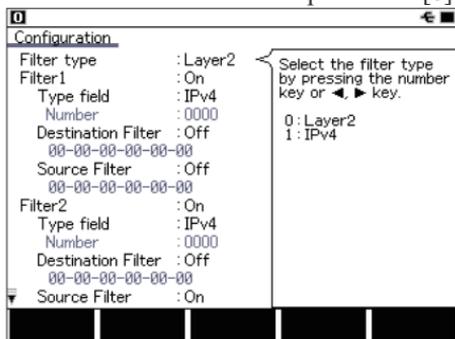
When you want to set Port A to MDI and Port B to MDI-X, select "0:MDI".

When you want to set Port A to MDI-X and Port B to MDI, select "1:MDI-X".

 When the AutoNegotiation is set as "On" or "Select" Auto-MDIX function is activated and the link can be established even with cable combinations not described in Section 3.1 "Connection". However, when the power failure of the analyzer occurs, the analyzer makes straight connection of PORT A and PORT B internally and the link may become invalid depending on the situation. Thus use the cable combinations described in 3.1 "Connection".

3.3 Filter Setup

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



■ Filter Type

Select the filter type.

Layer2 : Layer 2 field.

IPv4 : IP(Version4) field.

■ Filter1/2

Set the settings of Filter1 and Filter2.

When Filter1 is "Off", Filter2 will be automatically "Off".

<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

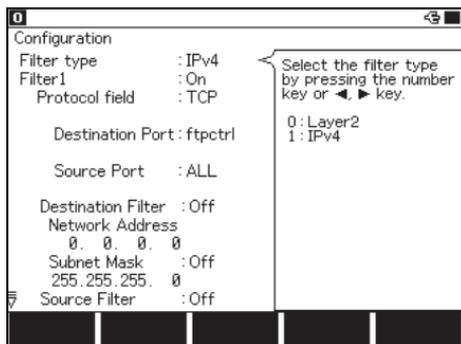
On : Input the MAC address of destination.

Off : Not specify.

■ Source Filter

On : Input the MAC address of Source.

Off : Not specify.



<IPv4>

Set the conditions of IP header for IPv4 frame.

■ Protocol field

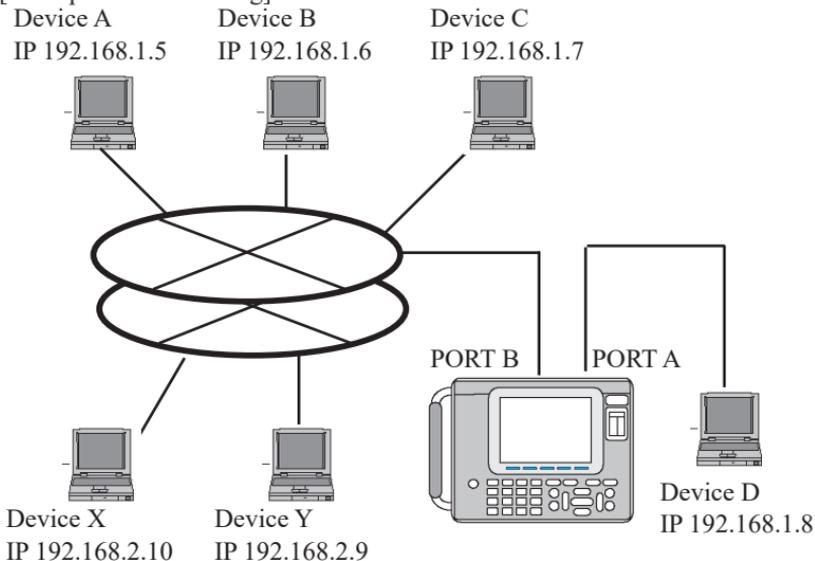
Select the protocol field from ICMP, IGMP, TCP, UDP, Custom (specify the number) and All.

■ 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 Filter
ON : Input the IP address of destination in the "Network Address" and "Subnet Address".
OFF : Not specify.
- Source Filter
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.

[Example of IPv4 setting]



- Monitoring example of TCP/IP frames between Device A and D by filtering.
- Monitoring example of UDP protocol frames between the Devices (A, B, C, and D) which belong to the network address “192.168.1”.

Configuration

Filter type	:IPv4
Filter 1	:On
Protocol field	:TCP
Destination Port	:All
Source Port	:All
Destination Filter	:On
Network Address	192.168.1.5
Subnet Mask	:Off
Source Filter	:On
Network Address	192.168.1.8
Subnet Mask	:Off
Filter 2	:On
Protocol field	:TCP
Destination Filter	:On
Network Address	192.168.1.8
Subnet Mask	:Off
Source Filter	:On
Network Address	192.168.1.5
Subnet Mask	:Off

The configuration example above is to monitor TCP frames from Device D to Device A by the Filter 1, and monitor TCP frames from Device A to Device D by the Filter 2.

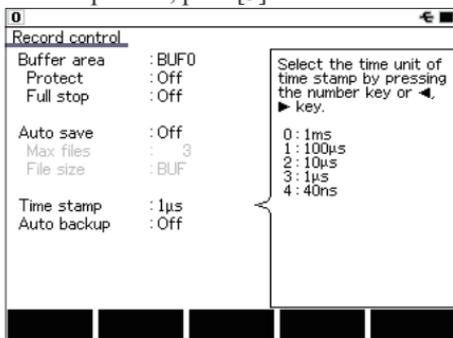
Configuration

Filter type	:IPv4
Filter 1	:On
Protocol field	:UDP
Destination Port	:All
Source Port	:All
Destination Filter	:On
Network Address	192.168.1.0
Subnet Mask	:On
	255.255.255.0
Source Filter	:On
Network Address	192.168.1.0
Subnet Mask	:On
Filter 2	:Off

This configuration example above is to monitor frames of UDP protocol which have 192.16.1 as their network address of both destination IP and source 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 (m:s.μs)	Source	Destination	Protocol
35:08.539700	192.168.0.7	66.249.89.99	TCP
35:08.555100	66.249.89.99	192.168.0.7	TCP
35:08.577500	72.14.203.100	192.168.0.7	TCP
35:08.577500	192.168.0.7	72.14.203.100	TCP
35:08.587800	66.249.89.99	192.168.0.7	TCP
35:08.624200	72.14.203.100	192.168.0.7	TCP
35:08.624900	72.14.203.100	192.168.0.7	TCP
35:08.644700	192.168.0.7	72.14.203.100	TCP
35:08.644700	192.168.0.7	66.249.89.99	TCP
35:08.783700		FF-FF-FF-FF-FF-FF	IPX
35:08.944800	192.168.0.2	192.168.0.255	UDP
35:08.944900	192.168.0.2	192.168.0.255	UDP
35:08.954000	192.168.0.7	192.168.0.1	UDP
35:08.959000	192.168.0.1	192.168.0.7	UDP

Change time display Find setup

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)Source address

3)Destination address

4)Protocol

Time (m:s:μs)	Source	Destination	Protocol
35:08.539700	192.168.0.7	66.249.89.99	TCP
35:08.555100	66.249.89.99	192.168.0.7	TCP
35:08.577500	72.14.203.100	192.168.0.7	TCP
35:08.577500	192.168.0.7	72.14.203.100	TCP
35:08.587800	66.249.89.99	192.168.0.7	TCP
35:08.624200	72.14.203.100	192.168.0.7	TCP
35:08.624900	72.14.203.100	192.168.0.7	TCP
35:08.644700	192.168.0.7	72.14.203.100	TCP
35:08.644700	192.168.0.7	66.249.89.99	TCP
35:08.783700	FF-FF-FF-FF-FF-FF	FF-FF-FF-FF-FF-FF	IPX
35:08.944800	192.168.0.2	192.168.0.255	UDP
35:08.944900	192.168.0.2	192.168.0.255	UDP
35:08.954000	192.168.0.7	192.168.0.1	UDP
35:08.959000	192.168.0.1	192.168.0.7	UDP

Change time display Find setup

[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

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 (m:s:μs)	Source	Destination	Protocol
35:08.539700	192.168.0.7	66.249.89.99	TCP

Type: IP (0x0800)
 Internet Protocol
 Version: 4
 Header length: 20
 Service type: 0x00
 Total length: 257
 Identification: 0x146e (5230)
 Flags: 0x00
 Fragment offset: 2048
 Time to live: 128
 Protocol: TCP (0x06)
 Header checksum: 0x887d - correct
 Source: 192.168.0.7
 Destination: 66.249.89.99
 Transmission Control Protocol

Change time display Dump view Find setup

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

69956 Detail				
Time (m:s.µs)	Source	Destination	Protocol	
35:08.539700	192.168.0.7	66.249.89.99	TCP	
030:	FC 16 38 AE 00 00 35 30	63 38 36 35 62 66 34 62		
040:	3A 55 3D 35 30 63 61 64	62 64 37 62 63 65 30 30		
050:	33 39 33 3A 54 4D 3D 31	32 37 38 32 39 37 33 39		
060:	38 3A 4C 4D 3D 31 32 37	38 33 30 31 36 37 39 3A		
070:	53 3D 70 73 66 4E 54 67	5F 66 6D 35 6D 44 56 48		
080:	78 42 3B 20 4E 49 44 3D	33 37 3D 51 2D 7A 72 31		
090:	4A 71 66 5F 4B 63 47 57	37 62 39 44 49 37 4D 6D		
0A0:	64 78 46 37 43 41 52 51	44 59 61 59 36 36 4F 4D		
0B0:	73 68 4D 30 6F 30 62 39	59 75 37 68 35 54 72 4B		
0C0:	53 46 55 4C 55 32 69 50	52 2D 4A 42 57 33 56 6B		
0D0:	5A 73 68 4F 74 6A 59 4E	73 59 5F 66 68 47 39 6E		
0E0:	59 62 51 32 71 35 68 62	43 70 43 41 2D 74 6C 4A		
0F0:	38 34 41 32 70 41 53 57	67 4F 38 6F 2D 76 46 52		
100:	33 70 38 69 6E 77 56 31	4B 65 43 0D 0A 0D 0A		

←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.

585 Overview				
Time (m:s.µs)	Source	Destination	Protocol/St.	
38:04.321958	01-02-03-04-05-06	FF-FF-FF-FF-FF-FF	ARP	
38:04.321973	192.168.1.20	192.168.1.10	IP	
38:04.322023	01-02-03-04-05-06	FF-FF-FF-FF-FF-FF	ARP	
38:04.322046	192.168.1.20	192.168.1.10	IP	
38:04.322087	01-02-03-04-05-06	FF-FF-FF-FF-FF-FF	ARP	
38:04.322120	192.168.1.20	192.168.1.10	IP	
38:04.322151	01-02-03-04-05-06	FF-FF-FF-FF-FF-FF	ARP	
	--Overrun--			
38:04.474539	01-02-03-04-05-06	FF-FF-FF-FF-FF-FF	ARP	
38:04.474540	192.168.1.20	192.168.1.10	IP	
38:04.474603	01-02-03-04-05-06	FF-FF-FF-FF-FF-FF	ARP	
38:04.474613	192.168.1.20	192.168.1.10	IP	
38:04.474667	01-02-03-04-05-06	FF-FF-FF-FF-FF-FF	ARP	
38:04.474687	192.168.1.20	192.168.1.10	IP	

Broken off Data packet can not
be displayed correctly.

"Overrun" display

■Printing Out 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)=====[2014-04-21 11:20:10]*
* Model      : LE-8200      *
* Version    : 1.00        *
* Extension   : OP-SB89G   *
* Serial No. : XXXXXXXX    *
* Start time : 2014-04-21 11:18:24 *
* Stop time  : 2014-04-21 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]=====[2014-04-21 11:22:26]=*
* Model      : LE-8200      *
* Version    : 1.00        *
* Extension  : OP-SB89G    *
* Serial No. : XXXXXXXX    *
* Start time : 2014-04-21 11:18:24 *
* Stop time  : 2014-04-21 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

```

3.7 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)	Source	Destination	Protocol
39:21.039000	169.254.177.58	169.254.255.255	UDP
010:	00 60 00 04 00 00 80 11	35 52 A9 FE B1 3A A9 FE	
020:	FF FF 00 89 00 89 00 4C	B6 44 80 00 29 10 00 01	
030:	00 00 00 00 00 01 20 45	4D 45 46 43 4E 45 4E 45	
040:	50 45 43 45 4A 45 4D 45	46 43 41 43 41 43 41 43	
050:	41 43 41 43 41 41 41 00	00 20 00 01 C0 0C 00 20	
060:	00 01 00 04 93 E0 00 06	60 00 A9 FE B1 3A	

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

Search

Factor : Data

Search Type : Layer2

Type field : IPv4

Number : 0000

Destination Addr : Off

Source Addr : Off

Action : Display

Select the Search type by pressing the number key or <,> key.

0: Layer2

1: IPv4

Backward search

■ Protocol

Select the protocol type to retrieve.

Layer2 : Layer 2 field.

IPv4 : IP(Version4) field.

Search

Factor : Data

Search Type : IPv4

Protocol field : TCP

Number : 0

Destination Port : http

Source Port : http

Destination Addr : Off

Source Addr : Off

Select the Search type by pressing the number key or <,> key.

0: Layer2

1: IPv4

Backward 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, 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, 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.

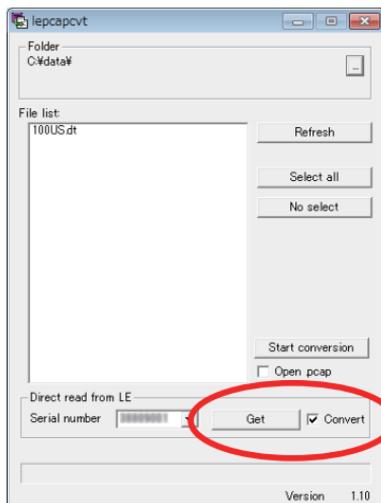
OFF : Not specify.

3.8 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 "lepcapvt.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 "lepcapvt.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.



3.9 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).

Trigger Summary			
	-- Factor --	-- Action --	
▶ 0 : Trigger0	<input checked="" type="checkbox"/> IPv4	--> Stop	
1 : Trigger1	<input type="checkbox"/> TRG IN	--> Stop	

Select the trigger by ▲ or ▼key. Enable and Disable the trigger by [F1],[F2]key. Detailed setting can be set by the number key or [Enter] key.

Enable Disable

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 0	
Trigger	: On
Factor	: Layer2
Type field	: Custom
Number	: 0000
Destination address	: On
00-00-00-00-00-00	
Source address	: On
00-00-00-00-00-00	

Select the trigger factor by pressing the number key or ◀, ▶ key.

0 : Layer2
1 : IPv4

- Trigger
ON : Valid
OFF : Invalid

Trigger 0	
Trigger	: On
Factor	: IPv4
Protocol field	: Custom
Number	: 0
Destination address	: On
Network Address	
0. 0. 0. 0	
Subnet Mask	: On
255.255.255. 0	
Source address	: On
Network Address	
0. 0. 0. 0	
Subnet Mask	: On
255.255.255. 0	

Select the trigger factor by pressing the number key or ◀, ▶ key.

0 : Layer2
1 : IPv4

- 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, 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.

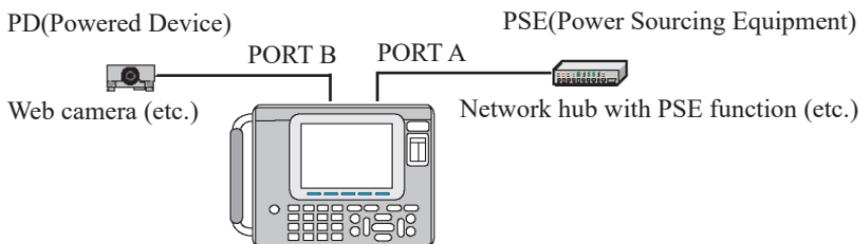
Off : Not specified

Chapter 4. PoE (Power over Ethernet) Measurement Function

This function measures power (watt), voltage and current provided from a PSE device (Power Sourcing Equipment) which supports PoE/PoE+ (IEEE802.3af/at) to a PD (Powered Device). It can also distinguish types of power supply and appropriate power range. Select "PoE" from the top menu to use this function.

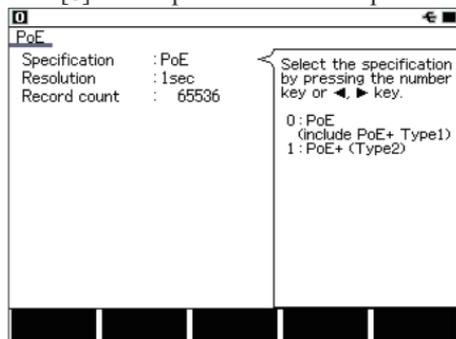
4.1 Connection

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



4.2 PoE Setup

Press [6] "PoE options" from the top menu.



■ Specification

Select the specification of PoE.

■ Resolution

Select the measurement cycle (interval).

■ Record count

Enter the number of times for recording.

 It automatically stops measuring when it reaches the specified count.

4.3 Start and Stop Measurement

Press [Run] and start measuring. The analyzer will stop measuring automatically when it reaches the specified count. Press [Stop] to finish measuring manually.

 Do not unplug the LAN cables during the measurement.

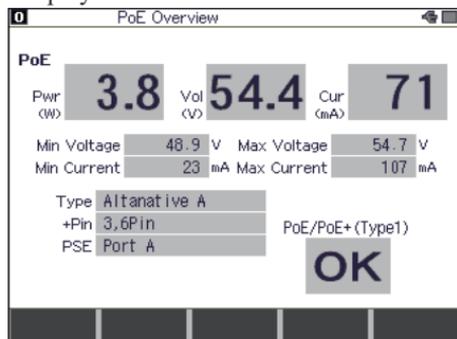
 Press [F5] to stop updating the display. Press [F5] again to display the latest data.

4.4 Display

By pressing [Data] key, the display switches in the order of “PoE Overview” -> “PoE Dump” -> “PoE Graph”.

■ PoE Overview display

It displays the result of PoE measurement.



Pwr : Power(W)

Vol : Voltage(V)

Cur : Current(mA)

Min Voltage : Minimum voltage (V)

Max Voltage : Maximum voltage (V)

Min Current : Minimum current (mA)

Max Current : Maximum current (mA)

Type : Type of power supply (Alternative A, Alternative B, or both)

PSE : The port connected to a Power Sourcing Equipment (PSE).

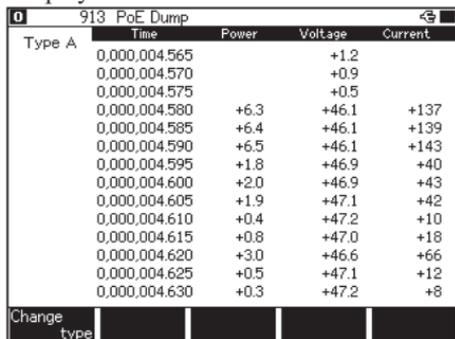
+ pin : The numbers of plus(+) pins.

OK/NG : "OK" appears when the voltage is in the range of 44V to 57V and the power is less than 15.4W.

 The results of PoE measurement (excepting voltage) shows after measured voltage exceeds 22V for the first time in the measurement.

■PoE dump display

It displays the list of recorded data.



Type A	Time	Power	Voltage	Current
	0,000,004.565		+1.2	
	0,000,004.570		+0.9	
	0,000,004.575		+0.5	
	0,000,004.580	+6.3	+46.1	+137
	0,000,004.585	+6.4	+46.1	+139
	0,000,004.590	+6.5	+46.1	+143
	0,000,004.595	+1.8	+46.9	+40
	0,000,004.600	+2.0	+46.9	+43
	0,000,004.605	+1.9	+47.1	+42
	0,000,004.610	+0.4	+47.2	+10
	0,000,004.615	+0.8	+47.0	+18
	0,000,004.620	+3.0	+46.6	+66
	0,000,004.625	+0.5	+47.1	+12
	0,000,004.630	+0.3	+47.2	+8

Time : Measured time

Power : Power(W)

Voltage : Voltage(V)

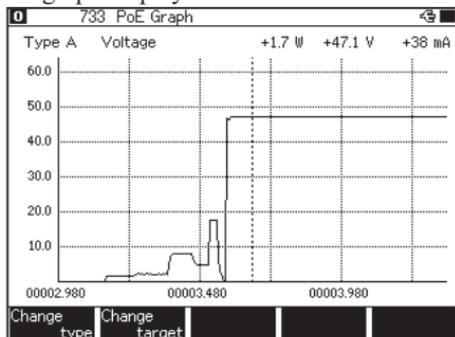
Current : Current(mA)

[F1]: Switch the types

By [F1] key, you can switch the measured data of Alternative A and of Alternative B.

Scroll the window by [▲], [▼], [PageUp], [PageDown] keys.

■PoE graph display



[F1] : Switch the types

By [F1] key, you can switch the measured data of Alternative A and of Alternative B.

[F2] : Switch the targets

By [F2] key, you can switch the targets in the order of "voltage" -> "current" -> "power".

Move the cursor vertically by [◀] and [▶] keys.

■Save and utilize the measured data

PoE measured data can be saved to a storage device (CF card or USB flash drive) as text format or CSV format. Therefore, you can utilize the data in the spreadsheet (etc.) on PC.

Preparation: Insert a CF card or a USB flash into the analyzer.

Press [Menu] -> [F2] -> [2] and set "Output" to "File" in the "Print out condition".

 Only LE-8200A supports USB flash drive.

How to save measured data of PoE

1.Start the PoE measurement.

2.Press [Data] to show PoE dump display.

3.Scroll and/or move the page to show the top of data you want to save.

 Press [Top] to save entire data.

4.Press [Print] and assign number of pages you want to save by [0] to [9] keys.

 66 rows are saved per 1 page. To save entire data, assign large number (e.g. 99999).

5.Press [F1] and select the format from "normal" (text format) or "CSV".

6.Press [Enter]. A file is saved in the storage device as designated format.

 The file is saved to the "PRINTOUT" folder in the storage device.

 When you set "Output" to "AUX" in the "Print out condition", it is able to export the measured data through the AUX (RS-232C) port.

• Example of text format output

```
*=[LE-8200A]====[2015-01-23 19:57:39]-*
* Model : LE-8200A *
* Version : 1.05 *
* Extension : OP-SB89G *
* Serial No.: 99999999 *
* Start time: 2015-01-23 19:55:47 *
* Stop time : 2015-01-23 19:55:59 *
*-----*
* PROTOCOL : IEEE 802.3at *
* TYPE: Altanative A *
* PSE: Port A *
* PIN: 1,2 Pin *
*-----*

-----TM-----POWER-----VOLTAGE-----CURRENT-----
0.000,003.800 -- +2.7 --
0.000,003.820 -- +2.7 --
0.000,003.840 +0.3 +16.8 +18
0.000,003.860 +0.1 +8.4 +20
0.000,003.880 0.0 0.0 +1
0.000,003.900 +4.5 +46.9 +98
0.000,003.920 +3.5 +47.4 +75
0.000,003.940 +1.8 +47.4 +39
0.000,003.960 +1.4 +47.4 +30
0.000,003.980 +1.4 +47.4 +31
0.000,004.000 +1.5 +47.4 +33
0.000,004.020 +1.4 +47.4 +31
0.000,004.040 +1.4 +47.4 +30
0.000,004.060 +1.4 +47.4 +30
```

• Example of CSV format output

913	--	1.2	--
914	--	0.9	--
915	--	0.5	--
916	6.3	46.1	137
917	6.4	46.1	139
918	6.5	46.1	143
919	1.8	46.9	40
920	2	46.9	43
921	1.9	47.1	42
922	0.4	47.2	10
923	0.8	47	18
924	3	46.6	66
925	0.5	47.1	12
926	0.3	47.2	8
927	0.7	47.1	16
928	2.9	46.7	64
929	4	46.7	86
930	0.3	47.2	7
931	0.7	47.1	16
932	3.2	46.6	69

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 Interface Setup

Press [1] "Interface" from the top menu.

 Refer to the "Chapter 3. On Line Monitor Function".

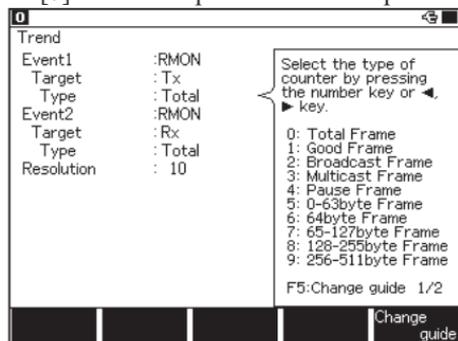
5.3 Frame Counters

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

5.4 TREND Setup

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



■Target

Select the target from transmission line and reception line.

Tx : Transmission signal

Rx : Reception signal

■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).

5.5 Start and Stop Measurement

■Start measurement

Press [Run] to start measuring.

■Stop measurement

Press [Stop] to stop measuring.

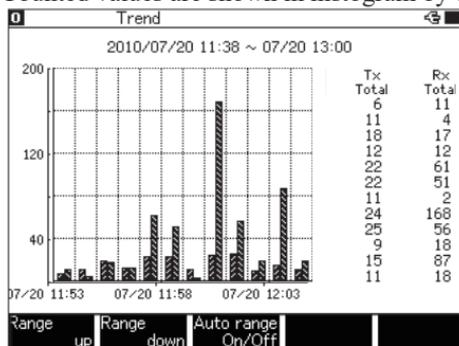
The analyzer will stop measuring automatically after 2000 times of statistics.

5.6 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.

	Tx (1,2Pin)	Rx (3,6Pin)
Total	88001	130115
Good	88001	130115
Broadcast	372	3916
Multicast	0	226
Pause	0	0
0-63 (Length1)	0	0
64 (Length2)	71062	12965
65-127 (Length3)	7940	8283
128-255 (Length4)	1006	2694
256-511 (Length5)	2636	5507
512-1023 (Length6)	4343	3445
1024-1518 (Length7)	1014	97221
1519-Over (Length8)	0	0
CRC error	0	0
Alignment error	0	0
Fragment error	0	0

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

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

Connect a target device to test to Port A.

6.2 Registration of Packets to Transmit

By pressing [9]"Data send table" from top manu, 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 15982 byte			
No.	FrameGap	Length		No.	FrameGap	Length	
0	<input checked="" type="checkbox"/>	96	8	8	<input type="checkbox"/>	96	0
1	<input type="checkbox"/>	96	0	9	<input type="checkbox"/>	96	0
2	<input type="checkbox"/>	96	10	A	<input type="checkbox"/>	96	0
3	<input type="checkbox"/>	96	0	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 FrameGap and Data Length in the data table.
Edit by [03]~[F] key. (select by ▲▼◀▶ key.
Then press [Enter])

Enable Disable PG option Change Inputmode

Data table Summary		Remain 15982 byte	
No.	Frame Data	No.	Frame Data
0	<input checked="" type="checkbox"/> FFFFFFFFFFFFFFF0	8	<input type="checkbox"/>
1	<input type="checkbox"/>	9	<input type="checkbox"/>
2	<input type="checkbox"/> 0102030405060708090A	A	<input type="checkbox"/>
3	<input 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 [03]~[F] key. (select by ▲▼◀▶ key.
Then press [Enter])

■ Display of Frame Gap Setup

Data table0

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 15982 byte	
No.	Frame Data	No.	Frame Data
▶ 0	: FFFFFFFF FFFFFFFD	8	:
1	:	9	:
2	: 0102030405060708090a	A	:
3	:	B	:
4	:	C	:
5	:	D	:
6	:	E	:
7	:	F	:

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

Data table 0		Remain 15843 byte	
		Position	0
0 0 0 0	: FF FF FF FF FF FF FF FF	00	00 00 00 00 00 00 00
0 0 1 0	: 00 00 00 00 00 00 00 00	00	00 00 00 00 00 00 00
0 0 2 0	: 00 00 00 00 00 00 00 00	00	00 00 00 00 00 00 00
0 0 3 0	: 00 00 00 00 00 00 00 00	00	00 00 00 00 00 00 00
0 0 4 0	: 00 00 00 00 00 00 00 00	00	00 00 00 00 00 00 00
0 0 5 0	: 00 00 00 00 00 00 00 00	00	00 00 00 00 00 00 00
0 0 6 0	: 00 00 00 00 00 00 00 00	00	00 00 00 00 00 00 00
0 0 7 0	: 00 00 00 00 00 00 00 00	00	00 00 00 00 00 00 00
0 0 8 0	: 00 00 00 00 00 00 00 00	00	00 00 00 00 00 00 00

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

< 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.

Data table 0	
Protocol Type	: Ethernet
Destination MAC address	00-00-00-00-00-00
Source MAC address	00-00-00-00-00-00
Type	: 0000

Input the MAC address of Destination.
Range: 00-00-00-00-00-00 ~ FF-FF-FF-FF-FF-FF
[0]~[F]:address
[◀▶]:move cursor

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	
	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	*1
Flags	0	Decimal	
Fragment offset	0	Decimal	
TTL	0	Decimal	
Protocol	0	Decimal	
Checksum	0000	Hex	
Source IP address	0.0.0.0	Decimal	
Destination IP address	0.0.0.0	Decimal	

Item	Default Value	Input Value	Remark
< 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	
< ICMP >			
Destination MAC address	00-00-00-00-00-00	Hex	
Source MAC Address	00-00-00-00-00-00	Hex	
Type	0800	Hex	
Version	4	Decimal	
Header length	5	Decimal	
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	
< 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	

Item	Default Value	Input Value	Remark
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	
Data offset	0	Decimal	
Reserved	0	Decimal	
URG	0	Decimal	
ACK	0	Decimal	
PSH	0	Decimal	
RST	0	Decimal	
SYN	0	Decimal	
FIN	0	Decimal	
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	
Checksum	0000	Hex	
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

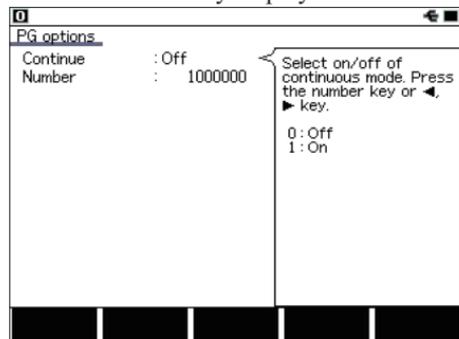
*1 Checksum calculation

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

Push [1]"interface" from top menu and set up the interface.

📖 Refer to Chapter 3 Online Monitor Function.

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	226435	1079
Good		1079
Broadcast		19
Multicast		1
Pause		1059
0-63 (Length1)		0
64 (Length2)		1064
65-127 (Length3)		8
128-255 (Length4)		4
256-511 (Length5)		3
512-1023 (Length6)		0
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-SB89G. Port A of OP-SB89G is AutoMDI/MDI-X.

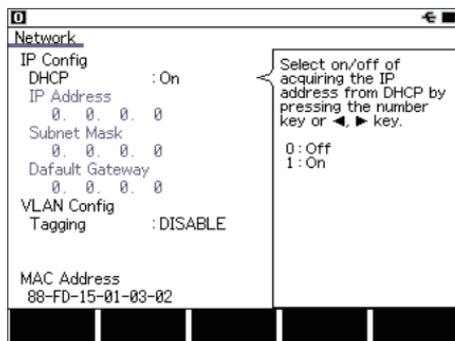
7.2 Interface Setup

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

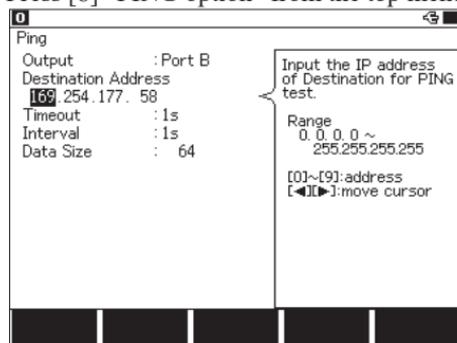
Enter the ID number of the VLAN tag.

■ 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

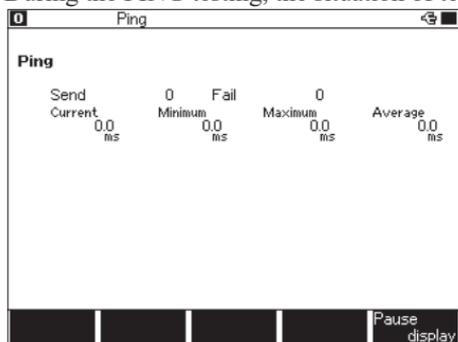
By pressing [Run], Port A and Port B work as LAN ports, instead of TAP ports. Then, the analyzer joins the target network and starts the PING testing.

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.

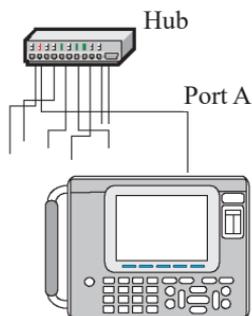
 **Cannot record these data and results.**

Chapter 8 Port Blink Function

It blinks the link LED of the network HUB connected to the Port A. This can help you to find which port of the HUB is connected to the OP-SB89G.

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: 10BASE-T/100BASE-TX/1000BASE-T
Monitor Function	Measurement and logging of LAN frames between port A and B Frame size: 60byte-9Kbyte, Time stamp (13 digit, minimum resolution: 40ns.) Auto stop by external signal trigger
Recording Frame	Max. 48,000 - 1,048,000 frames (equivalent to 100Mbyte)
Display	Translatable protocol: IPv4, ARP, ICMP, TCP, UDP, DHCP A software to convert to pcap file is attached.
Filter Function	Monitoring of specified frames (disregarding the other frames)
Auto save Function	Automatically saves the captured data into an external memory.
Retrieval Function	You can retrieve specified frames and display/count it.
Statistic Function	This function keeps statistics of 2 kinds of frame counters by specified interval (1-240 minute), and display it in a graph. It is possible to display all the frame counter values in real time
PoE Measurement Function	Measurement and continuous logging of the power consumption/ Voltage/Current/Power(Alternative A/B, power supply port, polarity), OK/NG statement between devices of PoE(IEEE802.3af /PoE IEEE802.3at) Interval: 1ms-1s. Max recording time: 400 million. Voltage: 0-60V ($\pm 1\%$ F.S.). Current: 0-600mA ($\pm 2\%$ F.S.).
PG function	Transmits any packet by wire rate from Port A. Transmits up to 16 kinds of packets at specified number of times or continuously. It is possible to set frame gap for each packets.
PING function	Transmits PING commands and display the situation of reply.
Port Blink function	It is possible to make the link LED of the connected HUB blink periodically.
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 operating environment of the conversion software "lecapevt" to pcap format is Windows 7/8.1/10.

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.

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