LINEEYE®

2011

DIGEST

Products Digest Catalog

LINEEYE compact analyzers support the development, testing and maintenance of communications equipment and information systems.

MULTI PROTOCOL ANALYZER

LE-8200

- Wide Color LCD
- Mega Speed Measurement
- Giga Byte Long Hour Record

LINEEYE interface converters convert LAN to Serial and USB to Serial interfaces at low cost.

INTERFACE CONVERTER

SI-series

- Small, Low Power Consumption
- Usable Over Wide Range of Temperature
- Suitable for Factories Automation

LINEEYE CO., LTD.

RS-232C | RS-422 | RS-485

Async | Sync | BSC | SDLC | HDLC | X.25 | PPP

Multi Protocol Analyzer

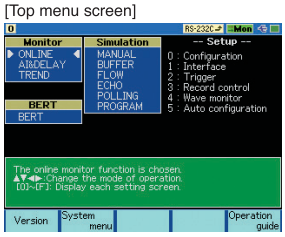
LE-8200

Top-level model of battery powered portable communication analyzer with wide color display and Japanese & English guide message.

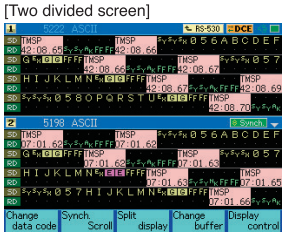
Large-sized Color TFT LCD for Efficient Analysis

The large-sized color LCD is an easy-to-understand display showing a flow of communication protocol and data transmitted or received, thus greatly improving the efficiency of measurement data analysis.

[Top menu screen]



[Two divided screen]



Long Hour Record Enables to Find Data Troubles

Incorporates a 100-MB capture memory that is ideal for the analysis of hi-speed, large-volume communications. The use of the CF card enables the continuous recording of communications data for as long as several days.

>>Details on P7

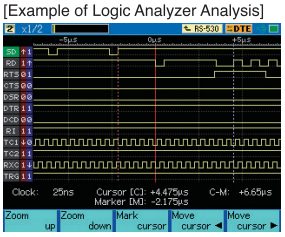
Measures at Low to Mega Speeds

Using high-precision DPLL technology for open baud rate support, transmission and reception speeds can be separately set to 4 effective digits for measurement tests.

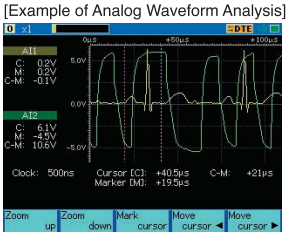
Supports Logic Analyzer / Analog Waveform Analysis

Supports logic analyzer analysis and analog waveform analysis up to 40M sampling per second.(*1)

[Example of Logic Analyzer Analysis]



[Example of Analog Waveform Analysis]



Expands Measurement Targets With Interface Expansion Kits

RS-232C/RS-422/RS-485 can be measured without any options.
The FlexRay (next-generation high-speed in vehicle network) and other protocols can be measured by adding expansion kits.

>> Details on P8-P11

Expansion Kits Support:

TTL | I²C | SPI | IrDA | Current loop | CC-link | CAN | LIN | FlexRay | LAN(PoE)

▲Differing communications standards are supported by simply exchanging the measurement board.

Data Analysis

Multi Protocol	Expansion Board: 6	CF card: 16GB	Time stamp: min.1µs	Auto save: Max stop	Data retrieval
Auto Run/Stop	Auto-config (monitor)	Delay time measure	Signal voltage measure	Statistical analysis	Two divided screen
Trigger: 8	Timers: 4	Counters: 4	Logic Analysis: max. 40MHz	High-speed analog waveform (*1)	

Simulation

MANUAL mode	FLOW mode	ECHO mode	POLLING mode	BUFFER mode	PROGRAM mode

Bit Error Rate Test

Max speed: 4Mbps	Test pattern: 14

External Input/Output

PC link: USB high-speed	Print out: AUX/file	File: PC compatible

Speed	Full duplex 2.150Mbps Half duplex 4.000Mbps
Memory	100Mbyte
Display	5.7 inch color LCD
Battery powered	4 hours
Size	240(W)x190(D)x48(H)mm
Weight	approx. 1.1kg

*1: Need to have OP-SB85L for high-speed analog waveform

RoHS Directive Compatible

Multi Protocol Analyzer

LE-3500

RS-232C RS-422 RS-485

Async Sync BSC SDLC HDLC X.25 PPP

Perfect model of battery powered portable communication analyzer with statistical analysis function and program simulation function.

Supports Communication Protocols at 50bps to 2.048Mbps.

Supports multi protocols which are used in RS-232C/RS-422/RS-485 interfaces at user-specified speed for measurement test.

Records Data Logs for Long Hours by Auto Save Function

Auto Save function continuously saves communication logs into a CF card. For example, it can save data at 19.2Kbps for about 10days. It is useful for identifying rare communication failures of unknown cause.

>> Details on P7

Expands Interfaces by Various Options

A Dsub 9-pin conversion cable and a variety of dedicated cables, such as X.20/21, RS-449, and V.35 cable, are available. Protocols of differing hardware specifications are supported by simply changing the measurement boards.

>>Details on P12, 13

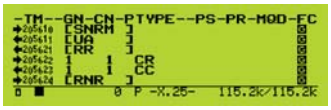
Expansion Kits Support:

TTL I²C SPI IrDA Current loop CC-link CAN LIN

Cables and terminal adapters in a wide variety are available to meet the shapes of the connectors of measurement targets.

[Protocol setup display]

[Example of X.25 protocol translation]



Statistical Analysis on a Time Zone Basis

Measures the volume of communications and the number of occurrence times of specified communication status for a specified period ranging (1 ~ 240 minutes) with the results graphically displayed. It is possible to graph communications traffic and the number of errors on a time zone basis.

[Graph of statistically analyzed data]

Simulation Function for Transmission/Reception Test

Manual mode sends data registered in transmission table, which corresponds to the control key. In the Program mode, creating a purpose-specific command programs can test the communications.

[Example of Program mode]

Data Analysis					
Multi Protocol	Expansion Board: 4	CF card: 8GB	Time stamp: min.10ms	Auto save	Data retrieval
Auto Run/Stop	Auto-config (monitor)	Delay time measure	Signal voltage measure	Statistical analysis	Two divided screen
Trigger: 4	Timers: 2	Counters: 2	Logic Analysis: max. 20MHz	High-speed analog waveform	

Simulation					
MANUAL mode	FLOW mode	ECHO mode	POLLING mode	BUFFER mode	PROGRAM mode

Bit Error Rate Test	
Max speed: 2.048Mbps	Test pattern: 11

External Input/Output		
PC link: USB full-speed	Print out: AUX/file	File: PC compatible

Speed	Full duplex 1.544Mbps Half duplex 2.048Mbps
Memory	6.4Mbyte
Display	Monochrome, LCD backlight
Battery powered	8 hours
Size	210(W)x154(D)x38(H)mm
Weight	approx. 790kg

RoHS Directive Compatible

RS-232C | RS-422 | RS-485

Async | Sync | BSC | SDLC | HDLC | X.25 | PPP

Multi Protocol Analyzer
LE-2500

Compact A5 size, high performance with low costs model, which supports multi protocols and expands target measurement with dedicated cables and expansion kits.

CE

Compact A5 size with excellent functions

Displays a flow of communications protocols and data transmitted or received in the LCD. It is a lightweight unit in A5 size that can be battery driven for 8 hours continuously, and inevitable to on-site tests as well as analyzing of communications line trouble.

[Example of Time stamp / Idle time display]

[Example of Data with line state]

Multi Protocols and Multi Interfaces

Supports various types of communications protocols widely used over RS-232C / RS-422 / RS-485. Protocols of differing hardware specifications are supported by simply changing the measurement boards.

>>Details on P12, 13

Expansion Kits Support:

TTL | I²C | IrDA | Current loop | CAN | LIN

▲New communications standards different in hardware specification are supported with the replacement of the measurement board.

Trigger Feature for Catching User-specified Events/ Errors

The trigger feature allows you to specify a communication conditions and operations which is executed when that condition is satisfied. Up to four pairs of conditions and operations can be set.

>>Details on P7

PC Link Software for Effective Data Use

Text conversion software and capturing software for printout data (*1), makes it possible to utilize measurement data on the user's PC. Furthermore, the use of the optional PC Link Software will widen the application range.

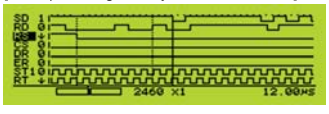
>>Details on P14

*1: Able to download from LINEEYE Website.

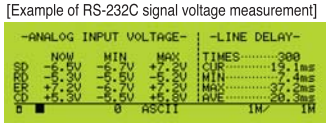
Logic Analyzer and Signal Voltage Measurement

Detailed timing analysis is possible at logic analyzer display without using probing units. Signal voltage measurement ensures ease of the voltage measurement of RS-232C signals.

[Example of logic analyzer measurement]



[Example of RS-232C signal voltage measurement]



Data Analysis					
Multi Protocol	Expansion Board: 4	CF card: 2GB	Time stamp: min.10ms	Auto save	Data retrieval
Auto Run/Stop	Auto-config (monitor)	Delay time measure	Signal voltage measure	Statistical analysis	Two divided screen
Trigger: 4	Timers: 2	Counters: 2	Logic Analysis: max. 20MHz	High-speed analog waveform	

Simulation					
MANUAL mode	FLOW mode	ECHO mode	POLLING mode	BUFFER mode	PROGRAM mode

Bit Error Rate Test	
Max speed: 1.000Mbps	Test pattern: 11

External Input/Output		
PC link: USB full-speed	Print out: AUX/file	File: PC compatible

Speed	Full duplex 1.000Mbps Half duplex 1.000Mbps
Memory	2.4Mbyte
Display	Monochrome, no LCD backlight
Battery powered	8 hours
Size	210(W) x 154(D) x 38(H)mm
Weight	approx. 760kg

RoHS Directive Compatible

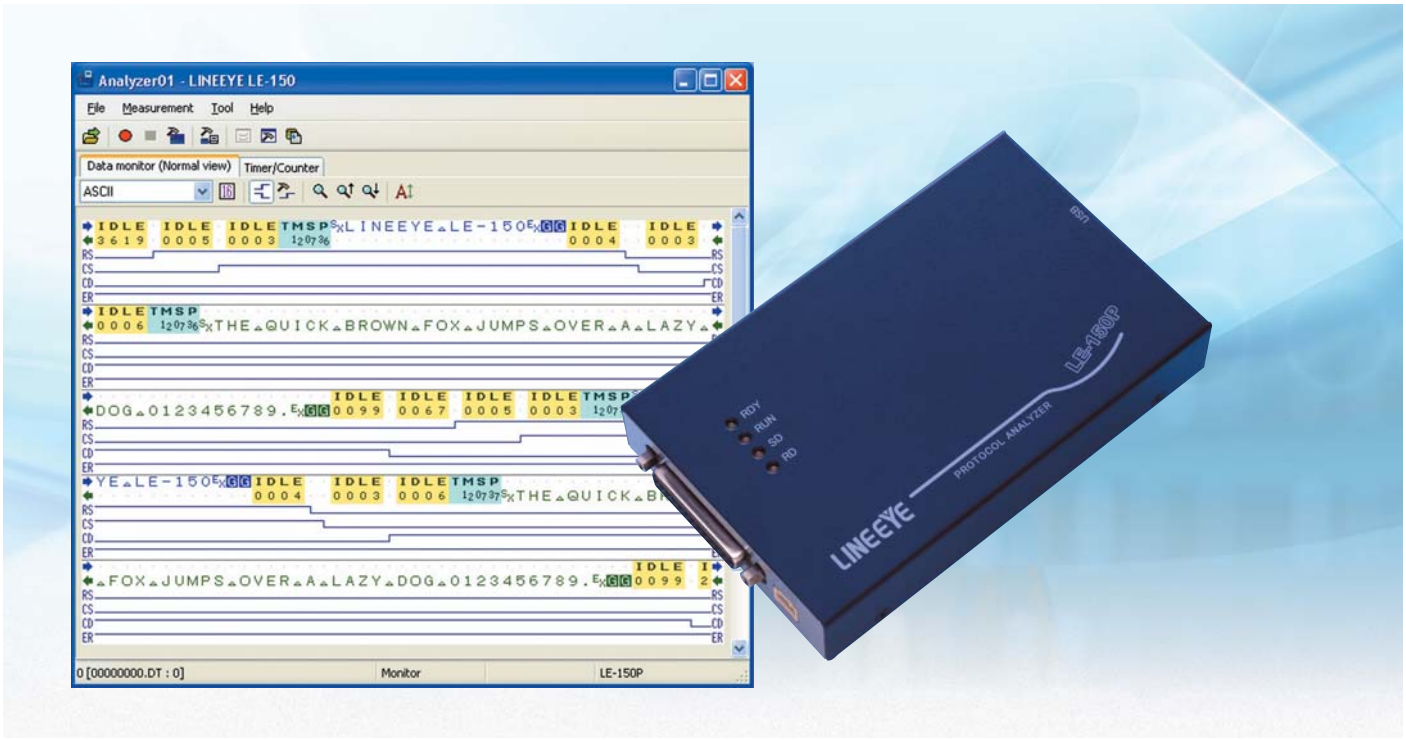
RS-232C RS-422 RS-485

Async PPP

PC-connectable Protocol Analyzer

LE-150P

Low cost model for Async communications, which can analyze PPP communications on the PC.



Functions in Cooperation with the PC

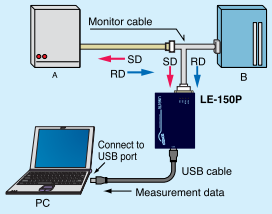
Measurement operations such as starting measurement, and changing the display modes can be made from the PC. It records measurement data on the HDD of the PC, specifying the file size (1M/2M/4M/8M) and the number of files (max. 1,000).

[Standard Time for Continuous Recording on Hard Disk *1]

Target line speed	When 1GB is specified (e.g. 1MB x 1,000 files)	When 8GB is specified (e.g. 8MB x 1,000 files)
9600 bps	Approx. 60 hrs	Approx. 480 hrs
19200 bps	Approx. 30 hrs	Approx. 240 hrs
230.4 Kbps	Approx. 2.5 hrs	Approx. 20 hrs

*1: When measuring full-duplex communications, which is transmitted at a 1-ms interval between 1KB data blocks.

Connection example for measuring data between A and B



Supports RS-232C/RS-422/RS-485 as Standard Feature

Comes standard with high-use RS-232C and high-speed RS-422/RS-485 measurement interfaces. With the OP-5M (option), it is possible to support TTL-level communications at 2.5V/3.3V/5V.

[Signal Definitions for Measurement Interface (Dsub 25-pin)]

Pin	Signal	
1	FG	
2	RS-232C	SD
3	RS-232C	RD
4	RS-232C	RS
5	RS-232C	CS
6	RS-232C	DR
7	GND*2	
8	RS-232C	CD
9	+5VDC*1	
10	RS-422	RXDB(+)*2
11	RS-422	RXDA(−)*2
18	RS-422 / 485	TXDB(+) / TR(+)*2
19	RS-422 / 485	TXDA(-) / TR(-)*2
20	RS-232C	ER
22	RS-232C	CI

*1: Power is supplied when connecting adapter such as OP-5M.
*2: Signals are obtainable on the terminal block with the LE-5TB.

[Image with LE-5TB Used]

[Image with OP-5M Used]

>> Details on P16

Simultaneous Recording of Time Data and Control Line Data

Measures data on idle time, time stamps and control line changes highly precisely and analyzes the data along with communications data. It internally processes such data without being influenced by the load condition of the PC's operating system.

Data Analysis			Simulation
Async protocol	Expansion Board: 1	Time stamp: min.10ms	MANUAL mode
Trigger: 4	Timers: 2	Counters: 2	

Compact, Lightweight, and Low Power Consumption

Employs an aluminum casing and a high density six-layer PCB for a size reduction to a pocketbook size. LE-150P consumes minimal power, thus operating at USB bus power.

Speed	Full duplex 250Kbps Half duplex 250Kbps
Memory	256Kbyte (analyzer) max.8Gbyte (HDD)
Environment	Windows® 98SE/Me/2000/XP/Vista®/7
Power	USB Bus Power
Size	90(W) x 150(D) x 28(H)mm
Weight	approx. 200g

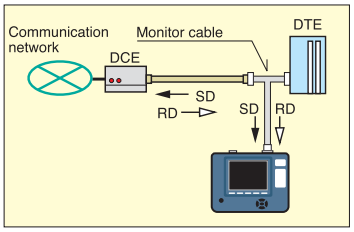
RoHS Directive Compatible

Features of Multi Protocol Analyzers (LE series)

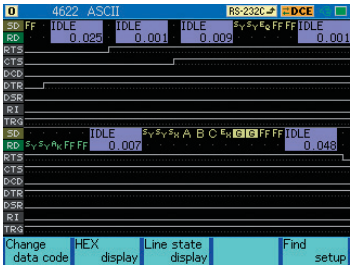
The Monitor Function exactly Records and Visualizes Communications Data

The line monitor function allows the recording of communications data and provides an easy-to-understand large-sized display without affecting the communications lines. This function makes it possible to grasp the conditions of transmission and reception, thus greatly shortening the required time of troubleshooting.

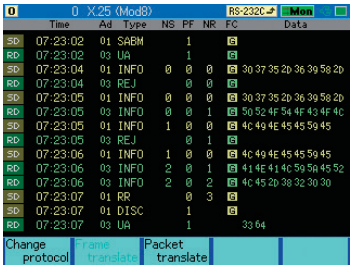
[Example of connection for online monitoring]



[Example of display with line state]



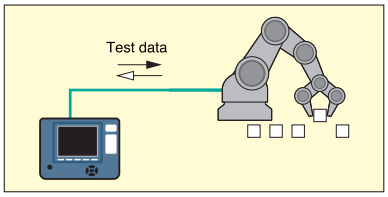
[Example of X.25 protocol translation]



Simulation Function Provides the Actual Operating Environments

With the simulation feature, LINEEYE protocol analyzers act as the counterpart to the target device and perform transmission / reception tests according to protocol. Error handling process can be checked by sending data with parity errors. Margins can be evaluated by intentionally shifting communications speed. For example, test the 9600bps target device at 9840bps speed. In addition, data transmission can be linked with the changes in the signal lines, and an automatic control of RS-485 transmission driver IC is supported.

[Example of connection for simulation]



MANUAL mode

The MANUAL mode allows you to send the data registered in transmission table which corresponds to the "0" to "F" keys. The data can be sent with one press of a key. You can turn RTS/CTS and DTR/DCD signal lines on/off by pressing a key combination.

BUFFER mode

In the BUFFER mode, you can select between transmission and reception, and send communications data that has been captured in the buffer using the unit's monitoring capabilities, as simulation data without requiring further manipulation. This mode is effective in conducting reproducibility tests using the same data as that monitored under actual communications conditions.

FLOW mode

Flow control can be simulated on the transmission and reception-lines using X-on/off flow control or the control line handshake.

ECHO mode

In the ECHO mode, LINEEYE protocol analyzers internally return received data. This mode is useful for the echo-back test.

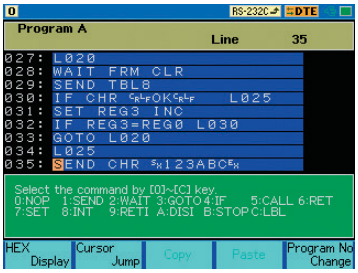
POLLING mode

The POLLING mode simulates the slave and master units in multidrop (1:N connection) polling protocols. In the master mode, LINEEYE protocol analyzers send polling messages to 32 slave units, and check and display replies from each slave.

PROGRAM mode

By creating a purpose-specific command program, the communications protocol can be flexibly simulated alongside condition monitoring.

[Example of configuration of LE-8200 PROGRAM mode]



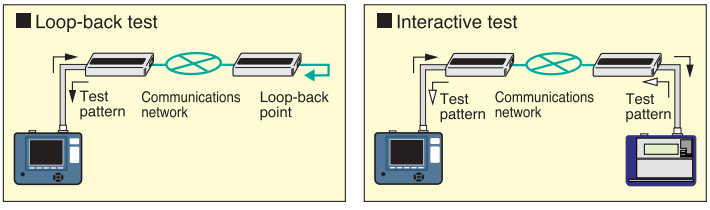
Meaning

027: Label 020
028: Wait new receiving frame
029: Transmit data table 8
030: If receiving [CR, LF, O, K, CR, LF], jump to label 025
031: Set register3+1
032: If value of register3 is equal to register0, jump to label 030
033: Jump to label 020
034: Label 025
035: Transmit [SX, 1, 2, 3, A, B, C, EX]

Bit Error Rate Test Measures Transmission Quality of Communications Lines

BERT function enables you to measure parameters conforming to ITU-T G.821 notifications by loop-back test and interactive test.
Elaborate test patterns and functions such as bit error forced interrupt and repeat measurements are comparable to dedicated equipment.

[Example connection for BERT]

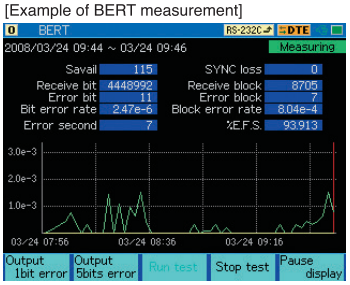


[Setting items of BERT measurement]

Test mode	ASYNCmode, SYNC mode
Test period	Continuous, Number of received bit, Specified time, Repeat for specifid time
Pattern	2^6-1, 2^9-1, 2^{11}-1, 2^{15}-1, 2^{20}-1, 2^{23}-1, MARK, SPACE, ALT, DBL-ALT, 1in4, 1in8, 1in16, 3in24 (*1)

*1: Only LE-8200 can have pattern "2^{15}-1", "2^{20}-1" and "2^{-23}-1".

[Example of BERT measurement]



*Graph of error rate is only supported by LE-8200.

[Contents of BERT measurement]

LE-8200	Other models	Meaning	Range
Savail	Savail	Available measurement in seconds	0～9999999(sec)
Receive bit	R-bit	Effective bits received	0～9999999～9.99E9
Error bit	E-bit	Error bit count	0～9999999～9.99E9
Bit error rate	Bit -ER	Bit error rate	0.00E-0～9.99E-9
Sync loss	LOSS	SYNC loss count	0～9999
Receive block	R-Blk	Effective blocks received	0～9999999～9.99E9
Error block	E-Blk	Block error count	0～9999999～9.99E9
Block error rate	Blk-ER	Block error rate	0.00E-0～9.99E-9
Error second	E-Sec	Error second	0～9999999(sec)
%E.F.S	%E.F.S	Normal operation rate	0.000～100.000(%)

Example of connecting RS-485 signals via optiinal terminal block (LE-25TB)

Full of Convenient Functions for Efficient Measurement

Long Hour Recording Function (Auto Save)

Auto Save function saves communications data and records it as measurement log of a user-specified size into a CF card. Measurement log files will be recorded using ring recording as long as the card has space. It is useful for identifying rare communication failures of unknown cause.

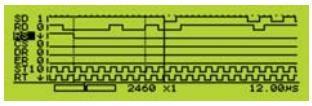
Target Line Speed (bps)	Continuous Recording Time Reference (LE-3500)	
	Main memory Only	When Using CF-8GX
9600	Approx. 22min.	Approx. 480hrs.
115.2K	Approx. 110sec	Approx. 40hrs.
1M	Approx. 14sec	Approx. 5hrs.

* Calculated for full-duplex transmission of 1,000 byte data frames per m-sec. Both transmission and reception data consume 4 byte of memory with each capture.

Logic Analyzer Function

Logic Analyzer function measures communication line timing at a time resolution of nano second. It is useful for finding the hardware problems and education purpose such as studying communications protocols.

[Example of logic analyzer measurement]

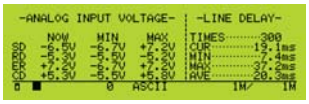


*Between cursors: 12μs

Signal Voltage Measurement Function

Signal Voltage Measurement function allows ease of the voltage measurement of RS-232C signals in places where tester probes cannot reach smoothly. It can display the max/min/current of voltage and thus contributes to the investigation of communication trouble caused by an insufficiency in the amplitudes of signals.

[Example of signal voltage measurement]



Idle Time and Time Stamp

LINEEYE Protocol analyzers record not only communications data but also the time stamp of transmission/reception as well as non-communication time between frames (idle time).

Idle time	Off (no record), 100ms, 10ms, 1ms selectable
Time stamp	Off (no record), Day/Hr/Min, Hr/Min/Sec, Min/Sec/10ms selectable
High-precision Time stamp *	Off (no record), 100μs, 10μs, 1μs selectable

*LE-8200 only

Trigger Feature for Catching User-specified Events

The trigger allows you to specify a communication event and have measurement operation executed when that condition is satisfied. It is possible to analyze complicated operations based on sequential triggers.

[Example trigger condition setup]

[Example trigger action setup]

Trigger conditions	Error, data string, matched timer/counter, idle time more than specified duration, logic status of signal line/extarnal trigger input
Trigger actions	Activates buzzer, stops measuring, saves monitor data on a CF card, controls timer/counter, validates trigger conditions, sends specified data, sends pulse to external trigger.

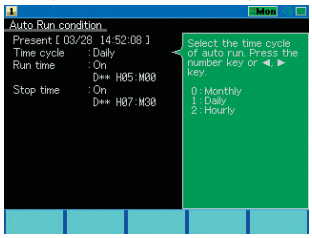
Monitor Condition Auto Setting

The communications conditions, such as the communications speed and framing of the lines, can be automatically detected if relatively large volumes of communications data with few errors flow in the lines. This is effective for monitoring lines of unknown communication conditions.
*Accurate auto settings will not be possible for small volumes of communications data or data that contains many errors.

Auto RUN/STOP Function

By setting time and a date of measurement start and end, measurement can be done automatically during the specified time.

[Example of auto RUN/STOP setup]



The screen is set to make measurement from 5:00 a.m. to 7:30 a.m. automatically on a daily basis.

Data Retrieval Function for Large Volumes of Data

A powerful retrieval function, which finds a specific data in the memory card allows you to locate specific data and perform counting.

[Example of retrieval settings]

This screen is set to retrieve for time stamp from 10:00:00 to 10:30:59

Retrieval condition	Error, data string (don't care and bit mask available), idle time more than specified duration, specified time stamp, trigger matching data
Retrieval action	Shows the matched data at the top or number of matched data

PC-compatible File Management Specification

Test conditions and results can be saved on a CF card in the files management format compatible with your PC. The files can be interchangeably used between models.

* The LE-8200, LE-3500, LE-2500, LE-7200, LE-3200, LE-2200, and LE-1200 are compatible in measurement data file. Part of files or data saved in higher models, however, may not be available to lower models or conventional models.

Printout Function Supporting Text Data Record

Printout data of text format can be save on a CF card or output to the AUX port. Saving printout data on the CF card and use with a text-editor on the PC would save paper resources.
* LE-8200 can save printing images of bitmap files on the CF card.

LE-8200 Options

TTL | I²C | SPI | IrDA | CC-Link | Current Loop | CAN | LIN | FlexRay | LAN

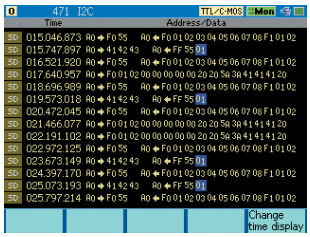
Follows the Progress of Communication Technology at Low Cost.

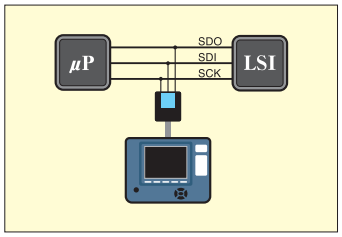
TTL/I²C/SPI Communications Expansion Kit

OP-SB85L

This expansion kit supports I²C clock synchronous communications and SPI communications used between LSI chips on printed circuit boards (PCB) beside HDLC communications and UART asynchronous communications. It can measure TTL/C-MOS level of communication at 1.8V/2.5V/3V/5V and supports I²C/SPI monitoring and simulation.

[Example of I²C monitor display]





Interface	TTL, I²C, SPI
Input level	1.8V/2.5V/3V/5V selectable (*1) Input threshold are different in voltage level. (Permissible range: -1～+7V)
Output level	1.8V/2.5V/3V/5V selectable. CMOS/OC output selectable. (*1)
Probe signal	SD(SDA/SDO), RD(SDI), RTS(SS), CTS, EXIN, TXC(SCL/SCK), RXC, TRG.IN, TRG.OUT [Lead length:170mm]
Expansion protocol	I²C, SPI, Burst (*2)
Test function	Monitor, Simulation, BERT (*3)
Speed (I²C test)	50Kbps (*4), 100Kbps, 200Kbps (*4), 384bps, 417bps (*4), 1Mbps
Speed (SPI test)	Monitor: Max. 20Mbps (*5), Simulation : Max. 12Mbps (*6)
Analog waveform analysis	The signal voltages of 2 channels are measured and displayed in analog waveform. Sampling: 1KHz to 40MHz (in 15 steps), 4K points Measurement range: ±6V/±12V
Composition	Dedicated expansion board, relay cable, high-speed TTL probe pod, 3-wire probe cable

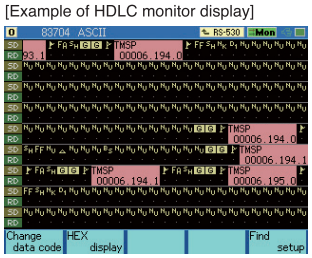
*1: Set from the analyzer. *2: Mode for sampling data at all clock edges.
*3: BERT for I²C/SPI/Burst not supported. *4: Firmware has to be Ver 1.07 or later.
*5: Need to have the High-speed expansion firmware. Without high-speed expansion firmware, transmission data must be less than 1K byte. If transmission data is more than 1K byte, max. speed is 2.15Mbps.
*6: Need to have the High-speed expansion firmware. Without high-speed expansion firmware, the max. speed is 4Mbps.

High-speed HDLC/SPI Communcations Firmware

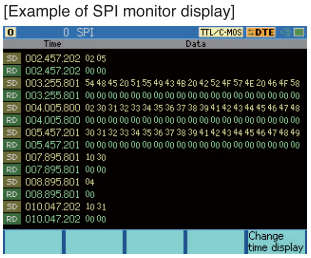
OP-FW12G

This expansion firmware increases the baud rates of bit synchronous communications (e.g.,HDLC/SDLC/X.25, and CC-Link communications) and SPI communications up to 12 Mbps. The firmware processes main measurement items completely with a field programmable gate array (FPGA), thus precisely capturing communications data along with time stamps in 1-μs units.

[Example of HDLC monitor display]



[Example of SPI monitor display]



Interface		RS-422/485 (RS-530) (*1), TTL (*2), SPI (*2)
Protocol		HDLC, SDLC, X.25, CC-Link(NRZ/NRZI format, AR clock), SPI
Speed	HDLC, CC-Link	115.2kbps-12Mbps (*3)
	SPI	115.2kbps-20Mbps (*3) (*4) Max 12Mbps for simulation master mode Max 6Mbps for simulation slave mode
	Setting steps	User-set: 4 effective digits
Error Check		FCS Error(CRC-ITU-T), Abort, short frame
On-line Monitor	Time stamps	9 digits , 0 to 134217727. selectable in 1mS, 100μS, 10μS or 1μS
	ID Filter (HDLC)	able to set 2 characters (don't care, bit masks available)
Simulation	Transmission data table	16K data (can be divided to 16 tables)
	MANUAL mode	Data table corresponding to the numerical keys can be sent. Able to set continuous transmission and interval.
Trigger		Set up to 8 characters (don't care and bit masks available). When 2 individual or sequential characters, errors or the external trigger input(low level) are found, the analyzer automatically stops monioring.
Data Search		search any trigger data, error data and character lines
Auto Run/Stop		Measurement starts and stops in appointed time
Composition		Firmware CD, Instruction Manual

*1: LE-25TB (DSUB 25-pin terminal block) is useful to connect to the target device.
*2: Need to have OP-SB85L
*3: Need to have OP-SB85L for high-speed simulation of TTL/SPI.
*4: When transmission data continues more than 16Kbyte, max speed will be 6Mbps.

LE-8200 Options

TTL | I²C | SPI | IrDA | CC-Link | Current Loop | CAN | LIN | FlexRay | LAN

Expansion Kit for Infrared Communications

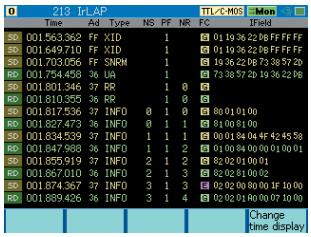
OP-SB85IR

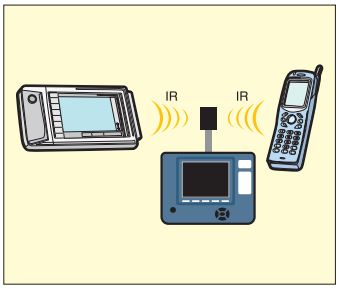
Interface	Infrared rays Photodiode/LED: HSDL-3602 or equivalent
Measurement Signal	SD, RD
Protocol	IrDA1.1 (SIR/MIR/FIR), ASK
Baud Rate (bps)	2400, 9600, 19.2K, 38.4K, 57.6K, 115.2K, 0.576M, 1.152M, 4M Automatically detects and follows IrLAP protocol. (*1)
Communications test function	Monitor / Simulation
Output Emission Level	High/Low interchangeable
Analog waveform analysis	The signal voltages of 2 channels are measured and displayed in analog waveform. Sampling: 1 KHz to 40MHz (in 15 steps), 4K points. Measurement range: ±6V/±12V
Composition	Dedicated expansion board, relay cable, IrDA probe pod, 3-wire probe cable

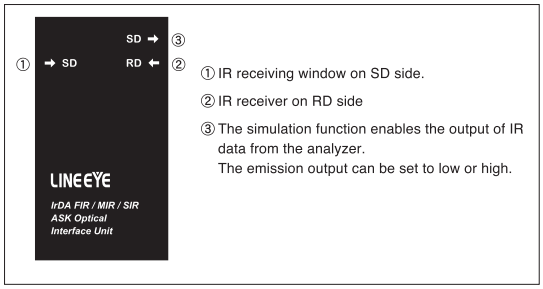
*1: Current firmware version cannot automatically detect the communications speed of IrSimple. To measure only transmission data of IrSimple, set speed to 4Mbps.

This expansion kit is provided with a probe pod for monitoring IrDA (SIR, MIR, and FIR) and ASK infrared communications. The kit has an IrDA monitor function that makes it possible to change communications speed automatically according to the IrLAP protocol and allows the seamless monitoring of infrared data, the mode of which changes from SIR (9600 bps) to FIR (4 Mbps). The kit has two optical emission levels (high and low levels), either one of which is selectable, and incorporates an analog waveform analysis function as well.

[Example of IrDA monitor display]







① IR receiving window on SD side.

② IR receiver on RD side

③ The simulation function enables the output of IR data from the analyzer.
The emission output can be set to low or high.

Expansion Kit for Current Loop Communications

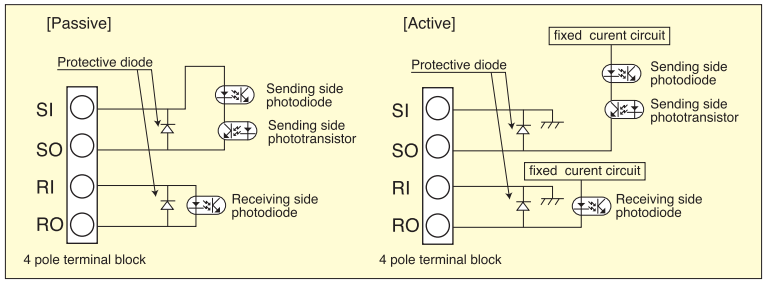
OP-SB85C

Measurement Interface	Current loop communications (4-pole terminal block)
Measurement signal	SD, RD
Baud rate	19.2 Kbps max.(*1)
Communications test function	Monitor/Simulation
Monitor current level	10 to 60mA
Simulation mode	Passive type test, active type test, active current of 20 mA/40mA (selectable with DIP switch)
Analog waveform analysis	The signal voltages of 2 channels are measured and displayed in analog waveform. Sampling: 1 KHz to 40MHz (in 15 steps). Measurement range: ±6V/±12V
Composition	Dedicated expansion board, relay cable, 3-wire probe cable, current loop adapter (OP-1C) (*2)

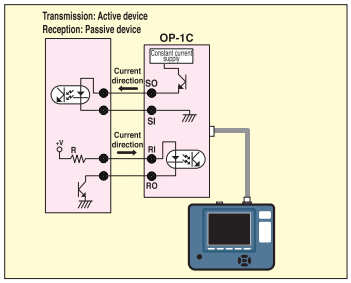
*1: The baud rate is restricted by the cable length and current value.
*2: The OP-1C Current Loop Adapter is sold separately as well. OP-SB85L or OP-SB85IR can be combined with the OP-1C to make an equivalent set.

This expansion kit supports current loop communications. The kit incorporates a communications circuit with photo-coupler insulation and constant-current power supply of insulated type, thus realizing not only monitoring but also easy communications testing with passive or active current loop devices.

[Circuit block diagram of Input/Output]



[Example of connection for Current loop product]



LE-8200 Options

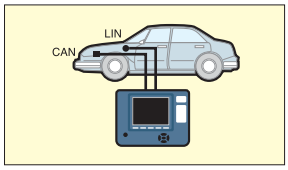
TTL | I²C | SPI | IrDA | CC-Link | Current Loop | CAN | LIN | FlexRay | LAN

High-capacity memory makes efficient improvements in the development of in-vehicle networks and data analyses.

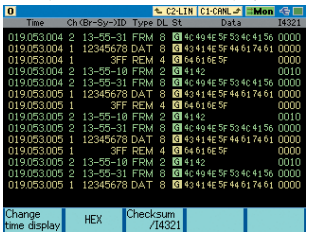
Expansion Kit for CAN/LIN Communications

OP-SB87

This expansion kit makes the measurement of up to 2 channels simultaneously by using Controller Area Network (CAN) communications (conforming to ISO11898/ISO11519-2 standards) used widely in FA systems and in-vehicle communications, and Local Interconnect Network (LIN) communications data in flexible connection. External signals in four lines can be measured as digital or analog signals simultaneously with the measurement of communications data.



[Example of CAN/LIN monitor display]

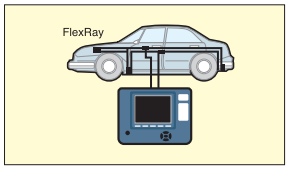


Measurement Interface	CAN: Conforming to ISO11898/ISO11519-2 standards (selectable with relay) (DSUB 9-pin connector x 2). LIN: Conforming to ISO9141 (header 3-pin connector x 2)
Transceiver	CAN: TJA1050/1054 or equivalent. LIN: TJA1020 or equivalent
No. of measurement channels	2 channels in total with CAN, LIN, or CAN/LIN in combination
Expansion protocol	CAN, device network, LIN (Rev1.1, 1.2, 1.3, 2.0)
Baud rate	CAN: 1 Mbps max. LIN: 20 Kbps max.
Monitor function	ID filter, time stamp (1 ms min.) recordable. CAN: Standard/Expansion format supported, and bit timing arbitrary settings possible. LIN: Arbitrary baud rate setting possible
Trigger function	Conditions: Specified communications data string (8 characters max), specified remote frame (CAN), frame error (LIN), timer and counter coincidence, external signal logic. Operation:Measurement stop, saving in a memory card, time control, counter control, specification data transmission, buzzer, validation of trigger condition.
Simulation function	Pre-registered data is selected by key operation and transmitted (sweep transmission available). Master and slave simulation (LIN only)
External signal input	Real-time display of 4-channel external signal state with LED possible. Signal logic recordable in synchronization with data. continuous measurement of signal voltage possible (Measurement range:±15V)
Composition	Dedicated expansion board, line state indication sheet B, DB9 monitor cable x 2, 3-wire probe cable x2, 8-wire probe cable

Expansion Kit for FlexRay Communications

OP-SB88

This expansion kit allows the simultaneous monitoring of FlexRay communications data on up to two channels in real time. The FlexRay is anticipated as a next-generation high-speed in-vehicle network. The kit incorporates a monitor function that does not require complicated parameter settings and a simulation function with which the OP-SB88 works as a FlexRay communications node to transmit and receive data, thus powerfully supporting the initial development. The filter function and high-capacity memory greatly shorten the analysis time of trouble at the time of FlexRay system introduction. Furthermore, it incorporates a simultaneous measurement function for external signals, which makes it possible to investigate the relationship between the operation of peripheral devices and communications data.

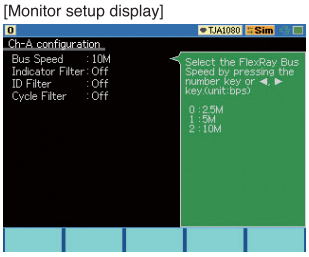


Expansion protocol	FlexRay V2.1A
Transceiver	TJA1080 (DSUB 9-pin connector) RS-485 (DSUB 9-pin connector, Header 3 pin-connector) (*1)
Baud rate	10 Mbps, 5 Mbps, 2.5 Mbps A/B channel
Monitor function	Records/displays FlexRay data in frame units. Checks header/frame CRC error. Time stamp (9 digits, resolution of 1ms/100μs/10μs/1μs)
Display mode	Frame display, payload display, specific frames (channel, ID, cycle counter) at the pointed position, event counter display, external signal voltage display
Capture Memory	Max. 100M byte (records in the capture memory of analyzer)
Filter	Channel, each bit of indicator, specific ID, specific cycle counter
Trigger function	Condition: Up to 6 sets of appointed channel/ indicator/ ID/ cycle counter/ specific payload data (max.16 data, don't care and bitmask availabe), error (header CRC/ frame CRC error), External Input. Action: Stops measuring, Counts data, Output external signal.
Simulation function	Transmits registered test frames (Data length: 0-254 byte, max 784 kinds), Transmits start-up frame/Synch frame (up to 2 node), Preamble indicator available, Transmits wakeup symbol/ media access test symbol.
Preset parameter	Parameter are already preset to transmit/receive FlexRay data. (*2)
External signal input	Real-time display of 4-channel external signal state with LED possible. Signal logic recordable in synchronization with data. Continuous measurement of signal voltage possible (Measurement range:±15V)
Composition	Dedicated expansion board, firmware CD, line state indication sheet B, DB9 monitor cable x 2, 3-wire probe cable x 2, 8-wire probe cable

*1: RS-485 is SN85HVD3088E equivalent. TJA1080 and RS-485 are selectable from analyzer.
*2: It is the parameter of transmittion/reception between 2 node of analyzer and test board of Freescale Semiconductor.

Easy-to-set Monitoring Function

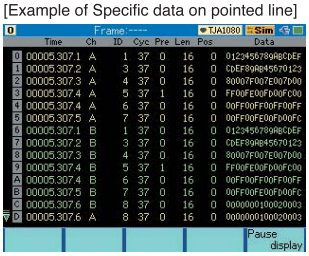
[Monitor setup display]



The unit enables measurement of FlexRay data by only choosing a communication speed without setting approximately 50 communication parameters that are unique to FlexRay.

Versatile Display Mode

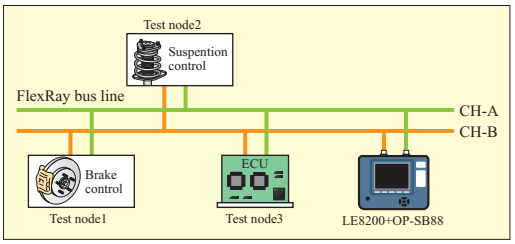
[Example of Specific data on pointed line]



Data analysis is enabled with Frame display, Payload display, and Event counter display. The unit also displays the arbitrary data (Frame header and Payload data) of any specific frame in the pointed line by overwriting the existing data, thus making it possible to study the change of data ideally in real time.

[Commercial Support Option]
To receive LINEEYE's technical support for the unit, including technical advice and software update, customers need to make a Commercial Support Application.
OP-SB88 1-year support (continuous): OP88-SP1
OP-SB88 1-year support (non-continuous): OP88-SD1
* The unit is provided with a three-month free support period after purchase. For more information, contact your LINEEYE representative.

Simulation Function Supporting Non-cold Start Nodes



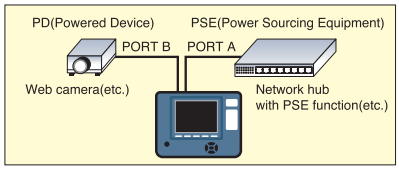
The unit has two built-in nodes that offer an evaluation environment of the non-cold start node to act for the movement of the FlexRay node. The unit allows the repeated automatic transmission of registered payload data and the manual transmission of events by key operation, thus bringing you the effective test environment demanded at each development stage.

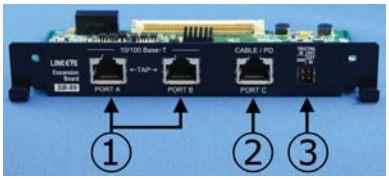
A single unit enables LAN packet data analysis and PoE (Power Over Ethernet) measurement.

Expansion Kit for LAN(supporting PoE) Communications

OP-SB89 NEW

This unit is an expansion board for Ethernet LAN (10Base-T/100Base-TX) measurement. It supports the PoE (Power Over Ethernet IEEE 802.3af) standard, performs data frame analyses over LAN communications, and precisely analyzes and records the power supply from PoE equipment. Furthermore, the unit is provided with versatile functions that are useful at development sites for LAN equipment and at installation sites for LAN cables.



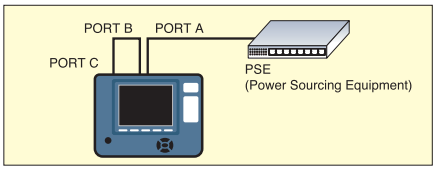


Incorporates a fail-safe tap with a built-in isolation transformer for PoE.

The unit incorporates a tap circuit for PoE, to which LAN cables between PoE devices can be connected directly. The circuit is provided with a fail-safe tap to ensure that communication between the devices is not disrupted in case of lack of power to the analyzer, thus ensuring smooth analysis in environments where interruption of communication is not allowed. The unit not only performs communications packet analyses with the tap connected, but also works as a PoE power logger, thus ensuring efficient analysis operation.

1. Fail-Safe Tap Ports (Supporting PoE)
   Work as normal LAN ports under PING function and Port blink function.
2. Cable Test Port
   Also works as Dummy PD Port.
3. Input Port of External Trigger

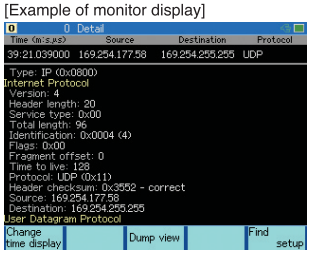
[Test Example of Power Supply from PSE with Port C (Dummy PD Port)]



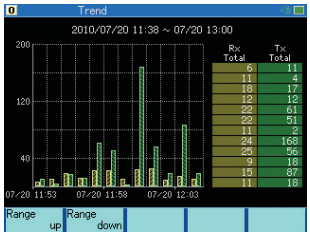
Communication Analysis over Ethernet LAN

LAN data frames can be recorded in a 100M-byte high-capacity capture memory and displayed on the analyzer after translation. The unit enables specific frame filtering besides the statistical graph display on a time zone basis, such as changes in communications traffic and number of error packets. In addition, measurement data can be converted in file format so that the data can be used with popular LAN analysis freeware (e.g., Wireshark) on PCs.

[Example of monitor display]



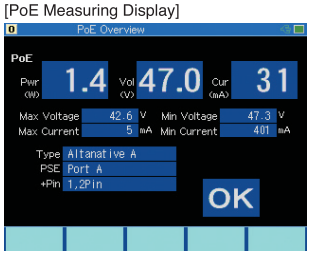
[Example of statistical graph display]



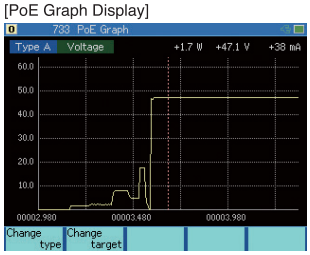
PoE Measurement Function

With this function, the power supply conditions of power sourcing equipment (PSE), such as supply voltage, current and power consumption conditions for each powered device (PD), can be measured to judge the appropriateness of the PoE. The unit can be used as a PoE data logger that can measure up to four million times in specified cycles, and measurement data can be saved in CSV format in CF cards and utilized in spreadsheet software. Furthermore, this function is useful for the power system evaluation test of PoE-supporting devices such as network cameras and IP phones.

[PoE Measuring Display]



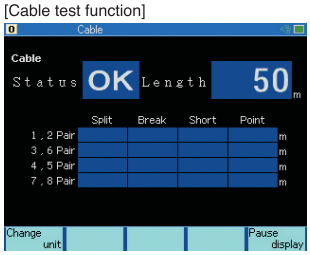
[PoE Graph Display]



Useful Cable Test Function at Installation Sites of LAN Cables

The unit is provided with a cable test function to perform cable length measurements and detect cable breakage, short-circuiting, and split pairs. It is also provided with easy-to-use functions that are useful for onsite operations, (e.g., a port blink function that makes it possible to single out a target cable from a large number of cables by flashing the corresponding link lamp of the hub, and a PING function that facilitates link check tests.

[Cable test function]



Measuerment Interface	Port A,B: 10Base-T/ 100Base-TX (IEEE802.3) , PoE (IEEE 802.3af) Measurement Port C:Cable Test Port, Dummy PD port to detect the PSE
Monitor Function	Measure/record the LAN frames by TAP connection of A/B ports. (*1) Frame size: 60-2047 byte, Time stamp (13 digit, resolution: 1ms, 100μs, 10μs, 1μs) , Auto stop when full memory, External signal trigger stop, Conversion software for Ethereal / Wireshark (.pcap format) . (*2)
Recording Frame	Max. 48,000-1,388,000 frames (equivalent 100M byte) (*3)
Display	Frame/Translation/Dump (in HEX) Display Translation protocol:IPv4, ARP, ICMP, TCP, UDP, DHCP
Filter Function	Monitor only specified frames. Layer 2:type number, MAC address IPv4:protocol number, IP address, Subnet Mask
Retrieval Function	Retrieve the specified frame only and display/count Layer 2:type number, MAC address IPv4:protocol number, port number, IP address, Sub-net Mask
Statistic Analysis Function	Calculate 2 frame counter values at the same time at specified interval (1-240 minute) , and display in graph. Display all frame counter values in real time, Frame counter: total received frames, normal frames, Broadcast, Multicast, pause, error frames (CRC, Alignment, Fragment), numbers of frames of each byte length (0-63, 64, 65-127, 128-255, 256-511, 512-1023, 1024-1518, 1519-), Max. calculation number: 4,294,967,295 (each)
PoE Measurement Function	Measure/consecutively record the PoE equipment power consumption/voltage/current/power(alternative A/B, power supply port, polarity), OK/NG statement in specified cycles (1ms-1s, 10 stages) Max no.of recordings: 4 million, Voltage: 0-60V (accuracy : ±1% F.S.), Current: 0-380mA (accuracy : ±2% F.S.), Normal/Dump/Graph Display, Able to print reports, Able to save as CSV file
PSE Detection	Detect the PSE connection to Port C (Dummy PD port of class A) and light LED.
Cable Test Function	Measure and check the cable length (3-120m)/breakage point/short circuit point/split pair detection (*4) Method of calculation of length: TDR, Margin of error: ±1m (not more than 3-20m) /±5% (more than 20m) (*5), Cable characteristic calibration parameters can be set.
PING Function	Transmit the PING commands about 30,000 times to the PortA/B (*6), and display the number of times of reply/length of reply time. Able to specify the interval of transmitting commands (10ms, 50ms, 100ms, 500ms, 1s) , time out (10ms, 50ms, 100ms, 500ms, 1s, 5s, 10s), payload length (0-900)
Port Blink Function	Repeat linking/cutting link on Port A/B*6 in about 1s intervals. The link LED for connected HUB will be blinking to easily identify the target ports.
composition	Interface expansion board, line state sheet C, LAN cable, Utility CD

*1: Port A/B is a fail-safe TAP circuit and will not affect the communications between the target devices even in case of power shortage of the analyzer.
*2: Conversion software for pcap format can be used in the Windows2000/XP/Vista/7. CF card and PC with CF card reader slot are necessary to transmit/receive the measurement data.
*3: 12 byte of additional information will be added for each frame.
*4: Cannot display the cable map because of open measurement method.
*5: It is the standard margin of error for category 5e cable measurement. For some cables, it may be necessary to set cable calibration parameters.
*6: When starting the cable test, Port A/B will switch to LAN port instead of TAP connection.

LE-2500/LE-3500 Options

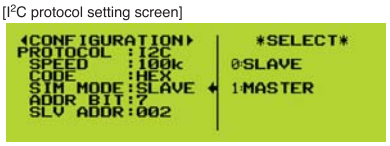
TTL | I²C | SPI | IrDA | CC-Link | Current Loop | CAN | LIN

Optional measurement boards along with a variety of measurement cables expand the application range of the LE Series.

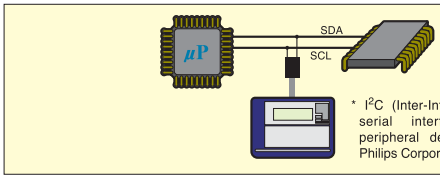
TTL/I²C/SPI Communications Expansion Kit OP-SB5GL

This expansion kit supports I²C clock synchronous communications and SPI communications used between LSI chips on printed circuit boards (PCB) besides HDLC communications and UART asynchronous communications at 1.8V/2.5V/3V/5V TTL signal levels. And this allows the direct probing connection of the communications lines on PCBs.

[I²C protocol setting screen]



[Example of I²C monitor display]



* I²C (Inter-Integrated Circuit) is a serial interface standard for peripheral devices developed by Philips Corporation.

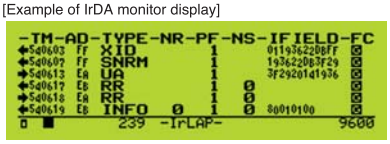
Applicable analyzers	LE-3500, LE-2500
Interface	RS-232C, TTL / CMOS (for I²C and SPI*1)
Probe signal	SD (SDA/SDO) , RD (SDI) , RS (SS) , CS , EX IN , SD CLK (SCL/SCK), RD CLK , Trigger IN , Trigger OUT [Lead length: 170mm]
Test function	Monitor / Simulation / BERT (*2)
Baud Rate	ASYNC, ASYNC-PPP, SYNC, BURST : 50bps - 2.048Mbps (*3) HDLC : 50bps to 2.048Mbps (*3) , 115.2Kbps to 10Mbps on using OP-FW10G (*4) SPI : 50bps to 2.048Mbps (*5), 115.2Kbps to 10Mbps on using OP-FW10G (*6) I²C : max. 1Mbps (On simulation 50K, 100K, 200K, 384K, 417K, 1Mbps)
Input Level	Settings of 1.8V/2.5V/3.3V/5.0V are available. According to the voltage level, input level threshold is variable. (Acceptable input range : -1V to +7V)
Output Level	1.8V/2.5V/3V/5V of CMOS output or OC output are available
Composition	Dedicated expansion board, relay cable, probe pod

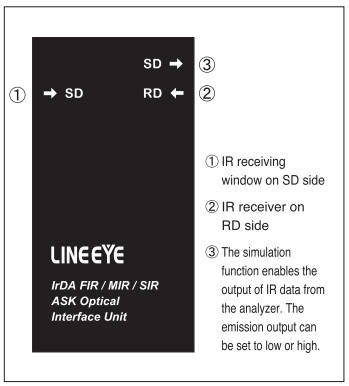
*1 : SPI is only available with LE-3500. *2 : BERT testing of I2C, SPI and BURST are not supported.
*3 : Applied in the half duplex by LE-3500. Restricted by the performance of the analyzer.
*4 : Applied in the half duplex. In the full duplex 5Mbps at Max.
*5 : When the continuous transfer is less than 1Kb, Max 5Mbps at monitoring and Max 2.048Mbps at simulation.
*6 : Applied in monitor mode. Max 5Mbps at simulation mode.

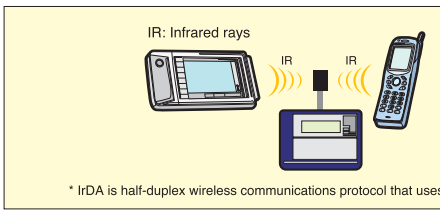
Infrared Communications Expansion Kit OP-SB6G

This expansion kit is provided with a probe pod for monitoring IrDA (SIR. MIR. and FIR) and ASK infrared communications. The kit has an IrDA monitor function that makes it possible to change communications speed automatically according to the IrLAP protocol and allows the seamless monitoring of infrared data, the mode of which changes from SIR (9600 bps) to FIR (4Mbps). The kit has two optical emission levels (high and low levels), either one of which is selectable.

[Example of IrDA monitor display]







* IrDA is half-duplex wireless communications protocol that uses infrared rays.

Applicable analyzers	LE-3500, LE-2500
Interface	RS-232C, IR (IrDA/ASK) Photodiode / LED : HSDL-3602 or equivalent
Measurement signal	SD,RD
Protocol	IrDA1.1(SIR/MIR/FIR(*1)),ASK
Function	Monitor/Simulation/BERT(*2)
Baud rate (bps)	2400, 9600, 19.2K, 38.4K, 57.6K, 115.2K, 0.576M, 1.152M (*3) Automatically detects and follows IrLAP protocol.(*1)
Output emission level	High/low interchangeable
Composition	Dedicated expansion board, relay cable, probe pod

*1: The Expansion Kit is in automatic tracking control of MIR (at 576 kbps or 1.152 Mbps) or FIR (at 4 Mbps) while the expansion kit is in monitoring. Due to the performance of the analyzer, however, continuous data may not be correctly captured midway.
*2: IR bit error rate testing (BERT) is not possible.
*3: Settings are not possible in the LE-2500.

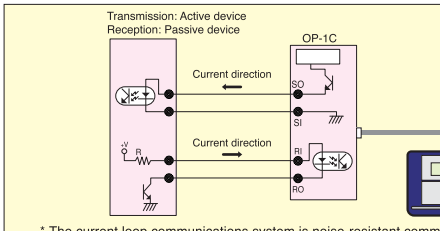
Current Loop Adapter and Expansion Board OP-1C + SB-25L

The OP-1C used in combination with the SB-25L (see note 1) supports current loop communications presently used in the FA field. The kit incorporates a communications circuit with photocoupler built in OP-1C insulation and constant-current power supply of insulated type, thus realizing not only monitoring but also easy communications testing with passive or active current loop devices.

Note 1: The dedicated expansion board provided to the OP-SB5GL or OP-SB6G can be used in place of the SB-25L. The purchase of the SB-25L is unnecessary if the dedicated expansion board is on hand.

[OP-1C Current Loop Adapter]

[SB-25L Expansion Board]



* The current loop communications system is noise-resistant communications method in which logic is decided with the ON/OFF of the current.

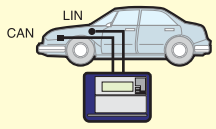
Applicable analyzers	LE-3500, LE-2500
Interface	RS-232C, Current loop communications (4-pole terminal block)
Measurement signal	SD, RD
Baud rate (bps)	19.2 kbps max. (*1)
Function	Monitor/Simulation
Monitor current level	10～60mA
Signal polarity	Normal/inversion (*2)
Simulation mode	Passive test and active test Passive current: 20/40 mA (selectable with DIP switch)
OP-1C dimensions and mass	60(W)×100(D)×20(H)mm. Approx. 180g
OP-1C accessories	Dedicated adapter and relay cable

*1: The baud rate is restricted by the cable length and current value.
*2: The signal polarity is set in the analyzer. OP-1C is not provided with DIP switches for polarity switching equivalent to that of the conventional model OP-1B.

Increases in the efficiency of developing and testing in-vehicle networks.

CAN/LIN Communications Expansion Kit **OP-SB7GX**

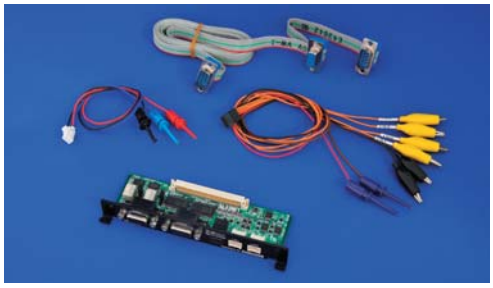
This expansion kit makes the measurement of up to 2 channels simultaneously by using Controller Area Nerwork (CAN) communications used widely in FA systems and in-vehicle communications, and Local Interconnect Network (LIN) communications data in flexible connection. It allows the simultaneous logic measurement and analog measurement of four-line external signals.



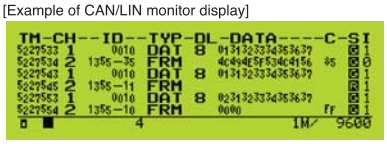
*CAN is the communications protocol for in-vehicle network developed by Robert Bosch GmbH. LIN is communications protocol for in-vehicle network proposed by automobile manufacturers in Europe.

●CAN/LIN Simultaneous Monitoring

The OP-SB7GX enables the simultaneous measurement of CAN communications data and LIN communications data along with time stamp, thus contributing to the development of bridge units connecting the CAN and LIN. Furthermore, the ID filter can be used for highly efficient analysis.



[Example of CAN/LIN monitor display]

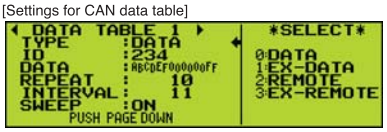


TM	Displays the time of frame reception completion in millisecond units (Example: 4216898 → Reception at 42 minutes 16.898 seconds) The [ZOOM/CODE] key can be used to select the display of the difference in time (dT) from the moment the previous frame is received.
CH	Reception channels (1: CH1 and 2: CH2)
ID	CAN: ID of received frame, LIN: Displays the following items in sequence. SynchBreak bit width, SynchFiled, "-" and ID (Example: 1355-35, SynchBreak width=13 bits, SynchField=55h, and ID=35h)
TYP	Types of reception frames DAT: CAN data frame, REM: CAN remote frame, ERR: CAN error frame FRM: LIN frame, ILL: Illegal frames beyond LIN standards
DL	CAN: Contents of data length code (number of data bytes) LIN: Data length set for CONFIG for each ID
DATA	Contents of data field
C	Contents of LIN checksum (hexadecimal)
S	Displays whether or not the frame was normal.
I	Displays the logic of external signal IN1. All the external signals will be displayed with the [DISPLAY MODE] key.

●CAN Simulation Function

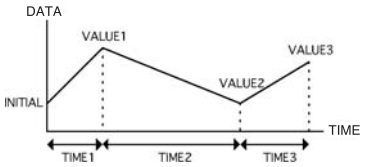
A frame registered in the CAN data table is transmitted. A part of the data in the frame can be specified as sweep data that can be transmitted with the value of the data automatically changed from the initial value to the third target value, which makes it easy to check the response of the equipment according to the change of communications data.

[Settings for CAN data table]



Sixteen frames specified with the number of repeating times and transmission intervals can be registered in advance.

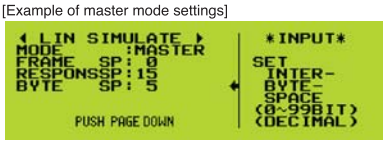
[Image of sweep data settings]



●LIN Simulation Function

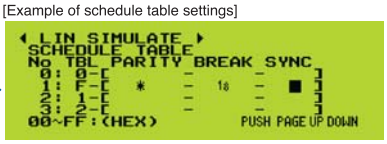
The OP-SB7GX in master mode can transmit the contents of the LIN data table in the order set in the schedule table repeatedly or according to key manipulation. A parity error, any number of break bits, and any SYNC data can be set to conduct confirmation tests for error data with ease. While in slave mode, the contents of the data table set with an ID conforming to the request of the master will be transmitted. Furthermore, the WakeUp signal (80h) can be transmitted at any time.

[Example of master mode settings]



A 15-bit response space (the space between the header block and response block) and 5-bit inter-byte space (the space between adjacent response data items) are set.

[Example of schedule table settings]



Data table numbers 0, F, 1, and 2 are transmitted in sequence with a parity error set for an 18-bit-length BREAK filed for table F data.

Applicable analyzer	LE-3500, LE-2500
Interface	CAN: Conforms to ISO11898/ISO11519-2 standards (*1) (DSUB9-pin connectors x 2) LIN: Conforms to ISO9141 standards (header 3-pin connector x 2)
Transceiver	CAN: Equivalent to TJA1050/1054 LIN: Equivalent to TJA1020
No. of measurement channels	2 channels in total with CAN, LIN or CAN / LIN in combination
Protocol	CAN2.OB, device net, LIN (Rev 1.1, 1.2, 1.3, and 2.0)
Baud rate (bps)	CAN: 1 Mbps max. LIN: 20 kbps max. Arbitrary baud rate settings possible
Monitor function	ID filter possible and time stamp (1 ms min.) recordable CAN: Standard/Expansion format supported and possible to make bit timing settings LIN: Frame breaking possible according to the data length of each ID or specified idle time
Trigger function	Conditions: Specified communications data string (8 characters max.), specified remote frame (CAN), frame error (LIN), timer and counter coincidence, and external signal logic Operation: Measurement stop, saving in a memory card, timer control, counter control, specified data transmission, buzzer, and validation of trigger conditions
Simulation function	Pre-registered data is selected by key operation and transmitted (sweep transmission available) and Master and slave simulation (LIN only).
External signal input	Real-time display of 4-channel external signal state with LED possible. Signal logic recordable in synchronization with data continuous measurement of voltage possible. (Measurement range: ±15 V)
Composition	Dedicated expansion board, DB9 monitor cable x 2, 3-wire probe cable x 2, and 8-wire probe cable

*1: Settings in the Analyzer selectable with a relay.

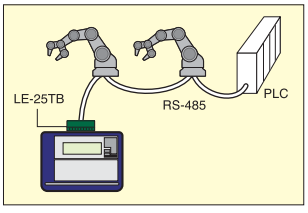
Supports high-speed HDLC/SPI communications for FA fields and CC-Link.

High-speed HDLC/SPI Communications Firmware **OP-FW10G**

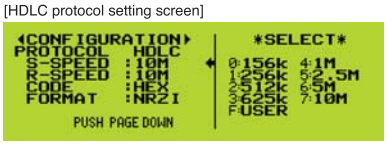
This expansion firmware increases the baud rates of bit synchronous communications (e.g., HDLC/SDLC/X.25, and CC-Link communications)and SPI communications up to 10 Mbps. The firmware processes main measurement items completely with a field programmable gate array (FPGA), thus precisely capturing communications data along with time stamps in 1-μs units.

Applicable analyzer	LE-3500
Interface	RS-422/RS-485 (RS-530) (*1), TTL(*2), SPI (*2)
Protocol	HDLC, SDLC, X.25. CC-Link (NRZ/NRZI format, AR clock), SPI
Baud rate (bps)	Half-duplex : 115.2 kbps ~ 10 Mbps (*3) Full duplex : 115.2 kbps ~ 5 Mbps (*3) Setting steps : arbitrary: 4 digits
Error check	FCS error (CRC-ITU-T), abort, short frame
Time stamp	6 digits (0 to 524287) Resolution: 1 ms, 100 μs, 10 μs, or 1 μs (selectable)
ID filter	Specified address frame (a 16-bit length, don't care and bit mask available)
Trigger function	Communications error and specified data strings up to 8 characters (don't care and bit mask available)
Simulation function	Specified data string (16 kinds up to 16k in total) can be transmitted by key operations

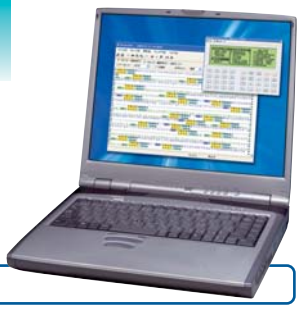
*1: LE-25TB(DSUB25-pin teminal block)is useful to connect to the target device.
*2: OP-SB5GL is required.
*3: OP-SB5GL is required for high-speed simulation of TTL/SPI.



[HDLC protocol setting screen]



PC Link Software Enhances the Link between Analyzers and your PC



PC Link Software
LE-PC800G
Applicable Analyzer*1: LE-8200

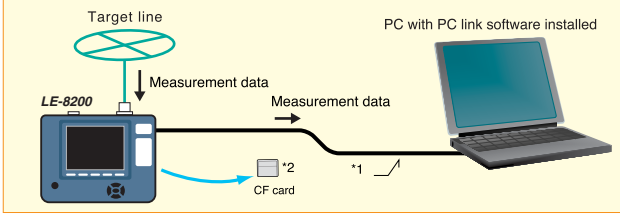
PC Link Software
LE-PC300G
Applicable Analyzers*1: LE-3500/2500/7200/3200/2200/1200

*1: Cannot use this software together with CAN/LIN communications expansion kit and high-speed HDLC/I²C communications firmware at the same time.

Enables simultaneous control of multiple analyzers from a PC

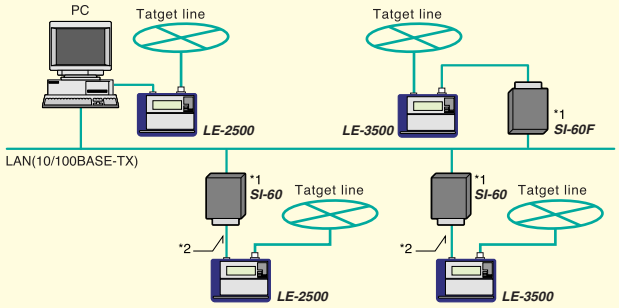
PC Link Software supports serial connections through the COM port, USB connectios, and LAN connections via LINEEYE SI-60 or SI-60F converter, thus enabling remote measurement by multiple analyzers connected at the same time. It also allows you to browse measurement data saved in the memory cards and convert data.

[Serial connections and memory card]



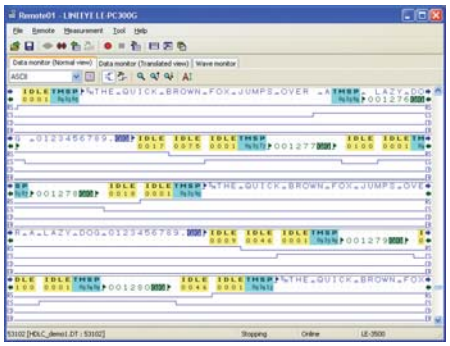
*1: The PC link software is not provided with USB cable. Prepare a USB cable if you intend to use USB connection. The LE2-8V AUX cable provided to the analyzer is available in the case of serial connection.
*2: An interface to read the CF card is required on the PC side.

[Linking multiple analyzers by serial and LAN connections]

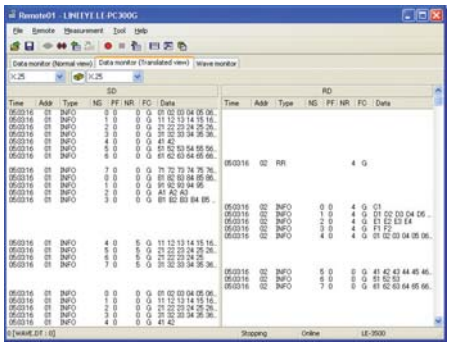


*1: SI-60/SI-60F are LAN-serial converter supported by LE-PC300G/LE-PC800G. Target analyzer is identified by specifying IP adress of SI-60/SI-60F on the remote setting window of LE-PC300G/LE-PC800G.
*2: Optional AUX cable for DSUB 25 pin (LE2-8C). Set the DTE/DCE switch of SI-60 to DTE.

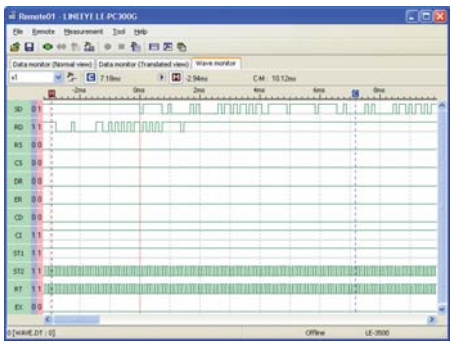
Allows the measurement data to be checked on your large PC screen.



▲ Normal display



▲ HDLC translation display



▲ Logic analyzer display

Records communication logs continuously on PC up to a maximum of 16GB

The remote monitor function allows to record the data measured by an analyzer on the hard disk of PC. The fixed buffer mode and ring buffer mode are available. The former stops recording when the specified data size is reached, and the latter records data endlessly within the limit of the specified size.

[Standard time for continuous recording on hard disk *1]

Target line speed *2	When 1 GB is specified : (e.g.: 1 MB x 1,000 files)	When 16 GB is specified : (e.g.: 8 MB x 2,000 files)
9600bps	Approx. 60 hrs	Approx. 960 hrs
19200bps	Approx. 30 hrs	Approx. 480 hrs
38400bps	Approx. 15 hrs	Approx. 240 hrs

*1: In case of full-duplex communications line for transmission at 1 ms interval per 1 KB.
*2: Maximum communications speed that ensures recording of measurement data without failure will be about 1/5 of serial transfer speed between analyzer and PC.

Converts the recorded data to text format or CSV format all at once

Multiple files of communications logs can be converted to text or CSV format for use on word processor or spreadsheet. Conversion to text is based on the print format of the analyzer. In consideration of analysis on general search tool, it is possible to delete decorative guides or time data, and to specify conversion of sender or receiver data only.

Changes the System Language Automatically

The system language alternates automatically between English and Japanese according to that of OS. This facilitates introduction of the software to development bases outside Japan.

Specification

connection port	Serial, USB, and LAN (with SI-60/SI-60F unit sold separately)	
No. of analyzers	Multiple analyzers can be connected and controlled simultaneously.(No. of connectable analyzers depends on the performance of PC.)	
Key emulation function	Presents the analyzers display on the PC screen to enable control in a manner as if operating the analyzer.	
Measurement condition	Measurement conditions (communications parameters, trigger and simulation data) can be input and edited on the dedicated window on PC screen.	
Remote monitor function	Starts/stops measurement with analyzer, displays the measurement data on PC screen, and records data continuously.	
	Recording modes	Fixed buffer mode (Records data up to the specified size) or ring buffer mode (Records data endlessly while leaving the latest data of the specified size) can be selected.
	Recording capacity	Max. 16 GB can be specified up to 2,000 files in the unit of 1/2/4/8 MB data file.
Display modes	Selectable among raw data, protocol translation and logic analyzer waveform.	
	Raw data	Displays communications data accompanied by idle time, time stamp and line status. Character code (10 kinds) and character size (small/medium/large) can be changed.
	Protocol translation	Translates and displays SDLC, X.25 and LAPD protocols. (Target protocols planned to be increased.)
	Logic analyzer waveform	Enlarges and reduces waveform, measures time between cursors, and rearranges signals.
Display area	Display window size can be changed.	
Character codes	ASCII, EBCDIC, JIS7, JIS8, Baudot, Transcode, IPARS, EBCD, EBCDIK, HEX (including error codes)	
Search function	Finds and displays the data that matches the search key.	
	Search key	Specified data string of max. 8 characters (don't care and bit mask can also be specified), idle time beyond a specified duration, specific time stamp (don't care can also be specified), error (parity, framing, BCC, break/abort, short frame: individual error type can be specified) external trigger matching data
Text-CSV conversion function	Specified number of recorded files can be converted to text or CSV format all together.	
Bitmap conversion function	Analyzers display shown by key emulation can be saved to bitmap files.	
System requirements	PC	PC / AT compatible CPU: Pentium3 1GHz or faster RAM: 256 MB or more (recommended) HDD: 5 MB + free bytes on the measurement data area
	OS	Windows® 2000 / XP / Vista® / 7
Composition	CD (Software) x 1, instruction manual x 1, user registration card x 1	

Analyze CAN/LIN Communications from your PC

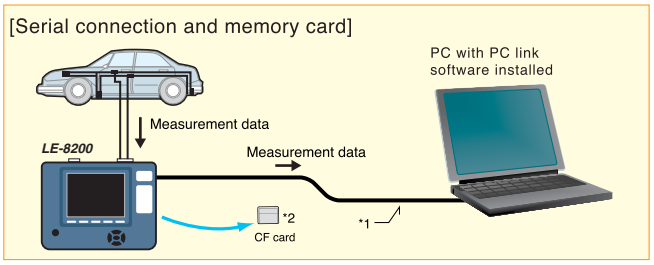
PC link software for CAN/LIN communications
LE-PC87
Applicable Analyzer*1: LE-8200

PC link software for CAN/LIN communications
LE-PC7GX
Applicable Analyzer*2: LE-3500/LE-2500/LE-7200/LE-3200/LE-2200

*1: CAN/LIN communications expansion kit OP-SB87 is required.
*2: CAN/LIN communications expansion kit OP-SB7GX, OP-SB7FX or OP-SB7F is required.

Enables Remote-Control of the Analyzer from Your PC

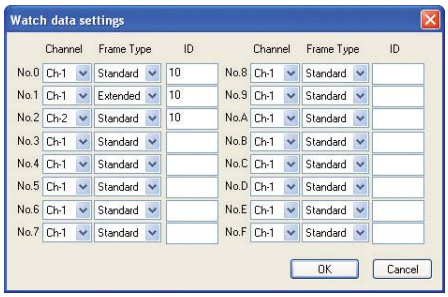
This software links your PC and the analyzer equipped with CAN/LIN communications expansion kit, thus, you can analyze collected CAN/LIN data on your PC. It supports serial connection through the COM port, USB connections, and LAN connections via LINEEYE SI-60 or SI-60F converter. It enables not only the measurement on your desk, but also the remote-access measurement. In addition, you can utilize and convert the data saved in the memory card by this software.



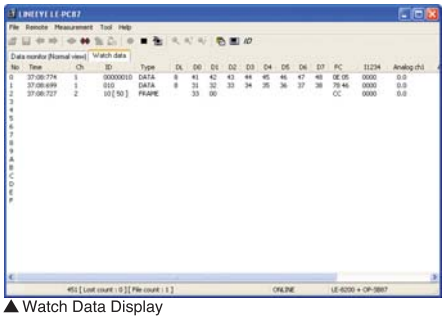
*1: The PC link software is not provided with USB cable. Prepare a USB cable if you intend to use USB connection. The LE2-8V AUX cable provided to the analyzer is available in the case of serial connection.
*2: An interface to read the CF card is required on the PC side.

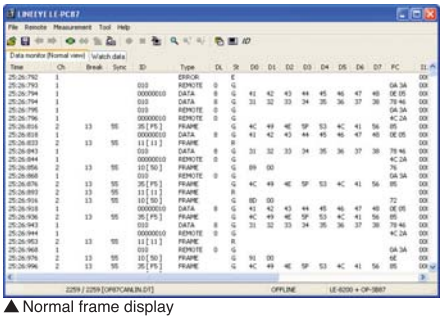
Allows the CAN/LIN data to be checked on your large PC screen.

Watch Data function displays the specific ID frame in the pointed line at real time. It displays only the latest data without stopping the measurement, thus you can monitor its transition continuously. Normal frame display shows CAN/LIN communication frames in order of the data transmitted/ received.



▲ Watch Data Display Settings


▲ Watch Data Display


▲ Normal frame display

Records CAN/LIN communication logs continuously on PC up to a maximum of 16GB

The remote monitor function allows to record the CAN/LIN data measured by ananalyzer on the hard disk of PC.

[Standard time for continuous recording on hard disk]

Target line speed	When 1 GB is specified : (e.g.: 1 MB x 1,000 files)	When 16 GB is specified : (e.g.: 8 MB x 2,000 files)
125Kbps	Approx. 6 hrs	Approx. 96 hrs
1Mbps	Approx. 45 min	Approx. 12 hrs

Changes the System Language Automatically

The system language alternates automatically between English and Japanese according to that of OS. This facilitates introduction of the software to development bases outside of Japan.

Data search and conversion to text/CSV format

It is possible to search not only data but also timestamp and frame of which trigger is generated. It also has the text/CSV conversion function, whitch can convert multiple files of communications log to text or CSV format for use on word processor or spreadsheet.

[Text Conversion Settings]

Specification

Connection port	USB, Serial(RS-232C), LAN (with SI-60/SI-60F unit sold separatly)	
No. of analyzer	Connected with 1 analyzer, with remote control	
Key Emulation Function	Direct operation of analyzer on PC is possible with remote control. Save the screen image in bitmap format.	
Measurement Conditions	It is possible to set and edit the analyzer conditions. (communication conditions, triggers, simulation data)	
Remote Monitor Function *1	Start/stop the measurement. Display the measured data on the PC. Record data (Can be specified up to 2,000 files in units of 1/2/4/8M byte.)	
Normal Frame Display *2	Time stamp (difference of time stamp), CAN/LIN frame display (SynchBreak*3, SynchField*3, ID, TYPE, DLC, DATA0-7, Checksum*3, STATUS), External signal level*4, Trigger	
Watch Data Display	Display the specific ID communication frame (max.16 kinds) overwritten in the specified line in real time.	
Search	Display matched data or count data	
	Conditions	Trigger: Trigger matching point Error: Break, Sync, Parity, Checksum, Framing Data: Specified ID (don't care(*) can be set) Character string (up to 8 characters, don' t care (*), bit mask can be set) CAN remote data : Specified ID (don't care can be set) Time stamp: specific time stamp External signal
Text Conversion	Convert measured file into text or CSV format.	
Memory Card	It is possible to read the measured file on the memory card on the analyzer side	
Environment	PC	PC/AT compatible(DOS/V), HDD: 3MB+free space for saving the measurement data.
	OS	(Japanese/English version) Windows® 2000 / XP / Vista® / 7
Composition	CD(Software), Instruction manual, Warranty	

*1: The communication speed of the target device which can be recorded with the remote monitor without any data loss will differ depending on the connection method of the PC and the analyzer. Use the following as reference

USB connection	Approx. 15000 frames/sec
Serial port direct (115.2Kbps)	Approx. 140 frames/sec
Via SI-60 (230.4Kbps)	Approx. 280 frames/sec

Maximum no. of frames per second which can be recorded without any data loss. Regardless of the communication speed of the target device (even if the speed is 1 Mbps), measurement data can be recorded without any data loss in case intermittent communication does not exceed the number of frames in the table.

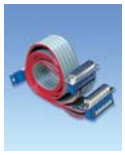
*2: Cannot display in real time. *3: Display only LIN frame. *4: Displayed in digital/analog in OP-SB87/OP-SB7GX. Displayed in digital in OP-SB7FX/OP-SB7F.

Cables / Memory Cards / Printer / Small Options

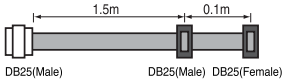
Variety of cables and terminal blocks facilitate the connections.
Memory cards and compact printers help you log the data.

Cables / terminal blocks

Monitor cable for DSUB 25-pin
LE-25M1

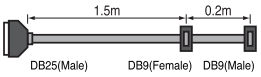


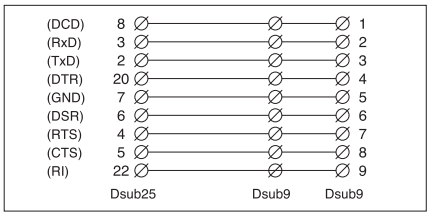
Branch cable for monitoring communication lines over general DSUB 25-pin.
*Same as the cable packed with analyzer.



Monitor cable for DSUB 9-pin
LE-259M1

Branch cable for measuring RS-232C over DSUB 9-pin of PC, etc.





TTL Monitor Probe Pod
OP-5M
Applicable Analyzers: LE-150P

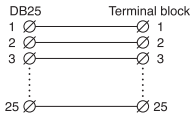
A connection probe for monitoring TTL-level communication lines. Supports TTL-level communication at 2.5, 3.3, and 5V.

Terminal block adapter
LE-5TB
Applicable Analyzer: LE-150P

An adapter to pull out the RS422/485 signal on DB connector to Terminal block.

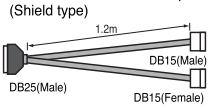
Terminal block for DSUB 25-pin
LE-25TB

Converts analyzer's RS-422/485 port (DSUB 25-pin specification) to terminal block specification.



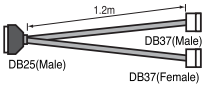
X.21 Monitor cable
LE-25Y15

Branch cable for measuring X.20/21 over DSUB 15-pin. (Shield type)



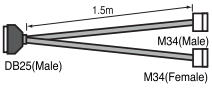
RS-449 Monitor cable
LE-25Y37

Branch cable for measuring RS-449 over DSUB 37-pin. (Shield type)



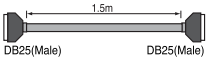
V.35 Monitor cable
LE-25M34

Branch cable for measuring V.35 over M34-pin.



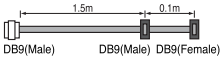
RS-530 cable
LE-25S530

Shield cable for RS-530 interface.



DB9 monitor cable
LE-009M1

Monitor cable for measuring CAN and FlexRay over DSUB 9-pin.
*Same as the cable packed with OP-SB88/OP-SB87/OP-SB7GX.



3 Line probe cable
LE-3LP

Probe cable for measuring LIN and FlexRay signal.
*Same as the cable packed with OP-SB88/OP-SB87/OP-SB7GX.

External signal cable
LE-4TG

Probe cable for inputing/outputing external signal.
*Same as the the cable packed with analyzer.

AUX cable for DSUB 9-pin
LE2-8V

Cable for connecting AUX (RS-232C) port of an analyzer with PC (DSUB 9-pin DTE specification).
*Length:2.5m
*Same as the the cable packed with analyzer.

AUX cable for DSUB 25-pin
LE2-8C

Cable for connecting DSUB 25-pin DTE external device (SI-60) with AUX (RS-232C) port of analyzer.
*Length:1.5m

AUX cable for DPU-414
LE2-8P

Cable for connecting AUX (RS-232C) port of analyzer and serial port of DPU-414 (printer).
*Length:1.5m

USB-Serial(RS-232C) Converter
LE-US232B

A convenient adapter to connect conventional model of analyzer with PC

>>see p.23 for detail

Memory Card / AC Adapter / Battery Pack

16G byte CF card
CF-16GX

16G byte compact flash card, the operation of which has been confirmed on LINEEYE's Analyzers.
Applicable model: LE-8200

8G byte CF card
CF-8GX

8G byte compact flash card, the operation of which has been confirmed on LINEEYE's Analyzers.
Applicable model: LE-8200 and LE-3500

2G byte CF card
CF-2GX

2G byte compact flash card, the operation of which has been confirmed on LINEEYE's Analyzers.
Applicable model : LE-8200, LE-3500 and LE-2500

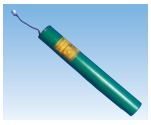
Wide input AC adapter
3A-183WP09

Input : AC100-240V, 50/60Hz
Output : DC9V, 2A
Plug : center ⊕
Applicable model : LE-8200, LE-3500 and LE-2500

Wide input AC adapter
3A-161WP09

Input : AC100-240V, 50/60Hz
Output : DC9V, 1.7A
Plug : center ⊖
Applicable model : see p.19 for detail

NiMH battery pack for replacement
P-20S



Rating: 6V, 2100mAh
Applicable model: LE-8200
*An auxiliary and replacement battery equivalent to the Analyzer built-in battery.

NiMH battery pack for replacement
P-19S

Rating: 4.8V, 1900mAh
Applicable model: LE-3500, LE-2500, LE-7200, LE-3200, LE-2200, LE-1200
*An auxiliary and replacement battery equivalent to the Analyzer built-in battery.

Carrying Bag
LEB-01

Bag with pockets for storing and carrying accessories such as AC adapter, cables, etc.
*Same as the carrying bag packed with analyzer.

Handy thermal printer for on-site printout of measurements

Compact thermal Printer

RoHS Compatible

- Prints 40 digits per line in normal mode and 80 digits in reduced mode.
- Incorporates eco-friendly NiMH battery.
- Supports Centronics parallel and RS-232C ports.
- Dimensions: 160(W)x 170(D)x 67(H)mm
- Weight: Approx. 690g (including built-in NiMH battery)

Compact thermal Printer

DPU-414-41B-E

Built-in battery, dedicated roll paper (x1) included.
*AC adapter and cable are not prepared. Provide them separately.

AC adapter for DPU-414-41B-E

PW-4007-JU1-E

Input: AC100V
Output: DC6.5V, 2A(center⊖)

For use in Japan/US.
For use in other countries, please contact us for more infomation.

Options

Roll paper

TP-411L

Thermal roll paper for DPU-414-41B-E. 10 rolls per carton.
Width: 112mm
Length per roll: Approx. 28m

Battery pack for DPU-414

BP-4005-E

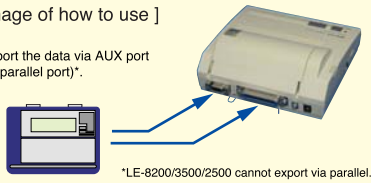
Same as NiMH battery built-in DPU-414-41B-E.
4.8V, 1100mAh

Support all printing formats of the analyzer

Supports all printing formats of the analyzer, such as the hard-copy printing of display, continuous printing of logic analyzer waveform and statistically analyzed graph as well as continuous printing of measurement.

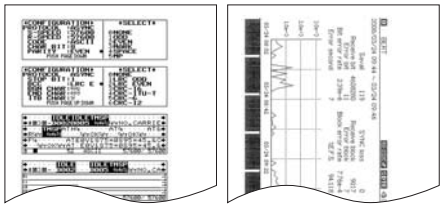
[image of how to use]

Export the data via AUX port (or parallel port)*.



*LE-8200/3500/2500 cannot export via parallel.

[Example of display hard-copy printing]



Accessories for LE-7200/LE-3200/LE-2200/LE-1200 and other old models

TTL/I²C Expansion Kit

OP-SB5F

Composition: Dedicated expansion board, Relay cable, Probe pod

An expansion kit for 3.3/5V TTL level communications which is frequently used between LSI's on the circuit board. It also enables you to analyze I²C and clock synchronous communication.

Infrared Communications Expansion Kit (IrDA, ASK)

OP-SB6F

Composition: Dedicated expansion board, Relay cable, IrDA probe pod

An expansion board and probe pod for Infrared ray communications such as IrDA (SIR/MIR/FIR) and ASK. It's monitoring function supports automatic setting of communication speed according to IrDA protocol.

CAN Communications Expansion Kit

OP-SB7F

Composition: Dedicated expansion board, Firmware CD, DB9 Monitor cable

An expansion kit which enables to analyze CAN (ISO11898/ISO11519-2) that is widely used in automotive and factory automation field. It supports CAN communication analysis at Max. speed 1 Mbps and simultaneous measurement of 2 channels of Devicenet communications data.

CAN/LIN Communications Expansion Kit

OP-SB7FX

Composition: Dedicated expansion board, DB9 Monitor cable, 3-wire probe cable, firmware CD

An expansion kit which supports the analysis of CAN (ISO11898/ISO11519-2) at Max.speed 1 Mbps and also LIN (ISO9141) at Max.speed 20 Kbps. It can measure up to 2 channels of CAN/LIN communications data simultaneously.

PC Link Software for CAN/LIN Data

LE-PC7GX

See P15 for detail.

Firmware for High-speed HDLC mode

OP-FW10

A firmware to upgrade protocol analyzer to dedicated analyzer that is specialized for High-speed HDLC and X.25 up to 10Mbps. It enables the analyzer to extract Synchronizing clock from transmitted/received data. Thus the analyzer can support high-speed RS-485 communications lacking clock signal such as CC-Link.

Adapter for Current Loop

OP-1C

See P12 for detail.

TTL Monitor Probe Pod

OP-5C

Composition: Relay cable, Probe pod

A probe pod which supports 3V/5V TTL level communications at the baud rate up to 115.2Kbps. It is suitable for measurement and testing of UART communications from CPU or LSI on circuit board.

Expansion board

SB-20L

Composition: Dedicated expansion board

*If you use OP-1C on LE-3100 / 2100 / 1100 which equipped with TTL port , you don't need SB-20L.

Expansion board for OP-1C Current Loop Adapter

Print data capturing software

LE-PC100

A software to capture the print data from analyzer to PC through serial port (AUX port). It supports Windows® 2000/XP.

Composition: Software CD, AUX cable (LE2-8V)

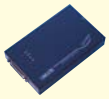
PC Buffering Software

LE-PC200

This software helps you do remote control of the analyzer from your PC and also enables to record communication data continuously to hard disk. It supports Windows® 2000/XP.

Composition: Software CD, AUX cable (LE2-8V)

Comparative Chart of Communications Analyzers

Model		 LE-8200	 LE-3500	 LE-2500	 Discontinued model LE-1200	 LE-150P
Interface	RS-232C	◎	◎	◎	◎	◎
	RS-422/485(RS-530)	◎(*1)	◎(*1)	◎	◎	◎
	RS-422/485 (original alignment)	○[LE-25TB]	○[LE-25TB]	○[LE-25TB]	○[LE-25TB]	○[LE-5TB]
	X.20/21	○[LE-25Y15]	○[LE-25Y15]	○[LE-25Y15]	–	–
	RS-449	○[LE-25Y37]	○[LE-25Y37]	○[LE-25Y37]	–	–
	V.35	○[LE-25M34]	○[LE-25M34]	–	–	–
	Current loop	○[OP-SB85C]	○[OP-1C+SB-25L]	○[OP-1C+SB-25L]	○[OP-1C+SB-20L]	–
	TTL/I²C/SPI	○[OP-SB85L]	○[OP-SB5GL]	○[OP-SB5GL](*2)	○[OP-SB5F](*3)	○[OP-5M](*3)
	Infrared communication	○[OP-SB85IR]	○[OP-SB6G](*4)	○[OP-SB6G](*4)	–	–
	CAN/LIN	○[OP-SB87]	○[OP-SB7GX]	○[OP-SB7GX]	–	–
	FlexRay	○[OP-SB88]	–	–	–	–
	LAN(PoE)	○[OP-SB89]	–	–	–	–
Standard Protocol	ASYNC (Asynchronous)	ASYNC, PPP	ASYNC, PPP	ASYNC, PPP	ASYNC, PPP	ASYNC, PPP
	Character synchronous	SYNC, BSC	SYNC, BSC	SYNC, BSC	–	–
	Bit synchronous	HDLC, SDLC, X.25	HDLC, SDLC, X.25	HDLC, SDLC, X.25	–	–
Capture memory	Memory Capacity(*5)	100MB	6.4MB	2.4MB	1.2MB	256KB(*6)
	Auto backup	◎(*7)	–	–	–	–
	saved by the built-in battery	–	about 5 years	about 5 years	about 30 days	–
Backup memory	saved by the built-in battery	about 10 years	about 5 years	about 5 years	about 30 days	–
Baud rate	Max. speed (Full duplex)	2.150Mbps	1.544Mbps	1.000Mbps	250Kbps	250Kbps
	Max. speed (Half duplex)	4.000Mbps	2.048Mbps	1.000Mbps	250Kbps	250Kbps
	Expansion speed (HDLC mode)	12Mbps(*8)	10Mbps(*9)	–	–	–
	Speed setting range	50～4.000Mbps	50～2.048Mbps	50～1.000Mbps	50～250Kbps	50～250Kbps
	Arbitrary Speed setting (four digits)	◎(*10)	◎(*10)	◎(*10)	◎(*10)	◎
Data Format	NRZ, NRZI, FM0, FM1, 4PPM, ASK	◎	◎	◎	Only NRZ	Only NRZ
Data code	ASCII, EBCDIC, JIS7, JIS8, Baudot, Transcode, IPARS, EBCD, EBCDIK, HEX	◎	◎	◎	◎	◎
Parity bit	NONE, ODD, EVEN, MARK, SPACE	◎	◎	◎	◎	◎
Bit transmission order	LSB first or MSB first (switchable)	◎	◎	◎	◎	◎
Polarity inversion		◎	◎	◎	◎	◎
Error check		◎	◎	◎	◎(*11)	◎(*11)
LED(*12)		11	11	11	8	2
Online monitor functions	Idle time display	min. 1m sec.	min. 1m sec.	min. 1m sec.	min. 1m sec.	1m sec. unit
	Time stamp display	min. 1μ sec.(*13)	min. 10m sec.	min. 10m sec.	min. 10m sec.	min. 10m sec.
	Line status display	7 lines	4 lines	4 lines	4 lines	8 lines
	Two seperated screens	◎	–	–	–	–
	Bit shift display	◎	◎	◎	–	–
Logic analyzer function	Max. sampling clock	40MHz	20MHz	20MHz	20MHz	–
	ONLINE trigger	◎	–	–	–	–
Timer	Number	4	2	2	2	2
Data counter	Number	4	2	2	2	2
Trigger function	Max. No. of trigger condition	8 sets	4 sets	4 sets	4 sets	4 sets
Data search function		◎	◎	◎	◎	◎
Auto run/stop function		◎	◎	◎	◎	–
Auto save function		◎	◎	◎	◎	–
Delay time function		◎	◎	◎	◎	–
Signal voltage measuring function		◎	◎	◎	–	–
Statistical analysis function		◎	◎	–	–	–
BERT (bit error rate test)	Test pattern	14 patterns	11 patterns	11 patterns	11 patterns	–
Simulation function	MANUAL mode	◎	◎	◎	◎	◎
	FLOW mode	◎	◎	◎	◎	–
	ECHO mode	◎	◎	◎	◎	–
	POLLING mode	◎	◎	◎	–	–
	BUFFER mode	◎	◎	–	–	–
	PROGRAM mode	◎	◎	–	–	–
LCD	Display resolution	color 320x240 dots	monochrome 240x64 dots	monochrome 240x64 dots	monochrome 240x64 dots	depend on the PC
	back light	◎ brightness adjustable	◎	–	–	depend on the PC
File management	Max. capacity	CF card 16GB(*14)	CF card 8GB(*14)	CF card 2GB(*14)	CF card 2GB(*14)	PC HDD 8GB
Printout function	Port for printer connection	AUX(RS-232C)	AUX(RS-232C)	AUX(RS-232C)	Centronics 14 pin	–
	File output	◎	◎	◎	–	–
PC Link function	Port for PC connection	USB2.0(High speed), AUX(RS-232C)	USB2.0(Full speed), AUX(RS-232C)	USB2.0(Full speed), AUX(RS-232C)	AUX(RS-232C)	USB2.0(Full speed)
	PC software	○[LE-PC800G]	○[LE-PC300G]	○[LE-PC300G]	○[LE-PC300G]	◎
Power Saving Function	Auto power off	◎	–	–	–	–
	back light	auto dimmer	auto power off	–	–	–
Power supply	AC adapter	3A-183WP09	3A-183WP09	3A-183WP09	3A-161WP09	USB Bus power
	Built-in nickel hydrogen battery	P-20S	P-19S	P-19S	P-19S	
	Battery operating time(*15)	4 hours	8 hours	8 hours	8 hours	
Dimensions(*16)		240×190×48mm	210×154×38mm	210×154×38mm	240×180×39mm	90×150×28mm
Mass		about 1.1kg	about 790g	about 760g	about 940g	about 200g
Accessories		Analyzer etc.(*17)	Analyzer etc.(*18)	Analyzer etc.(*18)	Analyzer etc.(*18)	Analyzer etc.(*19)

◎:Standard equiped function ○:To enable the function, optional accessory described in "[ ]" is required.

*1: By the configuration of analyzer, it can be converted to the port for V.35 which contains the mixture of RS-422 and RS-232C. *2: The measurement of SPI is done by BURST mode, in which all data is imported in synch with clock edge. *3: Measurement of I²C and SPI is not supported. *4: SIR, MIR and FIR of IrDA communications are automatically followed by this function, but measuring performance for MIR and FIR is restricted by speed of the analyzer. *5: Transmission/reception data, idle time, time stamp, line status consume 4 bytes of memory at each capture. *6: When the data transfer from the analyzer to PC encounter a delay, an amount of data up to the capacity of this memory is preserved. *7: At the end of the measurement, this function automatically saves the measurement data in the CF card. *8: To enable the function, a dedicated firmware (OP-FW12G) for HDLC half duplex communications (e.g. CC-Link) is required. *9: To enable the function, a dedicated firmware (OP-FW10G) for HDLC half duplex communications (e.g. CC-Link) is required. *10: You can configure the setting of transmission and reception seperately. *11: Cannot detect the errors which will not occur under ASYNC communications such as abort and short frame. *12: LED of red and green light. At the measurement of RS-232C, it indicates 3 status of ON (red), OFF (green) and NC (off) for each lines of SD, RD, RS(RST), CS(CTS), ER(DTR), DR(DSR), CD(DCD), CI(RI), ST1(TXC1), ST2(TXC2) and RT(RXC). And at the measurement of communications other than RS-232C, it indicates 2 status of ON (red) and OFF (green) for signals of each interface. LE-1200 has no LED for ST1, ST2 and RT. *13: Resolution of time stamps which indicate the elapsed time from the start of measurement. For conventional real-time time stamp, 3 steps of settings are available: "Day/Hr/Min", "Hr/Min/Sec" and "Min/Sec/10ms". *14: Operation is not guaranteed with memory cards not specified by LINEEYE. *15: Under the normal operation. (LCD back light of LE-3500 is turned off.) *16: Any projecting parts like Hand straps are not included in dimensions. *17: DSUB 25-pin Monitor cable x1, Serial AUX cable x1, external signal I/O cable x1, Line state sheet x1, AC adapter x1, carrying bag x1, Hand strap x1, Utility CD x1, instruction manual x1, warranty card x1 *18: Carrying bag x1, DSUB 25-pin Monitor cable x1, Serial AUX cable x1, external signal I/O cable x1, AC adapter x1, Utility CD x1, instruction manual x1, warranty card x1 *19: DSUB 25-pin Monitor cable x1, USB cable x1, Utility CD x1, instruction manual x1, warranty card x1

Options of Communication Analyzer

Options	Model number	LE-8200	LE-3500	LE-2500	LE-1200	LE-150P	LE-7200	LE-3200	LE-2200	LE-7000	LE-3100/ 2100/1100
TTL/I²C/SPI expansion kit	OP-SB85L	○	×	×	×	×	×	×	×	×	×
TTL/I²C/SPI expansion kit	OP-SB5GL	×	○	○*1	×	×	×	×	×	×	×
TTL/I²C expansion kit	OP-SB5F	×	×	×	○*2	×	○	○	○	×	×
TTL monitor probe pod	OP-5M	×	×	×	×	○	×	×	×	×	×
TTL communication probe pod	OP-5C	×	×	×	×	×	×	×	×	×	○
Infrared (IrDA, ASK) expansion kit	OP-SB85IR	○	×	×	×	×	×	×	×	×	×
Infrared (IrDA, ASK) expansion kit	OP-SB6G	×	○	○	×	×	×	×	×	×	×
Infrared (IrDA, ASK) expansion kit	OP-SB6F	×	×	×	×	×	○	○	○	×	×
CAN/LIN expansion kit	OP-SB87	○	×	×	×	×	×	×	×	×	×
CAN/LIN expansion kit	OP-SB7GX	×	○	○	×	×	×	×	×	×	×
CAN/LIN expansion kit	OP-SB7FX	×	×	×	×	×	○	○	○	×	×
CAN expansion kit	OP-SB7F	×	×	×	×	×	○	○	○	×	×
Current loop expansion kit	OP-SB85C	○	×	×	×	×	×	×	×	×	×
Current loop adapter	OP-1C	△*3	△*4	△*4	△*5	×	△*5	△*5	△*5	×	○*6
Exclusive expansion board	SB-25L	×	○	○	×	×	×	×	×	×	×
Exclusive expansion board	SB-20L	×	×	×	○	×	○	○	○	×	×
FlexRay expansion kit	OP-SB88	○	×	×	×	×	×	×	×	×	×
LAN(PoE) expansion kit	OP-SB89	○	×	×	×	×	×	×	×	×	×
Firmware for High-speed HDLC/SPI	OP-FW12G	○	×	×	×	×	×	×	×	×	×
Firmware for High-speed HDLC/SPI	OP-FW10G	×	○	×	×	×	×	×	×	×	×
Firmware for High-speed HDLC	OP-FW10	×	×	×	×	×	○	○	×	×	×
16GB CF card	CF-16GX	○	×	×	×	×	×	×	×	×	×
8GB CF card	CF-8GX	○	○	×	×	×	×	×	×	×	×
2GB CF card	CF-2GX	○	○	○	×	×	×	×	×	×	×
8GB CF card (with PC card adapter)	MC-8GCF	○*7	○*7	×	×	×	○*8	×	×	×	×
2GB CF card (with PC card adapter)	MC-2GCF	○*7	○*7	○*7	○*22	×	○	○*9	○*9	×	×
Monitor cable for RS-232C (DB25)	LE-25M1	○	○	○	○	○	○	○	○	○	○
Monitor cable for RS-232C (DB9)	LE-259M1	○	○	○	○	○	○	○	○	○	○
Terminal block for DSUB 25-pin	LE-25TB	○	○	○	○	×	○	○	○	×	×
Terminal block adapter	LE-5TB	×	×	×	×	○	×	×	×	×	×
X.21 monitor cable	LE-25Y15	○	○	○	×	×	○	○	○	×	×
RS-449 monitor cable	LE-25Y37	○	○	○	×	×	○	○	○	×	×
V.35 monitor cable	LE-25M34	○	○	△*10	×	×	○	○	△*10	×	×
DB9 monitor cable	LE-009M1	△*11	△*12	△*12	×	×	△*13	△*13	△*13	×	△*14
Three-wire probe cable	LE-3LP	△*11	△*12	△*12	×	○	△*15	△*15	△*15	×	×
RS-530 cable	LE-25S530	○	○	○	○	×	○	○	○	×	×
External signal cable	LE-4TG	○	○	○	○	×	○	○	○	×	×
AUX cable for DSUB 9-pin	LE2-8V	○	○	○	○	×	○	○	○	○	○
AUX cable for DSUB 25-pin	LE2-8C	○	○	○	○	×	○	○	○	○	○
AUX cable for DPU-414	LE2-8P	○	○	○	○	×	○	○	○	○	○
PC link software	LE-PC800G	○*16	×	×	×	×	×	×	×	×	×
PC link software	LE-PC300G	×	○*17	○*17	○*17	×	○*17	○*17	○*17	×	×
PC link software for CAN/LIN	LE-PC87	△*18	×	×	×	×	×	×	×	×	×
PC link software for CAN/LIN	LE-PC7GX	×	△*19	△*19	×	×	△*19	△*19	△*19	×	×
Printed data capture software	LE-PC100	—*20	—*20	—*20	—*20	×	—*20	—*20	—*20	○	○
PC buffering software	LE-PC200	×	×	×	×	×	×	×	×	×	○*21
PC buffering software (English)	LE-PC200-E	×	×	×	×	×	×	×	×	×	○*21
Carrying bag	LEB-01	○	○	○	○	×	○	○	○	○	○
Battery pack for replacement	P-20S	○	×	×	×	×	×	×	×	×	×
Battery pack for replacement	P-19S	×	○	○	○	×	○	○	○	×	×
Battery pack for replacement	P-18S	×	×	×	×	×	×	×	×	○	○
Wide input AC adapter	3A-183WP09	○	○	○	×	×	×	×	×	×	×
Wide input AC adapter	3A-161WP09	×	○	○	○	×	○	○	○	○	○*21
AC adapter	VFN-650B	×	×	×	×	×	×	×	×	×	○

*1 : SPI not supported. *2 : I²C not supported. *3 : Expansion Kit(OP-SB85L or OP-SP85IR) is required. *4 : Expansion Board(SB-25L) is required. *5 : Expansion Board(SB-20L) is required. *6 : The communication where current makes Mark condition is not supported. * 7 : CF card is available but PC card adapter attatched to this product is not. *8 : This is supported after the firmware's version 1.04. *9 : This is supported after the firmware's version 1.10. *10 : Control signals of V.35 not supported. *11 : This is an accessory of Expansion Kit(OP-SB87) and available as a spare cable. *12 : This is an accessory of Expansion Kit(OP-SB7G) and available as a spare cable. *13 : This is an accessory of Expansion Kit(OP-SB7F and OP-SB7FX) and available as a spare cable. *14 : This is available with the adapter for RS-422/485(OP-2B(the sale end)). *15 : This is an accessory of Expansion Kit(OP-SB7FX) and available as a spare cable. *16 : This is not available with Expansion Kit or Firmware (OP-SB87,OP-SB88,OP-FW12G). *17 : This is not available with Expansion Kit or Firmware (OP-SB7GX,OP-SB7FX,OP-SB7F,OP-FW10G,OP-FW10). *18 : Expansion Kit(OP-SB87) is required. *19 : Expansion Kit(OP-SB7GX or OP-SB7F or OP-SB7FX) is required. *20 :The analyzer can make the same function alone. *21 : This is available with the products of version A of LE-3100 or LE-2100, which were made after October 2001. *22 : This is supported after the firmware's version 1.12.

LAN Packet Tester Connected to PC

Compact and light weight analyzer used by connecting to USB port of notebook PC.

Software Version Up!

- Long time monitoring for much data
- English or Japanese display can be selected.

Easy to evaluate and test Ethernet network and to analyze Ethernet data via USB port.

LAN Packet Tester

LAN PACKET TESTER

LE-580FX

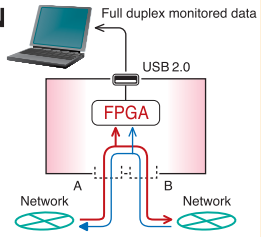
LE-580FX is a test tool for Ethernet network that is controlled by PC via USB2.0 port.
With TAP mode, you can capture full-duplex data on 10/100Base-TX and can transmit it to PC via USB2.0 port (480Mbps).
With PG mode,you can generate traffic of max. at 100 Mbps line-speed.

- Checking LAN protocols and data between the target devices.
- Checking and analyzing the time series change of network traffic.
- Providing statistic information, such as error rate etc.
- Generating test packets for network load test.
- Measuring QoS, such as latency etc.
- Studying or educating network communication protocols.

Functions and Features

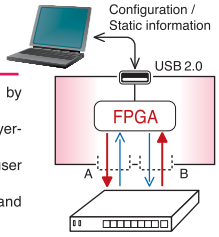
High speed capture of LAN packets Via USB2.0 port

- Filter to capture specific packets in real time
- The high precision measurement packets with the receiving timing per 1μS by the FPGA.
- Directly controlling of this device as a network adapter with a popular LAN analysis software.



Generating packets MAX. at 100Mbps line speed.

- Packet generating by the FPGA not affected by the performance of PC.
- Packet editor is included, that can make Layer-2~7 packets and can add errors to them.
- Generating not only the packets edited by user but also the ones captured from network.
- Measuring QoS, such as transmit rate and latency etc.



Specification

Measurement		2 ports of Ethernet 10Base-T/ 100Base-TX (RJ-45 connector) Auto MDI/MDI-X supported (*1)
PC connection port		USB2.0 High Speed (Mini USB connector)
LED		Display for power ON/OFF, TAP/PG, Link/Tx of PortA/B, Rx/Err of PortA/B,
TAP mode		Capture full-duplex packet data on PortA and PortB. Data will be transmitted to USB2.0 adding the time stamp information etc. (*2) Display the captured packet data (filtering available) (*3) . Display the statistic data of packets (*4) . Save automatically to the specified file (*5). Export to EXCEL format. Save automatically in the Ethereal/Wireshark format(.enc).
PG mode		Generate test packets max. at 100Mbps line-rate from Port A or PortB individually. Set up the transmission type (10/100M, full/half duplex, Auto), transmitting rate, flow control ON/OFF, transmission continuously or selected times (max. 65535), 2 to 7 layer (max. 128 frames (*6) , able to use captured data as transmitting data, select VLAN/MPLS). Add errors (CRC error, Alignment error, Dribble error, IP Checksum error). Transmit test frames (max. 8 frame lines) from PortA(B) to PortB(A). Set up the test time (5-3600s), VLAN tags, line-rate for transmission, bandwidth by pause packets. Measure received line rate, frame loss rate and latency time. Provide trend time chart (color edit available). Display statistic data. Save measured data.
NIC mode		Use PortA or PortB as NIC (Network Interface Card)
Temperature & Humidity		0 to 40°C(operation), -10 to 50°C(storage), Below 85%RH (no condensation)
Power		USB bus power (max.3W) (*7)
Dimension and Weight		95(W)x75(D)x20(H)mm, 180g
Adaptation mark		CE (EMI : Class A)
Operating environment	PC	PC/AT compatible with USB2.0 port. Pentium 4 1.6GHz or more. Memory 256MB or more. HDD capacity 10G or more. (*8)
	OS	Windows® 2000/XP/Vista®
Accessories		Analyzer, Utility CD, USB cable, USB 2way cable, manual, warranty.

*1: Automatically distinguish between cross cable and straight cable.
*2: Time stamp starts after receiving the previous frame. (unit:1μs, max:57 minutes)
*3: LE-580FX captures max. 64-1536 byte of packets in TAP mode includes CRC. (48-2032 byte in PG mode)
*4: Statistic data will not be affected by the performance of PC.
*5: Able to capture max. at 90Mbps in half duplex and 120Mbps in full duplex without any data loss. However, it will be affected by the performance of PC or USB. LE-580FX Window (LE-580FX Window V1.5 or later) captures max. 250,000,000 frames continuously. With different software, it will be different.
*6: LE-580FX Window transmits packets max. at 2004 byte, including CRC.
*7: Use 2way cable if you have power shortage. Provide the power source from 2 USB ports.
*8: It is recommended to have more capacity in HDD to capture large amount of packets.

USB Protocol Analyzer

The LE-620HS and LE-610FS are USB protocol analyzers dedicatedly designed for monitoring and used in connection with the PC through a USB port. It is easy to use them, and they are low price products.

Expandable FPGA Firmware

- Powerful Trigger
- Real-time Filtering
- High-precision(Resolution of 16.7 ns) time measurement
- Display of Communication Speed
- Saving data in binary file

Japanese Version **LE-620HS**
English Version **LE-620HS-E**

High-speed (480 Mbps) Support

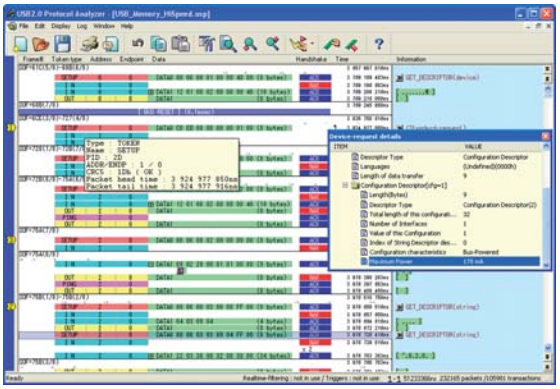
- Max. 480 Mbps support
- Continuous 20 Gbyte recording
- External eight channels of trigger data

Japanese Version **LE-610FS**
English Version **LE-610FS-E**

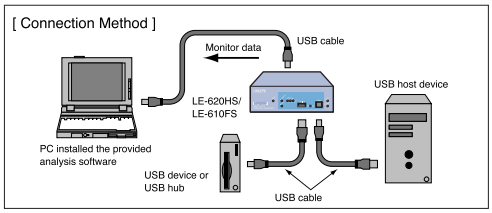
Full-speed (12Mbps) Support

- Max. 12 Mbps support
- Continuous 10 Gbyte recording
- External one channel of trigger data

Clearly Detailed Monitor Display can fully support the analysis of USB communication.



Measurement can start only by pressing the space key of PC, because this device can judge the USB communication speed automatically. USB data is saved to the memory of this device and then it is also saved as measured log files(their size should be previously set from 1 to 2048M bytes) to the HDD of PC that is for analysis. While monitoring, this analyzer does not interfere the USB communications. Furthermore, it is possible to form a ring buffer to record multiple log files continuously by using repetitive recording mode.That is useful for long time measurement. The measurement log data can be displayed per one transaction in detail and scrolled during measurement, which is effective for reducing the time for analysis.

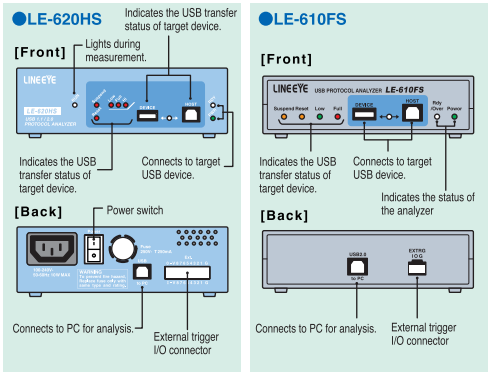


Model	LE-620HS	LE-610FS
Standard	USB 2.0 / 1.1 Max. 480 Mbps HIGH / FULL / LOW Automatically tracking of USB Communication	USB 2.0 / 1.1 Max. 12 Mbps FULL / LOW Automatically tracking of USB Communication
Storage capacity	Capture memory of the device: 256 MB HDD of PC :20GB*1 *1 Log file size(selected from 1 to 2048MB) x 10 files	Capture memory of the device: 16 MB HDD of PC :10GB*2 *2 Log file size(selected from 1 to 2048MB) x 5 files
Displayed packets	SOF, IN, OUT, SETUP, DATA0, DATA1, ACK, NAK, STALL, PRE, DATA2, PING, MDATA, SPLIT, ERR, NYET, and Unknown (undefined).	
Time stamp	High-precision time measurement ON: Resolution of 16.7 ns for 5 hours max. High-precision time measurement OFF: Resolution of 125 μs in USB (micro) frame time units.	
Filter	Particular packets or address end points can be filtering conditions and can make filters for saving or displaying the packets.	
Trigger	Particular kinds of packets or address end points or contents of packets can be the trigger condition. The trigger actions are log start, log stop, and external trigger output. They are up to 16 with sequential action.	
	8-point external trigger input and 8-point external trigger output	1-point external trigger input and 1-point external trigger output
Translate display	Standard request, peculiar device requests to HUB/HID/Audio/Communication/MassStorage/Printer/USBTMC class,standard descriptors, detailed display of descriptors of HUB/HID/Audio/Printer/USBTMC/Communication in each class, detailed display of Mass Storage (SCSI transparent command set, SFF-8070i)/PTP/MPT in selected class	
Other functions	Search, Statistics, Marking jump, Color setup, Saving in binary file	
Save	Saving measured log data or data in text or binary format. Data can be copied and pasted through the clipboard, and saved data can be added with comments.	
Power supply	AC 100 to 240 V (50/60 Hz) at 10 W max.	Bus power (Current consumption: 400 mA max.)
Dimension and Weight	145 (W) x 190 (D) x 45 (H) mm, approx. 950 g	130 (W) x 145 (D) x 38 (H) mm, approx. 300 g
Operating environment	OS:Windows® 2000/XP/Vista®/7 PC:PC/AT compatible with USB2.0 port.	
Accessories	Analyzer, analysis software CD, USB cable (x 2),AC cable, carrying bag, instruction manual, and warranty	Analyzer, analysis software CD, USB cable (x 2), instruction manual, and warranty

About the difference of Software between Japanese version and English version(-E)

Japanese version can operate only in Japanese OS. But English one can operate both in Japanese and English OS. Furthermore It can display English or Japanese in Japanese OS. They are selectable.

Nomenclature



Options

Three-wire Probe Cable
LE-3LP

A cable with IC clip terminals suitable to the external trigger I/O connector of the LE-610FS and LE-150P.

SMD IC Clip with Harness
LE-62BG

A socket with loose wires suitable to the external trigger I/O connector of the LE-620HS. In a set of 2.

Interface Converter
LAN/USB Series

Converts Ethernet LAN and USB connections into FA-compatible RS-232C/RS-422/RS-485 connections.

SI-60F is more Environment-friendly than any Conventional Model

- More compact and energy-saving than any conventional model.
- Accepts a wide range of DC inputs to save power.
- DSUB 9-pin connector

LAN ⇔ Serial conversion type

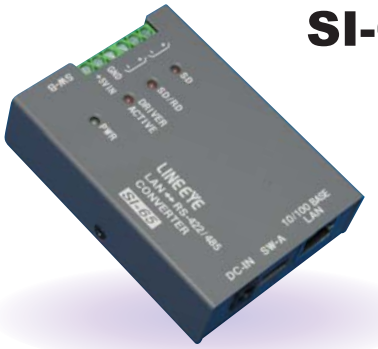
RoHS Compatible

This unit is a LAN serial converter with a built-in Lantronix XPort® in its LAN (Ethernet) interface block. It has a robust metal housing, allows 35-mm DIN track mounting, and operates over a wide temperature range, thus ensuring ease of use for FA applications where high reliability is required.

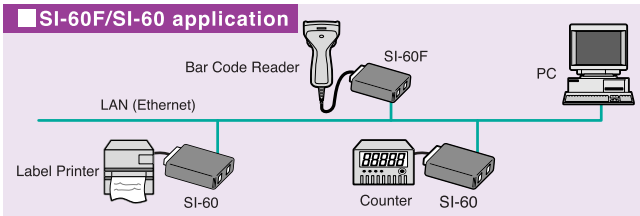
LAN ⇔ RS-232C
SI-60F

LAN ⇔ RS-232C
SI-60

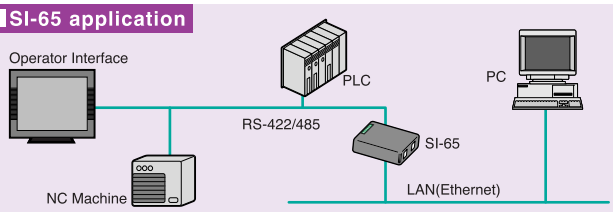
LAN ⇔ RS-422/485
SI-65



SI-60F/SI-60 application



SI-65 application



Model	SI-60F	SI-60	SI-65
Conversion type	LAN ⇔ RS-232C	LAN ⇔ RS-232C	LAN ⇔ RS-422/485
LAN interface	Ethernet (IEEE 802.3) 10Base-T or 100Base-TX (Auto-Sensing) Connector: RJ45		
LAN protocol	TCP/IP, UDP/IP, ARP, ICMP, SNMP, TFTP, Telnet, DHCP, BOOTP, HTTP, Auto IP		
Serial interface	RS-232C DSUB9pin Male (4-40 UNC)	RS-232C DSUB 25pin Female (M2.6)	RS-422/485 6 pole terminal block (press-to-screw pitch type) Fitness wire: AWG24-14/2.5mm²
Serial signal	SD, RD, RTS, CTS, DSR / DTR (*1) DTE type	SD, RD, RTS, CTS, DSR / DTR (*1) DTE/DCE selectable	SD, RD or SD/RD
Communication mode speed	ASYNC, 300bps～921.6kbps	ASYNC, 300bps～230.4kbps	ASYNC, 300bps～921.6kbps
Flow control	Xon/Xoff, RTS/CTS	Xon/Xoff, RTS/CTS	Xon/Xoff
RS-485 state watch	–	–	○ (*2)
RS-485 driver control	–	–	○ (*3)
Initial setting, Management	Internal Web server, serial, Telnet		
Sample software	The transmit and receive program (with the source code) for Windows® 2000/NT/XP/Vista®/7 is the standard attachment.		
Power Supply	Use the included AC adapter, or supplies DC 5V (250mA) to 25V (50mA) from DC-IN.	Use the included AC adapter, or supplies DC 5V to 12V (maximum 300mA) from 9 pin of the DSUB connector.	Use the included AC adapter, or supplies DC 5V to 12V (maximum 300mA) from 6 pin of the terminal block.
Environment in operation	Temperature: -10 ～ 50 ℃ , Humidity: 5 ～ 95%RH	Temperature: -10 to 50°C (*4) , Humidity: 5 to 95%RH	
Dimensions, Weight	58 × 88 × 24mm (W × D × H), about 170g	65 × 95 × 24mm (W × D × H), about 200g	65 × 90 × 24mm (W × D × H), about 200g
Mounting method	Using M3 screw hole in the bottom face, installation to a DIN rail (SI-DIN70 is required.)		
Composition	AC adapter (*5), Utility CD, instruction manual , user registration card		

*1: DSR and DTR are connected inside the unit, whose logic state can be checked with CP1 of the XPort®. *2: The unit detects a state of no data transmission of other devices for the timer period specified by the switch, and notifies CP2 of the XPort® of the state, thus alleviating the communication control load on the LAN. *3: The RS-485 driver IC will be instantly activated at the head of transmission data, and automatically deactivated with the lapse of the timer period specified by the switch once the end of the transmission data string is reached. *4: The operating temperature range specified will be -10°C to +40°C if a voltage of 10 VDC or over is supplied from the DSUB connector (SI-60) or the terminal block (SI-65). *5: The Japanese model is provided with the VFN-650B AC adapter with an input of 100 VAC. The overseas model is provided with the SI-60-E/SI-65-E/SI-60F-E AC adapter(3A-183WP09) with an input range of 100 to 240 VAC.

Options

RoHS Compatible

DIN rail mounting plate
SI-DIN70

Uses for installing 35mm DIN rail.

RS-232C cable
SI-RS259

DSUB9pin Female - DSUB25pin Male
(Straight connection 1.8m)
Uses to connect SI-60(DCE setting) to the serial port of DOS/V computer.

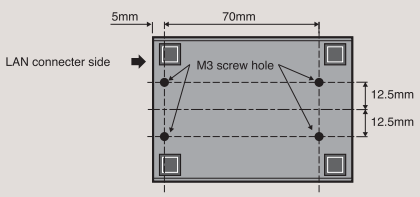
Wide input AC adapter
3A-183WP09

Input: AC100-240V, 50/60Hz
Output: DC9V, 2A
Plug: center + 2.1mm (5.5mm outside)

DC Plug cable
SIH-2PG

Plug: 2.1mm (5.5mm outside) - Y terminal (1.8m)
For the external DC power supply connection to the DC-IN terminal of SI-60F
The cable clamp attachment.

●SI-60F/ SI-60/ SI-65 mounting arrangement It is put, or it is fixed using M3 screw hole in the bottom face.



DIN rail mounting example

USB ⇔ Serial conversion type

RoHS Compatible

3000V High-voltage Resistant Insulation Type

This unit is an interface converter that converts a PC's USB port to an RS-232C, RS-422, or RS-485 port. A photocoupler and an isolation transformer electrically isolate the USB port from the conversion port, which is ideal for FA equipment and medical equipment that require high safety and reliability.

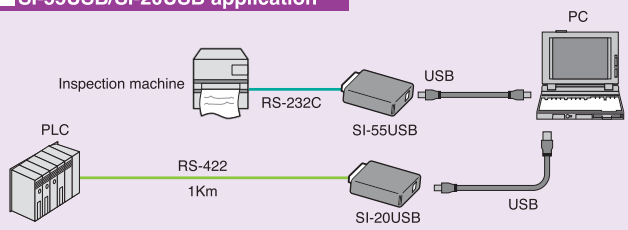
USB ⇔ RS-232C
SI-55USB

USB ⇔ RS-422
SI-20USB

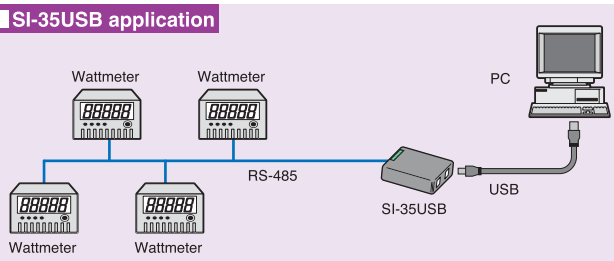
NEW

USB ⇔ RS-422/485
SI-35USB

SI-55USB/SI-20USB application



SI-35USB application



Model	SI-55USB	SI-20USB	SI-35USB
Conversion type	USB ⇔ RS-232C	USB ⇔ RS-422	USB ⇔ RS-422/485
USB interface	USB1.1/2.0 Full Speed compatible B type connector		
LED	TXD, RXD, PWR (Power)		
Serial interface	RS-232C DSUB9pin Male (4-40 UNC)	RS-422 SUB9pin Male (4-40 UNC)	RS-422/485 5 pole terminal block(press-to-screw pitch type) Fitness wire :AWG24-14 (*1)
Serial signal	TXD, RXD, RTS, CTS, DSR, DTR, DCD, RI	TXD, RXD, RTS, CTS	TXD, RXD, TXD/RXD
Communication mode	ASYNC (Asynchronous)		
Speed	300bps～1Mbps(*2)	300bps～3Mbps (*3)	
Character Framing	Data bits [7 or 8] + Parity [Even / Odd / none] + Stop bits [1 / 2]		
Flow control	Xon/off, RTS/CTS (*4) (by Virtual COM Port Drivers)		
Other function	PC COM port compatible	Built-in 120 Ohm termination resistors for RXD / CTS	No-communication state of RS-485 can be watched. (*5) RS-485 driver automatic control (*6)
Power Supply	USB bus powered maximum 270mA	USB bus powered maximum 200mA	USB bus powered maximum 250mA
Temperature/Humidity	In operation:-10 ～ 55°C In storage: −20 ～ 75°C / 10 ～ 90%RH		
Dimensions, Weight	65x95x22mm (WxDxH), about 200g		65x90x22mm (WxDxH), about 200g
Mounting method	Using M3 screw hole in the bottom face, installation to a DIN rail (SI-DIN70 is used.)		
Signal isolation protection	3KV DC isolation protection		
System requirements	USB equipment : PC (PC/AT compatible) OS : Windows® 98/98SE/Me/2000/XP/Vista®/7		
Composition	USB cable (1.8m), CD (USB driver), instruction manual , user registration card		

*1 : Wire range:0.2mm^2 to 2.5mm^2 *2 : Speed is established in an application software.*3 : Speed is established in an application software. Certain speed beyond 1.2Mbps can't be established.*4 : RTS/CTS is utilized, when the transmit timing is controlled using RS-485 state monitoring system. *5 : It is notified in CTS signal of the Virtual COM Port, when designated non-communication period was detected. By this, communication control processing in the PC side is simplified. *6 : Only when sending, RS-485 driver IC can be activated.

Options

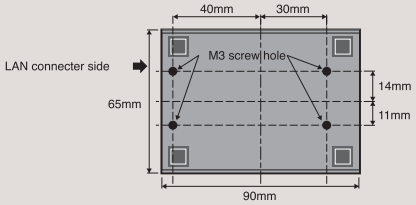
RoHS Compatible

DIN rail mounting plate
SI-DIN70
Uses for installing 35mm DIN rail.

RS-232C cable
SI-RS259
DSUB9pin Female - DSUB25pin Male
(Straight connection 1.8m).

●SI-55USB/ SI-20USB/ SI-35USB mounting arrangement

It is put, or it is fixed using M3 screw hole in the bottom face.



DIN rail mounting example

USB ⇔ Serial Converter
Non-isolation model

RoHS Compatible

USB ⇔ RS-232C
LE-US232B

LE-US232B is USB-RS232C conversion cable of the non-isolation specification. It is optimum for the connection between note PC without the serial port and RS-232C equipment.

- ●Uses latest FTDI chip set and drivers for maximum compatibility.
- ●Enhanced RS232 port gives serial port speed of up to 460.8K bps.
- ●Side-lit blue RX and TX traffic LED indicators.
- ●RS-232 signals: TXD, RXD, RTS, CTS, DSR, DTR, DCD, RI are supported perfectly.
- ●OS:Windows® 98/Me/2000/XP/Vista®/7

See more information in the Web page

http://www.lineeye.com

If you need each product catalog, please contact us.

Environmental Activities

To conserve the global environment, LINEEYE CO., LTD. is focusing its effort on reducing environmental impact.
ISO 14001(Year 2004)Certification Registration in May 31, 2005.

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For you to use the products for a long period of time, we provide a repair service and product parts supply.

[Technical Support]

We wil answer your questions via e-mail, FAX or TEL. Also, we put FAQ in our web page.

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* LINEEYE CO., LTD. is a venture company founded by electronic equipment development members of the former Sekisui Chemical Co., Ltd. with investment from the Sekisui Venture Fund.

Tohmatsu QMS, EMS QR−00337 ER−00094

MS JAB CM037

PRINTED WITH SOY INK

Printed in Japan

M-10C01E/LE