LINEEYE®

*Fully supports the development, testing and maintenance of communications equipment and information systems to help you make the jump to Information Technology.*

# Portable Communication Analyzer Series

Multi-protocol support

**MULTI PROTOCOL ANALYZER**

- **LE-7200** NEW Firmware | 2Mbps | 11.6MB
- **LE-3200** NEW Firmware | 1Mbps | 3.6MB
- **LE-2200** NEW Firmware | 500Kbps | 1.2MB

For asynchronous communications

**COMPACT PROTOCOL ANALYZER**

- **LE-1200** NEW | 250Kbps | 1.2KB

## High Performance Portable Communications Analyzers Capable of Mega-speed Measurement and Long Recording

## New Lineup



**SPEED** [ ] :Half-duplex communication

2Mbps (4Mbps)
1Mbps (1.5Mbps)
500Kbps (1Mbps)
250Kbps (250Kbps)

Sufficient 250 Kbps | 1.2 MB memory | Interface board interchangeability | 512 MB CF card support

**NEW COMPACT PROTOCOL ANALYZER LE-1200**

Entry model designed specifically for asynchronous communications. Good balance of required measuring functions and cost-performance.

High-speed 500 Kbps | 1.2 MB memory | Interface board interchangeability | 1 GB CF card support

**NEW Firmware MULTI PROTOCOL ANALYZER LE-2200**

High cost-performance model with multi-protocol and multi-interface support.

Powerful 1 Mbps | 3.6 MB memory | Interface board interchangeability | 1 GB CF card support

**NEW Firmware MULTI PROTOCOL ANALYZER LE-3200**

Super standard model for mega-speed measurement. Features large capacity internal memory and built-in simulation capabilities.

Perfect 2 Mbps | 11.6 MB memory | Interface board interchangeability | 1" HDD card support

**NEW Firmware MULTI PROTOCOL ANALYZER LE-7200**

High speed, high-end model of overflowing performance including program simulation and long recording by 6 GB HDD support.

For ASYNC exclusive use (Async, PPP) | Multi Protocol (Async, Sync, BSC, SDLC, HDLC, X25, PPP, I²C, IrDA, CAN, LIN, .... )

# Portable Communication Analyzer Series

## MULTI PROTOCOL ANALYZER — Multi-protocol support

## LE-7200 / LE-3200 / LE-2200

In today's ubiquitous society, there is great need for a compact portable communication analyzer that can easily measure the multiple protocols used in accordance with applications and systems in the field.
Since the first model was launched in 1986, the LINE EYE Protocol Analyzer Series has continually evolved, reflecting customer opinion and demand.

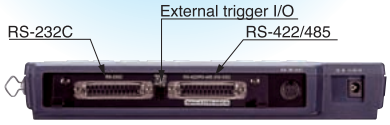
Now, there is a new lineup with even further polished analytical capabilities for working with multiple protocols and offering the same ease-of-use found on predecessor models.
This new series of compact portable analyzers is the powerful backup that the developers and the technicians need in communication network testing of the Information Technology age.

## Multi-protocol support

### Multi-protocol support is provided as a standard feature

LE-7200/LE-3200/LE-2200 come standards with measurement interfaces for the RS-232C (V.24) and RS-422/485 (RS-530) standards. X.21, RS-449 and V.35(*) require only a dedicated cable.

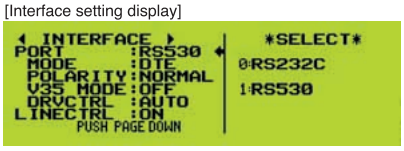
* LE-2200 does not support V.35 control signals.




Simply pull out the interface board from the measurement unit and replace it with an expansion board for another protocol.

[Protocol setting display]


[Interface setting display]




### Expansion Kits Broaden the Range of Use

Protocols of differing hardware specifications are supported by simply changing the measurement boards.

**TTL , I²C** — Expansion kit **OP-SB5F**

**IrDA** — Expansion kit **OP-SB6F**

**RS-422/485 easy connection** — Dedicated cables & Terminal block


**CAN** — Expansion kit **OP-SB7F**

**CAN , LIN** — Expansion kit **OP-SB7FX**

**CC-Link** — Expansion kit **OP-FW10**


CE

## Auto Save...Long Recording Time

### Gigabytes of Continuous Recording by Auto Save

Automatically save content of the capture memory on a microdrive (1" HDD card) or high capacity compact flash (CF) card. Auto Save continuously saves data into the measurement log of a user-specified file size, using ring recording as long as the card has space. It is useful for identifying rare communication failures of unknown cause.

Built-in memory card (PC card) interface

6 GB microdrive **MC-6GH**

1 GB CF card **MC-1GCF**

| Target line speed (bps) | Continuous recording time reference (LE-7200) | | |
|---|---|---|---|
| | Main memory only | When using MC-1GCF | When using MC-6GH |
| 9600 | Approx. 40 min | Approx. 60 hrs | Approx. 360 hrs |
| 115.2K | Approx. 200 sec | Approx. 5 hrs | Approx. 30 hrs |
| 1M | Approx. 26 sec | Approx. 38 min | Approx. 3.5 hrs |

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

*These instruments are necessary tools for stepping into the Information Technology age, as they can be used for a variety of ways from development and testing of complicated high-speed communications systems and equipment to communications network maintenance.*

## Upgraded Firmware !

◎Expands memory card support

| LE-7200 | LE-3200 , LE-2200 |
|---|---|
| 4 G byte → 6 G byte | 512 M byte → 1 G byte |

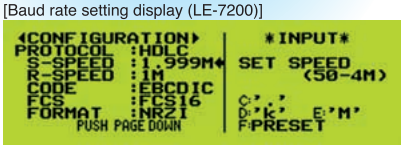
## Mega Speed Measurement

### Seamlessly Measures Mega Speed Communications

Analysis is possible at any baud rate(*) from low speed to high speed.
Margin tests on communication speed deviation are simple.

*Using high precision DPLL technology for open baud rate support, transmission and reception speeds can be separately set to an effective 4 digits. (Error: within ± 0.01 %)

[Baud rate setting display (LE-7200)]



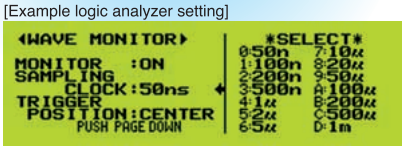


## Logic Analyzer Display

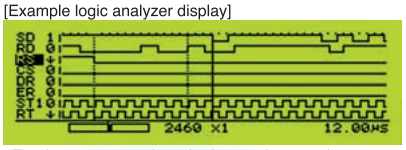
### Analyzes Timing Trouble in Bits

Communication line timing is analyzed and displayed as a logic analyzer display to a time resolution of max. 50 ns. This function helps to identify the problems with hardware. Also, you can use it as educational use, comparing documents for communications protocol.

[Example logic analyzer setting]




[Example logic analyzer display]



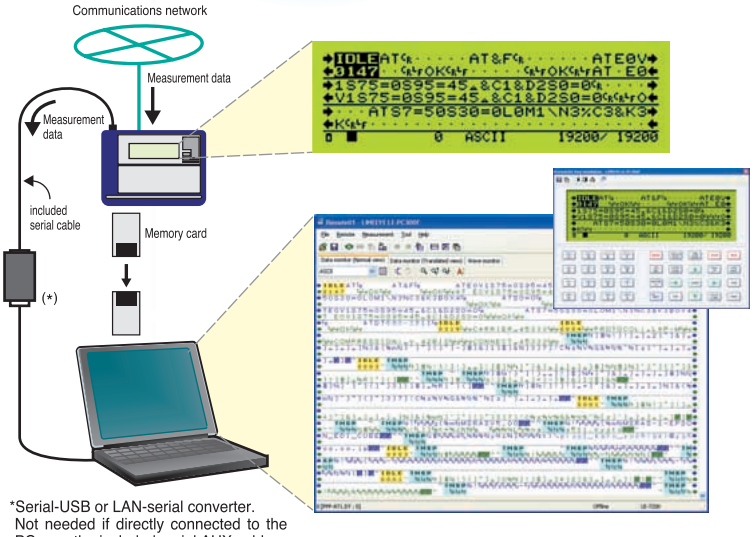

* Time between cursors determined as 12 microseconds.

## PC Link

### Use Measurement Data on PC via Dedicated Application

Manipulate measurement data on your own PC. Measurement files saved on memory card can be loaded into a PC.(*)
Also, with the optional PC link software, you can operate the PC from remote, continuously recording the measurement log in the PC and display data onto a large screen for easy viewing. The opportunities for application are as endless as the PC.

*Comes with software (DOS prompt version) for converting measurement log files into text format. Windows version includes it as one of the features of the optional PC link software.




*Serial-USB or LAN-serial converter.
Not needed if directly connected to the PC over the included serial AUX cable.

**MULTI PROTOCOL ANALYZER**

# LE-7200

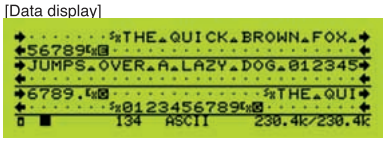
●240 (W) x 180 (D) x 39 (H) mm , Approx. 950 g

# Online Monitoring

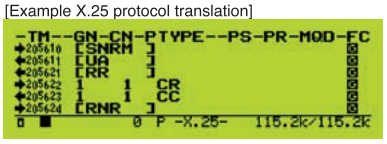
## Supports multi-protocols

The online monitor feature records communications data in the capture memory and provides an easy-to-understand display for the type of protocol, without affecting the communications line. As a standard feature, LINE EYE protocol analyzers support various communications standards from asynchronous to packet switching systems. Depending on the test, you can select bit transfer sequence and polarity, as well as modulation format from NRZ, NRZI, FMO, FM1 and 4PPM. The feature allows to support effective analysis by omitting SYN codes and using SDLC/HDLC address filter.

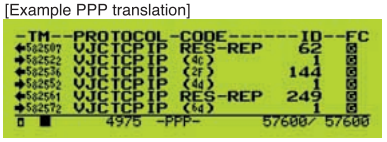
[Data display]




[Example X.25 protocol translation]



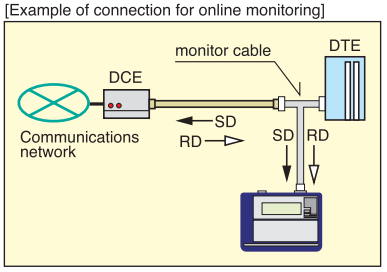

[Example PPP translation]




Line state LED


Communications line state is indicated in real time using 2-color LEDs

[Example of connection for online monitoring]



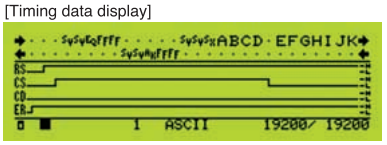

## Records Time Data with Communication Data

LINE EYE protocol analyzers record not only communications data but the time (time stamp) of transmissions and receptions as well as idle time; therefore failure time and timeout status can be checked. It is also possible to record the information of changes in control lines at the same time.

[Example record data selection]


[Time stamp / idle time display]

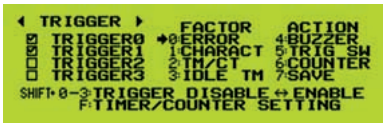

[Timing data display]



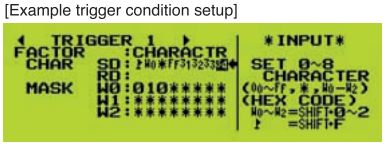

## Trigger Feature for Catching User-specified Events

The trigger feature allows you to specify a communications event as the trigger condition and have measurement operations executed automatically when that condition is satisfied. Up to four pairs of conditions and operations can be set, which is helpful towards identifying frequent intermittent faults that occurs with communications systems. And, the operation of a trigger condition can be specified as the condition for another trigger, making it possible to analyze complicated operations based on sequential triggers.

[Trigger setup summary display]




[Example trigger condition setup]




[Example trigger action setup ]

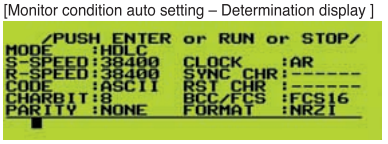

## Monitor Condition Auto Setting

LINE EYE protocol analyzers can analyze communications data and automatically set basic measuring conditions, such as communications speed, character framing, data code, synchronization character, BCC/FCS, etc. This is effective for monitoring lines of unknown communications conditions.

*The auto setting is not accurate with small volumes of communications data or data that contains many errors.

[Monitor condition auto setting – Search display]

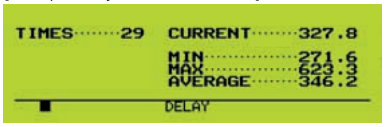

[Monitor condition auto setting – Determination display ]




## Delay Timer Measurement

You can measure the minimum, maximum and average time (0.1 ms resolution) required for a specified signal to change status, as well as the number of changes in signal status. This is useful for analyzing RTS-CTS delay on control lines.

[Example delay time measurement ]

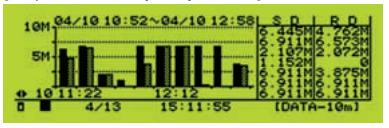



## Statistical Analysis Capabilities

Only for LE-3200 and LE-7200

Statistics can be compiled for transmission and reception data sets, frames and the number of established trigger events, and subsequently displayed as a graph (Unit: 1-240 min.). This helps to understand communications traffic and error frequency for a specific time period.

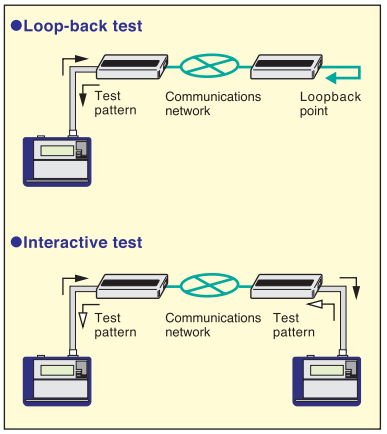
[Graph of statistically analyzed data]




# BERT (Bit Error Rate Test)

BERT support enables you to measure transmission quality of communications lines by a loop-back or interactive connection. It is possible to measure evaluation parameters (bit error count, block error count) conforming to ITU-T G.821 Notification, hence enabling bit error rate evaluations and fault point identification. Elaborate test patterns and functions such as bit error forced interrupt are comparable to dedicated equipment.

[Example connection for BERT]




Evaluation is possible in ASYNC or SYNC mode, by specifying measurement period (continuous, received bits, duration) or test pattern.

[BERT setting display]


Once started, the results of measured line quality are displayed and updated in real time.

[Example BERT measurement]


[Contents of BERT measurement]

| | | |
|---|---|---|
| Savail | Available measurement in seconds | 0~9999999 |
| R-Bit | Effective bits received | 0~9999999~9.99E9 |
| E-Bit | Error bit count | 0~9999999~9.99E9 |
| Bit-ER | Bit error rate | 0~9.99E-9~1 |
| E-Sec | Error in seconds | 0~9999 |

| | | |
|---|---|---|
| Loss | SYNC loss count | 0~9999999 |
| R-Blk | Block error count | 0~9999999~9.99E9 |
| E-Blk | Block error rate | 0~9999999~9.99E9 |
| Blk-ER | Effective blocks received | 0~9.99E-9~1 |
| %E.F.S | Normal operation rate | 0.000~100.000% |


Example of connecting RS-485 signals via optional terminal block (LE-25TB) for a DSUB 25-pin connector.

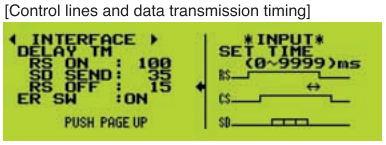
# MULTI PROTOCOL ANALYZER
## *LE-7200 / LE-3200 / LE-2200*

# *Online Monitoring, Simulation and BERT Support All-in-One*

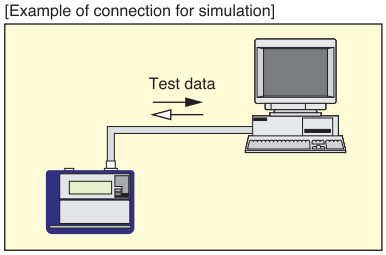
## Simulations

With the simulation feature, the LINE EYE protocol analyzers act as the counterpart to the target device and perform transmission and reception tests according to protocol. Even in the early stages of development when matching devices are not available, tests can be run at near to actual operating status. After checking the communications protocol step by step in LINE EYE analyzer's own original MANUAL mode, a developer can create a simple program to branch conditions using menu selection and test more complicated communications protocols. Communications speed can be freely set; therefore margins can be evaluated by intentionally shifting communications speed, and error response processing can be checked using test data that mixes in data with parity errors.
In addition, data transmission can be linked with the changes in the signal lines such as RTS and CTS at the preset timing.

[Control lines and data transmission timing]




[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 set with one press of a key. While checking replies from a unit under development with the monitoring feature, you can easily and simply test the communications process. You can also send fixed data by registering it under a key combination of the SHIFT and "0" to "D" keys, as well as turn RTS/CTS and DTR/DCD signal lines on/off with the SHIFT and "E"/"F" key combinations.

[Transmission table setup display]


### FLOW mode

Flow control can be simulated on the transmission and reception-lines using X-on/off flow control or the control line handshake. In the transmission mode, up to 16 cycles of data from transmission start until a generated interrupt request can be displayed. In the reception mode, you can set the number of received data cycles until a transmission interrupt request is generated, as well as the time until the transmission resume request is generated.

[FLOW mode setup display]


### ECHO mode

In the ECHO mode, LINE EYE protocol analyzers internally return received data in units of bits, bytes or frames (character string). It is used to test display terminals and communications terminals, and to set loopback points for the BERT feature.

### POLLING mode

Only for LE-2200, LE-3200 and LE-7200

The POLLING mode simulates the slave and master units in multidrop (1:N connection) polling protocols. In the slave mode, the LINE EYE protocol analyzers check the number of received frames that are assigned their address and whether errors occur or not, replying with user-set data. In the master mode, they send polling messages to 32 slave units, and check and display replies from each slave.

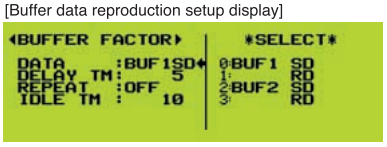
[Polling setup display]


### BUFFER mode

Only for LE-3200 and LE-7200

In the BUFFER mode, you can select between transmission and reception, and send transmitted or received 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.

[Buffer data reproduction setup display]

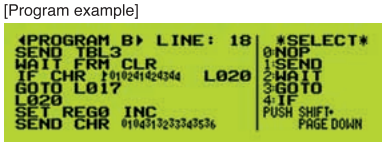



### PROGRAM mode

Only for LE-3200 and LE-7200

By creating a purpose-specific command program, the communications protocol can be flexibly simulated alongside condition monitoring. The program is created using the menu selection, so it is easy to master.

[Program example]




[PROGRAM mode commands]

| Command | Operation |
|---|---|
| SEND CHR □□□□□□□□ | Sends max. 8 data sets. |
| SEND REG □ | Sends data registered in transmission table under specified REG No. |
| WAIT CHR □□□□□□□□ | Waits until receiving specified data (max. 8 data sets). |
| WAIT FRM | Waits until receiving 1 frame. |
| WAIT TM □□□□ | Waits for specified amount of time. |
| GOTO L□□□ | Jumps to specified label No. |
| CALL L□□□ | Jumps to subroutine of specified label No. |
| IF CHR □□□□□□□□ L□□□ | Branches if specified data in reception buffer. |
| IF LN □=□ L□□□ | Branches if interface line is specified logic. |
| SET REG □ □□□□□□ | Sets or increases/decreases value of specified REG No. |
| SET TM □ □□□□□□ | Controls specified timer and sets to specified value. |
| INT TRG 0 L□□□ | Interrupts specified label when trigger 0 condition is satisfied. |

# Easy-to-Use Handy Functions Continue to Evolve

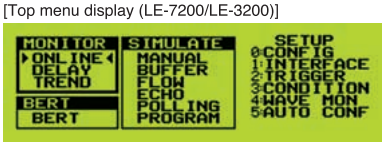
## Firmware That Evolves

The latest firmware with additional functions and improvements can be found on our website. If you download it with your PC, you can then update to the latest version via a serial cable.

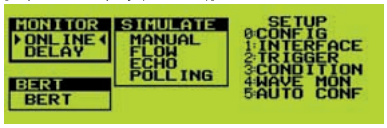
## Menu-based Simple Operation

Anyone can easily use LINE EYE protocol analyzers owing to the easy menu selection system handed down from earlier models.

[Top menu display (LE-7200/LE-3200)]




[Top menu display (LE-2200)]



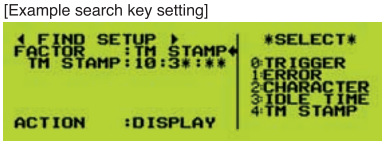

A backlit LCD makes it easy to view measurement data at night and in dark places. (LE-7200, LE-3200)

## Offline Analysis and Data Searches

Measurement data displays can be freely scrolled and paged. A powerful search feature allows you to locate specific data and perform counting

| | |
|---|---|
| Search key | Communications error (individual error type can be specified), communications 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), external trigger matching data |
| Search operations | Find and display, counting |

[Example search key setting]




Using "don't care (*)", you can search for time stamp data from 10:30:00 to 10:39:59 as in this example.

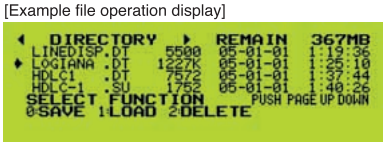
## PC-compatible File Management Specification

Test conditions and results such as measured data can be saved on microdrives, compact flash cards and other memory cards in the file management format compatible with your PC. Of course, files can be interchangeably used between models. Therefore, measurement data can be saved on-site with the LE-2200, and analyzed or manipulated in greater detail using the LE-7200 back in the office.

* Interchangeable use of card files is supported between the LE-7200, LE-3200, LE-2200 and LE-1200.

Types, names, sizes and the date/time of files saved in the memory card can be checked.

[Example file operation display]




When many files have been saved, the file filter feature allows you to specify the type of file to be displayed.

[File filter setup display]


## Auto RUN/STOP for Unmanned Measurement

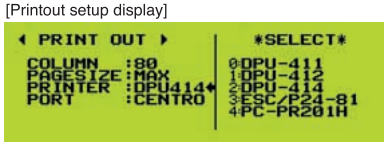
By setting time and a date of measurement start and end, measurement can be done automatically during the specified time period. For example, measurement only for 3 hours from 18:00 to 21:00 every day is possible. Besides, if the power ON auto run function is used, unmanned measurement can be started automatically without pressing the RUN key after turning power ON.

[Example auto run display]

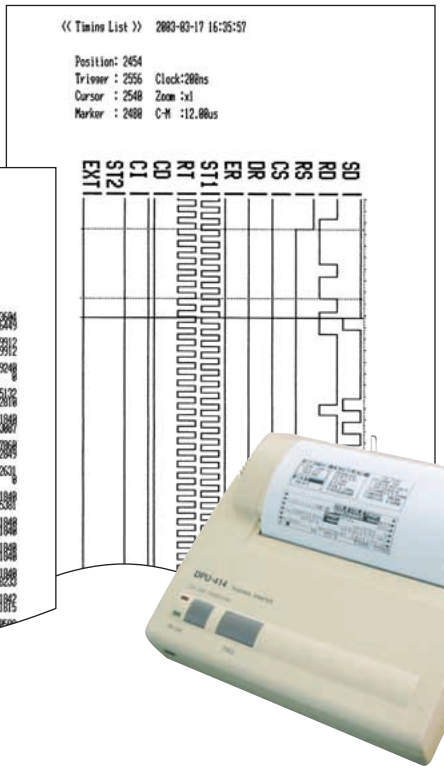

## Various Print Formats

Measurement data of a user-specified range can be printed out continuously from any printer, in the text format that corresponds to the display mode. And, with a dedicated printer, you can print hardcopy of display images, continuous images of logic analyzer waveforms, and results of statistical analysis.

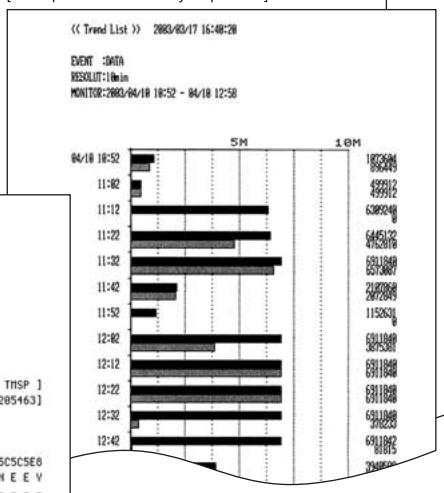
[Printout setup display]



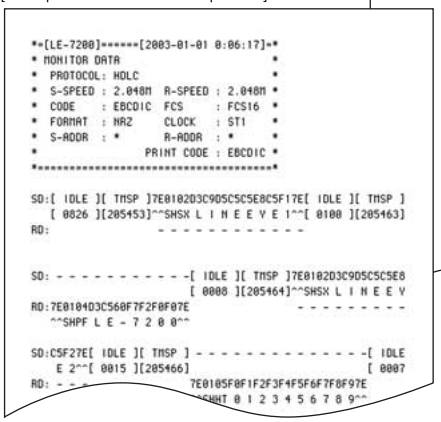

[Example logic analyzer waveform printout]




[Example statistical analysis printout]




[Example measurement data printout]




Dedicated printer (DPU-414-CA)

# Portable Communication Analyzer Series

## COMPACT PROTOCOL ANALYZER For asynchronous communications

## NEW LE-1200

Entry model designed specifically for asynchronous communications. Good balance of required measurement functions and cost-performance. Can easily measure PPP (Point to Point Protocol) over an Internet connection from the field site or anywhere.

**RS-232C/422/485 support (Standard feature)**

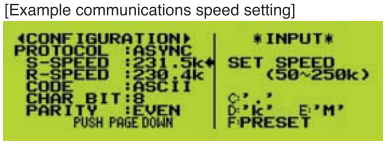
**Arbitrary speed setting to 4 effective digits**

**512 MB CF card support**


### Supports Measurements of a Max. 250 Kbps

Regardless of trigger setting or other test conditions, LE-1200 assuredly monitors and records full-duplex data communications of a max. 250 Kbps in real time. Recording is made into the buffer memory of the analyzer.

[Example communications speed setting]




### Interface Expansion by Board Exchange

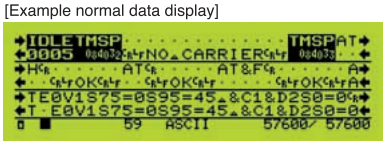
RS-232C and RS-422/485 support comes as a standard feature. Using a dedicated expansion board helps you test 3V/5V TTL level (*) or current loop communications.

*:TTL level asynchronous communications (microcomputers or communications LSI asynchronous serial boards, etc.) are supported but not I²C or clock-synchronized communications.

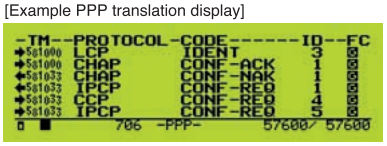
### Displays for Easier Understanding of Communications Data

Communications data across the target line is displayed in real time with idle time and time stamps. Also, one press of a key switches to a translation display of PPP and BSC.

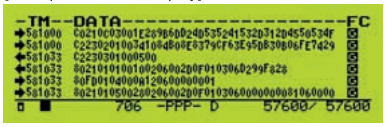
[Example normal data display]




[Example PPP translation display]




[Example PPP data display]




### User-friendly Simulation Capabilities

LE-1200 comes with simulation capabilities that offer 3 modes (MANUAL/FLOW/ECHO) easy to be used in communications test at the initial stage of development.

### BERT Functions for Measuring Line Error Rate

With BERT(Bit Error Rate Test) functions that comply with ITU-T G.821 Notification, you can evaluate quality of communication lines. They are helpful in measuring error rate in communications lines that include modems and terminal adapters, as well as in identifying failure points.

### Memory Card Interface

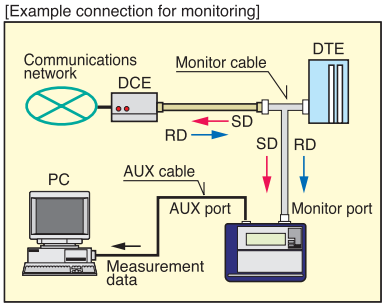
LE-1200 supports 512 MB CF cards. Cards can be used to save measurement data and test settings. They are very useful when using the auto save function that saves measurement data continuously to files of the specified size during monitoring.

[Buffer memory setting display]


### Measurement Linked with PC

LE-1200 is provided with utility software that converts the measurement data to a text file for use on PC. Optional PC link software (LE-PC300F) further enhances the measurement and analysis capabilities linked with PC.

[Example connection for monitoring]




### Battery Drive in B5 Size and Just 940 g

Possible to carry LE-1200 in the included carrying bag. And, battery drive is possible for places where AC supplies are unavailable, so there is no need to worry where you go.

### Upgraded from Predecessor Model

With the easy-to-operate menu-driven display same as before, LE-1200 has been upgraded significantly, compared with the predecessor model for asynchronous communications.

[Top menu display]

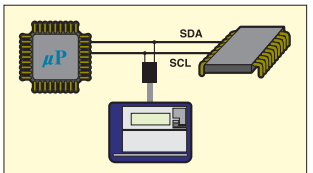

| Model | | LE-1200 | LE-1100 (Predecessor model) |
|---|---|---|---|
| Measurement interface | Standard | RS-2332C, RS-422/485 | RS-2332C |
| | Option | TTL, current loop | RS-422/485, TTL, current loop |
| Capture memory | | 1.2 MB | 192 KB |
| Baud rate | | 50 bps ~ 250 Kbps (Arbitrary setting possible) | 50 bps ~ 115.2 Kbps (33 steps) |
| Time measurement | Idle time | OFF/100ms/10ms/1ms (switchable) | OFF/100ms/10ms (switchable) |
| | Time stamp | OFF, [Day/Hr/Min], [Hr/Min/Sec], [Min/Sec/10ms] | OFF, [Day/Hr/Min], [Hr/Min/Sec] |
| Logic analyzer functions | | Max. 20 MHz sampling, trigger, cursor time measurement, zoom in/out | Not available |
| Trigger function | | Sequential action | Single action |
| Max. memory card capacity | | 512 MB (Dedicated CF card) | 1 MB (Dedicated SRAM card) |

# Expansion Kits for Wider Range of Use

## For I²C development ....

Expansion board with probe pod for monitoring I²C and clock-synchronized TTL level communications. Ideal for on-board probing connections for monitoring communications between LSIs.
It is also possible to input/output data by using the analyzer as a slave or master.

[Example I²C monitor display]


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

TTL, I²C expansion kit

### OP-SB5F

Applicable models : LE-7200 / LE-3200 / LE-2200 / LE-1200 (I²C not available)

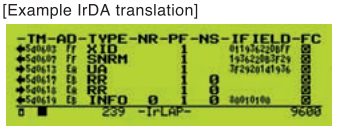
| | |
|---|---|
| Interface | RS-232C, TTL, I²C |
| Probe signal | SD (SDA), RD, RS, CS, EXIN, SDCLK (SCL), RDCLK, Trigger IN, Trigger OUT [Lead length: 170mm] |
| Protocol | I²C, Clock SYNC (*1) |
| Function | Monitor/Simulation/BERT(*2) |
| Speed (I²C test) | 100 Kbps, 400 Kbps, 1 Mbps |
| Input impedance | 100KΩ Vin max. ± 25V |
| Input level threshold | High: Min. 2.2 V, Low: Max. 0.9V |
| Output level voltage | High: 3.0V, 4.5V, without pull-up (*3): Low: Max. 0.5V |
| Composition | Dedicated expansion board, relay cable, probe pod |

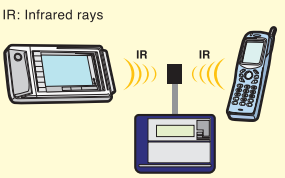
*1 : Mode for sampling data at all clock edges. *2 : I²C BERT testing not supported. *3:Set from analyzer.

## For Evaluation of Infrared Communications ....

Expansion board with probe pod for monitoring IrDA (SIR, MIR, FIR) and ASK infrared communications. Supports automatic setting of communication speed according to IrDA protocol. Even when the mode changes from SIR (9600 bps) to FIR (4 Mbps) during communications, the flow of IrDA procedure can be monitored continuously.

[Example IrDA translation]




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

Expansion kit for infrared communications (IrDA, ASK)

### OP-SB6F

Applicable models : LE-7200 / LE-3200 / LE-2200

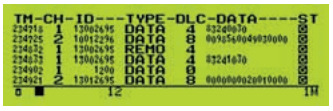
| | |
|---|---|
| Interface | RS-232C, IR |
| Measurement signal | SD,RD |
| Protocol | IrDA1.1(SIR/MIR/FIR),ASK |
| Baud rate (bps) | 2400, 9600, 19.2K, 38.4K, 57.6K, 115.2K, 0.576M, 1.152M, 4M (*1) Automatically detects and follows IrLAP protocol. |
| Function | Monitor/Simulation/BERT (*2) |
| Photodiode / LED | HSDL-3602 or equivalent |
| Output emission level | High/low interchangeable (*3) |
| Composition | Dedicated expansion board, relay cable, probe pod |

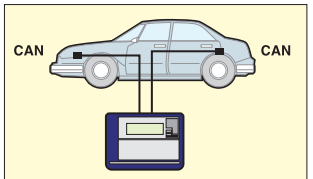
*1 : Restricted by analyzer performance. *2 : I²C BERT testing not supported. *3 : Set from analyzer.

## For CAN monitoring ....

Includes expansion board and firmware for CAN communications widely used in automotive and factory automation fields. It allows CAN data (conforming to ISO11898/ISO115119-2) to be monitored at 2 channels simultaneously.

[Example CAN display]




*CAN is the communications protocol for in-vehicle network developed by Robert Bosch GmbH.

Expansion kit for CAN communications

### OP-SB7F

Applicable models : LE-7200 / LE-3200 / LE-2200

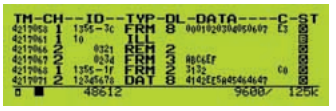
| | |
|---|---|
| Interface | Supports ISO 11898/ISO 11519-2 (*1) D-SUB 9-pin connector |
| CAN transceiver | TJA1050/1054 or equivalent |
| No. of measurement channels | 2 channels |
| Protocol | CAN, Device Net |
| Baud rate (bps) | Max. 1 Mbps (*2) |
| Function | Monitor/Simulation |
| Time stamp measurement | Min. 1 ms |
| Composition | Dedicated expansion board, CAN monitor cable, firmware CD |

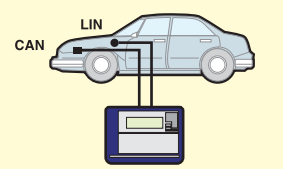
*1 : Set by relay. *2 : Restricted by analyzer performance.

## For CAN and LIN testing ....

Includes expansion board and firmware for CAN and LIN communications mainly used for in-vehicle network. It enables monitoring of CAN and LIN data in any combination up to 2 channels at a time. Suitable for evaluation of mixed in-vehicle networks of CAN and LIN.

[Example CAN / LIN display]




*LIN (Local Inter Connect Network) is communications protocol for in-vehicle network proposed by automobile manufacturers in Europe.

Expansion kit for CAN/LIN communications

### OP-SB7FX

**Due for release in July 2005**

Applicable models : LE-7200 / LE-3200 / LE-2200

| | |
|---|---|
| Interface | CAN : Supports ISO 11898/ISO 11519-2 (*1) / D-SUB 9-pin connector x 2<br>LIN : Supports ISO 9141 Header 3-pin connector x 2 |
| CAN transceiver | CAN : TJA1050/1054 or equivalent LIN: L9637D or equivalent |
| No. of measurement channels | Max. 2 channels |
| Protocol | CAN, Device Net, LIN (Rev. 1.1, 1.2, 1.3, 2.0) |
| Baud rate (bps) | CAN : Max. 1 Mbps (*2) LIN: Max. 20 Kbps |
| Function | Monitor/Simulation |
| Time stamp measurement | Min. 1ms |
| Composition | Dedicated expansion board, CAN monitor cable, 3-wire probe cable, firmware CD |

*1 : Set by relay. *2 : Restricted by analyzer performance.

## For CC-Link Measurement ....

Firmware for speeding up HDLC measurement to 10 Mbps for CC-link, etc

Firmware for High-speed HDLC mode

### OP-FW10

Applicable models : LE-7200 / LE-3200

| | |
|---|---|
| Protocol | SDLC, HDLC, X.25, (NRZ, NRZI)<br>* Synchronizing clock extracted from transmitted/received data. |
| Baud rate (bps) | Half-duplex: 115.2K – 10M Full-duplex: 115.2K – 5M |
| Error check | FCS error (CRC-ITU-T), abort, short frame |
| Time stamp | 6 digits (0 - 524287) Resolution: 1ms / 100μs / 10μs / 1μs (selectable) |
| ID filter | Specified address frame (16-bit length, don't care and bit mask available) |
| Trigger function | Communications error, specified data string 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. |
| Composition | Firmware CD, instruction manual |

## For Current Loop Communications ....

Adapter for current loop

### OP-1B

Expansion board

### SB-20L

Adapter for current loop communications widely used in factory automation fields

Applicable models : LE-7200/LE-3200/LE-2200/LE-1200

| | |
|---|---|
| Measurement signal | SD, RD |
| Baud rate (bps) | Max. 38.4 K |
| Current | 10~60 mA |
| Function | Monitor/Simulation |
| DIP switch | Polarity: Normal/inverted |
| Power supply | Supplied from the analyzer main unit |
| Outer dimensions/weight(OP-1B) | 60 (W) x 100 (D) x 20 (H) mm, approx. 180g |
| Composition (OP-1B) | Adapter main unit, relay cable |

OP-1B and SB-20L must be used as a set.

Note) The dedicated expansion board that come with OP-SB5F or OP-SB6F may be used in place of SB-20L. If you already have these expansion kits, SB-20L is not required.

# LE-PC300F Enhances the Link between Analyzers and your PC

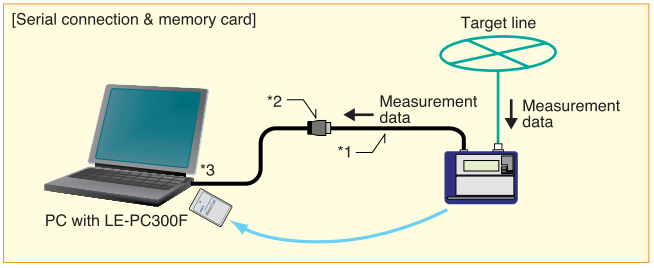
NEW

*PC link software*

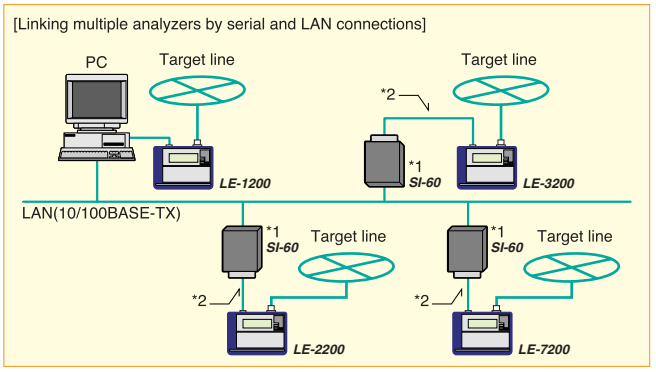
# LE-PC300F

## Enables simultaneous control of multiple analyzers from a PC

LE-PC300F supports serial connection via COM port and LAN connection via LINEEYE SI-60 converter, thus enabling remote measurement by multiple analyzers connected at the same time. It also allows you to browse measurement data saved in memory card and convert data.



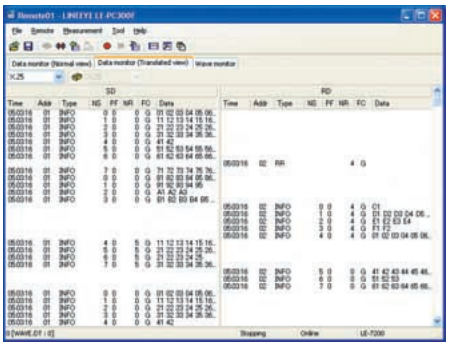

*1: AUX cable (LE2-8V) that comes with the analyzer.
*2: Serial-USB converter (LE-US232B). To be used if the PC has no COM port or if the performance of COM port is so poor as to cause data receiving errors. Not required when connecting to the COM port directly.
*3: PC must be provided with interface for PC or CF card.



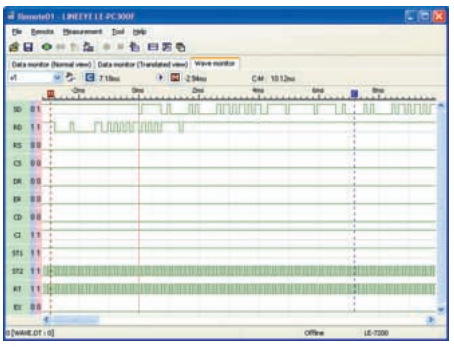

*1: SI-60 is a LAN-serial converter supported by LE-PC300F. Target analyzer is identified by specifying IP address of SI-60 on the remote setting window of LE-PC300F.
*2: Optional AUX cable for DSUB 25-pin (LE2-8C). Set the DTE/DCE switch of SI-60 to DTE.

## 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) |
|---|---|---|
| 9600 bps | Approx. 60 hrs | Approx. 960 hrs |
| 19200 bps | Approx. 30 hrs | Approx. 480 hrs |
| 38400 bps | 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 1/4 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.

## LE-PC300F Specifications

| | | |
|---|---|---|
| Applicable analyzers | LE-7200, LE-3200, LE-2200, LE-1200 | |
| Analyzer connection | Serial or LAN connections (Supports the LAN-serial converters SI-60 and FA-11.) | |
| No. of analyzers to be connected | Multiple analyzers can be connected and controlled simultaneously.(No. of connectable analyzers depends on the performance of PC.) | |
| Key emulation function | Presents the analyzer's display on the PC screen to enable control in a manner as if operating the analyzer. | |
| Measurement condition setting | 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 (in hexadecimal 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 | Analyzer's 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 |
| | O S | Windows® 98 / 98SE / Me / 2000 / XP |
| Composition | CD (Software) x 1, instruction manual x 1, user registration card x 1 | |

## Recommended Kits

LAN-serial converter
### SI-60

Used to connect an analyzer to a PC via LAN.

AUX cable for D-SUB 25-pin connector
### LE2-8C

Used to connect an analyzer and SI-60.

Serial-USB converter
### LE-US232B

Used to connect a laptop PC having no serial port and an analyzer.

# LINE EYE Series Specifications

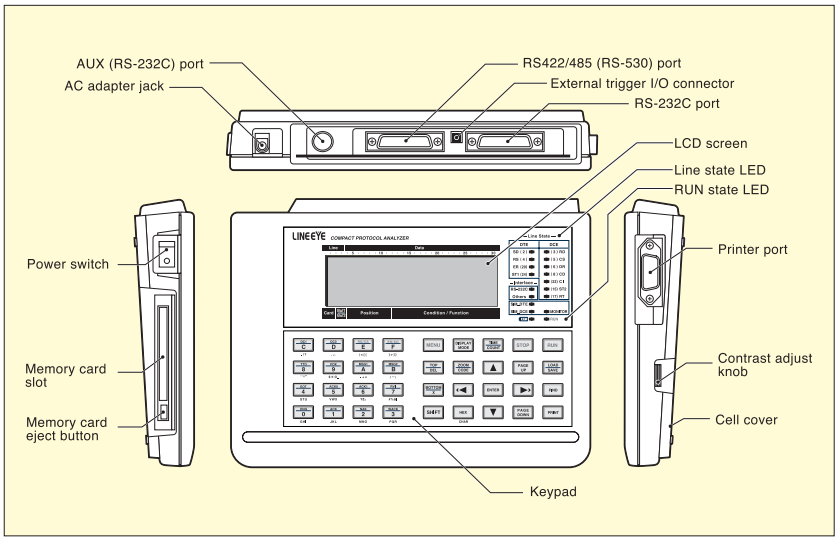
| Model | | LE-7200 | LE-3200 | LE-2200 | LE-1200 |
|---|---|---|---|---|---|
| Interface | RS-232C (V.24) | ◎ (*1) | ◎ (*1) | ◎ (*1) | ◎ (*1) |
| | RS-422/485 (RS-530) | ◎ (*2) | ◎ (*2) | ◎ (*2) | ◎ (*2) |
| | X.20/21 | ○[LE-25F15] | ○[LE-25F15] | ○[LE-25F15] | Not supported |
| | RS-449 | ○[LE-25F37] | ○[LE-25F37] | ○[LE-25F37] | Not supported |
| | V.35 | ○[LE-25M34] | ○[LE-25M34] | ○[LE-25M34] (*3) | Not supported |
| | Current loop | ○[OP-1B+SB-20L] | ○[OP-1B+SB-20L] | ○[OP-1B+SB-20L] | ○[OP-1B+SB-20L] |
| | 3V/5V TTL | ○[OP-SB5F] | ○[OP-SB5F] | ○[OP-SB5F] | ○[OP-SB5F] |
| | 3V/5V $I^2C$ | ○[OP-SB5F] | ○[OP-SB5F] | ○[OP-SB5F] | Not supported |
| | Infrared communications IrDA, ASK | ○[OP-SB6F] | ○[OP-SB6F] | ○[OP-SB6F] | Not supported |
| | CAN | ○[OP-SB7F] | ○[OP-SB7F] | ○[OP-SB7F] | Not supported |
| | CAN/LIN | ○[OP-SB7FX] | ○[OP-SB7FX] | ○[OP-SB7FX] | Not supported |
| | High-speed RS-485/CC-link | ○[OP-FW10+ LE-25TB] | ○[OP-FW10+ LE-25TB] | Not supported | |
| Standard protocol | Asynchronous: ASYNC, PPP | ◎ | ◎ | ◎ | ◎ |
| | Character synchronous: SYNC, BSC | ◎ | ◎ | ◎ | Not supported |
| | Bit-oriented synchronous: HDLC,SDLC, X.25 | ◎ | ◎ | ◎ | Not supported |
| | For expansion: $I^2C$, IrDA, BURST (*4) | ◎ | ◎ | ◎ | Not supported |
| | Synchronous clock | Transmission/reception clock (ST1, ST2, RT), extraction clock AR (*5) | | | Not supported |
| Capture memory | Memory capacity (*6) | 11.6 MB | 3.6 MB | 1.2 MB | 1.2 MB |
| | Battery backup | Approx. 5 years | Approx. 5 years | Approx. 30 days | Approx. 30 days |
| | Added functions | Two divided areas, data protection, and selection between fixed-size buffer and ring buffer | | | |
| Baud rate | Max. speed (full-duplex) | 2.048 Mbps | 1.000 Mbps | 500 Kbps | 250 Kbps |
| | Max. speed (half-duplex) | 4.000 Mbps (*7) | 1.544 Mbps | 1.000 Mbps | 250 Kbps |
| | Speed setting range | 50 – 4.000 Mbps | 50 – 1.544 Mbps | 50 – 1.000 Mbps | 50 - 250 Kbps |
| | Speed setting step, accuracy | Freely set to four effective digits, separately for transmission and reception.(Margin of error: ± 0.01% or less) | | | |
| Data format | | NRZ, NRZI, FM0, FM1, 4PPM, ASK | | | NRZ |
| Data code | | ASCII, EBCDIC, JIS7, JIS8, Baudot, Transcode, IPARS, EBCD, EBCDIK, HEX | | | |
| Character framing | Asynchronous | Data bit (5, 6, 7, 8) + parity bit (0, 1) + stop bit (1, 2) | | | |
| | Character synchronous | Data bit + parity bit (6 or 8 bits in total) | | | Not supported |
| | Bit-oriented synchronous | Data bit (8 bits) | | | Not supported |
| Parity bit and multi-processor bit | | None, Odd, Even, Mark, Space, MP (Multi-processor bit: Shown with a special mark) | | | |
| Bit transmission order | | LSB first or MSB first (switchable) | | | |
| Polarity inversion | | Normal or Inverted (switchable) | | | |
| Error check | For all protocols | Parity (odd, even, mark, space), framing, break, BCC (LRC, CRC-6, CRC-12, CRC-16, CRC-32, CRC-ITU-T) | | | |
| | For bit-oriented synchronous protocol | Abort, short frame | | | Not supported |
| Online monitor functions | Communications mode | Supports half-duplex and full-duplex communications. | | | |
| | Idle time display | OFF (No recording); Resolution: 1ms / 10ms / 100ms; Max. 999.9 s | | | |
| | Time stamp display | OFF (No recording), unit selectable among “Day / Hr / Min”, “Hr / Min / Sec” and “Min / Sec / 10ms”. | | | |
| | Line status display | Records and displays the waveforms of 4 signals (chosen from RS, CS, ER, DR, CD, CI, EXIN) along with transmitted/received data. | | | |
| Data display/operations | | Pause in capture, scroll, paging, jump to the specified screen. | | | |
| Bit shift in SYNC | | Entire frame can be shifted to the right or left in 1 bit increments. | | | Not available |
| Data search function | Search condition | Communications error (Parity, MP, framing, BCC, break, abort (*8), short frame (*8)can be specified individually.), communications data string up to 8 characters (don’t care and bit mask available), idle time more than the specified duration, specified time stamp (don’t care available), trigger matching data | | | |
| | Search action | Shows the match data at the top or enumeration display (selectable) | | | |
| Protocol translation display | | SDLC (modulo 8/128) translation, ITU-T X.25 (modulo 8/128) translation, LAPD translation, PPP translation, BSC translation, IrLAP translation, $I^2C$ translation | | | PPP translation, BSC translation |
| Line status LED (2-color LED) | Target signals | SD, RD, RS, CS, ER, DR, CD, CI, ST1, ST2, RT | | | Same as left (ST1, ST2 and RT excluded) |
| | RS-232C | Indicates the logic of signals with 3 modes: ON (red), OFF (green) and NC (unlit). | | | |
| | Other interface | Indicates the logic of signals with 2 modes: ON (red) and OFF or NC (unlit). | | | |
| Timer | Interval timer | 2 kinds; Max. count: 999999 (Resolution selectable from among 1ms/10ms/100ms). | | | |
| Counter | General-purpose counter | 2 kinds; Max. count: 999999 | | | |
| | Data counter | For SD and RD (1 each); max. count: 4294967295 | | | |
| Trigger functions | Simultaneous detection conditions | Up to 4 pairs of trigger condition and action can be specified. (Sequential action, which validates another condition after one condition satisfied, is also possible.) | | | |
| | Trigger condition | Communications error (Parity, MP, framing, BCC, break, abort (*8), short frame (*8)can be specified individually.), communications data string up to 8 characters (don’t care and bit mask available), idle time more than the specified duration, match time/counter value, logic status of interface signal line, external trigger input | | | |
| | Trigger action | Stops measurement/test (offset can be set), validates trigger condition; controls timer (start/stop/restart), controls counter (count/clear), activates buzzer, saves monitor data on a memory card, sends the specified character string (during manual simulation). | | | |
| | External trigger output | Sends pulse to external signal when condition satisfied. | | | |
| Monitor condition auto setting | | Measurement conditions such as protocol, transmission speed, (max. 115.2 Kbps), data code, synchronous character and BCC check can be set. | | | |
| Auto run/stop function | | Enables measurement to start and end at the specified time at the selected repeating cycle (monthly, daily, hourly). | | | |
| Power ON auto run function | | Enables measurement to start automatically after power is turned ON. | | | |
| Auto save function | Specification | Automatically saves the contents of capture memory during monitoring as communications log file on the memory card. | | | |
| | File size | BUF (capture memory size), 1 MB, 2 MB, 4 MB, 8 MB | | | |
| | Max. files | 1024 | 512 | | |
| Delay time function | | Measures and displays the interval of change in the interface signal line.(Resolution: 0.1 ms) | | | |
| Statistical analysis function | | Takes statistics and displays graphs of transmitted/received data count, number of frames, and satisfied trigger condition count. | | Not available | |
| Logic analyzer functions | Sampling clock | 1 kHz - 20 MHz (14 steps) | | | |
| | Sampling memory | Min. 2,000 | | | |
| | Trigger condition | Logical status match between communications signal line and external signal | | | |
| | Trigger position | Before, center, after | | | |
| | Zoom in/out | x16, x8, x4, x2, x1, x1/2, x1/4, x1/8, x1/16, x1/32, x1/64 | | | |
| | Other functions | Time measurement by cursor, signal line exchange, signal status search | | | |

| Model | | LE-7200 | LE-3200 | LE-2200 | LE-1200 |
|---|---|---|---|---|---|
| BERT (bit error rate test) | Specification | Measurers error rate conforming to ITU-T Notification G.821 by loop-back test or interactive test. | | | |
| | Communications mode | Synchronous (SYNC) or asynchronous (ASYNC) | | | Asynchronous (ASYNC) |
| | Max. speed | 2.500Mbps | 1.544Mbps | 1.000Mbps | 250Kbps |
| | Test pattern | $2^6$-1 , $2^9$-1 , $2^{11}$-1 , MARK , SPACE , ALT , DBL-ALT , 1in4 , 1in8 , 1in16 , 3in24 | | | |
| | Error bit insertion | Inserts 1-bit or 5-bit error in test pattern by key operation. | | | |
| | Measurement range | Effective received bits (0~9999999~9.99E9), bit errors (0~9999999~9.99E9), bit error rate (0~9.99E-9~1), block errors (0~9999999~9.99E9), block error rate (0~9.99E-9~1), Savail (available measurement time: 0~9999999 s), loss count (sync loss: 0~9999), error duration (0~9999), %EFS (normal operation rate: 0.000~100.000%) | | | |
| Simulation function | Specification | Enables transmission/reception test of any given data in DTE or DCE mode (selectable with pin assignments). | | | |
| | Transmission data entry | Can be registered in 16 types of transmission data table. (Total of 16K data) | | | |
| | Error data entry | A part of transmission data can be registered as error data such as parity error. | | | |
| | Line control mode | Auto (Controls transmission timing with RS, CS, ER and CD signal lines automatically in 1 ms increments) or manual (key operation) can be selected. | | | |
| | Transmission driver control | Auto control (Turns ON driver only before and after data transmission) or manual mode (link with ER/CD operation) can be selected during simulation of RS-485. | | | |
| MANUAL mode (Manual test) | | Sends the data assigned to operation keys each time a key is pressed, while checking communications status on the display. Can be used together with the trigger function. | | | |
| FLOW mode (Flow control test) | | Simulates the X-on/X-off control data and flow control procedures of RTS/CTS control lines. (Sender and receiver selectable) | | | |
| ECHO mode (Echo test) | | Sends the received data frame by frame after the specified response time. | | | |
| POLLING mode (Multi-polling test) | | Simulates multi-polling communications procedures. (Sender and receiver selectable) | | | Not available |
| BUFFER mode (Buffer transmission test) | | Reproduces transmission of selected data (SD or RD) captured in memory by monitor function. | | Not available | |
| PROGRAM mode (Program simulation) | | Creates a simulation program (Max. steps: 512) according to the protocol using dedicated commands (36 types) to test transmission and reception. | | Not available | |
| File management function | File types | Measurement data (.DT), trigger save data (TG SAVEnn.DT), auto save data (#nnnnnnn.DT), measurement condition (.SU), transmitted data for simulation (.ST), simulation program (.SP) | | | |
| | File operations | Normal file display, file display by specified type, save, load, delete, format | | | |
| Display | Monochrome LCD 240 x 64 dot | With back-light | | Without back-light | |
| Memory card | Max. capacity | 6 GB (*9) | 1 GB (*9) | 1 GB (*9) | 512 MB |
| interface | Memory card types (*10) | HDD, PC, CF | PC, CF | PC, CF | PC, CF |
| AUX (RS-232C) port | Connector | Mini DIN 8-pin | | | |
| | Communications speed | 9,600 bps ~ 230.4 Kbps (6 steps) | | | |
| | I/O functions | Printout, data I/O, firmware update | | | |
| | PC link (*11) | ○[LE-PC300], [LE-PC300F] | | | ○[LE-PC300F] |
| Printer port | Connector | Centronics 14-pin | | | |
| | Print function | LCD screen hardcopy, measurement data continuous printout | | | |
| Power supply | AC adapter | 100~240 V AC, 50/60 Hz | | | |
| | Built-in secondary battery | Nickel metal-hydride battery (Model: P-19S) | | | |
| | Battery operating time | Approx. 8 hrs (*12) | Approx. 8 hrs (*12) | Approx. 8 hrs | Approx. 8 hrs |
| | Charging time | Approx. 2.5 hrs | Approx. 2.5 hrs | Approx. 2.5 hrs | Approx. 2.5 hrs |
| Dimensions and mass | | 39 (H) x 240 (W) x 180 (D) mm, approx. 950 g | | 39 (H) x 240 (W) x 180 (D) mm, approx. 940 g | |
| Accessories | | Monitor cable for DSUB 25-pin (LE-25M1), AUX cable for DSUB 9-pin (LE2-8V), external signal I/O cable, AC adapter, carrying bag, Utility CD, instruction manual(*13) and warranty | | | |

◎: Standard support. ○: Supported with option product in [ ].

*1: Monitor cable LE259M1 (option) is required if the target model has DSUB 9-pin connector. *2: LE-25TB terminal block for DSUB 25-pin (option) is required if the target model has RS-422/485 connector or terminal block of unique assignments. *3: V.35 control signal lines are not supported. *4: Mode in which all data is imported in synch with clock edge. *5: Synchronous clock extracted from edge of transmission/reception data. *6: Transmission/reception data, idle time, time stamp, and line status consume 4 bytes of memory at each capture. *7: 3.5 Mbps if continuous data exceeds 1200 bytes. *8: LE-1200 does not support abort and short frame. *9: Supported by firmware Ver.1.04 or later (Ver. 1.03 or earlier version supports 4 GB for LE-7200 and 12 MB for LE-3200/LE-2200.) *10: Operation is not guaranteed with memory cards not specified by LINE EYE. *11: DOS-based tool for capturing print data and converting memory card data to text data is included in the utility CD. *12: When LCD back-light is OFF. *13: An English manual is provided by putting -E behind the model name when placing the order.

## Part Names



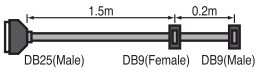

## Standard Set

- Portable communication analyzer ····· 1
- DSUB 25-pin monitor cable (LE-25M1) ····· 1
- DSUB 9-pin AUX cable (LE2-8V) ····· 1
- External signal I/O cable ····· 1
- AC adapter ····· 1
- Instruction manual ····· 1
- Carrying bag ····· 1
- Warranty ····· 1
- Utility CD ····· 1

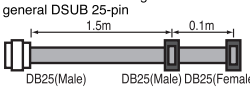
# Option list

## Cables / terminal blocks

Monitor cable for DSUB 9-pin
### LE-259M1
Branch cable for measuring RS-232C over DSUB 9-pin of PC, etc.

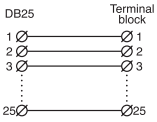



Monitor cable for DSUB 25-pin
### LE-25M1
Branch cable for monitoring communication lines over general DSUB 25-pin



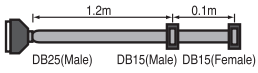

* Same as cable packaged with LE-7200, LE-3200, LE-2200 and LE-1200.

Terminal block for DSUB 25-pin
### LE-25TB

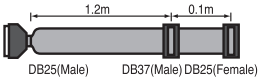



Converts analyzer's RS-485/422 port (DSUB 25-pin specification) to terminal block specification.

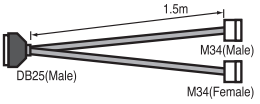
X.21 Monitor cable
### LE-25F15
Branch cable for measuring X.20/21 over DSUB 15-pin.



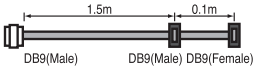

RS-449 Monitor cable
### LE-25F37
Branch cable for measuring RS-449 over DSUB 37-pin.




V.35 Monitor cable
### LE-25M34
Branch cable for measuring V.35 over M34-pin.

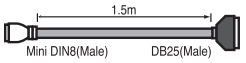



Monitor cable for CAN
### LE-009M1
Monitor cable for measuring CAN signals over DSUB 9-pin.

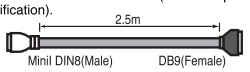



* Same as cable packaged with OP-SB7F, OP-SB7FX and OP-2B.

AUX cable for DUB 25-pin
### LE2-8C
Cable for connecting DUB 25-pin DTE external device with AUX (RS-232C) port of measurement unit.




AUX cable for DSUB 9-pin
### LE2-8V
Cable for connecting AUX (RS-232C) port of measurement unit with PC (DSUB 9-pin DTE specification).




* Same as cable packaged with LE-7200, LE-3200, LE-2200 and LE-1200.

## HDD / Memory cards

6GB HDD card
### MC-6GH NEW
Equivalent to 1" microdrive(With PC card adapter)

1GB CF card
### MC-1GCF NEW
1GB compact flash card(With PC card adapter)

4GB HDD card
### MC-4GH
Equivalent to 1" microdrive (With PC card adapter)

512MB CF card
### MC-512CF
512MB compact flash card (With PC card adapter)

## Battery pack

NiMH battery pack for replacement
### P-19S
•Rating : 4.8V, 1900mAh
•Appropriate model : LE-7200, LE-3200, LE-2200 and LE-1200

## Carrying bag
### LEB-01
Bag with pockets for storing and carrying accessories such as AC adapters, cables, etc.
* Same as accessories packaged with LE-7200, LE-3200,LE-2200 and LE-1200.

## Compact thermal printer

### *Handy thermal printer for on-site printout of measurements*

**Battery Driven!**

- Prints 40 digits per line in normal mode and 80 digits in reduced mode.
- High-speed printing at 52.5 characters per second.
- Incorporates eco-friendly NiMH battery.
- Supports Centronics parallel and RS-232C ports.
- Dimensions : 160 (W) x 170 (D) x 67 (H) mm
- Weight : Approx. 690 g (including built-in NiMH battery)

Compact thermal printer
### DPU-414-31B
Built-in battery, dedicated roll paper (x 1) included.
* AC adapter and cable are not prepare. Provide them separately.

Compact thermal printer set
### DPU-414-CA
Includes printer (DPU-414-31B), AC adapter (PW-4007), roll paper x 1 and printer cable (SC-14N36).

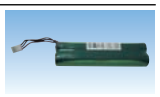
**Options**

AC adapter for DPU-414
### PW-4007
Dedicated adapter for DPU414-31B.
- Input: 100 V AC
- Output: 6.5 V DC 2A(Center ⊖)

Printer cable
### SC-14N36
Cable for connecting analyzer and DPU-414.
- Amphenol connector 14-pin to 36-pin
- Length: 1.5 m

Roll paper
### TP-411L2
Thermal roll paper for DPU-414-31B. 10 rolls per carton
- Width: 112 mm
- Length per roll: Approx. 28 m

Battery pack for DPU-414
### BP-4005
Same as the NiMH battery built in DPU-414-31B.
- 4.8 V, 1100 mAh



**Model list**

| Model NO. | LE-7200 | LE-3200 | LE-2200 | LE-1200 |
|---|---|---|---|---|
| OP-SB5F | ○ | ○ | ○ | ○(*1) |
| OP-SB6F | ○ | ○ | ○ | × |
| OP-SB7F | ○ | ○ | ○ | × |
| OP-SB7FX | ○ | ○ | ○ | × |
| OP-FW10 | ○ | ○ | × | × |
| OP-1B | ○(*2) | ○(*2) | ○(*2) | ○(*2) |
| MC-6GH | ○(*3) | × | × | × |
| MC-4GH | ○ | × | × | × |
| MC-1GCF | ○ | ○(*3) | ○(*3) | × |
| MC-512CF | ○ | ○ | ○ | ○ |
| DPU-414-CA | ○ | ○ | ○ | ○ |
| LEB-01 | ○ | ○ | ○ | ○ |
| LE-259M1 | ○ | ○ | ○ | ○ |
| LE-25TB | ○ | ○ | ○ | ○ |
| LE-25F15 | ○ | ○ | ○ | × |
| LE-25F37 | ○ | ○ | ○ | × |
| LE-25M34 | ○ | ○ | △(*4) | × |
| LE2-8C | ○ | ○ | ○ | ○ |
| LE2-8V | ○ | ○ | ○ | ○ |
| LE-PC100 | ○ | ○ | ○ | ○ |
| LE-PC300 | ○ | ○ | ○ | × |
| LE-PC300F | ○ | ○ | ○ | ○ |
| P-19S | ○ | ○ | ○ | ○ |

*1 : Does not support I²C or clock synchronous communications.
*2 : Requires dedicated expansion board (SB-20L).
*3 : Supported by firmware Ver. 1.04 or later.
*4 : Applicable only to monitor function for V.35 data (control signals not possible).

**SAFETY WARNING**

Read the instruction manual provided with the product before use and use the product as explained in that manual. Using the product in ways not guaranteed in the manual, connecting it to systems outside of the specified ranges and remodeling can all cause trouble and damage. LINE EYE CO. LTD. will assume no responsibility whatsoever for trouble or damage arising because of unauthorized ways of use.

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