

LINEEYE

COMPACT PROTOCOL ANALYZER

LE-1500R

Quick Start Guide

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

- | | |
|---|---|
| <input type="checkbox"/> Protocol Analyzer | 1 |
| <input type="checkbox"/> Interface Sub-board (attached to the analyzer) | 1 |
| <input type="checkbox"/> Wide input AC Adapter (Model : 6A-181WP09) | 1 |
| <input type="checkbox"/> DSUB25pin Monitor cable (Model : LE-25M1) | 1 |
| <input type="checkbox"/> USB cable | 1 |
| <input type="checkbox"/> Utility CD | 1 |
| <input type="checkbox"/> Carrying bag (Model : LEB-01) | 1 |
| <input type="checkbox"/> Quick Start Guide (this booklet) | 1 |
| <input type="checkbox"/> Registration card, Warranty | 1 |

Please let us know if you find any damage to the product or accessories lacking. Save the outside package and contact LINEEYE or LINEEYE distributors.

---Note---

The Nickel-Hydrogen battery is built into the product. It is not full charged to keep the quality. Before using the product, charge the battery first. If you dispose the product, follow the regulations of your city.

<p>The utility CD attached to the product contains the instruction manual. Refer to the instruction manual for more detailed operation and important notes.</p>

Read this first

Thank you for your purchase of LE-series.

To use it correctly, you are advised to read and understand this booklet and the instruction manual stored in the CD thoroughly.

When you encounter some problems, you will find helpful information.

Please do not use the analyzer in the following conditions.

[Description of the symbol and mark]



Warning

If the device is used without followings, there is a possibility of accidents, such as a death or a serious injury.



Caution

If the device is used without followings, there is a possibility of accidents, such as a injury, or material damage.



Warning

- Do not use the AC adapter or battery excepting the one LINEEYE designated. This may cause of exothermic reaction, ignition, electric shock, and malfunction.
- Do not disassemble, modify or repair analyzer. This may result in a injury, electric shock, and ignition.
- Turn off the power and unplug the analyzer immediately when smoke or smells emanated. Continuous use may result in an electric shock, burn and ignition.
- Do not use the analyzer where there is inflammable gas. This may result in fire and explosion.
- Turn off the power and unplug the analyzer immediately when a liquid or foreign substance get into the analyzer. Continuous use may result in ignition, electric shock and malfunction.
- Do not get the analyzer wet in water. This may cause of electric shock and malfunction.
- Do not put the analyzer in fire or place near the heater. This may result in a injury, fire and explosion.
- Never plug or unplug the AC adapter in wet hands. This may result in an electric shock.
- Do not touch the AC adapter or cables when out-breaking the thunder. This may result in an electric shock.
- Do not extend the plug to multi-outlets. This may result in the ignition.
- Remove the dust from the AC adapter to avoid the ignition.



Caution

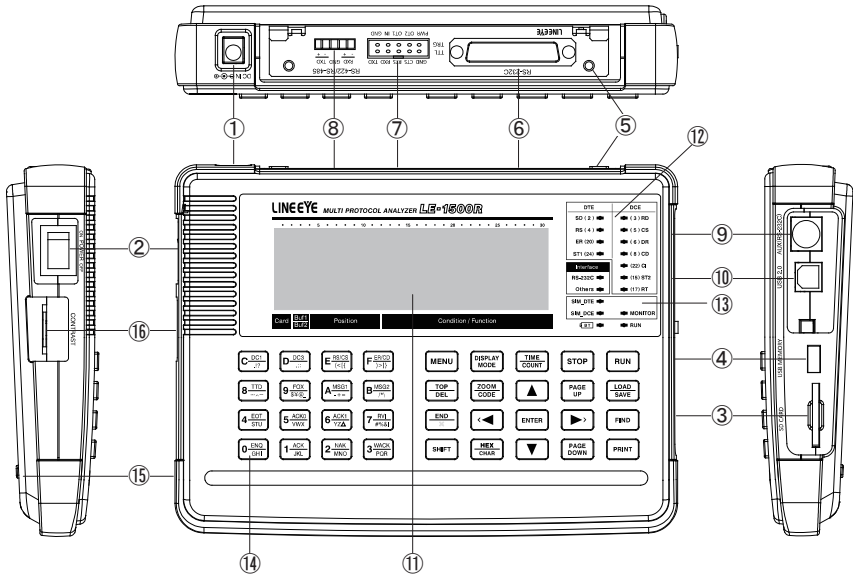
- Do not give impact to the analyzer, such as dropping and hitting.
- When removing/connecting the cable, hold the connector of the cable.
- When plugging/unplugging the AC adapter, hold the body of the AC adapter.
- Do not place the analyzer where is not flat, or vibrated place.
- Do not place the analyzer where temperature or humidity is above the specification or sudden temperature change.
- Do not place the analyzer affected by direct sun or near the fire.
- Do not place the analyzer in the strong magnetic field, or static electricity place.
- Do not place the analyzer where there is leaking water or electricity.

---- Contents ----

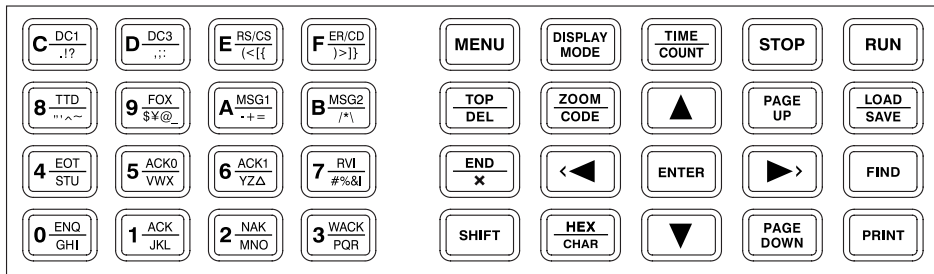
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Nomenclature

General



Name		Function
①	AC Adapter Plug	Connects the AC adapter.(It deals with the polarity of plus and negative.)
②	Power Switch	Turns the power on/off.
③	SD Card Slot	The inlet for a SD card
④	USB Host Port	To connect to a USB flash memory
⑤	Interface Sub-Board	A sub-board equipped with RS-232C, RS-422/485, and TTL interface
⑥	RS-232C Port	Measurement port for RS-232C (V.24)
⑦	TTL/ External Signal I/O terminal	Measurement port for TTL. A port for external signal I/O
⑧	RS-422/485 Port	Measurement port for RS-422/485
⑨	AUX(RS-232C) Port	Used to input or output external equipment equipped with RS-232C interface.
⑩	USB Device Port	Uses for a remote-control from a PC, or for updating firmware.
⑪	Liquid Crystal Display	Wide view angle and high contrast liquid crystal display.
⑫	Line State LED	Indicates logical status of signal line on the target interface.
⑬	Action State LED	Indicates the status of an analyzer's operation.
⑭	Keypad	Press to enter commands and data.
⑮	Battery Cover	Open only when replacing the nickel-hydrogen battery.
⑯	Contrast Adjust Knob	Adjusts the display contrast.



Key	Function
[RUN]	Starts monitoring, measuring or testing operation.
[STOP]	Stops monitoring, measuring or testing operation. Interrupts printing.
[MENU]	Returns to the top menu for selecting functions and setting conditions. *Returns to the previous screen.
[DISPLAY MODE]	Displays the monitored or measured data. Switches over to the display format.
[TIME/COUNT]	Switches to counter/timer display and timing waveform display.
[LOAD/SAVE]	Sets configuration of file management for the storage device
[FIND]	Switches over to the retrieval function.
[PRINT]	Switches over to the printing function.
[HEX/CHAR]	Switches over the monitored data displayed in char. to one in hexadecimal.
[ZOOM/CODE]	Zooms up in the timing waveform screen. Changes the display code of monitored data.
[PAGE UP]	Goes to previous data. Moves the setting items upward.
[PAGE DOWN]	Goes to next data. Moves the setting items downward.
[▲], [▼]	Scrolls the data line.Moves the cursor on the condition setting screen.
[◀], [▶]	Scrolls the displayed data character by character.Changes or selects the setting item on the condition setting screen.
[ENTER]	Definite input for execution of function or a command.Pauses the display when pressing the key during the measurement.
[0] ~ [F]	Enters the corresponding numerical values.Selects an item number or the data to be sent.
[TOP/DEL]	Displays the top section of data. Deletes the entry indicated by the cursor.
[END/X]	Jumps to the end of the screen. Enters data "Don't Care."
[SHIFT]	Press to use the expanded alternate function of each key.
[SHIFT] + [PRINT]	Prints the hard copy (screen image).
[SHIFT] + [FIND]	Sets configuration of retrieval condition.
[SHIFT] + [PAGE UP]	Moves to the setting help screen upward.
[SHIFT] + [PAGE DOWN]	Moves to the setting help screen downward.
[SHIFT] + [DISPLAY MODE]	Turns on/off the back-light. (Applicable models only)
[SHIFT] + [HEX/CHAR]	Selects the fixed transmission data.

*This booklet uses [+] mark, when two keys needs to be pressed at the same time.
(e.g., [SHIFT] + [PRINT])

Charging the Battery

The Nickel-Hydrogen is fully charged in about 2.5 hours by the AC adapter.

Please charge the battery before using the product.

- * The "BT" LED blinks in green when charging, and lights in green when completing the charge.
- * The analyzer can perform the battery drive for about 6.5 ~ 8 hours with the full charge.

[Note]

Do not use the AC adapter or battery excepting the one LINEEYE designated.

If you are not going to use the analyzer for a long term, fill up the battery before putting back.

After that, try to charge the battery every 6 months.

If the service time after charging becomes extremely short, the battery must be replaced with a new one. (Battery model: P-19S)

- * Even though the service time becomes short within the warranty period, you need to purchase the new one because batteries are considered as consumable part.

Lithium Battery

The data of memory IC and timer IC is saved for about 10 years by built-in Lithium battery even if the power supply is OFF.

Turn on the Power, Software Reset



Turn on the power of analyzer (Press left side button.)

The opening screen with firmware version will be displayed after the self-check test.

- * If "Self-check NG" is displayed, please contact LINEEYE distributors or LINEEYE directly.
- * The latest firmware is available from LINEEYE web page.

Software Reset

To restore the initial conditions (factory setting) into the analyzer, turn on the power while pressing [Enter]+[Top/Del] keys. [Initialized!] will be displayed in the opening screen.

Calibration

Enable to have a diagnostics by the analyzer itself.

- * After the calibration, it will go back to the initial conditions and capture memory will be erased.

Preparation Remove all cables from the analyzer and insert a USB flash or an optional SD card to the memory card. (if you have one)

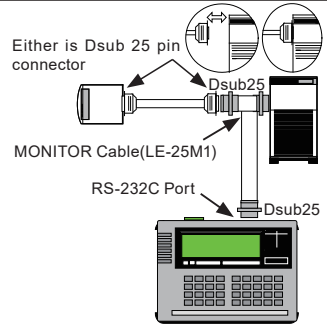
Operation Turn on the power while pressing [1]+[D]. Press all keys one by one when the key marks are displayed. "--OK--" will be displayed if the result is fine. Turn off the power of analyzer.

- * If "NG" is displayed, please contact LINEEYE distributors or LINEEYE directly.

Connect to the Target Devices

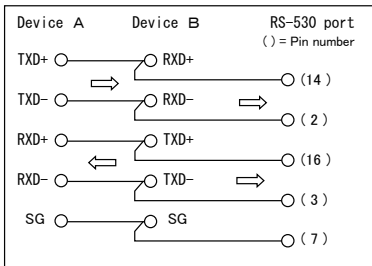
Connect to RS-232C

- To monitor the communication data
Connect the monitor cable (LE-25M1) to the Dsub 25pin connector of RS-232C for the target devices.
- To have the transmission/reception (simulation) test
Set the interface condition according to the DTE/DCE specification and pin assignment of RS-232C cable for the target devices. (->P7)

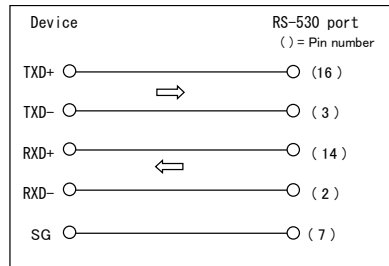


Connect to RS-422/RS-485

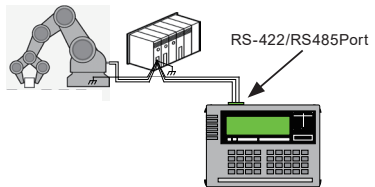
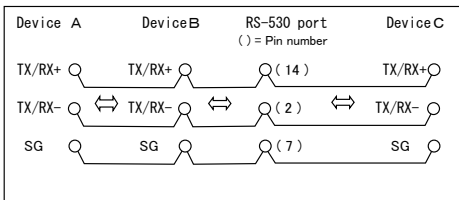
- To monitor RS-422



- To simulate RS-422



- To monitor/simulate RS-485

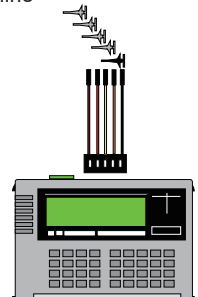


Connect to TTL

When you measure UART of TTL, I2C, or SPI set the "PORT" item of "INTERFACE" setting to "TTL" and connect the analyzer with the target by dedicated cable.

- When you execute monitoring or send/receive simulation of TTL level line

Lead wire	Signal name	Definition
Brown	TXD	Monitor input / Simulation output of SD data.
Red	RXD	Monitor input of RD data.
Orange	RTS	Monitor input / Simulation output of RTS control line.
Yellow	CTS	Monitor input of CTS control line.
Green	GND	Signal Ground



Interface Setting

Select the measurement port which is used in the target device.

Press [1] on the top menu screen([MENU]), and select "INTERFACE."

```

┌─┐ INTERFACE ─┐ *SELECT*
PORT : RS232C ◀ 0:RS232C
MODE : DTE      1:RS485
POLARITY: NORMAL
LINECTRL : OFF  2:TTL
    
```

```


┌─┐ INTERFACE ─┐ *SELECT*
PORT : RS485 ◀ 0:RS232C
MODE : DTE      1:RS485
POLARITY: NORMAL
DRVCTRL : OFF  2:TTL
    
```

```

┌─┐ INTERFACE ─┐ *SELECT*
PORT : TTL ◀ 0:RS232C
LEVEL : 5.0V  1:RS485
OUTPUT : PUP  2:TTL
POLARITY: NORMAL
    
```


■ PORT (Selecting Ports to Measure)

Select "RS232C" to measure RS-232C, "RS485" to measure RS-422/485, "TTL" to measure TTL interface.


 The action LED light of RS-232C and Others will be switched.


■ MODE (DTE/DCE Switch)

Select the specification of signal input/output for the measurement port while using Simulation or BERT function. Select "DCE" if the target device is "DTE". Select "DTE" if the target device is "DCE".

 "DTE" is widely used in PC and data terminal devices. "DCE" is widely used in modems and terminal adapters etc.

 LED lighting for SIM DTE and SIM DCE is switched when using the Simulation or BERT function.

 When monitoring is executed, setting this is not necessary.

 Only during[RUN], signal of measurement port will be the output pin when using Simulation or BERT function.

■ POLARITY (Polarity Switch)

Normally select "NORMAL".

 In INVERT, all the signal polarity of SD and RD including the idle state of the line is inverted.

■ DRVCTRL (RS-485 driver control)

Setting of the driver IC control method when selecting "RS-485"

■ LINECTRL (Control of the control line)

Control setting of the control line when selecting "RS-232C"

■ LEVEL (signal voltage level selection)

Selection of the signal voltage level of the measurement target when selecting "TTL". Select from 5.0V, 3.3V, 2.5V, or 1.8V depending on the specification of the target hardware.

■ OUTPUT (Output selection)

Output selection of the simulation when "TTL" is selected. Select from "PUP" (open collector output with pull-up resistor), "NO-PUP" (open collector output without pull-up resistor), or "CMOS" (CMOS push pull output) depending on the hardware specification of the target device.

Measurement Function

Press [MENU](top menu) and move "▶◀" mark to select the appropriate function.

```

┌───┐ ┌───┐ ┌───┐
│ MONITOR │ │ SIMULATE │ │ SETUP │
│ ▶ ONLINE ◀ │ │ MANUAL │ │ 0:CONFIG │
│ DELAY │ │ FLOW │ │ 1:INTERFACE │
│ ──── │ │ ECHO │ │ 2:TRIGGER │
│ ──── │ │ ──── │ │ 3:CONDITION │
│ BERT │ │ ──── │ │ 4:WAVE MON │
│ BERT │ │ ──── │ │ 5:AUTO CONF │
└───┘ └───┘ └───┘
    
```


ONLINE Function	Monitor communication data at real time (->P10)
DELAY Function	Measure the delay time of the signal changes and voltage of RS-232C/TTL.
BERT Function	Measure the transmission quality of communication line. (->P12)
MANUAL Function	Have the transmission/reception test by key operation. (->P11)
FLOW Function	Have the flow control on Simulation function.
ECHO Function	Echo back function

*Refer to the instruction manual stored in the CD to use the Delay, Flow and Echo functions.

Condition Setting

Set the environmental conditions required to operate the analyzer.

Press [MENU](top menu) ->[3]"CONDITION" to select the conditions.

```

< CONDITION >
0 BUFFER SELECT
1 RECORD & DISPLAY CONTROL
2 PRINT OUT CONDITION
3 AUX CONDITION
4 AUTO RUN
5 TIME & DATE SET
6 OTHER FUNCTION

```

No.	Item	Setting Conditions
0	BUFFER SELECT	Sets the allocation of partitions in the capture buffer to store the measured data. Selects ON/OFF for the protection of the capture buffer, buffer full stop function, automatic back up function, AUTO SAVE function, and automatic saving file. Selection of save device.
1	RECORD & DISPLAY CONTROL	Selects and sets ON/OFF for each display; idle time, time stamp, line status. Selects BSC translation.
2	PRINT OUT CONDITION	Sets printing conditions and selects an output port.
3	REMOTE CONDITION	Sets the AUX communication conditions. Wi-Fi setting.
4	AUTO RUN	Sets ON/OFF of the automatic start/ stop. Sets the starting/ending time and ON/OFF of the automatic RUN.
5	TIME & DATE SET	Sets time and date (Sets the built-in clock).
6	OTHER FUNCTION	ON/OFF of the key click sound, time until automatically turning OFF the back-light, ON/OFF of the [RUN] operation check display, ON/OFF of prohibition of measurement at the time of battery warning, ON/OFF of prohibition of simulation.

Press a number key corresponding to each item to set the configuration (or move[▲] [▼] and then press [ENTER].)

For example, press [5] to set the time and date.

```

< TIME & DATE >
PRESENT [13 01/21 20:44:10]
  DATE   '13 01/21
  TIME   20:43:20
< , > , > , > , > SELECT & INPUT DATA

```

- 1: Current time and date is displayed in the first line.
- 2: Move the cursor to change the setting.
- 3: Input using [0] [9] keys.
- 4: Input the date information of year (last 2 digits), month and day.
Input the time information by H/D/S (24hours)
- 5: Press [Enter] to reflect the setting.

* To cancel inputting, press [Menu] key. (Not [ENTER] key)

Communication Condition

Press [MENU] -> [0] "Configuration" to set the communication conditions.

Move " " mark by pressing [▼],[▲],[PAGE DOWN],[PAGE UP] keys or press [0] - [F] keys to set the configuration.

<pre> <CONF IGRATION> PROTOCOL :ASYNC S-SPEED :9600 R-SPEED :9600 CODE :ASCII CHAR BIT :8 PARITY :NONE PUSH PAGE DOWN </pre>	<pre> *SELECT* 0:ASYNC 1:ASYNC (PPP) </pre>
--	---

■ PROTOCOL

Select ASYNC for Asynchronous communication.

■ S-SPEED (Sets the transmission communication speed.)

R-SPEED (Sets the reception communication speed.)

When "S-SPEED" is set, "R-SPEED" is automatically set.

Press [F] to set any communication speed by 4 effective digits.

For example, to set speed of 123.4Kbps, Input [1] , [2] , [3] , [C](.) , [4] , [D](k)

<pre> <CONF IGRATION> PROTOCOL :ASYNC S-SPEED :9600 R-SPEED :9600 CODE :ASCII CHAR BIT :8 PARITY :NONE PUSH PAGE DOWN </pre>	<pre> *SELECT* 0:110 1:1200 2:9600 3:19200 4:38400 F:USER PUSH SHIFT+PAGE DOWN </pre>
--	---

<pre> <CONF IGRATION> PROTOCOL :ASYNC S-SPEED :9600 R-SPEED :9600 CODE :ASCII CHAR BIT :8 PARITY :NONE PUSH PAGE DOWN </pre>	<pre> *SELECT* 0:ASCII 1:EBDCIK 2:EBDCIK 3:JIS7 4:JIS8 PUSH SHIFT+PAGE DOWN </pre>
--	--

■ CODE (Sets the display code on the screen.)

■ CHAR BIT (Sets a character bit length.)

■ PARITY (Sets parity bit)

"MP" is used for communication adding Multi-processor bit.

Press [PAGE DOWN]

<pre> <CONF IGRATION> PROTOCOL :ASYNC STOP BIT :1 BCC CHAR :NONE BGN CHAR :0102 END CHAR :0317 ITB CHAR :1F PUSH PAGE UP DOWN </pre>	<pre> *SELECT* 0:1bit 1:2bit </pre>
--	---

■ STOP BIT (Sets a stop bit length)

It is valid only for Simulation function.

For receiving data, 1 bit is set in spite of any setting.

■ BCC (Sets block check code)

When "OFF" is set, block check is not executed.

■ BGN CHAR (Sets a calculation start character for BCC)

■ END CHAR (Sets a calculation end character for BCC)

<pre> <CONF IGRATION> PROTOCOL :ASYNC STOP BIT :1 BCC CHAR :NONE BGN CHAR :0102 END CHAR :0317 ITB CHAR :1F PUSH PAGE UP DOWN </pre>	<pre> *SELECT* 0:NONE 1:LRC ODD 2:LRC EVEN 3:CR-16 4:CR-17U-T 5:CR-6 6:CR-12 </pre>
--	---

■ ITB CHAR (Sets an ITB character)

Not need to set for normal use.

<pre> <CONF IGRATION> PROTOCOL :ASYNC STOP BIT :1 BCC CHAR :NONE BGN CHAR :0102 END CHAR :0317 ITB CHAR :1F PUSH PAGE UP DOWN </pre>	<pre> *INPUT* SET 1~2 CHARACTER (00~FF) (HEX CODE) </pre>
--	---

Press [PAGE DOWN]

<pre> <CONF IGRATION> PROTOCOL :ASYNC TRANSPRT :OFF DLE CHAR :10 SEQUENCE :LSB FRM TIME :5 FRM END : PUSH PAGE UP </pre>	<pre> *SELECT* 0:OFF 1:ON </pre>
--	--

■ TRANSPRT

Set "OFF" for normal use. Set "ON" to measure in Transparent mode.

■ DLE CHAR (Sets a DLE character for transparent mode)

Not need to set for normal use.

■ SEQUENCE (Sets bit sequence)

Set "LSB" first for ASYNC communication.

■ FRM TIME (Sets a non-communication time considered to be a frame end)

When the time reached to the setting, it ends the frame.

■ FRM END (Sets the frame end characters)

When receiving the frame end characters, it ends the frame.

The left screen shows the setting of carriage return (0Dh).

<pre> <CONF IGRATION> PROTOCOL :ASYNC TRANSPRT :OFF DLE CHAR :10 SEQUENCE :LSB FRM TIME :5 FRM END : PUSH PAGE UP </pre>	<pre> *INPUT* SET FRAME END TIME (1~100)ms (DECIMAL) </pre>
--	---

<pre> <CONF IGRATION> PROTOCOL :ASYNC TRANSPRT :OFF DLE CHAR :10 SEQUENCE :LSB FRM TIME :5 FRM END : PUSH PAGE UP </pre>	<pre> *INPUT* SET 0~2 CHARACTER (00~FF,*) (HEX CODE) </pre>
--	---

On-line Monitor Function

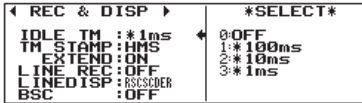
This function records communication data in the capture buffer without affecting the communication.

Also, it displays clearly following each communications protocol.

Operation



Press [MENU](top menu) and select "ONLINE".
Press [0] to set the configuration. (->P9)

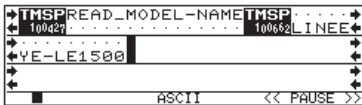


Press [Menu]->[3]->[1] to set the time stamp, idle line, line state, and BSC translation.

Set other configuration if necessary.(->P8)

Press [RUN] to start measuring, and the RUN LED will light.

Then, the measured data will be displayed on the screen.



➡ SD data

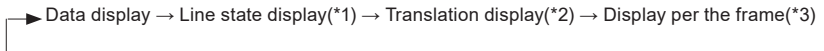
↩ RD data

[ENTER] The screen is temporarily paused. Press it again to continue.

[STOP] Stop measuring.

○ Change the Display Mode

Press [Display Mode] to change the mode.



*1: It is displayed if recording the line state.

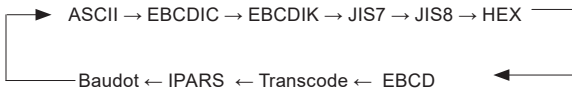
*2: It is displayed if setting "On" on translation display.

*3: It is displayed if recording the time stamp.

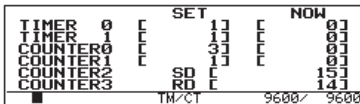
○ Change the Display Code

Press [HEX] to change the display codes to HEX. To return to the former code, press it again.

Pressing [ZOOM/CODE] changes the display code in following order.



○ Timer and Counter



Press [TIME/COUNT] to display the value of time and counter.

"Timer0, 1" "Counter0, 1" is used when measuring with trigger function. (->P13)

"Counter 2, 3" is used when counting the total number of SD/RD data after starting the measurement.

○ Scroll, Jump, Search

Scroll the screen by pressing [PAGE UP],[PAGE DOWN] after the measurement.

Jump function Specify the position of measured data by [0]-[9]keys and press [Enter].

Search function Specify the search conditions by [SHIFT]+[FIND]keys and press [Find] (or "▲","▼") or [Enter].

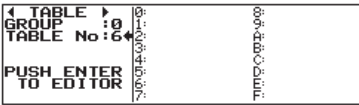
Simulation Function

With the simulation function, the analyzer acts as the counterpart to the target device and performs transmission/ reception tests. In this section, it only describes the MANUAL mode, which sends the data registered in transmission table corresponds to the keys. To know about other modes, refer to the instruction manual stored in the CD.

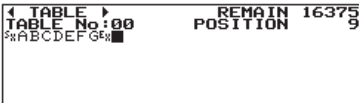
Operation



Press [MENU](top menu) and select "MANUAL".
Press [0] and set the communication condition. (->P9)

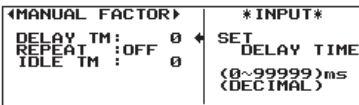


Press [Menu]->[9] and display the summary screen of data tables.
There is "0" to "F" transmission data tables which corresponds to the key board.
Select the table group (GROUP) and table number by [0]-[F] key and press [ENTER].



Input data by [0]-[F] keys in HEX. To input data in alphabet, press [SHIFT]+[HEX/CHAR].
Press [HEX/CHAR] to change the input data in HEX.

For more details of setting, such as BCC insertion ([SHIFT]+[ENTER]), Parity error ([SHIFT]+[E]), copy/paste and delete, refer to the instruction manual stored in the CD.



Press [MENU]->[A](Manual Factor), and set the "DELAYTM" (Space between characters), "REPEAT" (repetitive transmission), and "IDLETM" (Interval of repeat transmission).

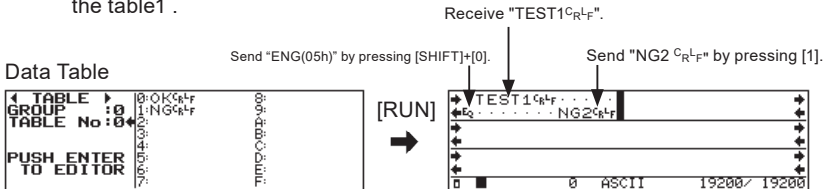
Press [RUN] and then [0]-[F] key corresponds to the transmission data table. The table group to be transmitted can be changed by [SHIFT] + [◀] or [▶]. Transmission data and reception data can be seen on the screen.

Press [SHIFT]+[0]-[D] key to send the pre-set data.

Press [SHIFT]+[E] or [F] to turn on/off the control line of RS(RTS)/CS(CTS) and ER(DTR)/CD(DCD).

Press [STOP] to end the measurement.

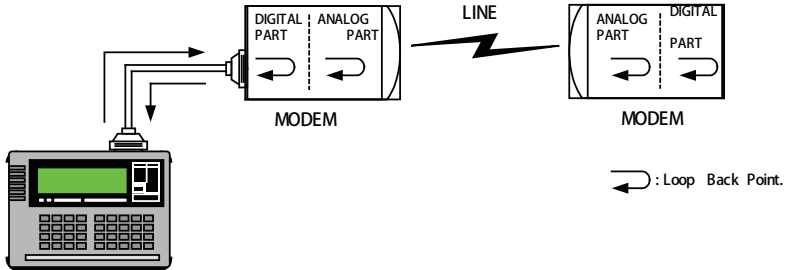
(e.g.,) Send "ENG" at DCE mode (->P7). When receiving "TEST1CRLF", send "NG2CRLF" on the table1 .



Bit Error Rate Test Function

With Bit Error Rate Test function, the analyzer evaluates the quality of a data communication line of target devices (modems and converters etc.).

(e.g.,) Connection of Loop-back test

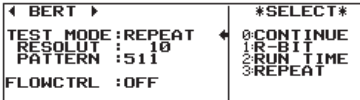


The loop-back point can be usually set and changed by using the self-test function of the modem. (Refer to the instruction manual of the modem.)

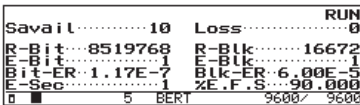
Operation



Press [MENU](top menu) and select "BERT".
Press [0] and set the communication condition. (->P9)



Press [MENU] and [8]"BERT" and set "Test Mode"(Test time, Repeat operation), "Pattern"(test pattern), FLOWCTRL" (On/Off of transmission control on RTS/CTS). The left setting indicates that it repeats 511 random test pattern for 10 minutes.



Press [RUN] to start transmitting test pattern and display the result of reception data compared to the test pattern.

Press [STOP] to end the measurement. However, the transmission of test pattern continues and RUN LED is still lighting. Press [MENU] to end transmitting the test pattern.

Name	Description	Measured Range
Savail	Effective period after synchronization is first established.	0~9999999(sec)
R-Bit	Number of received bits while synchronization is maintained.	0~9999999~9.99E9
E-Bit	Number of bit errors occurred.	0~9999999~9.99E9
Bit-ER	Bit error rate.	0.00E-0~9.99E-9
LOSS	Number of deviations from synchronization.	0~9999 2
R-Blk	Number of received blocks while synchronization is maintained.	0~9999999~9.99E9
E-Blk	Number of blocks which included bit errors.	0~9999999~9.99E9
Blk-ER	Block error rate.	0.00E-0~9.99E-9
E-Sec	Time when bit errors were detected during Savail	0~9999
%E.F.S	Error-free seconds (%)	0.000~100.000(%)

Useful Functions

○ Trigger Function

Trigger Function is for starting a specific action upon occurrence of a specific event as the trigger. For example, when receiving the specific data, it changes the external terminal or counts the error times.

← TRIGGER →	FACTOR	ACTION
TRIGGER0	0: ERROR	4: BUZZER
TRIGGER1	1: ERROR	5: BUZZER
TRIGGER2	2: ERROR	6: BUZZER
TRIGGER3	3: ERROR	7: BUZZER
SHIFT+0~3: TRIGGER DISABLE ↔ ENABLE		
F: TIMER/COUNTER SETTING		

Press [MENU](top menu) ->[2]"Trigger".

Enable the trigger by pressing [SHIFT]+[0]-[3].

Set the trigger factor and action for each trigger by pressing [0]-[7] keys (or [ENTER]).

To use the timer/counter in the trigger condition, press [F] for detailed setting.

< FACTOR >

ERROR	Communications error (Parity, MP, Framing, BCC, Break)
CHARACTER	Max 8 characters with don't care and bit mask
IDLE TIME	Idle time more than specified time
TM/CT	Matched with timer/counter value
LINE	Status of signal line and external trigger input

< ACTION >

STOP	Stop measurement. Able to set with OFFSET
TRIG SW	Enable other trigger conditions
TIMER	Start/ Stop/ Restart
COUNTER	Count/ Clear
BUZZER	Buzz sound
SAVE	Save data in memory card
SEND	Send specific data on MANUAL simulation
OT2	Output low pulse for about 1ms to the external trigger terminal OT2

(e.g.): Stop measurement when receiving "41h, 42h, 43H" on SD, and then "4Fh, 4Bh, 30h" or "4Fh, 4Bh, 32h" on RD for 3 times.

← TRIGGER →	FACTOR	ACTION
TRIGGER0	0: ERROR	4: BUZZER
TRIGGER1	1: ERROR	5: BUZZER
TRIGGER2	2: ERROR	6: BUZZER
TRIGGER3	3: ERROR	7: BUZZER
SHIFT+0~3: TRIGGER DISABLE ↔ ENABLE		
F: TIMER/COUNTER SETTING		

Enable the Trigger0/2 by pressing [SHIFT]+[0] and [SHIFT]+[2].

←TIMER/COUNTER→	*INPUT*
TIMER 0:	1 SET COUNTER0
SCALE: *10ms	
TIMER 1:	1 (1-999999)
SCALE: *10ms	3 (DECIMAL)
COUNTER0:	
COUNTER1:	1

Set the Counter0 to be 3.

← TRIGGER 0 →	CHARACTER	*INPUT*
CHAR SD:	1: 414243	← SET 0~8
R0:	CHARACTER	CHARACTER
MASK	W0: *****	(00-FF * * 00-FF)
	W1: *****	(HEX CODE)
	W2: *****	00~FF=SHIFT+0~2

Condition of Trigger0 Input "41h, 42h, 43h" on SD.

← TRIGGER 0 →	*SELECT*
ACTION	0: TRIGGER0
TRIG No	1: TRIGGER1
ENABLE	2: TRIGGER2
	3: TRIGGER3

Action of Trigger0 Enable the Trigger1 condition.

← TRIGGER 1 →	CHARACTER	*INPUT*
CHAR SD:	1: 4F4B40	← SET 0~8
R0:	CHARACTER	CHARACTER
MASK	W0: 1001100*0	(00-FF * * 00-FF)
	W1: *****	(HEX CODE)
	W2: *****	00~FF=SHIFT+0~2

Condition of Trigger1 Set "4Fh, 4Bh, WO" on RD. Set "WO" by pressing [SHIFT]+[0].

← TRIGGER 1 →	*SELECT*
ACTION	0: BUZZER
CT No	1: STOP
INCREMENT	2: SAVE
	3: TIMER
	4: COUNTER
	5: TRIG SW
	6: SEND 7: OT2

Action of Trigger1 Set "INCREMENT" on the Counter0.

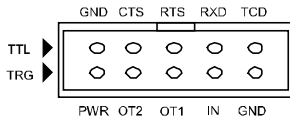
← TRIGGER 2 →	*SELECT*
ACTION	0: ERROR
POINT	1: CHARACTER
CT0	2: LINE
	3: TM/CT MAT
	4: IDLE TIME

Condition of Trigger2 Select "TM/CT" and Conter0.

← TRIGGER 2 →	*SELECT*
ACTION	0: QUICK
OFFSET	1: BEFORE
QUICK	2: CENTER
	3: AFTER

Action of Trigger2 Stop measurement immediately ("QUICK").

*External Trigger Input/Output



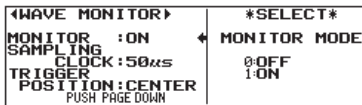
Connector : 2.54mm pitch
pin header type

Signal name	Pin name	Input/Output
Power for external circuit ⁽⁻¹⁾	PWR	
External trigger output 2 (TTL level output) ⁽⁻²⁾	OT2	O
External trigger output 1 (TTL level output) ⁽⁻²⁾	OT1	O
External trigger input (TTL level input) ⁽⁻³⁾	IN	I
Signal GND	GND	-

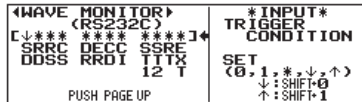
- *1: Voltage () can be set in "LEVEL" item.
Maximum output current is 30mA.
- *2: Open drain output, +5V, 10KΩ pullup
- *3: Input voltage range is -0.5V - 6.0V.
It is pulled up with 10KΩ on +5V.

○ Timing Waveform Measurement

This function is to measure the timing of data as a logic analyzer through a communication line.



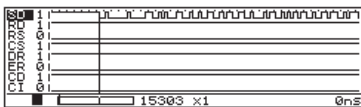
[Press [MENU](top menu) ->[4](WAVE MONITOR) and set "MONITOR:ON". Set the sampling clock (50ns-1ms) and trigger position (of the memory).



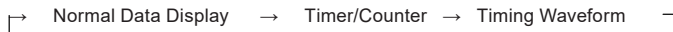
Press [PAGE DOWN] and select the logical status of the line to be the trigger condition.
Select the edge by pressing[SHIFT] + [0](↓) or [SHIFT] + [1](↑).

Press [RUN] and start measuring and record logical status of the lines at the specified sampling clock in the memory.

When the trigger condition is satisfied and waveform measuring ends, "WAVE-MON END" will be displayed on the right bottom of the screen.

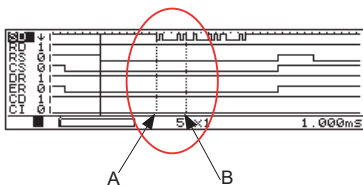


Press [STOP] to end measuring and display the waveform by pressing [Time/Count] key for a few times.



Scroll the screen by[◀]/[▶] or [PAGE UP]/[PAGE DOWN] keys.

Enlarge or reduce the display by [ZOOM/CODE] or [SHIFT]+[ZOOM/CODE] keys.



It is possible to calculate the time between two points.
Press [2] or [SHIFT]+[◀] and [3] or [SHIFT]+[▶] to move the cursor to position A, then press [ENTER].
Move the cursor to position B.

○ Auto Start/Stop Function

The AUTO RUN function enables to start and stop a measurement at the specified time. It is useful when you monitor at the specific time only.

◀ AUTO RUN ▶ 08/17 10:40J MODE : DAILY RUN TIME : ON STOP TIME : ON 12:30 P-ON RUN : OFF ** 13:00	*SELECT* 0:MONTHLY 1:DAILY 2:HOURLY
--	--

Press [MENU]->[3]->[4] ("AUTO RUN").
 Set Mode (repeat mode), RUN TIME (starting time), STOP TIME (end time), P-ON RUN (Auto run when powering on).

In this setting, it starts measuring at 12:30 until 13:00 every day.

○ File Management (Save/Load to a USB flash or SD Card)

Measured data and configuration can be saved in a storage device such as USB flash or SD card. And saved files can be edited from the analyzer and PC.

◀ DIRECTORY ▶ REMAIN 7630MB ▶ BF001 .DT 163K 13-01-28 14:43:06 AF001 .DT 34K 13-01-28 14:44:03 TEST10 .DT 1689K 13-02-12 9:08:02 TEST10 .SU 1916 13-02-12 9:08:20 SELECT FUNCTION 0:SAVE 1:LOAD 2:DELETE	
---	--

Press [LOAD/SAVE] to display the directory screen.
 Select the appropriate file by [▼]/[▲] keys and press [1]->[ENTER] to load the file.
 Or press [2]->[ENTER] to delete the file.

◀ SAVE OPTION ▶ FILENAME : TEST11 TYPE : ALL .DT RANGE : ALL PUSH ENTER EXEC.	*INPUT* SET FILENAME - CHAR -
---	-------------------------------------

Press [0] to save data. Name the file by [0]-[F] keys and press [ENTER].
 "TYPE:DT" stands for the measured data and "TYPE:SU" stands for the configuration data.

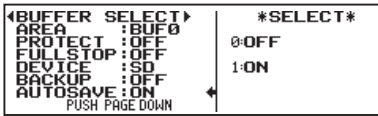
◀ SAVE OPTION ▶ FILENAME : TEST11 TYPE : ALL .DT RANGE : CURRENT~ SIZE : 20 PUSH ENTER EXEC.	*SELECT* 0:ALL 1:CURRENT~
---	---------------------------------

To save a partial data, select "RANGE:CURRENT" and input the data size (in 1k byte).

○ Auto Saving to a USB flash or SD Card

Transfer the data on the captured memory into the optional USB flash or SD Card at specified size automatically while measuring.

It is useful for rare network trouble of unknown case by recording communication data for a long time.

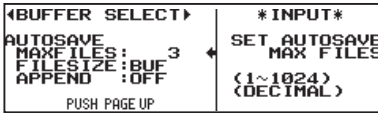


Insert a USB flash or an optional SD card to the memory card slot of analyzer.

Press [MENU]->[3]->[0] and then "Full Stop:OFF" and "AUTO SAVE:ON".

Select the type of storage device from "DEVICE" item.

*If setting "FULL STOP:ON", the measurement will be stopped when the capture buffer becomes full.



Press [PAGE DOWN] and set MAXFILES (Max saving files), FILESIZE, APPEND (How to use the existing file when saving new data).

*When setting the FILESIZE larger than the capture memory, captured data in the storage device cannot be loaded to the analyzer.

In this case, use the PC link software (the light edition of LE-PC300R) in the attached CD-ROM (Refer to the manual of the software for how to use) to use the data on PC.

Press [RUN] to start measuring and the log data in the capture memory is saved into the storage device with the name of "#XXXXXXX.DT".

("XXXXXXX" is the number which starts from 0000000). When the number of the auto-saved files is reached to the MAXFILE, the oldest file will be deleted and new file will be saved



If the storage device has the existing auto-saved files, warning message will appear before starting the measurement. Press [RUN] to continue, or [STOP] to save data into the HDD of PC or another storage device.

* "APPEND:OFF" deletes the existing auto-saved files and starts saving from "#0000000.DT".

* "APPEND:ON" keeps the existing auto saved file and starts saving from the next number of existing file name. However, if it reaches to the MAXFILES already, it will delete the oldest file before starting the measurement.

Note

Do not turn of the power supply while using Auto Saving. It will affect not only the autosaving file, but also the storage device itself.

○ Usage on PC

By using PC link software (Light Edition), you can execute real time measurement and convert a captured file into text file. The Captured data is in unique data form thus you need to convert it to use it on PC.

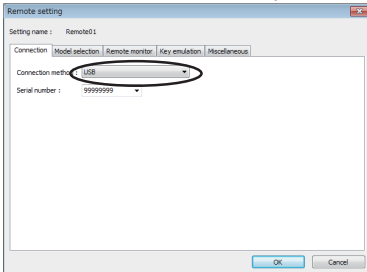
PC link software “LE-PC300R (Light Edition)”

With this software you can take the monitor data into PC through USB port, AUX port(serial), Wi-Fi, or storage device.

* Wi-Fi function is available only in Japan, USA, Canada, and EU nations where the product is needed to be compliant with RE directive (2014/53/EU).

■ Install of PC link software

The Utility folder of attached CD-ROM includes the light edition of the PC link software “LE-PC300R”. Double-click setup.exe in the folder and install it following the install wizard.





■ PC Connection

The Utility folder of attached CD-ROM includes the light edition of LE-PC300R.

Double-click setup.exe in the folder and install it following the install wizard.

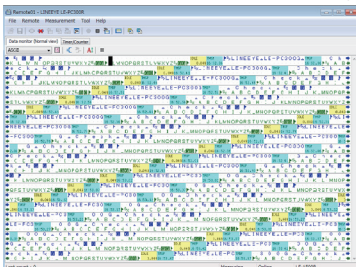
- When you use USB connection, you need to install the USB driver before the use. The driver is in the Driver folder of attached CD-ROM.

■ Start/Stop measurement

After finishing configuration of communication condition, click  to display and record the measured data. Click  to stop measurement.

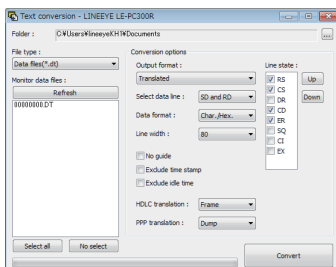
- LE-PC300R (Light Edition) has 10 minutes limitation for measurement time. When you need to measure for more long time please purchase the full edition of LE-PC300R.

- For “how to use” of LE-PC300R (Light Edition), refer to the online help of LE-PC300R.



■ Text conversion

You can convert the data file which is measured by the analyzer into text file. By clicking of LE-PC300R, the text conversion window opens. Then select the folder which has the data to be converted and select the data. You can select normal format or translation format for the text conversion. You can also convert it to csv format.



- LE-PC300R (Light Edition) has 3 files limitation (at one time) for the file conversion. When you need to convert many files at one time, please purchase the full edition of LE-PC300R.

■ Save

Click  to save the data which was measured by LE-PC300R.

Troubleshooting

When you encounter some problems, please refer to "FAQ" from LINEEYE web page.
If you still cannot solve the problems, please contact LINEEYE or LINEEYE distributors.

Can monitor only transmission or reception line.

It is possible that you select Simulation function. Select Monitor function from top menu.

"B" is displayed on the screen without any communication data after pressing [RUN].

It is possible that you select "POLARITY:INVERT" at Interface setting. Press [MENU]->[1] and select "POLARITY:NORMAL" .

Cannot send pre-registered data by pressing [SHIFT]+[9] when using MANUAL Simulation.

Press [MENU]->[1] and set "LINECTRL:OFF".

Press [MENU]->[1] and select "DRVCTRL:AUTO" if "PORT" is "RS530".

Find a small light on the LED of line state which is not in use.

Use the accessory cable. It is possible that the line standing next to it affects (crosstalk) and lights the LED.This is not a product malfunction.

"ILLEGAL CARD" is displayed after inserting the SD card and pressing [LOAD/SAVE].

Use the LINEEYE optional SD card. Max capacity of SD card depends on the analyzer model.
LINEEYE does not warranty the SD card for other manufacture.

User Registration

For any technical questions, please feel free to send us an email or FAX.

We do answer your questions via phone but prefer email or FAX.

Email: info@lineeye.co.jp FAX:+81-75-693-0161

(office hours: 9:00to12:00, 13:00to18:00)

Please register your products before asking questions about your products.

You can register your products from LINEEYE web page. Go to [Support] and fill in the application.

You can also register your product via FAX using the registration card attached to the products.

LINEEYE CO., LTD.

4F., Marufuku Bldg., 39-1, Karahashi Nishihiragaki-cho,
Minami-ku, Kyoto, 601-8468, Japan
Phone : +81-75-693-0161 Fax : +81-75-693-0163

URL : <https://www.lineeye.com>

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