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## Foreword

This user's manual contains useful information about the precautions, functions, and operating procedures of the DL-Term program that is downloadable from <http://www.yokogawa.com/tm/tm-softdownload.htm>. To ensure correct use, please read this manual thoroughly during operation.

After reading the manual, keep it in a convenient location for quick reference whenever a question arises during operation.

For information about the handling precautions, functions, and operating procedures of the DL series digital oscilloscopes, and the handling and operating procedures of Windows, see the manuals that accompany the particular instrument you are using.

## Notes

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functions. The figures given in this manual may differ from the actual screen.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer.

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## Revisions

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# Product Overview

## Functions

As one of PC-based software utilities for the DL series oscilloscope, the DL-Term provides users basic communication platform, with which users can communicate with the DL, sending commands to the DL and receiving response messages from it. Programmers can test and evaluate their commands on the platform before developing their specific applications.

You can communicate with the DL via the LAN,USB, RS232, or GP-IB interface.

The main window looks like fig0.

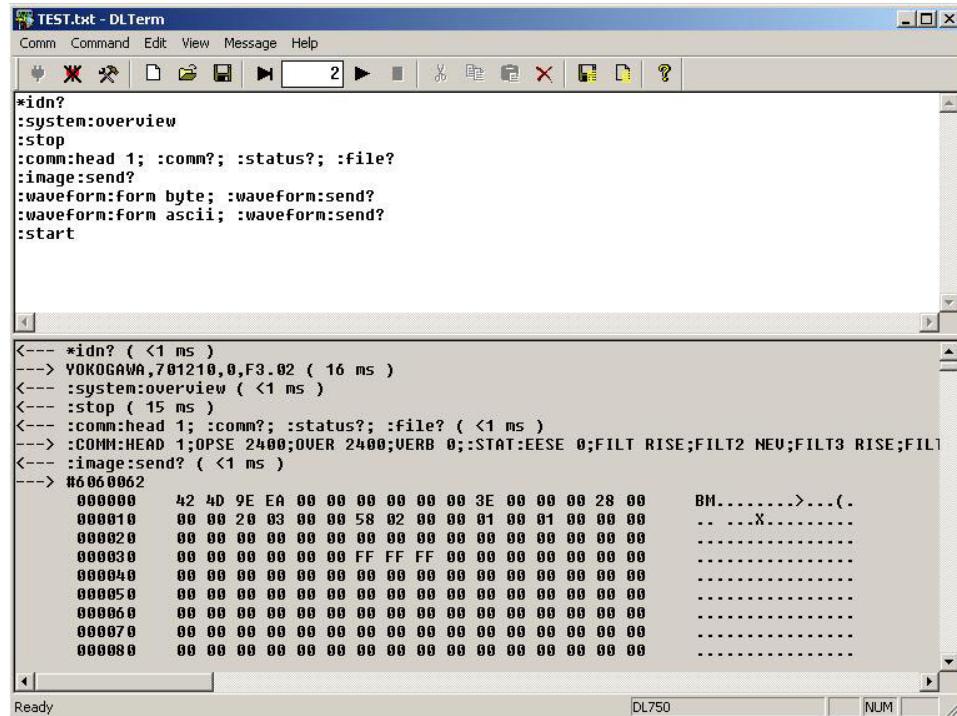


fig0 Main Window of DL-Term

It has two child windows, the upper command window and lower message window. In the command window communication commands to the DL are input and edited while in the message window, response messages from the DL are displayed.

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## PC System Requirements

### **PC**

PC capable of running Windows 2000, Windows Me, and Windows XP with at least a Celeron 500 MHz processor and at least 64 MB of memory (128 MB or more recommended).

In addition, a USB driver for the connected DL is required. For details on the USB drivers, see the user's manual for the relevant DL.

### **CRT, printer, and mouse**

Display: SVGA/XGA (XGA or better recommended)

Color: 65536 colors or more

Must support Windows2000, Windows Me, and Windows XP.

### **GP-IB Board**

When using the GP-IB interface, GP-IB board by National Instruments or a PCMCIA card is required.

### **DL Series Required for Operation**

DL750,DL1600 Series, DL1700 Series, DL7100,DL7200, and DL7400 Series

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# Notes on Using the Software

## Exemption from Responsibility

Yokogawa Electric Corporation shall not be held responsible by any party for any losses or damage, direct or indirect, caused by the use or any unpredictable defect of the product.

## Precautions Concerning the Use of the Software

- Do not perform operations directly on the DL series digital oscilloscopes while using this software program. Doing so can lead to erroneous operation.
- If the standby mode provided on your PC is activated, the operation of the software may not be able to continue.  
When using the software, turn OFF the standby mode.
- If you run the software using a LAN interface, the line load is 1 Mbytes/s maximum. Consult your network administrator on using the LAN interface.
- If a connection error occurs when connecting to a DL digital oscilloscope, power cycle the DL.

## 1. 1 Setting Configurations

Before creating communication with the DL, make sure that the cable between PC and DL has been correctly wired. For the hardware connection between PC and DL, please refer to the communication operation guide of your specific instrument

### Create Connection to the DL Instrument

Click **File > Connect** menu or  icon, the connect dialog will then open. The predefined connection configurations are listed in it as shown in fig1.1.

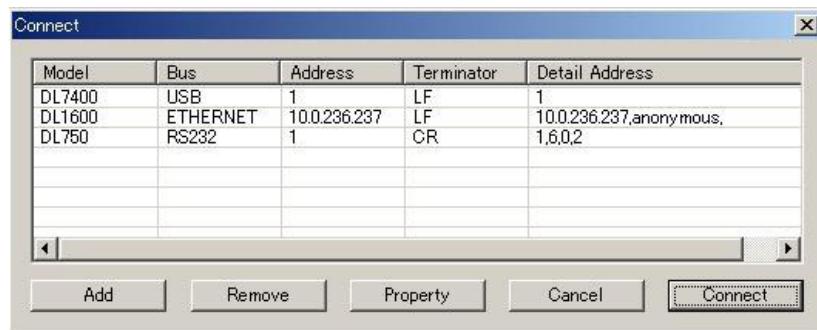


fig1.1 Connection Dialog

### Add New Connection Configuration

The connection configuration list is empty at first start. To add new connection configuration to the DL, click the **Add** button. A new device configuration dialog will then open in which users can select the variable communication port and setup the corresponding parameters.

Set the interface to be used from the menu of the DL.

- For DL750 and DL1600/DL1700: **MISC > Remote Cntl**
- For DL7100/DL7200: **MISC > Communication**
- For DL7400: **MISC > Remote Control**



fig 1.2 New Device Configuration Dialog

**GPIB**

Address: The unique ID of a GPIB device, ranges from 0~30

**RS232**

Port: COM1, COM2, COM3  
Baud Rate: 1200, 2400, 4800, 9600, 19200, 38400, 57600  
Format: 8-NO-1 / 7-EVEN-1 / 7-ODD-1 / 7-NO-2  
Handshaking: CTS-RTS / NO-NO / XON-XON  
Terminator: LF / CR / CR+LF

**USB**

Address: The unique ID of a USB device, ranges from 0~127

**Ethernet**

IP Address: The IP address or host name of the instrument  
Username: The login username for the **Remote Control** assigned by the instrument  
Password: The password for the username

Click the **OK** button to add new connection configuration into the configuration list. The program will try to check the correctness of the configuration, if succeeded, it will display the instrument model name, and otherwise it will return an error message and display “unknown” as model name.

**Remove Connection Configuration**

Click the **Remove** button to remove a selected connection configuration from the configuration list.

**Change Connection Configuration’s Parameters**

Click the **Property** button to change a selected connection configuration’s parameters, a configuration property setting dialog will then open which looks same as the new instrument dialog. Change the connection configuration’s parameters and click the **OK** button to save changes.

## 1.2 Creating / Braking up Connection

### Create Connection to the DL Instrument

Select a defined connection configuration in the configuration list and click the **Connect** button to connect to the DL. (Double click on defined configuration in the list , also can create connection.) The program then will try to initialize the communication to the DL with selected configuration. If succeeded, The file system of the DL will be list in the tree view and list view, else, an error message will be displayed.

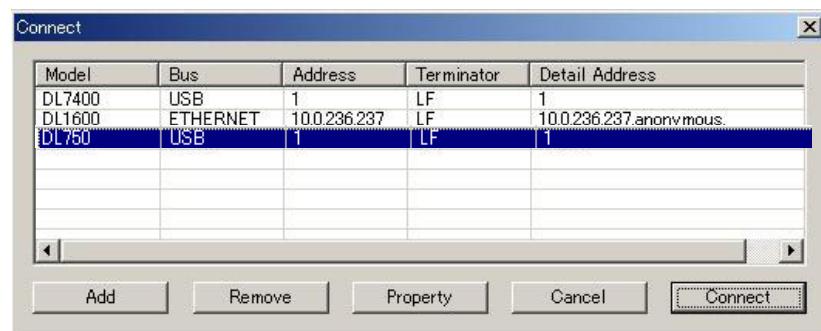


fig1.3 Select a defined connection configuration

### Break up Connection

Click **File > Disconnect** menu or  icon to break up current connection to the DL .

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#### Note:

- The connection can not be broken up during its receiving session.
-

## 1.3 Optional Setting

Select **Command Option** after click **Comm > Option** menu or  icon, the communication option dialog will then open as shown in fig1.4. Communication options such as timeout, execution mode and message format are set in it.

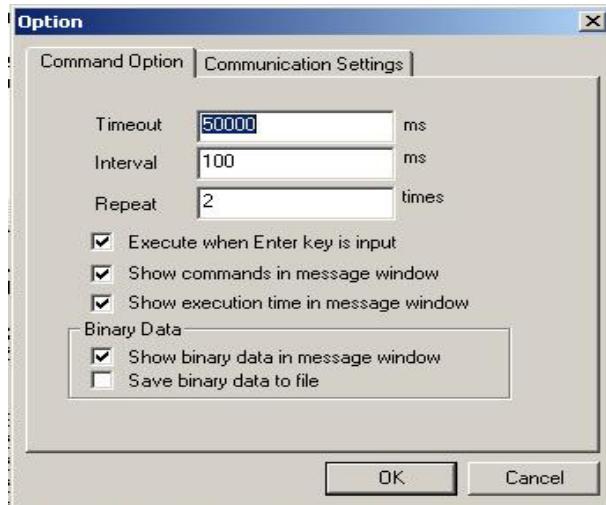


fig1.4 Communication option dialog

### Timeout:

The maximal time taken to communicate with the DL. If timeouts occurs, an error message will be returned.

The other options are specific for command execution and message display and will be described later.

### Execution Interval

The time interval between the executions of two successive command lines

### Repeat Times

The repeat times for auto execution.

### Execute when Enter key is input

Check or uncheck this item to enable or disable immediate execution.

### Show Command in Message Window

Check or uncheck this item to show or hide commands in message window. If unchecked, the identification header "\_\_\_>" and "<\_\_\_" will also be hidden.

### Show Execution Time in Message Window

Check or uncheck this item to show or hide execution time in message window.

### Show Binary Data in Message Window

Check this item to show binary data in hex format in message window. If unchecked, the binary data will not be displayed in message window.

### Save Binary Data to File

Check this item to prompt to save binary data to file. If unchecked, the binary data will be discarded during receiving messages.

Select **Communication Settings** after click **Comm > Option** menu or  icon, the DL communication settings dialog will then open as shown in fig.1.5. Communication settings such as local/remote status, header and verbose of response messages are set in it.



fig1.5 Communication settings dialog

#### **Header in response message**

Determines whether a header is to be added or not when sending a response message to a query. Check the item to include header in response message.

Example)

Checked:	CHANNEL1:VOLTAGE:PROBE 10
Unchecked:	10

#### **Set DL in remote mode**

Sets DL instrument to remote/local mode. Check this item to set the DL to remote mode.

#### **Full form for response message (Verbose)**

Determines whether a response message to a query is to be returned in full form or in abbreviated form.

Example)

Checked:	CHANNEL1:VOLTAGE:PROBE 10
Unchecked:	CHAN1:VOL:PROB 10

## 2. 1 Sending Communication Commands

### Input Command

When the program starts, a hint will be shown in the command window to prompt users to input commands here.

The command window actually is a text editor, users can input and edit command lines in it, also can load commands from files or save them to files. The command files are text formatted and can be viewed, edited with any text editor.

To load commands from files, click **Command > Open** menu. To save commands into files, click **Command > Save** or **Save as** menu.

When Execution, the commands in the command window are sent to the DL line by line.

### Immediate Execution

When the optional parameter **Execute when Enter key is input** has been checked, as soon as the Enter key is input, the command string before Enter key in the line will be sent to the DL immediately if the connection is created.

### Step Execution

Click **Command > Step** menu or  icon to enter step execution mode. In this mode, execute one command line as the user clicks the step button, one line one click.

In step mode, the commands cannot be edited.

### Auto Execution

Click **Command > Run** menu or  icon to start auto execution. During auto execution, the commands in the command window will be executed from the head to the end. When the previous command is sent the next command will be sent after some time intervals which is set in the communication option dialog.

In auto execution mode, commands can be repeated for more than one time. You can set the repeat times in the toolbar area or in the communication option dialog.

### Stop Execution

Click **Command > Stop** menu or  icon to stop the current execution.

### Special Commands

#WAIT N

This command is useful to wait for some time-cost command execution. ( in units of mS )

//

The comment lines are identified by “//”. The comment lines will not be sent to the DL.

#### Note:

- The max line length is up to 1024 bytes and the excess will be transit to next line.
- The max amount of commands that the command window can contain is limited to 64k bytes and the excess will be discarded.

## 2.2 View of Response Messages

In the message window, following contents will be displayed.

## Command

When the optional parameter **Show command in message window** has been checked, the communication commands that have been send to the DL are identified by “<--”.

## Message

The response messages received from the DL are identified by “--->”.

## Execution Time

When the optional parameter **Show execution time in message window** has been checked, the execution time spent to sending commands or receiving messages will be displayed behind the command or message.

## Binary Data

When the optional parameter **Show binary data in message window** has been checked, if the response message includes binary data, this binary data will be displayed in hex format. Waveform data, setup data, image data and some other files are treated as binary data when transferred between PC and DL.

The typical display message format looks like fig2.1.

```

<--- *idn? (<1 ms )
---> YOKOGAWA, 701705, 0, F1.52 (<1 ms )
<--- :system:overview ( 60 ms )
<--- :stop ( 110 ms )
<--- :image:send? (<1 ms )
---> #6006900
    000000  89 50 4E 47 0D 0A 1A 0A 00 00 00 00 0D 49 48 44 52 .PNG. .... IHDR
    000010  00 00 02 80 00 00 01 E0 08 03 00 00 00 02 0F 2C .....
    000020  D6 00 00 03 00 50 4C 54 45 00 00 00 00 00 00 DB .... PLTE. .....
    000030  DB DB 92 92 92 00 00 FF FF 49 B6 B6 FF 49 B6 B6 .... I.... I...
    000040  B6 00 00 6D FF FF FF FF FF FF FF FF DB DB DB .... m. .....
    000050  FF FF FF 00 00 00 FF 92 92 00 00 00 24 24 00 24 .... $$. $
.....
    001a90  A4 40 40 40 0A 9D 80 17 41 7D 80 C1 3C 64 6F 48 .@@@... A]..<doH
    001aa0  A5 DE 71 C0 03 08 08 48 81 80 80 14 08 08 48 81 ..q.... H..... H.
    001ab0  80 80 14 08 08 48 81 80 80 14 08 08 48 81 80 80 .... H..... H...
    001ac0  14 08 08 48 81 80 80 14 08 08 48 81 80 80 94 D7 ... H.... H. ~...
    001ad0  2F 09 10 10 4C 40 40 40 0A 49 13 FC 7E BF FE 0F /...L@@@. I..~...
    001ae0  7C 4D E6 80 D8 5D F4 75 00 00 00 00 49 45 4E 44 |M...].u... IEND
    001af0  AE 42 60 82 ..B`
```

(6900 bytes of binary data received) ( 3344 ms )

<--- :image? (<1 ms )
---> TIFF:OFF;"";0;1;" ( <1 ms )
<--- :comm? ( 10 ms )
---> 0:352:352:0 ( 10 ms )

fig2.1 Typical display message format

## 2.3 Operations on Response Messages

### Save Binary Data

Besides displayed with hex format, the binary data also can be saved into files. When the optional parameter **Save binary data to file** has been checked, a message box will appear to query whether to save the received binary data.



fig2.2 Query dialog

It will be saved with binary format equally to the data displayed in the message window and can be processed by proper utilities.

### Save Messages

Click **Message > Save Message** menu or  icon to save content in the message window to a log file. The log file is text formatted and can be viewed, edited by any text editor.

### Clear Message

Click **Message > Clear Message** menu or  icon to clear content in the message window.

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#### Note:

- The max amount of message window is limited to about 600K bytes. When the messages in the window have exceeded the limit, the oldest part will be cleared.
-

## 3 Exiting the Application

### Exiting the Application

Click **File > Exit** menu or  icon to exit the application.

If current connection has not been disconnected, the message box shown in fig 3.1 will appear to confirm whether to exit.

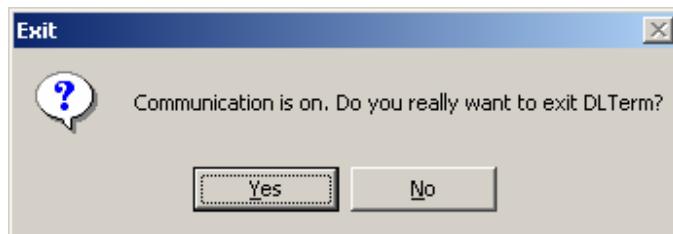


Fig3.1 Confirm dialog

### Saving the Contents of the Command Window

The message box shown in fig 3.2 will appear to query whether to save the contents of the command window.

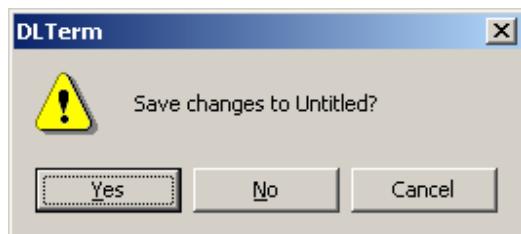


Fig3.2 Query dialog