

Thank you for purchasing Yokogawa products. This manual explains the conditions and method of using the sample program when connecting Yokogawa products to a PC to perform communications. The sample program is written in Visual Basic Ver. 6.0 or Visual C++ Ver. 6.0. To ensure correct use, please read this manual thoroughly before beginning operation. For a description of the communication commands used to actually control Yokogawa products when using the sample program, see the Communication User's Manual for the respective product. The sample program is created using the communication library of the YOKOGAWA DL Series Digital Oscilloscopes. For a description of the DL Series Library, see tmctl read me.txt that comes with the communication library "TMCTL" (URL: <http://tmi.yokogawa.com/service-support/downloads/>).

Notes

The contents of this manual are subject to change without prior notice as a result of continuing improvements to the performance and functions.

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System Requirements

PC and Language

PC:	Windows PC
OS:	Windows XP, Windows Vista, Windows 7
Programming language:	Visual Basic Ver. 6.0 Professional Edition or later, Visual C++ Ver. 6.0 Professional Edition or later
GPIB board:	GPIB board by National Instruments, running NI-488.2 driver

Applicable Products and Communication Interfaces

DL1600:	GP-IB, USB, Ethernet, and RS-232
DL1700:	GP-IB, USB, Ethernet, and RS-232
DL1700E:	GP-IB, USB, and Ethernet
DL7200:	GP-IB, Ethernet, and RS-232
DL7400:	GP-IB, USB, and Ethernet
DL750:	GP-IB, USB, Ethernet, and RS-232
SL1400:	GP-IB, USB, Ethernet, and RS-232
DLM2000:	GP-IB, USB(USBTMC), Ethernet(VXI-11)
DLM4000:	GP-IB, USB(USBTMC), Ethernet(VXI-11)
DL850:	GP-IB, USB(USBTMC), Ethernet(VXI-11)

This sample program has been created using the “USB Driver for DL Series and the communication library TMCTL.”

To use USB, the DL dedicated USB driver is also needed. Before starting the sample program, install the USB driver available at the “USB Driver” download page.

Note

The applicable products and communication interfaces listed above vary depending on the installed options of the respective model and firmware version. For details, see “Instruments Supporting Communications Functions” at the Web page.

File Construction

Visual Basic (Under the VB Directory)

Sample.vbp	VB project file
DLSample1.bas	Sample program

(The following six files are dedicated libraries.)

tmctl.dll	TMCTL library	
tmctl.bas	Dedicated library	Function definition file
tmval.bas	Dedicated library	Constant definition file
ykusb.dll	Dedicated library	USB library file
USBTMCAP1.dll	Dedicated library	USB library file
YKMUSB.dll	Dedicated library	USB library file

Visual C++ (Under the VC Directory)

DLSample.dsw	VC++ project workspace file
DLSample1.cpp	Sample program

Other files that are automatically created by Visual C++ are also included.

(The following six files are dedicated libraries.)

tmctl.dll	TMCTL library	
tmctl.h	Dedicated library	Function header file
tmctl.lib	Dedicated library	Import library file
ykusb.dll	Dedicated library	USB library file
USBTMCAP1.dll	Dedicated library	USB library file
YKMUSB.dll	Dedicated library	USB library file

Starting the Program

Visual Basic (Under the VB Directory)

Open Sample.vbp using Visual Basic. You can immediately run the program on Visual Basic.

Visual C++ (Under the VC Directory)

Open DLSample.dsw using Visual C++. You can immediately run the program on Visual C++.

Setting the Applicable Products

GP-IB

The GP-IB address is set to 1 in the sample program. Set the GP-IB address to 1 according to the procedures given in the Communication User's Manual of the product.

USB (DL7400/DL1700/DL1600/DL750/DL7200/SL1400)

The USB ID is set to 1 in the sample program. Set the USB ID to 1 according to the procedures given in the Communication User's Manual of the product.

Ethernet

Examples of Ethernet settings used in the sample program are shown in the table below. However, the IP addresses in the table are for illustrative purposes only, and the instrument will not function if these settings are used. During actual operation, use IP addresses for products and the sample program that match your networking environment. For settings on the instrument, enter the user name, password, timeout time, and TCP/IP settings according to the procedures given in the Communication Interface User's Manual of the product.

VXI-11	ON (DLM2000/DLM4000/DL850), OFF (other than DLM2000/DLM4000/DL850)
IP address	11.22.33.44
User name	anonymous (other than DLM2000/DLM4000/DL850)
Password	None (other than DLM2000/DLM4000/DL850)
Timeout time	Set the time as necessary.
TCP/IP	Set TCP/IP to match the network environment.

RS-232

The RS-232 settings used in the sample program are shown below. Set the RS-232 parameters according to the procedures given in the Communication User's Manual of the product.

Baud Rate	19200
Format	8-NO-1
Rx-Tx	CTS-RTS
Terminator	LF

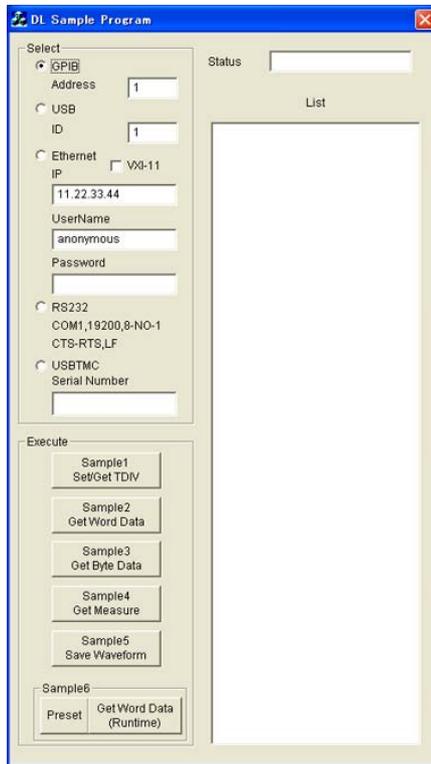
USBTMC (DLM2000/DLM4000/DL850)

Set the serial number of the product as the parameter Serial Number.

Description of the Execution of the Sample Program

The sample program establishes connection using the initialization function against the controlled device (product) that is connected to the PC. The ID value that the function returns is used as the device ID. Other transmission/reception functions use the ID to control the target device.

When you run the program, a sample program window opens. Select the communication method in the Select area and click the button under Execute to execute the sample program.



Below is a description of the execution of the sample program.

1. Sets T/div and gets T/div settings
Sets T/div to 2 ms/div and queries and displays T/div.
2. Retrieves 1002 points of CH1 waveform data and displays the data as physical values in unit of words
Retrieves waveform data from point 0 to 1001 at 2 bytes per data point and displays the data.
3. Retrieves 1002 points of CH1 waveform data and displays the data as physical values in unit of bytes
Retrieves waveform data from point 0 to 1001 at 1 byte per data point and displays the data.
4. Acquires the waveform once, stops, performs automated measurement of waveform parameters (P-P, Avg, and Freq), and displays the result
(Set the CH1 setting to 0.5 V/div and 100 ms/div and input a waveform that activates a trigger.)
Sets the voltage sensitivity to 0.5 V/div and the time axis to 100 ms/div and acquires the waveform once. After stopping waveform acquisition, the program controls the device to measure and display P-P, Avg, and Freq values.
5. Performs calibration and auto setup, stops, and saves waveform data to a file on the storage medium A waveform data file with .wvf/wdf extension is automatically assigned a file name (TEST+number) and saved.
If the storage medium is not inserted, an error appears on the DL and sample program (PC) screens.

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6. Retrieves 1250 points of waveform data being measured on each channel and displays the data as physical values in unit of words.

Only for the DLM2000/DLM4000.

After executing Initialize under "Preset", set the following:

T/div = 500 μ s/div; record length = 1.25 kpoints; trigger level = 500 mV, each channel probe attenuation = 10:1; and V/div = 500 mV/div. Using "Get Word Data(Runtime)", 0 to 1249 points (max.) of waveform data on each channel are acquired and displayed during measurement at a size of 2 bytes per data.