

Pro-face



Pro-Server

2 Way Communicator

with Pro-Studio for Windows

Operation Manual

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PREFACE

Thank you for purchasing Digital's "Pro-Server with Pro-Studio for Windows" for use with Digital's GP series touch panels.

To ensure correct use of this product, be sure to carefully read the manuals included and keep them nearby so that you can refer to them whenever required.

NOTE

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This product omits individual descriptions of each of these rights.

Trademark/Tradename	Right Holder
Microsoft, MS-DOS, Windows 98, Windows 98 SE, Windows Me, Windows NT, Windows 2000, Windows XP, Windows Explorer, Active X, eMbedded Visual C++, eMbedded Visual Basic, Excel, Access	Microsoft, U.S.
Intel, Pentium, MMX	Intel, U.S
Pro-face	Digital Electronics Corporation
VGA, PC/AT	IBM, U.S.
FIX32, FIX-MMI, FIX-FA, iFIX	Intellution, U.S.

The following terms used in this manual differ from the above mentioned formal trade names and trademarks.

Term used in this manual	Formal Trade Name or Trademark
Windows 98	Microsoft® Windows® 98 Operating System
Windows 98 SE	Microsoft® Windows® 98 SE Operating System
Windows Me	Microsoft® Windows® Me Operating System
Windows NT	Microsoft® Windows® NT Operating System
Windows 2000	Microsoft® Windows® 2000 Operating System
Windows XP	Microsoft® Windows® XP Operating System

HOW TO USE THIS MANUAL

Structure of This Manual

This manual, titled “Pro-Server with Pro-Studio for Windows Operation Manual” describes how to use the “Pro-Server with Pro-Studio for Windows” software, hereinafter referred to as “this software”

The following table describes the GP-PRO/PBIII for Windows software’s manuals, which are often referred to in this manual.

Vol. 1	Operation Manual	Describes the procedures for the installation and operation of GP-PRO/PBIII for Windows.
Vol. 2	Tag Reference Manual	Includes detailed descriptions on the “tags” used to specify the functions used on the GP’s screen.
Vol. 3	Parts List	Describes the library of pre-made Parts included with this product as well as a variety of diagram symbols.
Vol. 4	Device/PLC Connection Manual	Describes the procedures to create connections between GP series units and other manufacture PLCs.

In addition to this manual, information on additional/modified functions may be provided as data files.

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MANUAL SYMBOLS AND TERMINOLOGY

This manual uses the following symbols and terminology.

If you have any questions about the contents of this manual, please contact your local GP distributor.

Also, If you have any question about your personal computer or Windows, please contact your local distributor or manufacturer.

Safety Symbols and Terms

This manual uses the following symbols and terms for important information related to the correct and safe operation of this product.

Symbol	Description
 Warning	Incorrect operation resulting from negligence of this instruction may cause death or serious injury.
 Caution	Incorrect operation resulting from negligence of this instruction may cause injury or damage to equipment.
	Indicates Instructions/Procedures that must be performed to ensure correct product use.
	Indicates Actions/Procedures that should not be performed.

General Information Symbols and Terms

This manual uses the following symbols and term for general information.

Symbol	Description
	Provides hints on correct use, or supplementary information.
Reference →	Indicates (manual name, page number) related information.
Pro-Server with Pro-Studio for Windows	Downloading Ethernet (2-Way Driver) information to the GP allows the Host PC to use the network to send and receive data from a PLC, via the GP.
GP-PRO/PB III C-Package	Includes the new GP-PRO/PB III for Windows and Pro-Control Editor software. This single package allows you to perform a wide variety of tasks, from screen creation and editing to logic programming.
PLC	Acronym for Programmable Logic Controller.
FGW	Abbreviation for Factory Gateway

PRECAUTIONS

Product Usage Precautions

To prevent program malfunctions or accidents, be sure to observe the following instructions:

Warning

- ❗ Touch panel switches should NOT be used for a device's Emergency Stop switch. Generally speaking, all industrial machinery/systems must be equipped with a mechanical emergency stop switch that can only be operated by people. Also, for other kinds of systems, similar mechanical switches must be provided to ensure safe operation of that system.

Cautions

- ⊘ Do not turn off your personal computer's power switch during the execution of a program. Also, be sure your PC "Power Management" area's "System Standby" and "Turn off hard disk" are set to "Never".
- Do not change the contents of this product's project files using the Text Editor software.

■ CD-ROM Usage Precautions

To prevent CD-ROM damage or malfunctions, please observe the following instructions:

- Do not remove a CD-ROM disk from the CD-ROM drive while the operation lamp is lit.
- Do not touch the CD-ROM recording surface.
- Do not store the CD-ROM disk in a place where it may be exposed to extremely high or low temperatures, high humidity, or dust.

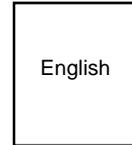
PACKAGE CONTENTS

The Pro-Server with Pro-Studio for Windows package includes the following items. Check that there are no missing items before using the software.

- Pro-Server with Pro-Studio for Windows
Application CD-ROM



- User Registration (Japanese/English)



- Installation Guide (Japanese/English)



OPERATING ENVIRONMENT

■ Pro-Server with Pro-Studio for Windows

Item	Specification	Remark
Personal Computer	PC/AT compatible	Pentium 133MHz or faster processor
Display	VGA (640 x 480) or higher	64 bit color or higher
Hard Disk Space Requirements	20 MB or more	30 MB or more is recommended
Memory Requirements	32 MB or more	128 MB or more is recommended
CD-ROM Drive	Windows compatible	
OS Requirements*1	Windows 98 (English or Japanese)	*2
	Windows Me (English or Japanese)	*2
	Windows NT 4.0 (English or Japanese)	Service Pack 3.0 or higher
	Windows 2000 (English or Japanese)	
	Windows XP (English or Japanese)	*2
Related software	Microsoft Access 97 or later Microsoft Excel 97 or later Browser (IE V4.0 or later)	When using action contents
	Visual Studio 6.0 SP3 or higher	When using Simple DLL Function
Supported languages	Japanese, English	
Printer	Any printers that your OS supports	
Mouse	Windows compatible	Mouse is required for operation.
Ethernet Board	10BASE-2/5/T, 100BASE-T	
Network Configuration	TCP/IP Protocol	Set up from Control Panel.*3
Additional Items	Ethernet Hub, Ethernet cables, etc.	User supplied

The following operating environment is required when you use the OPC Server.

Item	Specification	Remark
OS Requirements	Windows NT 4.0	Service Pack 3.0 or higher
	Windows 2000	
	Windows XP	
Hard Disk Space	100 MB or more	
Memory	64 MB or more	

*1 Pro-Server Ver. 4.5 does not support Windows95.

*2 You can not use this feature with the OPC Server.

*3 Until the TCP/IP protocol is set, Pro-Server with Pro-Studio cannot be used.

MEMO

- Depending on the type of Ethernet hub used, Pro-Server may be unable to transmit data. Be sure to test and confirm the compatibility of Pro-Server with your Ethernet network prior to installing a complete Pro-Server with Pro-Studio for Windows system.
- When using a Switching Hub, if the GP and the Switch Hub are started at the same time, a communication error can occur. If the Switching Hub cannot be started first, Set the GP's [START TIME] to slow the start of the GP.

When installing and using the GP-Viewer, the following system environment is required.

Related Software	Microsoft Internet Explorer Ver. 5.0 or higher	Includes JavaVM (Ver.5.0.3176 or higher)
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MEMO

- When using Microsoft Internet Explorer Ver. 5.0, some of the features may not display as desired. To solve this problem, please use Microsoft Internet Explorer Ver. 5.01 or later, in combination with the latest version of Microsoft Java VM. The latest versions of Microsoft Internet Explorer and Microsoft Java VM can be downloaded from Microsoft's homepage.
- When using GP-Viewer on a PC with GP-Web installed, please be sure the version of GP-Web is 1.5 or later.

■ 2-Way Driver

Hardware

Series Name		Product Name	Model	Built-in Ethernet Unit	External Ethernet Unit	Comment	
GP77Rseries	GP-377Rseries	GP-377RT	GP377R-TC11-24V	×	○	*1	
			GP377R-TC41-24V				
	GP-477Rseries	GP-477RE	GP477R-EG11				
			GP477R-EG41-24VP				
	GP-577Rseries	GP-577RS	GP577R-SC11				
			GP577R-SC41-24VP				
GP-577RT			GP577R-TC11				
		GP577R-TC41-24VP					
GP2000series	GP-2300series	GP-2300L	GP2300-LG41-24V	○	×	-	
			GP-2300T				GP2300-TC41-24V
	GP-2400series	GP-2400T	GP2400-TC41-24V				
			GP-2500series		GP-2500T	GP2500-TC11	○
	GP2500-TC41-24V						
	GP-2500L	GP2500-LG41-24V					
			GP-2500S		GP2500-SC41-24V		
	GP-2501series	GP-2501S	GP2501-SC11		×	○	*1
			GP-2501T		GP2501-TC11		
	GP-2600series	GP-2600T	GP2600-TC11		○	○	*2
GP2600-TC41-24V							
GP-2601series	GP-2601T	GP2601-TC11	×	○	*1		
GLC2000series	GLC2300series	GLC2300L	GLC2300-LG41-24V	○	×	-	
			GLC2300T				GLC2300-TC41-24V
	GLC2400series	GLC2400T	GLC2400-TC41-24V				
			GLC2500series		GLC2500T	GLC2500-TC41-24V	○
	GLC2500-TC41-200V						
	GLC2600series	GLC2600T	GLC2600-TC41-24V				
GLC2600-TC41-200V							
ITseries	IT2400series	IT2400 TypeA	IT2400-TC41-GP	○	×	-	
			IT2400-TC41-GP200V				
		IT2400 TypeB	IT2400-TC41-GLC				
			IT2400-TC41-GLC200V				
Factory Gateway	Factory Gateway	FGW-SE41-24V	○	-	-		

*1 GP Ethernet I/F Unit or the Multi Unit E is required.

*2 GP Ethernet I/F Unit or the Multi Unit E can be attached.

MEMO

The Expansion Ethernet unit is required to use the 2-Way Driver with a GP77R series, GP-2501 series or GP-2601 series unit. Therefore, protocol for the expansion units cannot be used.

You cannot use both the 2-Way Driver and the Ethernet protocol together with a GP77R series, GP-2501 series or GP-2601 series unit.

Reference → "Pro-Server compatible PLC Vendors and Models"

Settings used will differ (IP Addresses Port No., etc.), depending on the type of Ethernet unit used, i.e. built-in type or expansion unit type.

Reference → "Using an Ethernet protocol with the 2-Way Driver"

■ Software

GP-PRO/PB III for Windows (Screen creation software)

Screen Creation Software	Language	Software Version	System Version				
			GP70	GP77R	GP377R	GP2000	Factory Gateway
GP-PRO/PBIII for Windows	Japanese	Ver.3.0	Ver.1.51	Ver.2.40	-	-	-
	ML	Ver.3.0	Ver.1.51	Ver.2.40a	-	-	-
	Japanese	Ver.4.0	Ver.1.54	Ver.2.60	Ver.2.60	-	-
	Japanese/ML	Ver.5.0	Ver.1.55	Ver.2.64	Ver.2.64	Ver.3.10	-
	Japanese	Ver.6.0	Ver.1.55	Ver.2.68	Ver.2.68	Ver.3.30	-
	ML	Ver.6.0	Ver.1.55	Ver.2.68	Ver.2.68	Ver.3.30	Ver.3.42
	Japanese/ML	Ver.6.1	Ver.1.55	Ver.2.69	Ver.2.69	Ver.3.50	Ver.3.42
	Japanese/ML	Ver.6.2 SP1	Ver.1.55	Ver.2.69d	Ver.2.69d	Ver.3.53	Ver.3.42
	Japanese/ML	Ver.6.3 SP2	Ver.1.55d	Ver.2.69j	Ver.2.69j	Ver.3.53b	Ver.3.56
	Japanese/ML	Ver.7.0	Ver.1.55e	Ver.2.69k	Ver.2.69k	Ver.4.00	Ver.3.56

The following restrictions apply to Pro-Server and any related software.

Pro-Server and GP-PRO/PB III for Windows

Feature	Compatibility Requirement
GP screen capture (capturing JPEG files)	GP-PRO/PB III for Windows V6.0 or later
LS area extension	GP-PRO/PB III for Windows V6.0 or later
Online screen upload (GP-Viewer)	GP-PRO/PB III for Windows V6.0 or later
CF Card Online Write	GP-PRO/PB III for Windows V6.1 or later
CF Card access all File Names	GP-PRO/PB III for Windows V7.0 or later
Increased number of Alarm Blocks	GP-PRO/PB III for Windows V7.0 or later

■ Pro-Server compatible PLC Vendors and Models

Vendor Name	Device/PLC Type (in GP-PRO/PBIII for Windows)	2-Way Driver				Comment
		GP77R GP-2501 GP-2601	GP-2500 GP-2600 GLC2500 GLC2600	GP-2300 GP-2400 GLC2300 GLC2400	FGW	
DIGITAL Electronics	MEMORY LINK SIO Type	O	O	O	O	
	MEMORY LINK Ethernet Type	X	O	O	O	*2
Mitsubishi Electric	MITSUBISHI MELSEC-AnN(LINK)	O	O	O	O	
	MITSUBISHI MELSEC-AnN(CPU)	O	O	O	O	
	MITSUBISHI MELSEC-AnA(LINK)	O	O	O	O	
	MITSUBISHI MELSEC-AnA(CPU)	O	O	O	O	
	MITSUBISHI MELSEC-A(JPCN1)	X	O	X	X	*1
	MITSUBISHI MELSEC-A(ETHER)	X	O	O	O	*2
	MITSUBISHI MELSEC-FX(CPU)	O	O	O	O	
	MITSUBISHI MELSEC-FX(CPU2)	O	O	O	O	
	MITSUBISHI MELSEC-FX2(LINK)	O	O	O	O	
	MITSUBISHI MELSEC-FX 1:N Comm.	O	O	O	O	
	MITSUBISHI MELSEC-QnA(LINK)	O	O	O	O	
	MITSUBISHI MELSEC-QnA(CPU)	O	O	O	O	
	MITSUBISHI MELSEC-Q(ETHER)	X	O	O	O	*2
	MITSUBISHI MELSECNET/10	X	◆	X	X	*3
	MITSUBISHI FREQROL SERIES CC-Link Type	X	O	X	X	*1
Omron	OMRON SYSMAC-C SERIES	O	O	O	O	
	OMRON SYSMAC-C 1:n Comm.	O	O	O	O	
	OMRON SYSMAC-CV SERIES	O	O	O	O	
	OMRON SYSMAC-CS1 SERIES	O	O	O	O	
	OMRON SYSMAC-CS1(ETHER)	X	◆	◆	◆	*2 *3
OMRON THERMAC NEO SERIES	O	O	O	O		
Sharp Corp.	SHARP NewSatellite JW Series	O	O	O	O	
Yokogawa Electric Corp.	YOKOGAWA FACTORY ACE 1:1 Comm.	O	O	O	O	
	YOKOGAWA FACTORY ACE 1:n Comm.	O	O	O	O	
	YOKOGAWA FA-M3 (ETHER)	X	O	O	O	*2
Fuji Electric Co.,Ltd.	FUJI MICREX-F SERIES	O	O	O	O	
	FUJI MICREX-F SERIES (FLT)	O	O	O	O	
	FUJI MICREX-F SERIES (T LINK)	X	O	X	X	*1
	FUJI FLEX-PC (LINK)	O	O	O	O	
	FUJI FLEX-PC (CPU)	O	O	O	O	
	FUJI INVERTER	O	O	O	O	
	FUJI TEMPERATURE PXR	O	O	O	O	
Toyota Machine Warks, Ltd.	TOYOTA TOYOPUC-PC2 SERIES	O	O	O	O	
	TOYOTA TOYOPUC-PC2 1:n Comm.	O	O	O	O	
	TOYOTA TOYOPUC-PC3J SERIES	O	O	O	O	
	TOYOTA TOYOPUC-PC3J 1:n Comm.	O	O	O	O	
Yaskawa Electric Corp.	YASUKAWA Memocon-SC SERIES	O	O	O	O	
	YASUKAWA GL120/130 SERIES	O	O	O	O	
	YASUKAWA MP2000/920 (ETHER)	O	O	O	O	
	YASUKAWA PROGIC8 SERIES	O	O	O	O	
	YASUKAWA MP900/CP9200SH SERIES	O	O	O	O	
YASUKAWA INVERTER	O	O	O	O		
Hitachi Ltd.	HITACHI HIDIC-S10a SERIES	O	O	O	O	
	HITACHI HIDIC-S10a (JPCN1)	X	O	X	X	*1
	HITACHI HIZAC-EC SERIES	O	O	O	O	
Hitachi Industrial Equipment Systems.	HITACHI IES SJ300/L300P Series	O	O	O	O	
	HITACHI HIDIC H SERIES	O	O	O	O	
	HITACHI HIDIC H2 SERIES	O	O	O	O	
	HITACHI HIDIC-H (ETHER)	X	◆	◆	◆	*2 *3

Vendor Name	Device/PLC Type (in GP-PRO/PBIII for Windows)	2-Way Driver				Comment
		GP77R GP-2501 GP-2601	GP-2500 GP-2600 GLC2500 GLC2600	GP-2300 GP-2400 GLC2300 GLC2400	FGW	
Toshiba Corp.	TOSHIBA PROSEC-EX2000 SERIES	0	0	0	0	
	TOSHIBA PROSEC-T SERIES	0	0	0	0	
	TOSHIBA PROSEC-T (ETHER)	X	0	0	0	*2
Matsushita Electric Works, Ltd.	MATSUSHITA MEWNET-FP SERIES	0	0	0	0	
Koyo Electronics Industries Co.	KOYO KOSTAC-SG8 SERIES	0	0	0	0	
	KOYO KOSTAC SR21/22 SERIES	0	0	0	0	
	KOYO DL-305 SERIES	0	0	0	0	
	KOYO DL-205/405 SERIES	0	0	0	0	
Toshiba Machine Co.,	TOSHIBA TC200 SERIES	0	0	0	0	
	TOSHIBA MACHINE TC200-S SERIES	0	0	0	0	
GE Fanuc AutoMation	GE FANUC SERIES 90 SNP-X	0	0	0	0	
	GE FANUC SERIES 90-30/70 SNP	0	0	0	0	
Fanuc Motion Controller	FANUC POWER MATE SERIES	0	0	0	0	
IDEC Izumi Corp.	IZUMI IDEC_1	0	0	0	0	
	IZUMI IDEC_2	0	0	0	0	
	IZUMI IDEC_3	0	0	0	0	
	IZUMI MICRO3	0	0	0	0	
	IDEC FC3/FC4A Series	0	0	0	0	
Siemens AG	SIEMENS S5 90-115 SERIES	0	0	0	0	
	SIEMENS S5 135-155 SERIES	0	0	0	0	
	SIEMENS S5 3964(R) Protocol	0	0	0	0	
	Siemens S7-200 PPI	0	0	0	0	
	Siemens S7-200 via MPI	0	0	0	0	*3
	Siemens S7-300/400 via MPI	0	0	0	0	*5
	SIEMENS S7-300/400 (ETHER)	0	0	0	0	*6
	SIMATIC S7 via 3964/RK512	0	0	0	0	
	SIMATIC 545/555 CPU	0	0	0	0	
Rockwell (Allen-Bradley)	Allen Bradley PLC-5 SERIES	0	0	0	0	
	Allen Bradley SLC500 SERIES	0	0	0	0	
	AB Data Highway Plus	X	◆	X	X	*3
	AB Slc500 DH485	◆	◆	◆	X	*3
	AB Remote IO	X	◆	X	X	*3
	Allen Bradley ControlLogix DFI	0	0	0	0	
	AB ControlLogix (EtherNet/IP)	0	0	0	0	*6
	Allen Bradley SLC5/05 (ETHER)	X	0	0	0	*3
Keyence Corp.	KEYENCE KZ300 SERIES	0	0	0	0	
	KEYENCE KZ-A500 (CPU)	0	0	0	0	
	KEYENCE KZ-A500 (LINK)	0	0	0	0	
	KEYENCE KV-10_80RW/TW SERIES	0	0	0	0	
	KEYENCE KV-10_40A/D SERIES	0	0	0	0	
	KEYENCE KV-700 SERIES (CPU)	0	0	0	0	
Shinko Electric	SHINKO SELMART SERIES	0	0	0	0	
Matsushita Electric	MATSUSHITA MINAS-A/S SERIES	0	0	0	0	
	Panadac 7000 SERIES	0	0	0	0	
Modicon Corp.	Modicon Modbus (MASTER)	0	0	0	0	
	Modicon Modbus (SLAVE)	0	0	0	0	
	Modicon Modbus Plus	X	◆	X	X	*3
FATEK	FATEK FACON FB	0	0	0	0	

Vendor Name	Device/PLC Type (in GP-PRO/PBIII for Windows)	2-Way Driver				Comment
		GP77R GP-2501 GP-2601	GP-2500 GP-2600 GLC2500 GLC2600	GP-2300 GP-2400 GLC2300 GLC2400	FGW	
ORIM VEXTA	ORIM VEXTA E1 SERIES	O	O	O	O	
Yamatake Corporation	YAMATAKE SDC SERIES	O	O	O	O	
Toho Electronics Inc.	TOHO ELECTRONICS TTM SERIES	O	O	O	O	
RKC Instrument Inc.	RKC CB/SR-Mini SERIES (MODBUS)	O	O	O	O	
	RKC CB/REX-F/LE100 (RKC)	O	O	O	O	
Shinko Technos Corp.	SHINKO TECHNOS INDICATING	O	O	O	O	
Fenwal Co.,Ltd	FENWALI AL SERIES	O	O	O	O	
JT Engineering inc.	JTE Analyzer	O	O	O	O	
MEIDENSHA CORPORATION.	MEIDENSHA Ethernet	X	O	O	O	*2
SHIMADEN Co.,Ltd.	SHIMADEN CONTROLLER	O	O	O	O	
CHINO Corp.	CHINO CONTROLLER (MODBUS)	O	O	O	O	
Schneider Electric.	Schneider TSX via UNI-TELWAY	O	O	O	O	*6
	Schneider Modbus TCP (ETHER)	O	O	O	O	*6
	Schneider Modbus RTU 1:n comm.	O	O	O	O	*6
PROFIBUS	PROFIBUS-DP	X	O	X	X	*1
INTERBUS	INTERBUS SLAVE	X	O	X	X	*1
JPCN-1	JPCN-1 (Standard)	X	O	X	X	*1
DeviceNet	DeviceNet Slave I/O	X	O	X	X	*1
TOSHIBA SCHNEIDER	TOSHIBA SCHNEIDER INVERTER	O	O	O	O	
Ubon	Ubon UPZ Series	O	O	O	O	

O...Supported

◆...Supported with restriction (See *3)

X...Not Supported

MEMO

Protocols before V1.2 can be used, however it cannot detect write errors.

Although you can use protocol older than V1.2, it cannot detect a write error.

You can check the protocol version on “Status Monitor”.

Reference → “6.2 GP Status Monitoring”

- *1 An expansion Ethernet unit is required to use the 2-Way Driver with GP77R/GP-2501/GP-2601 series units. The attachment of this unit prevents the attachment of any other expansion units, which in turn prevents the use of any other protocols.
Since Expansion Units cannot be used with GP-2300/GP-2400 Series, GLC2300/GLC2400 Series and Factory Gateway units, Expansion Unit protocols also cannot be used.
- *2 You cannot use both the 2-Way Driver and Ethernet protocols at the same time on GP77R/GP-2501/GP-2601 series units.
- *3 You can use the 2-Way Driver together with listed protocols, however, there are device restrictions for Pro-Server access. Screens only need to be created for the devices that can be accessed.

Protocol Name	Restriction
MITSUBISHI MELSECNET/10	Can access only the link device, LS Area and symbols designated in a GP-PRO/PB III project file (.prw).
AB Slc500 DH485	Can access only the LS Area and symbols designated in a GP-PRO/PB III project file (.prw).
Siemens S7-200 via MPI	
OMRON SYSMAC-CS1 (ETHER)	
HITACHI HIDIC H (ETHER)	
Allen Bradley SLC5/05 (ETHER)	
Allen Bradley PLC-5 Data Highway Plus	
AB Remote I/O	Can access only the LS Area.
Modicon Modbus Plus	

- *4 This protocol cannot be used with the 2-Way Driver.
- *5 When accessing a device connected one-to-one with a PLC, it is not necessary to register Symbols with GP-PRO/PBIII for Windows.
However, when connecting to multiple PLC units or accessing an Expansion device, Symbols must be registered with GP-PRO/PBIII for Windows.
- *6 Simultaneous use of the 2-Way Driver is possible, however, only the LS area and symbols set via the C-Package03 project file can be accessed. The Factory Gateway cannot be used to enter protocol settings.

1

Introduction

This chapter describes how to use this software to configure a system in which you can gather data from devices/PLCs connected to networked GPs.

- 1.1 Outline
- 1.2 What is the 2-Way Driver?
- 1.3 System Configuration
- 1.4 Application Interfaces
- 1.5 Provider Information Outline
- 1.6 Overview of Data View
- 1.7 Configuring the System

1.1 Outline

The Pro-Server software reads/writes/collects data to and from PLC, and GP's data via a network (Ethernet).

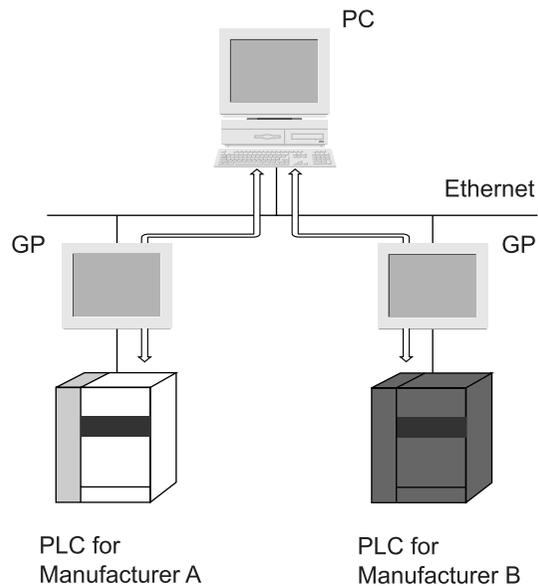
Pro-Server on your PC lets you use commercially available application software or programs you have created to read/write/collect data on the GPs and PLCs connected to the network.

It can also save and playback (Playback Feature) the saved data.

1.2 What is the 2-Way Driver?

The 2-Way Driver is software that allows the host PC to access data on GPs or PLCs connected to a network (Ethernet). One advantage of this software is that you can transfer data to the host PC, regardless of type of PLC being used.

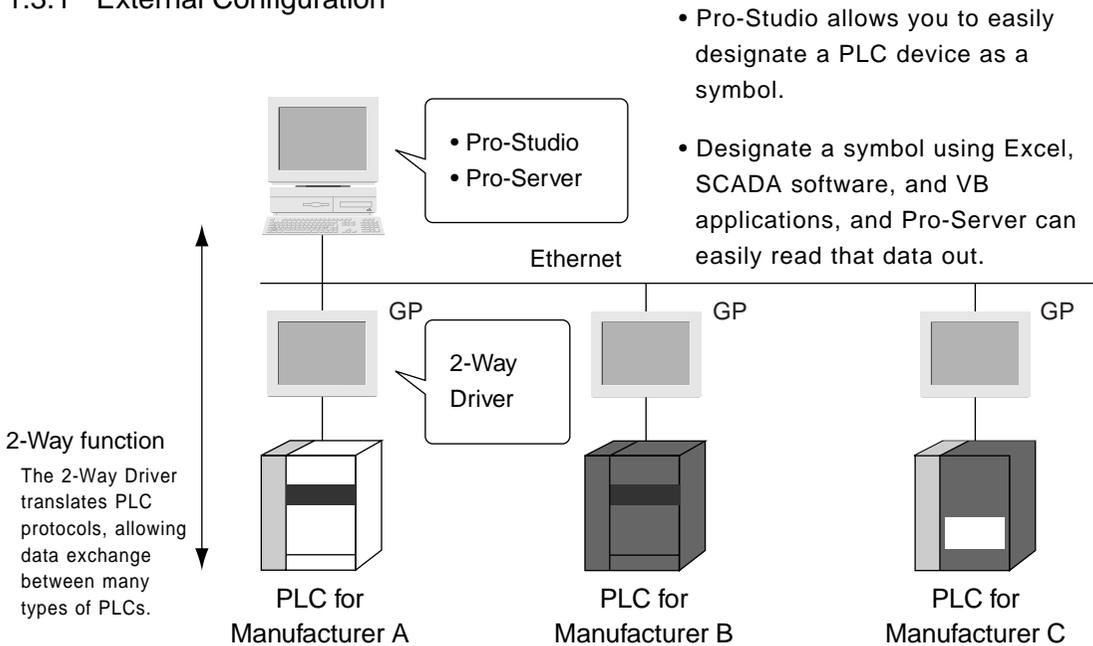
To use the 2-Way function, Pro-Server software and an Ethernet compatible GP unit are required.

**MEMO**

The GP reads and writes data via the 2-Way driver only when it is not serving as a display and operation panel, which is its first priority. Also, reading or writing a large volume of data may cause the GP to temporarily stop refreshing its display.

1.3 System Configuration

1.3.1 External Configuration



- Pro-Studio allows you to easily designate a PLC device as a symbol.
- Designate a symbol using Excel, SCADA software, and VB applications, and Pro-Server can easily read that data out.

Pro-Studio (Performs Network project file editing/setting)

This software is used to set and register symbols for the GPs and PLCs designated as data providers.

Physical IP addresses, PLC device addresses, etc. can all be converted into symbols.

Pro-Server (Performs Data exchange between applications and GPs)

This software that communicates with GPs according to the requests made by Excel, VB, SCADA or other applications.

2-Way Driver (Protocol conversion driver built into GPs)

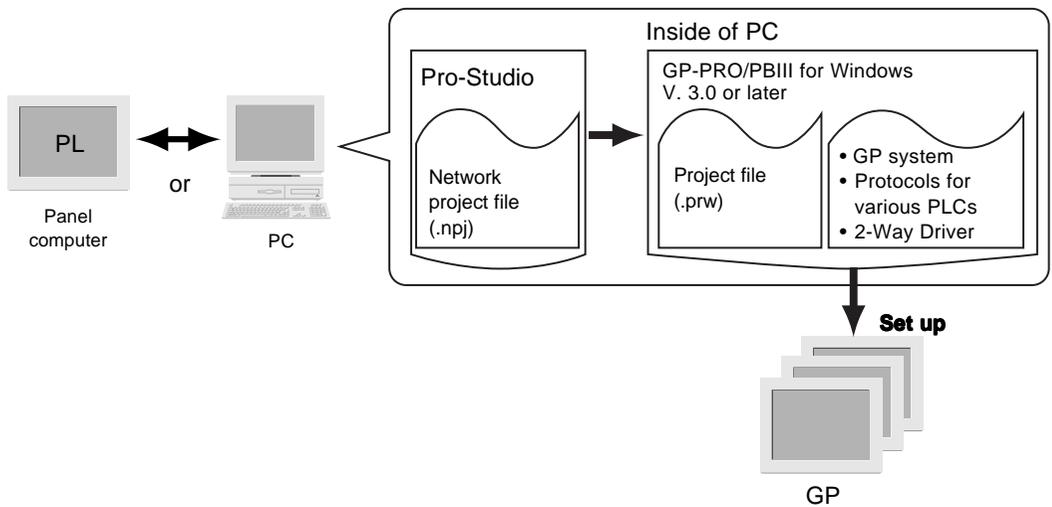
This driver selects the applicable PLC protocol, based on the Pro-Server read/write command. GP77R series units requires setup and then transfer to the GP unit via the screen editor software GP2000 and GLC2000 series unit 2-Way Driver software is factory installed.

1.3.2 Internal Configuration

Off-line

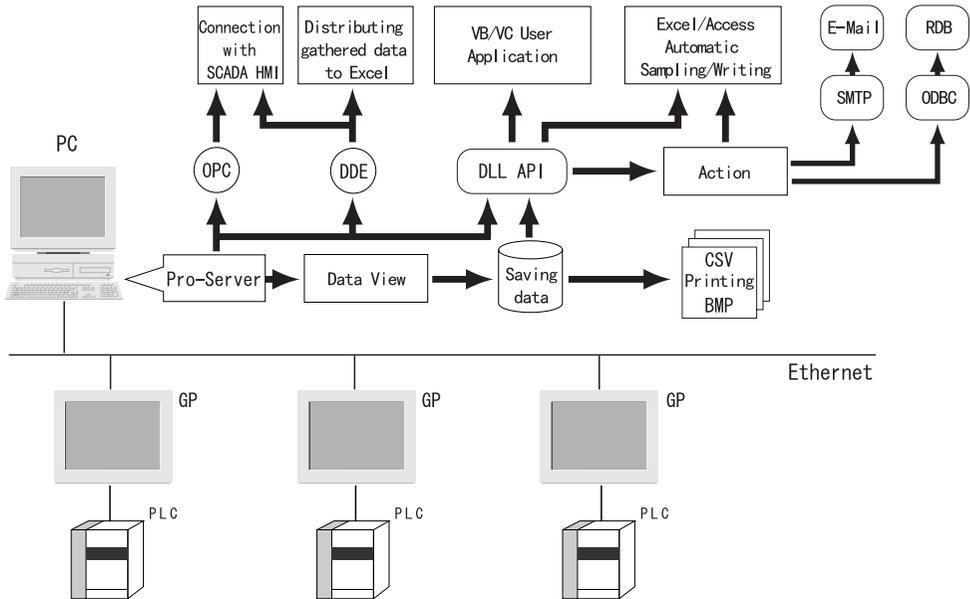
Inside your PC, information such as node names of the connected GPs, symbol names for accessing the PLC devices, and information read from the GPs is all set up and controlled via this software. The file in which this information is stored is called a network project file (*.npj) and is used by Pro-Server for its data exchange with application programs.

To exchange data with the host PC, each GP must have the 2-Way Driver and the network project information downloaded to it, along with the GP's screen information, via GP-PRO/PBIII for Windows Ver. 3.0 or later. The 2-Way Driver is factory installed in the GP2000 and GLC2000 Series units.



On-line

In response to an application's request, this software accesses PLC data, by way of the GP, using the network project file. Prior to using Pro-Server, be sure to first use your PC's GP-PRO/PBIII for Windows software to download the "2-Way Driver" and your PLC's protocol to the GP unit.



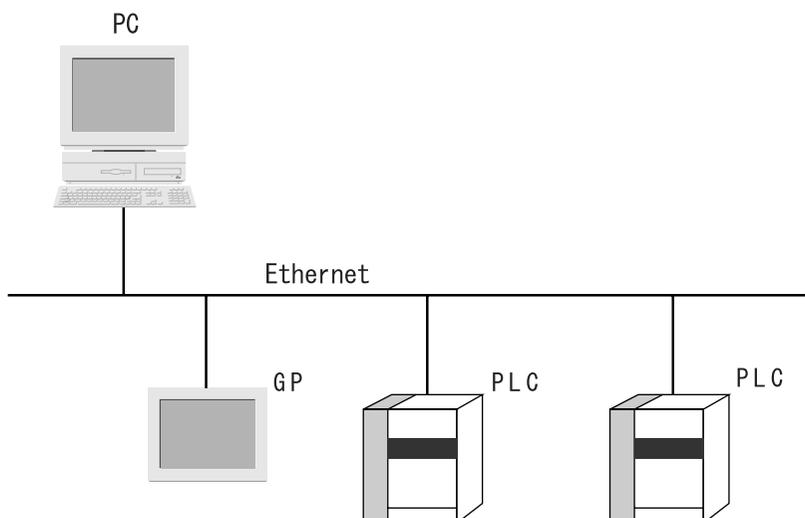
MEMO

- Transferring screen data in on-line mode or downloading a network project file, will temporarily cause the Transfer screen to appear and all other data transfer operations to stop.
- After screen transfer is completed, the screen will re-activate and regular operation will resume.

Using an Ethernet protocol with the 2-Way Driver

Pro-face's GP2000 (GP-2501 does not support this function) and GLC2000 Series units can simultaneously use an Ethernet communication protocol and the 2-Way Driver feature to communicate with a PLC. However, the IP address and the Port No. used for differ depending on whether the internal Ethernet I/F or the Expansion Ethernet I/F is used.

Network with only one GP Ethernet I/F



Using the GP/GLC's internal Ethernet I/F to communicate with a PLC allows you to also use the 2-Way Driver feature. However, while you will need only one IP Address, you will need to designate two Port No.s. One will be for when you transfer data to a PLC, and the other will be when using the 2-Way feature.

In order to transfer data to a PLC, you will need to enter your GP/GLC unit's Ethernet settings via the OFFLINE mode's [INITIALIZE] -> [PLC SETUP] -> [PLC SETUP] -> [SETUP ETHERNET INFORMATION] screen. However, the Subnet Mask and IP Address must be entered in the [PLC SETUP] -> [SETUP ETHERNET EXT. INFORMATION] screen. This data must also be entered in the GP-PRO/PBIII for Windows software's Project Manager screen [GP Setup] menu's [Communication Settings] tab.

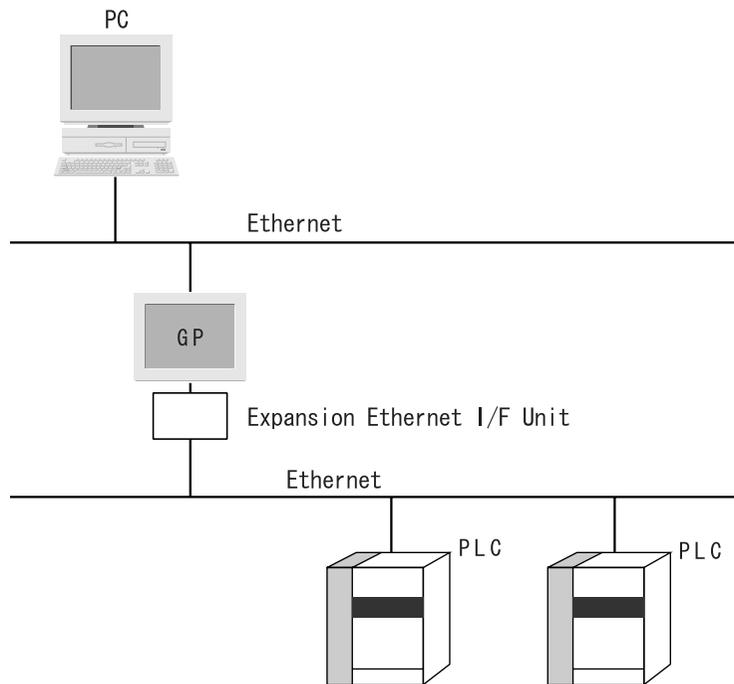
The entering of Ethernet settings for communication using the 2-Way Driver feature is done via the previously mentioned OFFLINE mode. Select the [INITIALIZE] -> [PLC SETUP] -> [EXPANSION SETTINGS] -> [ETHERNET SETUP] area, and enter the required setting data there. You need to also enter the required settings in the Pro-Studio program's [Register/Edit Node] area, and the [Port No.] in the [Configure] -> [Network] area.

The following table describes what each setting is used for.

Setting	PLC Transfer Settings	2-Way Driver Settings	Remarks
IP Address	O	X	These settings apply to a single Ethernet I/F and only one setting value can be entered. When the PLC Transfer Settings are not entered, the 2-Way Driver Settings will be enabled.
Subnet Mask	O	X	
Gateway (IP Route Address)	O	X	
Port No.	O	O	Be sure the Port No.s used are not the same. Port numbers are allocated continuously for a total of 10 No.s, starting from the 2-Way Driver Port No. entered.

O: Setting enabled X: Setting disabled

Network with GP's embedded Ethernet and the extended Ethernet I/F unit



After attaching the Expansion Ethernet I/F Unit, your GP unit is now equipped with two Ethernet I/F units. This can separate the network between PLC-GP and GP-PC to break up traffic.

(The Ethernet Expansion Unit cannot be used with the GP-2300, GP-2400, GLC2300 or GLC2400 series units.)

The Expansion Ethernet I/F Unit is used for PLC data transfer and the internal Ethernet I/F is used for data transfer via the 2-Way Driver.

Use of the Expansion Ethernet I/F Unit will require the setting of a separate IP Address.

In order to transfer data to a PLC, you will need to enter your GP/GLC unit's Ethernet settings via the OFFLINE mode's [INITIALIZE] -> [PLC SETUP] -> [PLC SETUP] -> [SETUP ETHERNET INFORMATION] screen. However, the Subnet Mask and IP Address must be entered in the [PLC SETUP] -> [SETUP ETHERNET EXT. INFORMATION] screen. This data must also be entered in the GP-PRO/PBIII for Windows software's Project Manager screen [GP Setup] menu's [Communication Settings] tab.

The entering of Ethernet settings for communication using the 2-Way Driver feature via the internal Ethernet I/F is done using the GP unit's previously mentioned OFFLINE mode. Select the [INITIALIZE] -> [PLC SETUP] -> [EXPANSION SETTINGS] -> [ETHERNET SETUP] area, and enter the required setting data there. Also, enter the required settings in the Pro-Studio program's [Register/Edit Node] area. Also, enter the [Port No.] in the [Configure] -> [Network] area.

The following table describes what each setting is used for.

Setting	PLC Transfer Settings	2-Way Driver Settings	Remarks
IP Address	O	O	The PLC communication settings used are allocated to the Expansion Ethernet I/F Unit, and the 2-Way Driver settings are allocated to the GP's internal Ethernet I/F.
Subnet Mask	O	O	
Gateway (IP Route Address)	O	O	
Port No.	O	O	

O: Setting enabled X: Setting disabled

Reference → "2-Way Driver"

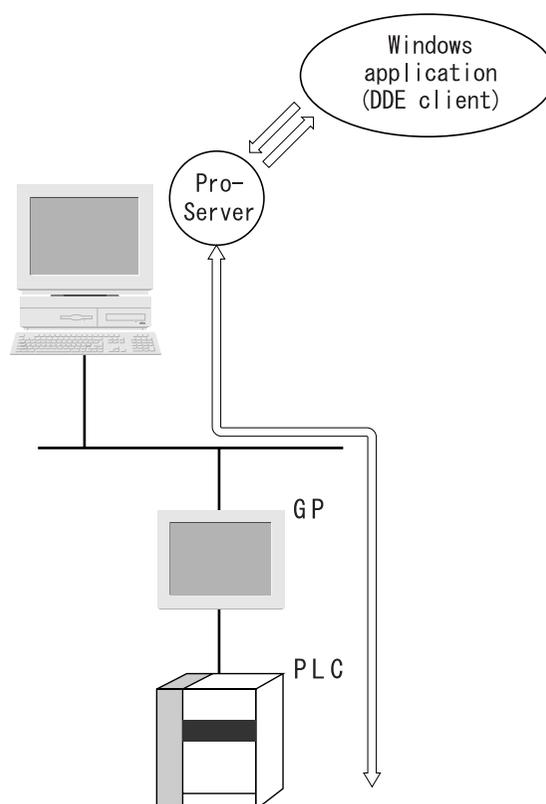
1.4 Application Interfaces

1.4.1 DDE function Outline

The DDE (Dynamic Data Exchange) function can be used with your PC's commercial applications (SCADA or MMI software) and Excel, which supports the DDE client function that provides for program-less data exchange.

Once a DDE link is established, Pro-Server monitors the internal data and, if a stored value changes, notifies the client of the change. Pro-Server provides the client with the data being monitored when a read-out request is received and writes the data when a write request is received.

DDE function



MEMO

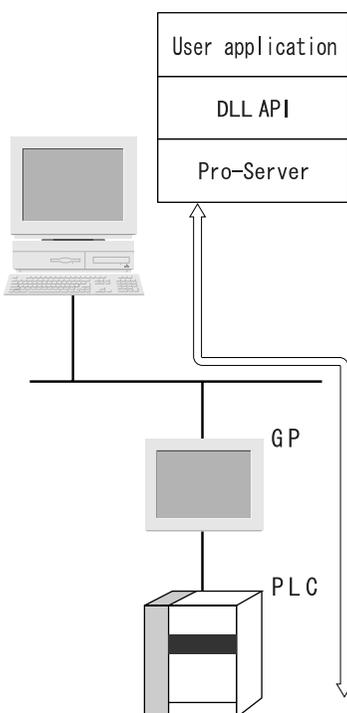
Excel's client feature does not support data write, so the DDE's write feature cannot be used. When you write data by Excel, use the VBA Support Function.

Reference → "3.5 Using the VBA Support Function"

1.4.2 Simple DLL Function

The applications you create with Visual Basic or Visual C will request Pro-Server to read/write PLC data via a GP. The function (API) for this is provided in the form of a DLL.

Simple DLL Connection

**MEMO**

In environments where data transfer errors can frequently occur, be sure your applications include a data transfer retry feature.

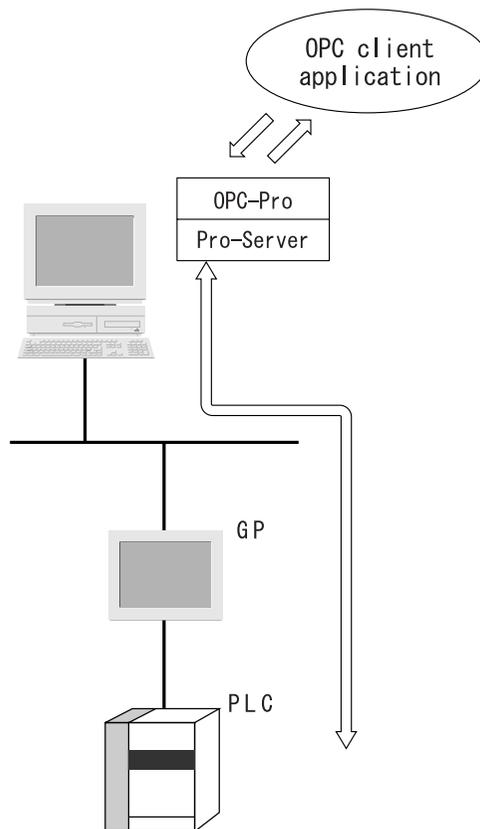
1.4.3 OPC Interface Function

Installing a Pro-Server OPC server allows you to use applications that have an OPC client function, such as Intellution's iFIX, as well as others.

The OPC interface function can only be used on a Windows NT, Windows 2000 or Windows XP system.

However, the security level of Windows 2000 must be set to the same as that used by Windows XP. For setting information, see Appendix 6 Changing Windows XP Security Levels.

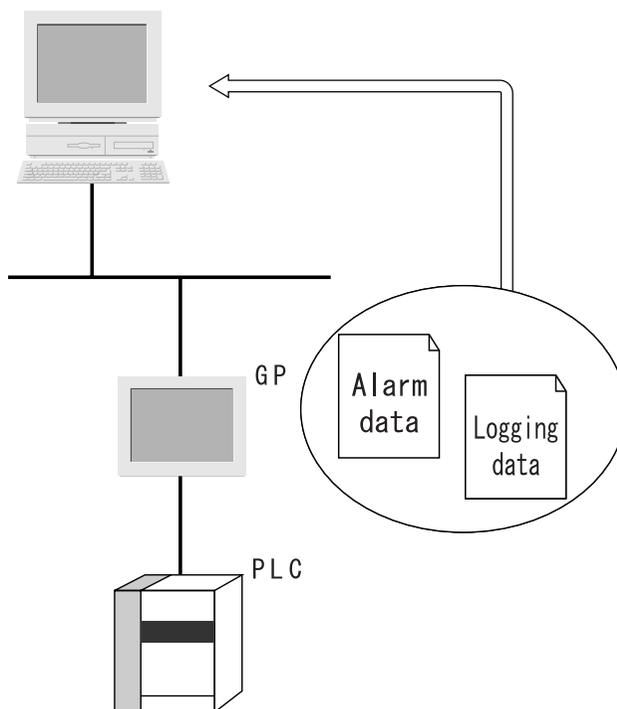
OPC Interface Design



1.4.4 SRAM Backup Data Storage Function

The backup data in the SRAM of each GP can be easily transferred to the host PC. This SRAM backup function is available for logging data, trend data, sampling data, alarm data (log/history), and others.

SRAM Backup Function



For details about the types of data you can transfer to the host PC, refer to the GP-PRO/PBIII for Windows Tag Reference Manual.

Reference → "GP-PRO/PBIII for Windows Tag Reference Manual"

MEMO

- You can assign alarm data (active) to the alarm block. By default, you can take it into Pro-Server by designating Alarm Block1.
Reference → "3.6 Saving Backup Data in SRAM"
- Simultaneous upload of multiple types of data from a single GP is not possible.

* You cannot use this feature on Factory Gateway.

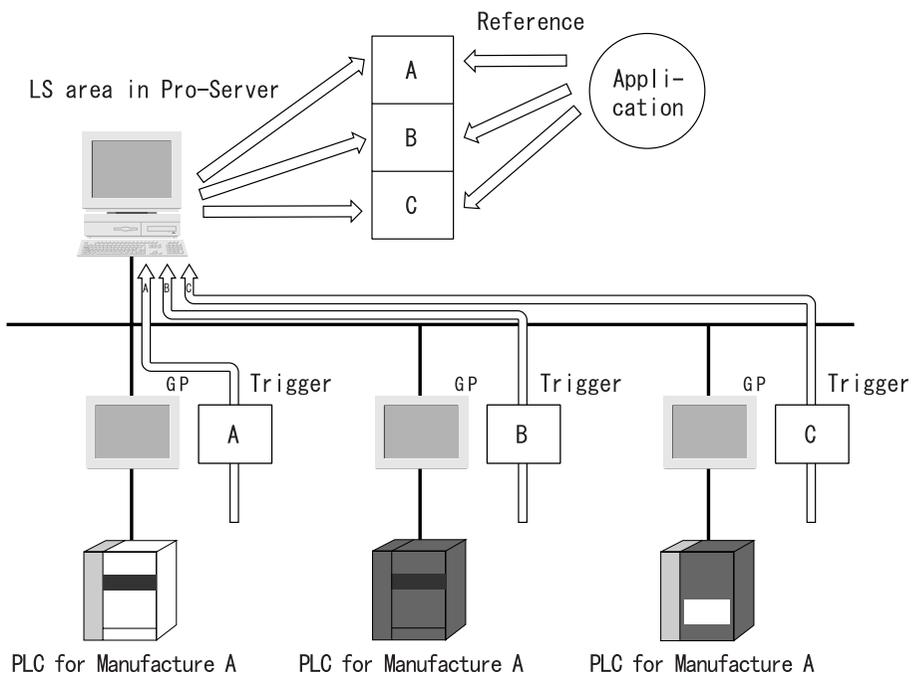
1.5 Provider Information Outline

1.5.1 Providing Information to the Host

When a designated trigger's condition(s) set by Pro-Studio is/are satisfied, PLC data is collected by the GP's resident 2-Way Driver and provided to the host PC. Therefore, since Pro-Server can temporarily store this data in the PC's memory, overall network traffic can be reduced.

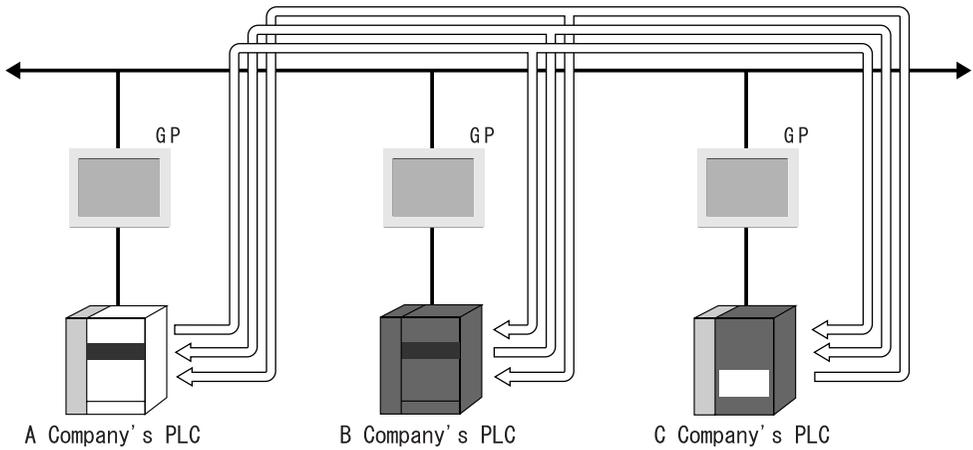
For the procedure to register symbols in Pro-Server's PC memory area, refer to 3.2 Registering Symbols.

Reference → "3.2 Registering Symbols"



1.5.2 Providing Information between GPs

Even if your system lacks a host PC or Pro-Server, you can transfer the provider information setting file setup in Pro-Studio to each GP. This then allows device data to be exchanged, via the GP, between PLCs on the network, at a predetermined times or event, regardless of the brand of PLC used.



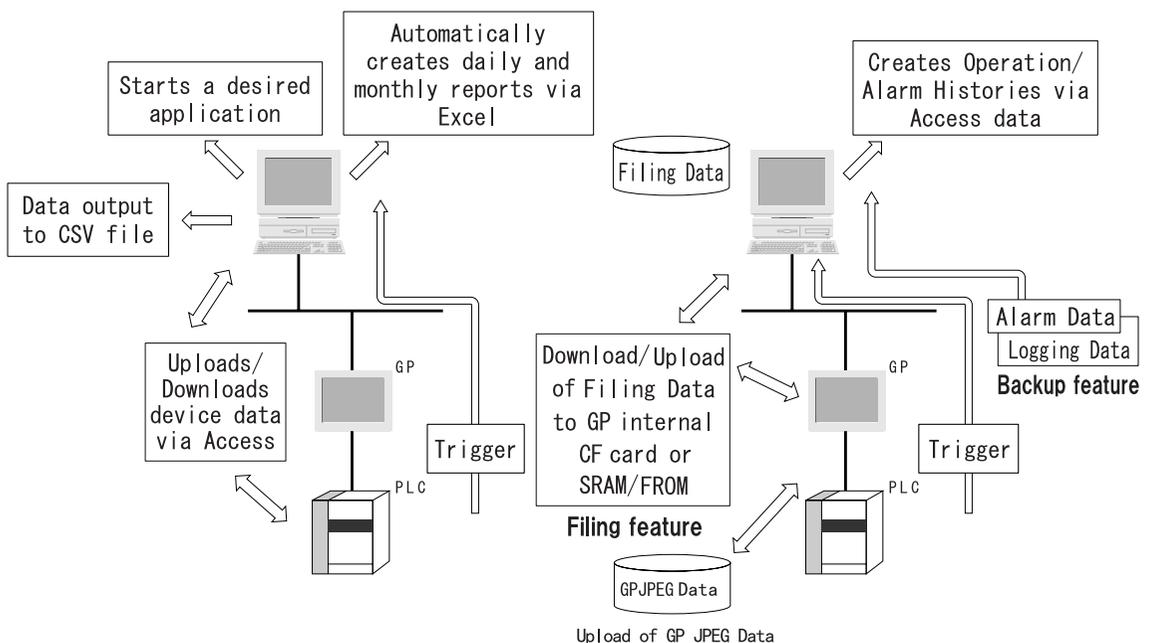
1.5.3 Action Feature Overview

When the designated trigger conditions are fulfilled, an “Action” feature allows an application in a remote PC on the network to be activated. Also, the program triggered by the Action feature is called the “Action Contents”.

Action Features

- Automatic Upload of Access Data (requires Microsoft Access)
- Automatic Download of Access Data (requires Microsoft Access)
- Writes Data to Excel Book (requires Microsoft Excel)
- Download of Excel Recipe (requires Microsoft Excel)
- Upload of GP Log Data
- Automatic Upload of GP Filing Data
- Automatic Download of GP Filing Data
- Writes Data to E-Mail
- Alarm Log (with Sound Alert Feature) (requires Microsoft Access)
- Data Upload to Database (requires Microsoft Access/Excel)
- Data Download from Database (requires Microsoft Access/Excel)
- Start Application
- Upload of GP JPEG Data
- Writes Data to CSV File
- Writes Data from CSV File
- Create Report using Excel

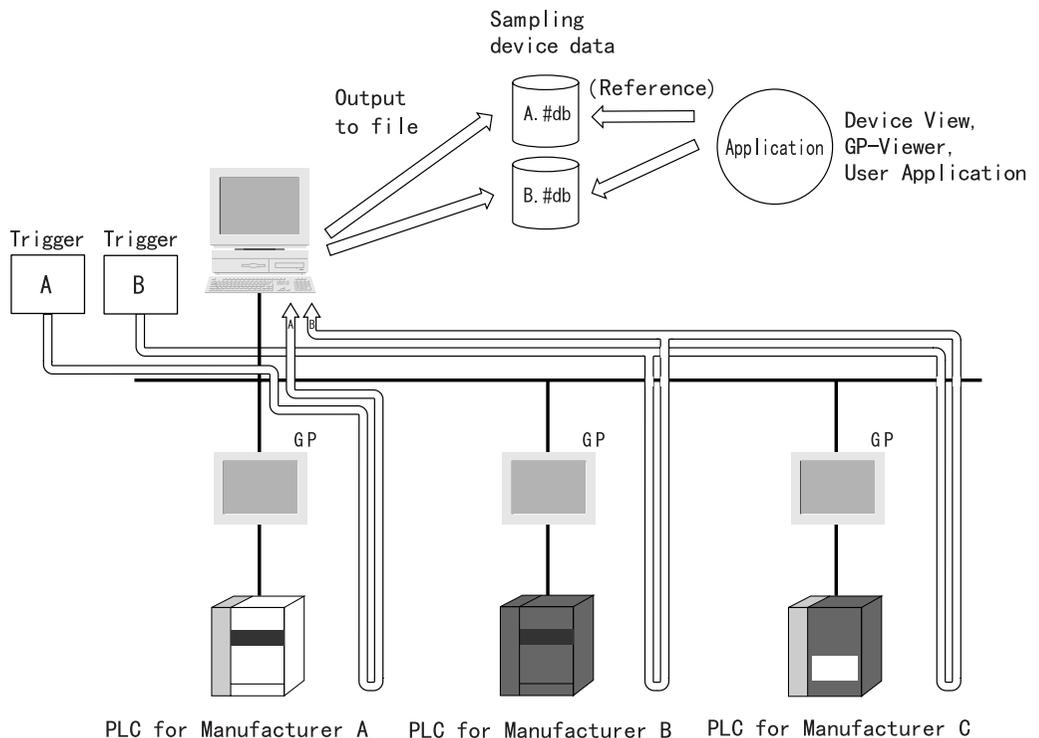
Action Feature Overview



1.6 Overview of Data View

When a designated trigger's condition(s) set by Pro-Studio is/are satisfied, PLC data is collected by the GP's resident 2-Way Driver and saved on the server PC. Data View allows you to display the collected data on Pro-face's exclusive browser (GP-Viewer, Device View) in real-time. You can also change the data collection condition or set the synchronization style with GPs (GP-Viewer only) using Data View. Device data of multiple PLCs can be collected at the same time (Device View only).

In addition to the above, you can playback device data already collected on Data View (Playback Feature) or on user-created applications (System Time Bar).

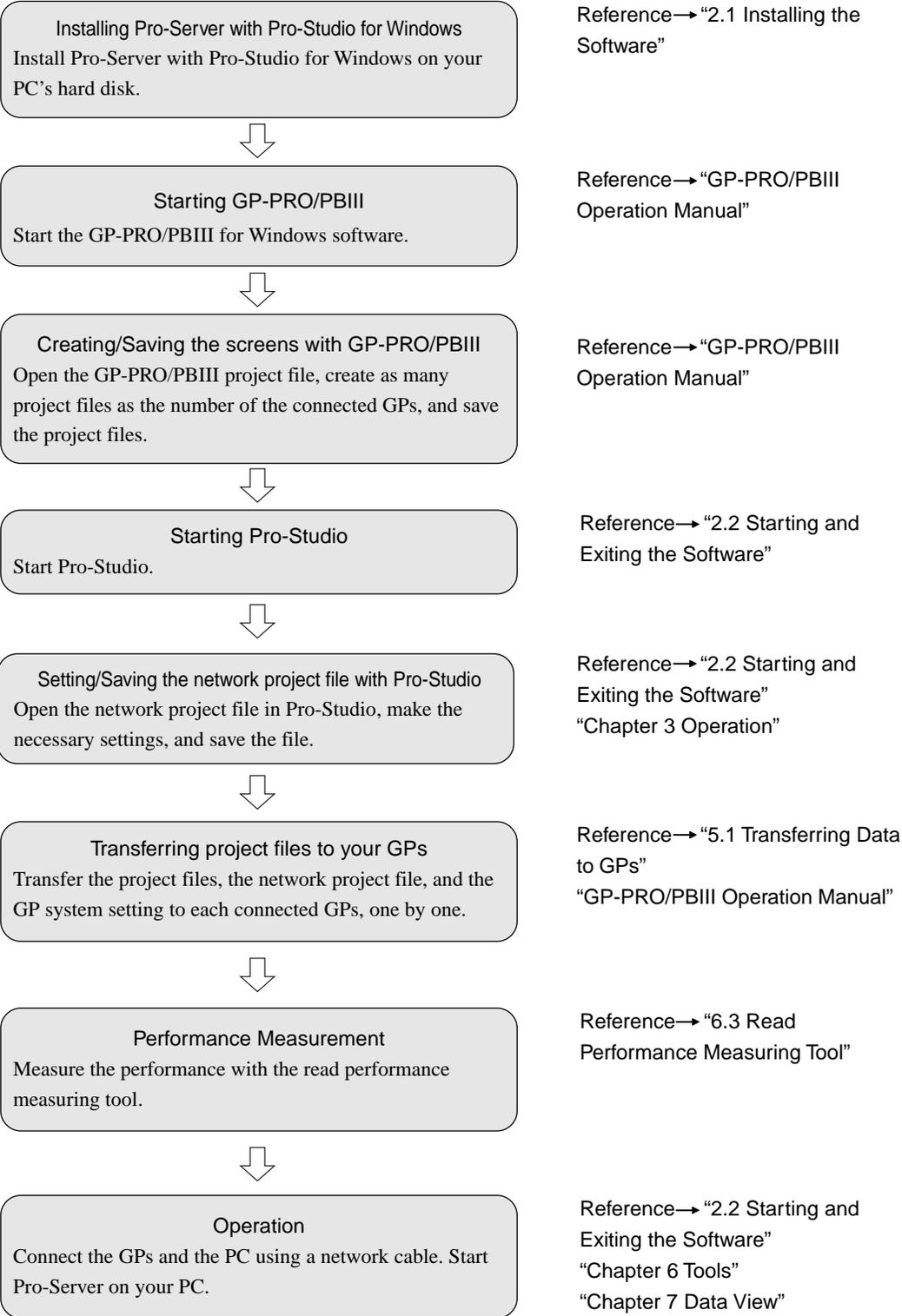


MEMO

Collected device data can be viewed using a variety of tools, such as Device View and GP-Viewer.

1.7 Configuring the System

The following explanation describes the steps you must follow to start Pro-Server, and assumes that GP-PRO/PBIII is already installed on your PC.



2 | Pro-Server Fundamentals

This chapter describes how to install this software. It also explains the procedures for starting and exiting the software.

- 2.1 Installing the Software
- 2.2 Starting and Exiting the Software
- 2.3 Screen Item Names and Functions

2.1 Installing the Software

Install this software from the CD-ROM to your hard disk. The following explanation assumes that Windows is already installed on your hard disk.

If you install Pro-Server V4.5 while GP-Viewer V1.0 remains on PC, a problem will occur when you install GP-Viewer again. Be sure to uninstall GP-Viewer V1.0 and Pro-Server with Pro-Studio of the older version from PC before installing Pro-Server V4.5.

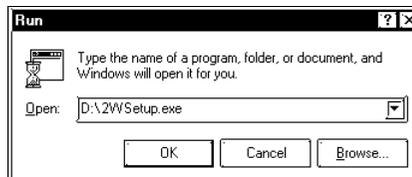
MEMO

- Prior to installing the software, exit all programs except the Pro-Server with Pro-Studio for Windows Setup program. Be sure to quit all memory-resident programs (such as Virus detection software).
- Copying the master CD-ROM files to your hard disk does not install this software. To be able to start this software, you must use the Setup program (step 2 below).

1. Insert the CD-ROM into your PC's CD-ROM drive.
2. Click the [Start] button and, when the Start menu appears, select [Run].

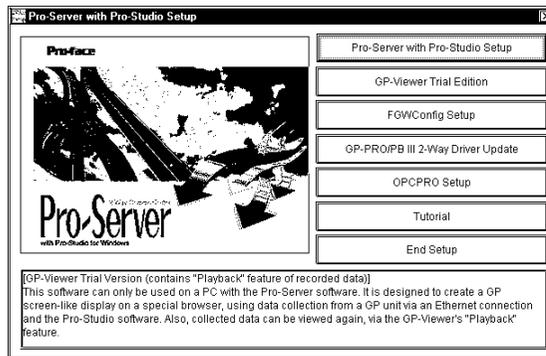


3. Type "D:/2WSetup.exe" and then click [OK]. ("D" represents the drive letter assigned to your CD-ROM drive.)



The master CD-ROM supports the AutoPlay feature, which means inserting it into your CD-ROM drive will automatically start the Setup program.

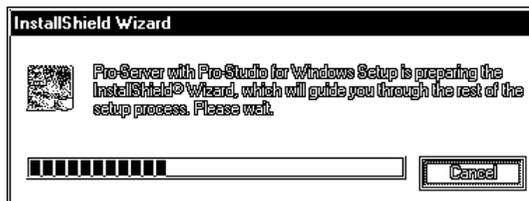
4. The installation menu appears. Click the “Pro-Server with Pro-Studio Setup” bar.



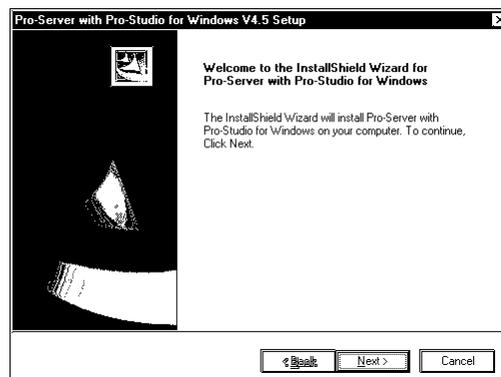
5. Select which language you wish to use in the Setup program (English or Japanese) and click “OK”.



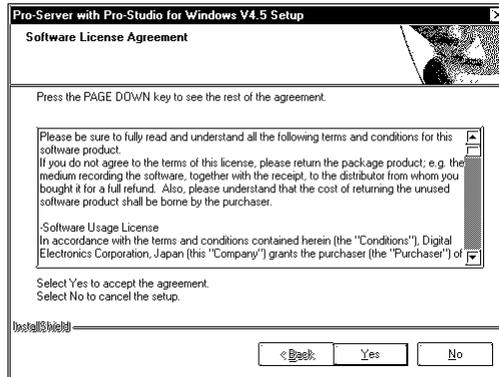
6. [InstallShield Wizard] dialog will start.



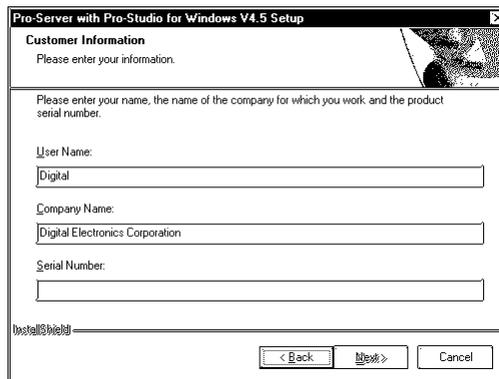
7. [Pro-Server with Pro-Studio for Windows V4.5 Setup] dialog appears. Click on the [Next] button.



8. “Software License Agreement” appears. Click [Yes] when you agree with all contents described here.

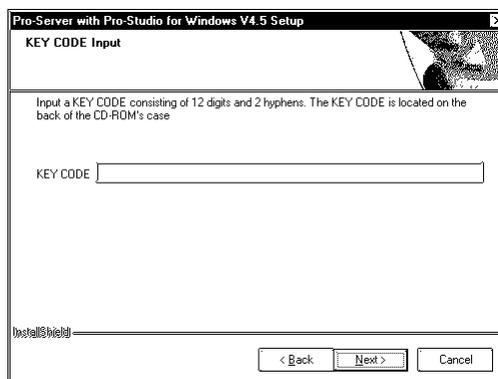


9. The User Information screen will appear. Enter all the information and click the [Next] button.



10. The key code entry screen then appears. Enter the code printed on the rear of your CD-ROM case and click [Next].

The data entered must also include the “-” character.



After this, follow the instructions displayed on the screen.

In addition to the Pro-Server with Pro-Studio for Windows V4.5 Setup Wizard, the “2WSetup.exe” command can be used to start the following items.

- GP-PRO/PBIII 2-Way Driver Update

If you use the 2-Way Driver (Ver. 4.14 or older) older than GP-PRO/PB III for Windows Ver.7.0, be sure to update the 2-Way Driver and set up GP. If you use Ethernet protocol with Factory Gateway, you should also execute the update.

You can check the 2-Way Driver version on the status monitor.

Reference → “6.2 GP Status Monitoring”

- OPC Setup

The server and the client versions are available and support only Windows NT4.0, Windows 2000 and Windows XP. Install the server version on the PC where you use Pro-Server and the client version on the PC where you use client software.

- Tutorial

The tutorial uses HTML files to explain the installation, setup and usage of the Pro-Studio software.

- GP-Viewer Trial Version Setup

This is the trial version of “GP Viewer”. Install the GP-Viewer after Pro-Server installation is completed. When you set up the trial version of “GP-Viewer”, you must have installed Microsoft JAVA VM on your PC in advance. If not, you should obtain it from the Microsoft site.

- Setting the Factory Gateway Configuration Tool

If you use this tool, you can perform the communication setup of Factory Gateway even without the GP/PRO/PB III environment.

2.2 Starting and Exiting the Software

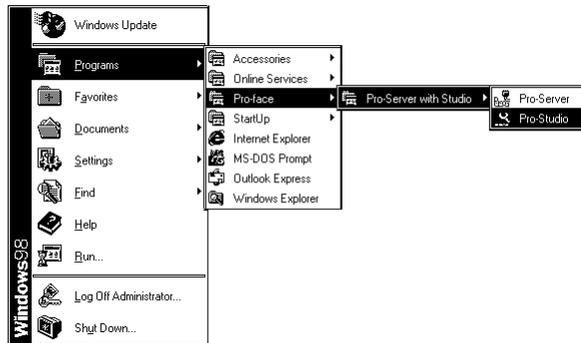
This section describes how to start and exit this software.

2.2.1 Using Pro-Studio

Starting Pro-Studio

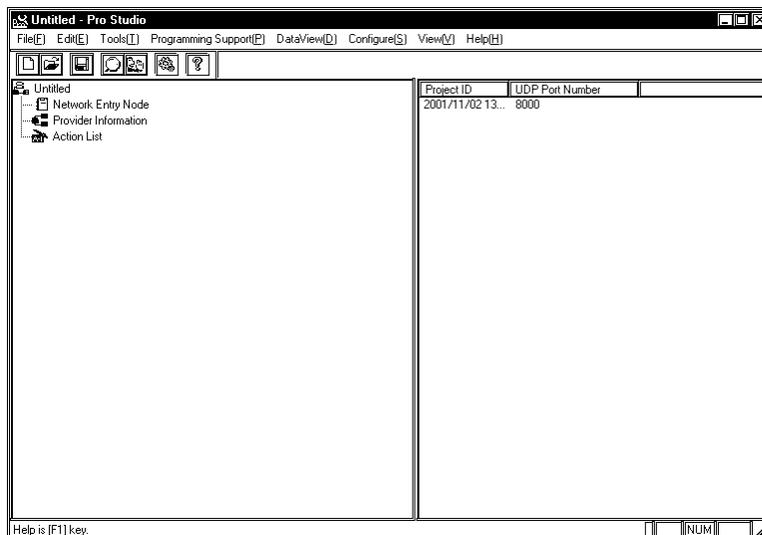
The following explanation assumes that the Windows desktop is already displayed.

1. Click [Start] button and when the Start menu appears, point to [Programs], [Pro-face] and [Pro-Server with Studio], and select [Pro-Studio].



Double-clicking on the desired network project file (*.npj) in Windows Explorer automatically starts Pro-Studio.

2. The program's main window will appear. The left-side window shows a list of network entry node GPs; the right-side window shows the symbols registered for each GP. Use this screen to enter a variety of settings to configure your system.



MEMO

- Starting Pro-Studio automatically starts Pro-Server. Pro-Server resides in memory and its indicator appears on the right side of the taskbar.
- Quitting Pro-Server automatically exits Pro-Studio as well.

To start Pro-Server only, click the [Start] button and, when the Start menu appears, point to [Programs], [Pro-face] and [Pro-Server with Studio] and then click on [Pro-Server].

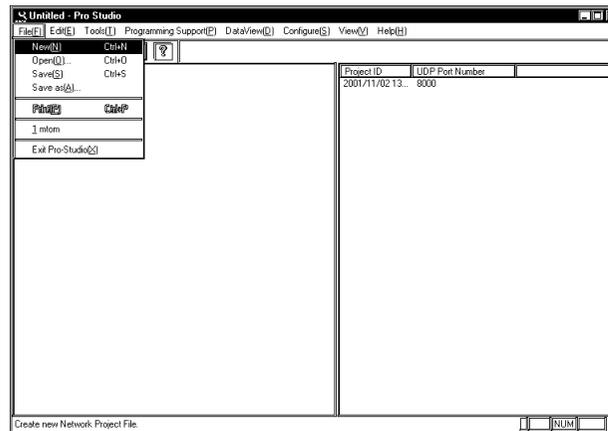
Creating a Network Project File

A network project file (*.npj) stores information such as the network entry nodes, symbols, and provider information settings.

Creating a New Network Project

The following explains how to open a window and create new network projects.

1. Select [New(N)] in the [File(E)] menu.

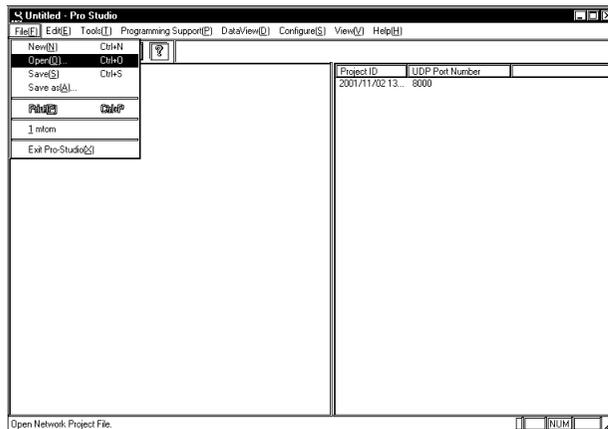


Opening/Saving a Network Project File

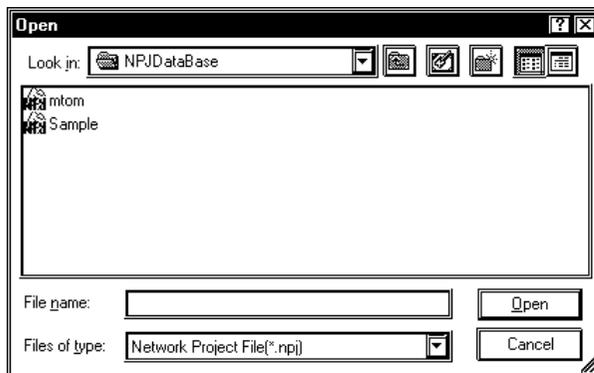
The following procedures explain how to open, close, and save a network project file. Before you proceed, open the Pro-Studio main window.

Opening a Network Project File

1. In the program's main window, click [Open(O)] in the [File(E)] menu.



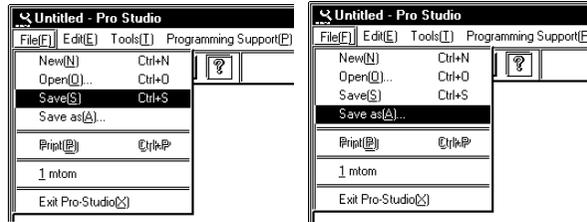
2. Select the file you wish to open, and click [Open(O)].



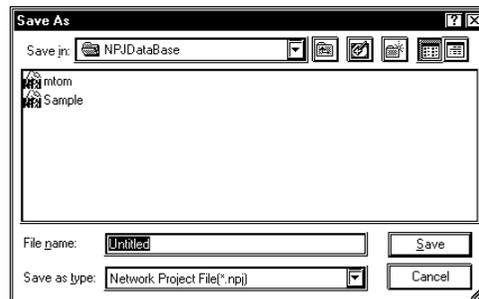
3. The file opens.

Saving a Network Project File

1. In the program's main window, click [Save(S)] or [Save as(A)] in the [File(E)] menu.



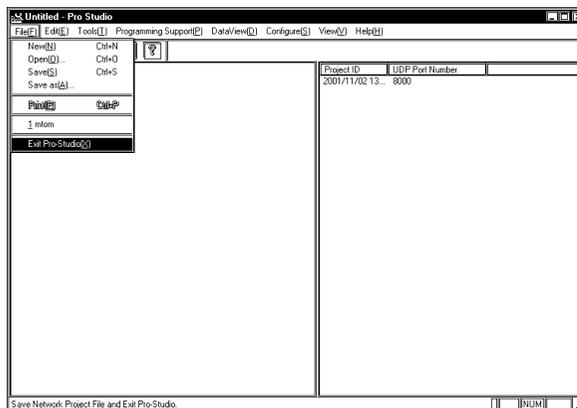
2. If you have selected [Save(S)], the file is saved by overwriting the existing contents. If you have selected [Save as(A)], in the following dialog box, save the file with a new file name.



2.2.2 Exiting Pro-Studio

The following describes the procedure for exiting Pro-Studio.

1. Click [Exit Pro-Studio(X)] in the [File(F)] menu.



MEMO

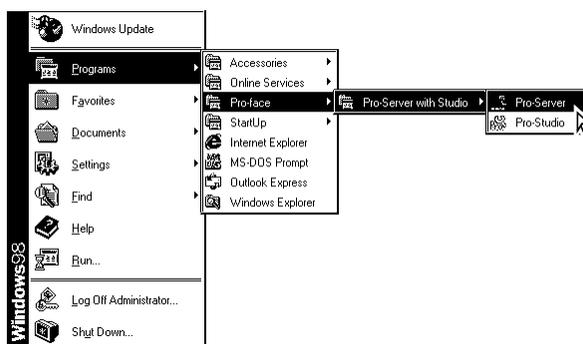
- If you change the settings of a currently open project and then attempt to close it, you will be asked whether or not to save the new settings. Clicking [Yes] saves the settings by overwriting the existing contents, and then exits Pro-Studio. Clicking [No] exits Pro-Studio without saving the changes.
- Exiting Pro-Server automatically closes Pro-Studio. To be sure to terminate all communication, be sure to exit Pro-Server.

2.2.3 Starting and Exiting Pro-Server

The following explanation assumes that the Windows desktop is already displayed.

Starting Pro-Server

1. Click the [Start] button and, when the Start menu appears, point to [Programs] [Pro-face] and [Pro-Server with Studio], and then click [Pro-Server].



2. While Pro-Server is running, the Pro-Server icon appears on the right side of the task tray.

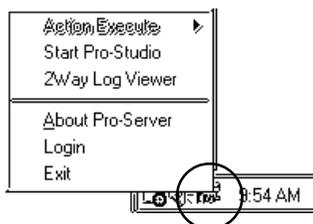


MEMO

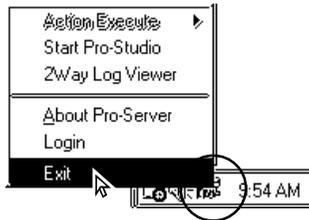
Starting Pro-Studio automatically starts Pro-Server.

Exiting Pro-Server

1. To exit Pro-Server, right-click on the Pro-Server icon on the right side of the task tray.

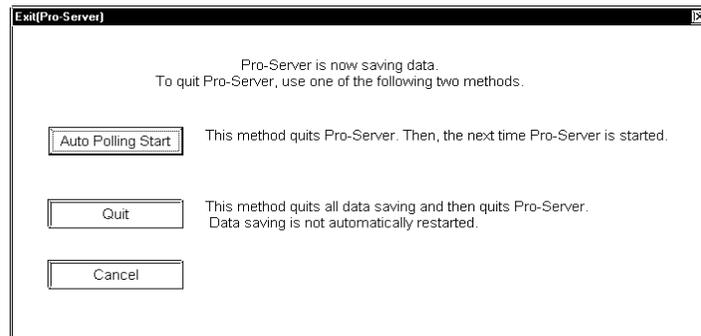


2. When the shortcut menu appears, click [Exit].



MEMO

- Exiting Pro-Server automatically exits Pro-Studio.
- If an application uses Pro-Server as a DDE client, an alarm message will appear before you exit this software.
- An alarm message dialog will appear when you try to exit Pro-Server while it is collecting data.

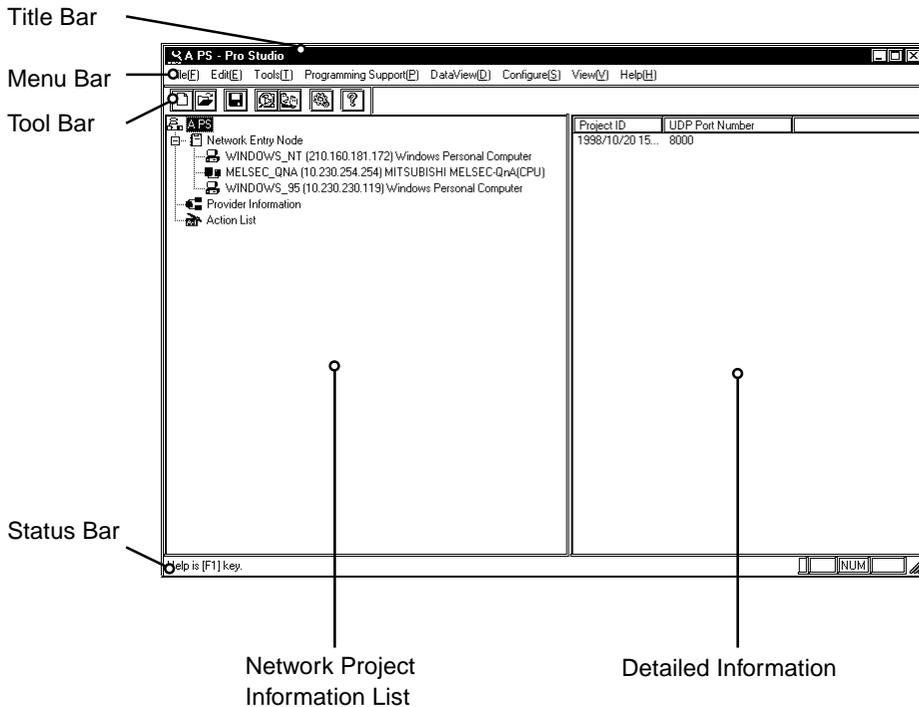


- If the OS is shutdown while a Pro-Server Action feature (See Chapter 4 Action Items) is running, the dialog [This program is not responding] may appear. (The dialog shown below is from Windows 2000 Professional.) If it does appear, the OS will not shut down until the dialog box is closed. Please pay careful attention to this point when performing a remote OS shutdown.



2.3 Screen Item Names and Functions

The names and functions of Pro-Studio's main screen items are as follows:



Title Bar

Displays the currently open network project file (*. npj)'s name.

Menu Bar

Displays the menu to be used to operate Pro-Studio. Use the mouse or keypad to select a desired menu, and the pull-down menu appears.

Tool Bar

Displays icons that represent frequently used commands. Click on an icon to execute that command.

Status Bar

Displays operation-related messages and other information.

Network Project Information List

Displays the currently open network project file's contents in a tree structure.

Detailed Information

Displays network project information list, nodes, symbols, and actions.

3 | Operation

This chapter describes how to register various types of system information.

- 3.1 Registering Network Entry Nodes
- 3.2 Registering Symbols
- 3.3 Registering Provider Data
- 3.4 Using the DDE Function
- 3.5 Using the VBA Support Function
- 3.6 Saving Backup Data in SRAM
- 3.7 Device Data Backup and Restoration
- 3.8 GP Capture Data Saving Function
- 3.9 Security Function
- 3.10 Configuring the System
- 3.11 Configuring the Network
- 3.12 Printing the Setting Data
- 3.13 Other Instructions

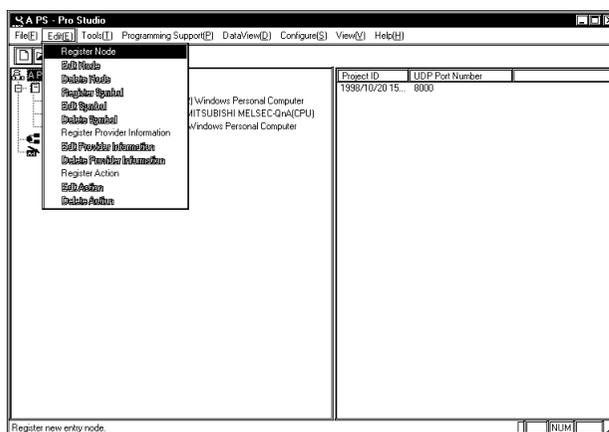
3.1 Registering Network Entry Nodes

3.1.1 Registering a Network Node

The procedure for entering the node name, IP address, sub net mask, gateway, and PLC type information is described below. The node name can be the same as the project file name with the PLC type automatically determined by selecting GP-PRO-PB III's project file (*.prw). To transfer provider data from a GP to the PC, you must first register the PC as a network entry node.

The following description assumes that Pro-Studio's main window is open.

1. Select [Register Node] in the [Edit(E)] menu.



You can right-click on the network entry node and select [Register Node] from the shortcut menu that appears.

- The [Register Node] window will appear.

Change [Node Name]. The default value is "GP*:". It is recommended to use the node name that you can easily understand what is connected. When you change [Node Name], you must follow restrictions described below.

Select the equipment that you register here for [PLC Type].

Designate [IP Address] so that it does not overlap with any other addresses.

Designate [SubnetMask] and [Gateway] only when required.

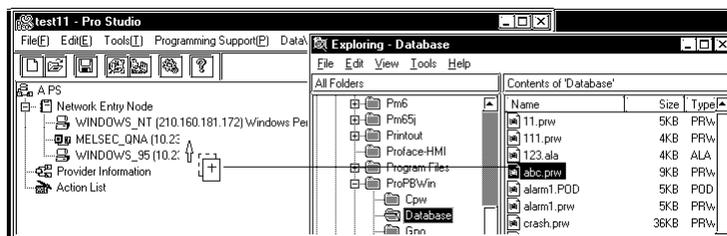
Enter the necessary data for all the items and click [OK].

A [Node Name] indicates a name of a communicator (usually, GP or PC) that performs communication activities on the network, which is usually a GP unit or personal computer. This node name must:

- Consist of 31 characters or less.
- Begin with an alphabetic letter.
- Use alphanumeric characters (no differentiation between upper and lowercase letters), _ (underscore), ~ (tilde), and 80h or higher ASCII characters.

MEMO

- Select the GP-PRO/PBIII for Windows project file (.prw) you wish to use.
- You may also drag the file from Windows Explorer and drop it in the Pro-Studio's main window.



MEMO

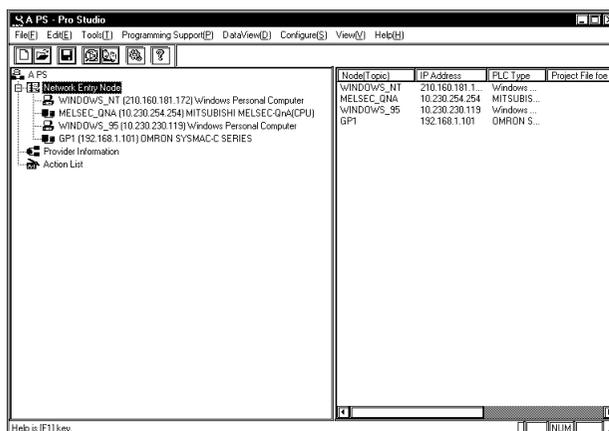
The character string data mode is set according to the data storage order of the used PLC. Normally, it is automatically set to the mode according to the data storage order of the used PLC, therefore, you do not have to change it. When you changed the setting of the character string data mode, you must reset the character string data mode in the project file (*.prw) of GP on the entry node side to the value designated here.

Reference → “GP-PRO/PB III for Windows Operation Manual GP Setup”

(I) Device Storage Order of Data	(II) Byte LH/HL Storage Order in Word	(III) Word LH/HL Storage Order in Double-Word	Character String Data Mode
Store from the front data	LH	LH	4
		HL	2
	HL	LH	5
		HL	1
Store from the end data	LH	LH	6
		HL	7
	HL	LH	8
		HL	3

The detailed settings of the selected network entry node are shown in the right-side window.

- After registration is completed, the registered node name will be added to the network node list. If you wish to change a node (topic)’s data after it has been registered, simply right-click on the topic to bring up a list of selections. From these, click either the [Edit Node] or [Delete Node] selections, or, from the menu bar, click the [Edit] menu’s [Edit Node] or [Delete Node] items.

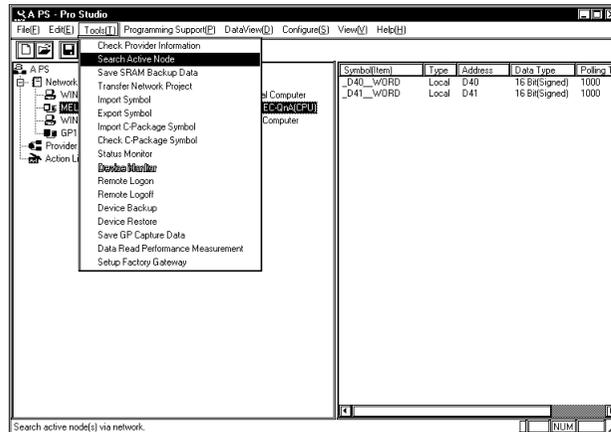
**MEMO**

Clicking either  or  allows you to edit the registered nodes, in the order of registration. When  is clicked on while the last registered node is highlighted, the “edit” mode will change to the “add” mode and a new node will be added.

3.1.2 Searching a Network Node

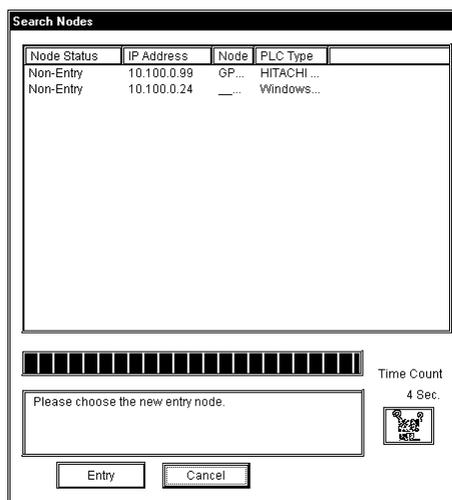
You can create a list of the GPs and PCs that are active in the network and immediately register any node that is not in the network project file (*.npj). (The following description assumes that Pro-Studio's main window is open)

1. Click [Search Active Node] in the [Tools(I)] menu.

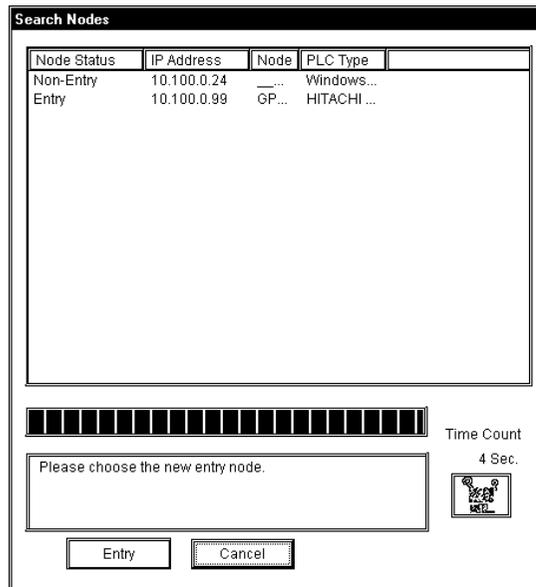


Use this function to automatically search for the nodes connected to the network. It allows you to register network nodes easily, since information such as the PLC type is retrieved and entered automatically by Pro-Studio.

2. The following dialog box will appear. To register any of the detected nodes, click first the [Node Status] "Non-Entry" text, then the [Entry] button.



3. The following dialog box will appear to show that the node has been registered.

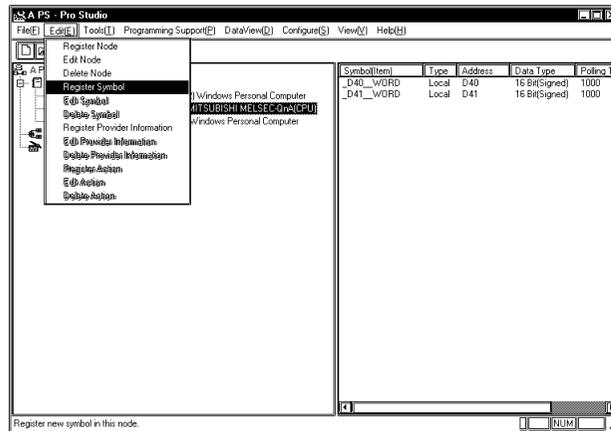


3.2 Registering Symbols

The following describes how to enter symbol name, device address, data type, and polling time data. The device address you enter will be converted internally into a device code that can be used inside the GPs. Polling time refers to how often Pro-Server polls the GP when data is read out through a DDE. You may also import symbols that have been exported from GP-PRO/PBIII. Symbols can be registered for each network entry node.

(The following description assumes that the program's main window is open)

1. Click on the right section of the window. Or, click on the right-side window and then click [Register Symbol] in the [Edit(E)] menu.



2. The [Register Symbol] window then appears. Enter all items and click [OK].

A symbol must

- Consist of 31 characters or fewer.
- Begin with an alphabetic letter.
- Use alphanumeric characters (no differentiation between upper and lowercase letters), _ (underscore), ~ (tilde), and 80h or higher ASCII characters.

[Create from Address]

After selecting a Device Address, click on this button to automatically register the Device Address as a symbol.

[Global Symbol]

Clicking on the Global Symbol check box automatically designates the same symbol for all of the registered network nodes. This setting will be ignored if the device specified by the symbol does not exist in the registered network nodes.

[Data Type]

Designate the data type of the symbol to be registered. Data types that you can designate are 12 types shown in the table below.

Data Type	Data Type	Data Type
Bit	BCD 16 Bits	BCD 32 Bits
16 bits signed decimal	32 bits signed decimal	Single precision floating point
16 bits unsigned decimal	32 bits unsigned decimal	Double precision floating point
16 bits hexadecimal	32 bits hexadecimal	Character string

For setting/editing C-Package symbol and GLC, there are following restrictions to the setting of these symbols' formats.

Device Format Designated by Symbols	Changeable Format	Notes
Word Type	Formats other than Bit type.(signed/unsigned 16/32 bits, hexadecimal, BCD, single precision floating point, double precision floating point, character string)	You cannot select an unchangeable format.
Bit Type	Supports only the Bit format.	
32 Bits Word Type (GLC symbols only)	Supports only the 32 bits format.(signed/unsigned 32 bits, hexadecimal, BCD, single precision floating point)	

[Polling Time]

The data here shows an example of data being read out via the DDE feature.

Under certain conditions the polling time used for collecting or writing data for each symbol, distributing data and monitoring devices may not be performed. These conditions include the number of currently registered GPs, number of Tags used on each screen sent, type of PLC connection, and number of other currently open Windows applications. Entering "0" will allow the system to operate at maximum speed. Use this value as a benchmark when entering other values to "fine-tune" your system.

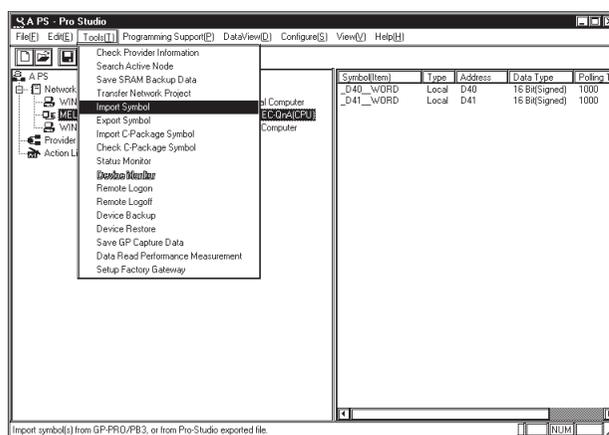
3. When all settings are selected, the detailed settings appear in the right-side window.

If you wish to change a symbol's data after it has been registered, simply right-click the symbol name (right-window) to bring up a list of selections. From these, click on either the [Edit Symbol] or [Delete Symbol] selections, or, from the menu bar, click on the [Edit (E)] menu's [Edit Symbol] or [Delete Symbol] items.

3.2.1 Importing Symbols

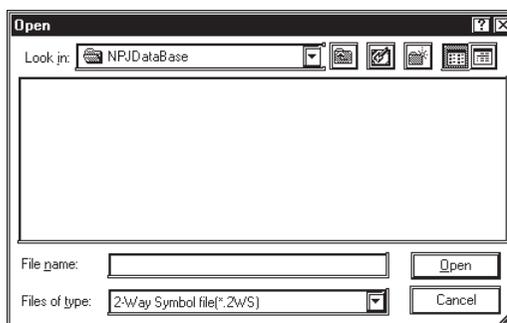
This section describes how to import symbols. The usable symbol data include symbols imported from GP-PRO/PBIII (*.lbe), symbols exported from other network project file (*.2ws), and comment data (*.csv) from GPP function software for Windows (Mitsubishi Electric).

1. Click [Import Symbol] in the [Tools(T)] menu.

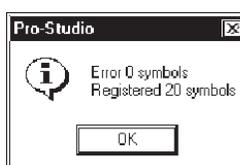


You can also right-click the registered network node and click [Import Symbol] on the shortcut menu.

2. The following dialog box will appear. Select the file type to be imported. Then, click a desired file and then the [Open] button.



3. The following dialog box will appear, and the designated symbol will be imported.



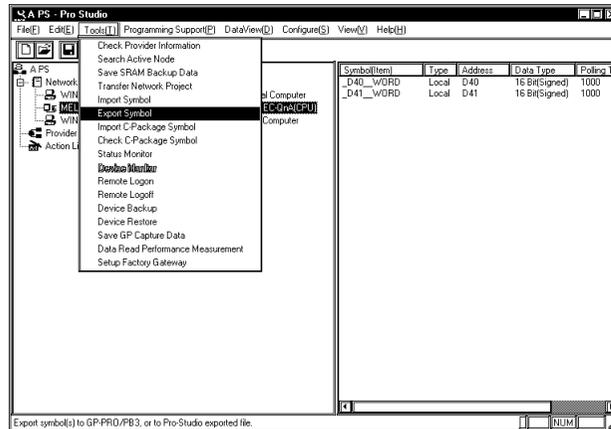
MEMO

When using Special Protocol, refer to "3.2.3 Importing C-Package Symbol".

3.2.2 Symbol Export

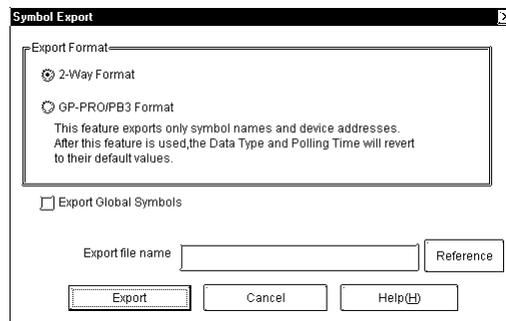
The created symbols can be exported in a file format (*.lbe) that can be used on GP-PRO/PBIII for Windows. Also, these symbols can be exported in a file format (*.2ws) that can be imported to another network project.

1. Select the [Tool(I)]-[Export Symbol] from the Menu Bar.



Right-clicking on a desired node can also be used to select [Export Symbol].

2. The following dialog box will appear. Designate the format and name of the file to be exported and click [Export].



3. The following dialog box will appear and the symbol will be exported.



3.2.3 Importing C-Package Symbol

For Pro-Server to access to the C-Package symbol (Special Protocol symbols and GLC symbols (variables) registered on GP-PRO/PB III), you should import Special Protocol symbols and GLC symbols defined in the GP-PRO/PB III for Windows project file (*.prw) to the network project using Pro-Studio.

MEMO

When importing screen definition symbols via Pro-Server, those symbols must be used on the same version screen editor software used to create them.

The following 12 kinds of protocols require symbol registration for drawing data.

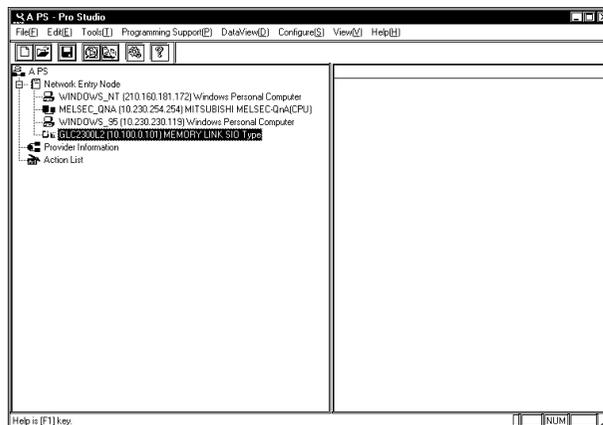
- MITSUBISHI MELSECNET/10
- OMRON SYSMAC-CS1 (ETHER)
- HITACHI HIDIC H (ETHER)
- Siemens S7-200 via MPI
- Siemens S7-300/400 via MPI
- SIEMENS S7-300/400 (ETHER)
- AB Slc500 DH485
- AB ControlLogix (EtherNet/IP)
- Allen Bradley SLC5/05 (ETHER)
- Schneider TSX via UNI-TELWAY
- Schneider Modbus TCP (ETHER)
- Schneider Modbus RTU 1:n comm.

These 12 kinds of protocols are regarded as “Special Protocol” on Pro-Server, and the protocol description on Pro-Server is shown as “OMRON SYSMAC-CS1 (ETHER) *”.

For Pro-Server to support “Special Protocol”, GP-PRO/PB III for Windows for creating the project file (*.prw) is required.

Reference → “GP-PRO/PB III for Windows Operation Manual” Symbol Editor

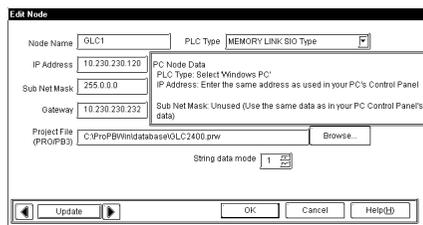
1. Select the target node from the Network Entry Node list.



MEMO

The “Import GLC Symbol” menu from Pro-Server ver.4.0 or earlier has been integrated into the “Import C-Package Symbol” menu.

2. Designate the project file to import in the [Edit Node] screen's [Project File (PRO/PB3)] window.



When using the "Browse" button to designate the project file (*.prw), the following project filename change confirmation dialog box will appear.



Yes :Change Node name to Project file name.

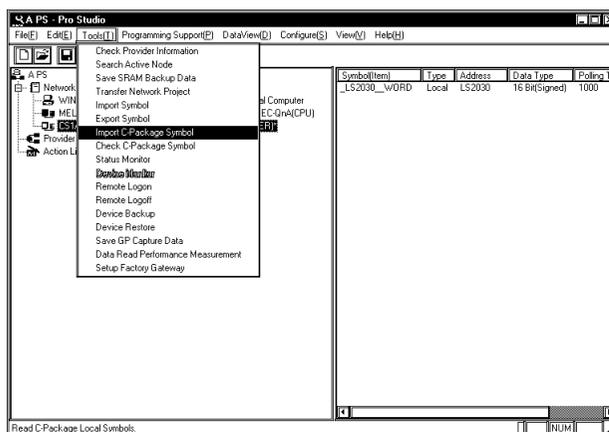
No :Do not change Node name.

Cancel :Returns to the [Edit Node] dialog box without changing the project file.

MEMO

- If the designated project file (*.prw) name is incorrect, an alarm message dialog box will appear.
- When the designated GP-PRO/PBIII project file has been changed, all of that node's previously registered symbol's address display section GLC Symbols/Screen Creation Definition Symbols that have become symbols are automatically deleted.

3. Select the [Tools(T)]-[Import C-Package Symbol] command.



If the setting contents are incorrect, following dialogs will appear.

Dialog Contents	Solution
XXX (number) undefined Screen Editor Symbols have been used on the screen. If they are not defined symbols, they cannot be imported (used) by Pro-Server.	To import (use) the Screen Editor Symbols in Pro-Server, you must use drawing software data (only the Screen Editor Symbols used on the screen can be imported).
Cannot perform processing because the PLC type set on Pro-Server does not match to that defined in the PRO/PB III project file.	Set the correct PLC type in the [PLC Type] field of the [Edit Node] dialog box in procedure 2.
Cannot find the project file to be imported. Designate the project file using the [Edit(E)]-[Edit Node]-[PRO/PB III Project File] feature.	Designate the project file (*.prw) using the [PRO/PB III Project File] field of the [Edit Node] dialog box in the procedure 2. If the designated project file (*.prw) does not exist, re-designate the correct project file.
Cannot execute not in administrator mode. Please login again.	Login again in administrator mode, and re-import the data.

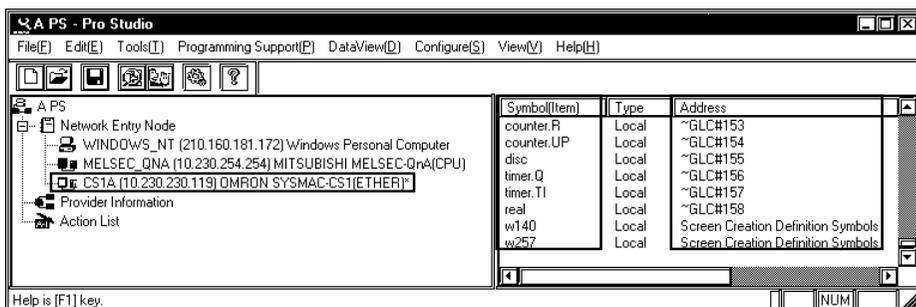
4. The following dialog box will appear and the GLC symbols will be imported.



5. If you click [OK], the contents of the imported C-Package symbol will appear on the screen. Nodes with “*” at the end of those names in the network entry node list means that it imported the “Special Protocol”.

If imported Special Protocol symbol names start from numbers, “_” will be added in the beginning of those symbol names. If Special Protocol symbol names also include single-byte characters other than characters, numbers, “_”, “~”, “.”, “#”, (“ ”), those characters will be converted to “_” when imported.

The special protocol symbol cannot display the device address. Therefore, all special protocol symbols are displayed as “Screen Creation Definition Symbols”. For other symbols, corresponding device addresses are displayed.



MEMO

- When importing C-Package symbols, be sure to send the Network Project file to the GP/GLC/Factory Gateway.
- When using Pro-Control Editor to Add or Delete GLC variables (GLC symbols), be sure to import the C-Package symbols again.

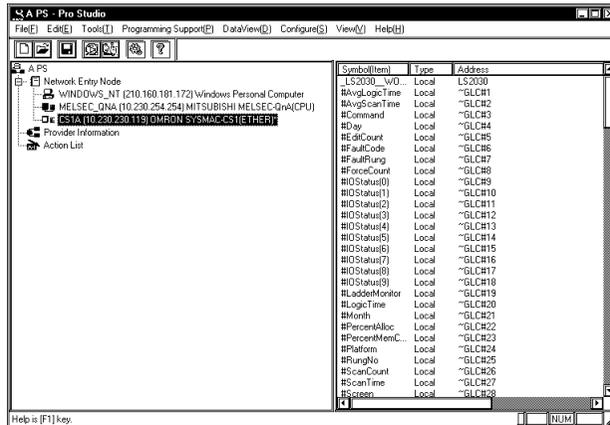
When GLC variables are added or deleted, the related variable's information is remapped to GLC memory. If old mapping information is used when Pro-Server accesses the GLC, it can result in a unit operation error.

- Do not import C-Package symbols while a Data View is performing Data Sampling. Prior to importing symbol data, be sure to close all Data Views and use the [Data View (D)] screen's [Data Sampling Status] dialog box to confirm that all data sampling is stopped.

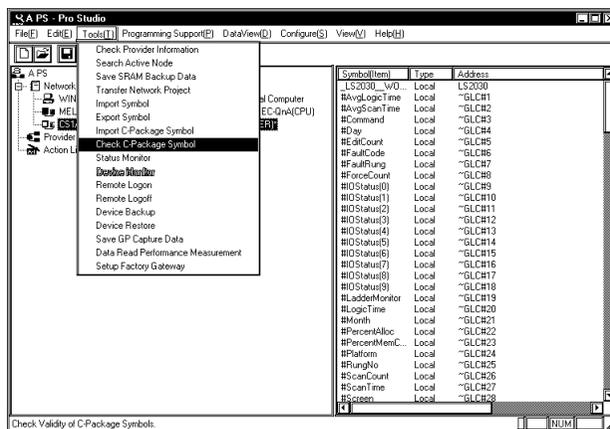
3.2.4 Checking C-Package Symbol

Check if the system is running using the same file by comparing Special Protocol symbols imported to the Pro-Server's network project file (*.npj) with those in the project file (*.prw) transferred to GP.

1. Select the entry node to check the C-Package symbol from Network Entry Nodes.



2. Select [Tool(T)]-[Check C-Package Symbol] from the menu bar.



3. The checking process is executed and the following dialog box will be displayed when no errors exist.



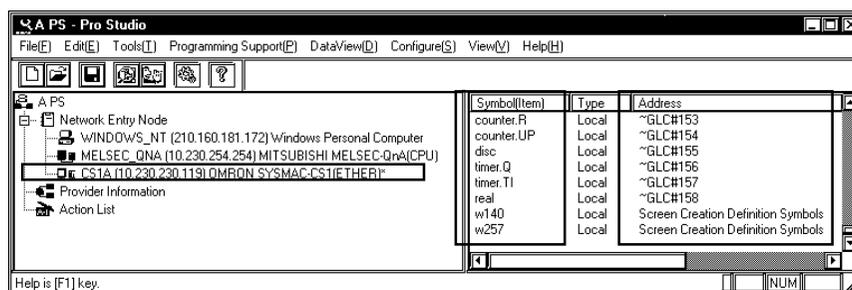
If the checking result includes errors, following dialog boxes will appear.

Dialog Contents	Solution
The C-Package symbol may have been changed. Do you want to import the C-Package symbol?	If you wish to update the C-Package symbol and continue checking, click [Yes]. If you continue checking without updating it, click [No].
The C-Package symbol may not have been transferred to the designated entry node.	Transfer the project file (*.prw) to the entry node using C-Package.
Cannot execute the process because the PLC type set on Pro-Server does not match that defined in the PRO/PB III project file.	The "PLC Type" setting is incorrect. Change the node's PLC type to the same as the "PLC Type" in the project file (*.prw).
Cannot find the project file on the import source. Designate the project file on the import source to [Edit(E)]-[Edit Node]-[PRO/PB III Project File].	The project file (*.prw) may not have been designated, or the designated project file (*.prw) does not exist. Change the project file designated by the entry node to the appropriate one.
Cannot execute not in administrator mode. Please login again.	Login again in administrator mode, and re-import the data.
Cannot connect to the designated entry node.	Cannot connect to the entry node is usually due to such a communication setting problem (the IP address is incorrect or a cable is disconnected). Check the IP address and all communication cables.
Cannot acquire symbol information from the designated entry node.	Failed to acquire information from the symbol file.
Cannot execute the process because the designated entry node does not support online upload.	You cannot check an entry node which does not support online update.

4. If you click [OK], the contents of the imported C-Package symbol will appear on the screen. Nodes with “*” at the end of those names in the network entry node list mean that they use a “Special Protocol”.

If imported drawing definition symbol names start from numbers, “_” will be added in the beginning of those symbol names. If drawing definition symbol names also include single-byte characters other than characters, numbers, “_”, “~”, “.”, “#”, “(“ ”)”, those characters will be converted to “_” when imported.

Drawing definition symbol addresses of “Special Protocol” are “Screen Creation Definition Symbols”, and other symbol addresses are corresponding device addresses.



MEMO

System Variables can be set to “Show” or “Hide” mode. System Variables can be set to “Show” or “Hide” by clicking the  icon, or via the [View(V)] menu's [System Variables(V)] setting screen. After a Symbol is imported, the System Variable is set to “Hide” mode.

3.3 Registering Provider Data

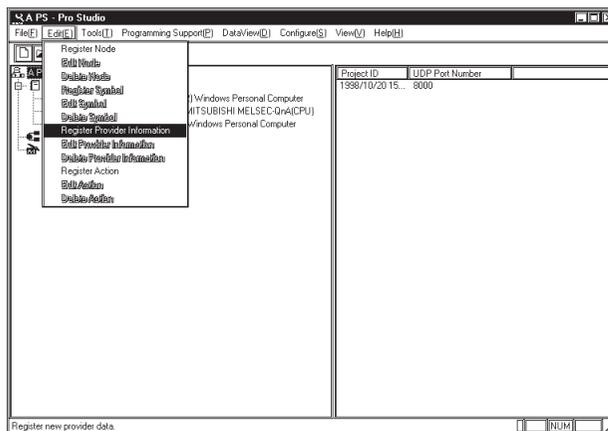
Designate data that GP of each node provides periodically or when the trigger condition is satisfied, as well as data storage location for GP or PC, which receives data.

Designated provider information becomes effective by transferring the network project file to GP. The following description starts from the state after the main screen is opened.

MEMO

If constant is selected in the [Provider Information], when you open the network project file in a different environment (Japanese OS/English OS), the contents of [Symbol Name] are displayed incorrectly. Please make the settings of [Provider Information] once again.

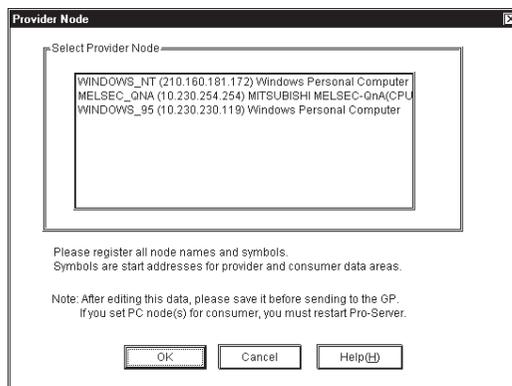
1. Select the registered entry node, and then select [Edit(E)]-[Register Provider Information] from the menu bar.



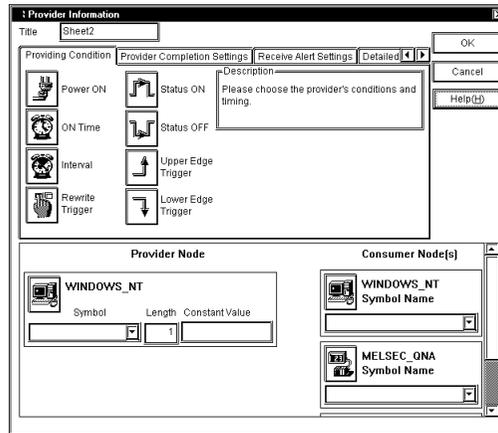
MEMO

- The maximum number of provider information that can be registered is 350.
- You can also select [Register Provider Information] by right clicking the provider information list.

2. The [Provider Node] dialog appears. Select the data provider source node, and then click [OK].

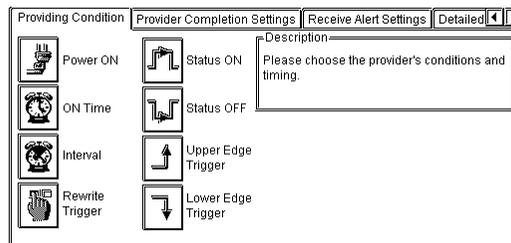


3. The [Provider Information] dialog box appears. Perform necessary settings in [Providing Condition], [Provider Completion Settings], [Receive Alert Settings], [Detailed Settings], [Provider Node] and [Consumer Node(s)], and then click [OK].



For provider node symbols and consumer node symbols, only the same format can be selected.

Providing Condition Tab



Following items are displayed by selecting the providing condition.

Condition	Setup Items				Remarks
	Symbol Name	Time/Interval Setup	Designated Interval	Processing after Providing	
Power ON	X	X	X	X	
On Time	X	O	X	X	
Interval	X	O	◆	X	
Rewrite Trigger	O	O	◆	X	
Status ON	O	O	◆	X	
Status OFF	O	O	◆	X	
Upper Edge Trigger	O	O	◆	◆	*1
Lower Edge Trigger	O	O	◆	◆	*2

X: Setting disabled O: Setting enabled ◆: Option (need to be set when check boxes are checked)

*1 If you designate “Upper Edge Trigger” and check “OFF Time After Providing”, the device designated by the symbol name is set to OFF (0) when the providing process is completed.

*2 If you designate “Lower Edge Trigger” and check “ON Time After Providing”, the device designated by the symbol name is set to ON (1) when the providing process is completed.

Each item on the [Providing Condition] tab are as following:

[Power ON]

Provides only once when the power of provider node is turned ON.

[ON Time]

Provides only once at the designated time. Enter the time.

[Interval]

Provides according to the designated interval. If you wish to limit the period, check [Limit Period] and enter the period. Trigger condition becomes effective only during that period. Enter the providing interval (ms).

[Rewrite Trigger]

Provides when a device value designated a symbol is rewritten. Select the symbol to designate from the pull-down list. If you wish to limit the period, check [Limit Period] and enter the period. Trigger condition becomes effective only during that period. Enter also the interval (ms) to check device rewrites.

[Status ON]

Provides when a device value designated by a symbol is other than zero. Select the symbol to designate from the pull-down list. If you wish to limit the period, check [Limit Period] and enter the period. Trigger condition becomes effective only during that period. Enter also the interval (ms) to check device ON/OFF.

[Status OFF]

Provides when a device value designated by a symbol is equal to zero. Select the symbol to designate from the pull-down list. If you wish to limit the period, check [Limit Period] and enter the period. Trigger condition becomes effective only during that period. Enter also the interval (ms) to check device ON/OFF.

[Upper Edge Trigger]

Provides when a device value designated by a symbol changes from zero to values other than zero. Select the symbol to designate from the pull-down list. If you wish to limit the providing period, check [Limit Period] and enter the period. Trigger condition becomes effective only during that period. After providing this device, check [OFF After Providing] to turn it OFF automatically. Also, enter the interval (ms) to check device values.

[Lower Edge Trigger]

Provides when a device value designated by a symbol changes from values other than zero to zero.

Select the symbol to designate from the pull-down list. If you wish to limit the providing period, check [Limit Period] and enter the period. Trigger condition becomes effective only during that period. After providing this device, check [ON After Providing] to turn it ON automatically. Also, enter the interval (ms) to check device values.

Provider Completion Settings Tab (This tab's settings are enabled only when the 2-Way Driver is Ver.4.10 or later)

[Provider Completion Device]

Sets “0” or “1” to the designated device at provider completion.

If you wish to reset the provider completion device automatically by the 2-Way system when providing conditions are reset, check [Automatic Device Reset after Reset of Provider Settings]. [Provider Completion Device] supports all data types. If [Provider Completion Device] is not designated, nothing will be set.

If provider completion device write failed 3 times continuously, an error occurs.

When one of condition a through c is satisfied, provider is regarded as being completed.

- a : If the “Reply Check” option in the [Detailed Settings] tab is checked, this feature indicates that a response was received from all providers, or indicates that polling termination was performed after the [Provider Timeout Time] elapsed and no response was received.
- b : If provider is executed with “Reply Check” unchecked in the [Detailed Settings] tab, provider is regarded as being completed when having received replies from all provider destinations.
- c : When condition a is satisfied and a [Retry] value has been entered in the [Detailed Settings] tab, this condition indicates polling termination was performed after the Retry was performed the specified number of times and no response was received.

Entering the following settings in the [Providing Condition] tab will disable the [Provider Completion Device] feature.

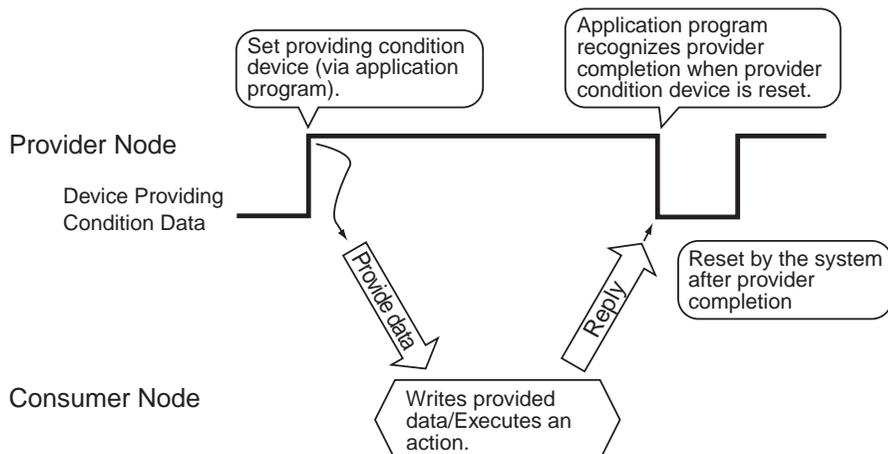
- Checking [OFF After Providing] of [Upper Edge Trigger] or [ON After Providing] of [Lower Edge Trigger] in the [Providing Condition] tab.

You can set the [Automatic Device Reset after Reset of Provider Settings] checkbox only under the following condition.

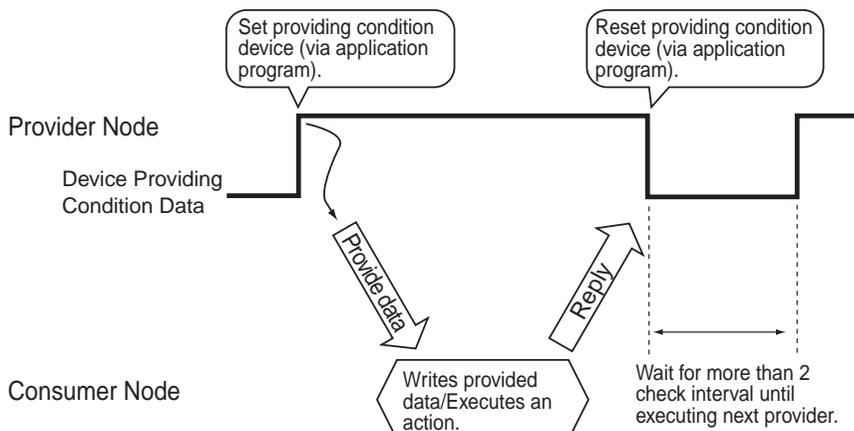
- When [OFF After Providing] of [Upper Edge Trigger] or [ON After Providing] of [Lower Edge Trigger] in the [Providing Condition] tab are not checked.

The following timing charts describe 4 kinds of provider completion conditions using “Upper Edge Trigger” and “Lower Edge Trigger” in the [Providing Condition] tab.

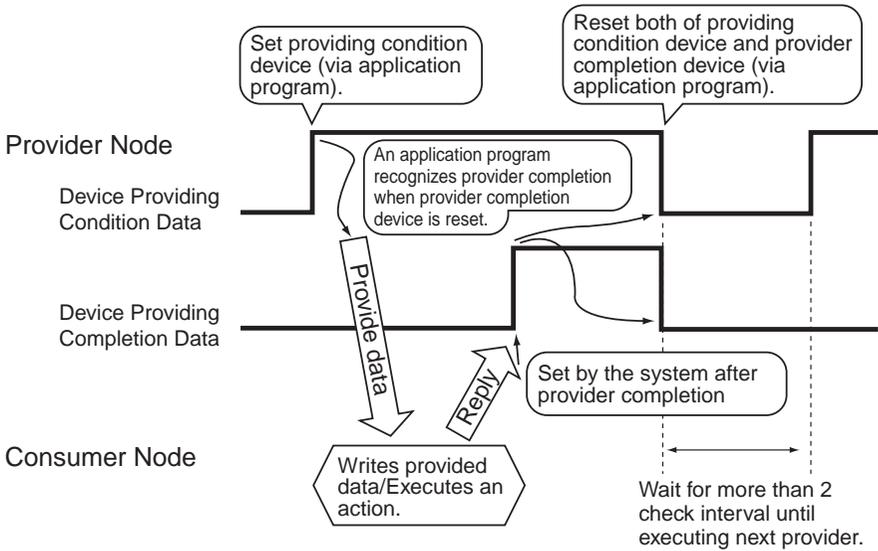
- When [OFF After Providing] is checked while [Upper Edge Trigger] in the [Providing Condition] tab is selected:
- When [ON After Providing] is checked while [Lower Edge Trigger] in the [Providing Condition] tab is selected:



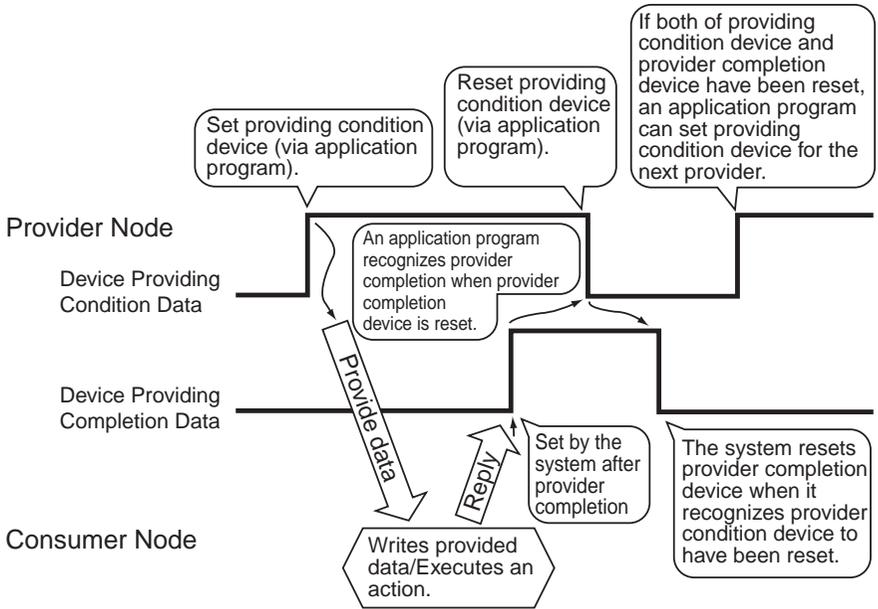
- When [OFF After Providing] is unchecked while [Upper Edge Trigger] in the [Providing Condition] tab is selected:
- When [ON After Providing] is unchecked while [Lower Edge Trigger] in the [Providing Condition] tab is selected:



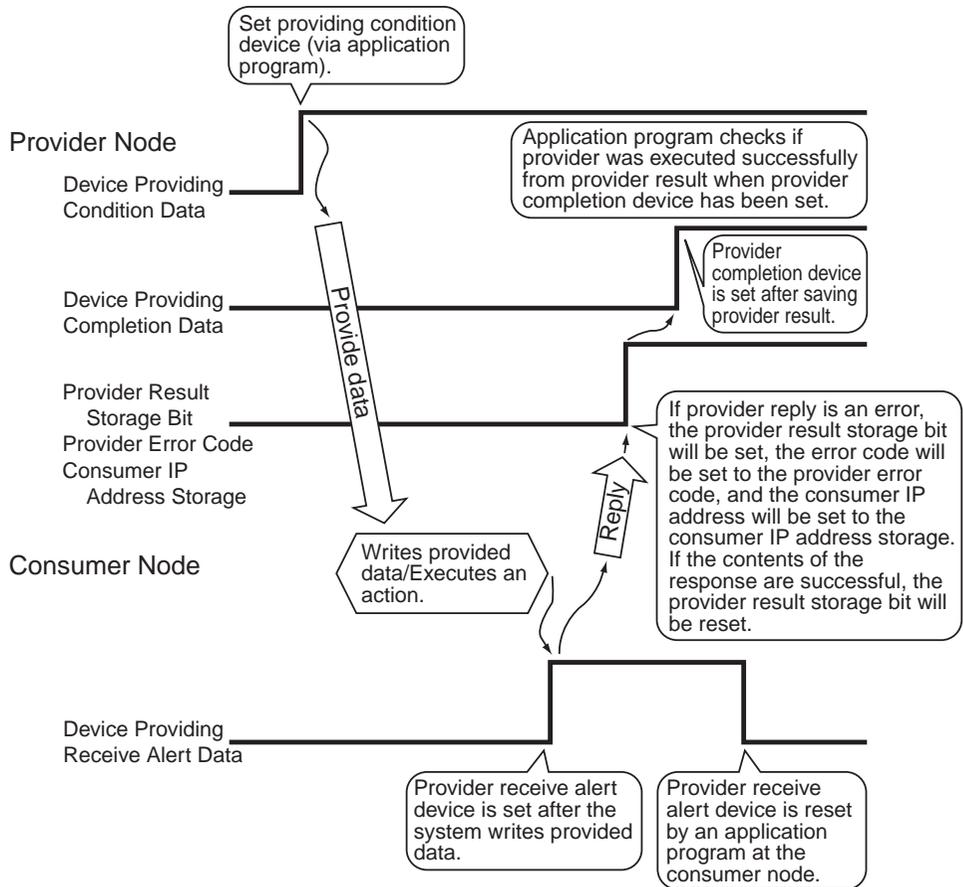
- When [Provider Completion Device] is “designated” and [Automatic Device Reset after Reset of Provider Settings] is unchecked while [Upper Edge Trigger] is selected in the [Providing Condition] tab:
- When [Provider Completion Device] is “designated” and [Automatic Device Reset after Reset of Provider Settings] is unchecked while [Lower Edge Trigger] is selected in the [Providing Condition] tab:



- When [Provider Completion Device] is “designated” and [Automatic Device Reset after Reset of Provider Settings] is checked while [Upper Edge Trigger] is selected in the [Providing Condition] tab:
- When [Provider Completion Device] is “designated” and [Automatic Device Reset after Reset of Provider Settings] is checked while [Lower Edge Trigger] is selected in the [Providing Condition] tab:



The following shows timing among [Providing Condition Device], [Provider Completion Device], [Provider Result Storage Bit Device] (described later), [Provider Error Code Storage Device] (described later), [Consumer IP Address Storage Device] (described later) and [Provider Receive Alert Device] to be set in the [Receive Alert Settings] tab.



[Provider Result Storage Bit Device]

Sets "0" if provider result is normal, and "1" if not. Data will be overwritten every time provider is received. You can set only symbols with the "Bit" format.

[Provider Error Code Storage Device]

Stores error codes when provider result is abnormal. You can set only symbols with the "16 Bits" or the "32 Bits" format.

[Consumer IP Address Storage Device]

Stores the IP address of the provider destination when an provider error occurs. You can set only symbols with the "32 Bits" format.

Receive Alert Settings Tab (This tab's settings are enabled only when the 2-Way Driver is Ver.4.10 or later)

Providing Condition		Provider Completion Settings	Receive Alert Settings	Detailed
Consu.	R.	Receiver Sym.	Provider Receive Ale.	
WINDO...	1			
MELSE...	1			
WINDO...	1			

[Consumer Node]

Displays network entry nodes.

[Row]

Displays the number of provider record. You can set receive alert per provider record.

[Receiver Symbol Name]

Displays device symbols names to receive provider. Symbol names set on entry nodes are displayed.

[Provider Receive Alert Device]

Designate device to set to "1" (ON). Select device from the pull-down menu.

This device is set before provider completion device is set.

For details of set/reset timing between this device and other device, refer to the timing chart in the previous page.

Detailed Settings Tab (This tab's settings are enabled only when the 2-Way Driver is Ver.4.10 or later)

Provider Completion Settings	Receive Alert Settings	Detailed Settings
Provider Type <input checked="" type="radio"/> Peer to Peer <input type="radio"/> Broadcast Caution: Do not use the Broadcast setting unless you are familiar with Ethernet settings.		
<input checked="" type="checkbox"/> Reply Check <input checked="" type="checkbox"/> Use Provider Timeout Time from Network Settings		
Retry <input type="text" value="2"/> Provider Timeout Time <input type="text" value="20000"/> msec		

[Provider Type]

Select the provider type.

[Reply Check]

Select if the replay for provider completion should be checked. The maximum waiting time is the provider timeout time.

[Retry]

Designates the Retry count when the "Reply Check" option is checked. Enter a numeric value from 0 to 32.

[Provider Timeout Time]

Sets the provider timeout time. If you wish to change the provider timeout time to desired numbers, uncheck [Use Provider Timeout Time from Network Settings].

Provider timeout time designated per the network project file (*.npj) with Pro-Server V4.0 or older can be set per provider sheet. If you uncheck [Use Provider Timeout Time from Network Settings], you can designate provider timeout time per provider sheet individually.

If provider is executed before provider destination GP is started such as more than one GP is started simultaneously, an error is displayed on the provider destination GP. You can avoid unnecessary error display by setting the number of retry.

If you use the system in the environment where communication errors frequently occur, you can avoid unnecessary error display by setting the number of retry.

When a large volume of data is sent, the GP will not refresh its display while data is being provided.

The volume of data which can be provided at one time differs depending on an area supported by PLC.

For the volume of data which can be provided at one time, refer to each PLC manual.

Moreover, symbols designated to provider nodes/consumer nodes depend on the maximum number of data which can be provided. The following table shows the relationship between the maximum number of data which can be provided and symbols to be designated.

Device Type to Access	Format	Maximum Number of Data When Designating Special Protocol Symbols to Provider Nodes	Maximum Number of Data When Designating Special Protocol Symbols to Consumer Nodes	Maximum Number of Data When Designating Other Symbols to Provider/Consumer Nodes
Bit Device	Bit	255	1	16
16 Bits Device	Bit	255	1	16
	16 bits	255	40	255
	32 bits	127	20	255
	Single precision floating point	127	20	255
	Double precision floating point	63	10	255
	Character string	255 (single byte)	80 (single byte)	255 (single byte)
32 Bits Device	Bit	255	1	255
	32 bits	255	40	255
	Single precision floating point	255	40	255
	Double precision floating points	127	20	255
	Character string	255 (single byte)	160 (single byte)	255 (single byte)

If you designate values exceeding those maximum numbers, the warning dialog will appear.

You can register 3 "Symbol Names" at maximum per "provider information".

If you select [String Fixed Number] in the [Symbol] field of the provider node, the count calculation will be performed automatically only by entering a fixed number. Although you can change this count to the larger number than the string number entered by a fixed number, do not change the number calculated automatically to avoid unfixed data to be entered.

MEMO

- The check interval is defaulted to “500” ms.
- The process after providing should be set to “Complete Process”. The process is completed even when a providing error occurred.

If you designate the existing sheet name in the [Title] field of the [Provider Information] dialog, the following dialog will appear.



Change the sheet name in the [Title] field to something new.

If you wish to change a node (topic)’s data after it has been registered, simply right-click on the topic to bring up a list of selections. From these, click either the [Edit Node] or [Delete Node] selections, or, from the menu bar, click the [Edit(E)] menu’s [Edit Node] or [Delete Node] items.

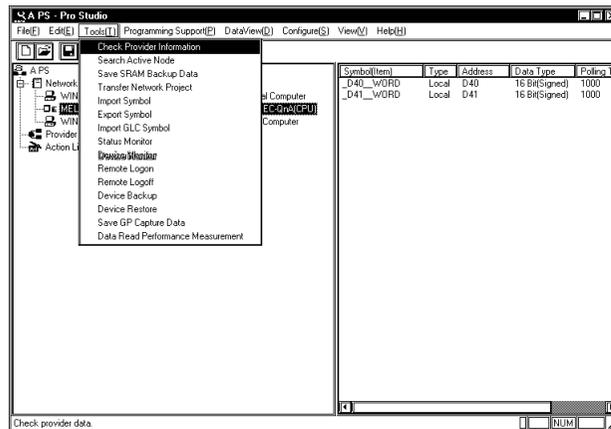
The contents of provider settings may affect system communication speed. In such a case, refer to “A.5 Optimizing Communication Speed” and change settings.

Reference → “A.5 Optimizing Communication Speed”

3.3.1 Checking for Provider Data Errors

The following procedure explains how to check provider data. If, after registering provider data, you delete the relevant symbol name or network node, or alter any symbol's data type, an error message will appear. If no errors are found in the provider data, the data's file size when it is downloaded to the GP will be displayed. The file size shown in this dialog box reflects the amount of GP screen area used. (The following description assumes that the program's main window is open)

1. Click the [Check Provider Information] item in the [Tools(I)] menu.



2. The following dialog box appears.



Although the program checks provider data automatically during saving, it will not display the file size.

In the following cases an error will occur:

After entering provider information,

- the data type of a symbol has been changed,
- a symbol name has been changed or deleted, or
- a node name has been changed or deleted.

If an error occurs, you will not be able to transfer the network project file (*.npj) to the GP.

DO NOT edit or delete a symbol, or that symbol's designated provider node.

Maximum size of provider information data is 56 kbytes.

Rule of thumb

Base.....36bytes

Register Node.....88bytes

RegisterProvideInformation.....120bytes

3.3.2 Action Items

Using the action item function, you can designate the desired action item(s) (called action item “contents”) so that a Consumer (only a Windows OS personal computer) which has received provider information will perform them.

You can start action items by setting the symbol name of the Provider node to the action name.

Action items must be set up, however, it is possible that they are not used during normal operation.

For a detailed explanation of action item functions, refer to “Chapter 4 Action Items”.

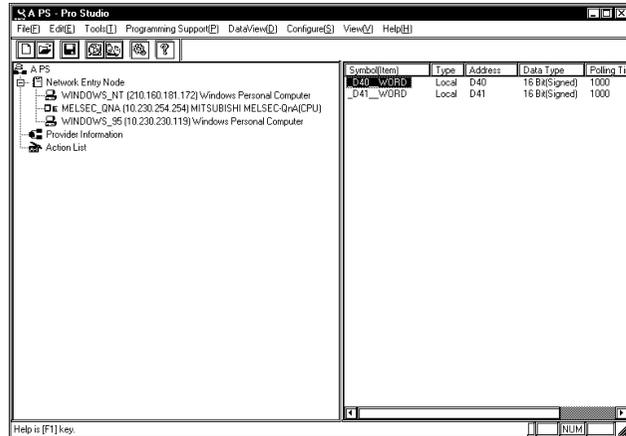
Reference → “Chapter 4 Action Items”

3.4 Using the DDE Function

Pro-Server incorporates the DDE server function and therefore can exchange data with applications that support the DDE client function. The following description assumes that the program's main window is open.

DDE: String Copy

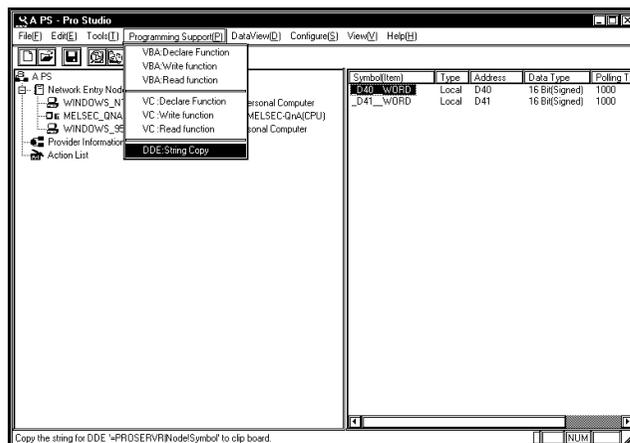
1. Click the desired symbol name.



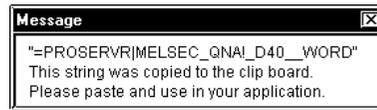
MEMO

- With Excel, you cannot use DDE to write data because Excel does not support data writing as a DDE client. To write data to Excel, use the VBA function.
Reference → “3.5 Using the VBA Support Function”
- If you use Windows XP, you cannot execute write using the DDE feature.

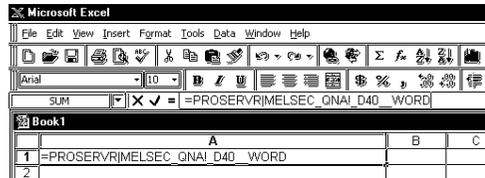
2. Select [Programming Support(P)]-[DDE: String Copy]. Or, right-click the symbol name, and then select [DDE: String Copy].



3. When the following dialog appears you can paste the copied string into any DDE-compatible software.



4. Here, the copied string is pasted into an Excel worksheet to create a DDE link.



MEMO

When a symbol's data is text and is copied to an Excel cell, only the first character of the text will be displayed. In this case, edit that Excel cell and add the required characters.

Ex.)

=PROSERVER|GP1!' SYMBOL .*20'

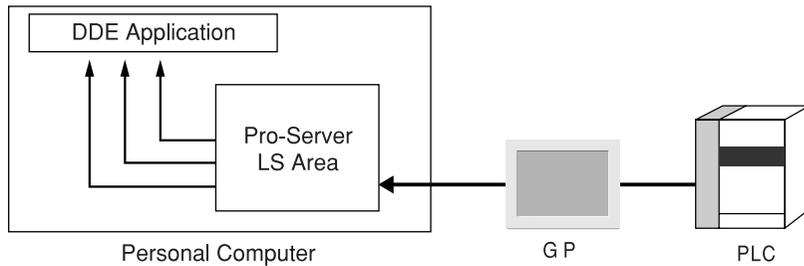
Be sure to put "" (quotation marks)" around "!".

Reference → "A.1 DDE Function Details"

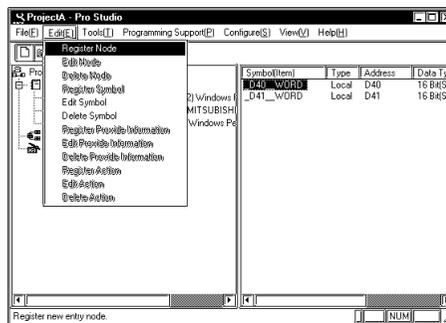
Workaround Example 1 for Mass Data

Creating an LS Area inside your PC

When using the (data) distribution feature, the creation of an internal LS (Pro Server) area inside your PC will allow you to read out data periodically via GP from one or more PLCs. The setting of the DDE feature to read out collected data from the LS area will allow the data in the LS area to be refreshed faster.

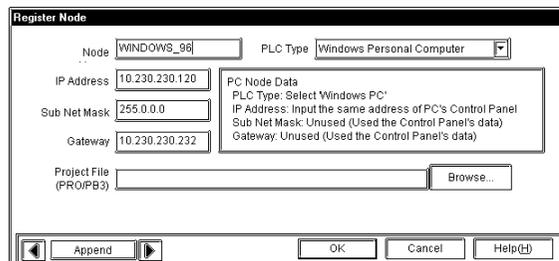


1. Call up the Register Node feature to register the host PC.



To Register a Node, refer to “3.1 Registering Network Entry Nodes”

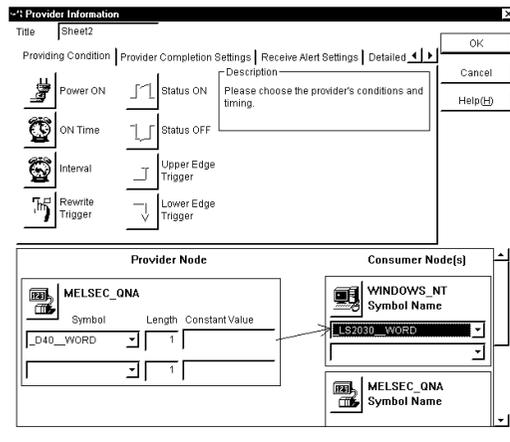
2. Designate the IP address for host PC.



[PLC Type]

Designate the “Windows Personal Computer”.

3. Enter the settings for the PC's internal LS area.



[Consumer Node(s)]

Designate the LS area name that the host PC will use. You should designate the LS area name that you wish to use among LS, LSA, LSB ... LSY and LSZ.

For detailed Provider information, refer to “3.3 Registering Provider Data”.

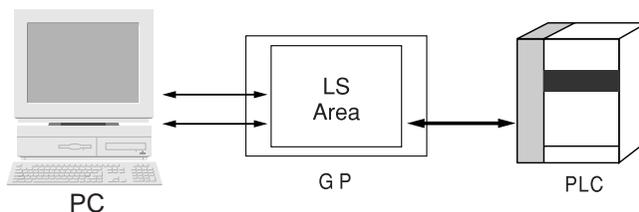
4. Designate the LS area inside PC by the application which supports DDE.

Workaround Example 2 for Mass Data

Creating an LS Area inside your GP

Creating an LS area inside your GP will allow your PC to easily read out data periodically from the GP. The setting of this feature allows data to be read out faster. This feature also speeds up data writing.

However, you must consider validity to the system because it affects GP's refresh speed.



For registering the read area, refer to “Device/PLC Connection Manual”.

Reference → “Device/PLC Connection Manual”

MEMO

The GP's LS area will vary depending on the GP system used. The following table shows LS area sizes according to GP system versions.

LS Area Size	GP
4096	GP77R SERIES
9999	GP-2000 SERIES/GLC2000 SERIES/IT SERIES

For the GP's LS area size, the 2-Way Driver will automatically decide its accessible range.

GP-PRO/PBIII for Windows Ver. 7.0 or later should be installed on the GP system to use the LS area up to 9999.

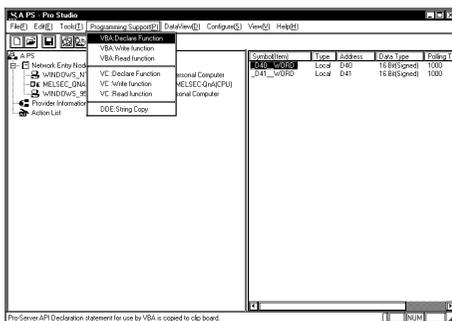
3.5 Using the VBA Support Function

Pro-Server can read and write data both to and from applications supporting Visual Basic and Visual C++ using read and write functions. The following procedures explain how to write data from Excel to a designated symbol via a programming support function.

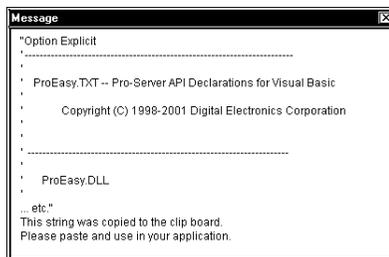
When developing applications with VB or VC, refer to “Chapter 9 Simple DLL Function”.

VBA: Declare statement

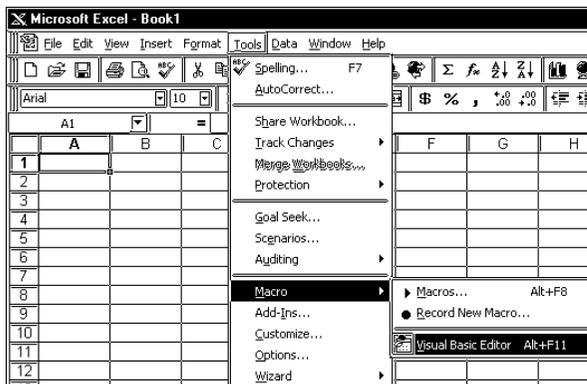
1. Selecting [VBA: Declare Function] from [Programming Support].



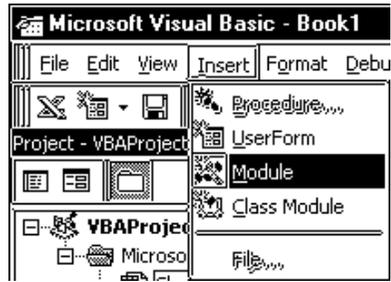
2. The declaration is copied to the Clip board.



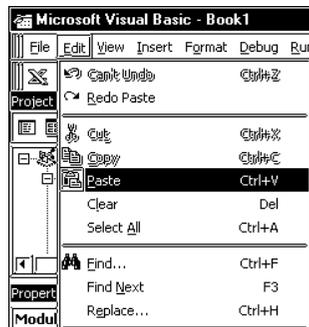
3. Start-up Microsoft Excel. Select [Visual Basic Editor] from the [Tools] menu's [Macro] feature.



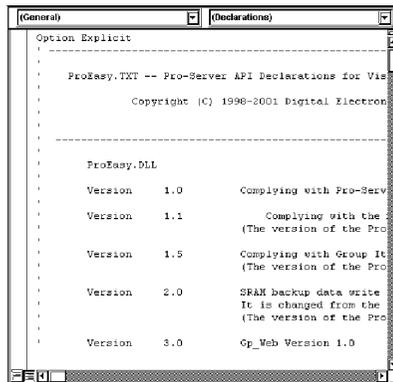
4. Select [Module] from [Insert] in the Visual Basic Editor.



5. Paste the declare statement in the inserted standard module.

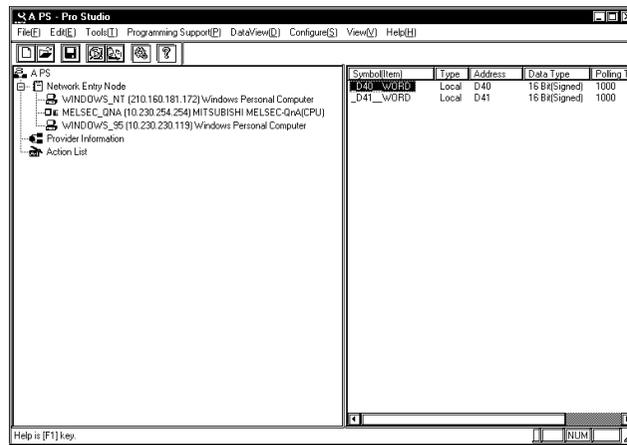


6. This completes function declaration.

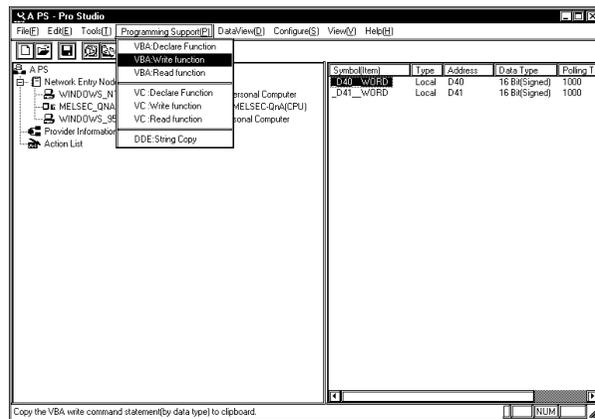


VBA: Write Function

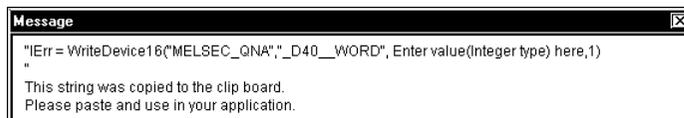
- Click the desired symbol name.



- Select [Programming Support(P)]'s [VBA: Write function] from the Menu Bar.



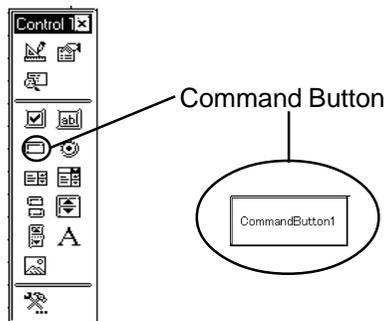
- Write Command is now copied to the Clipboard.



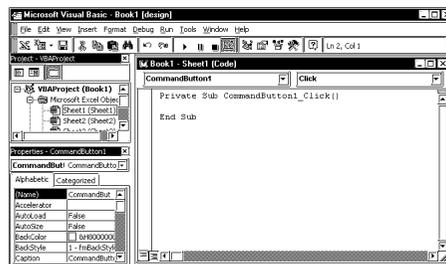
10. In Microsoft Excel, select the [Control Toolbox] from the [Views] menu's [Tool bars] feature.



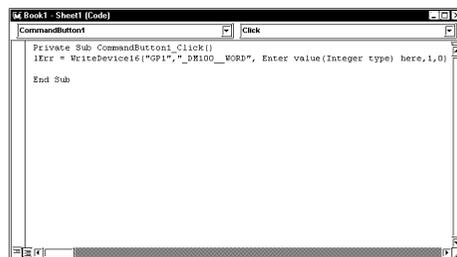
11. Paste the command button onto the sheet.



12. Double click the button. The following VBA creation screen is displayed.

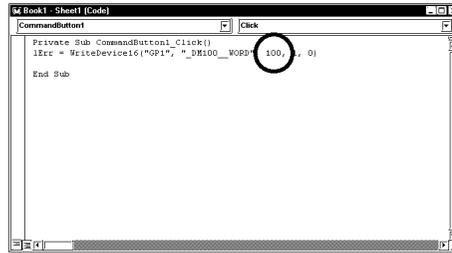


13. Paste the instruction statement in the program position of the VBA creation screen.

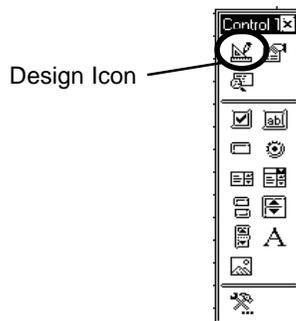


14. Input the value to be written into the PLC device whose symbol is indicated. Replace the words 'Input value here' with the numeric value.

Example) When set to 100,



15. Click on the [Design] icon to quit the Design Mode.

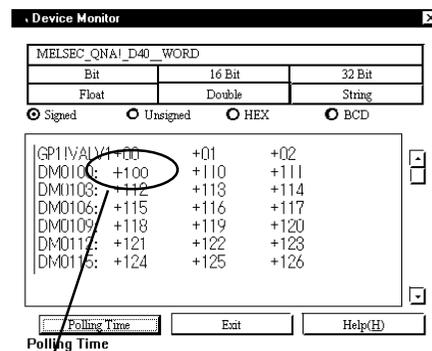


16. Thus, when you click Excel's Command Button, "100" is written to the PLC symbol's device.



The Device Monitor feature allows you to easily check that the data has been written successfully.

Reference → "Chapter 6 Tools"



"100" has been written to the device.

(Reference)

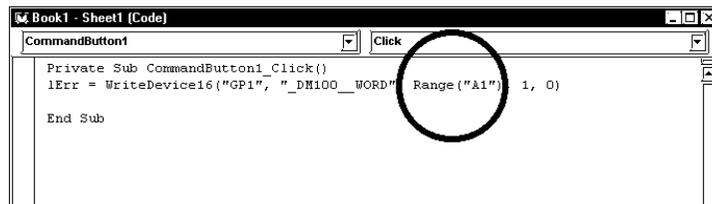
Cells that have been designated as using Excel's Range Function can write data to a GP or PLC device. If you then change the value entered in this cell and push the Command Button, the device's data will be immediately refreshed.

Reference → Step 11

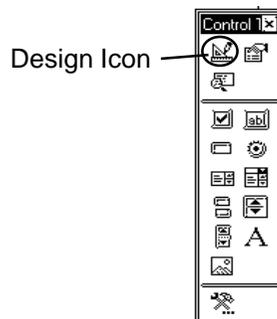
1. Input the value to be written to the symbol's PLC device.

Here, enter "Range("A1")" in the space shown by "Enter value here"

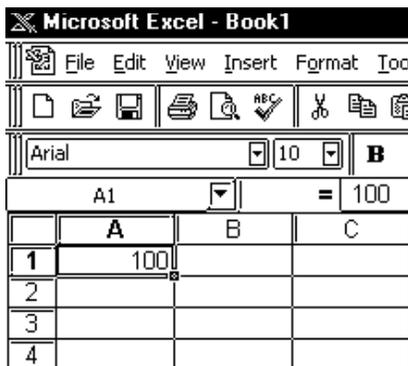
"!Err = WriteDevice16("GP1", "_DM100_WORD", Range("A1"), 1, 0)"



2. Click the [Design] icon to quit the Design Mode.

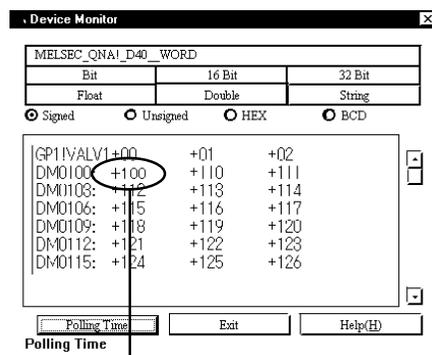


3. Thus, when you enter 100 in Excel's worksheet cell A1, and press the Command Button, "100" is written to the GP or PLC symbol's device.



The Device Monitor feature allows you to easily check that the data has been written successfully.

Reference → Chapter 6 "Tools"



"100" has been written to the device.

MEMO

When using VB.NET, if you insert the declaration according to this procedure, an error will occur when executing it.

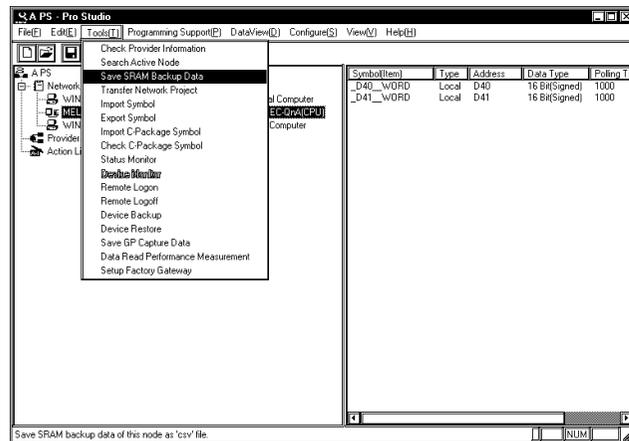
You cannot use VBA: Declaration directly because data sizes of Integer or Long are different between VB.NET and Visual Basic.

VBA: Declaration is for Visual Basic or Basic for Application.

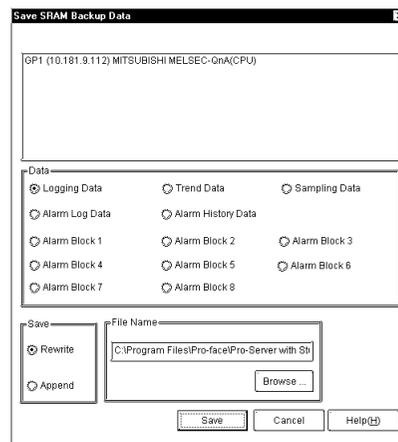
3.6 Saving Backup Data in SRAM

Pro-Studio allows you to upload backup data stored in a GP's SRAM to the host PC as a comma-delimited CSV (Comma Separated Value) file. You can open CSV files using Excel, Access, or any application that supports the CSV file editing format. There are 13 types of backup data you can upload (or save).

1. Click [Save SRAM Backup Data] on the [Tools(T)] menu.

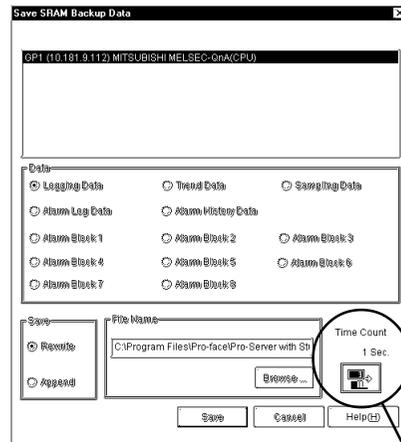


2. The [Save SRAM Backup Data] window appears. After selecting the network entry node, the data you wish to save, and the file in which the data is saved, click [Save].



For detailed information about each data, refer to GP-PRO/PBIII for Windows Tag Reference Manual.
Reference → "GP-PRO/PBIII for Windows Tag Reference Manual"

3. After data save starts, the elapsed time is displayed.



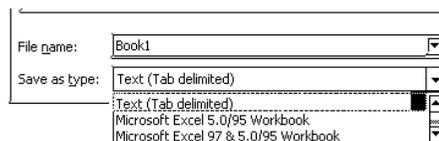
Elapsed time display

4. When the saving process has been completed successfully, the following window appears.



MEMO

To open an SRAM backup data file you saved using Excel, start Excel, click [Open] on the [File] menu, and then select [Text file (*.prn; *.txt; *.csv)] as [Save as type].



3.7 Device Data Backup and Restoration

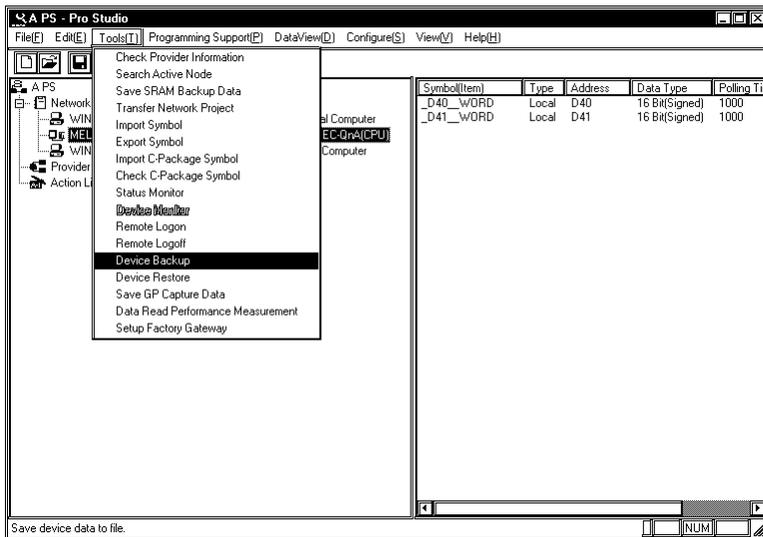
The device data backup function allows you to collect a series of device data via the Internet and to save it as data files.

The device data restoration function allows you to restore collected data from a series of devices.

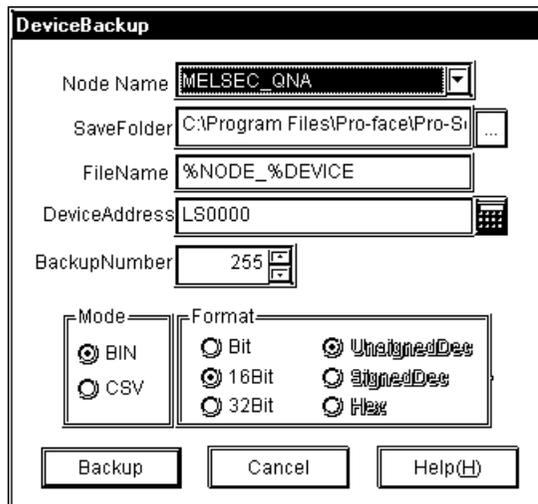
The data saving format can be either BIN (binary) or CSV.

3.7.1 Device Data Backup

1. Click the [Tools (T)] menu in the [Device Backup] window.



2. The [Device Backup] window appears. After selecting all items, click [Backup].



[Node Name]

Select the node name. If unselected, the error dialog will appear.

[Save Folder]

Enter the path to the folder that you wish to save data. This is defaulted to the “NPJDataBase” folder in the current directory of Pro-Server. If not entered, the error dialog will appear.

[File Name]

Enter the file name. By default, the file name will vary depending on the node name, the device address, the saved type and the data type. If not entered, the error dialog will appear.

[Device Address]

Enter the device address that you wish to start saving. This is defaulted to “LS0000”. If not entered or entered incorrectly, the error dialog will appear.

[Backup Number]

Enter the number of backup data. The maximum number of data that you can backup depends on the device. However, maximum numbers of data that you can backup from Special Protocol symbols are restricted to the contents of the table below.

Device Type to Access	Format	Maximum Number of Backup Data from Special Protocol Symbols	Maximum Number of Backup Data from Other Device
Bit Device	Bit	255	Depends on a backup data file
16 Bits Device	Bit	255	
	16 Bits	255	
32 Bits Device	32 Bits	127	
	Bit	255	
	32 Bits	255	

If you designate values exceeding those maximum numbers, the warning dialog will appear.

[Mode]

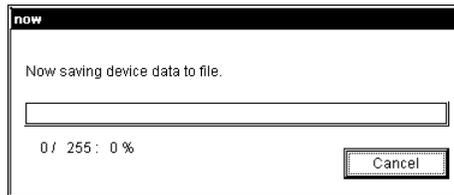
Select the saved type. This is defaulted to “BIN” (binary).

[Format]

Select the data type. This is defaulted to “16 bits unsigned decimal”. Select the number system only when the saved type is CSV.

If you select “CSV” for [Mode] when designating a special protocol symbol in the [Device Address] field, nothing will be output in the “Comment” field of the CSV file for addresses without symbol registration.

3. The backup processing status is displayed in the [now] dialog.



If the contents set in the [Device Backup] dialog are incorrect, following dialogs will appear.

Dialog Contents	Workaround
Designate number up to 255 for data backup in the BIT format.	Reset the value in the [Backup Number] field, and then execute backup.
Cannot execute bit-type symbol backup other than in the BIT format.	If you designated a BIT symbol in the [Device Address] field, you cannot execute backup in formats other than BIT. Reset the format to "BIT", and then execute backup.
Cannot execute symbol backup other than a bit-type in the BIT format.	If you designated a symbol other than a bit-type in the [Device Address] field, you cannot execute backup in BIT. Reset the format to something else but "BIT", and then execute backup.

4. When the backup process has been completed successfully, the following window appears. Click [OK] to exit the process.



MEMO

- The following shows the data contents for CSV device data.

Node name, (Node name for backup) (CR)

Device name, (Device address to start backup) (CR)

Number, (Number of backup data) (CR)

Device length, (Bit length of the backup device) (CR)

Data type, unsigned decimal (CR)

Date, (Backup date) (CR)

(CR)

Data, comment (CR)

(Value of the first device address), (Name of the first device address) (CR)

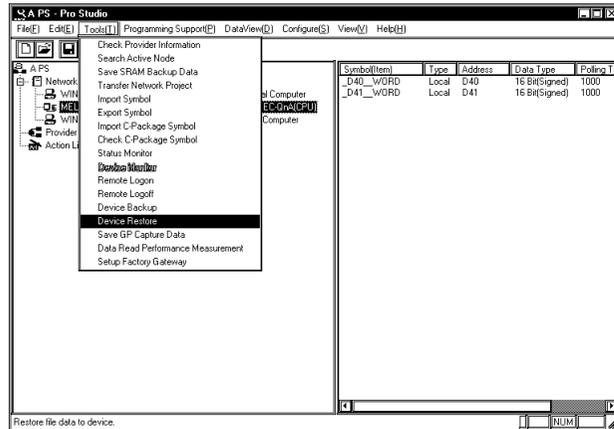
(Value of the second device address), (Name of the second device address)

(CR)

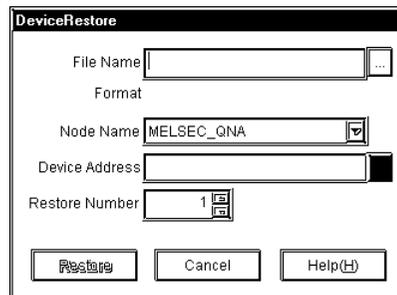
- The backup date should be written in a format of (year)/(month)/(day) (space) (hour):(minute). If (minute), if it is one digit, use 0 (zero) in the second digit.

3.7.2 Restoring Device Data

1. Click [Device Restore] on the [Tools (I)] menu of the Menu Bar.



2. The [Device Restore] window appears. After selecting all items, click [Restore].



[File Name]

Enter the file name, which you have created according to the procedure in the section “ 3.7.1 Device Data Backup”. All buttons except for the cancel button will stay dimmed until you designate the correct file.

[Format]

If you designate a file in the [File Name] field, the following table showing formats corresponding to files will appear.

File Format	Bit Length	Write Format	Display
Binary	1		Bit
	16		16 Bits
	32		32 Bits
CSV	1		Bit
	16	Unsigned decimal	16 Bits unsigned decimal
		Signed decimal	16 Bits signed decimal
		Hexadecimal	16 Bits hexadecimal
	32	Unsigned decimal	32 Bits unsigned decimal
		Signed decimal	32 Bits signed decimal
Hexadecimal		32 Bits hexadecimal	

[Node Name]

Select the node name from the selection box. If unselected, the error dialog will appear.

[Device Address]

Enter the device address to start the restoration. When you enter the file name, the header address saved in the file is entered. If not entered or entered incorrectly, the error dialog will appear.

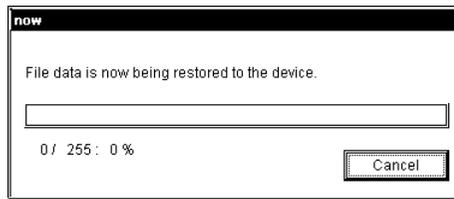
[Restore Number]

Enter the number of restoration data. By default, the number of data saved in the file is displayed when entering the filename. The minimum number to data to restore is one. The maximum number of data differs depending on a backup data file, however, you cannot restore the number of data exceeding the restriction in the table below.

Device Type to Access	Format	Maximum Number of Restore Data from Special Protocol Symbols	Maximum Number of Restore Data from Other Device
Bit Device	Bit	255	Depends on a backup data file
16 Bits	Bit	255	
Device	16 Bits	255	
	32 Bits	127	
32 Bits	Bit	255	
Device	32 Bits	255	

If the contents set in the [Device Restore] dialog are incorrect, following dialogs will appear.

3. The restoration processing status is displayed in the [now] dialog.



If the contents set in the [Device Restore] dialog are incorrect, following dialogs will appear.

Dialog Contents	Workaround
Cannot designate a bit-type symbol to data restore other than in the BIT format.	If you designated a Bit symbol in the [Device Address] field, you cannot restore data in formats other than BIT. Reset the symbol other than in "BIT" in the [Device Address] field, and then restore.
Cannot designate a symbol other than in BIT to data restore in the BIT format.	If you designated a symbol in formats other than BIT in the [Device Address] field, you cannot restore BIT data. Reset the BIT symbol in the [Device Address] field, and then restore.
The designated file is incorrect.	If you designate a Bit backup data file by Pro-Server of the older version (V4.0) in the [File Name] field, you cannot restore it. Reset other file in the [File Name] field, and then restore.

4. When the restoration process has been completed successfully, the following window appears. Click [OK] to exit the process.



3.8 GP Capture Data Saving Function

Pro-Server allows you to read the on-line GP capturing data on your network. This screen capturing is realized by two different ways, the way to execute it using the action item function or the interactive way.

This section describes the interactive capturing procedure.

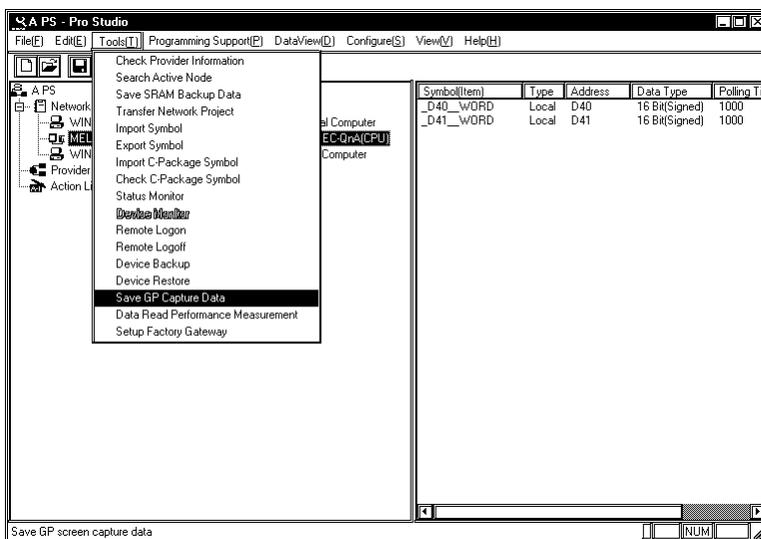
For the procedure using the action item function, refer to “4.3.12 Upload of JPEG Data”.

Reference → “4.3.12 Upload of JPEG Data”

When you use the save feature of the GP screen, there are following restrictions.

- You can use this function only on GP-2000 series/GLC2000 series/IT series.
- Prior to performing this function with the CF Card inserted into the GP because the read data is temporarily saved in the CF Card.

1. Click [Save GP Capture Data] on the [Tools (T)] menu of the Menu Bar.



2. The [Screen Capture & Save] window appears. After selecting all items, click [Save].

[Node Name]

Select the node name. If unselected, the error dialog will appear.

[Folder Name]

Enter the folder name to save data. This defaults to the “NPJDataBase” folder in the current directory of Pro-Server. If not entered, the error dialog will appear.

[File Name]

Enter the file name. This defaults to %NODE%Y%M%D%h%m%s (node name, year, month, day, hour, minute).

[Show Browser]

Select if you wish to display it on your browser after uploading the GP screen. If you check (ON) the box, it will be displayed on your browser. This defaults to unchecked (OFF).

When you execute [Save GP Capture Data], drawings and operations on the GP screen will stop for a few seconds. Therefore, you cannot normally execute the GP screen capturing operation from upper-level PCs.

You should set the bit “0” of GP’s LS2076 to “ON (1)” to capture GP screens from upper-level PCs. During capturing, the LS2077 bit is set to “ON” on GP. After finishing capturing, it will be automatically set to “OFF”.

3.9 Security Function

Pro-Server has a security function to protect PLC and GP data.

The following items are included in this function:

- Passwords to set up user levels (User level password)
- Password to protect accesses from unregistered personal computers (Remote password)

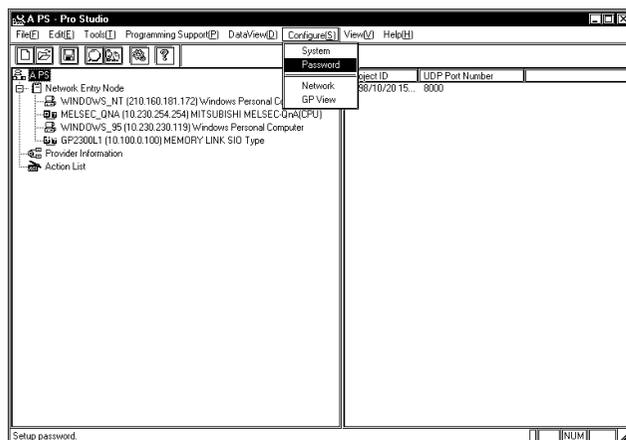
3.9.1 User Level Password Settings

Pro-Server can restrict the range of functions available to a user via three different password levels.

MEMO

Be sure to write down every password registered so as not to forget it. You cannot log on to the system without the correct password.

1. Select [Password] in the [Configure(S)] menu.



2. The Password window appears. Specify whether you enable or disable the password check by turning on the corresponding option. If you select [Enable], enter all the items and then click [OK].

Operations available for each level are as follows:

Level	Change settings	Writing data	Reading data
Administrator	○	○	○
Read / Write	×	○	○
Read only	×	×	○
Disconnect	×	×	×

Change Settings...Provider information setting changes, etc.

Writing data.....Data write via device monitor

Reading data.....Data read via device monitor

If you enter a password, the following Login window will appear at the start of Pro-Server.

3.9.2 Remote Password Setup

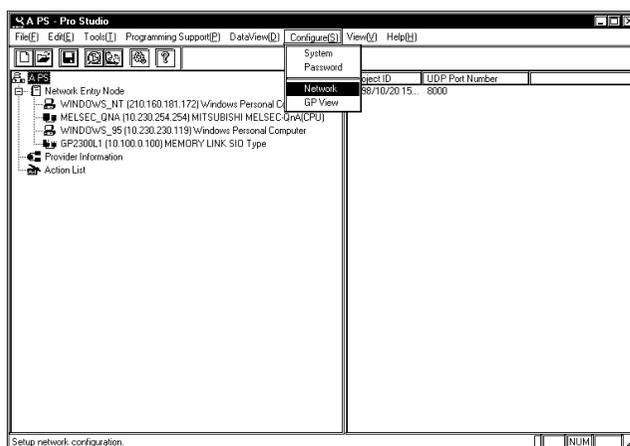
In order to prevent illegal accesses by a personal computer that has not been registered on the network, a password can be registered for the entire network.

When remote access is attempted from a personal computer that has not been registered as a network node, a dialog box will appear asking for the password. After the registered password is correctly entered, remote access can be performed.

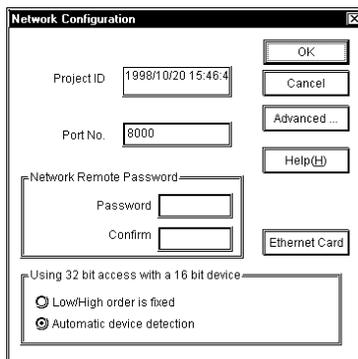
MEMO

Be sure to write down each registered password. If a password is forgotten, remote access cannot be performed.

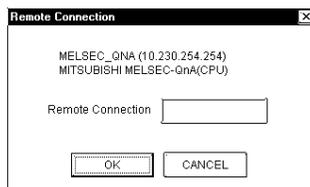
1. Select [Network] in the [Configure(S)] menu.



- The [Network Configuration] dialog box will appear. Enter a password in [Network Remote Password] and click the [OK] button.



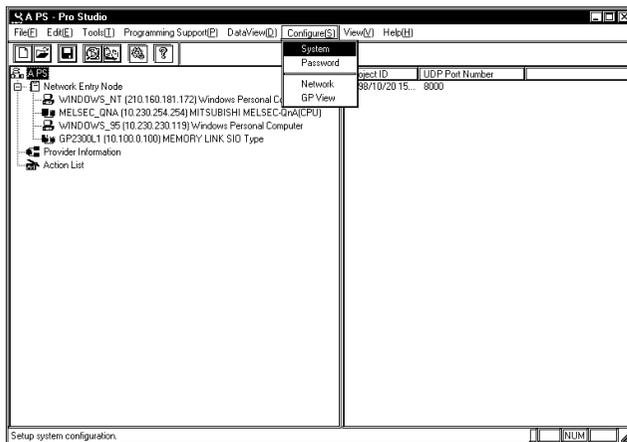
When selecting a node via a personal computer that has not been registered as a network node and selecting [Tool]'s [Remote Logon] from the Menu Bar, a dialog box will appear, asking for the password.



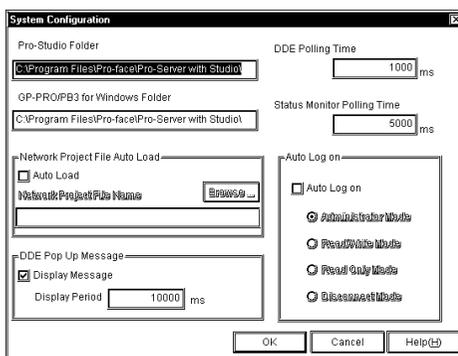
3.10 Configuring the System

The following describes how to enter Pro-Server and Pro-Studio system information. The following description assumes the program's main window is open.

1. Select [System] in the [Configure(S)] menu.



2. The [System Configuration] window will appear. Enter all necessary data and click [OK].



[DDE Polling Time]

The DDE polling time designated here will be used as an initial value of the polling time when a symbol is registered.

[GP-PRO/PBIII for Windows Folder]

Designate the folder where GP-PRO/PBIII for Windows is installed.

The default is “C:\Program Files\Pro-face\ProPBWin”.

[Network Project File Auto Load]

The designated network project file is loaded automatically when Pro-Server starts.

For access rights by modes:

Reference → “3.9.1 User Level Password Settings”.

For the detailed information for other items:

Reference → On-line Help.

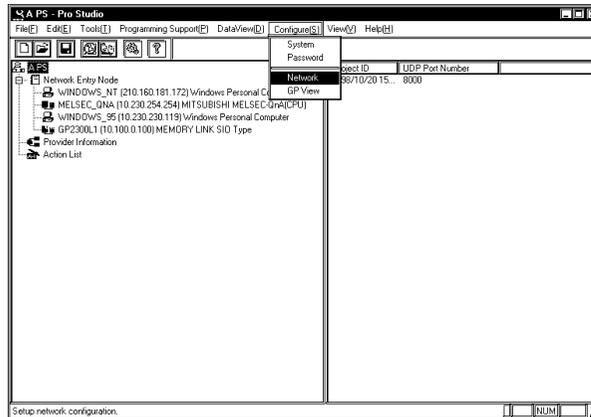
MEMO

- The polling time used set for collecting or writing data for each symbol, providing data and monitoring devices may not be able to be performed under certain conditions. These conditions include the currently registered number of GPs, number of Tags used on each screen sent, type of PLC connection, and number of other currently open Windows applications. Entering “0” will allow the system to operate at its maximum speed. Use this value as a benchmark when entering other values to “fine-tune” your system.
- If you create and add Pro-Server’s short-cut to the Windows Start Up menu, Pro-Server will start automatically with a network project that has been designated via [Network Project File Auto Load].

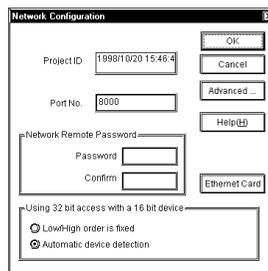
3.11 Configuring the Network

Follow the procedure below to change the Network Port Number setting. The ports to be used should be consecutive ports, beginning with the first port number entered. The default port number setting is “8000” which uses ports 8000 and 8001. The following description assumes the Pro-Studio main window is open.

1. Click [Network] in the [Configure(S)].



2. The [Network Configuration] window will appear. Enter all necessary data and click [OK]. To enter advanced settings, click on [Advanced].



[Port No.]

For port numbers, ten numbers in series are used, starting from the designated number.

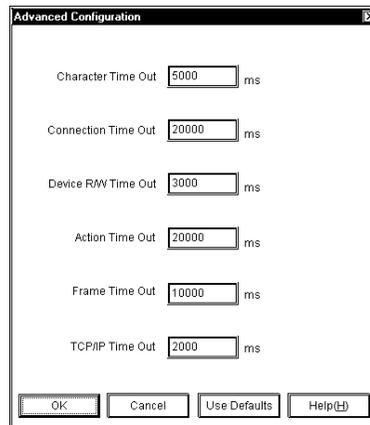
[Network Remote Password]

For a remote password through network, refer to “3.9.2 Remote Password Setup”.

[Using 32 bit Access with a 16 bit device]

Selects the access order of sequential two 16-bit devices which are regarded as a single 32-bit device.

3. The [Advanced Configuration] window will appear. Enter all necessary data and click [OK].



The screenshot shows a dialog box titled "Advanced Configuration" with the following settings:

Parameter	Value	Unit
Character Time Out	5000	ms
Connection Time Out	20000	ms
Device R/W Time Out	3000	ms
Action Time Out	20000	ms
Frame Time Out	10000	ms
TCP/IP Time Out	2000	ms

Buttons at the bottom: OK, Cancel, Use Defaults, Help(F1).

[Character Time Out]

Pro-Server is normally used via Ethernet, however, this is the reserved parameter to be used when you improve and use Pro-Server for serial connection. This setup is not used currently. (One byte of data will be sent at one time in serial communication, and if the interval exceeds the value designated here, it will be regarded as receive error and also regarded as timeout.)

[Connection Time Out]

While currently establishing connection, if there is no communication via the connection for the period of time designated here, the connection will be terminated. (You can establish only one connection for one consumer node.)

[Device R/W Time Out]

If there is no response within the time designated here after Pro-Server raised a read/write request, it will be regarded as timeout.

[Action Time Out]

If there is no response within the time designated here after provider or action is executed, it will be regarded as timeout. However, in the case of provider, this is effective only when you checked [Reply Check] and [Use Provider Timeout Time from Network Settings] in the [Detailed Settings] tab.

Reference → "3.3 Registering Provider Data"

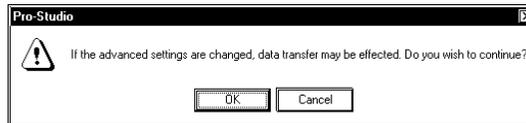
[Frame Time out]

When working on mass data, a provider node sends data dividing those into more than one packet, while a consumer node receives a packet sent in turn. If a consumer node cannot receive the next packet within the time designated here after receiving one packet, it will be regarded as timeout.

[TCP/IP Time Out]

In TCP communication, “ACK” will be returned to data sent. If “ACK” is not returned, it will be retried, however, if “ACK” is not returned even at retry time, it will be disconnected. Time designated here is maximum waiting time for one action from data sending till ACK return.

After you have selected an advanced setting, the following message appears.

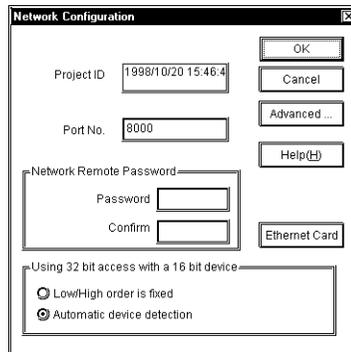


Clicking [Use Defaults] resets all values to the default values.

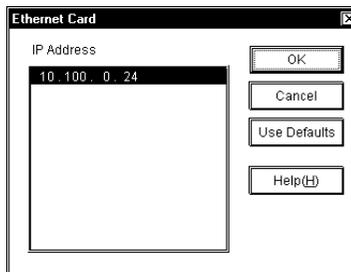
3.11.1 Configuring Ethernet Cards

If the PC for Pro-Server has equipped with two or more Ethernet cards, it is required to designate the specific card for Pro-Server to use. If the PC has only one Ethernet card, there is no need to change the settings.

1. Select [Configure(s)]-[Network Configuration] item.



2. Click the [Ethernet Card] button. The Ethernet Card window will appear.



3. Select the IP address of the card to be used by Pro-Server and click [OK].

MEMO

After changing the Ethernet card, make sure to restart both Pro-Server and Pro-Studio.

3.12 Printing the Setting Data

You can Print Pro-Studio Setting data.

The items that can be printed are as follows:

- Provider's list

IP address, sub net mask, PLC type

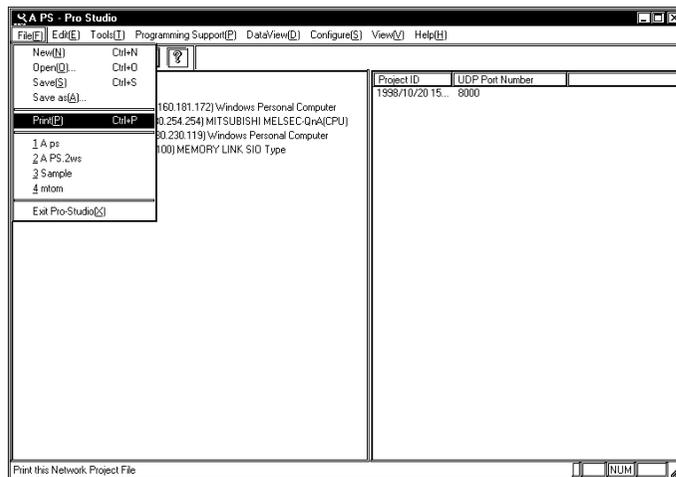
- Registered symbol information by provider

Symbol name, symbol type, device address, data type, polling time

- Registered provider information data by provider

Provider title, provider contents (conditions, symbol name, check interval, provider, receiver)

1. Select the [File(E)]-[Print(P)] command.



When no Network Project file (*.npj) is open, a dialog box will appear to ask a target file to print.

2. The default printer will print the data.

Printable paper size is A4 only.

3.13 Other Instructions

This section describes instructions that you need to know for the Pro-Server operation.

3.13.1 Special Protocol

Pro-Server recognizes following 12 kinds of protocols as “Special Protocol”.

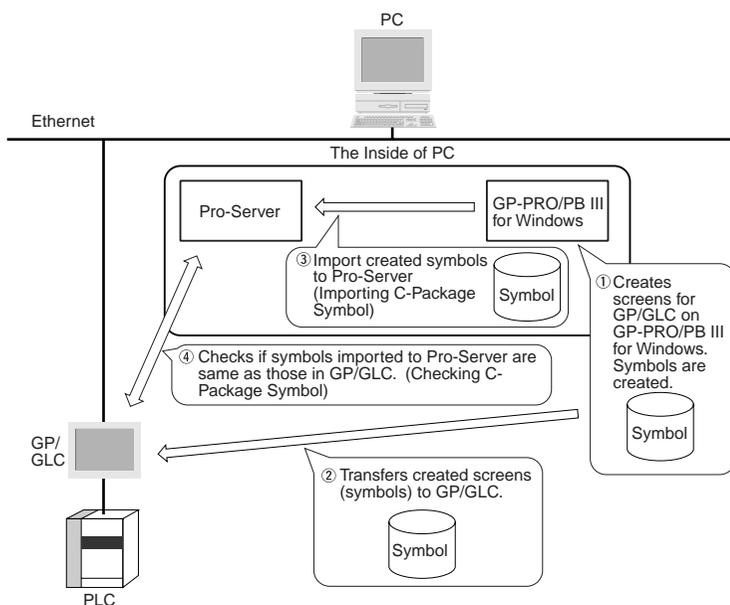
- MITSUBISHI MELSECNET/10
- OMRON SYSMAC-CS1 (ETHER)
- HITACHI HIDIC H (ETHER)
- Siemens S7-200 via MPI
- Siemens S7-300/400 via MPI
- SIEMENS S7-300/400 (ETHER)
- AB Slc500 DH485
- AB ControlLogix (EtherNet/IP)
- Allen Bradley SLC5/05 (ETHER)
- Schneider TSX via UNI-TELWAY
- Schneider Modbus TCP (ETHER)
- Schneider Modbus RTU 1:n comm.

The symbol of special protocol cannot display the device address. Therefore, these symbols are described as “Screen Creation Definition Symbol” on Pro-Studio.

All symbols for screens created by GP-PRO/PB III for Windows are normally screen creation definition symbols, however, only “Special Protocol Symbol” is described as “Screen Creation Definition Symbol” on Pro-Studio. In dialogs, if it is described as “Screen Creation Definition Symbol”, it means the symbol of special protocol.

The following figure shows the operation flow for the symbol of Special Protocol.

If all of symbols (①, ② and ③) aren't the same, Pro-Server can't access Special Protocol Symbol.



Restriction When Using Drawing Definition Symbols with Pro-Server's Various Features

When you use Special Protocol symbols defined by special protocols with Pro-Server's various features, there are following restrictions.

Pro-Server Features	Action	Restriction Contents
Print	O	No restrictions.
Provider (trigger, provider node, consumer node)	◆	The number of device is restricted.
Symbol Import, Export (2-Way, ProPB)	O	No restrictions.
Device Monitor	◆	The number of write device is restricted.
Device Backup	◆	The number of device is restricted.
Device Restore	◆	The number of device is restricted.
Read Time Measurement	◆	The number of device is restricted.
ProEasyAPI (ReadDevice, WriteDevice)	◆	The number of device is restricted.
DDE	O	No restrictions.
Device View	◆	The number of device is restricted. For the database storage feature, if symbol device definition is changed on the way, you cannot refer to precise past data.
GP-Viewer	◆	For the play-back feature, if symbol device definition is changed on the way, you cannot refer to precise past data.
Data Storage	◆	For the database storage feature, if symbol device definition is changed on the way, you cannot refer to precise past data.
GP-Web	◆	When you imported the project file (*.prw) on Pro-Server, you must re-compile it.

O no restrictions ◆ with restrictions

The maximum access number to special devices is as the following.

Device Type to Access	Format	Maximum Number of Read	Maximum Number of Write
Bit Device	Bit	255	1
16 Bits Device	Bit	255	1
	16 bits	255	40
	32 bits	127	20
	Single precision floating point	127	20
	Double precision floating point	63	10
	Character string	510 (single byte)	80 (single byte)
32 Bits Device	16 bits	255	1
	32 bits	255	40
	Single precision floating point	255	40
	Double precision floating points	127	20
	Character string	1020 (single byte)	160 (single byte)

3.13.2 Address for Windows Computer

You can use up to 27 names as Windows computer exclusive device names, that is, LS, LSA, LSB, LSC, LSD ... LSY and LSZ. The device address ranges from 0000 to 9999 in decimal word.

In BIT, upper 4 digits are designated in decimal and the lowest 1 digit is in hexadecimal ranging from 00000 to 9999F.

MEMO

The PC exclusive LS area can be used as the setup area for simple DLL functions, the provider feature or the action item feature.

4

Action Items

This chapter describes how to set up and use Action Items.

- 4.1 Overview
- 4.2 Registering Action Items
- 4.3 Registering Action Item Parameters
- 4.4 Using 'Create Report using Excel' Action

4.1 Overview

When you add an Action Item to your PC's existing Provider data (registered in "3.3 Registering Provider Data"), that Action (called an Action Item) will operate based on a trigger received from a Windows PC or GP on the network.

16 types of Action Items are installed during the Pro-Server software's standard installation. These include Actions for uploading GP log data, writing data to a designated Excel book, and others.

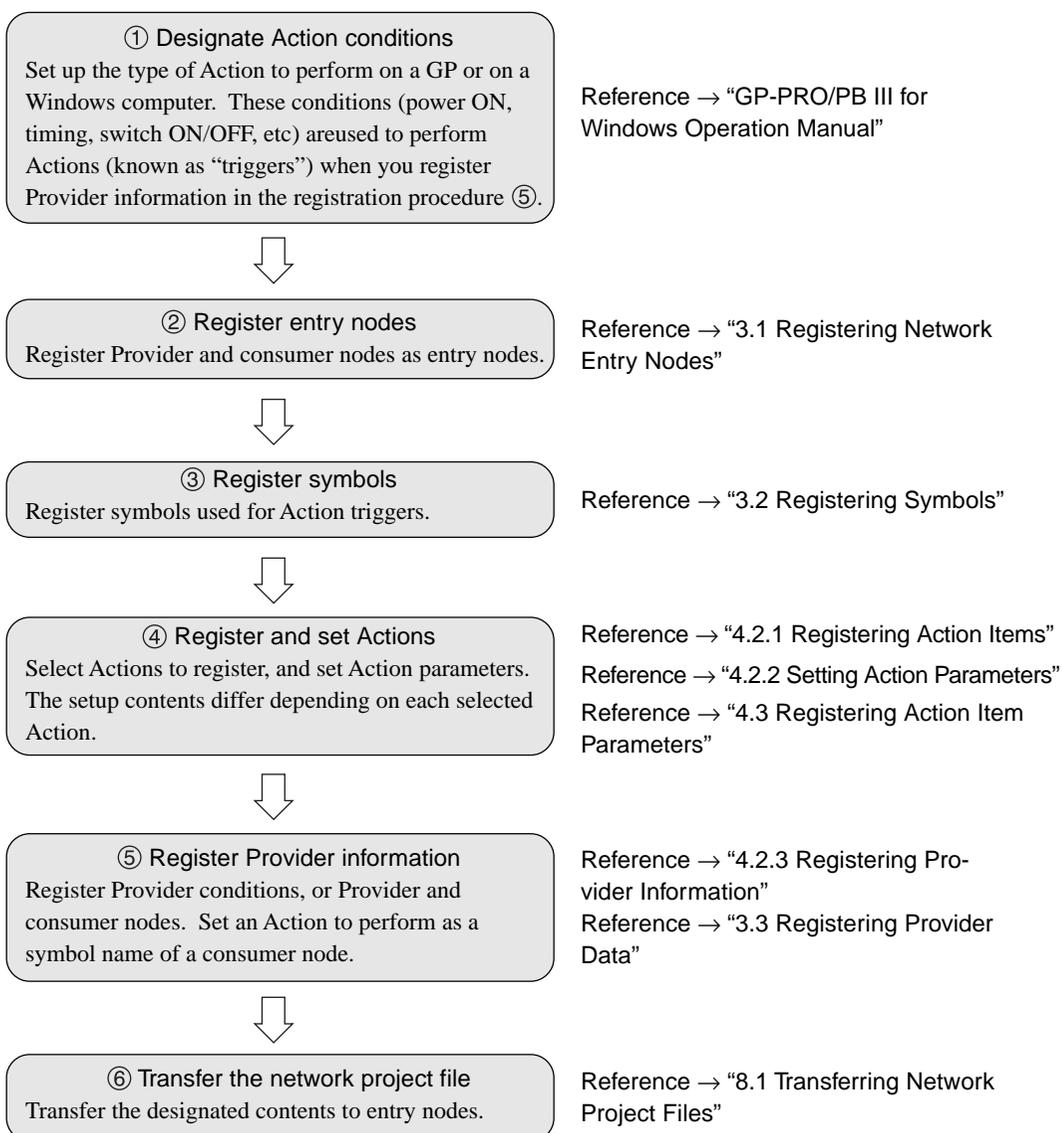
To use Action Items, you must first register the desired Action and then set the conditions that will trigger that Action.

MEMO

- Depending on the Action Item chosen, you may need to install Excel, Access or a RDB (Relational Database) in both the Provider and Consumer nodes.
This chapter's description assumes that the required Excel, Access and/or RDB have already been installed.
- If your PC is running Windows 98, Windows 98SE or Windows Me, and you have set up multiple Action Items, you may not be able to start an Action Item due to insufficient memory. This problem cannot be solved, however, by adding more RAM memory.

4.1.1 Action Item Registration

The following procedure describes how to register an Action Item.



MEMO

Registering the ‘Create Report using Excel’ Action Item is different from others. For procedures ④ and ⑤, refer to “4.4 Using ‘Create Report using Excel’ Action”.

4.1.2 Available Action Items

The following Action Items are available.

These Action Items are installed during the Pro-Server standard installation.

Start Application

This starts desired applications installed in Windows computers on the network.

Writes Data to Excel Book

This writes designated Provider data to an Excel book.

Alarm Log (with Sound Alert Feature)

This compares provided alarm log data with pre-defined data on the Access table and displays designated contents in a table (e.g. alarm messages) using Table View. You can also add a sound to an alarm notification by designating a Wav file in a table.

Upload of GP Log Data

This reads backup data online from SRAMs and CF Cards of Provider nodes by designating a reading source. You must set the logging and the alarm features on GP-PRO/PB III for Windows in advance and transfer it to GP of the Provider node.

Automatic Download of GP Filing Data

This writes filing data automatically. You can write filing data to SRAMs, CF Cards and internal memories (FROM) of Provider nodes by designating a writing target.

You must set the filing feature on GP-PRO/PB III for Windows in advance and transfer it to GP of the Provider node.

Automatic Upload of GP Filing Data

This reads filing data automatically. You can read filing data from SRAMs, CF Cards and internal memories (FROM) of Provider nodes (GPs) by designating a reading source.

You must set up the GP unit's filing feature in advance using GP-PRO/PB III for Windows. Once it is created, it must be transferred to the Provider node (GP).

Automatic Upload of Access Data

This reads device data into the Access file.

First, create a Access table in the desired format. This Action will compare Provider data with table data and read device data according to the table's designated contents.

Automatic Download of Access Data

This writes data from the Access file to the designated device data.

Create the Access table in advance according to the designated format. If you set this Action, it compares Provider data with table data and writes device data according to the contents designated in a table.

Download Recipe data for Excel

This writes data described in the Excel sheet to the designated device address.

Writes Data to E-Mail

You can send e-mails without programming. You can either use Provider data or choose a message created by Excel in advance as e-mail contents to send.

Upload to the database

This reads data at the device address designated by Excel or Access and writes to the designated relational database server.

- When you use Excel, data will be directly written to relational database.
- When you use Access, data will be written to the Access file once and then to relational database. Even if you fail to connect to the relational database, previously saved data will be written to relational database next time when the Action is started, so no data is lost. The table field for designated contents must exist in the designated relational database.

Download from the database

This reads data saved in the relational database server designated by the Excel or Access file and writes to the designated device address.

When you use Excel, data saved in relational database will be directly written to the designated device address. When you use Access, data saved in relational database will be written to the Access file once and then to the designated device address.

Upload of JPEG Data

This takes in capture data of a GP screen online to your PC. If a VM unit is mounted on a GP, you can also take in video capture data.

You must set the filing feature on GP-PRO/PB III for Windows in advance and transfer it to GP of the Provider node.

Writes Data to CSV file

This writes designated Provider data to a CSV format file.

Writes Data from CSV file

Writes data from the designated CSV file to the designated device address.

Create Report using Excel

You can create a Excel book that includes a variety of information, that is based on PLC device data, GP screen data or backup data within GP. You can also create various reports such as a work report or an error report.

Available data types will differ depending on the Action Item to be used.

The following table shows data types that can be designated as a Provider node symbol name.

Action Name	Bit	16 Bits				32 Bits				Single Precision	Double Precision	Character
		Signed	Unsigned	HEX	BCD	Signed	Unsigned	HEX	BCD			
Start Application	○	○	○	○	○	○	○	○	○	○	○	○
Writes Data to Excel Book	○	○	○	○	○	○	○	○	○	○	○	○
Alarm Log (with Sound Alert Feature)	○	○	○	○	○	○	○	○	○	○	○	×
Upload of GP Log Data	○	○	○	○	○	○	○	○	○	○	○	×
Automatic Download of GP Filing Data	○	○	○	○	○	○	○	○	○	○	○	×
Automatic Upload of GP Filing Data	○	○	○	○	○	○	○	○	○	○	○	×
Automatic Upload of Access Data	○	○	○	○	○	○	○	○	○	○	○	×
Automatic Download of Access Data	○	○	○	○	○	○	○	○	○	○	○	×
Download Recipe data for Excel	○	○	○	○	○	○	○	○	○	○	○	×
Writes Data to E-Mail (Title name)	○	○	○	○	○	○	○	○	○	○	○	○
Writes Data to E-Mail (Table)	×	○	○	○	×	×	×	×	×	×	×	×
Writes Data to E-Mail (no designations)	×	×	×	×	×	×	×	×	×	×	×	○
Upload to the database	○	○	○	○	○	○	○	○	○	○	○	○
Download from the database	×	○	○	○	×	×	×	×	×	×	×	○
Upload of JPEG Data	○	○	○	○	○	○	○	○	○	○	○	○
Writes Data to CSV file	○	○	○	○	○	○	○	○	○	○	○	○
Writes Data from CSV file	○	○	○	○	○	○	○	○	○	○	○	○
Create report using Excel	○	○	○	○	○	○	○	○	○	○	○	○

4.2 Registering Action Items

The information given here corresponds to registration procedures ④ and ⑤ (4.1.1 Action Item Registration). See references for registration procedures ① through ③ and ⑥.

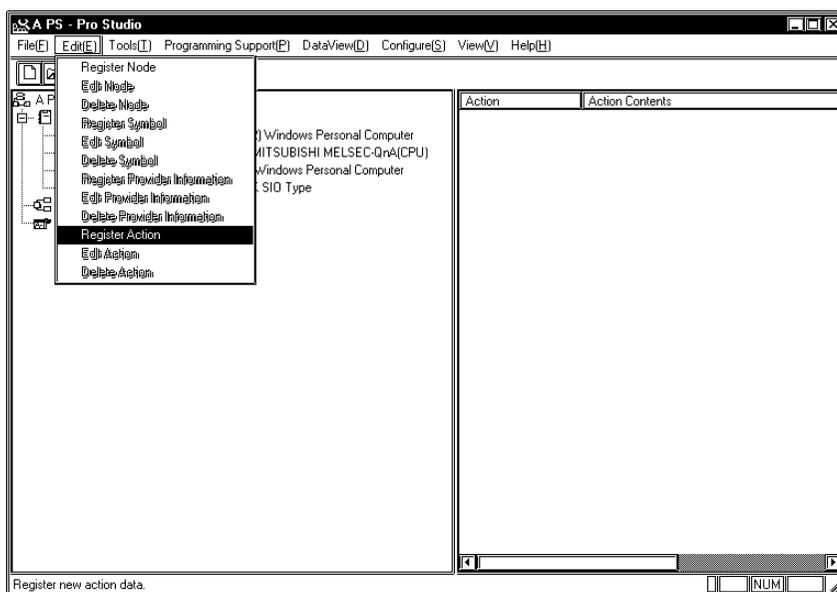
MEMO

This section describes a series of Action registration procedures - from Action registration to parameter setup and Provider information registration. The example Action used here is “Writes Data to Excel Book”. Action and Provider information registration are common to each Action Item, however, parameter registration steps will differ. For an example of entering other types of parameters, refer to “4.3 Registering Action Item Parameters”. The “Create Report using Excel” Action has its own, unique setup procedures, and these are summarized in “4.4 Using ‘Create Report using Excel’ Action”.

4.2.1 Registering Action Items

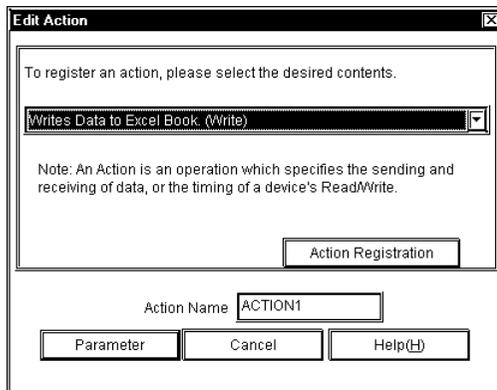
Here you can register the name used for an Action Item.

1. In the Pro-Studio main screen, click to select the Network Project tree's “Action List” feature.
2. Select [Edit (E)]-[Register Action] from the menu bar.



3. In the [Edit Action] dialog box, select the desired Action Item from the pull-down menu and designate the Action name.

This example uses “Writes Data to Excel Book” .



[Action Registration]

If you wish to create your own (custom) Action Item, you must register the Action Item using the [Action Registration] feature.

MEMO

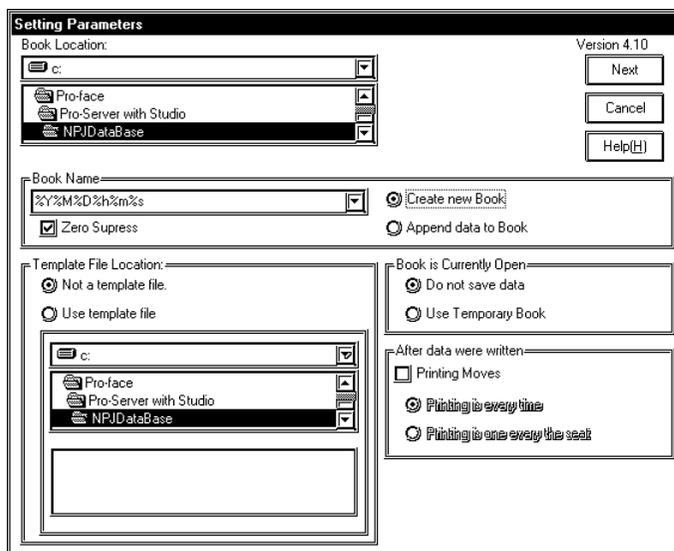
Standard Pro-Server with Pro-Studio Action Items are automatically registered during installation.

4. Enter your desired name for the selected Action Item in the [Action Name] box.
5. If you click [Parameter], the selected Action Item's detailed settings dialog box will appear.

4.2.2 Setting Action Parameters

The following describes the entering of sample parameters for the “Writes Data to Excel Book” Action. For parameter setups of other Action Items, refer to “4.3 Registering Action Item Parameters” and “4.4 Using ‘Create Report using Excel’ Action”.

1. If you select “Writes Data to Excel Book” and click [Parameter], the following dialog box will appear.



[Book Location:]

Designate the folder to save.

[Book Name]

Designate the book name. Books can be designated indirectly. For details, see 4.2.2 Setting Action Parameters - Creating a Macro to Use Same Save File for Actions

[Zero Suppress]

If you check this option, no zeros are used in the file name even though the folder name includes “%M%D%h%m%s” (month, day, hour, minute, second) data.

If you do not check this option, 0 (zeroes) are retained in the file name if the folder name includes “%M%D%h%m%s” (month, day, hour, minute, second) 0 data, i.e. “07” or “02”.

The default is “checked”.

MEMO

Writing in the Excel sheet is performed while searching blank line. A large amount of data in a sheet can slow down the writing process.

If a sheet is allocated using a book name like “%Y%M%D%h%m%s”, the writing process will be faster.

[File Save Method]

When you always wish to create a new book, check [Create new Book]. If you wish to add/append new data to old data, etc, check [Append data to Book].

MEMO

If you check [Append data to Book], you can use the high-speed data write feature. For details, refer to the next page.

[Template File Location]

If you wish to use an existing template file, check [Use template file], and then designate the template file name (*.XLT).

MEMO

The designated template file should contain only sheet1.

[Book is Currently Open]

Check this option when books with the same filename will be open during writing. Select either [Do not save data] or [Use Temporary Book].

If you check [Do not save data], written data will not be saved and it will be deleted.

If you check [Use Temporary Book], written data will be temporarily saved under a separate filename (The temporary filename will be “%Y%M%D%h%m%s.xls”).

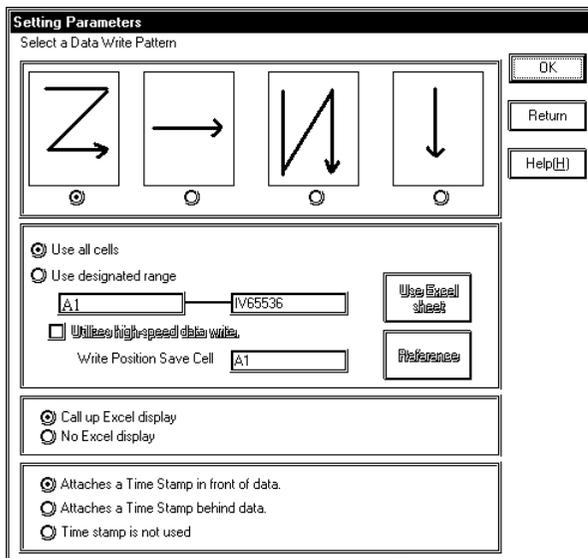
[After data were written]

Check this option when you print out written data. Select the printing timing from either [Printing is every time] or [Printing is one every the sheet].

If you check [Printing is every time], printing will be performed every time data is written.

If you check [Printing is one every the sheet], printing will be performed after all data is written to the designated range.

2. After setting all parameters and clicking [Next], the following dialog box will appear.



The dialog box is titled "Setting Parameters" and contains the following sections:

- Select a Data Write Pattern:** Four icons representing different write patterns: a Z-pattern, a horizontal arrow, a diagonal arrow, and a vertical arrow. The Z-pattern is selected with a radio button.
- Write Range Options:**
 - Use all cells
 - Use designated range: A1 to IV65536
 - Unless high-speed data write.
 - Buttons: Use Excel sheet, Preference
 - Write Position Save Cell: A1
- Excel Display Options:**
 - Call up Excel display
 - No Excel display
- Time Stamp Options:**
 - Attaches a Time Stamp in front of data.
 - Attaches a Time Stamp behind data.
 - Time stamp is not used

[Select a Data Write Pattern]

Designate the sheet write pattern.

Data is written on cells within a sheet according to the designated write pattern.

[Write Data Range]

If you wish to limit the write range to a single sheet, check [Use designated range].

If you click [Use Excel sheet], the following dialog box will appear and Excel will start.



The dialog box is titled "ProRpt" and contains the following text:

Please push O.K. after choosing the range by Microsoft Excel. Please do not close a sheet.

Buttons: OK

After designating the write range in Excel (shown below), click [OK] in the above dialog box.

This sets the designated range as the data write range.

	A	B	C	D	E	F	G	H
1								
2								
3								
4								
5								
6								
7								

When the designated data write range is filled with data, a new sheet is automatically created and the write process is continued on a newly created sheet.

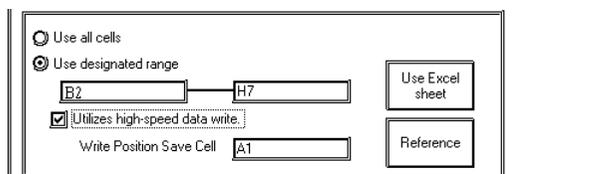
[High-Speed Data Write]

After you check [Append data to Book] as the data saving method in the [Setting Parameters] dialog box and designate the write cell range, [Utilizes high-speed data write] is enabled.

High-speed data write uses the designated data write cell location to start writing, which speeds up the writing process.

Check [Utilizes high-speed data write] and enter the cell where information for the write start location is saved in [Write Position Save Cell].

If you click [Reference], you can designate [Write Position Save Cell] using the same operation as [Write Data Range], i.e. calling up the Excel sheet and designating the position with your mouse.. You cannot designate a cell designated by [Write Data Range] for the [Write Position Save Cell].

**MEMO**

When you set up multiple Actions that use the “Writes Data to Excel Book” feature and then write to the same sheet using more than one Action, be sure to designate a different cell for each Action’s [Write Position Save Cell]. If you use the same cell for every Action, the write start location may shift.

[Call up Excel display]

If you check [Call up Excel display], Excel will automatically start as soon as the trigger conditions are satisfied and you can refer to write data.

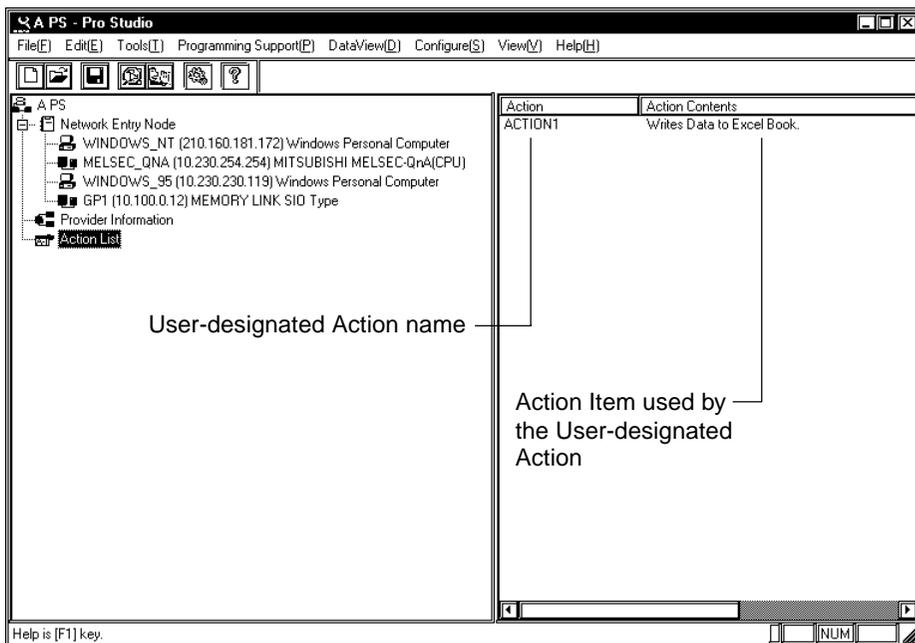
However, Excel will quit (exit) after a preset interval once writing is finished.

[Time Stamp]

If you check [Attaches a Time Stamp in front of data], the provided time will be written in the starting cell. If you check [Attaches a Time Stamp behind data], the provided time will be written in the ending cell.

Time display format is fixed and written in [%Y %M %D %h:%m:%s] format.

3. Designate each Action's parameters and click [OK]. All the registered settings for the Action will then be registered.



Creating a Macro to Use Same Save File for Actions

If the macro codes shown below are designated for the [Save File] name in an Action's parameter settings, the file name can be changed to [Node Name] or [Save data in Device Name (Symbol Name) of Provider Node)].

- Provider's Node Name - Macro Code: %NODE

Ex.) If the participating Node (GP1) is designated using "Data_%NODE", the filename will become "Data_GP1".

- Save data in Device Name (Symbol Name) of Provider Node - Macro Code: %DEV[Device or Symbol name]

Ex.) When saving "2043" to D100, if "Data_%DEV[D100]" is used, the filename will change to "Data_2043".

MEMO

When the data saved to the Provider's device name (symbol name) is converted to a filename, the following usage cautions apply.

- Data Types when designating the Device Name (Default: Decimal, signed 16-bit)

The data type can be changed if after the device name a single-byte space and one of the data type designation shown in the table below are attached.

Ex.) When using decimal, unsigned 16-bit, and storing "40505" to D100, designating "Lot_No%DEV[D100 .WORD]" will change the filename to "Lot_No40505".

Data Type	Designated Characters	Data Type	Designated Characters
Bit	.BIT	Decimal Unsigned 32-bit	.DWORD
Decimal Signed 16-bit	+.WORD	Hexadecimal 32-bit	.HEXDWORD
Decimal Unsigned 16-bit	.WORD	BCD 32-bit	.BCDDWORD
Hexadecimal 16-bit	.HEXWORD	Single precision floating decimal	.FLOORT
BCD 16-bit	.BCDWORD	Double precision floating decimal	.DOUBLE
Decimal Signed 32-bit	+.DWORD	Character string	.STR

- Cautions when using Non-character Strings for Symbol Names

The filename is created using the data type registered in the "Register Symbol" dialog box.

Ex.) If the value "0x999" is saved to the BCD format symbol "Product_3", when "Data_%DEV[Product_3]" is designated, the filename changes to "Data_9999".

- Cautions when using Character Strings for Symbol Names

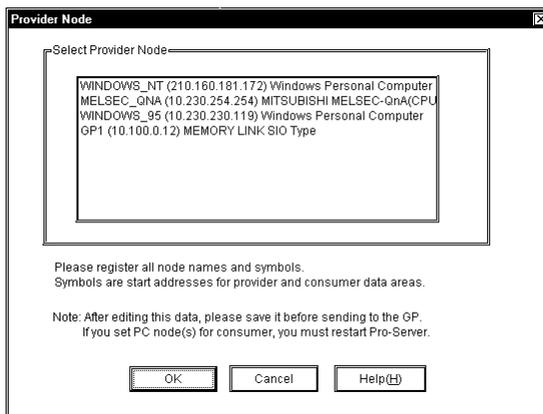
Attaching an asterisk (*) plus a number after a symbol name allows you to designate the number of characters. Default value is 32 characters, and the maximum is 255 characters.

Ex.) A string %DEV[MOJI .STR .*10] means that the 10 characters after the symbol name "MOJI" are read out, and file names are created until the string NULL is reached.

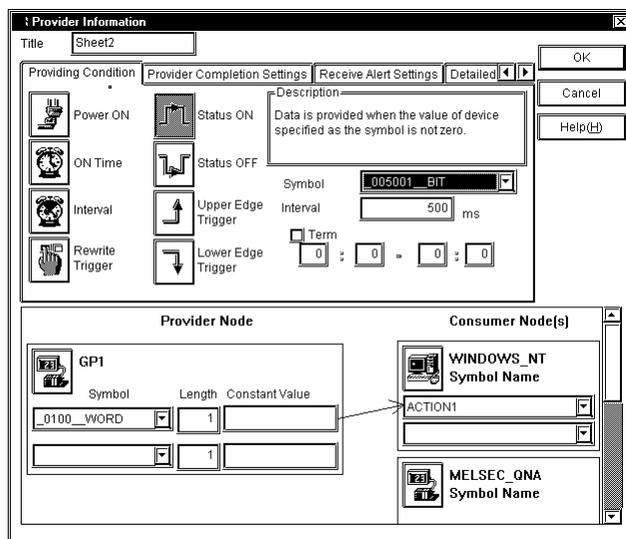
4.2.3 Registering Provider Information

The following describes how to register Provider information using an Action Item.

1. Select the Provider information list from the main screen's network project tree.
2. Select [Edit(E)]-[Register Provider Information] from the menu bar.



3. Select the Provider source node to use and click [OK].
4. The [Provider Information] dialog box appears.
5. Enter the desired Provider information name in the [Title] entry box.
Here, "Sheet2" is entered as an example.
6. Select the [Providing Condition] item and enter the device address to be written to as the Provider Node symbol name.



The following table shows data types that can be designated for the Provider Node symbol name.

Action Name	Bit	16 Bits				32 Bits				Single Precision	Double Precision	Character
		Signed	Unsigned	HEX	BCD	Signed	Unsigned	HEX	BCD			
Writes Data to Excel Book	○	○	○	○	○	○	○	○	○	○	○	○

Be sure to use the following codes/values when you designate an Action Item's data type.

Value	Data Type	Value	Data Type
1	Bit	7	Unsigned 32 bits decimal
2	Signed 16 bits decimal	8	32 bits hexadecimal
3	Unsigned 16 bits decimal	9	BCD 32 bits
4	16 bits hexadecimal	10	Single precision floating point
5	BCD 16 bits	11	Double precision floating point
6	Signed 32 bits decimal	12	Character string

MEMO

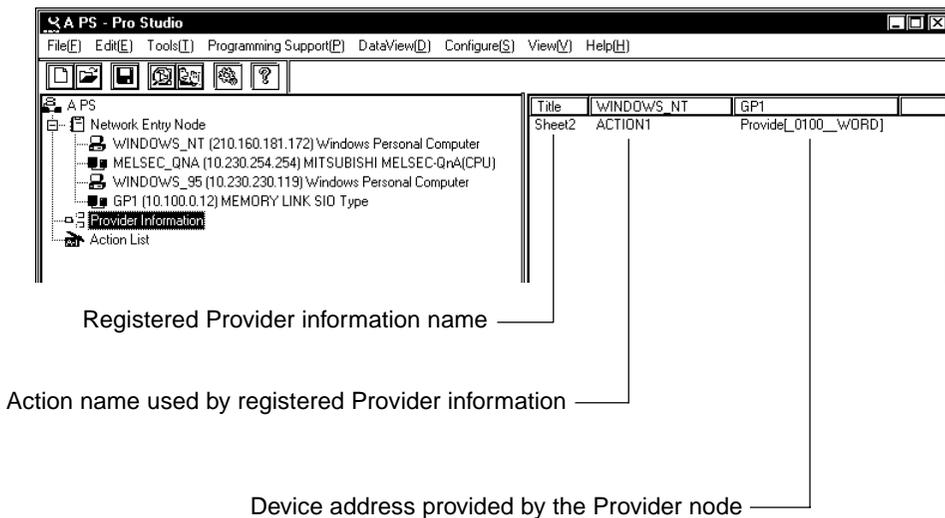
When an Action receives data from Provider Node:

- When an Action receives data of "signed 16 bits decimal/unsigned 16 bits decimal/16 bits hexadecimal", all data is processed as "signed 16 bits decimal".
- When an Action receives data of "signed 32 bits decimal/unsigned 32 bits decimal/32 bits hexadecimal", all data is processed as "signed 32 bits decimal".

7. Designate the Action Name used for the Consumer Node's Symbol Name.

When entering Provider settings, only Consumer Nodes that are Windows PCs can be assigned an Action Name. For Provider registration setting details, refer to "3.3 Registering Provider Data".

8. After all desired Provider Information settings are entered, click [OK], and that Provider Information will be registered.



9. Save the network project file, and then transfer the data to the GP.

For the procedure to save and to transfer the network project file, refer to “8.1 Transferring Network Project Files”.

4.3 Registering Action Item Parameters

For the procedure of designating an Action to register or registering Provider information using an Action, refer to “4.2 Registering Action Items”.

This section describes how to enter Action Item settings.

4.3.1 “Start Application” Action Item

This feature allows you to start desired applications in Windows computers connected to your network.

The following table shows data types that can be designated as the Symbol Name of the Provider Node.

Action Name	Bit	16 Bits				32 Bits				Single Precision	Double Precision	Character
		Signed	Unsigned	HEX	BCD	Signed	Unsigned	HEX	BCD			
Start Application	<input type="radio"/>											

1. Select [Start Application] in the [Edit Action] dialog box, click [Parameter], and the following dialog box will appear.

[Application Name]

Designate the *.exe file for the application to be started. If you click [Reference], the [Open] dialog box will appear so that you can designate the application’s *.exe file.

You can also designate user-defined software applications (e.g. *.EXE or *.COM).

[Startup Options]

When a startup option or Provider data is used as a parameter, enter that data and click the appropriate check box to designate the type of data.

[Node name]

The Provider node name is automatically added as a startup option.

[Write data]

Provider data (write data) is automatically added as a startup option. If there is multiple Provider data, <single-byte space> is added between <Provider data> entries .

Example : <starting options><single-byte space><Provider data><single-byte space><Provider data> ...

[Current Folder]

Designate the current folder that contains the [Application Name].

4.3.2 Alarm Log (with Sound Alert Feature)

This feature allows the simultaneous output of sound data and display of alarm data, while automatically saving a Provider's Alarm history data.

Also, after creating the following Access table data, the Action Item's table designation settings can be used to compare the Provider data and a Key Code, and then, based on the result, perform the designated Actions.

Example Access Table

mdb file name: ProAlarm.mdb

Table name: ProAlarm

Field name	ID	KEY	WAV	DISP1	DISP2
Value	1	1	C:\WINNT\Media\Ringin.wav	ProAlarm KEY=1	The sound is Ringin.wav
	2	2	C:\WINNT\Media\Tada.wav	ProAlarm KEY=2	The sound is Tada.wav

Designate the WAV files.

Enter the message you wish to have appear when the Action Item is started.

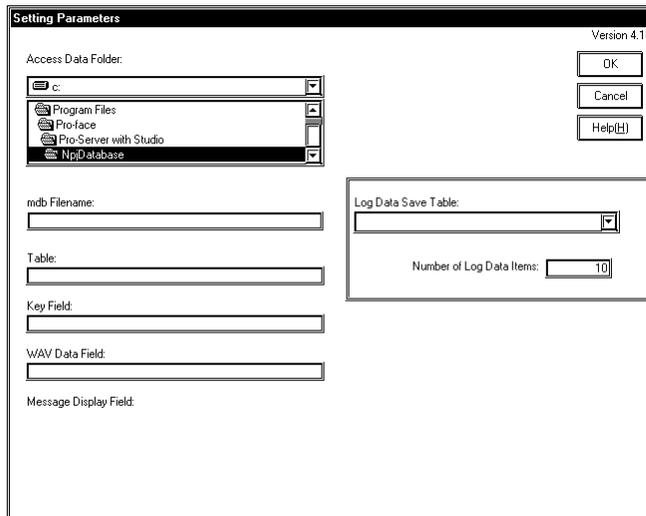
MEMO

The sample file "ProAlarm.mdb" is available in the "\Pro-Server with Pro-Studio\Pro-SDK" folder.

The following table shows the data types that can be designated for the Provider Node symbol name.

Action Name	Bit	16 Bits				32 Bits				Single Precision	Double Precision	Character
		Signed	Unsigned	HEX	BCD	Signed	Unsigned	HEX	BCD			
Alarm Log (with Sound Alert Features)	○	○	○	○	○	○	○	○	○	○	○	×

1. If you select [Alarm Log (with Sound Alert Feature)] in the [Edit Action] dialog box and click [Parameter], the following dialog box will appear.



Designate the table and field in the mdb file which have been created.

[mdb Filename]

Displays the name of the current folder's Access database file (*.mdb). Select the file with the desired alarm conditions, message(s) and sound (*.wav) information. Ex. "ProAlarm.mdb"

[Table]

Displays the table(s) found in the Access database file designated above. (Any table names containing spaces will not be displayed)

Select the table with the desired alarm condition, message(s) and sound (*.wav) information.

Ex. "ProAlarm"

[Key Field]

Designate the key field. After designating the table, the field within the table will be displayed automatically. Ex. "KEY"

You must also set the number data type to the field within the table designated by the KEY field.

[WAV Data Field]

Designate the sound field. After designating the table, the field within the table will be displayed automatically. Ex. "WAV"

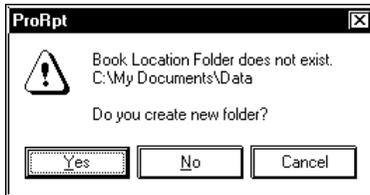
[Message Display Field]

Select the field where you display a message. After designating the table, the field within the table will be displayed automatically. Ex. "DISP1, DISP2"

[Log Data Save Table]

If you check the Save To Folder location in the Action parameter display, and if the folder exists, the contents will display exactly as you designated.

If the folder does not exist, the following window appears.



Click [Yes] to create the folder. The folder creation window will appear. If you click [No], the folder designation window will appear to designate the [Save To] Folder location.

If you click [Cancel], the process is canceled.

[Number of Log Data Items]

Enter the number of items to be logged. When the number of items exceeds this value, the oldest (last saved) item is deleted.

4.3.3 Upload of GP Log Data

Back-up data can be read online from the Provider GP unit's SRAM or CF Card by designating the read source.

If XLS format is selected for the data save format, Excel must be installed in the PC.

You must also set the GP-PRO/PB III for Windows logging feature to upload GP log data. For details of the logging feature, refer to "GP-PRO/PB III for Windows Operation Manual".

MEMO

When you open the network project file that contains the [Upload of GP Log Data] action in a different environment (Japanese OS/English OS), the contents of the [Data type] are displayed incorrectly. Please make the settings of the [Setting Parameters] once again.

The following table shows the data types that can be designated for the Provider Node symbol name.

Action Name	Bit	16 Bits				32 Bits				Single Precision	Double Precision	Character
		Signed	Unsigned	HEX	BCD	Signed	Unsigned	HEX	BCD			
Upload of GP Log Data	<input type="radio"/>	<input checked="" type="checkbox"/>										

1. Select [Upload of GP Log Data] in the [Edit Action] dialog box and click [Parameter]. The following dialog box will appear.

[Read Location]

Select the reading source from either SRAM or CF Card.

[Data type]

Select one of the following items from the pull-down box

Logging Data

Trend Graph Data

Sampling Data

Alarm History Data

Alarm Log Data

Block 1 (When designating an alarm block in GP-PRO/PBIII for Windows)

Block 2 (When designating an alarm block in GP-PRO/PBIII for Windows)

Block 3 (When designating an alarm block in GP-PRO/PBIII for Windows)

Block 4 (When designating an alarm block in GP-PRO/PBIII for Windows)

Block 5 (When designating an alarm block in GP-PRO/PBIII for Windows)

Block 6 (When designating an alarm block in GP-PRO/PBIII for Windows)

Block 7 (When designating an alarm block in GP-PRO/PBIII for Windows)

Block 8 (When designating an alarm block in GP-PRO/PBIII for Windows)

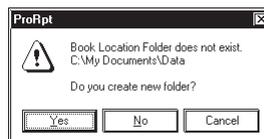
[Save To Folder]

If you check the Save To Folder location in the Action Parameter display, and if the folder exists, the contents will appear exactly as you designated.

If the folder does not exist, the following window appears.

Click [Yes] to create the folder. The folder creation window will appear. If you click [No], the folder designation window will appear to designate the Save To Folder location.

If you click [Cancel], the process is canceled.

**[File Name]**

Designate the name of the file that data are saved to. “%Y%M%D%h%m%s” (Year Month Date Hour Minute Second) has been set as default. File names can be designated indirectly. For details, see 4.2.2 Setting Action Parameters - Creating a Macro to Use Same Save File for Actions.

[Zero Suppress]

If you check this option, no zeros are supplied to the file name even if the file name includes zeros “%M%D%h%m%s” (month, day, hour, minute, second). Ex. “04”, or “07”.

If you do not check this option, 0 (zero) is added to the file name if the file name includes “%M%D%h%m%s” (month, day, hour, minute, second) data and that number is a single digit.

Default is “checked”.

[File Save Method]

Select either [Create new Book] or [Append data to Book].

If you designate a fixed file name, it will be written in sheet1.

[Book is Currently Open]

Select an Action from [Do not save data] or [Use Temporary Book] when books with the same filename are open during writing.

If you selected [Do not save data], written data is not saved when book files with the same filename are opened.

If you selected [Use Temporary Book], data is temporarily saved under a separate filename. The temporary filename will be “%Y%M%D%h%m%s.xls”.

[Save form]

Select either Excel (.xls) or text (.csv) file formats. You can also select both file types, and both types of files will be created.

[Template File Location]

If [Use template file] is selected, be sure to enter the Drive, Folder and Template File name.

MEMO

- The designated template file should contain only Sheet1.
- If you designate the GP unit’s CF Card as a reading source, you must designate the file No. to be uploaded when entering Provider information, since more than one file exists in the CF Card.

2. Clicking the previous Setting screen's [Next] button calls up the following screen.

[Select a Data Write Pattern]

Select the radio button that corresponds to the data write direction desired.

[Write Data Range]

Select the data range used for the data saved.

MEMO

When CSV is selected as the data save format, the [Template] and [Data write] patterns cannot be selected. Settings are fixed to [Data write] : [Z] type, [Use all cells], [Item names are not used], and [Time stamp is not used].

4.3.4 Automatic Download of GP Filing Data

This Action Item will automatically download filing data to a Provider GP unit's SRAM area, CF-Card, or internal memory FEPRM.

Data that has been previously uploaded from a GP can only be downloaded once. Also, only uploaded Excel data or CSV data can be changed, and even that data cannot be added to or deleted. Also, Comments, Addresses, Data Formats and other data settings cannot be edited.

MEMO

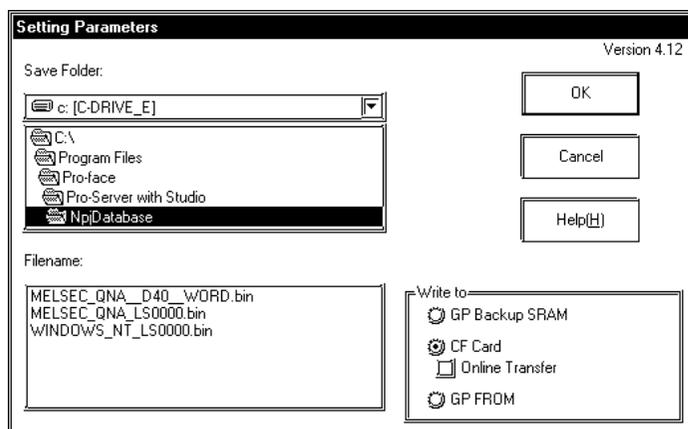
When data is being written to a GP's internal memory (FEPRM) or to its CF Card, the GP will switch to OFFLINE mode until the data transfer is completed. After the transfer is completed, the GP will be reset.

However, the "Online Transfer" option can be selected when writing to the CF Card.

The following table shows the data types that can be designated for the Provider Node symbol name.

Action Name	Bit	16 Bits				32 Bits				Single Precision	Double Precision	Character
		Signed	Unsigned	HEX	BCD	Signed	Unsigned	HEX	BCD			
Automatic Download of GP Filing Data	<input type="radio"/>	<input checked="" type="checkbox"/>										

1. If you select [Automatic Download of GP Filing Data] in the [Edit Action] dialog box and click [Parameter], the following dialog box will appear.



[Save Folder]

Select the folder where the downloaded filing data will be saved.

[Filename]

Designates where the write data source file will be saved. (.bin, .xls or .pfg)

MEMO

When designating CSV files that were uploaded via GP Filing Data's Automatic Upload Function, be sure to select a "pfg" file. A pfg file contains CSV file header information.

[Write to]

Designates the write data's destination.

MEMO

- When a CF Card is the write destination, selecting the "Online Transfer" option enables "online" download to the CF Card, i.e., data can be transferred even while the GP is online. This feature is available only with GP2000 Series units. And you will need to install both GP-PRO/PBIII C-Package02 or later and the 2-Way Driver version 4.10 or later.
- If you designate CF Card/(FEPROM) as a data read source, you must designate the file No. to be uploaded when entering Provider information settings, since more than one file exists in the CF Card/(FEPROM).
- After an Excel file is uploaded and saved as a CSV file, it cannot be downloaded.
- Grouping uploaded CSV files into an Excel file and downloading them is not possible.
- A CSV file exported from GP-PRO/PBIII can be downloaded to the GP unit by overwriting it with the corresponding uploaded CSV file. However, Comments, Addresses and Data Formats specified in the uploaded CSV File will then be downloaded to the GP unit, and all GP-PRO/PBIII settings will be lost.

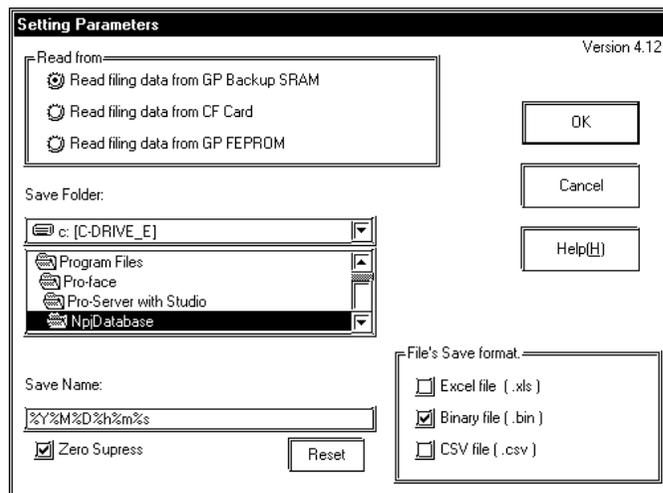
4.3.5 Automatic Upload of GP Filing Data

This Action Item will automatically upload filing data from a Provider's SRAM area, CF-Card, or FEPRM.

The following table shows the data types that can be designated for the Provider Node symbol name.

Action Name	Bit	16 Bits				32 Bits				Single Precision	Double Precision	Character
		Signed	Unsigned	HEX	BCD	Signed	Unsigned	HEX	BCD			
Automatic Upload of GP Filing Data	<input type="radio"/>	<input checked="" type="checkbox"/>										

1. If you select [Automatic Upload of GP Filing Data] in the [Edit Action] dialog box and click [Parameter], the following dialog box will appear.



[Read from]

Designates the read data source file:

SRAM, CF Card, FEPRM

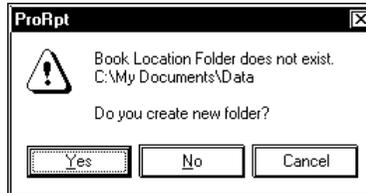
MEMO

If you designate the CF Card/(FEPRM) as the data read source, you must designate the file No. to be uploaded when entering Provider information settings, since more than one file exists in the CF Card/(FEPRM) .

[Save Folder]

If you check the Save To Folder location in the Action parameter display, and if the folder exists, the contents will appear exactly as you designated.

If the folder does not exist, the following window appears.



Click [Yes] to create the folder. The folder creation window will appear. If you click [No], the folder designation window will appear to designate the Save To Folder location.

If you click [Cancel], the process is canceled.

[Save Name]

Designate the file name used.

Default value is %Y%M%D%h%m%s. The [Reset] button will make your entry back to the default value. File names can be designated indirectly. For details, see 4.2.2 Setting Action Parameters - Creating a Macro to Use Same Save File for Actions.

[Zero Suppress]

If you check this option, no zeros are supplied to the file name even if the file name includes zeros “%M%D%h%m%s” (month, day, hour, minute, second). Ex. “04”, or “07”.

If you do not check this option, 0 (zero) is added to the file name if the file name includes “%M%D%h%m%s” (month, day, hour, minute, second) data and that number is a single digit.

Default is “checked”.

[File's Save format]

Designates the format used when the file is saved. Select either Excel (*.xls), Binary (*.bin - for GP-PRO/PBIII for Windows) or CSV (*.csv) format.

MEMO

If a CSV file was selected, a “.pfg” file, which contains CSV file header information, is created in the selected destination folder.

Uploaded CSV file data is saved in the same folder as the .pfg file. See the next page for an example folder structure.

CSV format folder structure:

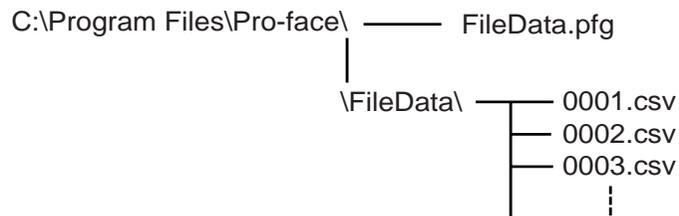
The folder structure used when GP filing data is saved in CSV format-

Data save destination : C:\Program Files\Pro-face

Filename : FileData

Zero suppress feature : Unchecked (Not used)

[Folder structure]



The “Zero Suppress” feature is reflected even in the names of CSV files being saved. If “Zero Suppress” is used, the CSV filenames will be 1.csv, 2.csv, 3.csv etc.

4.3.6 Automatic Upload of Access Data

This feature reads device data into an Access file.

Be sure to create an Access table in advance to use this feature. This Action compares Provider Data with table data and then reads device data according to the contents designated in the table.

The following explanation uses the “ProRcp.mdb” file from the [C:\Program Files\Pro-face\Pro-Server with Studio\Pro-SDK\] folder as an example. ProRcp.mdb contains 4 tables, the ProRcp table, the Data1 table, the Data2 table and the Data3 table.

■ ProRcp Table (Recipe DB Master Table)

If Provider data matches the [KEYCODE], device data is read to the [TBL] table, in the location described by the [MDB] cell.

Example : ProRcp Table

KEYCODE	MDB	TBL
1	C:\Program Files\Pro-face\Pro-Server with Studio\Pro-SDK\ProRcp.mdb	Data1
2	C:\Program Files\Pro-face\Pro-Server with Studio\Pro-SDK\ProRcp.mdb	Data2
3	C:\Program Files\Pro-face\Pro-Server with Studio\Pro-SDK\ProRcp.mdb	Data3

[KEYCODE]

Field compared with Provider data. The field in the Access database is “Number”.

[MDB]

Field used to designate the Access database file that contains the table designated by [TBL]. If the table to designate is included in the same file where the recipe DB master table is set, it can be left blank.

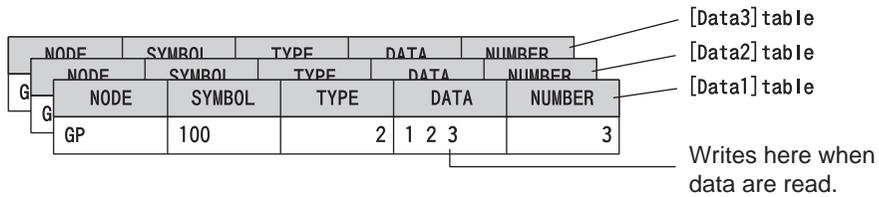
[TBL]

Field to designate the table where the data read source node and the symbol (device address) are set.

For example, if Provider data is “1”, the contents set in the [Data1] table in the [C:\Program Files\Pro-face\Pro-Server with Studio\Pro-SDK\ProRcp.mdb] file will be performed because the first line of [KEYCODE] matches to the value.

■ Data1, Data2 and Data3 Tables (Recipe Information Table)

Sets the read data source node and the symbol (device address). These are also tables where read data is written to. You can designate more than one read source for one table.

**[NODE]**

Designates the read data source node.

[SYMBOL]

Designates the head (first address) of the symbol (device address) to be read.

[TYPE]

Designates the type of data to be read.

[DATA]

Designates where the read data is written to.

[NUMBER]

Designates the amount of sequential data to be read, starting from the symbol (device address) designated by [SYMBOL].

As shown above, starting at GP unit internal address 100, data from 3 devices is read as signed 16 bit decimal data. Then, the TBL contents are copied to the file designated as the saving file, and data is written to the [DATA] field of the file. If more than one sequential data item is read, each data item is written separated with a comma.

However, in addition to the [DATA] field, read data is also written to the file designated in the Action as the save file.

MEMO

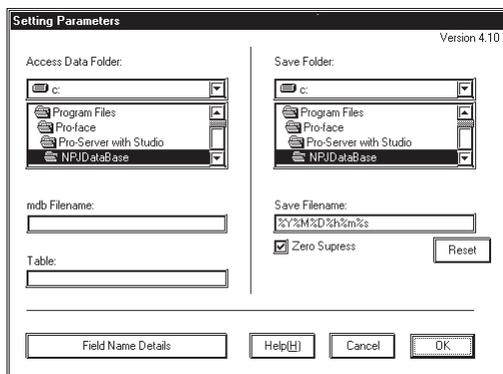
The following table shows the different data types and their corresponding codes.

Value	DataType	Value	DataType
1	Bit	7	Unsigned 32 bits decimal
2	Signed 16 bits decimal	8	32 bits hexadecimal
3	Unsigned 16 bits decimal	9	BCD 32 bits
4	16 bits hexadecimal	10	Single precision floating point
5	BCD 16 bits	11	Double precision floating point
6	Signed 32 bits decimal	12	Character string

The following table shows the data types that can be designated for the Provider Node symbol name.

Action Name	Bit	16 Bits				32Bits				Single Precision	Double Precision	Character
		Signed	Unsigned	HEX	BCD	Signed	Unsigned	HEX	BCD			
Automatic Upload of Access Data	<input type="radio"/>	<input checked="" type="checkbox"/>										

1. If you select [Automatic Upload of Access Data] in the [Edit Action] dialog box and click [Parameter], the following dialog box will appear.



[Access Data Folder]

Enter the save destination (drive and folder).

(Ex. C:\ProgramFiles\Pro-face\Pro-Server with Studio\Pro-SDK\)

[mdb Filename]

Designate the mdb filename. (Ex. ProRcp.mdb)

[Table]

Select the reference table. When an mdb file is selected, all the mdb tables are automatically displayed.

(Ex. ProRcp table)

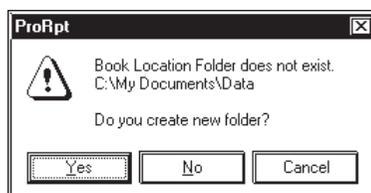
MEMO

Access reserved words such as INDEX cannot be used for Table.

[Save Folder]

If you check the Save To Folder location in the Action parameter display, and if the folder exists, the contents you designated are displayed.

If the folder does not exist, the following window appears.



Click [Yes] to create the folder. The folder creation window will appear. If you click [No], the folder designation window will appear to designate the Save To Folder location.

If you click [Cancel], the process is canceled.

[Save Filename]

Designate the save filename.

Default value is %Y%M%D%h%m%s. The [Reset] button will delete your entry and revert back to the default value. File names can be designated indirectly. For details, see 4.2.2 Setting Action Parameters - Creating a Macro to Use Same Save File for Actions.

[Zero Suppress]

If you check this option, no zeros are supplied to the file name even if the file name includes zeros “%M%D%h%m%s” (month, day, hour, minute, second). Ex. “04”, or “07”.

If you do not check this option, 0 (zero) is added to the file name if the file name includes “%M%D%h%m%s” (month, day, hour, minute, second) data and that number is a single digit.

Default is “checked”.

4.3.7 Automatic Download of Access Data

This feature writes to device data from a designated Access file.

Be sure to create an Access table in advance to use this feature. This Action compares Provider Data with table data and then reads device data according to the contents designated in the table.

The following explanation uses the “ProRcp.mdb” file from the [C:\Program Files\Pro-face\Pro-Server with Studio\Pro-SDK\] folder as an example. ProRcp.mdb contains 4 tables, the ProRcp table, the Data1 table, the Data2 table and the Data3 table.

■ ProRcp Table (Recipe DB Master Table)

If Provider data matches the [KEYCODE], device data is read to the [TBL] table, in the location described by the [MDB] cell.

Example : ProRcp Table

KEYCODE	MDB	TBL
1	C:\Program Files\Pro-face\Pro-Server with Studio\Pro-SDK\ProRcp.mdb	Data1
2	C:\Program Files\Pro-face\Pro-Server with Studio\Pro-SDK\ProRcp.mdb	Data2
3	C:\Program Files\Pro-face\Pro-Server with Studio\Pro-SDK\ProRcp.mdb	Data3

[KEYCODE]

Field to be compared with Provider data.

[MDB]

Field to designate the Access database file including the table designated by [TBL]. If the table to designate is included in the same file where the recipe DB master table is set, it can be left blank.

[TBL]

Designates the table where the write destination node, the symbol (device address) and write data is set.

For example, if Provider data is “1”, the contents set in the [Data1] table in the [C:\Program Files\Pro-face\Pro-Server with Studio\Pro-SDK\ ProRcp.mdb] file will be performed because the first line of [KEYCODE] matches the value.

■ Data1, Data2 and Data3 Tables (Recipe Information Table)

Sets the write destination node, the symbol (device address) and write data.

You can designate more than one read source for one table.

	NODE	SYMBOL	TYPE	DATA	NUMBER
	NODE	SYMBOL	TYPE	DATA	NUMBER
G	NODE	SYMBOL	TYPE	DATA	NUMBER
G	GP	100	2	1 2 3	3

[Data3] table
 [Data2] table
 [Data1] table

[NODE]

Designates the read data source node.

[SYMBOL]

Designates the head (first address) of the symbol (device address) to be read.

[TYPE]

Designates the type of data to be read.

[DATA]

Designates where the read data is written to.

[NUMBER]

Designates the amount of sequential data to be read, starting from the symbol (device address) designated by [SYMBOL].

As shown above, starting at GP unit internal address 100, data from 3 devices is read as signed 16 bit decimal data. If more than one sequential data item is written, each data item should be separated with a space (comma) in the [Data] field.

MEMO

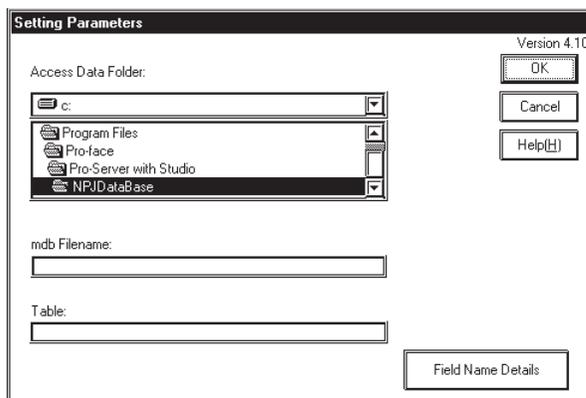
The following table shows the different data types and their corresponding codes.

Value	Data Type	Value	Data Type
1	Bit	7	Unsigned 32 bits decimal
2	Signed 16 bits decimal	8	32 bits hexadecimal
3	Unsigned 16 bits decimal	9	BCD 32 bits
4	16 bits hexadecimal	10	Single precision floating point
5	BCD 16 bits	11	Double precision floating point
6	Signed 32 bits decimal	12	Character string

The following table shows the data types that can be designated for the Provider Node symbol name.

Action Name	Bit	16 Bits				32 Bits				Single Precision	Double Precision	Character
		Signed	Unsigned	HEX	BCD	Signed	Unsigned	HEX	BCD			
Automatic Download of Access Data	○	○	○	○	○	○	○	○	○	○	○	×

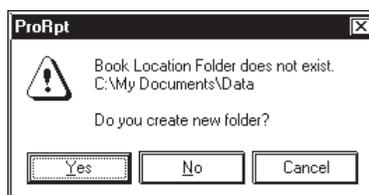
1. If you select [Automatic Download of Access Data] in the [Edit Action] dialog box and click [Parameter], the following dialog box will appear.



[Access Data Folder]

Designate the Access file name (drive and folder). (Ex. C:\ProgramFiles\Pro-face\Pro-Server with Studio\Pro-SDK\)

When the folder where Access files are saved is checked in the Action setting display, if the folder exists, information set will be displayed. If not, the following will appear.



Click [Yes] to create the folder and the folder creation window will appear. If you click [No], the folder designation window will appear to designate the Save To Folder location.

If you click [Cancel], the process is canceled.

[mdb Filename]

Select the desired mdb file. (Ex. ProRcp.mdb)

[Table]

Select the desired Table file. (Ex. ProRcp table)

MEMO

- Select the mdb file which includes the recipe DB master table.
- Access reserved words such as INDEX cannot be used for Table.

4.3.8 Download Recipe data for Excel

This feature writes Excel sheet data to a specified device address. The following two types of Excel sheet data can be used for designating write data.

When writing to sequential single-area addresses: Column Change [One Sheet Mode]

When writing to sequential multi-area addresses: Column Change [Any Sheet Mode]

MEMO

- Device access is performed at a rate of 255 times per scan. Thus, if you designate more than 255, a time lag will occur.
- If you designate a device address that does not exist, a device access error will occur.

Column Change [One Sheet Mode] Type

Block		3	
Item		5	
Address		D108	
Data Type		2	
Block1	Block2	Block3	
	1	12	21
	13	2	6
	18	7	3
	8	17	10
	22	9	14

If the Provider's data and a Block No. matches, the data in that column will be written to the device address specified in [Address]. Only one device address can be specified. [Item] specifies the number of sequential words (up to 10,000 words) to write from the first (top) address specified in [Address].

Designate the write data format (type) in [Data Type].

The following table shows the different data types and their corresponding codes.

Value	Data Type	Value	Data Type
1	Bit	7	Unsigned 32 bits decimal
2	Signed 16 bits decimal	8	32 bits hexadecimal
3	Unsigned 16 bits decimal	9	BCD 32 bits
4	16 bits hexadecimal	10	Single precision floating point
5	BCD 16 bits	11	Double precision floating point
6	Signed 32 bits decimal		

MEMO

Sample table file is in the folder "\Pro-Server with Pro-Studio\Pro-SDK".

Column Change [Any Sheet Mode] Type

Block	4			
Block Name	1	2	3	4
Address	D100	D200	D300	D400
Item	7	5	7	2
Data Type	2	2	2	3
	1	2	1	4
	2	4	2	4
	2	5	2	
	3	6	3	
<div style="display: flex; justify-content: space-between; border: 1px solid black; padding: 2px;"> Sheet1 Sheet2 Sheet3 </div>				

If the Provider data and a Sheet No. match, the data in that sheet will be written to the device address(es) specified in [Address]. Multiple device addresses can be specified at one time. [Item] specifies the number of sequential words to write from the first (top) address specified in [Address].

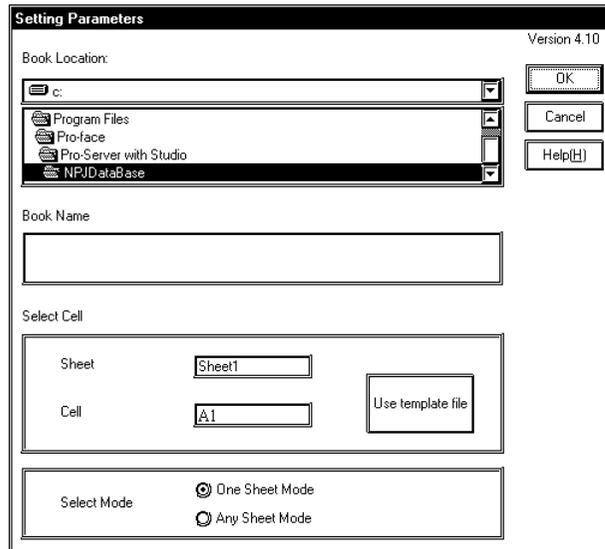
Designate the write data type to [Data Type].

Designate the [Data Type] using the same method as used in “Column Change [One Sheet Mode]” on the previous page.

The following table shows the data types that can be designated for the Provider Node symbol name.

Action Name	Bit	16 Bits				32 Bits				Single Precision	Double Precision	Character
		Signed	Unsigned	HEX	BCD	Signed	Unsigned	HEX	BCD			
Download Recipe Data for Excel	○	○	○	○	○	○	○	○	○	○	○	×

1. If you select [Download Recipe Data for Excel] in the [Edit Action] dialog box and click [Parameter], the following dialog box will appear.



[Book Location]

Designate the Excel file name.

If you check the Save To Folder location in the Action parameter display, and if the folder exists, the contents you designated are displayed.

If the folder does not exist, the following window appears.



Click [Yes] to create the folder. The folder creation window will appear. If you click [No], the folder designation window will appear to designate the Save To Folder location.

If you click [Cancel], the process is canceled.

[Select Cell:Sheet]

Select the desired Excel sheet name to read. When [Any Sheet Mode] is selected in [Column change], sheet name will change to [Sheet%n].

[Select Cell:Cell]

Designate the first cell to be read. Click [Reference] to allow you to designate the cell using Excel.

[Select Mode]

Designate the data sheet type to be written.

4.3.9 Writes Data to E-Mail

This Action feature allows you to automatically send an E-Mail without special programming. Mail data can be the Provider's data or the message sheet created by Excel. Multiple error information items can also be sent by E-Mail. This feature allows you to quickly contact employees or managers about site problems, without having to rely on an operator to send the message.

There are three email types.

- Send Provider data as Title
- Send fixed Title
- Send Title and message using Provider data

The following describes how to enter setting data for each method.

“Send Provider Data as Title”

Uncheck [Title name] and [Table] and use the same Symbol Type data used for Provider information.

“Send Fixed Title”

Check the [Title name] field and designate a Title.

“Send Title and Message Using Provider Data”

Check [Table name] and designate the Excel template file created.

If Provider data matches the value in the Key_Code field, the data in that line will be sent by email.

Example Excel Message Sheet

	A	B	C	D
1	Key_Code	Title	Message	Address
2	1	Device A Failure	Valve 1 failed.	a@zzzzz.com, ab@zzzzz.com
3	1	Device A Failure	Stopped device A due to a failure.	kanri@zzzzz.com
4	1	Device A Failure	Valve 1 failed. The repair part is at F1.	c@zzzzz.com
5	2	Device C Failure	Valve 2 failed.	a@zzzzz.com
6	2	Device C Failure	Stopped device C due to a failure.	kanri@zzzzz.com
7	2	Device C Failure	Valve 2 failed. The repair part is at F1.	b@zzzzz.com
8	3	Device B Failure	Oil pressure of device B is abnormal.	a@zzzzz.com
9	3	Device B Failure	Oil pressure of device B is abnormal.	b@zzzzz.com
10	3	Device B Failure	Stopped device B due to a failure.	a@zzzzz.com, ab@zzzzz.com
11				

When sending the same message to more than one destination, enter those addresses in the Key_Code field, separating them with commas.
If you do not create the [Address] column, an email is sent to the address designated in the [Send Mail Address] field of the [Setting Mail Information] dialog box.

MEMO

- You can register, at maximum, 5 messages with the same Key_Code.
- If an email cannot be sent, an error message will appear in the log viewer.

The following table shows the data types that can be designated for the Provider Node symbol name.

Action Name	Bit	16 Bits				32 Bits				Single Precision	Double Precision	Character
		Signed	Unsigned	HEX	BCD	Signed	Unsigned	HEX	BCD			
Writes Data to E-Mail (Title name)	<input type="radio"/>											
Writes Data to E-Mail (Table)	<input checked="" type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="checkbox"/>							
Writes Data to E-Mail (no designations)	<input checked="" type="checkbox"/>	<input type="radio"/>										

1. If you select [Writes Data to E-Mail] in the [Edit Action] dialog box and click [Parameter], the following dialog box will appear.

[Mail server settings]

Specify the mail server used to send the email.

[POP before SMTP]

Check this setting to authenticate the POP address when sending mail. If selected, a authentication is performed using a POP3 server prior to connecting to an SMTP server and sending data.

[POP server name]

Designates the POP3 server used for POP authentication.

[POP3 port number]

Designates the port used to communicate with the POP3 server. Range is from 1 to 65535.

[User name] *1

Designates the user name used when performing POP3 authentication.

[Password] *1

Designates the password used when performing POP3 authentication.

[Mail address]

Enter the sender's email address

[Send Mail address]

Enter a receiver's email address.

Enter addresses separated by commas per Key_Code, as shown in the previous page's sheet example, to send to more than one destination. If the "Address" column does not exist in the sheet, an email is sent to the mail address designated here.

[Message type]

Set when sending a fixed message.

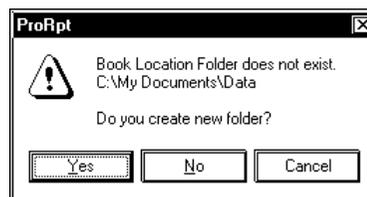
[Table information]

Designates when an Excel message sheet is used.

If the Provider's data matches the Key_code, the title and message in the specific line will be sent.

If you check the Save To Folder location in the Action parameter display, and if the folder exists, the contents you designated are displayed.

If the folder does not exist, the following window appears.



Click [Yes] to create the folder. The folder creation window will appear. If you click [No], the folder designation window will appear to designate the Save To Folder location.

If you click [Cancel], the process is canceled.

*1 Pro-Server Ver. 4.5 uses the [User Name] and [Password] settings for POP confirmation.

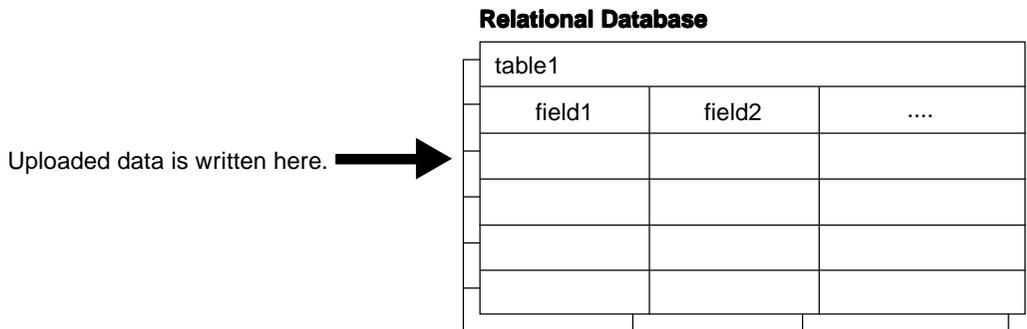
4.3.10 Upload to the database

Reads data from device address(es) specified by Excel or Access and writes the data to a designated relational database. This inserts a new record into the database and saves data to that record.

Enter the device address to read from, or the database to write data to using an Excel book file (*.xls) or an Access database file (*.mdb).

You can change the device address to read from or database to write to via the Provider data settings.

Using Excel, the data will directly be written to the relational database. Using Access, data will be temporarily saved in a file and then be written to the relational database. Even if the attempt to connect to the relational database fails, the saved data is not deleted and can be written to the relational database when the Action is triggered again. Be sure to create the table fields in the desired relational database.



Example Excel Sheet

Data Base	Table	Device	Field	Type
DBA	table1	D100	field1	2
DBA	table1	D101	field2	2
DBB	table2	D102	field1	2

Enter titles in cells on the first line.

Example Access Table

Data Base	Table	Device	Field	Type
DBA	table1	D100	field1	2
DBA	table1	D101	field2	2
DBB	table2	D102	field1	2

Enter titles in field names.

The following describes each Excel sheet and Access table item.

[Data Base]

Designates the name of database to write to.

[Table]

Designate the table name of database to write to.

[Device]

Designate the name of device to write to.

[Field]

Designate the field of device to write to.

[Type]

Designate the data type of data to write.

MEMO

Data types are designated by the following values.

Value	Data Type	Value	Data Type
1	Bit	7	Unsigned 32 bits decimal
2	Signed 16 bits decimal	8	32 bits hexadecimal
3	Unsigned 16 bits decimal	9	BCD 32 bits
4	16 bits hexadecimal	10	Single precision floating point
5	BCD 16 bits	11	Double precision floating point
6	Signed 32 bits decimal	12	Character string

In the case of Microsoft Excel Sheet Example (or Microsoft Access Table Example), the value of [D100] device of the provider node is written to the [field1] field of the [table1] table in [DBA] database as signed 16 bits decimal data (Data Type [2]). Equally, the value of the [D101] device and that of the [D102] device are written to the [field2] field of the [table1] table in [DBA] database and to the [field3] field of the [table2] table in [DBB] database respectively as signed 16 bits decimal data (Data Type [2]).

MEMO

- The sample table file (ProDB.xls) is available in the “\Pro-Server with Pro-Studio\Pro-SDK” folder. When using ProDB.xls, DataBase.mdb is in the same folder as the relational database sample.
- When [Type] is designated as “12 (Character string)”, 255 characters are read in from the device address designated in [Device] and until a NULL string is reached, data is written to the database.

The following table shows the data types that can be designated for the Provider Node symbol name.

Action Name	Bit	16 Bits				32 Bits				Single Precision	Double Precision	Character
		Signed	Unsigned	HEX	BCD	Signed	Unsigned	HEX	BCD			
Upload to Database	○	○	○	○	○	○	○	○	○	○	○	○

1. If you select [Upload to Database] in the [Edit Action] dialog box and click [Parameter], the following dialog box will appear.

[Database information]

Designate the information required to access the database server. Select either [SQL Server], [Oracle ODBC Driver] or [DSN].

MEMO

- When [Oracle ODBC Driver] is selected, the server name cannot be set.
- Only Oracle8 is supported.
- For [Oracle ODBC Driver], use Version 8.0.5.5.0 or later. If you use an older version, the “A reverse set does not support a reverse scroll.” message will appear and the Action will quit (exit).
- [DSN] supports only Microsoft Access. For setting information, refer to the following [Setting up DSN] section.
- When [DSN] is selected, do not enter any data for the server name.
- Do not use the search feature while the Microsoft Access Design view is open.

[Normally connected to server]

If you wish to connect to the server all the time, check [Normally connected to server].

[If connection request is not received within standard time period, connection is terminated.]

If you wish to disconnect from database when there is no communication with the server for a certain period of time, check this item. This can be set only if [Normally connected to server] is checked.

Designate the time period in [Min.] box.

[Database Access Method]

Select whether to write to the database at once (Excel) or to write to the database after saving data (Access).

[File designation]

Designate a file location and a sheet/table name.

If you check the Save To Folder location in the Action parameter display, and if the folder exists, the contents exactly as you designated is displayed.

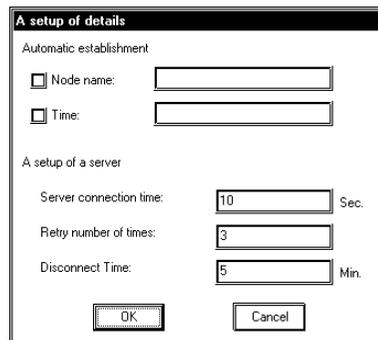
If the folder does not exist, the following window appears.



Click [Yes] to create the folder and the folder creation window will appear. If you click [No], the folder designation window will appear to designate the Save To Folder location.

If you click [Cancel], the process is canceled.

2. When clicking [Details], the following setting window will appear.

**[Automatic establishment]**

Select when Provider's name and/or data time are required to be written, and enter the target field name(s).

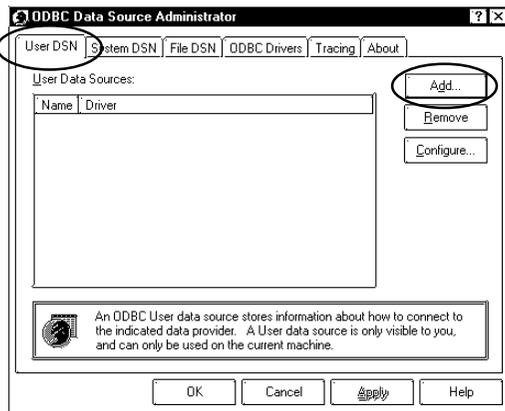
[A setup of a server]

Enter the communication time-out time and the number of retries used when connecting to the database server. If you have checked [If connection request is not received within standard time period, connection is terminated.] in the [Upload from the database] dialog, designate the time allowed until connection is cut with the database server.

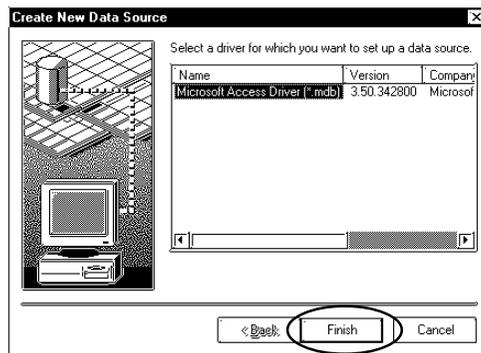
Setting up DSN

This example uses Microsoft Access running on Windows 2000 when registering a DSN to the ODBC Data Source.

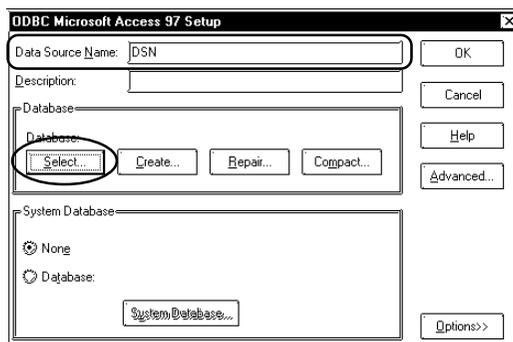
1. Click on [Control Panel] -> [Administrative Tools] -> [Data Sources (ODBC)] and the following dialog box will appear.



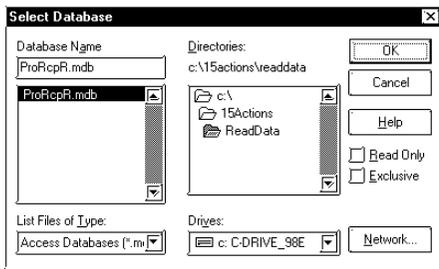
2. Select [Microsoft Access Driver (*.mdb)] and click [Finish].



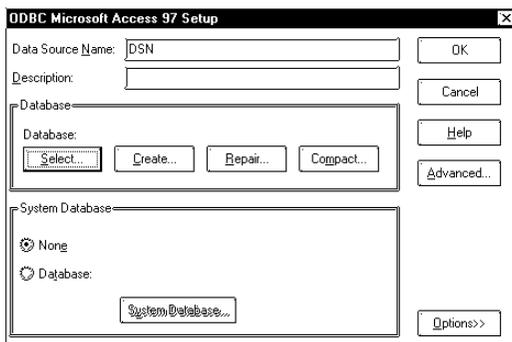
3. Enter the Data Source Name and click [Select].



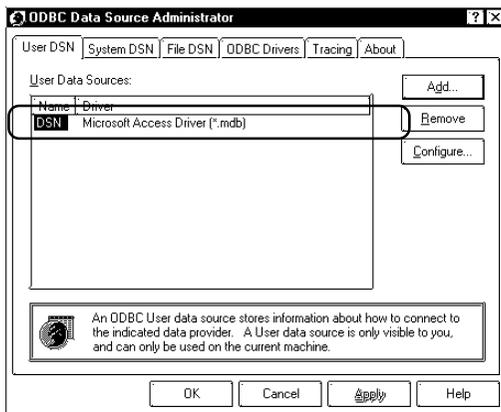
4. Select the previously created Access mdb file and click [OK].



5. Click [OK].



6. Check that the Data Source Name entered in step 3 is correct and click [OK].



4.3.11 Download from the database

Reads data from the relational database specified by Excel or Access and writes to the specific device address(es).

Device address to write to or database where write data is located is entered in the Excel book file (*.xls) or the Access database file (*.mdb).

You can change the designation of the device address to write to, or the database where where write data is located using the Provider data settings.

Using Excel, the data will directly be written into the specified device address(es). Using Access, data will once be written once as Access file and then be written into the specified device address(es).

Example Excel Sheet

Data Base	Table	Device	Field	Type
DBA	table1	D100	field1	2
DBA	table1	D101	field2	2
DBB	table2	D102	field1	2

Enter titles in cells on the first line.

Example Access Table

Data Base	Table	Device	Field	Type
DBA	table1	D100	field1	2
DBA	table1	D101	field2	2
DBB	table2	D102	field1	2

Enter titles in field names.

Table Example in Database (Contents of table1 in "DBA" (database name))

seqNo	F1	F2	F3
1	100	110	130
2	101	111	131
3	102	112	132
4	103	113	133

This value will be acquired (read) if you designate "field1" as the field name.

If "2" is designated as the "seqNo" to read by the Provider data, this row of data will be read.

The following describes each item in the Excel sheet and the Access table.

[Data Base]

Designate the name of database to be read.

[Table]

Designate the table name of database to be read.

[Device]

Designate the name of device to be read.

[Field]

Designate the field of device to be read.

[Type]

Designate the data type of data to be read.

MEMO

Data types are designated by the following values.

Value	Data Type	Value	Data Type
1	Bit	7	Unsigned 32 bits decimal
2	Signed 16 bits decimal	8	32 bits hexadecimal
3	Unsigned 16 bits decimal	9	BCD 32 bits
4	16 bits hexadecimal	10	Single precision floating point
5	BCD 16 bits	11	Double precision floating point
6	Signed 32 bits decimal	12	Character string

The following describes the operation contents of this action using “Microsoft Excel Sheet Example”, “Microsoft Access Table Example”, and “Table Example in Database (the contents of table1 in database called ‘DBA’)” in the previous page as reference examples.

If provider data indicating a line within the sheet/table is [1], it means that the 2nd line of the sheet/table has been designated. The [table1] table in [DBA] database (refer to “Microsoft Excel Sheet Example” and “Microsoft Access Table Example” in the previous page) is acquired according to the setting in the 2nd line. Next, the line where the same value as that of provider data designating “seqNo” is stored is searched from the acquired “seqNo” field of the “table1” table in [DBA] database. For example, if the value of provider data designating “seqNo” is “2”, the line with “seqNo” (refer to “Table Example in Database” in the previous page) of “2” will be searched.

MEMO

When the provider data's data type is not string, if the provider data's value is "0", the bottom-most row is searched. Do not use "0" with "seqNo".

The sheet/table is searched again on the action side to acquire the field name, and the value of the designated part is acquired. In this example, according to the setting of the 2nd line in the sheet/table, “field1” is acquired, and then the value of “101” existing in “field1” in the “2”nd line (refer to “Table Example in Database” in the previous page) is acquired.

Finally, the acquired value is written to device designated in the sheet/table in the designated data type. In this example, according to the setting of the 2nd line of the sheet/table, the value is written to [D100] device (Device=[D100]) of the provider node as signed 16 bits decimal data (Type=[2]).

The following table shows data types that can be designated to the symbol name of the Provider node per Action.

Action Name	Bit	16 Bits				32 Bits				Single Precision	Double Precision	Character
		Signed	Unsigned	HEX	BCD	Signed	Unsigned	HEX	BCD			
Download from Database	×	○	○	○	×	×	×	×	×	×	×	○

1. If you select [Download from Database] in the [Edit Action] dialog box and click [Parameter], the following dialog box will appear.

[Database information]

Designate the required information to access the database server. You can select the driver name from either [SQL Server], [Oracle ODBC Driver] or [DSN].

MEMO

- When [Oracle ODBC Driver] is selected, the server name cannot be set.
- Only Oracle8 is supported.
- For [Oracle ODBC Driver], use Version 8.0.5.5.0 or later. If you use an older version, the “A reverse set does not support a reverse scroll.” message will appear and the Action will quit (exit).
- [DSN] supports only Microsoft Access. For setting information, refer to 4.3.10 Upload to Database [Setting up DSN] section.
- When [DSN] is selected, do not enter any data for the server name.
- Do not use the search feature while the Microsoft Access Design view is open.

[Normally connected to server]

If you wish to connect to the server all the time, check [Normally connected to server].

[If connection request is not received within standard time period, connection is terminated.]

If you wish to disconnect from database when there is no communication with the server for a certain period of time, check this item. This can be set only if [Normally connected to server] is checked.

Designate the time period in [Min.] box.

[Database Access Method]

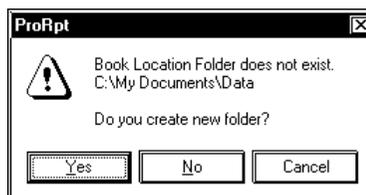
Selected data is written from the database at once (Excel) or written after being saved (Access).

[File designation]

Designate a file location and a sheet/table name.

If you check the Save To Folder location in the Action parameter display, and if the folder exists, the contents exactly as you designated is displayed.

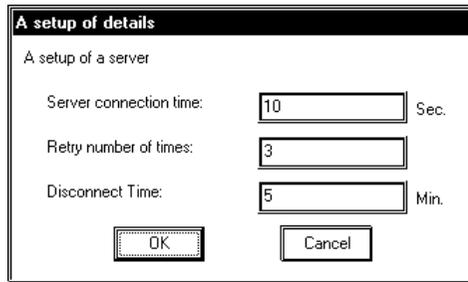
If the folder does not exist, the following window appears.



Click [Yes] to create the folder. The folder creation window will appear. If you click [No], the folder designation window will appear to designate the Save To Folder location.

If you click [Cancel], the process is canceled.

- When clicking [Details], the following setting window will appear.



A setup of details

A setup of a server

Server connection time: Sec.

Retry number of times:

Disconnect Time: Min.

[A setup of a server]

Enter the communication time to the database server and the number of retries performed.

If you have checked [If connection request is not received within standard time period, connection is terminated.] in the [Upload from the database] dialog, designate the time until connection is established with the database server.

4.3.12 Upload of JPEG Data

Pro-Server allows you to read the on-line GP screen data in your PC. If the VM unit is attached to the GP, video capture data can also be read.

Prior to performing this Action, be sure you have a CF Card inserted into the GP, since read data is temporarily saved in the CF Card.

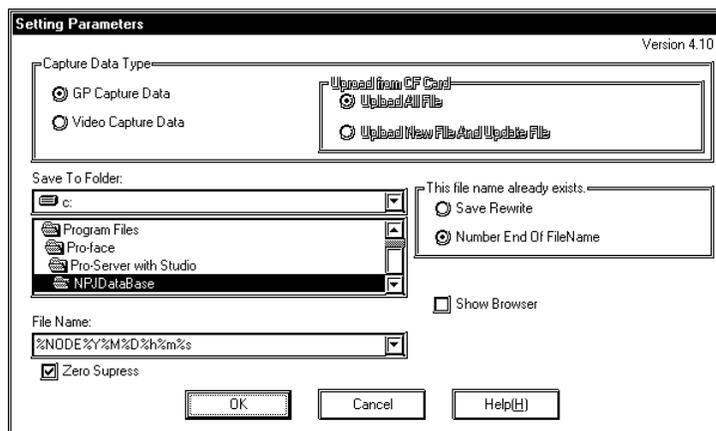
MEMO

You can use this Action on GP2000 Series, GLC2000 Series and IT Series units.

The following table shows the data types that can be designated for the Provider Node symbol name.

Action Name	Bit	16 Bits				32 Bits				Single Precision	Double Precision	Character
		Signed	Unsigned	HEX	BCD	Signed	Unsigned	HEX	BCD			
Upload of GP JPEG Data	<input type="radio"/>											

1. If you select [Upload of GP JPEG Data] in the [Edit Action] dialog box and click [Parameter], the following dialog box will appear.



[Capture Data Type]

Select data to read.

If you selected “GP Capture Data”, the displayed GP screen is captured and uploaded.

If you selected “Video Capture Data”, the video screen data saved in the CF Card is uploaded. If you select [Video Capture Data], you cannot designate [File Name], [Zero Suppress] or [Show Browser].

The default is “GP Capture Data”. Also, the maximum number of JPEG files that can be uploaded at one time is 32767.

[Upload from CF Card]

You should select either to upload all the video screen data in the CF Card, or to upload only files that do not exist in the directory designated by [Save To] or that have been updated.

This defaults to “Upload All Files”.

This item can be designated only when [Video Screen Saving Data] has been selected in [Select Data to Read].

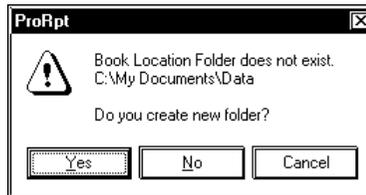
For information about how to capture video screens:

Reference → “GP-PRO/PBIII for Windows Tag Reference Manual Extended Functions of VM Unit”

[Save To Folder]

If you check the Save To Folder location in the Action parameter display, and if the folder exists, the contents exactly as you designated is displayed.

If the folder does not exist, the following window appears.



Click [Yes] to create the folder. The folder creation window will appear. If you click [No], the folder designation window will appear to designate the Save To Folder location.

If you click [Cancel], the process is canceled.

[File Name]

Designate the file name to save JPEG files read. The extension is “*.jpg”. This is defaulted to “%NODE%Y%M%D%h%m%s” (node name, year, month, day, hour, minute, second). The exact file name in the CF Card is used if [Video Screen Saving Data] has been selected at [Select Data to Read].

File names can be designated indirectly. For details, see 4.2.2 Setting Action Parameters - Creating a Macro to Use Same Save File for Actions.

[Zero Suppress]

If you check this option, no zeros are supplied to the file name even if the file name includes zeros “%M%D%h%m%s” (month, day, hour, minute, second). Ex. “04”, or “07”.

If you do not check this option, 0 (zero) is added to the file name if the file name includes “%M%D%h%m%s” (month, day, hour, minute, second) data and that number is a single digit.

Default is “checked”.

[This file name already exists.]

If you wish to overwrite existing files, check [Save Rewrite]. If you do not want to overwrite existing files, check [Number End of File Name].

This is defaulted to [Number End of File Name].

[Show Browser]

When this item is checked, the data uploaded is displayed using a special JPEG file browser.

This browser can be used to print, copy or call (start up) other Windows JPEG “viewer” applications (Internet Explorer, Paint, etc.).

When you perform [Save GP Capture Data], GPunit screen displays and operation will stop for a few seconds. Therefore, you cannot perform the GP screen capture operation from a host-level PC. You should set the bit “0” of the GP unit’s LS2076 to “ON (1)” to capture GP screens from a host-level PC. The 0 bit of LS2077 will become ON (1) during capturing, and it becomes OFF (0) when completed.

4.3.13 Writes Data to CSV file

This Action writes designated Provider data to a CSV file.

The following table shows the data types that can be designated for the Provider Node symbol name.

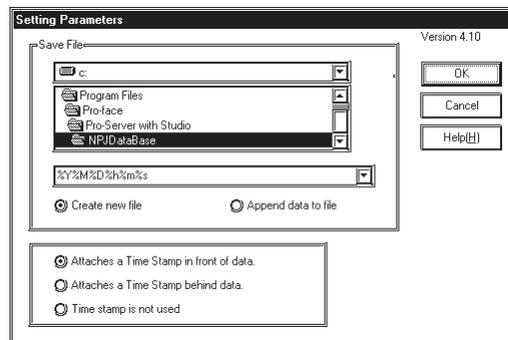
Action Name	Bit	16 Bits				32 Bits				Single Precision	Double Precision	Character
		Signed	Unsigned	HEX	BCD	Signed	Unsigned	HEX	BCD			
Writes Data to CSV File	<input type="radio"/>											

MEMO

When an Action receives data from Provider Node:

- When an Action receives data of “signed 16 bits decimal/unsigned 16 bits decimal/16 bits hexadecimal”, all data is processed as “signed 16 bits decimal”.
- When an Action receives data of “signed 32 bits decimal/unsigned 32 bits decimal/32 bits hexadecimal”, all data is processed as “signed 32 bits decimal”.

1. If you select [Writes Data to CSV File] in the [Edit Action] dialog and click [Parameter], the following dialog will appear.



[Save File]

Designate the folder to save files.

[File Name]

Designate the name of the CSV file. File names can be designated indirectly. For details, see 4.2.2 Setting Action Parameters - Creating a Macro to Use Same Save File for Actions

[Save Method]

If you wish to create a new file always, check [Create new file], and if you wish to add data such as history, check [Append data to file].

[Time Stamp]

If you select [Attaches a Time Stamp in front of data.], the time the data was provided will be written in front of data. If you select [Attaches a Time Stamp behind data.], the time the data was provided will be written at the end of data.

4.3.14 Writes Data from CSV file

This Action writes designated CSV file data to the designated device address.

1. Click on the [Edit Action] dialog box's [[Writes Data from CSV file] selection to bring up the following dialog box.

[Node Name]

Designates the write destination Node. When the action is started, default setting is “%NODE” (original data provider GP).

[Device Name]

Designates the write destination device address or symbol name. Designating “% DEV[Device Address] indirectly allows you to use the provider’s device name.

Clicking the [Reference] button calls up the following screen and allows you to directly enter the device name and symbol name.

[Data Type]

Designates the data type of write data.

[Readout File Name]

Designates the CSV file to be read. Filenames can be designated indirectly. For details, see 4.2.2 Setting Action Parameters - Creating a Macro to Use Same Save File for Actions.

[Readout Method]

Designates how the CSV data file will be read out. The [Readout Detail Configuration] area can be used to designate detailed readout information, which will vary depending on the data readout method used.

- All the Row

Readout Detail Configuration	Description
Start Row	Designates the start row. Entering 0 or a negative number starts from the last row.
Number of Rows	Designates the number of rows. Entering 0 or a negative number starts from the last row.

The shaded area in the following table indicates what data will be read out from a CSV file. Data readout order is from (1) to (10).

	1	2	3	4	5	
1						} Number of Rows
Start Row → 2	(1)	(2)	(3)	(4)	(5)	
3	(6)	(7)	(8)	(9)	(10)	
4						
5						

- From the Middle to the Last of a Row

Readout Detail Configuration	Description
Start Row	Designates the start row. Entering 0 or a negative number starts from the last row.
Number of Rows	Designates the number of rows. Entering 0 or a negative number starts from the last row.
Start Position	Designates the data read start column. Entering 0 or a negative number starts from the last column.

The shaded area in the following table indicates what data will be read out from a CSV file. Data readout order is from (1) to (6).

	1	2	3	4	5	
1						} Number of Rows
Start Row → 2			(1)	(2)	(3)	
3			(4)	(5)	(6)	
4						
5						

■ Number of Readouts from the Middle of a Row

Readout Detail Configuration	Description
Start Row	Designates the start row. Entering 0 or a negative number starts from the last row.
Number of Rows	Designates the number of rows. Entering 0 or a negative number starts from the last row.
Start Position	Designates the data read start column. Entering 0 or a negative number starts from the last column.
Number of Readouts	Designates the readout data column.

The shaded area in the following table indicates what data will be read out from a CSV file. Data readout order is from (1) to (6).

		Start Position					
		1	2	3	4	5	...
	1						} Number of Rows
Start Row →	2			(1)	(2)		
	3			(3)	(4)		
	4			(5)	(6)		
	5						
	:			} Number of Readouts			

■ All the Column

Readout Detail Configuration	Description
Start Column	Designates the start column. Entering 0 or a negative number starts from the last column.
Number of Columns	Designates the number of columns. Entering 0 or a negative number starts from the last column.

The shaded area in the following table indicates what data will be read out from a CSV file. Data readout order is from (1) to (10).

		Start Column					
		1	2	3	4	5	...
	1			(1)	(6)		} Number of Columns
	2			(2)	(7)		
	3			(3)	(8)		
	4			(4)	(9)		
	5			(5)	(10)		

■ From the Middle to the Last of a Column

Readout Detail Configuration	Description
Start Column	Designates the start column. Entering 0 or a negative number starts from the last column.
Number of Columns	Designates the number of columns. Entering 0 or a negative number starts from the last column.
Start Position	Designates the data read start row. Entering 0 or a negative number starts from the last row.

The shaded area in the following table indicates what data will be read out from a CSV file. Data readout order is from (1) to (8).

		Start Column					
		1	2	3	4	5	...
Start Position →	1						
	2			(1)	(5)		
	3			(2)	(6)		
	4			(3)	(7)		
	5			(4)	(8)		

Number of Columns

■ Number of Readouts from the Middle of a Row

Readout Detail Configuration	Description
Start Column	Designates the start column. Entering 0 or a negative number starts from the last column.
Number of Columns	Designates the number of columns. Entering 0 or a negative number starts from the last column.
Start Position	Designates the data read start row. Entering 0 or a negative number starts from the last row.
Number of Readouts	Designates the readout data row.

The shaded area in the following table indicates what data will be read out from a CSV file. Data readout order is from (1) to (6).

		Start Column					
		1	2	3	4	5	...
Start Position →	1						
	2			(1)	(2)		
	3			(2)	(4)		
	4			(3)	(5)		
	5						
	:						

Number of Columns

Number of Readouts

Important Information when Writing Device Data from a CSV file

When using this action, be sure to understand the following points.

- (1) When setting up the action, the write data format for the destination device is set to a single format. For example, If the first 5 rows of CSV data are set to “bit”, the following rows of data cannot be read as string data.
- (2) Any rows of data with empty cells will be treated as follows.
 - When the data type is set to “string”, empty cells are ignored during readout.
Ex. If the CSV data is “ A, , B, C, , D” then the write order is “ A, B, C, D”.
 - When the data type is not set to “string” (any other type), “0” is written, however if the last cell of data is empty, the row is ignored.
Ex. If the CSV data is “ 1, , 2, 3, , 4, ,” then the data write will look like “ 1, 0, 2, 3, 0, 4, 0 “.
- (3) Except for hexadecimal data, when writing non-string data, only “+”, “-”, and “.” are handled as special single-byte number and value characters. Data is read from the left-most digit and when a character that cannot be handled as a number is found, data read stops at the value immediately prior to that character. If the left-most position’s data cannot be handled as a value, that data is changed to a “ 0 ” value.
- (4) When writing hexadecimal data, be sure to use only data that is from 0 to 9, and from A to F. (Double-byte, single-byte, uppercase or lowercase).
- (5) When values read in exceed the range allowed for the designated data type, All 16 and 32-bit data that exceeds the allowed range for the designated data type will be converted to hexadecimal and the lower 4 digits (with 32-bit data the lower 8 bits) of data will be written. However, 16 bit (32 bit) hexadecimal data will cause an error.
- (6) Handling double-quotation marks.
 - When double-quotation marks are used in the first data position, until the second quotation mark is found, the data is considered to be one unit. If in that row the second double quotation mark cannot be found, the entire row is treated as a single piece of data.
 - Double-quotation marks found in any other position in the row of data are treated as characters.
- (7) Writing of string data is performed as follows.

Ex. 1) If single-byte string “AB,CD,E” is written to word address LS100, the data is stored as follows.

LS100	LS101	LS102
AB	CD	E

Ex. 2) If the single-byte string “ABC, DE” is written to LS100 (Word device), the data is stored as follows in the LS area.

LS100	LS101	LS102
AB	C	DE

Ex. 3) To write the single character “E” mentioned in Ex. 1 to LS103, insert two single-byte spaces between “D” and the next comma (“ AB,CD_ _E”) to push this data to LS103.

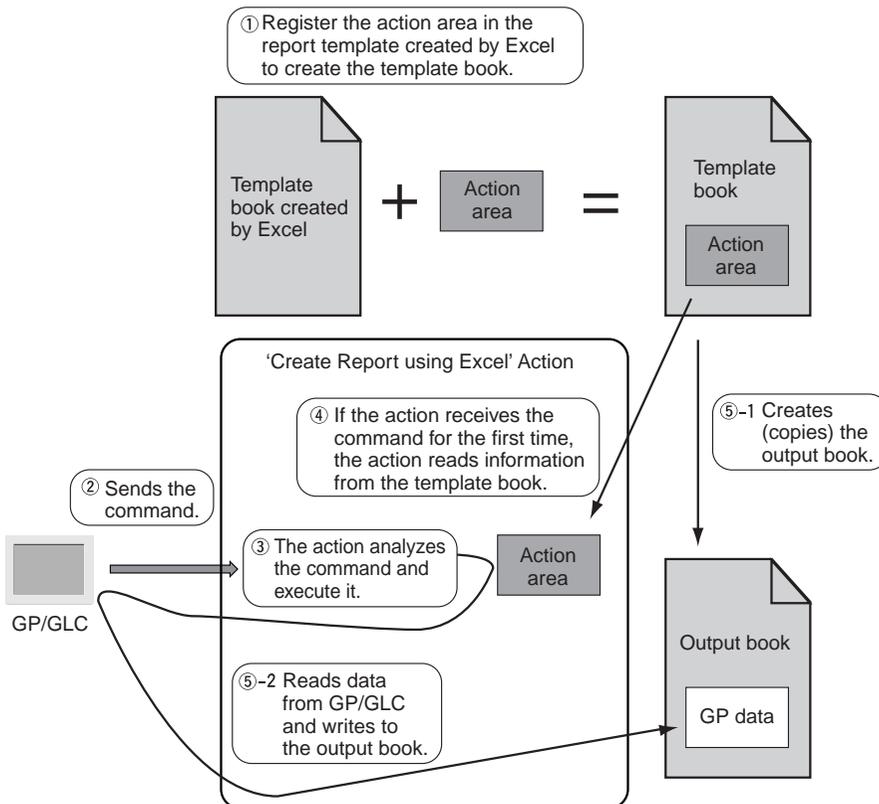
LS100	LS101	LS102	LS103
AB	CD		E

4.4 Using 'Create report using Excel' Action

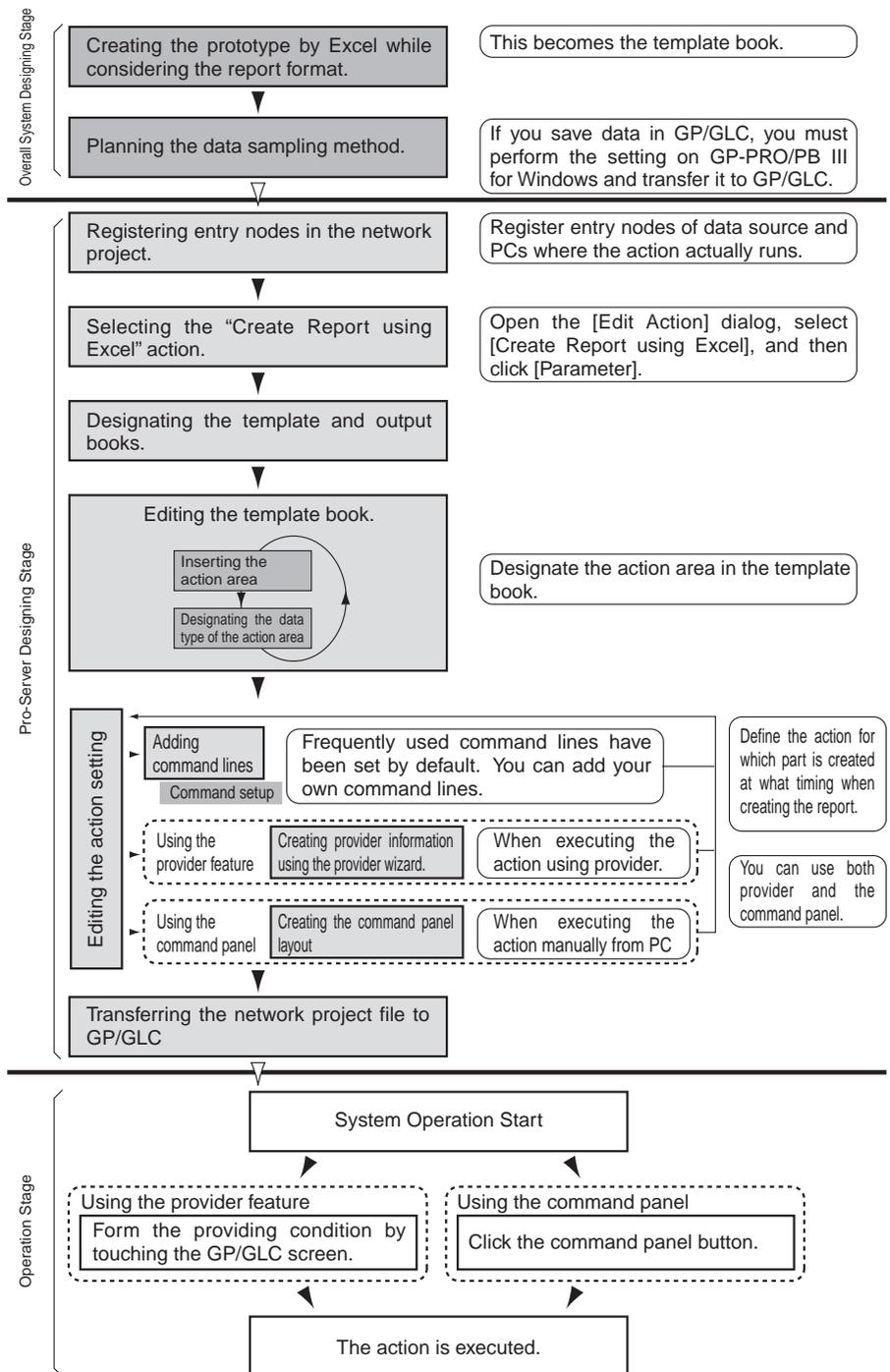
You can create an Excel book that includes a variety of information, such as PLC device data, GP screen data and GP backup data. You can use this data to create various reports such as a work report or an error report

The following describes the steps for using this Action.

- ① First, create an Excel report template book and designate what kind of information will be written to which part of this template book.
- ② Use a Provider to send this Action's special command(s).
- ③ The Action analyzes the command and performs it.
- ④ If the Action receives the command for the first time, the Action reads information from the template book.
- ⑤ The Action performs various operations according to the command such as creating (copying) (⑤-1 in the figure below) the output book, or reading data from GP/GLC and writing it to the designated output book (⑤-2 in the figure below). For details of operations you can use, refer to "4.4.2 Information Available in the Report".

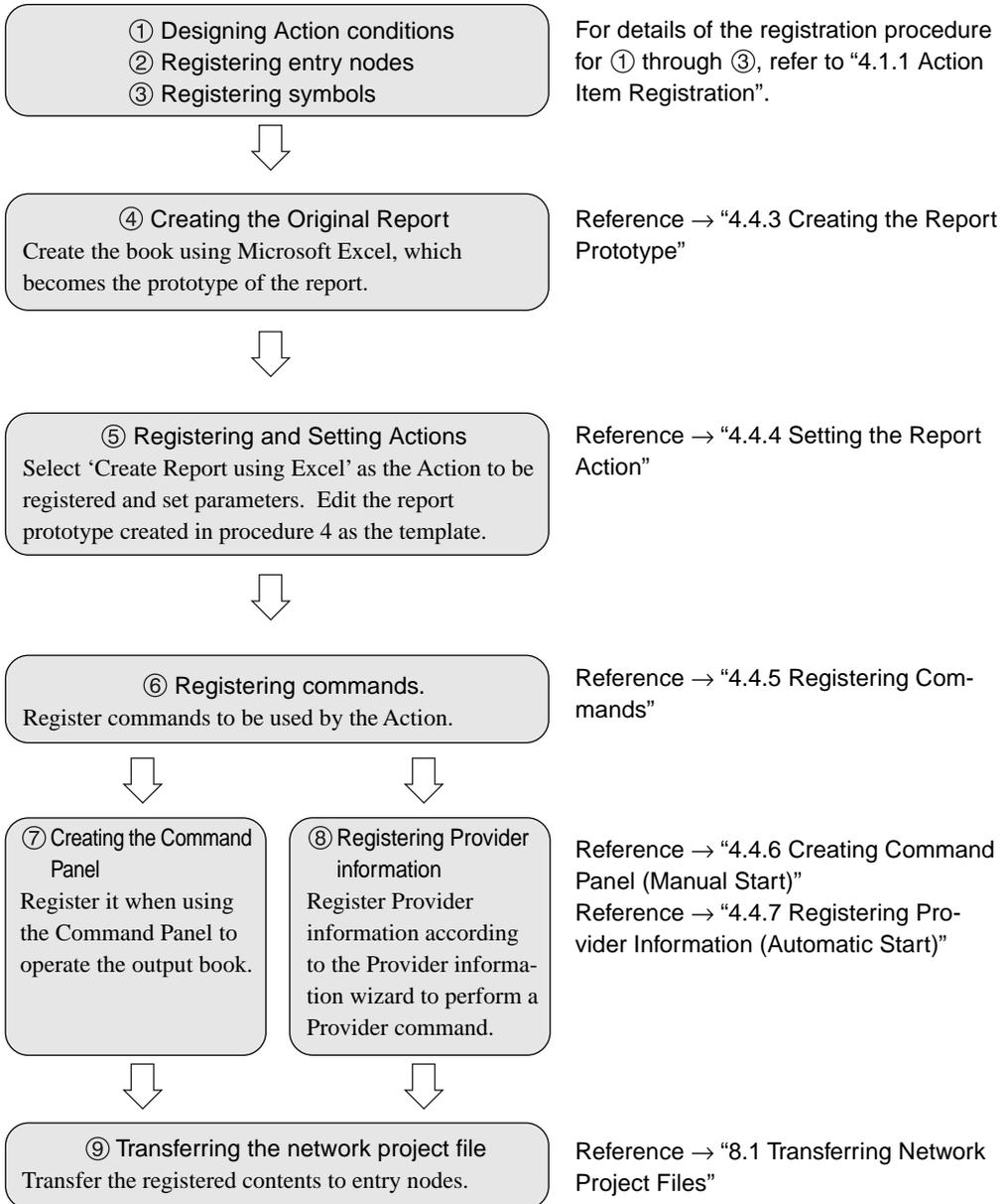


Flow from System Design to Operation Using 'Create Report using Excel' Action



4.4.1 Registration Procedure of 'Create report using Excel' Action

The following describes the registration procedure to use the 'Create Report using Excel' Action.



4.4.2 Information Writable to the Report

The following information can be written to the report.

You can create various types of report such as work-site status or production information by placing the following data in the template.

- Real time device value of, for example, PLC, GP/GLC/Factory Gateway or Pro-Server.
- Data saved in SRAM or CF Card of GP/GLC.
 - Logging data
 - Trend data
 - Sampling data
 - Alarm data
 - CSV data (CSV display data)
 - GP screen data (JPEG data)
- GP screen data of GP/GLC captured real time
- Clock data within GP/GLC and Factory Gateway
- Clock data of the PC where Pro-Server is running
- Provider's node name

In addition, you can perform the following operations on the output book.

- Create a new Excel book (begin on a new book)
- Create a new sheet (begin on a new sheet)
- Printing per book
- Printing per sheet
- Perform a desired macro
- Display a book
- Hide a book
- Close a book

4.4.3 Creating the Report Prototype

Create the report including blank cells where number data is previously written using Excel.

Create the report prototype while considering the contents of “4.4.2 Information Available in the Report”.

Use it as the template by designating what kind of data (e.g. device data, GP screen data) is written in blank cells created on this report prototype.

The “Create Report using Excel” Action creates the report (output book) based on this template book.

Example of Report (Prototype) Creation

The following report is only an example.

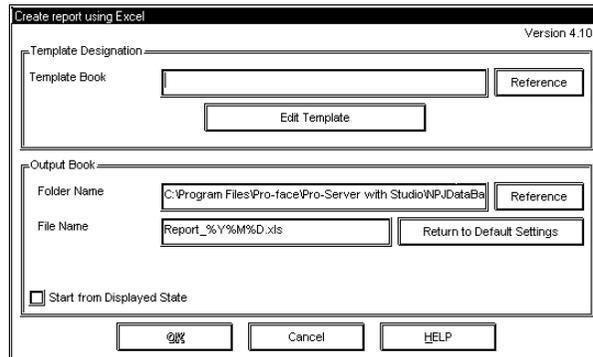
Create the report template according to your needs by setting the title of data to be written to the report and/or the format of the cell(s) where data is written.

	A	B	C	D	E	F	G	H	I
1	Work Report								
2							Date		No.
3									1002-52
4									
5									
6	Line Name	Chocolate Pre-Process							
7									
8	Operator								
9									
10	LOT No.	LD1000							
11									
12	Low Temperature Chocolate2								
13	Recipe	Temperature1			°C				
14		Temperature2			°C				
15		Sugar			kg				
16		Cocoa			kg				
17		Kneading Time			minute				
18									
19	Result	Time	Produced Quantity	Failure Quantity	Unfinished Quantity				
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35	Scheduled Quantity				Difference				
36	Produced Quantity				Failure Quantity				
37	Starting Time				Failure Rate				
38	Ending Time				Operation Time				
39									

4.4.4 Setting the Report Action

The contents described here correspond to registration procedure ⑤ described in “4.4.1 Registration Procedure of Report Creation Action”.

1. If you select [Create Report using Excel] in the [Edit Action] dialog box and click [Parameter], the following dialog box will appear.



[Template Designation]

Designate the sheet file created in the “4.4.3 Creating the Report Prototype” section.

Designate the filename using the file’s full path. You can enter up to 217 single-byte characters. Also, you cannot use ‘,’ (comma) for the template sheet name.

Click [Reference] and designate the file which becomes the report prototype from the [Open] dialog box.

[Output Book]

Designate the folder where the Excel file written by the Action is saved and the filename used.

Designate the folder name using the full path. You do not need to put “\” at the end of the name. Use no more than 74 single-byte characters.

The total number of characters for the full path folder name plus filename should be 216 single-byte characters or less.

If you use a macro, the filename can be the node name, device name or a time. For node name or device name details, see 4.2.2 Setting Action Parameters - Creating a Macro to Use Same Save File for Actions.

Macro Sign	Returned Data
%Y	The current year Year in 4 digits
%M	The current month 2 digits
%D	The current date 2 digits
%h	The current hour 2 digits
%m	The current minute 2 digits
%s	The current second 2 digits
%n	Number of output book creation. 1 or more. (For details, refer to 4.4.8 Record File of the Last Output Book Name)
%%	%

For example, when designating “%Y_%M_%D”, if it is November 1st, 2002, the output book name will be “2002_11_01.xls”.

Date and time on the server PC when newly created are added to the default filename.

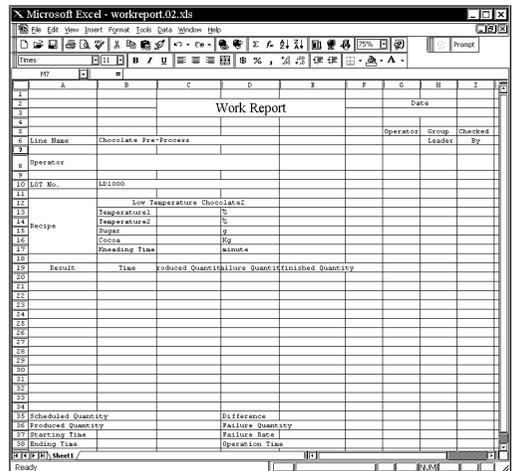
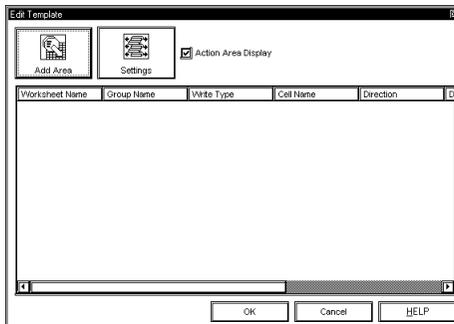
[Start from Displayed State]

If you check [Start from Displayed State], you can start with the output book opened when executing the Action.

2. Click [Edit Template].

Excel is started and the designated sheet file is opened. The [Edit Template] dialog box also appears. The created report prototype can be changed to suit your needs, for example, by entering the write data title. You must designate the area to write data and set device addresses of data to be written in the report prototype.

The area set here is called the Action area.

**[Add Area]**

Use to create the Action area to write data on the template.

[Settings]

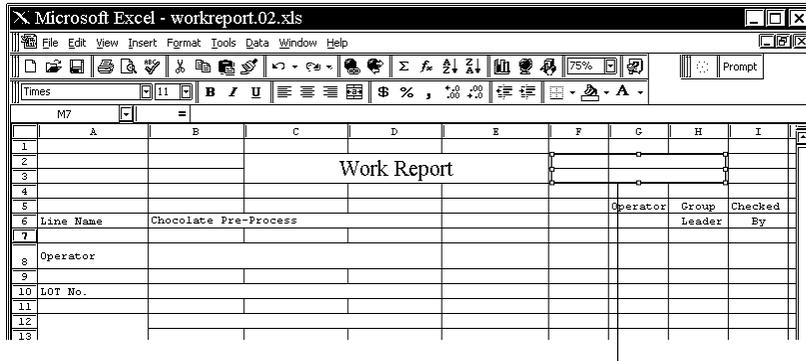
Designate the method to perform the Action area or commands for Excel.

[Action Area Display]

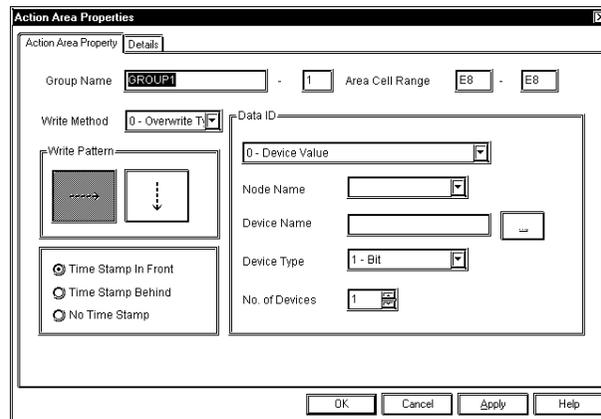
If you uncheck [Action Area Display], the template's Action area will be hidden. You can hide it when you wish to modify a template format.

3. Select cells to create the area and click [Add Area] to add the Action area.

The Action area with grids around selected cells is inserted, and the [Action Area Properties] dialog box appears.



Inserted Action area



MEMO

Even if a newly created Action area's settings are cancelled while being created, an area with no settings will be placed on the worksheet. In this case, simply select and delete the area.

[Group Name]

Group means a group of an Action area where data is written by one Action.

Perform the process of the Action area belonging to the group at one time by designating the group name. Enter a common group name for Action areas that you wish to perform at one time. A group name is not case sensitive. You cannot use ' ' (space) or ',' (comma) in a group name, and not '#' (sharp) in front (A name with '#' in front is regarded as a command.), either.

The number on the right of the [Group Name] entry field is the number that the system automatically assigns to this Action area so that you do not have to designate it.

The default value of [GROUP1] is set in the [Group Name] entry field.

[Area Cell Range]

It indicates a cell range occupied by an Action area.

[Write Method]

You can select any of the following 4 types.

- Overwrite Type

In Overwrite type, data write is always started from the same location (cell on the upper left corner of the Action area) when writing data repeatedly.

- Historical Type

In Historical type, data write is started from the next line of the line that writing was completed at the previous time when writing data more than one time. Data written previously remains as historical data.

When the write area is exceeded, writing continues on the next sheet.

- Scroll Type

When performing multiple data writes, the row following the previously written row is used to begin writing, with the previously written data retained as a history.

If the data write area is exceeded, rows of old data are deleted as new data is written. (see below)

19	Result	Time	No. Prod.	Defects	Prod. Types
20	1	2002/8/21 4.45	22	3	2
21	2	2002/8/21 4.45	26	4	4
22	3	2002/8/21 4.45	28	5	6
23	4	2002/8/21 4.46	30	5	6
24	5	2002/8/21 4.46	31	5	6
25	6	2002/8/21 4.46	32	6	6
26	7	2002/8/21 4.46	33	6	6
27	8	2002/8/21 4.46	34	8	6
28	9	2002/8/21 4.46	35	8	6
29	10	2002/8/21 4.46	36	9	6
30	11	2002/8/21 4.46	37	9	6
31	12	2002/8/21 4.46	38	10	6
32	13	2002/8/21 4.46	39	10	6
33	14	2002/8/21 4.46	40	11	6



Data scrolls upwards as new data is added.



Newest data is added here

- Loop Type

When performing multiple data writes, the row following the previously written row is used to begin writing, with the previously written data retained as a history.

If the data write area is exceeded, the oldest row of data is overwritten as each new data row is written. (see below)

19	Result	Date/Time	Prod.	Defects	Types
20	15	2002/8/21 4.47	41	11	5
21	2	2002/8/21 4.45	26	4	4
22	3	2002/8/21 4.45	28	5	6
23	4	2002/8/21 4.46	30	5	6
24	5	2002/8/21 4.46	31	5	6
25	6	2002/8/21 4.46	32	6	6
26	7	2002/8/21 4.46	33	6	6
27	8	2002/8/21 4.46	34	7	6
28	9	2002/8/21 4.46	35	7	6
29	10	2002/8/21 4.46	36	8	6
30	11	2002/8/21 4.46	37	8	6
31	12	2002/8/21 4.46	38	9	6
32	13	2002/8/21 4.46	39	9	6
33	14	2002/8/21 4.46	40	10	6



Newest data overwrites old data here

MEMO

The following data types are not available when the Scroll or Loop functions are used.

- 4 - Logging Data
- 6 - Sampling Data
- 8 - Alarm History (Block 2)
- 10 - CSV Data (CSV Display Data)
- 14 - Alarm Block 5 Data
- 16 - Alarm Block 7 Data
- 5 - Trend Graph Data
- 7 - Alarm Block 1 Data
- 9 - Alarm Log (Block 3)
- 13 - Alarm Block 4 Data
- 15 - Alarm Block 6 Data
- 17 - Alarm Block 8 Data

[Write Pattern]

Designate the write direction when writing data in cells.

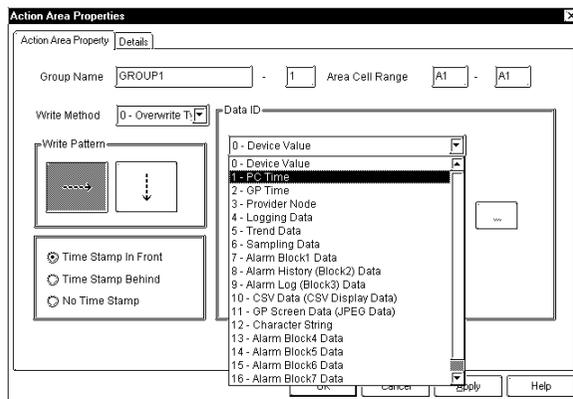
[Time Stamp]

If you select [Time Stamp in Front], time of a PC's internal clock when executing a command will be written in front of data. If you select [Time Stamp Behind], time of a PC's internal clock when executing a command will be written at the end of data.

Time display format is designated via the cell's "Write Setting/Display Format" settings.

[Data ID]

Select data to write in an Action area from among 13 available kinds of data. Since setup items displayed under data IDs differ depending on data IDs, select a data ID first.



Data ID and Setup Items

The following data shows the contents of data IDs and setup items per data ID.

0 - Device Value

Writes device values such as GP/GLC/Factory Gateway, PLC or PC in cells.

[Node Name]

Normally, designate the Provider node.

If you do not designate the node name, data is read from the Provider source node when an Action is started by Provider information. When the Action is started by the Command Panel, data is read from the PC where the Command Panel exists.

[Device Name]

Designate the data source device name.

[Device Type]

Designate the data type.

[Number]

Designate the number of data items used.

Reads data designated by [Device Type] as many times as designated by [Number] from the device designated by [Device Name], and writes those in designated cells. If there are too many devices, data which cannot be written within the cell range of the Action area will be truncated.

1 - PC Time

Use this ID to write PC internal clock time to a cell. You can use this ID, for example, if you wish to record time when a job is performed. Time display format is designated via the cell's "Write Setting/Display Format" settings.

2 - GP Time

Use this ID to write GP/GLC/Factory Gateway internal clock time to a cell. You can use this ID, for example, if you wish to record time when a job is performed. Time display format is designated via the cell's "Write Setting/Display Format" settings.

[Node Name]

Normally, designate the node name of your GP/GLC/Factory Gateway.

If you omit designating the node name, data is read from the Provider source node when an Action is started by Provider information. You cannot omit the node name when the Action is started by the Command Panel.

3 - Provider Node

Writes the node name of the Provider source if the Action is started by Provider information. Writes the node name of the PC where the Command Panel exists if the Action is started by the Command Panel.

4 - Logging Data, 5 - Trend Data, 6 - Sampling Data, 7 - Alarm Block 1 Data, 8 - Alarm History (Block 2) Data, 9 - Alarm Log (Block 3) Data, 10 - CSV Data (CSV Display Data), 13 - Alarm Block 4 Data, 14 - Alarm Block 5 Data, 15 - Alarm Block 6 Data, 16 - Alarm Block 7 Data, 17 - Alarm Block 8 Data.

Writes designated data from the GP/GLC's SRAM and CF Card.

[Node Name]

Normally, designate the GP/GLC node name.

If you omit designating the node name, data is read from the Provider source node when an Action is started by Provider information. You cannot omit the node name when the Action is started by the Command Panel.

[File Number Set]

Designate which SRAM and CF Card data will be processed.

0 - Current data

: Data in SRAM is processed.

1 - Latest data (data in CF Card)

: The latest file in the CF Card is processed.

2 - Indirect designation by device address (data in CF Card)

: Among data in CF Card, the file with the same number as the device value designated by [Device Name] is processed.

3 - File number designation (data in CF Card)

: The file with the number designated by [File Number] in CF Card is processed.

If [Write Method] is set to [Overwrite Type], data that cannot be written within a cell range of an Action area will be truncated. Adjust a cell range so that data can be written within an Action area.

11 - GP Screen Data (JPEG Data)

Writes captured data of the GP/GLC screen in GP/GLC's CF Card or captured data from current GP/GLC screens into cells.

[Node Name]

Normally, designate the name of the entry node which reads screen data.

If you omit designating the node name, data is read from the Provider source node when the Action is started by Provider information. You cannot omit designating the node name when starting the Action using the Command Panel.

[File Number Set]

Designate which data in the GP/GLC will be processed.

0 - Current data (capture)

The GP/GLC screen is captured when the Action is started, and captured data is processed.

1 - Latest data (data in the CF Card)

The latest captured data in the CF Card is processed.

2 - Indirect designation by device address (data in the CF Card)

Among data in the CF Card, captured data with the same number as the device value designated by [Device Name] is processed.

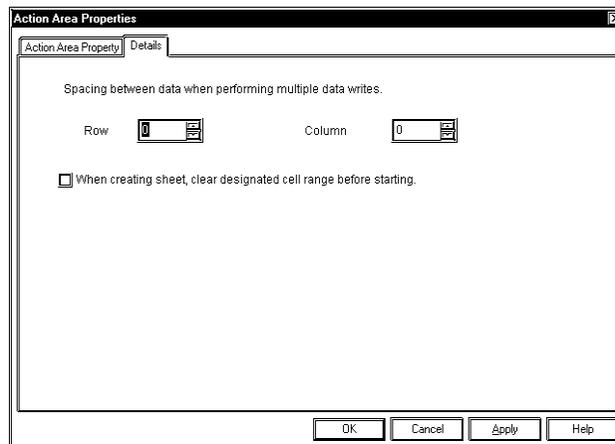
3 - File number designation (data in the CF Card)

Captured data with the number designated by [File Number] in CF Card is processed.

12 - Character String

Writes character strings given as a parameter into a cell when executing this Action area. For designating parameters, refer to "Command Description".

4. After setting [Action Area Property], set [Details] if necessary. When using "Write Method" to set Scroll Type/Loop Type, this feature cannot be used.

**[Spacing between data]**

If you write more than one data in one Action area, you can designate spacing between data using the number of cells in Row and Column directions. In the case of GP screen data (JPEG data), designate those not by the number of cell but by the number of points.

[When creating sheet, clear designated cell range before starting]

If any unnecessary data exists in cells designated as an Action area, by checking this item, that unnecessary data will be deleted when the Action is preformed.

5. After setting [Action Area Property], click [OK].
6. Create another Action area, referring to setup procedures 3 and 4.

After setting the necessary Action area in the report prototype sheet, the template appears as follows.

	A	B	C	D	E	F	G	H	I
1	Work Report								
2									
3									
4									
5									
6	Line Name	Chocolate Pre-Process							
7									
8	Operator								
9									
10	LOT No.	LD1000							
11									
12	Low Temperature Chocolate2								
13									
14	Recipe	Temperature1							°C
15		Sugar							g
16		Cocoa							kg
17		Kneading Time							minute
18									
19	Result	Time	Produced Quantity	Failure Quantity	Unfinished Quantity				
20									
21									
22									
23									
24									
25									
26									
27									
28									
29									
30									
31									
32									
33									
34									
35	Scheduled Quantity			Difference					
36	Produced Quantity			Failure Quantity					
37	Starting Time			Failure Rate					
38	Ending Time			Operation Time					
39									

Moreover, setup information for the created Action area is displayed in the [Edit Template] dialog box.

Worksheet Name	Group No...	Write Type	Cell Name	Direction	Data Type
Sheet1	GROUP1	0 - Overwrite Type	E8 : E8	To Right	0 - Device Value
Sheet1	GROUP1	0 - Overwrite Type	A11 : B13	To Right	1 - PC Time
Sheet1	GROUP1	0 - Overwrite Type	A1 : B2	To Right	2 - GP Time
Sheet1	GROUP1	1 - Historical Type	B15 : G19	To Right	0 - Device Value

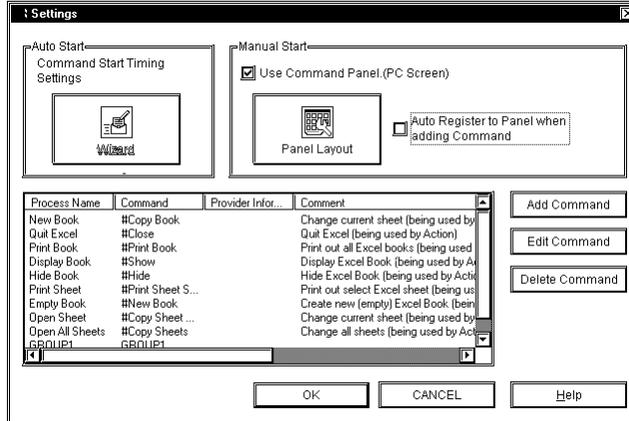
Your template is now complete.

If you create many Action areas in the template, it may take a long time to update the setup information (2 to 3 minutes per 100 Action areas). Please keep this in your mind when you create Action areas.

4.4.5 Registering Commands

The items described here correspond to the procedure ⑥ described in “4.4.1 Registration Procedure of Report Creation Action”.

1. If you click [Settings] in the [Edit Template] dialog, the [Settings] dialog will appear.

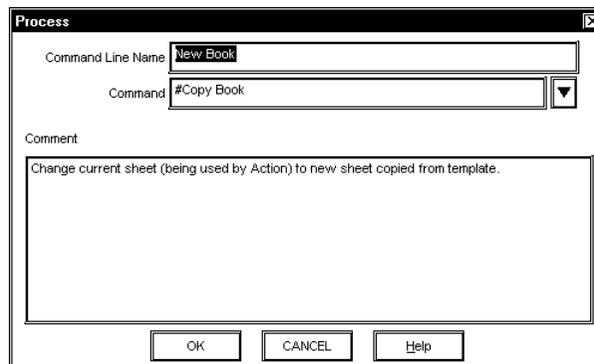


[Process Name]

9 kinds of frequently used command lines have been registered as samples. Groups created in [Edit Action] are registered as command lines.

For [Auto Start] information, refer to “4.4.7 Registering Provider Information (Auto Start)”. And for [Manual Start] information, refer to “4.4.6 Creating Command Panel (Manual Start)”.

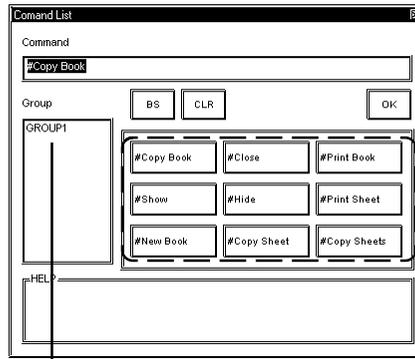
2. After selecting the command line to set/edit using a mouse pointer, if you either double click it or click [Edit Command], the [Process] dialog box will appear.



You can enter or change the command line name, the command and the comment.

For restrictions when registering commands/command lines, refer to “About Commands” on the next page.

- If you click the [▼] button on the right of the [Command] field, the [Command List] dialog will appear.



If you click it, group names separated by commas will be added in the command field.

Buttons to add each command separated by a comma in the command field.

- When you setup or edit commands, use the buttons in the dialog above to add commands or group names to the process name field.
If you click [BS], commands are deleted one by one. [CLR] deletes all commands.
- If you complete setting or editing commands, click [OK]. Next, click [OK] in the [Process] dialog box.

MEMO

You can create new commands by clicking [Add Command], however, the contents of the dialog displayed are same as those of [Edit Command].

When deleting a process name, select the process name using your, and then click [Delete Command].

About Commands

A command is a specific operation that you wish the designated Action to perform, and you can perform one operation using one command.

A command line consists of more than one command (including a group) so that it can perform a series of operations. The following restrictions apply when naming a command/command line/group/template sheet.

- A command line consists of more than one command (or group), and each command/group name is separated by ',' (comma).
- In the case of a command name, '#' (sharp) is added in front of the name.

3. In the case of a group name, you cannot use '#' (sharp) in front of the name.
4. In the case of a group name, you cannot use ' ' (space) in the name.
5. Names which start other than '#' (sharp) are regarded as group names.
6. A command may have a parameter. You cannot use ',' (comma) in a parameter.
7. You cannot use ',' (comma) in a template sheet/group/parameter name.
8. A command/group/template sheet name is not case sensitive.
9. You can enter up to 255 single-byte characters in a command line.
10. If a command line name includes the '&' (ampersand) character, it may not be displayed on the Command Panel.

If there is more than one command in a command line, the Action will perform each in order, one by one. If, however, an error occurs when executing a command, the process is terminated at that point.

For example, If "GROUP1,GROUP2,GROUP3" are defined in the command line, it will be performed in the order of GROUP1 → GROUP2 → GROUP3. However, if an error occurred in GROUP2, the process is terminated at that point and GROUP3 will not be performed.

Moreover, if more than one Action area has been registered within one group (when group names for those Action areas are same), the Action will perform the Action area in turn, however, if an error occurred mid-process, the process is terminated at that point, and remaining Actions will not be performed.

Command Description

New Book Creation Command

#New Book Creates a new blank book. However, an Action report sheet is automatically attached.

#Copy Book Copies a template book newly and creates an output book. This command functions equally as "#New Book, #Copy Sheets".

When you create a new book, an error will occur and exit the process if there are no template books existing.

New Sheet Creation Command

#Copy Sheets Creates copies of all template sheets within a template book in an output book.

#Copy Sheet Template Sheet Name

Creates a copy of the template sheet designated by Template Sheet Name within a template book in an output book.

There must be more than one blank space between #Copy Sheet and

Template Sheet Name .

For example, if `Template Sheet Name` is "Sheet1", the command should be "#Copy Sheet Sheet1".

If the designated `Template Sheet Name` does not exist in a template book, an error will occur and the setup will quit (exit).

Print Command

#Print Book Prints all sheets other than an Action template sheet in an output book.

#Print Sheet `Template Sheet Name`

..... Prints the last created sheet based on the template sheet designated by `Template Sheet Name` in an output book.

There must be more than one blank space between #Print Sheet and `Template Sheet Name`.

Executing a Macro

#Run `Macro Name` Performs the macro designated by `Macro Name`. There must be more than one blank space between #Run and `Macro Name`.

#Run `Macro Name` `Parameter`

..... Performs the macro designated by `Macro Name` with `Parameter` as the first argument (character type). There must be more than one blank space among #Run, `Macro Name` and `Parameter`.

If you set the same name to `Macro Name` as cell names used by Excel such as A1 or B1, an error will occur.

Do not set these names to `Macro Name`.

If the designated macro does not exist or a macro call failed, an error will occur and the setup will exit.

Even if a macro has a return value, it will be ignored.

Displaying an Output Book

#Show Opens and displays an output book.

Hiding an Output Book

#Hide If an output book has been opened by Pro-Server, an output book will not be displayed on the screen. At this time, an output book remains open.

If an output book is not opened by Pro-Server, nothing happens.

Closing an Output Book

#Close If an output book has been opened by Pro-Server, an output book will be closed after saving it automatically. Excel will also exit at this time.

Performing the Contents Designated by "Group Name"

Group Name Pro-Server searches the write area equal to the group name designated by **Group Name** within the write area designated by the template book.

When Pro-Server finds the write area, it writes values in cells of the output book according to the settings. If there is more than one write area in the template book, it writes to all write areas (you cannot designate the write order).

If an output book contains more than one sheet created from the same template sheet, the latest sheet will be written.

For example, if there are template sheets, Sheet1 and Sheet 2 including "Group1" in the template book and that Sheet1-1, Sheet1-2 and Sheet1-3 were created from Sheet1 and Sheet2-1 was created from Sheet-2 in the output book.

If you perform "Group1" in this situation, data will be written in Sheet1-3 and Sheet2-1 in the output book.

Group Name **String**

..... If the Data ID of the Action area is character strings, character strings are written in the cell. Character strings are designated next to a group name as **String** (parameter).

Insert a space between a group name and character strings.

You cannot use commas in **String**.

4.4.6 Creating Command Panel (Manual Start)

To create (write data to) the output book according to the contents designated in the template, you must perform the command to start the Action.

The Command Panel is the toolbar-like dialog box used to issue the “Perform the command” on PCs.

You can perform Actions easily by simply assigning the command line registered in the [Settings] dialog to the button on the Command Panel and clicking the button.

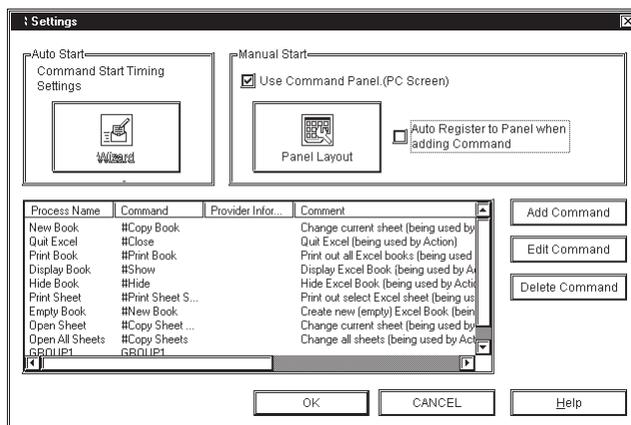
You can perform commands also by using Provider information, in addition to using the Command Panel described here.

For how to use Provider information, refer to “4.4.7 Registering Provider Information (Auto Start)”.

When you perform commands with the Command Panel, the PC that performs the Command Panel becomes the provider Node and the action is performed.

The contents described here correspond to the procedures ⑦ described in “4.4.1 Registration Procedure of ‘Create Report using Excel’ Action”.

1. If you click [Settings] in the [Edit Template] dialog, the [Settings] dialog will appear.



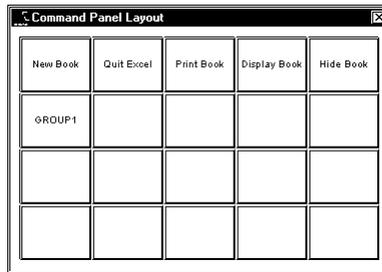
[Use Command Panel. (PC Screen)]

If you check this option, the Command Panel will be displayed when starting Pro-Server.

[Auto Register to Panel when adding Command]

If you check this option, commands are added automatically to the Command Panel when selecting new commands.

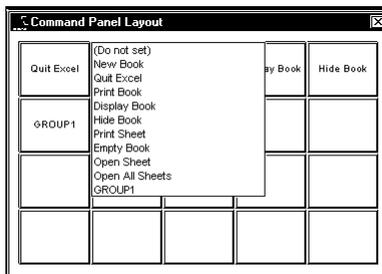
2. If you click [Panel Layout], the [Command Panel Layout] dialog box will appear.



Editing the Panel Layout

If you move the mouse pointer to right/left/bottom edges of the dialog box, the mouse pointer will change to the size-adjust pointer. You can also adjust the dialog box's size to change the number of buttons displayed in the panel. Moreover, the panel display location can be set by moving the [Command Panel Layout] dialog to the desired location on the screen.

If you right-click command buttons, the following command list will appear so that you can designate commands to set to those buttons.



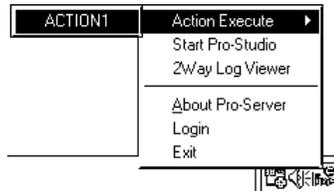
You can use left-click and drag to move existing commands to different locations.

The maximum number of buttons which can be displayed on the Command Panel is 7 (vertical) by 10 (horizontal) = 70 (total). You can display one Command Panel per Action.

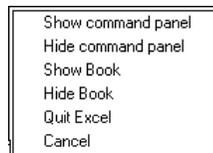
Command Panel Display

When you read the network project file that uses the 'Create Report using Excel' Action after starting Pro-Server, the Command Panel will appear on a PC screen if you have checked [Use Command Panel.(PC Screen)] in the [Settings] dialog box.

If you wish to display the Command Panel after closing it once, right-click the Pro-Server icon displayed in the Windows taskbar and select an Action name from [Action Execute].



The following control list appears. If you select [Show Command Panel], the Command Panel will be displayed again. In the control list, in addition to [Show/Hide Command Panel], you can also select [Show Book] (Show command), [Hide Book] (Hide command) and [Quit Excel] (Close command).



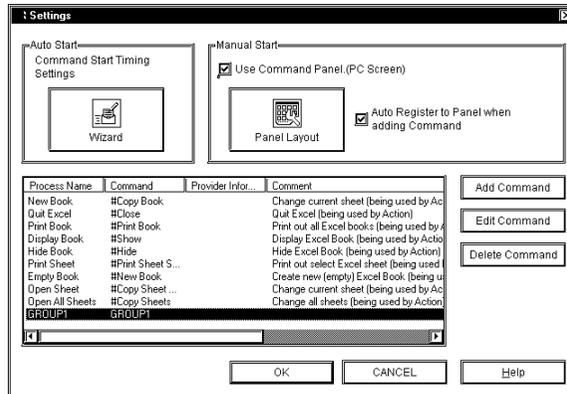
4.4.7 Registering Provider Information (Auto Start)

This feature registers Provider information per group and command line set in a template.

The following describes the procedures after the [Settings] dialog box is displayed.

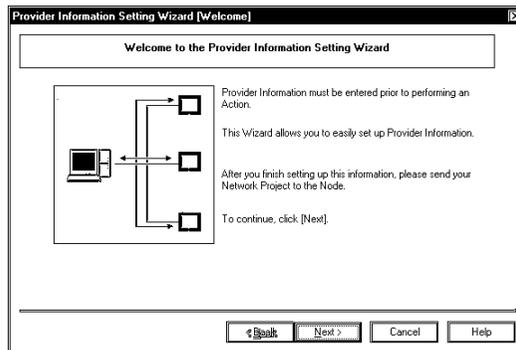
The steps described here correspond to the procedures ⑧ described in “4.4.1 Registration Procedure of Report Creation Action”.

1. To enter Provider information, select the groups and commands from the process name list.

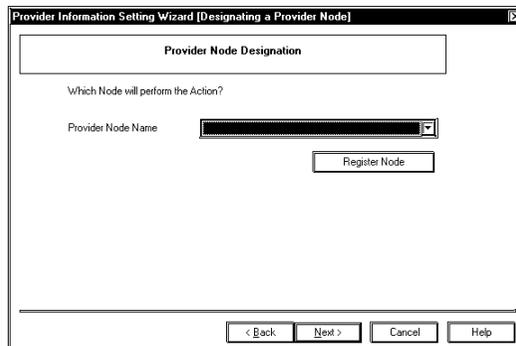


2. Click [Wizard] in the [Auto Start] field.

The [Provider Information Setting Wizard] will appear.



3. Click on the [Next] button.



4. After designating the entry node to perform the Action, click on the [Next] button.
To add an entry node, click [Register Node], and register the new entry node in the [Register Node] dialog box.

5. After designating the Action to use for the Action trigger, click on the [Next] button.
If [When the screen's button is touched] is designated as the trigger:
Designate the [Symbol Name], and then click on the [Next] button.
To register a new symbol, click [Register Symbol], and register the new symbol in the [Register Symbol] dialog box. For how to register symbols, see “3.2 Registering Symbols”.

- If [When the designated device is turned ON] is designated as the trigger:
Designate [Symbol Name] and [Check Interval], and then click on the [Next] button.
When registering symbols, the procedure is the same as that of [When the screen's button is touched].

If [Designated Interval] is designated as the trigger:

Designate [Symbol Name] and [Time Interval], and click on the [Next] button.

When registering symbols, the procedure is the same as that of [When the screen's button is touched].

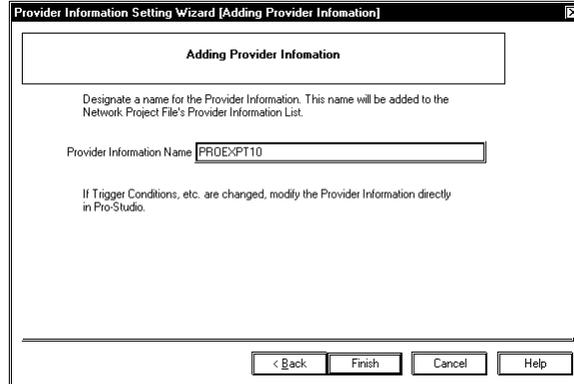
If [Designated Time] is designated as the trigger:

Designate [Action start time], and click on the [Next] button.

6. Designate the [Consumer Node Name], and click on the [Next] button.

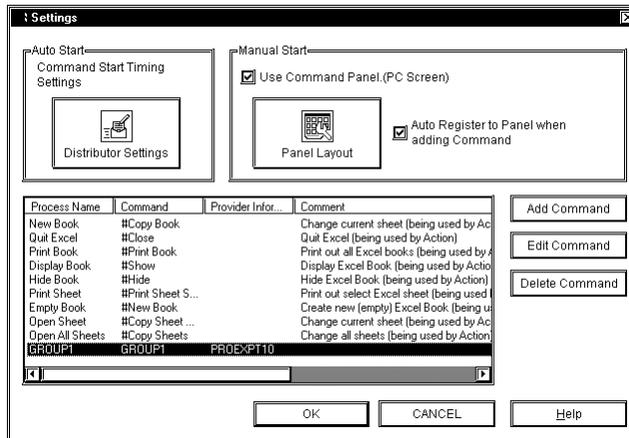
To add an entry node, click [Register Node], and then register the new entry node in the [Register Node] dialog box.

7. Enter [Provider Information Name], and click on the [Finish] button.



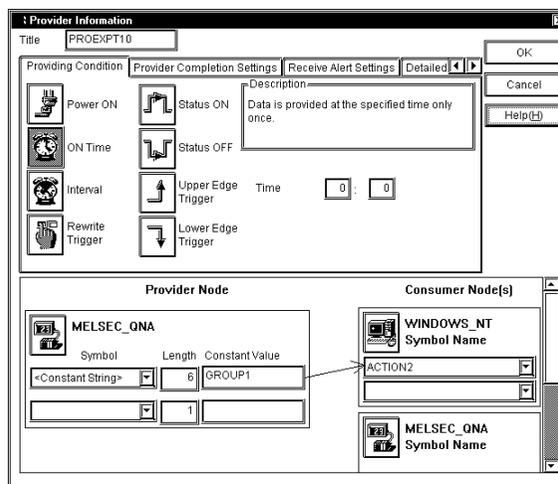
The [Provider Information Setting Wizard] will quit (exit).

The Provider Information name now appears in the designated [Process Name].



If you select Process Name for the Provider information that has been set, the [Auto Start] button will change from [Wizard] to [Distributor Settings].

8. If you click [Distributor Settings], the [Provider Information] dialog box will appear.



If you enter Provider information, all character strings in a command line will be registered as <String>. In this case, if you wish to add or edit command line character strings, you should edit only the contents of the fixed value because the data count is calculated automatically.

If you set the data count to more than the number of character strings in the fixed value, unfixed data may be written, so you may not change the count.

For [Provider Information] dialog box information, refer to “4.2.3 Registering Provider Information”.

4.4.8 When Registering/Using 'Create report using Excel' Action

The following information should understand prior to registering/using the "Create Report using Excel" Action.

Important:: When Starting Excel on PCs Running 'Create Report using Excel' Action

Be aware of the following points in environments where files with ".xls", ".xlt" or ".csv" extensions are registered to be started by Excel.

When Excel is started by an Action, if you try to open files by double clicking them in Explorer, files may not be opened or may not act as expected. Normally, if Excel has already been started, if you double click files on Explorer, Excel will try to open files. However, the "Create Report using Excel" Action only supports and controls files opened by the Action. Therefore, while this Action starts Excel, if files which have not been opened by this Action are opened by, for example, double clicking, the control will be out of this Action and Action operation will become unstable.

Also, do not open files using any other methods, since the same problem(s) can occur.

If you use Excel as follows, the Action will be unaffected.

In addition to Excel started by the Action, if you start Excel from the [Start] menu of "Windows" and open files from Excel's [Open] menu, or if you open files by the dragging and dropping on Excel, the Action will not be effected adn will operate normally.

Sheet Name of Template Book

You can use macros to the sheet name of the template book as well as the output book name. When creating a sheet in the output book, this Action adds the sheet name by replacing the registered macro sign with a specific value. The following shows the content of Excel macro symbols.

Macro Sign	Replacement Contents	
%Y	The current year	Year in 4 digits
%M	The current month	2 digits
%D	The current date	2 digits
%h	The current hour	2 digits
%m	The current minute	2 digits
%s	The current second	2 digits
%n	Number of sheets created within the book. 1	
%%	%	

For example, if you wish to create one sheet per day (with date attached) in the output book, set the sheet name of the template book as "%M (month) %D (day)". If the sheet is created in the output book on October 31st, the sheet name will be "10 (month) 31 (day)".

Even if you designate other characters than those in the table in the previous page right after “%”, it will not be recognized as the macro sign, and “%” will be ignored.

If you designate the sheet name in the “#Copy Sheet `Template Sheet Name`” or “#Print Sheet `Template Sheet Name`” command, you should designate the sheet name of the template book in the original way (macro sign before replacement)

Action Report Sheet

When creating the output book, this Action automatically adds the sheet with the name of “Action Report” in the output book.

In this Action Report sheet, the latest record about what kind of data this Action has output to the output book is always written. You can refer to it when checking, for example, the progress state of the process. Also, when the output book was once closed and then opened again, this Action starts the next operation based on the record in the Action Report sheet.

If you rewrite the contents of the Action Report sheet, it can cause unexpected conditions, such as that the Action does not run correctly. As a result, do not change/rewrite these contents if it is not necessary.

Record File of the Last Output Book

When creating the output book in the output folder for the first time, this Action creates the file to record the output book name. This filename will be the name of the created output book with the “.INI” extension added (*.INI). For example, if the output book name is “Report_%Y%M%D”, the “Report_%Y%M%D.INI” file will be created.

The name of the latest output book which performed output and the number of output book creation are recorded in this file.

When switching the output destination to other output book, this Action refers to the contents of this file. If you change the contents of the file or delete the file, it can cause unexpected conditions, such as that the Action does not run correctly.

Important Matters When Using “Create Report using Excel” Action

Be sure to understand these items prior to actually using this Action.

Timing of Opening/Closing Output Book

This Action opens the output book using the following timing.

- ① When running the Action from Provider, the Command Panel or user-defined applications (however, “#Close” and “#Hide” commands are excluded).
- ② When right clicking the Pro-Server icon in the task tray, selecting [Action Perform] → [Action Name], and then executing other menu options than [Hide] or [Close] (refer to “Displaying Command Panel”).

This Action closes the output book using following timing.

- ① When clicking [Close] in the Command Panel.
- ② When executing the “#Close” command from Provider or user-defined applications (however, it also exits Excel).
- ② When executing the “#NEW Book” or “#Copy Book” command from Provider or user-defined applications. In this case, the new book will be opened automatically after the old book is closed.
- ④ When the network project is reloaded.
- ⑤ When Pro-Server exits.

When you close the output book, close it using steps from ① through ⑤ described above. Do not close it directly using the [Exit] or the [Save As] menu option of Excel. If you close Excel using these menu options, it can cause unexpected conditions, such as that the Action does not run correctly.

Common Usage Violation of Output Book

While the output book is opened by this Action, if you try to open the output book by another version of Excel, it will cause a common usage violation of the output book so that you may not be able to open it.

When the output book is not opened by this Action, you can open the output book by another version of Excel, though, you should close it before starting this Action. If you leave the corresponding output book open, a common usage violation will occur on the Action side (PC) and the process may not be performed.

To avoid this problem, while the Action is running or when the Action may be started, open the corresponding output book by clicking the [Display] button in the Command Panel.

Environment to Use This Action

This Action starts one Excel book per one Action, and the Action will occupy Excel when the output book is opened (“Timing of Opening/Closing Output Book” in the previous page).

Therefore, even if you have registered more than one Action within the network project, this Action may not be started simultaneously due to resource problems such as PC or OS memory (the number of Actions which can be started simultaneously differs depending on your PC environment).

If there are any problems when starting this Action simultaneously, adjust the timing of starting or closing Excel, for example, using the “#Close” command.

Opening Template Book

The template book will be opened automatically in [hide] mode when the Action needs to refer to it (e.g. when creating a new output book or sheet). When the Action completes referring to the template book, it will be closed automatically.

Switching Timing of Output Book

If you do not change the output destination intentionally using the “#New” or the “#Copy” command, the output book will not be changed automatically. For example, when the file that the output book name is “Report_%Y_%M_%D” is used, if this Action uses the output book on October 29th, 2002, the Action result will be output to the output book of “Report_2002_10_29.xls”. If this Action uses the output book on the next day, October 30th, 2002, the Action result will be output to the “Report_2002_10_30.xls” output book, however, “Report_2002_10_29.xls” and “Report_2002_10_30.xls” are the same output book of “Report_%Y_%M_%D” and it means that a new output book will not be created every time the day changes.

Version Compatibility

- When a version of Pro-Server that is lower than 4.5 is used with a template set for either [Write method/ Scroll Type] or [Loop Type], the action area's OCX is copied as it is to the output file. In this case, delete the action area.
- When a version of Pro-Server that is lower than 4.5 is used with a template that has the data type of alarm blocks 4 to 8, the action area's OCX is copied as it is to the output file. In this case, delete the action area.

5 | GP Setup

This chapter explains how to transfer a Pro-Studio network project file (*.npj) and a GP-PRO/PB III project file (*.PRW) to a connected GP.

5.1 Transferring Data to GPs

5.1 Transferring Data to GPs

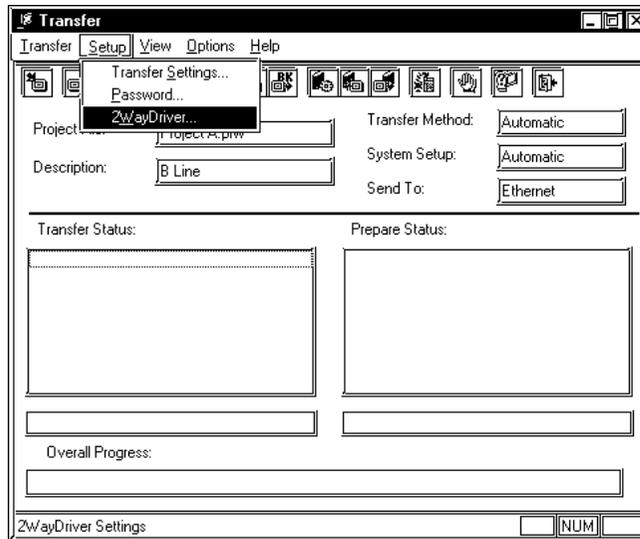
In the GP-PRO/PBIII screen editor software, select the network project file and node name and transfer the desired data to the connected GPs. The following description assumes that the GP-PRO/PBIII Ver. 3.0 Transfer feature's window is open.

MEMO

Be sure to first install the 2-Way driver in order to transfer a network project file (*.npj) from the GP-PRO/PB III for Windows to a GP unit.

Reference → “2.1 Installing the Software”

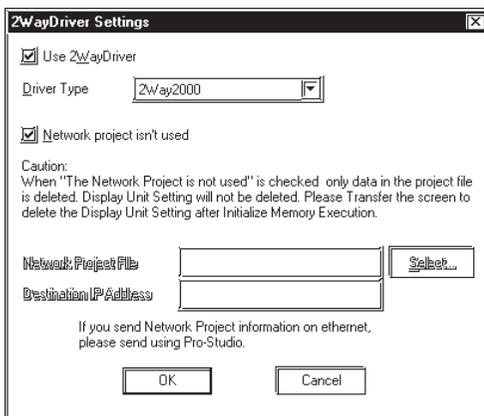
1. Click on [2WayDriver] in the [Setup] menu.



MEMO

- When transferring the network project file with GP-PRO/PBIII for Windows, use the data transfer cable.
- Transferring your screen data in the on-line mode temporarily causes the GP to display the transfer screen. The initial screen will be restored as soon as the data transfer is completed.

2. Select [2WayEther] from the [Driver Type] pull-down list.

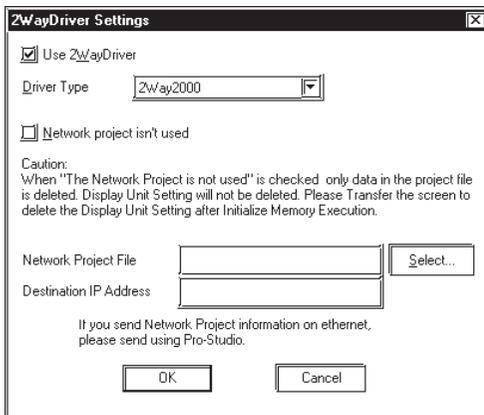


MEMO

To send to GP77R series, be sure to click on the [Use 2Way Driver] checkbox.

Otherwise, the 2-Way Driver will not function. [Use 2Way Driver] checkbox is initially checked for GP2000, GLC2000 series.

3. Select [2WayEther] from the [Driver Type] pull-down list.

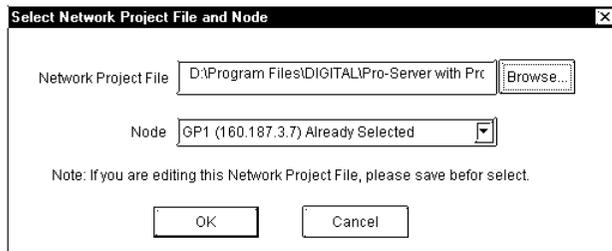


MEMO

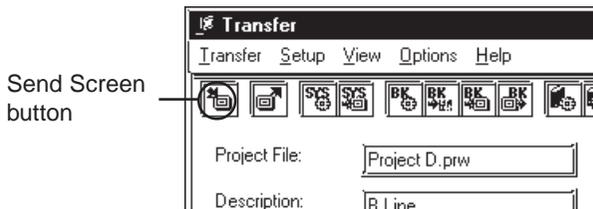
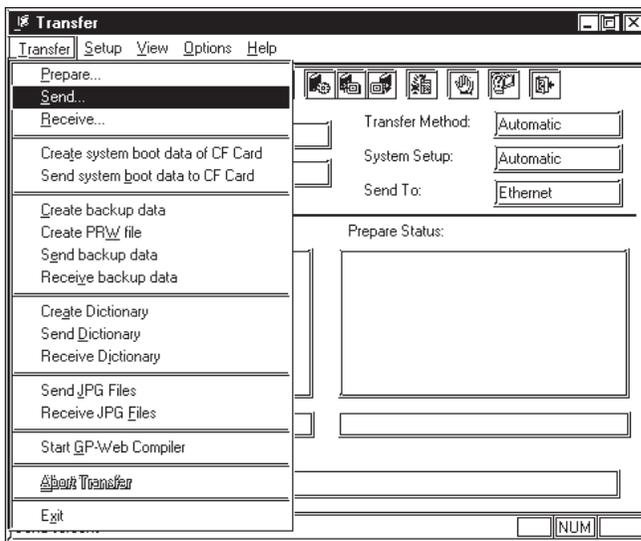
If you transfer the GP screen data alone to the GP to which the network project file has been already downloaded, the network project file might be deleted depending on transfer settings or a transfer method.

		Transfer Method	
		Transfer Cable	Ethernet Transfer
Setting	Transfer with [Send All Screens]	Delete	Remain
	Transfer with [Automatically Send Changed Screens]	Remain	Remain
	Transfer with [Force System Setup]	Delete	Remain

4. Select the network project file and the network node to which you wish to transfer the information and then click [OK].



5. Click [Send] on the Transfer menu or the Send Screen button to transfer the information to the GP.



6. The transfer is completed if no error message is displayed.

6 | Tools

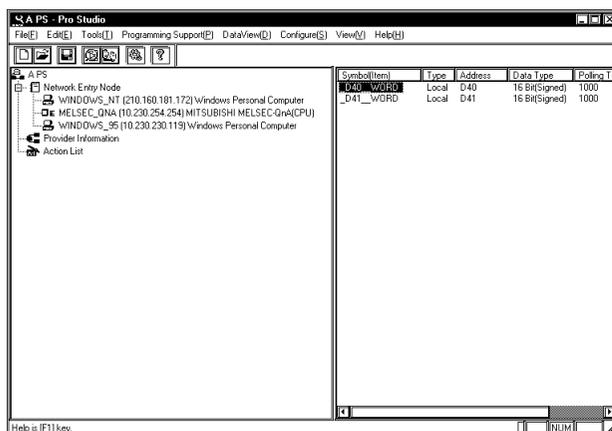
This chapter describes monitoring tools.

- 6.1 Device Monitoring
- 6.2 GP Status Monitoring
- 6.3 Read Performance Measuring Tool
- 6.4 Log Viewer

6.1 Device Monitoring

Any selected device can be monitored via this feature, which allows you to check the status of data communication. Also, in the [Device Monitor] window, you can specify the IP and device addresses.

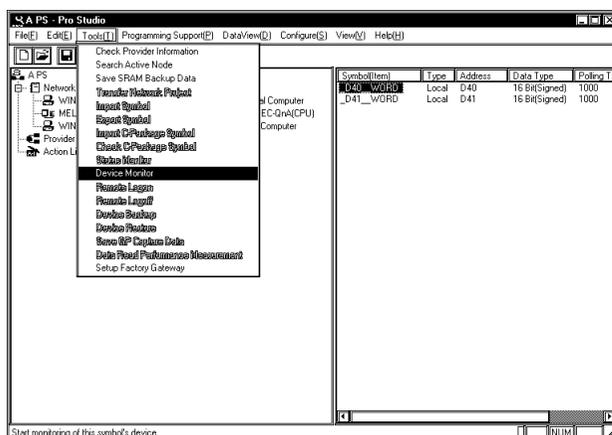
1. Click on the symbol name you want to monitor.



[Symbol (Item)]

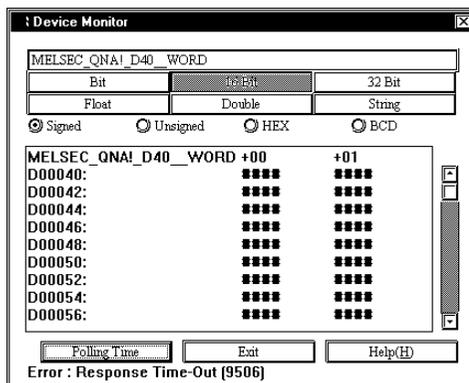
The registered symbol names are listed here.

2. Click [Device Monitor] in the [Tools(T)] menu.



You can right-click the symbol to select [Device Monitor] from the shortcut menu.

3. You can be monitored via the device.



To change the polling time and the number of displayed decimal places, click [Polling Time].

You can type in the IP address or device address directly.

Reference → “On-line Help”

When monitoring Special Protocol symbols, the maximum number of symbols to be displayed on the device monitor is restricted to “Maximum Number of Read” in the table below.

Writing is possible only to the head device, and the maximum write number is restricted to “Maximum Number of Write” in the table below.

If you execute writes exceeding those maximum numbers, the warning dialog will appear.

Device Type to Access	Format	Maximum Number of Read	Maximum Number of Write
Bit Device	Bit	255	1
16 Bits Device	Bit	255	1
	16 bits	255	40
	32 bits	127	20
	Single precision floating point	127	20
	Double precision floating point	63	10
	Character string	510 (single byte)	80 (single byte)
32 Bits Device	16 bits	255	1
	32 bits	255	40
	Single precision floating point	255	40
	Double precision floating points	127	20
	Character string	1020 (single byte)	160 (single byte)

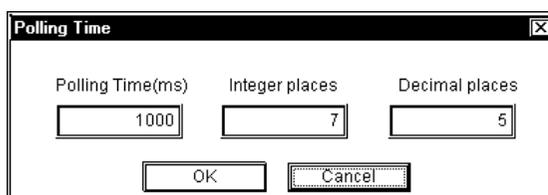
MEMO

The polling time set for collecting or writing data for each symbol, distributing data and monitoring devices may not be able to be performed under certain conditions. These conditions include the currently registered number of GPs, number of Tags used on each screen sent, type of PLC connection, and number of other currently open Windows applications. Entering "0" will allow the system to operate at its maximum speed. Please use this value as a benchmark when entering other values to "fine-tune" your system.

If you try to monitor non-existing devices, a communication error will be displayed on the GP screen so that you should be careful about it.

- Setting the Display of Polling Time and Decimal places

Within the [Device Monitor] box, click [Polling Time].



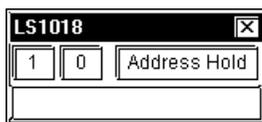
Enter values for [Polling Time(ms)], [Integer places] and [Decimal places], and click [OK]. The maximum value that can be entered for [Integer places] and [Decimal places] is 15.

For each item's details, refer to Online Help.

Reference → "Online Help"

- Device Write Method

Double-click the desired section to enter device address data.



Enter the value. Pressing [Enter] will write the value to the device address, and the next device address's Write Dialog Box will appear.

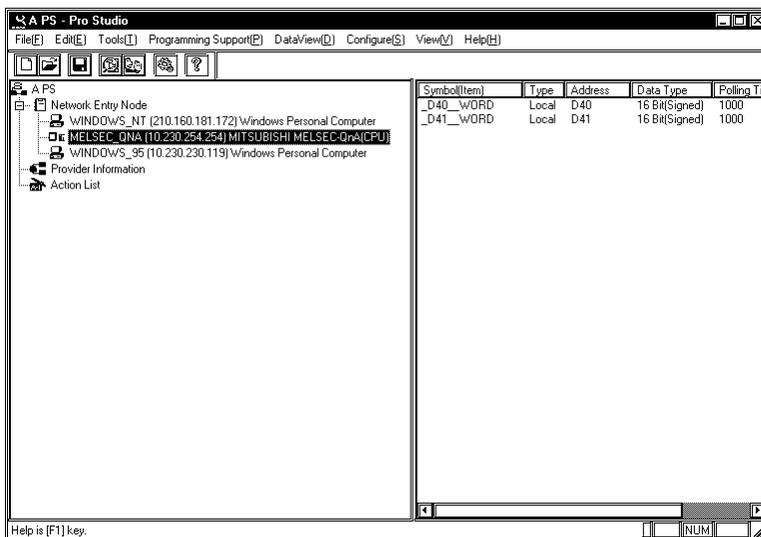
Clicking [0] or [1] will write a value of 0 or 1 to the device address.

Writing address data with the [Address Hold] button pressed down will continue to write data to the same address.

6.2 GP Status Monitoring

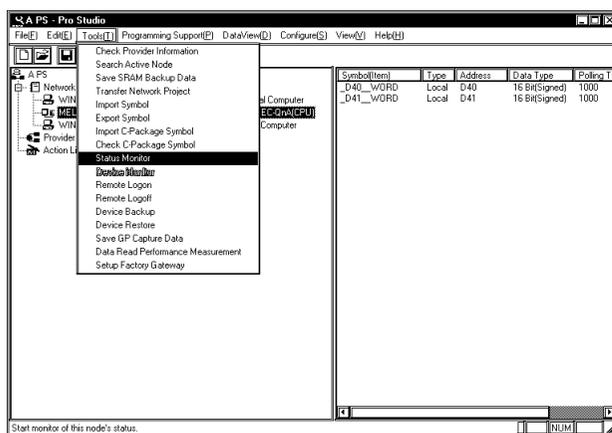
Here, you can monitor the status of any GP connected to the network.

1. Click the node you wish to monitor.



You can right-click the symbol to select [Status Monitor] from the shortcut menu.

2. Click [Status Monitor] in the [Tools(T)] menu.



3. Monitor the status of the GP. To change the polling time, click [Setting].
Click [Clear] to clear communication error codes of the selected node.

If you click [Clear], the following communication error codes will be cleared.

- PLC communication error code : LS2039
- PLC communication error code (for an extension) : LS2070
- 2-Way communication error code : LS2075

Reference →“A.2.2 2-Way Driver Error Messages and Syslog Features”

4. Set the polling time and then click [OK].

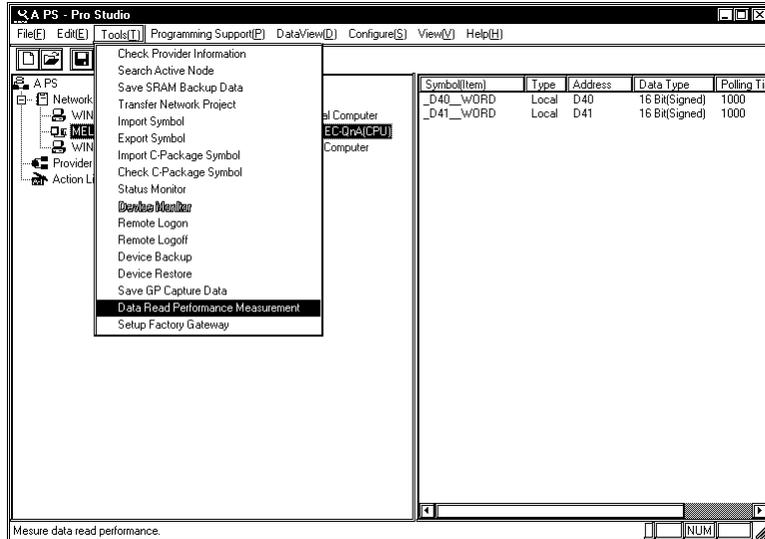
MEMO

The polling time set for collecting or writing data for each symbol, distributing data and monitoring devices may not be able to be performed under certain conditions. These conditions include the number of currently registered GPs, number of Tags used on each screen sent, type of PLC connection, and number of other currently open Windows software. Entering “0” will allow the system to operate at its maximum speed. Please use this value as a benchmark when entering other values to “fine-tune” your system.

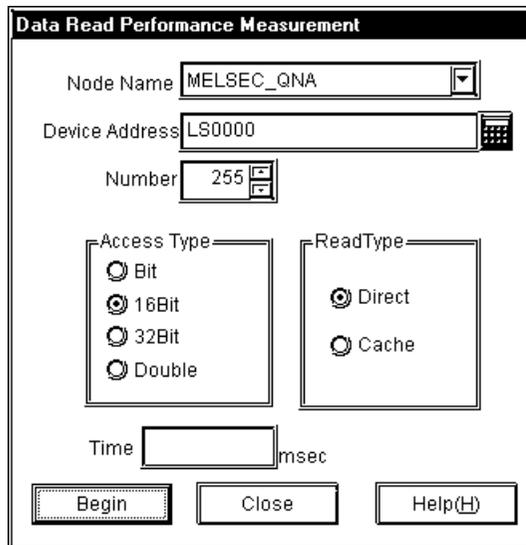
6.3 Read Performance Measuring Tool

This tool allows you to measure the data read performance from the designated node.

1. Click [Data Read Performance Measurement] on the [Tools (I)] bar of the Menu Bar.



2. The [Data Read Performance Measurement] dialog appears. After designating all items, click [Begin].



[Node]

Select the node name. All entry node names have been registered. If unselected, the error dialog will appear.

[Device Address]

Enter the device address or the symbol name to start measuring. This is defaulted to “LS0000” (This will vary depending on the PLC model). If not entered or entered an incorrect address, the error dialog will appear.

If you click the right-side icon, the [Device Address Entry] window appears and you can designate the device address from this window.

[Number]

Enter [Number]. 255 has been set as default. The minimum number is 1, and the maximum number is 65535 although it changes depending on the device address and the access type.

If you designate Special Protocol symbols imported from the project file (*.prw) on GP-PRO/PB III for Windows to device addresses, the maximum number to be read is restricted to the contents of the table below.

If you designate values exceeding those maximum numbers, the warning dialog will appear.

Device Type to Access	Format	Maximum Number of Read
Bit Device	Bit	255
16 Bits Device	Bit	255
	16 bits	255
	32 bits	127
32 Bits Device	Bit	255
	32 bits	255

[Access Type]

Select the access type. This is defaulted to “16 Bit”.

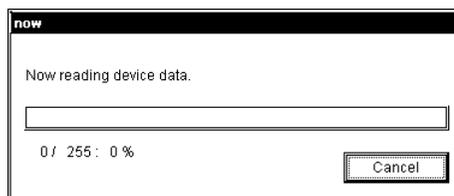
[Read Type]

Designate the read type. This is defaulted to “Direct”.

[Time]

The measured read performance value after the execution is displayed.

3. The processing status of the read performance measuring is displayed in the [now] dialog.



If the contents set in the [Data Read Performance Measurement] dialog are incorrect, a dialog will appear. The contents of dialog are as following.

Dialog Contents	Workaround
Cannot designate a bit-type symbol to measurement other than in the BIT format.	If you designated a BIT symbol in the [Device Address] field, you cannot measure read time designating the access type other than in Bit. Reset the access type to "Bit", and then execute measurement.
Cannot designate a symbol other than in BIT to measurement in the BIT format.	If you designated a symbol in formats other than Bit in the [Device Address] field, you cannot measure read time designating the access type in Bit. Reset the access type to something else but Bit, and then execute measurement.

- The measured result is displayed in the [Time] field of the [Data Read Performance Measurement] window.

The screenshot shows the 'Data Read Performance Measurement' dialog box. It contains the following fields and controls:

- Node Name: MELSEC_QNA
- Device Address: LS0000
- Number: 255
- Access Type: Radio buttons for Bit, 16Bit (selected), 32Bit, and Double.
- ReadType: Radio buttons for Direct (selected) and Cache.
- Time: 129 msec
- Buttons: Begin, Close, and Help(H)

MEMO

[Time] may vary depending on the environmental condition (number of tags on a screen, PLC connection style, application software running on Windows at the same time and so on).

6.4 Log Viewer

Pro-Server saves various information occurred during the operation in the internal log.

Log Viewer allows you to view internal log information saved by Pro-Server. Log Viewer can display Pro-Server's internal log information classifying it into 8 categories. You can also designate if you would like to save or delete messages per internal log information category.

Log Viewer can display 500 messages at maximum. When the number of messages exceeds 500, the oldest message will be deleted in turn.

Moreover, Log Viewer has online and offline modes.

The online mode displays the online log which is equal to the system log currently running real time.

The offline mode displays the log in the past saved by Log Viewer previously.

6.4.1 2Way Log Viewer

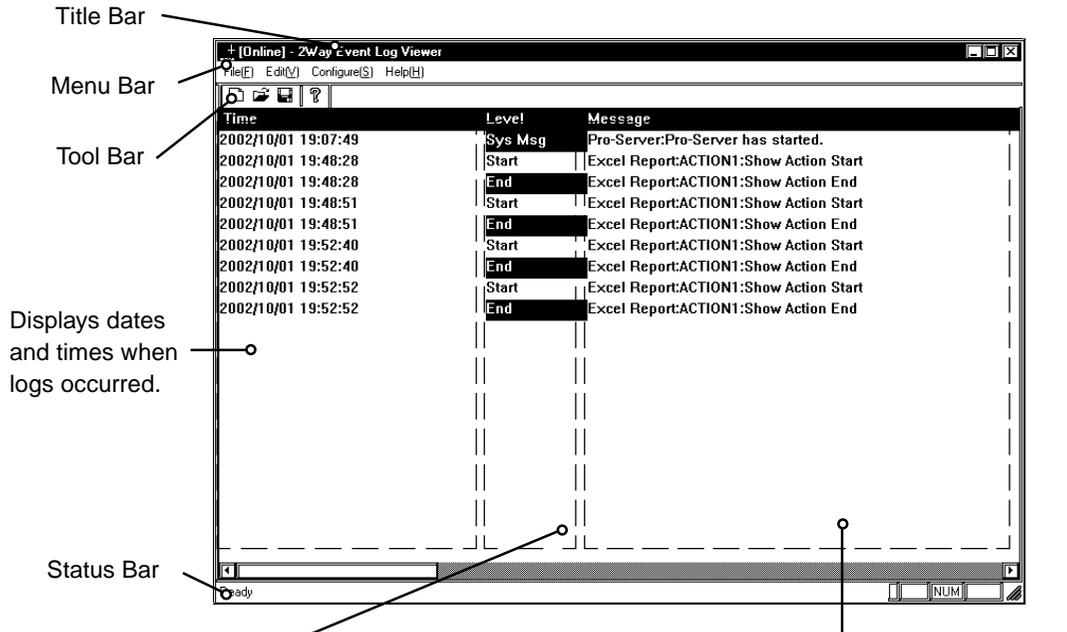
The following describes how to start Log Viewer and the display contents in the screen.

1. Right-click the icon in the right of the task tray, and then select [2Way Log Viewer].



2. Log Viewer starts.

The following shows the name and the role of each part of the Log Viewer screen.



Displays dates and times when logs occurred.

Displays the log level.

There are 8 kinds of the log level:

- SysMsg System message
- SysErr System error message
- Error Error messages of user-defined programs
- Start Starting messages of user-defined programs
- End Ending messages of user-defined programs
- Warning Warning messages of user-defined programs
- Message1 Detailed messages 1 of user-defined programs
- Message2 Detailed messages 2 of user-defined programs

Displays log messages. Action names designated on Pro-Studio are also displayed.

Title Bar

Displays the name of the opened log file (*.2lg)

Menu Bar

Displays menus to operate Log Viewer. If you click those using a mouse, pull-down menus will be displayed.

Tool Bar

Displays icons of frequently used commands. If you click those icons, commands will be executed.

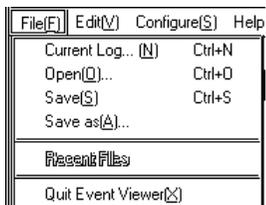
Status Bar

Displays messages for operations.

6.4.2 Pull-Down Menu of Each Log Viewer Menu

The following describes the pull-down menu of each menu in the menu bar.

[File(F)] Menu



[Current Log (N)]

Displays the online log (currently running system log).

[Open(O)]

Selects and displays the previously saved log file (*.2lg).

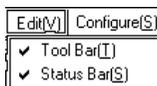
[Save(S)]

Overwrites and saves to the currently opened log file (*.2lg).

[Save as(A)]

Saves as the new log file (*.2lg).

[Edit(V)] Menu



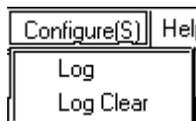
[Tool Bar(T)]

Designates ON/OFF of the tool bar. When it is displayed, the check mark is attached in front of [Tool Bar(T)].

[Status Bar(S)]

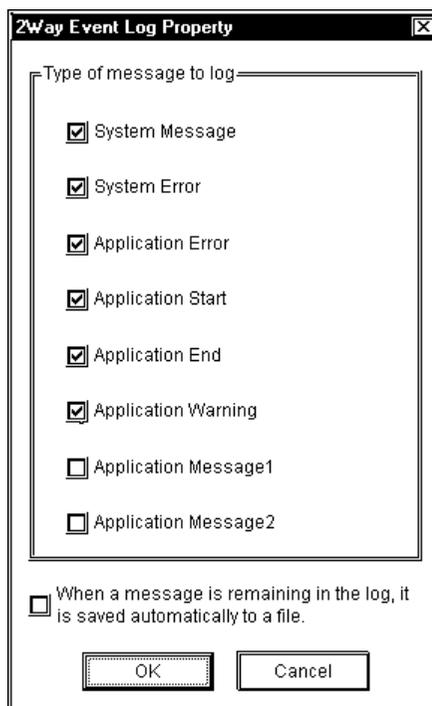
Designates ON/OFF of the status bar. When it is displayed, the check mark is attached in front of [Status Bar(T)].

[Configure(S)] Menu



[Log]

If you click this, the [2Way Event Log Property] dialog will appear.



Select message kinds to be displayed on Log Viewer. Check messages names that you wish to display.

The following shows the contents per message.

Message Kind	Contents
System Message	Indicates system messages for starting and shutting down the server.
System Error	Indicates system level errors (e.g. system fatal error).
Application Error	Indicates action error messages.
Application Start	Indicates action starting messages.
Application End	Indicates action ending messages.
Application Warning	Indicates action warning messages.
Application Message1	Indicates detailed action messages 1 (for debugging).
Application Message2	Indicates detailed action messages 2 (for debugging).

If you check [When a message is remaining in the log, it is saved automatically to a file.], data will be overwritten to the online log every time a new message occurs.

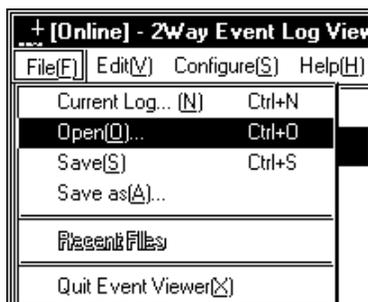
[Log Clear]

If you click this option, all contents of the online log will be deleted.

6.4.3 Switching Between Online and Offline Modes

Log Viewer is started in the online mode. If you open the previously saved log (*.2lg), it will be switched to the offline mode. New log messages occurred during the offline mode will remain in the online log.

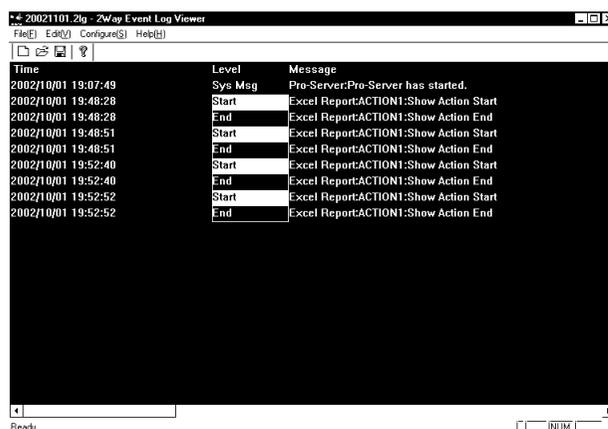
1. Select [File(F)]-[Open(O)] from the menu bar.



2. The [Open] dialog box appears. Designate [File name:], and then click [Open].



3. Log Viewer switches to the offline mode, and the selected log file (*.2lg) will be displayed. In the offline mode, the Log Viewer background becomes black.



To return to the online mode, select [File(F)]-[Current Log (N)] from the menu bar.

7 | Data View

This chapter describes data sampling/viewing tools, “GP-Viewer” and “Device View”.

- 7.1 Data View Overview
- 7.2 Device View
- 7.3 GP-Viewer
- 7.4 Checking the Data Sampling Status
- 7.5 System Time Bar

7.1 Data View Overview

The [Data View(D)] menu of the menu bar allows you to start the tool to display data saved on Pro-Server in various formats.

The following shows the overview of the display tool.

Device View

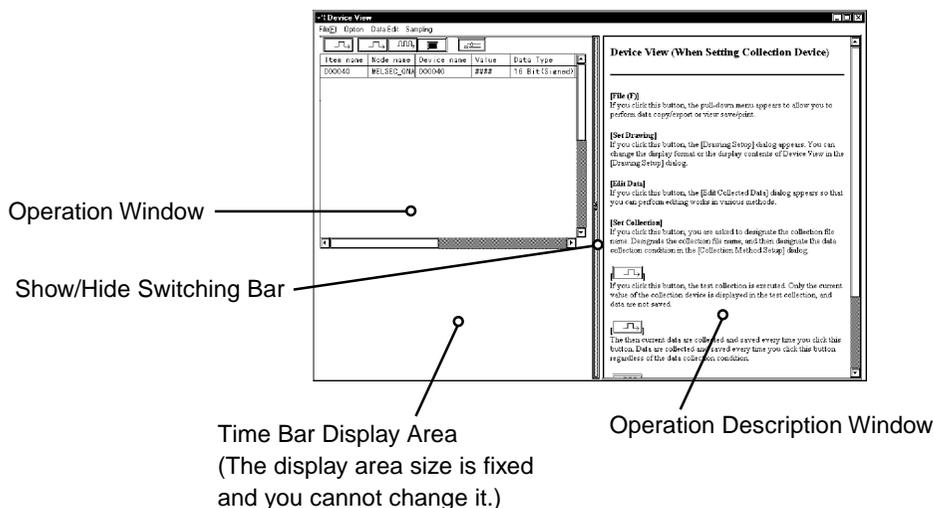
Device View allows you to sample data from devices connected to Ethernet to monitor the status or to playback saved device data on Device View.

GP-Viewer

GP-Viewer allows you to sample screen data from the GP system connected to Ethernet to display screen data or to playback saved GP data on GP-Viewer.

In addition to the above, you can also use the [Data Sampling Status] dialog showing the data sampling status on Pro-Server or the tool such as System Time Bar applicable to user created application software.

The frame structures of Device View, GP_Viewer and the [Data Sampling Status] dialog differ from other windows. The following shows the general view.



MEMO

You can only install the trial version of “GP-Viewer V1.1” from the “Pro-Server with Pro-Studio for Windows Ver.4.5” CD-ROM. When a trial version of the GP-Viewer software is used, the words “Trial Edition” will appear on the splash screen. All the program’s features, however, are the same as the official version.

Following four files are created by Device View.

- ***.#DV Sampled device information (text format)
- ***.#DB Sampling method information (text format)
- ***.#SR Sampled device optimal information (text format)
- ***.#DR Saved data (binary format)

MEMO

When using Data View, the database accessed, even if it is only temporarily, will be registered as a network project. If, during data polling the system should go down, once the system is restored, simply restarting Pro-Server will automatically restarts the data polling. (Polling data is saved in a file using the same file extension as a Network Project file - NPJ_DBs.)

When Pro-Server is started, the Network Project’s registered databases are read. As a result, if a large number of databases are registered, Pro-Server’s startup will be slowed, and can result in the use of a large amount of system resources. As a result, please be sure to delete any temporary databases that are no longer used from the Network Project’s registry. To do this, open Pro-Studio’s [DataView (D)] menu’s [Data Sampling Status] dialog box. Click on the unneeded database names and press your PC keyboard’s [Delete] key. Even though this deletes the database from the Network Project, the database itself is not deleted. If needed, the database file can be reopened by simply re-registering it in the Network Project.

7.2 Device View

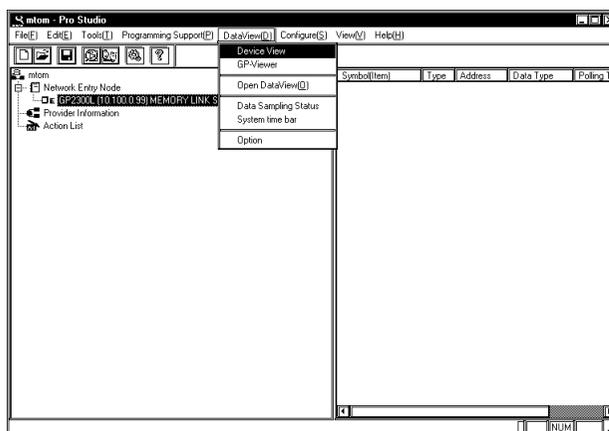
Device View allows you to sample data from devices connected to Ethernet to monitor the status or to playback saved device data on Device View.

You can also view non-sequential devices or devices of multiple entry nodes at one time.

7.2.1 Setting Sampling Target Device

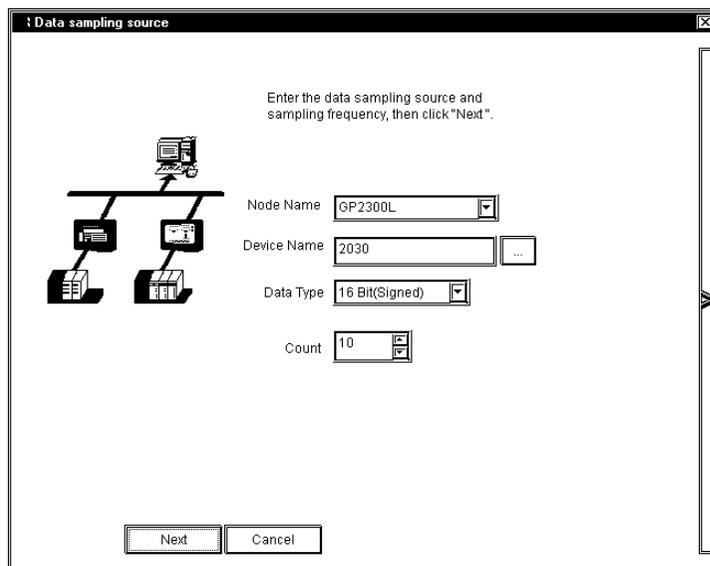
This section describes how to designate the device that you wish to sample data. After you completed the setup, you can monitor data of the target device.

1. After selecting the entry node that you wish to sample data, click [Device View] on the [Data View (D)] menu of the Menu Bar.



You can also right-click the entry node to select “Device View”.

- The [Data sampling source] window appears. After designating each item for the device that you wish to sample data, click [Next].



[Node Name]

Enter the node name to sample data. Node names registered in the network project file are displayed.

[Device Name]

Enter the device name to sample data. If you click [...], the symbol entry window appears.

[Device Type]

Designate the device model to sample data.

MEMO

Be sure to connect to the GP system since the communication process will start with the designated GP system when you click [OK].

[Append]

Use this button to append the device to sample data.

If you click this button, the [Append] dialog box (same as the [Data sampling source] dialog) will appear so that you can designate devices to append.

[Delete]

Use this button to delete lines.

Select lines to delete and then click [Delete].

[Upper], [Lower]

Use these buttons to change the order of lines.

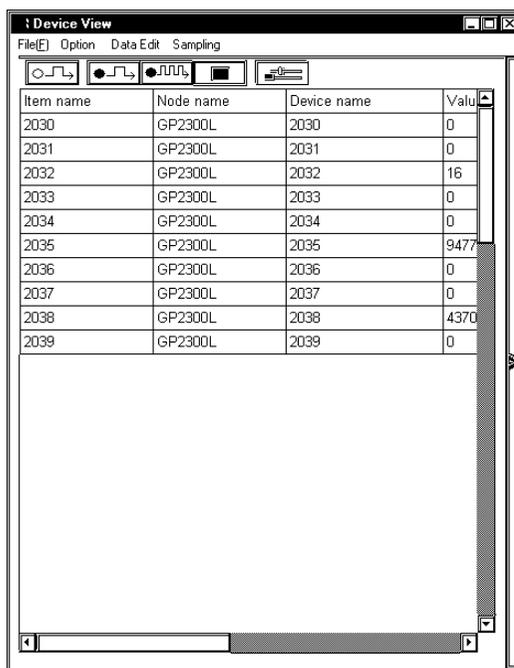
Select the line that you wish to change the order, and then click either [Upper] or [Lower].

If you designate Special Protocol symbols to [Device name] when you edit items directly in the [Data Input] dialog, the maximum number of read that you can input in the “Number of Data” field will be restricted to the contents of the table below.

Device Type to Access	Format	Maximum Number of Read
Bit Device	Bit	255
16 Bits Device	Bit	255
	16 bits	255
	32 bits	127
	Single precision floating point	127
	Double precision floating point	63
	Character string	510 (single byte)
32 Bits Device	16 bits	255
	32 bits	255
	Single precision floating point	255
	Double precision floating points	127
	Character string	510 (single byte)

If you designate values exceeding those maximum numbers, the warning dialog will appear.

4. The selected device data is displayed on Device View.



The screenshot shows a window titled "Device View" with a menu bar (File[F], Option, Data Edit, Sampling) and a toolbar with several icons. Below the toolbar is a table with four columns: Item name, Node name, Device name, and Value. The table contains 10 rows of data. Below the table is a large empty rectangular area, and at the bottom is a horizontal scrollbar.

Item name	Node name	Device name	Value
2030	GP2300L	2030	0
2031	GP2300L	2031	0
2032	GP2300L	2032	16
2033	GP2300L	2033	0
2034	GP2300L	2034	0
2035	GP2300L	2035	9477
2036	GP2300L	2036	0
2037	GP2300L	2037	0
2038	GP2300L	2038	4370
2039	GP2300L	2039	0

MEMO

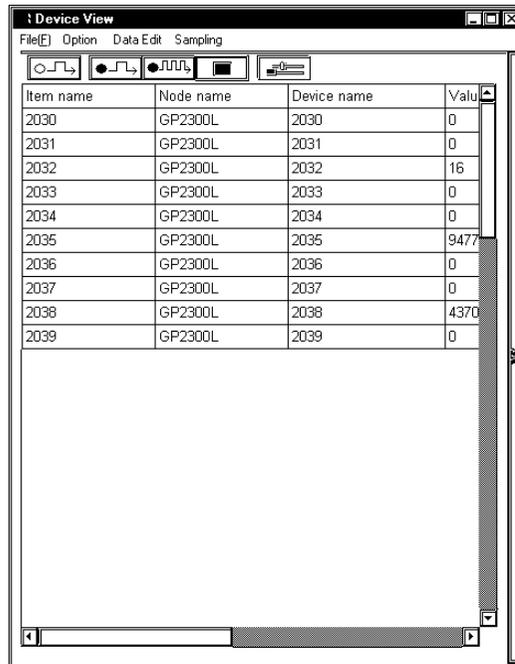
The contents here displayed on Device View are device data at the moment when you click [OK] in the procedure 3. This data is not updated.

7.2.2 Setting the Data Sampling Condition

This feature allows you to setup the data sampling condition from the sampling target device.

This section describes operations after you selected the sampling target device.

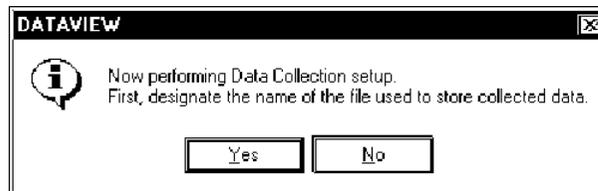
1. Click [Sampling] of Device View.



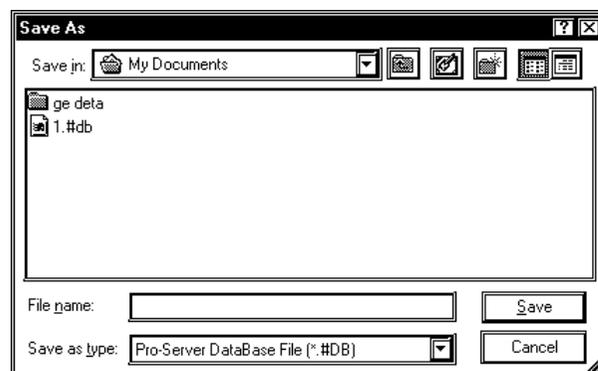
The screenshot shows the 'Device View' window with a menu bar (File[E], Option, Data Edit, Sampling) and a toolbar. Below the toolbar is a table with the following data:

Item name	Node name	Device name	Value
2030	GP2300L	2030	0
2031	GP2300L	2031	0
2032	GP2300L	2032	16
2033	GP2300L	2033	0
2034	GP2300L	2034	0
2035	GP2300L	2035	9477
2036	GP2300L	2036	0
2037	GP2300L	2037	0
2038	GP2300L	2038	4370
2039	GP2300L	2039	0

2. The following dialog appears. Click [Yes].



3. The [Save As] dialog appears, and you can create the file to save the sampled data. The file extension is (.DB). After you designated the file name, click [Save].



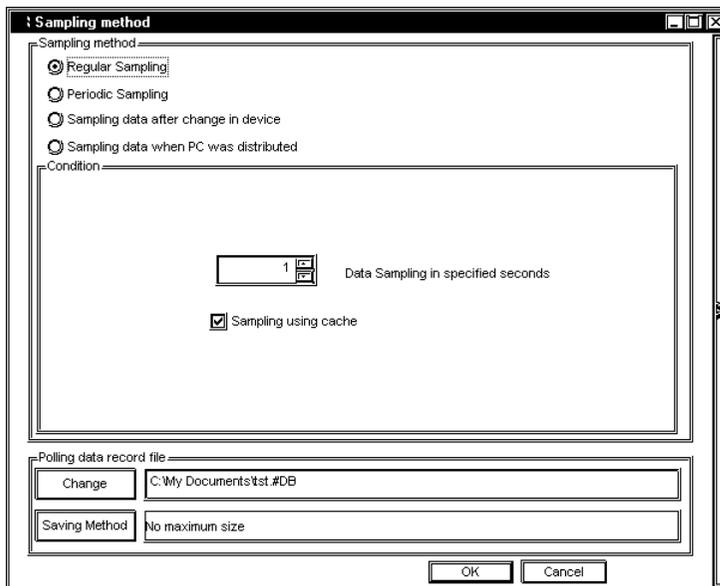
4. The [Sampling method] dialog appears.

Check the “Sampling method” that you wish to execute.

The contents of the “Condition” field differ depending on the “Sampling method” selected. You should perform the setting according to the contents displayed.

When You Selected “Regular Sampling” in “Sampling method” :

The setup contents are as the following. You should designate [Data sampling in specified seconds] and [Sampling using cache] in the “Condition” field.



[Data Sampling in specified seconds]

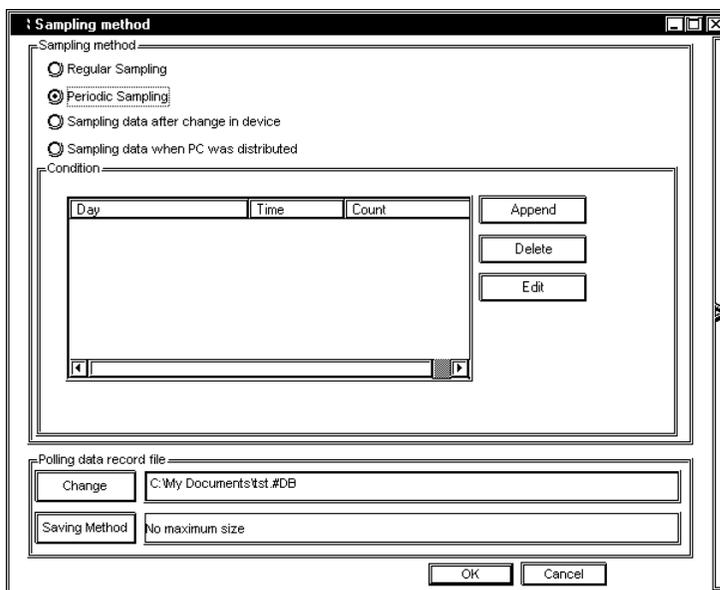
Designate the device data capturing interval in second. This is defaulted to “1 second”.

[Sampling using cache]

Check this box to use the cache to sample device data.

When You Selected “Periodic Sampling” in “Sampling method” :

The following settings are available. You should create the periodical sampling schedule using the [Append], the [Delete], and the [Edit] buttons in the “Condition” field.



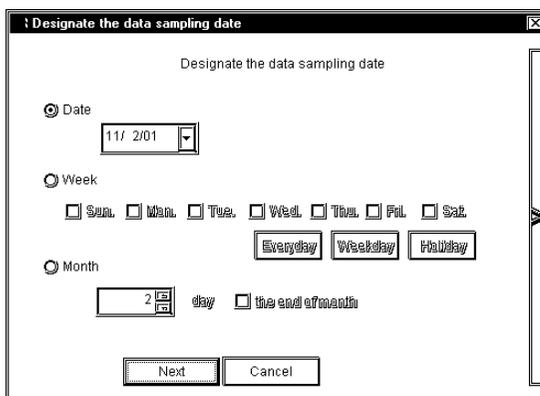
[Delete]

After selecting unnecessary schedules, click [Delete] to delete selected schedules.

[Append]

Click this button to create the new sampling schedule.

If you click the [Append] button, the [Designate the data sampling date] dialog appears. Designate each item in the [Designate the data sampling date] dialog, and then click [Next].



[Date]

Designate the date to sample device data. Device data are sampled on the day designated here.

[Week]

Designate a day of a week to sample device data. Check the day that you wish to sample device data. You can also click [Everyday] (Fri), [Weekday] (Mon, Tue, Wed, Thu, Fri) or [Holiday] (Sat, Sun) under the day check boxes.

[Month]

Designate a day of a month to sample device data. You can designate either a particular day (one day) or the last day every month. Device data are sampled on the day designated here every month.

If you click [Next], the [Designate the sampling time] dialog appears. Designate each item in the [Designate the sampling time] dialog, and then click [OK].

[Append] allows you to create the new sampling schedule and it will be displayed in the schedule field.

The screenshot shows a dialog box titled "Designate the sampling time". It has a close button in the top right corner. The dialog is divided into two main sections. The first section, "Start time", contains a text box with the label "Start time" and a time selection widget displaying "11:05:55 AM". The second section, "Sampling count", contains a checked checkbox labeled "One time only", a text box with the value "1", a dropdown menu set to "Hour", the word "repeat", another text box with the value "1", and the text "times every period". At the bottom of the dialog are three buttons: "Back", "OK", and "Cancel".

[Start Time]

Designate the time to start capturing device data. The sampling will start at the time designated here.

[Sampling count]

If you wish to sample device data once, check [One time only].

If you wish to repeat device data sampling, designate the sampling condition. You should designate the sampling interval and the number of sampling.

[Edit]

Click this button to change the contents of the selected schedule.

When You Selected “Sampling data after change in device” in “Sampling method”:

The contents of the “Condition” field are as the following. You should designate [Sampling Condition], [Interval Condition], and [Data sampling - from start to finish of data reception] in the “Condition” field.

[Sampling Condition]

Designate the timing to sample device data. You should designate the node name that you wish to perform a sampling, the target device name, the device model, and the device change condition.

[Interval Condition]

Designate intervals to check the device change and to sample data when the status changed.

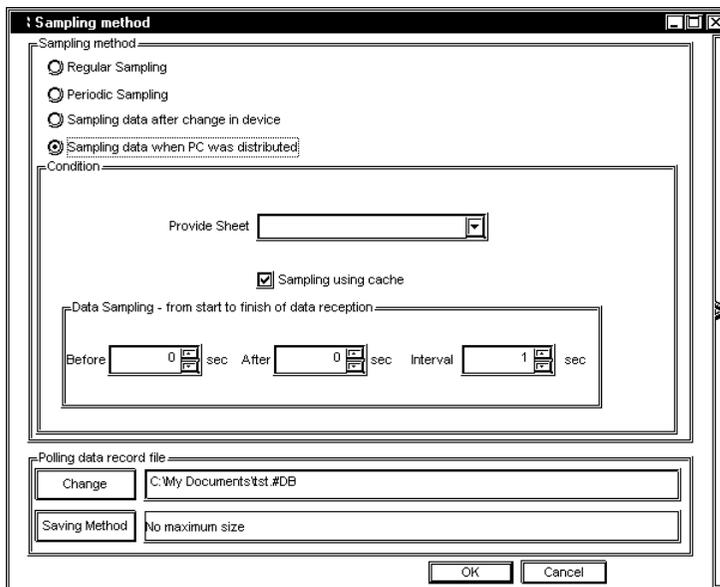
[Data sampling - from start to finish of data reception]

Designate the intervals to save data “before and after” the device change occurred and the sampling condition was satisfied. Intervals designated here should be longer than the sampling interval.

When You Selected “Sampling data when PC was distributed” in “Sampling method”:

Sampling is executed when PC where Pro-Server to sample data runs is distributed.

The contents of the “Condition” field are as the following.



[Provide Sheet]

If pre-defined Provider information setups exist, select it from the pull-down list.

Be sure to set the [Provide Information] interval to 1000ms or longer.

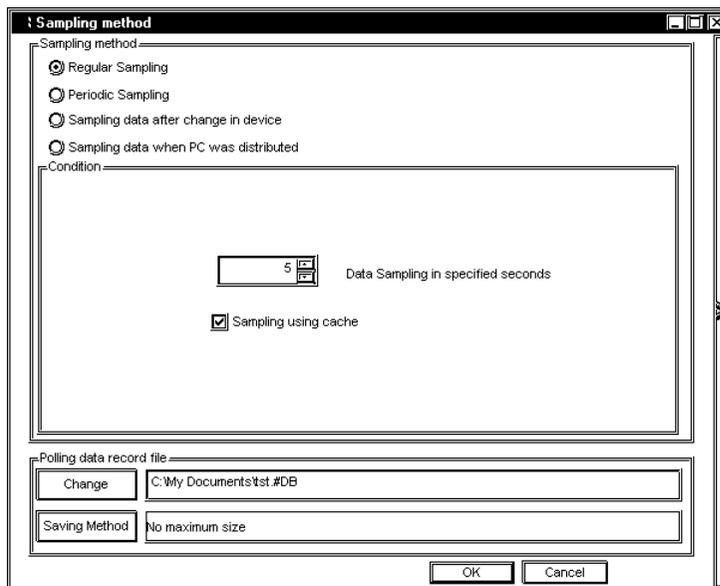
[Sampling using cache]

Check this box to use the cache to sample device data.

[Data Sampling – from start to finish of data reception]

Designate the sampling method “before and after” receiving the Provider information. You should designate sampling times “before” and “after” receiving (in second), and the sampling interval (in second).

5. Designate each item in the “Polling data file” field of the [Sampling method] dialog, and then click [OK].

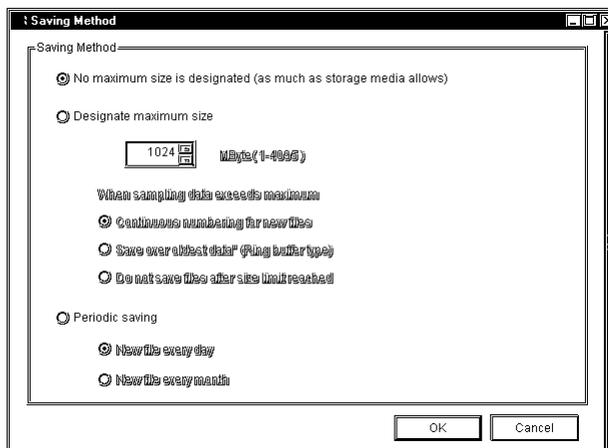


[Change]

Use this button to change the folder used to save sampled data.

[Saving Method]

If you click this button, the [Saving Method] dialog appears. Designate each item in the [Saving Method] dialog, and then click [OK].



[Designate the maximum size of data (file) to be stored]

Designate the folder to save sampled data. You should designate the total volume (size) of data to save among “No maximum size is designated (as much as storage media allows)”, “Designate maximum size” and “Periodic saving”.

If you selected “Designate maximum size”, you should also designate the maximum data size (in MByte) and the sampling method.

- Selecting “Continuous numbering for new files”

When the maximum allowed size is exceeded, the following new file is created:

```
****.[Sequence number]. #DT ABCD.0.#DT -> ABCD.1.#DT
```

- Selecting “Save over oldest data”

The oldest Polling data is overwritten when the maximum allowed size is exceeded.

- Selecting “Do not save files after size limit reached”

When the maximum allowed size is exceeded, Polling is stopped and an error message appears.

If you selected “Periodic saving”, you should also designate the interval to upload the files.

6. Execute the device data sampling.

If you wish to test the sampling, click  button. The sampling process starts and the contents are displayed on Device View. The sampled data are not saved at this time.

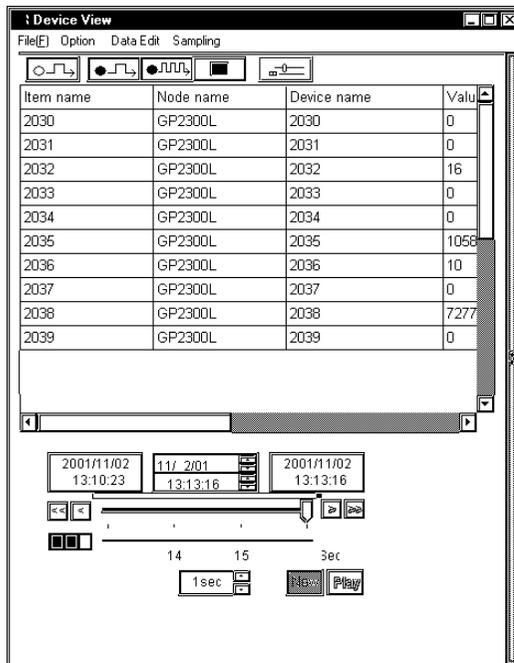
If you wish to sample data once, click  button. Data are sampled and saved every time you click the  button regardless of the designated data sampling condition. If you wish to sample data according to the designated data sampling condition, click the  button. The data “Sample & Save” is executed according to the data sampling condition, and the contents are displayed on Device View. The display contents are updated according to the data change.

When you start the device data sampling, various buttons for viewing sampled data are appended on Device View.

Refer to “7.2.5 Playback Feature” for the viewing method of sampled device data.

Reference → “7.2.5 Playback Feature”

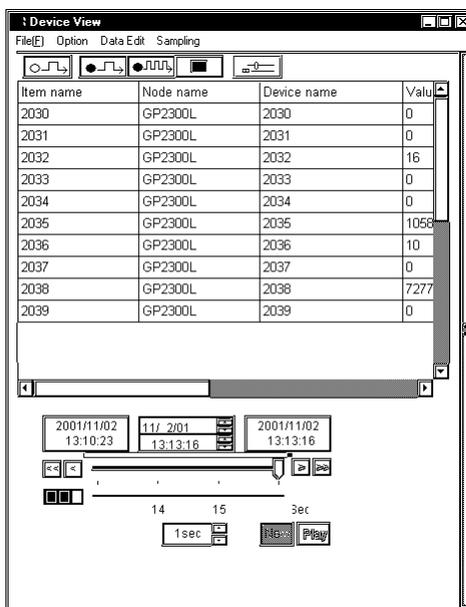
When gathering data, clicking the  icon, or selecting the [File | Show/Hide Time Bar] menu item allows you to set the Time Bar as “Show” or “Hide”. The System Time Bar is not displayed when [Device View] starts up. It is displayed, however, after “Sampling” operation is performed. Show/Hide status data is contained in the #DV file.



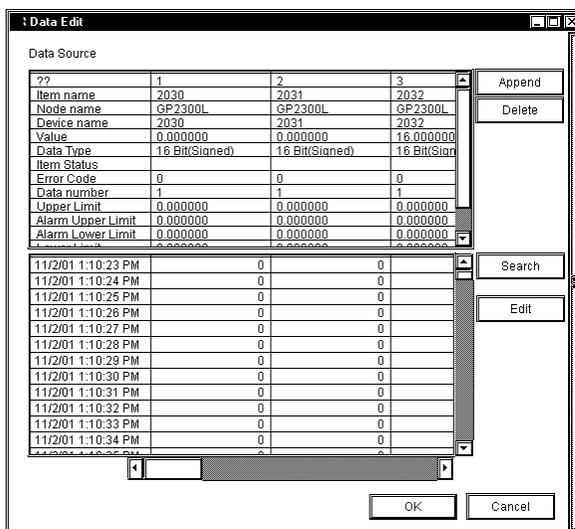
7.2.3 Editing Sampled Data

This feature allows you to edit saved device data.

1. Click [Data Edit] of Device View.



2. The [Data Edit] dialog appears. You can edit data in various methods. The following part describes the major operation method after the [Data Edit] dialog appeared.



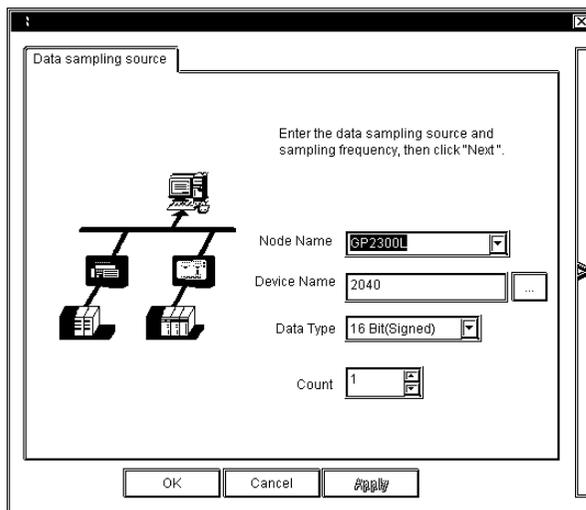
MEMO

Although you can start multiple Device View windows, you cannot edit data simultaneously.

Appending Sampled Data

1. Click [Append] of the [Data Edit] dialog.
2. The next dialog appears. Designate each item about the device that you wish to append, and then click [OK]. Items are equal to those in the [Data sampling source] dialog.

Reference → “7.2.1 Setting Sampling Target Device”



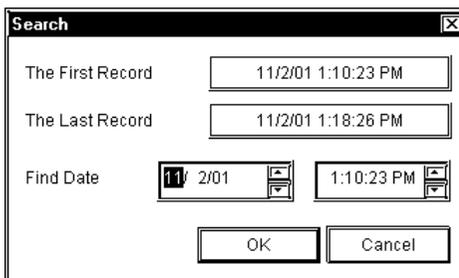
3. The device data that you wish to append are displayed in the [Data Edit] dialog.

Deleting Sampled Data

1. Select the data that you wish to delete in the [Data Edit] dialog.
2. Click [Delete]. The selected data will be deleted.

Searching Sampled Data

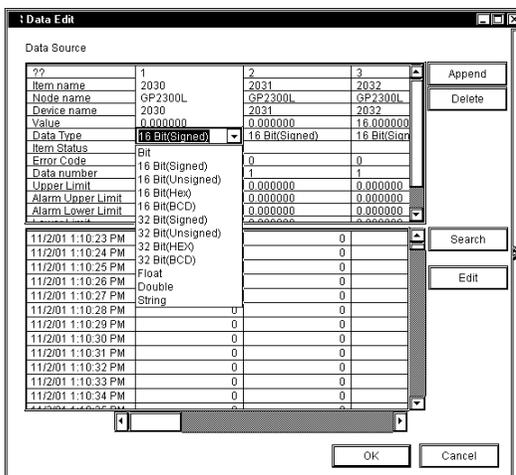
1. Click [Search] in the [Data Edit] dialog.
2. The [Search] dialog appears. Enter the date that you wish to search, and then click [OK].



3. The display contents are updated and data are displayed showing one closest to the date entered in the middle.

Editing Data Source

1. Click the data source field that you wish to edit. The column including the selected field is highlighted so that you can enter data from the keyboard in the selected field. The pull-down list may appear depending on the selected item.



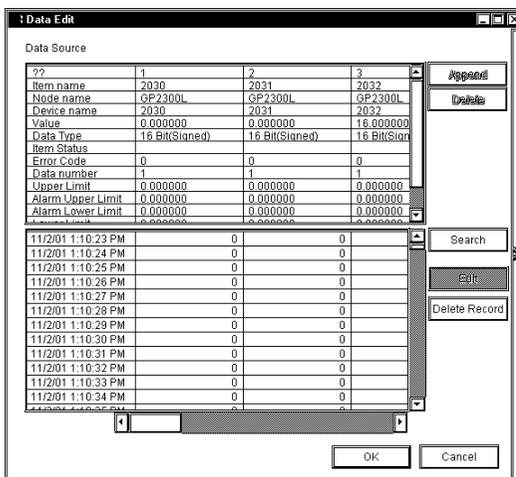
2. Enter the new contents from the keyboard. The contents of the selected field are updated.

MEMO

Data cannot be edited during Polling.

Editing Saved Data

1. Click [Edit] of the [Data Edit] dialog.
2. The [Edit] button in the [Data Edit] dialog is dimmed, and the [Delete Record] button appears.



3. Select the data that you wish to delete, and then click [Delete Record]. The selected data will be deleted.

MEMO

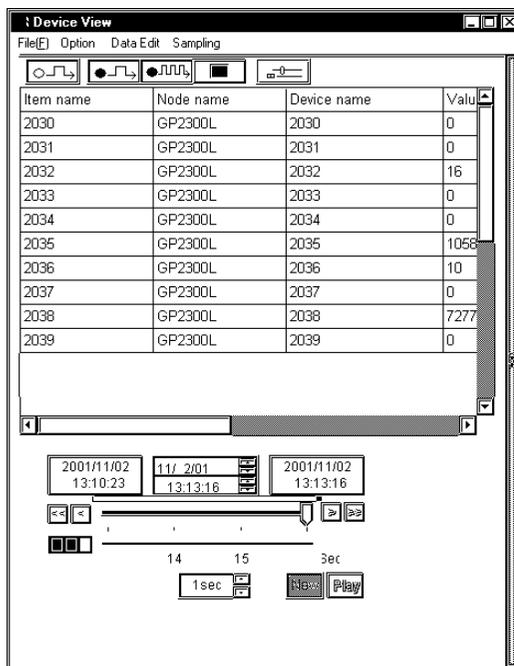
Click on [OK] to set the selections made in [Edit] and/or [Delete Record].

Click on [Cancel] to delete all current selections.

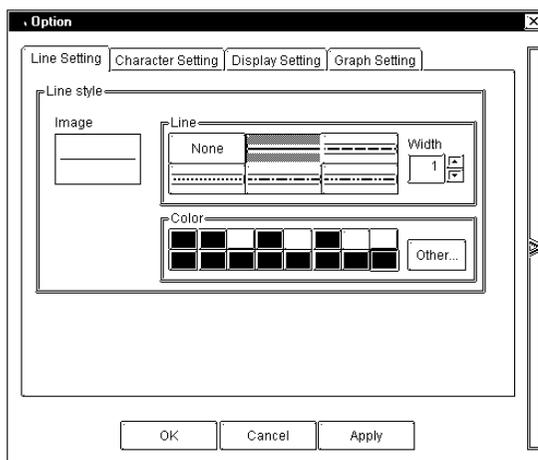
7.2.4 Option

This feature allows you to change the display format of the data display area in Device View.

1. Click [Option] of Device View.

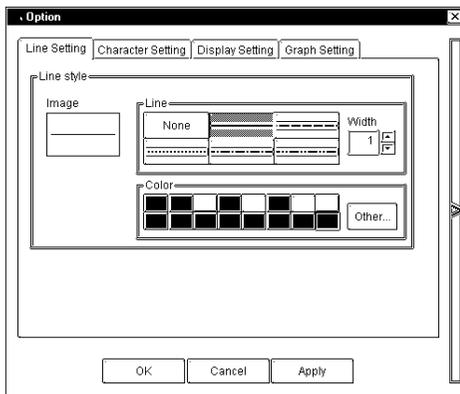


2. The [Option] dialog appears. You can change the display contents or format of the data display area in various methods. The following part describes the major operation method after the [Option] dialog appeared.



Setting a Line

1. Click the [Line setting] tab in the [Option] dialog.
2. Items on the [Line setting] tab appear. Designate each item in the [Line Style] field, and then click [OK].



[Line]

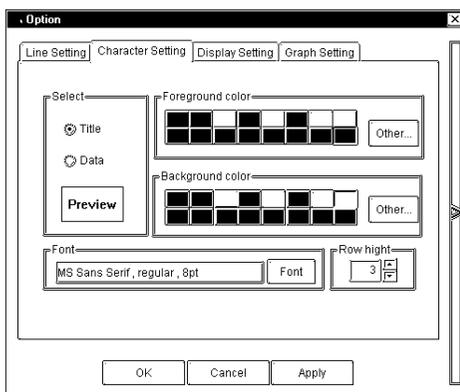
Select the ruled line that you wish to use among 6 styles. Also designate the thickness of the ruled line. The unit is point and it is defaulted to 1 point.

[Color]

Select the ruled line color among 16 colors. If you do not find one that you wish to use among those, click [Other]. The [Color Setup] dialog appears so that you can select or create the color that you wish to use.

Setting a Character

1. Click the [Character Setting] tab in the [Option] dialog.
2. Items on the [Character Setting] tab appear. Designate each item, and then click [OK].



[Select]

Select which texts you wish to change, “Title” texts on the top or “Data” texts.

[Foreground color]

Select the text color among 16 colors. If you do not find the color that you wish to use among those, click the [Other] button. The [Color Setup] dialog appears so that you can select or create the color that you wish to use.

[Background color]

Select the background color among 16 colors. If you do not find the color that you wish to use among those, click the [Other] button. The [Edit Color] dialog appears so that you can select or create the color that you wish to use.

[Font]

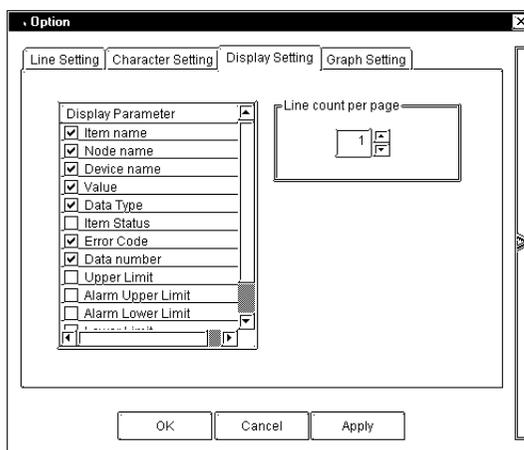
Select the font that you wish to use. Click [Font]. The [Font] dialog appears. Designate each item such as the “font to use”, the “font style”, the “font size” and the “type”, and then click [OK].

[Row height]

Designate the row height of the data display area. The unit is “point” and it is defaulted to 3 points.

Setting the Display Contents

1. Click the [Display Setting] tab in the [Option] dialog.
2. Items on the [Display Setting] tab appear. Designate each item, and then click [OK].



[Display Parameter]

Select parameters that you wish to display in the data display area. Check each item that you wish to display. The following describes the overview of each item.

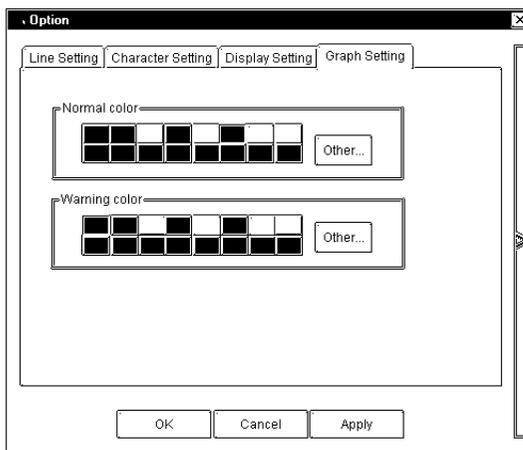
- | | |
|--------------------|---|
| Item name: | Designated symbol name. |
| Node name: | Designated node name. |
| Device name: | Designated device name. |
| Value: | The latest data. |
| Data Type: | Designated device data type. |
| Item Status: | (reserved) |
| Error Code: | Error code when an error occurred in sampling. (normally 0) |
| Data number: | (reserved) |
| Upper Limit: | The upper limit value to display the graph. (Even if you designate a greater value than this, the graph remains in the 100% status.) |
| Alarm Upper Limit: | The alarm upper limit value to display the graph. (including this value) |
| Alarm Lower Limit: | The alarm lower limit value to display the graph. (including this value) |
| Lower Limit: | The lower limit value to display the graph. (If you designate a less value than this, the graph will not be displayed.) |
| Graph: | The horizontal bar graph is displayed according to values of “Upper Limit”, “Alarm Upper Limit”, “Alarm Lower Limit” and “Lower Limit”. |

[Line count per page]

Designate the number of data lines per page that you wish to display in the data display area. If the actual number of data exceeds the number of data per page, the [Previous] and the [Next] buttons are displayed in the left and the right sides under the data display area respectively. You can switch pages using these buttons.

Setting the Graph Color

1. Click [Graph Setting] tab in the [Option] dialog.
2. Items in the [Graph Setting] tab appear. Designate each item, and then click [OK].



[Normal color]

Select the normal graph color among 16 colors. If you do not find the color that you wish to use among those, click the [Other] button. The [Color Setup] dialog appears so that you can select or create the color that you wish to use.

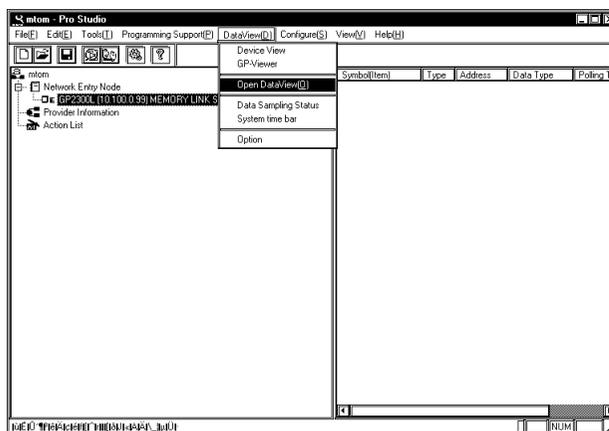
[Warning color]

Select the warning graph color among 16 colors. If you do not find the color that you wish to use among those, click the [Other] button. The [Edit Color] dialog appears so that you can select or create the color that you wish to use.

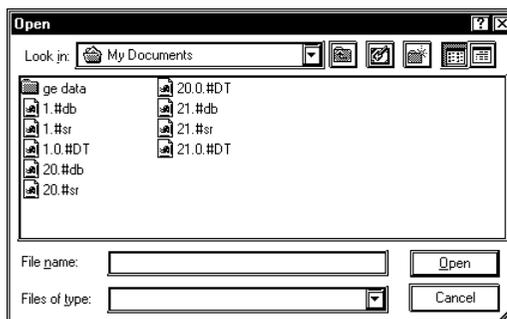
7.2.5 Playback Feature

This feature allows you to playback sampled device data on Device View.

1. Select [Open Data View (O)] on [Data View (D)] of the menu bar.



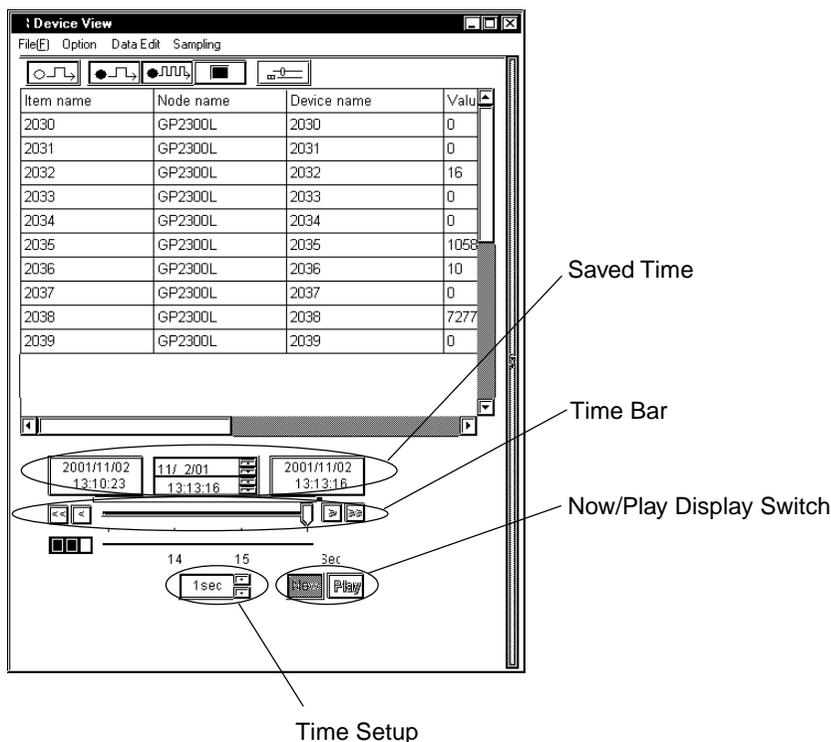
2. The [Open] dialog appears. Select the device data (.#DV) that you wish to playback, and then click [Open].



MEMO

You can also playback data in the saving process.

3. The contents of device data that you wish to playback are displayed on Device View. You can playback device data using various buttons on Device View.



[Saved Time]

This field shows the saved time of the saved device data.

The field shows, from the left, the saving start time, the time for currently displayed data and the last saved time. When the current status is displayed, the time for currently displayed data is identical to the last saved time.

[Time Bar]

Saved data can be displayed by sliding the time bar control to either side. The data saving process continues even while you operate the control.

[Time Setup]

You can designate the time unit for one graduation of the time bar.

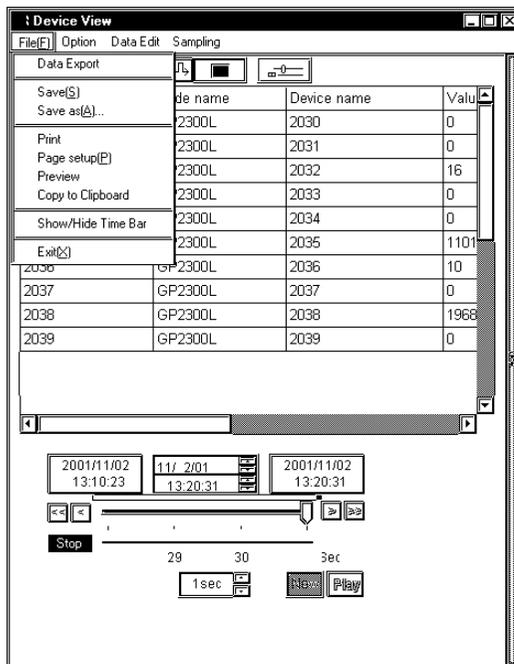
[Now/Play Display Switch]

[Now] and [Play] buttons are available. You can playback the saved data from the designated time either by sliding the time bar control to the time that you wish to start the playback or by clicking the [Play] button after clicking the time for currently displayed data (the center field of [Saved Time]) and then entering the time to start the playback.

7.2.6 Other Features

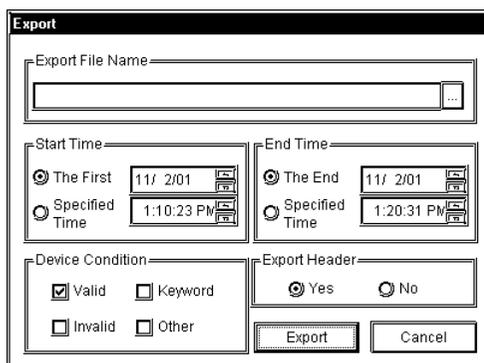
This section describes the File menu and options of Device View.

1. If you click [File (E)] of Device View, 9 options are available. The following describes the overview of each option.



Exporting Data

1. Select [Data Export] on the [File(E)] menu.
2. The [Export] dialog appears. Designate each item, and then click [Export].



[Export File Name]

Designate the location and the file name to save exported data. The file extension is (.CSV).

[Start Time]

Designate the time to start exporting data. To export Polling data immediately, click on the [The First] checkbox. To export Polling data after a specific period of time elapses, click on the [Specified Time] checkbox. If you checked “Specified Time”, you should also designate the start time to export.

[End Time]

Designate the time to end exporting data. To wait until all data is polled before exporting, click on the [The End] checkbox. To export Polling data after a specific period of time elapses, click on the [Specified Time] checkbox. If you checked “Specified Time”, you should also designate the end time to export.

[Device Condition]

This is the reserved data. You should not change the designated value.

[Export Header]

If you wish to include the header information in exported data, check “Yes”. If not, check “No”.

[Export]

Executes the data export.

[Cancel]

The process is stopped and goes back to Device View.

MEMO

- Although you can start multiple Device View programs, you cannot export data simultaneously.
- Data can be exported during Polling. However, if the [Designate maximum size/Save over oldest data] selection is used, data export cannot be performed.

Saving Data

1. If you wish to save displayed data on Device View, click [Save (S)] on the [File (E)] menu.

Data are overwritten.

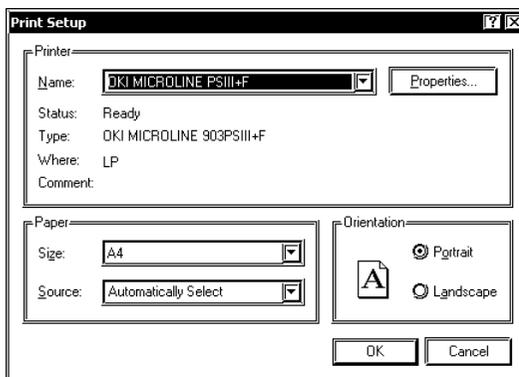
If you wish to save displayed data on Device View as a separate file name, click [Save As (A)] on the [File (E)] menu. The [Save As] dialog appears. Enter the file name, and then click [Save].

Print

1. Click [Print] on the [File (E)] menu. The printing process is executed.

Page Setup

1. Click [Page setup(P)] on the [File (E)] menu.
2. The [Print Setup] dialog appears. Designate each item, and then click [OK].



MEMO

The contents of the [Page setup] dialog differ depending on your printer. Refer to the user manual of your printer for details.

Preview

1. Click [Preview] on the [File (E)] menu.
2. The print preview appears.

Copy to Clipboard

1. Click [Copy to Clipboard] on the [File (E)] menu.
2. The data value displayed on Device View is copied into the clipboard.
3. Paste the data value onto the application used.

MEMO

You can only copy data in the data display area of Device View into the clipboard. You cannot copy data such as a title.

Show / Hide Time Bar

1. Clicking [File | Show/Hide Time Bar] enables setting the System Time Bar to “Show” or “Hide” mode.

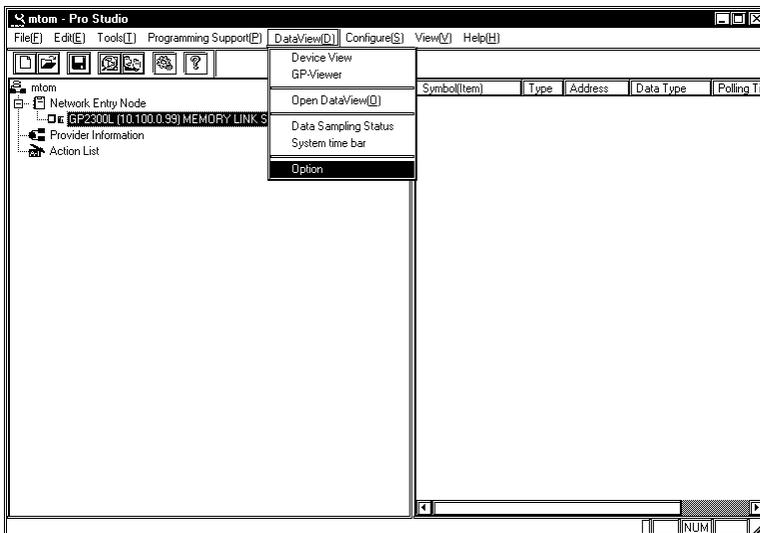
Exit

1. Click [Exit(X)] on the [File (E)] menu. Exits Device View.

Option

This is selected on [Data View (D)] of the menu bar.

1. Select [Option] on [Data View (D)] of the menu bar.

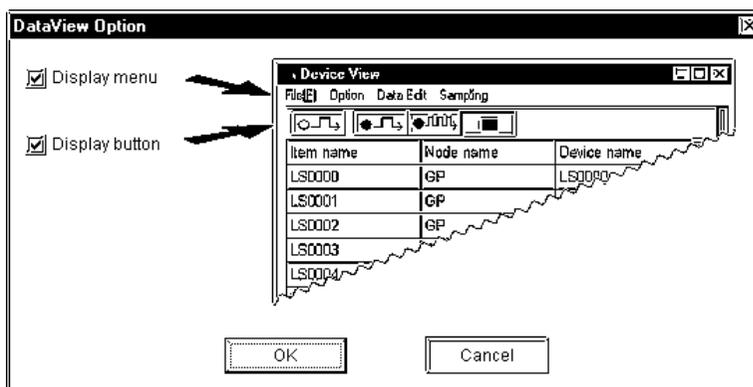


2. The [Data View Options] dialog appears.

You can select “Show/Hide” of the setup menu and the save button.

If you uncheck “Display menu”, the [Option], the [Data Edit], and the [Sampling] menus are hidden on Device View.

If you uncheck “Display button” four icons (a square wave, a sine wave, a square wave with a dot, and a square wave with a vertical line) are hidden on Device View.



7.3 GP-Viewer

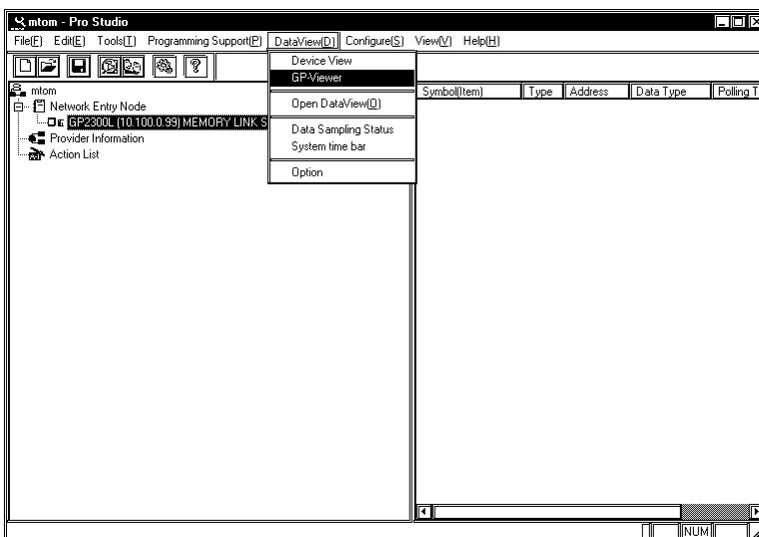
GP-Viewer allows you to sample screen data from the GP system connected to Ethernet to display screen data or to playback saved GP data on GP-Viewer.

If you install Pro-Server V4.5 while GP-Viewer V1.0 remains on PC, a problem will occur when you reinstall GP-Viewer. Be sure to install Pro-Server V4.5 after uninstalling GP-Viewer V1.0 and Pro-Server with Pro-Studio of any older versions.

7.3.1 Starting GP-Viewer

When you start GP-Viewer, screens on the GP system are displayed on the GP-Viewer browser in real time.

1. After selecting the entry node to use GP-Viewer, select [GP-Viewer] on [Data View (D)] of the menu bar.



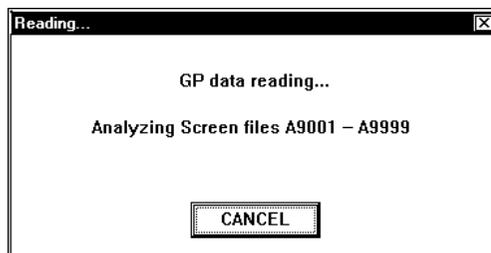
MEMO

- You should make sure to connect to the GP system because the communication process will start when you click [GP-Viewer].
- You can upload the connected GP screen on GP77R SERIES, however, the GP system is reset once. If your model does not support the online uploading function, the warning window appears.
- If the password protection has been set to the GP screen, the password entry dialog appears.

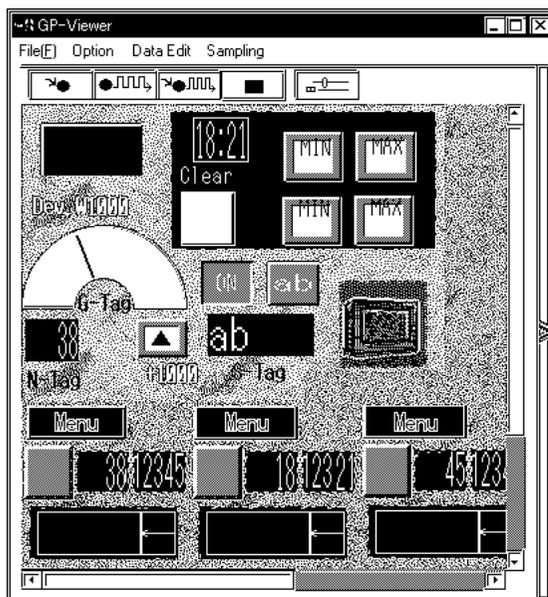
MEMO

- The GP-Viewer screen refresh period is set via Pro-Studio's -> [Configure] -> [System] -> [DDE Polling Time] dialog box (Default: 1000ms). If the GP-Viewer's screen refresh time becomes too slow, increasing the [DDE Polling Time] value will speed it up.

2. While the upload process from the GP system is running, the following dialog appears. The dialog will disappear when the upload process is completed.



3. The selected GP screen data are displayed on GP-Viewer.

**MEMO**

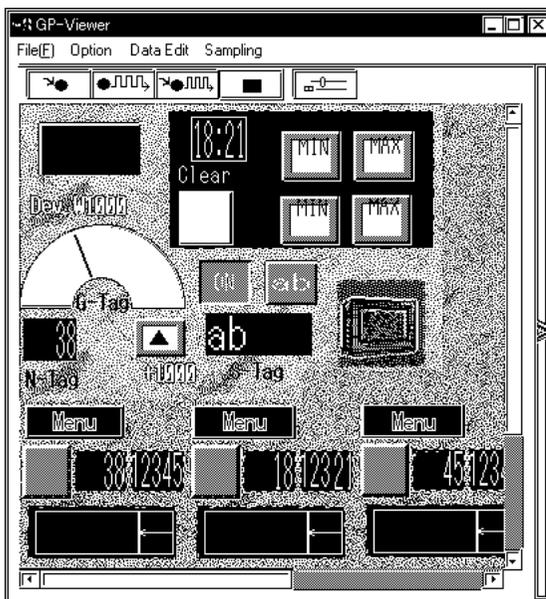
- Data have been monitored but not been saved at this stage.
- If the selected GP's screen size is smaller than the GP-Viewer's default window size, a portion of the GP-Viewer window may be blank. (GP2300, etc.)

7.3.2 Setting the Data Sampling Condition

This feature allows you to set the data sampling condition from the target device.

The following part describes the procedure after GP-Viewer is started.

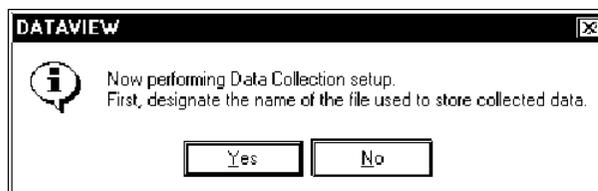
1. Click [Sampling] of GP-Viewer.



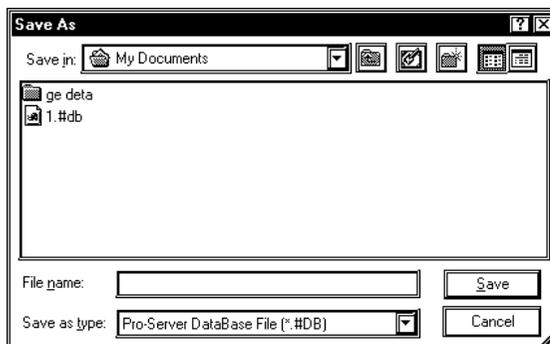
MEMO

If the selected GP's screen size is smaller than the GP-Viewer's default window size, a portion of the GP-Viewer window may be blank. (GP2300, etc.)

2. The next dialog appears. Click [Yes].



3. The [Save As] dialog appears so that you can create the file to save sampled data. The file extension is (.DB). Designate the file name, and then click [Save].



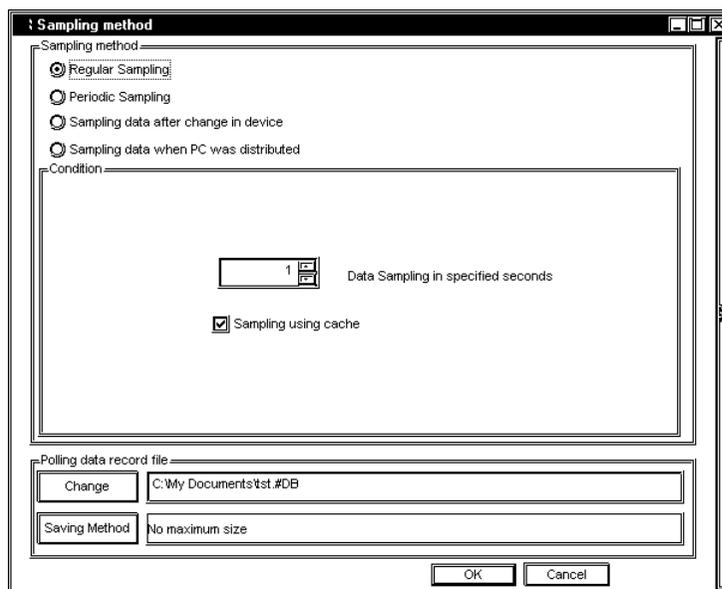
4. The [Sampling method] dialog appears.

Check the desired “Sampling Method”.

The contents of the “Condition” field differ depending on the “Sampling method” selected. You should perform the setting according to the contents displayed.

When You Selected “Regular Sampling” on “Sampling method”:

The setup contents are as the following. You should designate [Data Sampling in specified seconds] and [Sampling using cache] in the “Condition” field.



[Data Sampling in specified seconds]

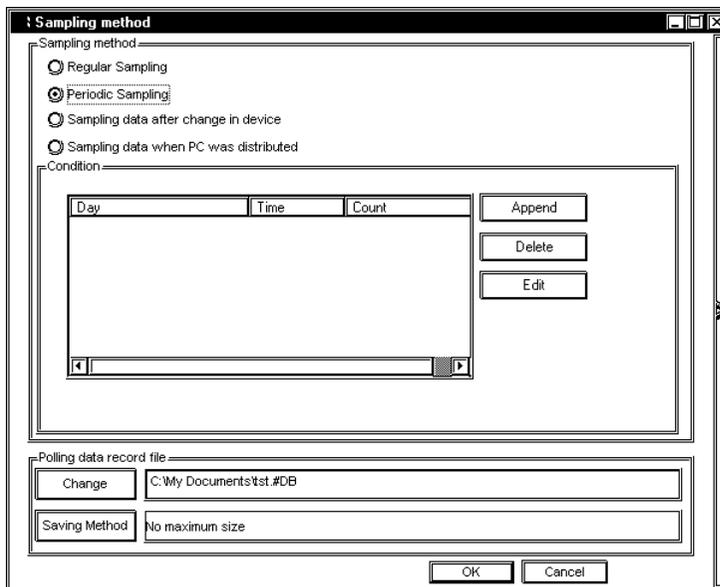
Designate the device data capturing interval in second. This is defaulted to “1 second”.

[Sampling using cache]

Check this box to use the cache to sample device data.

When You Selected “Periodic Sampling” in “Sampling method” :

The setup contents are as the following. You should create the periodical sampling schedule using the [Append], the [Delete], and the [Edit] buttons in the “Condition” field.



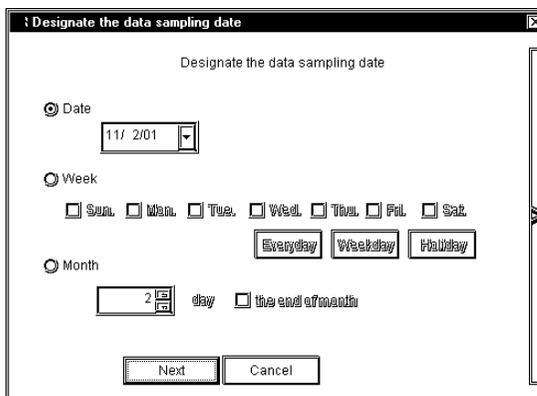
[Delete]

After selecting unnecessary schedules, click [Delete] to delete selected schedules.

[Append], [Edit]

Click these buttons to append or to edit the sampling schedule.

If you click either the [Append] button, the [Designate the data sampling date] dialog appears. Designate each item in the [Designate the data sampling date] dialog, and then click [Next].



[Date]

Designate the date to sample device data. Device data are sampled on the day designated here.

[Week]

Designate a day of a week to sample device data. Check the day that you wish to sample device data. You can also click [Everyday] (Fri), [Weekday] (Mon, Tue, Wed, Thu, Fri) or [Weekend] (Sat, Sun) under the day check boxes.

[Month]

Designate a day of a month to sample device data. You can designate either a particular day (one day) or the last day every month. Device data are sampled on the day designated here every month.

If you click [Next], the [Designate the sampling time] dialog appears. Designate each item in the [Designate the sampling time] dialog, and then click [OK].

[Append] allows you to create the new sampling schedule and it will be displayed in the schedule field.

[Edit] allows you to change the contents of the selected schedule.

[Start Time]

Designate the time to start capturing device data. The sampling will start at the time designated here.

[Sampling count]

If you wish to sample device data once, check [One time only].

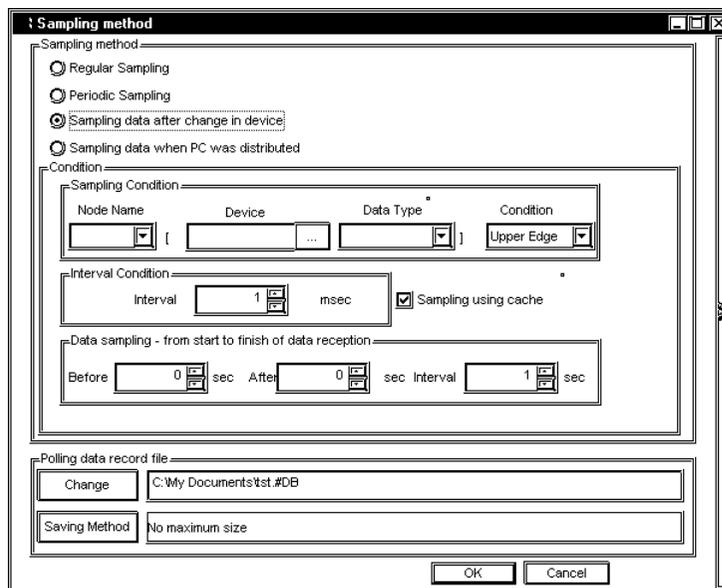
If you wish to repeat device data sampling, designate the sampling condition. You should designate the sampling interval and the number of sampling.

[Edit]

Click this button to change the contents of the selected schedule.

When You Selected “Sampling data after change in device” in “Sampling method” :

The contents of the “Condition” field are as the following. You should designate [Sampling Condition], [Interval Condition], and [Data sampling - from start to finish of data reception] in the “Condition” field.



[Sampling Condition]

Designate the timing to sample device data. You should designate the node name that you wish to perform a sampling, the target device name, the device model, and the device change condition.

[Interval Condition]

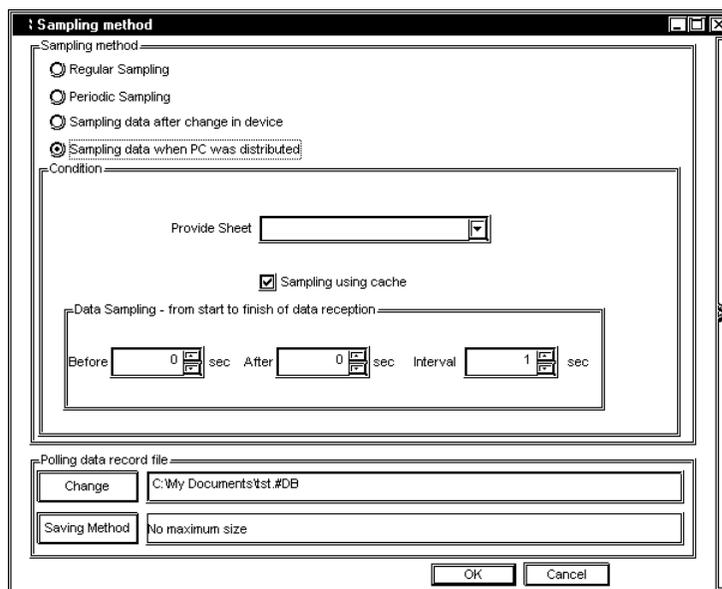
Designate intervals to check the device change and to sample data when the status changed.

[Data sampling - from start to finish of data reception]

Designate the intervals to save data “before and after” the device change occurred and the sampling condition was satisfied. Intervals designated here should be longer than the sampling interval.

When You Selected “Sampling data when PC was distributed” in “Sampling method” :

The contents of the “Condition” field are as the following. You should enter the Provider information setup name in [Provide Sheet] of the “Condition” field, and then click [Provider Data Registration] to designate the new Provider information setup. If you have already designated Provider information setups, you can select it from the pull-down list.



[Provide Sheet]

If pre-defined Provider information setups exist, select it from the pull-down list. If it does not exist, you should enter the name.

Be sure to set the [Provide Information] interval to 1000ms or longer.

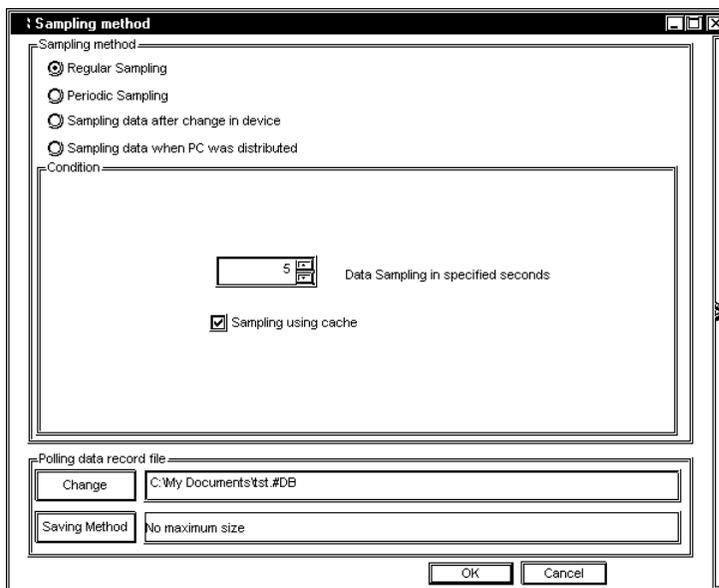
[Sampling using cache]

Check this box to use the cache to sample device data.

[Data sampling - from start to finish of data reception]

Designate the sampling method “before and after” receiving the Provider information. You should designate sampling times “before” and “after” receiving (in second), and the sampling interval (in second).

5. Designate each item in the “Polling data file” field of the [Sampling method] dialog, and then click [OK].

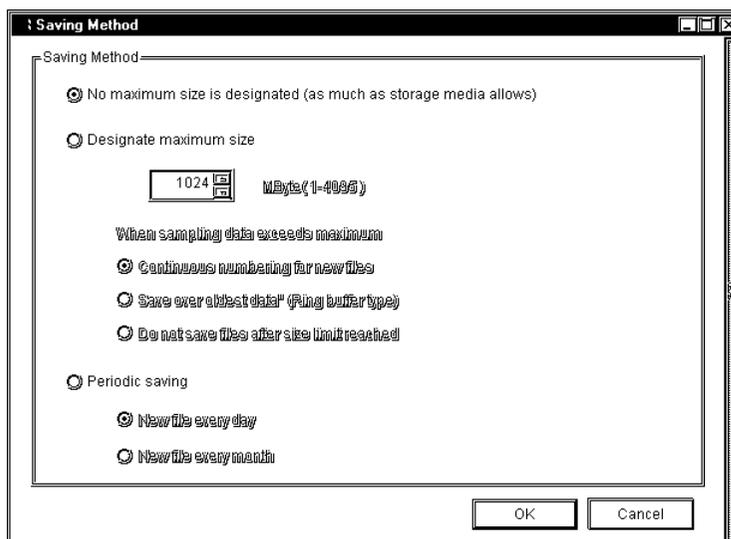


[Change]

Use this button to change the folder to save sampled data.

[Saving Method]

If you click this button, the [Saving Method] dialog appears. Designate each item in the [Saving Method] dialog, and then click [OK].



[Designate the maximum size of data (file) to be stored]

Designate the folder to save sampled data. You should designate the total volume (size) of data to save among “No maximum size is designated (as much as storage media allows)”, “Designate maximum size” and “Periodic saving”.

If you selected “Designate maximum size”, you should also designate the maximum data size (in MByte) and the sampling method.

- Selecting “Continuous numbering for new files”

When the maximum allowed size is exceeded, the following new file is created:

****.[Sequence number]. #DT ABCD.0.#DT -> ABCD.1.#DT

- Selecting “Save over oldest data”

The oldest Polling data is overwritten when the maximum allowed size is exceeded.

- Selecting “Do not save files after size limit reached”

When the maximum allowed size is exceeded, Polling is stopped and an error message appears.

If you selected “Periodic saving”, you should also designate the interval to upload the files.

6. Execute the device data sampling.

To perform sampling registration for GP display screens, click the  button.

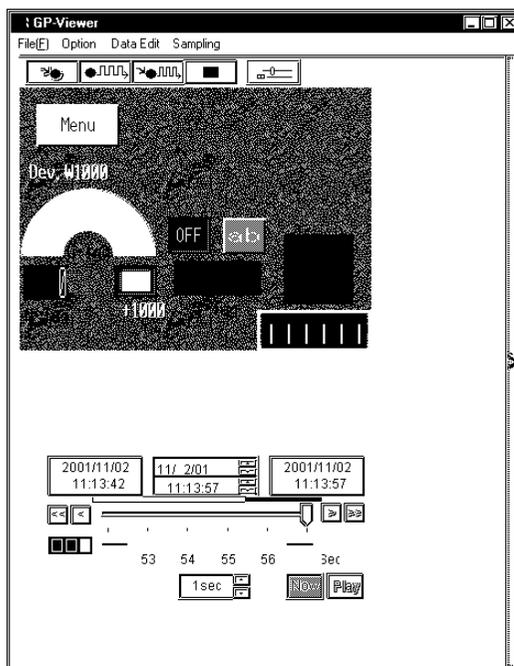
To poll sample registered device data, click the  button.

If you wish to sample data according to the designated data sampling condition, click the  button. The data “Sample & Save” is executed according to the data sampling condition, and the contents are displayed on GP-Viewer. The display contents are updated according to the data change. When you start the device data sampling, various buttons for viewing sampled data are appended on GP-Viewer.

Refer to “7.3.5 Playback Feature” for the viewing method of sampled device data.

Reference → “7.3.5 Playback Feature”

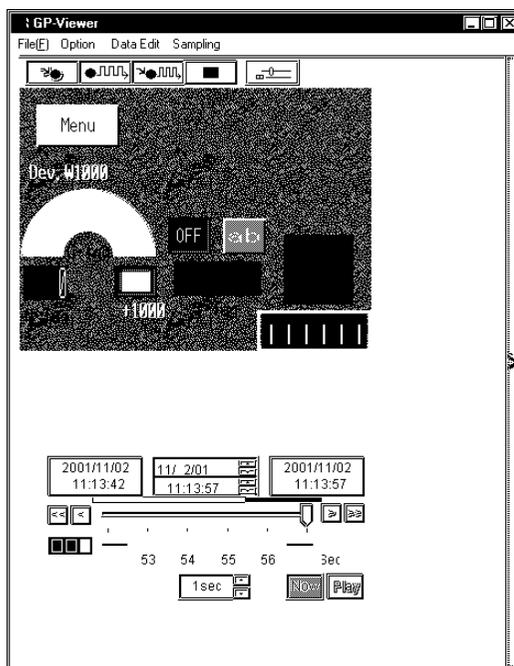
When gathering data, clicking the  icon, or selecting the [File | Show/Hide Time Bar] menu item allows you to set the Time Bar as “Show” or “Hide”. The System Time Bar is not displayed when [GP-Viewer] starts up. It is displayed, however, after “Sampling” operation is performed. Show/Hide status data is contained in the #DV file.



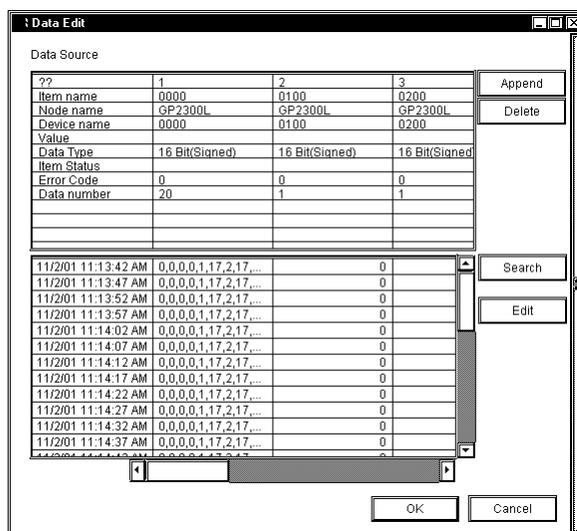
7.3.3 Editing Sampled Data

This feature allows you to edit sampled device data.

1. Click [Data Edit] of GP-Viewer.



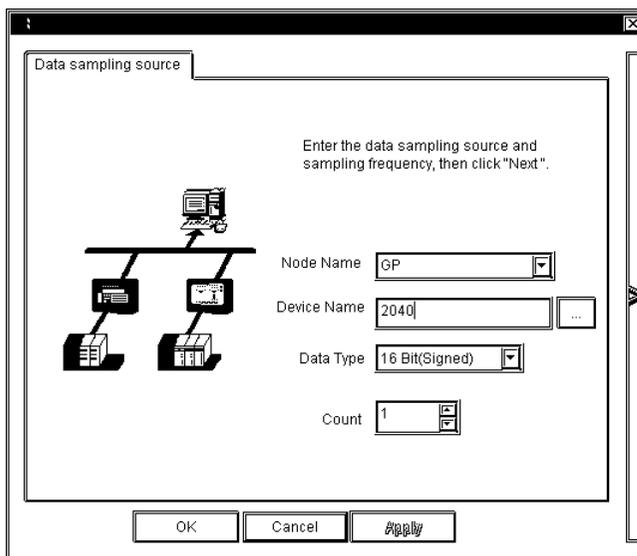
2. The [Data Edit] dialog appears. You can edit data in various methods. The following part describes the major operation method after the [Data Edit] dialog appeared.



Appending Sampled Data

1. Click [Append] of the [Data Edit] dialog.
2. The next dialog appears. Designate each item about the device that you wish to append, and then click [OK]. Items are equal to those in the [Data sampling source] dialog.

Reference → “7.2.1 Setting Sampling Target Device”



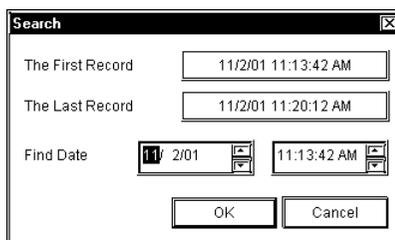
3. The device data that you wish to append are displayed in the [Data Edit] dialog.

Deleting Sampled Data

1. Select the data that you wish to delete in the [Data Edit] dialog.
2. Click [Delete]. The selected data will be deleted.

Searching Sampled Data

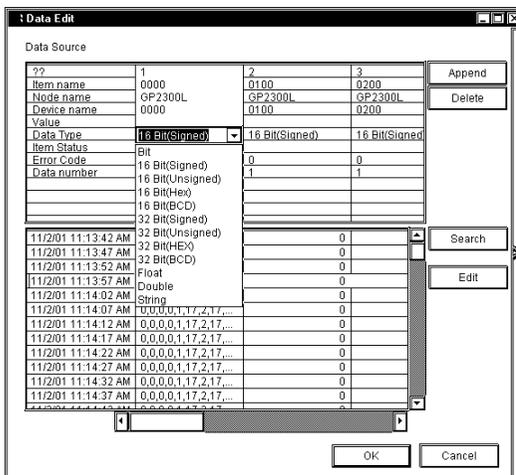
1. Click [Search] in the [Data Edit] dialog.
2. The [Search] dialog appears. Enter the date that you wish to search, and then click [OK].



3. The display contents are updated and data are displayed showing one closest to the date entered in the middle.

Editing Data Source

1. Click the data source field that you wish to edit. The column including the selected field is highlighted so that you can enter data from the keyboard in the selected field. The pull-down list may appear depending on the selected item.



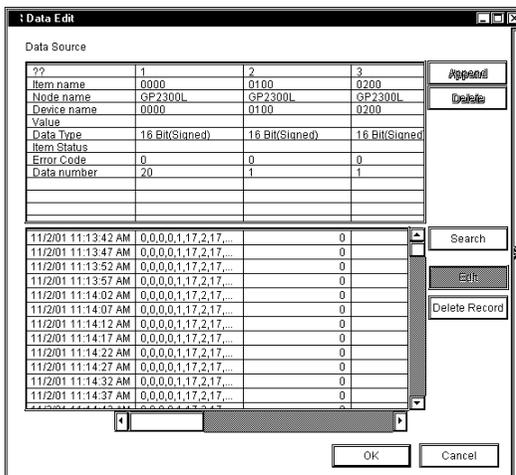
2. Enter the new contents from the keyboard. The contents of the selected field are updated.

MEMO

Data cannot be edited during Polling.

Editing Saved Data

1. Click [Edit] of the [Data Edit] dialog.
2. The [Edit] button in the [Data Edit] dialog is highlighted, and the [Delete Record] button appears.



3. Select the data that you wish to delete, and then click [Delete Record]. The selected data will be deleted.

MEMO

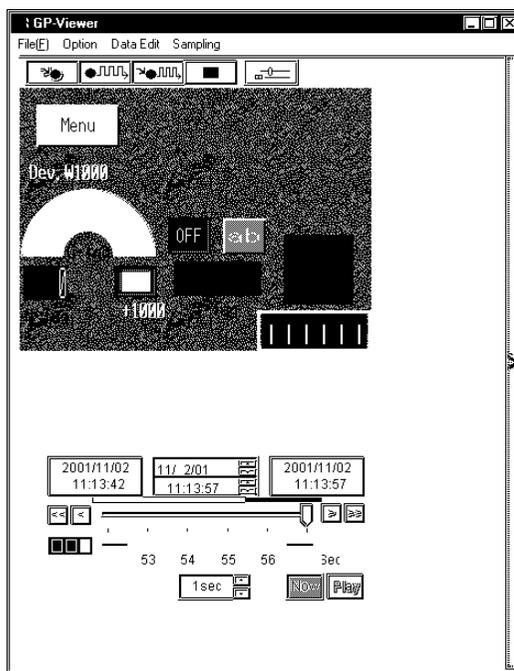
Click on [OK] to set the selections made in [Edit] and/or [Delete Record].

Click on [Cancel] to delete all current selections.

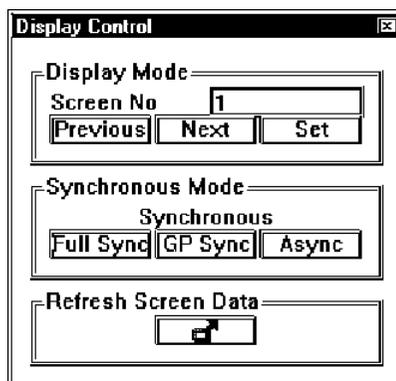
7.3.4 Setting Drawing

This feature allows you to change the display format of the data display area in GP-Viewer.

1. Click [Option] of GP-Viewer.



2. The [Wizard] dialog appears. Perform required settings, and then click [Option] of GP-Viewer to close the dialog.



[Synchronous Mode]

You can designate the synchronization style between GP screens and GP-Viewer. There are 3 synchronous modes available, Full Synchronous, GP Synchronous and Asynchronous. The following describes the detail of each style.

Asynchronous (Async)	Screens can be switched on GP-Viewer. Switching a screen on GP-Viewer does not synchronize with a screen on the GP system.
GP Synchronous (GP Sync)	Screens cannot be switched on GP-Viewer. Switching a screen on the GP system synchronizes with a screen on GP-Viewer. (This is the default setting.)
Full Synchronous (Full Sync)	Screens can be switched on GP-Viewer. Switching a screen on GP-Viewer synchronizes with a screen on the GP system and vice versa.

[Screen No]

This feature allows you to change the displayed screen of GP-Viewer according to screen numbers pre-defined on the GP system.

If you click [Previous], the previous screen from the currently displayed screen is displayed and the value in the “Screen No” field is decreased by one.

If you click [Next], the next screen from the currently displayed screen is displayed and the value in the “Screen No” field is increased by one.

If you enter the screen number that you wish to display in the “Screen No” field and click [Set], the corresponding screen to the number entered is displayed.

MEMO

- The screen switching feature of GP-Viewer is effective only when the synchronous mode is either “Asynchronous” or “Full Synchronous”.
- You cannot normally switch screens by GP-Viewer from upper-level PCs. You should set the bit “4” of GP’s LS2076 to “ON (1)” to switch screens in the “Full Synchronous” mode from upper-level PCs.

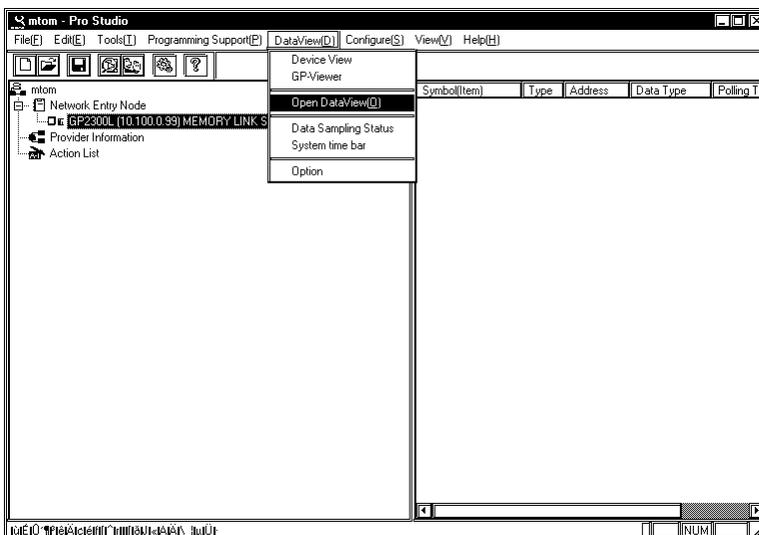
[Refresh Screen Data]

If you changed the GP screen contents, click [Refresh Screen Data]. GP-Viewer re-captures the setup contents of the GP system.

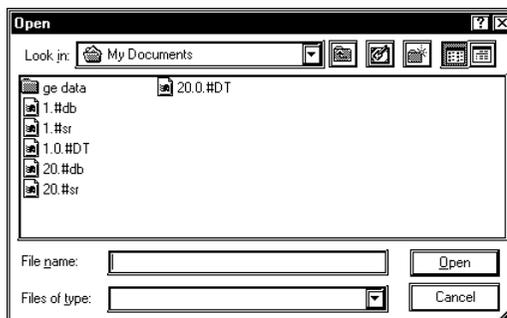
7.3.5 Playback Feature

This feature allows you to playback sampled device data on GP-Viewer.

1. Select [Open Data View (O)] on [Data View (D)] of the menu bar.



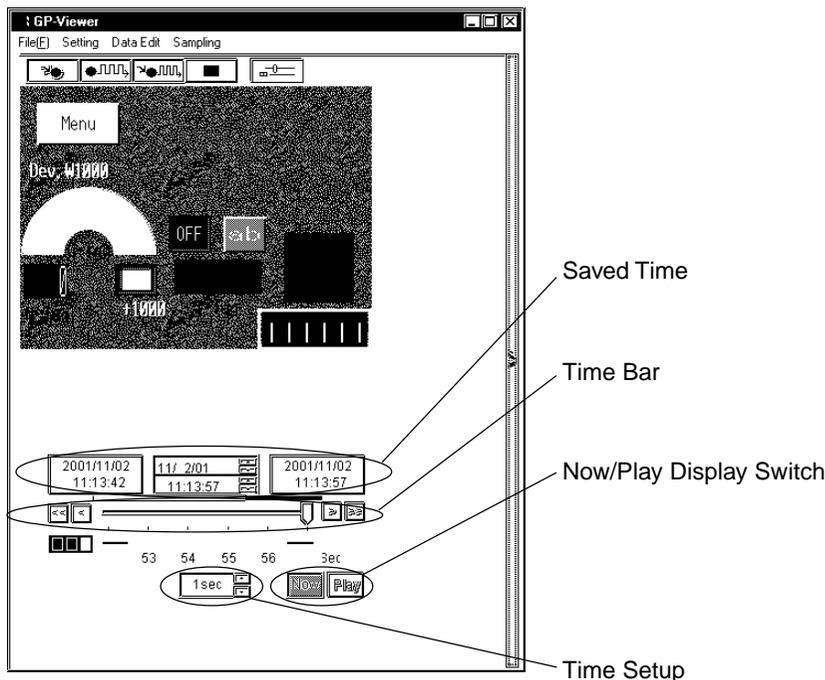
2. The [Open] dialog appears. Select the device data (.#DV) that you wish to playback, and then click [Open].



MEMO

You can also playback data in the saving process.

3. The contents of sampled data are displayed on GP-Viewer. You can playback saved data using various buttons on GP-Viewer.



[Saved Time]

This field shows the saved time of the saved device data.

The field shows, from the left, the saving start time, the time for currently displayed data and the last saved time. When the current status is displayed, the time for currently displayed data is identical to the last saved time.

[Time Bar]

Saved data can be displayed by sliding the time bar control to either side. The data saving process continues even while you operate the control.

[Time Setup]

You can designate the time unit for one graduation of the time bar.

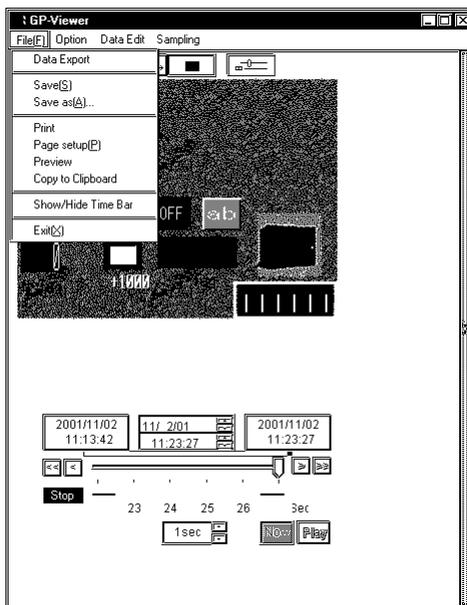
[Now/Play Display Switch]

[Now] and [Play] buttons are available. You can playback the saved data from the designated time either by sliding the time bar control to the time that you wish to start the playback or by clicking the [Play] button after clicking the time for currently displayed data (the center field of [Saved Time]) and then entering the time to start the playback.

7.3.6 Other Features

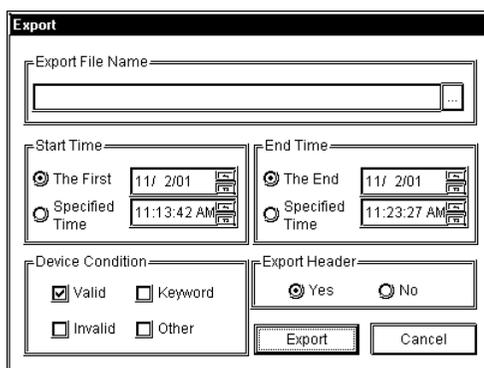
This section describes the File menu and options of GP-Viewer.

1. If you click [File (E)] of GP-Viewer, 9 options are available. The following describes the overview of each option.



Exporting Data

1. Select [Data Export] on the [File (E)] menu.
2. The [Export] dialog appears. Designate each item, and then click [Export].



[Export File Name]

Designate the location and the file name to save exported data. The file extension is (.CSV).

[Start Time]

Designate the time to start exporting data. If you wish to start exporting immediately after you clicked [Export], check “The First”. If you wish to start exporting at the designated time, check “Specified Time”. If you checked “Specified Time”, you should also designate the start time to export.

[End Time]

Designate the time to end exporting data. If you wish to export the entire sampled data, check “The End”. If you wish to export until the designated time, check “Specified Time”. If you checked “Specified Time”, you should also designate the end time to export.

[Device Condition]

This is the reserved data. You should not change the designated value.

[Export Header]

If you wish to include the header information in exported data, check “Yes”. If not, check “No”.

[Export]

Executes the data export.

[Cancel]

The process is stopped and goes back to GP-Viewer.

MEMO

- Although you can start multiple GP-Viewer programs, you cannot export data simultaneously.
- You can export data even while storing data. However, if you checked [Designate maximum size/Save over oldest data] in the [Saving Method] dialog, you cannot export while storing data.

Saving Data

1. If you wish to save displayed data to GP-Viewer, click [Save (S)] on the [File (E)] menu. Data are overwritten.

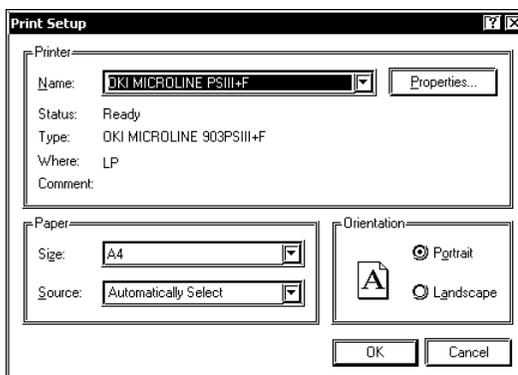
If you wish to save displayed data to GP-Viewer as a separate file name, click [Save As (A)] in the [File (E)] menu. The [Save As] dialog appears. Enter the file name, and then click [Save (S)].

Print

1. Click [Print] on the [File (E)] menu. The printing process is performed.

Page Setup

1. Click [Page Setup(P)] in the [File (E)] menu.
2. The [Print Setup] dialog appears. Designate each item, and then click [OK].



MEMO

The contents of the [Page Setup] dialog differ depending on your printer. Refer to the user manual of your printer for details.

Preview

1. Click [Preview] in the [File (E)] menu.
2. The print preview appears.

Copy to Clipboard

1. Click [Copy to Clipboard] in the [File (E)] menu.
2. The data value displayed on GP-Viewer is copied into the clipboard.
3. Paste the data value onto the application used.

MEMO

You can only copy data in the data display area of GP-Viewer into the clipboard. You cannot copy data such as a title.

Show / Hide Time Bar

1. Clicking [File | Show/Hide Time Bar] enables setting the System Time Bar to "Show" or "Hide" mode.

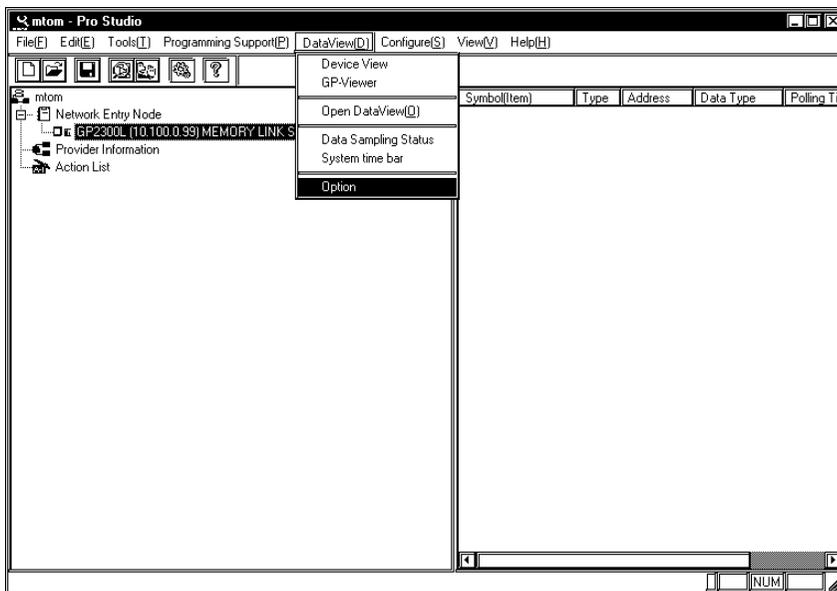
Exit

1. Click [Exit(X)] in the [File (E)] menu. Exits GP-Viewer.

Options

This is selected on [Data View (D)] of the menu bar.

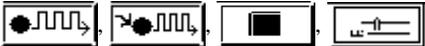
1. Select [Option] on [Data View (D)] of the menu bar.

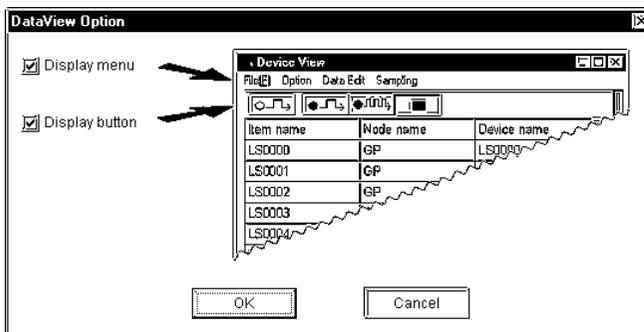


2. The [DataView Option] dialog appears.

You can select “Show/Hide” of the setup menu and the save button.

If you uncheck “Display menu”, the [Option], the [Data Edit], and the [Sampling] menus are hidden on GP-Viewer.

If you uncheck “Display button”,  buttons are hidden on GP-Viewer.



Supported Drawing Commands

Among GP-PRO/PBIII drawing commands, the following commands are supported by GP-Viewer.

Only the following drawing features are function properly.

- line/poly-line command
- rectangle command
- circle/ellipse command
- arc/sector command
- polygon fill command
- ruler command
- text string command
- mark call-up command

Among these drawing commands, there are some functions not available with GP-Viewer. Functions available and not available with GP-Viewer are listed below for each drawing command.

The display may differ between GP and GP-Viewer even if drawing commands are supported.

Line/Poly-line Command		
	specifying a display color	Yes
	blinking a display color	Yes
	specifying a background color	No
	blinking a background color	No
	drawing an arrow	Yes
	drawing a solid line	Yes
	drawing a dotted line	No
Rectangle Command		
	specifying a display color	Yes
	blinking a display color	Yes
	specifying a background color	No
	blinking a background color	No
	drawing a solid line	Yes
	drawing a dotted line	No
	chamfering	Yes
	specifying the number of dots in chamfering	Yes
	solid fill pattern	Yes
	fill patterns except for a solid fill	No

Circle/Ellipse Command		
	specifying a display color	Yes
	blinking a display color	Yes
	specifying a background color	No
	blinking a background color	No
	drawing a solid line	Yes
	drawing a dotted line	No
	solid fill pattern	Yes
	fill patterns except for a solid fill	No
Arc/Sector Command		
	specifying a display color	Yes
	blinking a display color	Yes
	specifying a background color	No
	blinking a background color	No
	drawing a solid line	Yes
	drawing a dotted line	No
Polygon Fill Command		
	specifying a display color	Yes
	blinking a display color	Yes
	specifying a background color	No
	blinking a background color	No
	drawing a solid line	Yes
	drawing a dotted line	No
	solid fill pattern	Yes
	fill patterns except for a solid fill	No
Ruler Command		
	specifying a display color	Yes
	blinking a display color	Yes
	specifying a background color	No
	blinking a background color	No
	drawing a solid line	Yes
	drawing a dotted line	No
	ruler type	Yes
	number of graduations to be divided	Yes

Text String Command		
	specifying a display color	Yes
	blinking a display color	Yes
	specifying a background color	Yes
	blinking a background color	Yes
	specifying a shade color of a carving style	Yes
	blinking a shade color of a carving style	Yes
	text direction	Yes
	text style	Yes
	text size	Yes
	text rotation angle	Yes
	text font	No
Mark Call-up Command		
	specifying a display color	Yes
	blinking a display color	Yes
	specifying a background color	Yes
	blinking a background color	Yes
	specifying a mark size	Yes

Supported Tag Commands

The following GP-PRO/PBIII tag commands are supported by GP-Viewer.

Only the following tags are supported.

- C tag
- E tag
- F tag
- G tag
- K tag
- L tag
- M tag
- N tag
- S tag
- T tag
- U tag

Among these tag commands, there are some features not available with GP-Viewer. Refer to the following list for each tag command.

The display may differ for GP and for your GP-Viewer even if drawing commands are supported.

C Tag		
	character size	Yes
	specifying a display color	Yes
	blinking a display color	Yes
	specifying display rotation	Yes
	specifying a tiling pattern	Yes
	specifying a background color	Yes
	character size (full/half)	Yes
	specifying a background color at tiling	Yes
E Tag		
	specifying data (absolute/relative)	Yes
	specifying a sign	Yes
	rounding off numbers	Yes
	specifying a display data form	Yes
	specifying display address (indirect)	No
	bit length when [relative] is selected	Yes
	input sign when [relative] is selected	Yes
	input display when [relative] is selected	Yes
	input range when [relative] is selected	Yes
	display range when [relative] is selected	Yes
	character size	Yes
	the number of digits to be displayed	Yes
	the number of decimals	Yes
	display style	Yes

E Tag		
	specifying a range	Yes
	the number of ranges	Yes
	setting a range	Yes
	specifying a number color	Yes
	blinking a number color	Yes
	specifying a background pattern	Yes
	specifying a background color	Yes
	blinking a background color	Yes
	operation	Yes
	specifying display rotation	Yes
F Tag		
	specifying a display (direct/indirect)	Yes
	type of screen (base screen/image screen)	Yes
	type of screen (CF card image screen)	No
	screen number	Yes
	specifying a word address	Yes
	specifying a display data form when [relative] is selected	Yes
	operation mode (area move/move between 2 points)	Yes
	displaying a display data form	Yes
G Tag		
	specifying data (absolute/relative)	Yes
	display mode	Yes
	display a data form when [absolute] is selected (BIN/BCD)	Yes
	input range when [relative] is selected	Yes
	chart type (bar chart/pie chart/half-pie chart)	Yes
	fill patterns for a bar chart	Yes
	chart fill patterns except for a bar chart	No
	indicating a starting point of a meter-type pie or half-pie chart	Yes
	specifying a display color	Yes
	specifying a background color	No
	blinking a background color	No
	displaying alarm	Yes
	specifying alarm background color	No
	blinking alarm background color	No
	specifying display rotation	Yes

K Tag		
	specifying a data (absolute/relative/character string)	Yes
	specifying a word address	Yes
	specifying a starting bit address	No
	specifying a display address (indirect)	No
	specifying a sign	Yes
	rounding off numbers	Yes
	specifying display/write data form	Yes
	bit length when [relative] is selected	Yes
	input sign when [relative] is selected	Yes
	input range when [relative] is selected	Yes
	display range when [relative] is selected	Yes
	the number of characters to be displayed when [character string] is selected	Yes
	character size	Yes
	the number of digits to be displayed	Yes
	the number of decimals (direct/indirect)	Yes
	specifying display style	Yes
	automatic clear	No
	checking the number of digits to be input	No
	bar code input	No
	alarm (direct/indirect/color change)	Yes
	specifying an alarm display color	Yes
	blinking an alarm display color	Yes
	specifying an alarm background color	Yes
	blinking an alarm background color	Yes
	operation	Yes
	specifying display rotation	Yes
L Tag		
	screen number (direct/indirect/state)	Yes
	starting method	Yes
	calling the base screen and the image screen	Yes
	delete action (enable/unable)	Yes
	display a data form when [indirect] is selected (BIN/BCD)	Yes
	calling image screens in the CF Card	No

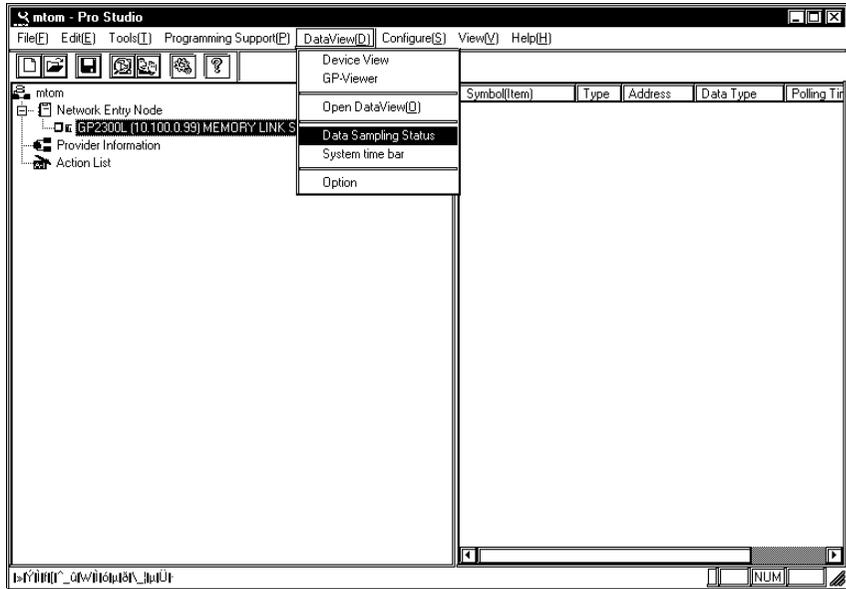
M Tag		
	screen number (direct/indirect)	Yes
	starting method	Yes
	display data format when [indirect] is selected (BIN/BCD)	Yes
	offset value	Yes
	specifying a display size	Yes
	display color (0) foreground color	Yes
	display color (0) blinking foreground color	Yes
	display color (0) background color	Yes
	display color (0) blinking background color	Yes
	display color (1) foreground color	Yes
	display color (1) blinking foreground color	Yes
	display color (1) background color	Yes
	display color (1) blinking background color	Yes
N Tag		
	specifying data (absolute/relative)	Yes
	specifying if to show a negative number	Yes
	specifying a display data form	Yes
	access a data length	Yes
	input range when [relative] is selected	Yes
	text size	Yes
	text font	No
	number of digits to be displayed	Yes
	specifying a display color	Yes
	blinking a display color	Yes
	specifying a background color	Yes
	blinking a background color	No
	alarm process	Yes
	specifying an alarm color	Yes
	blinking an alarm color	Yes
	specifying an alarm background color	Yes
	blinking an alarm background color	No
	operator process	Yes
	specifying display rotation	Yes

S Tag		
	starting method	Yes
	post-start read	Yes
	text size	Yes
	text font	No
	number of texts to be displayed	Yes
	specifying a text color	Yes
	blinking a text color	Yes
	specifying a background color	Yes
	blinking a background color	Yes
	display location	Yes
	clearing display	Yes
	specifying display angle	Yes
T Tag		
	write action mode (bit/word/special)	Yes
	specifying an operator	Yes
	hierarchical screen switching	Yes
	special actions except for T tag extension	No
	Q tag extended action	No
	function key process	No
	interlock capability	Yes
	grouping with the automatic disable capability	Yes
	addition/subtraction on/from a specified digit	Yes
	GP reset	Yes
	AUX output	No
	buzzer sound	Yes
	reverse display	Yes
U Tag		
	specifying method of the window registration screen (direct/indirect)	Yes
	display a data form when [indirect] is selected (BIN/BCD)	Yes
	action mode	Yes
	reshuffling of overlapped screens	Yes

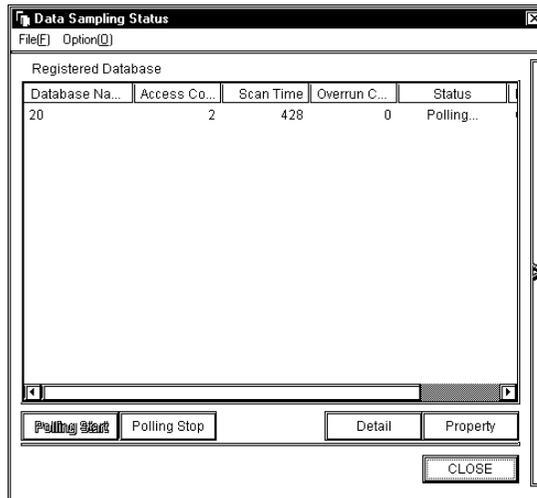
7.4 Checking the Data Sampling Status

This section describes the procedure to check the sampling status of device data.

1. Select [Data Sampling Status] on [Data View (D)] of the menu bar.



2. The [Data Sampling Status] dialog appears. The sampling status of each registered database is displayed so that you can check the contents.



[File (F)]

You can open a database not displayed here, or close the [Data Sampling Status] dialog.

[Option (O)]

You can set the [Data Sampling Status] dialog to be “displayed on the front always”.

[Registered Database]

Database Name	Database name currently registered.
Access Count	Number of data view (e.g. Device View, GP-Viewer) displaying database.
Scan Time	Time for one sampling.
Overrun Count	Number of times that sampling failed at the designated timing.
Status	Database status.

[Polling Start]

If you select a database that a sampling is not currently executed, this button becomes active.

If you click this button, the data save is started.

[Polling Stop]

If you select the database that a sampling is currently executed, this button becomes active.

If you click this button, the data save is stopped.

[Detail]

After selecting the database that you wish to check the detail, click the [Detail] button.

If you click it, the [Detail] dialog appears. The detailed contents of the selected database are displayed.

[Property]

After selecting the database that you wish to change the data sampling condition, click the [Set] button.

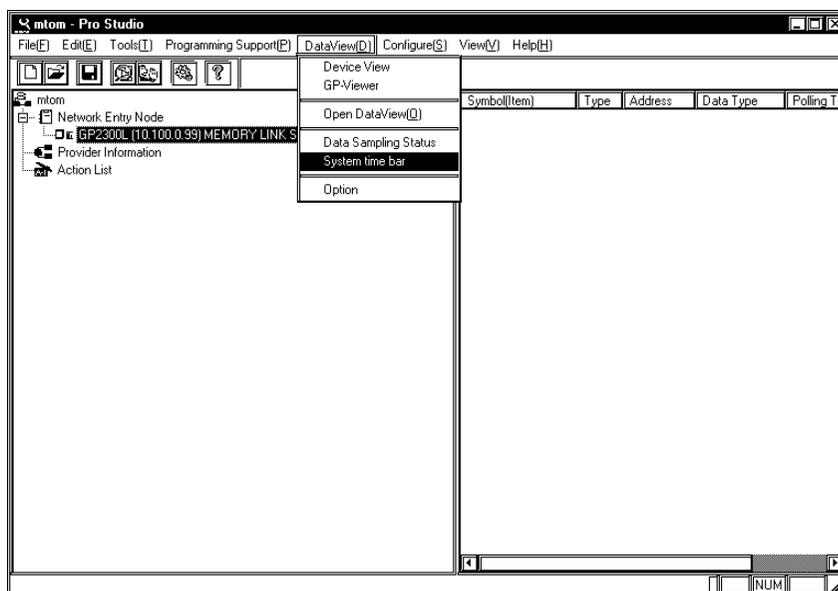
If you click it, the [Sampling method] dialog appears so that you can change the data sampling condition of the selected database. The operation procedure is equal to the procedure after Step 4 in “7.2.2 Setting the Data Sampling Condition” or in “7.3.2 Setting the Data Sampling Condition”.

Reference → “7.2.2 Setting the Data Sampling Condition”, “7.3.2 Setting the Data Sampling Condition”

7.5 System Time Bar

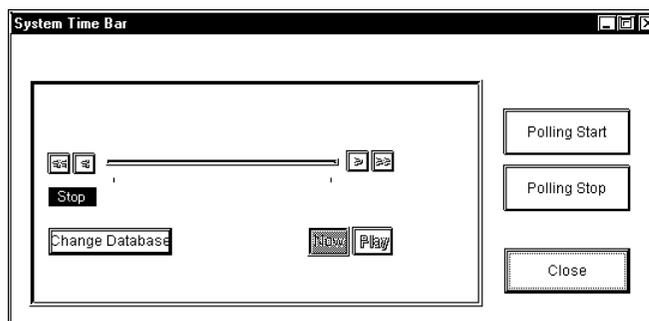
This section describes the operation procedure of System Time Bar.

1. Select [System time bar] on [Data View (D)] of the menu bar.

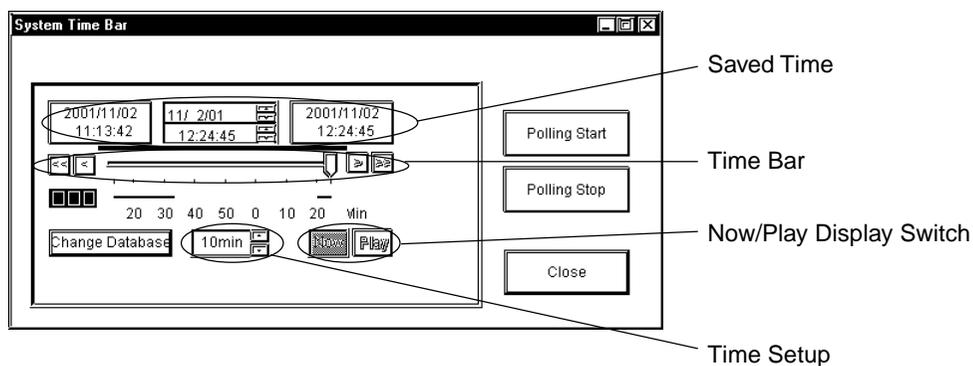


2. System Time Bar appears.

Click [Change Database] to open the database (file) that you wish to display.



3. The contents of the selected database is displayed in System Time Bar.



[Saved Time]

This field shows the saved time of the saved device data.

The field shows, from the left, the saving start time, the time for currently displayed data and the last saved time. When the current status is displayed, the time for currently displayed data is identical to the last saved time.

[Time Bar]

Saved data can be displayed by sliding the time bar control to either side. The data saving process continues even while you operate the control.

[Time Setup]

You can designate the time unit for one graduation of the time bar.

[Now/Play Display Switch]

[Now] and [Play] buttons are available. You can playback the saved data from the designated time either by sliding the time bar control to the time that you wish to start the playback or by clicking the [Play] button after clicking the time for currently displayed data (the center field of [Saved Time]) and then entering the time to start the playback.

[Polling Start]

If you click this button, the data save is started.

[Polling Stop]

If you click this button, the data save is stopped.

[Close]

If you click this button, you can exit the System Time Bar.

[Change Database]

If you click this button, the [Open] dialog appears. If you select the database that you wish to display and click [Open], it is displayed in System Time Bar.

Purpose of System Time Bar

System Time Bar has been developed for the purpose of using the Time Bar (data playback) feature on your own applications.

If you read the file used on your own application (e.g. application to display the database value in a bar graph format) that is equal to the Pro-Server Database File (*.#DB) into System Time Bar, you can synchronize the action of System Time Bar with the display contents of your application (e.g. length change of a bar graph) so that you can playback the database contents on various applications.

MEMO

If you set back data from the present to the past using the system time bar, it may cause an error or work incorrectly in user-defined applications.

Example1) For the temperature monitoring system of a fireplace, suppose that the system always checks temperature going up when a fire place is powered on, and creates an error when temperature goes down. When storing data of this system and setting back from the present to the past using the system time bar, an application recognizes that fireplace temperature went down and creates an error.

Example2) For the data upper/lower edge trigger detecting system, when setting back from the present to the past using the system time bar, an application recognizes that upper/lower edge trigger actually exists and work incorrectly.

8 Maintenance via Ethernet

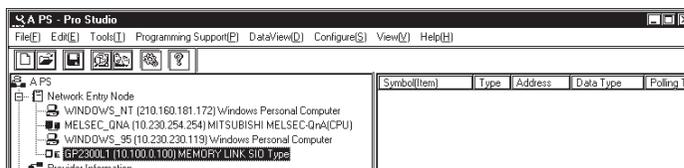
This chapter explains the maintenance procedures you can perform via the Ethernet network.

- 8.1 Transferring Network Project Files
- 8.2 Transferring Only Updated Screen Data to GPs

8.1 Transferring Network Project Files

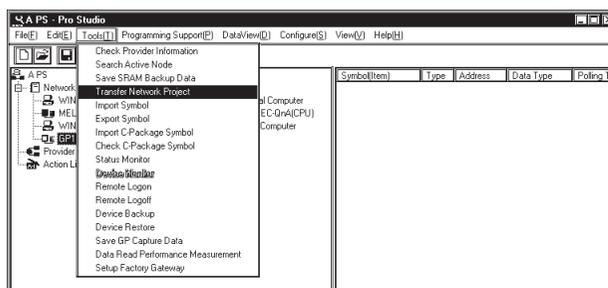
The following procedures explain how to transfer a modified network project file (*.npj) via the Ethernet network to a previously set up GP (i.e. that has had its system data file sent to it).

1. On the Network Entry Node list, click the destination GP.

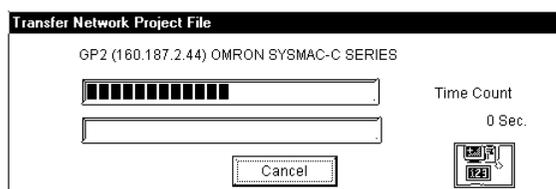


If you are currently editing a network project file, the file must be saved before it can be sent to a GP.

2. Click [Transfer Network Project] in the [Tools(T)] menu.



3. The [Transfer Network Project File] window appears and then the transfer of the network project file begins.



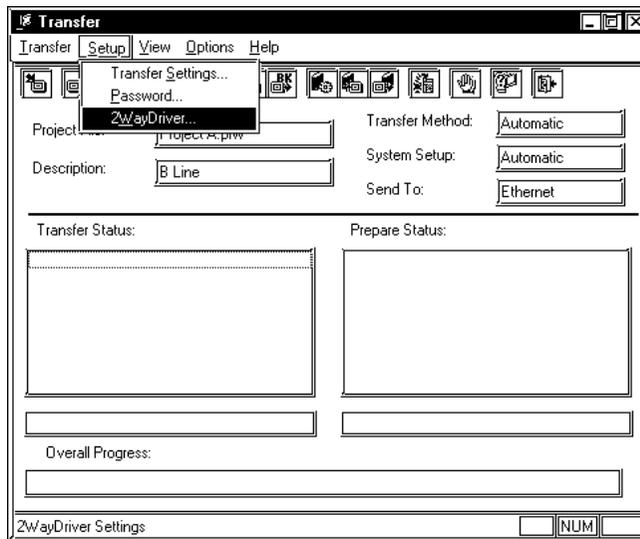
MEMO

- You can transfer the file to multiple GPs at the same time by selecting [Network Entry Node List] and then entry nodes that you wish to transfer the file from the listed entry nodes on the right side.
- Whenever the network project file is changed, it is necessary to transfer the network project file to all entry nodes registered in the network project.

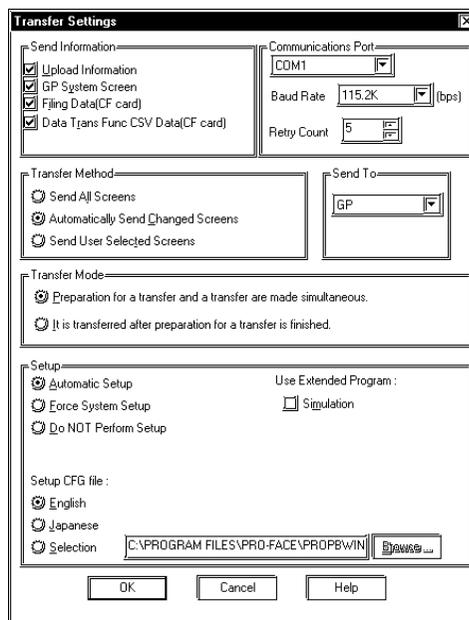
8.2 Transferring Only Updated Screen Data to GPs

If you have modified screen data via the GP-PRO/PB III screen editor software, follow the procedure below to transfer only screen data to the GP. The following description assumes that GP-PRO/PB III's data transfer window is open.

1. Click [Transfer Settings] in the [Setup] menu.



2. When the [Transfer Settings] window appears, click [Ethernet] in the [Send To] pull-down list and click [OK].



Ethernet can be used to transfer only the updated screen data to the GPs whose setup has been completed.

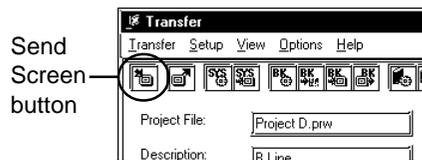
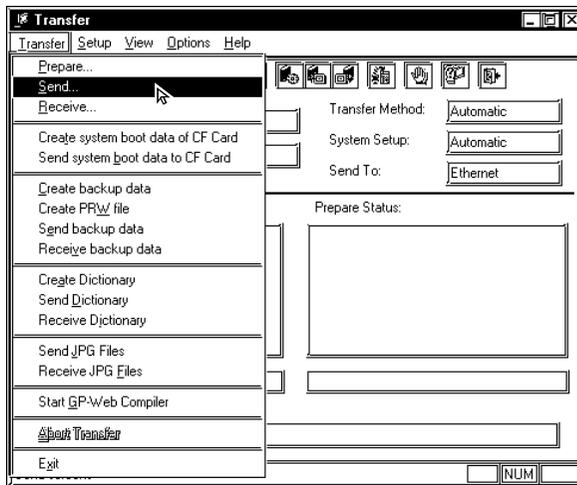
However, set-up via Ethernet is also possible with the GP2000 Series.

Reference → “GP-PRO/PBIII for Windows Help Files”

MEMO

Transferring your screen data in on-line mode temporarily causes the GP to display the transfer screen. The initial screen will be restored as soon as data transfer is completed.

3. Click [Send] in the Transfer menu or on the Send Screen button to transfer the information to the GP.



The GP displays the following information when the screen data is being transferred.

Receive the application data

Downloading the screen data from the upper screen for maintenance. Don't turn the GP power off. To turn the GP power off while downloading might destroy the data inside the GP.

For how to setup a GP for Ethernet, refer to "A.4 GP Ethernet Settings".

Reference → "A.4 GP Ethernet Settings"

MEMO

From GP-PRO/PBIII for Windows Ver. 4.0, only screen data transfer is required. The Network Project file's data is not sent.

As a result, the sending of the same screen data to multiple GPs at the same time is possible. When the Network Project file is modified, use the Pro-Studio [Tool] menu's [Transfer Network Project] selection to send this updated data.

Reference → "8.1 Transferring Network Project Files"

9 | Simple DLL Function

This chapter describes the Simple DLL function.

- 9.1 Simple DLL (ProEasy.DLL) Function
- 9.2 Examples of Simple DLL Function

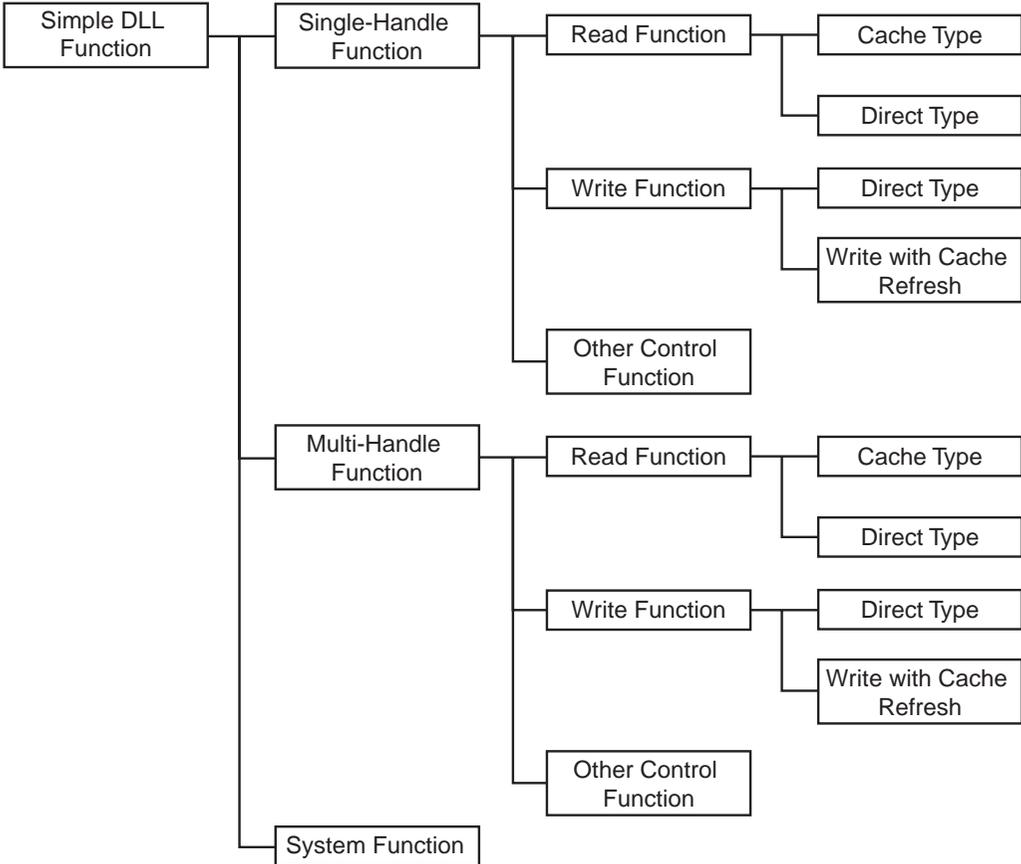
9.1 Simple DLL (ProEasy.DLL) Function

The Simple DLL is a series of API. Using the Simple DLL, you can read and write data of PLC connected to GP/GLC/Factory Gateway from applications in Visual Basic or Visual C++ via Pro-Server. The Simple DLL (ProEasy.DLL) is embedded in Windows System folder at the installation.

MEMO The sample Pro-Easy.DLL program is included in the [Pro-SDK] folder within the Pro-Server CD-ROM.

9.1.1 Simple DLL Structure

The Simple DLL is structured as follows.



Single-Handle Function

This function uses sequential communication so that you cannot call other functions while calling a certain function.

You can however call the function without having to acquire an access handle.

Multi-Handle Function

This function allows you to use more than one single-handle function with multiple partners simultaneously. The multi-handle function name has an upper case “M” at the end to distinguish it from the single-handle function.

For example, the multi-handle function which has the equal functionality as the single-handle function, “ReadDeviceVariant ()”, is “ReadDeviceVariantM ()”.

You can use the multi-handle function when you use a multi-thread or access to more than one PLC simultaneously.

Reference → “Precautions When Using Simple DLL in Multi-Thread Applications”

System Function

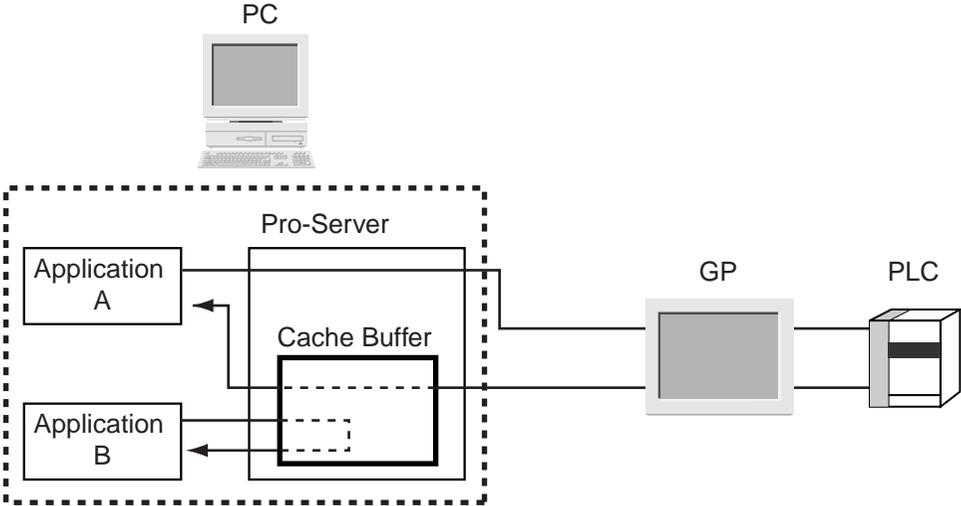
This is the Pro-Server’s system function which does not belong to either the single-handle or the multi-handle function.

Cache Read

When more than one application reads from the same device, it takes time if Pro-Server reads the PLC one by one according to those requests.

If Application A and B both request reads to the same PLC device, the cache read function reads data from PLC according to the request from Application A first, saves data in a cache buffer within Pro-Server and responds to Application A as the answer to the read request.

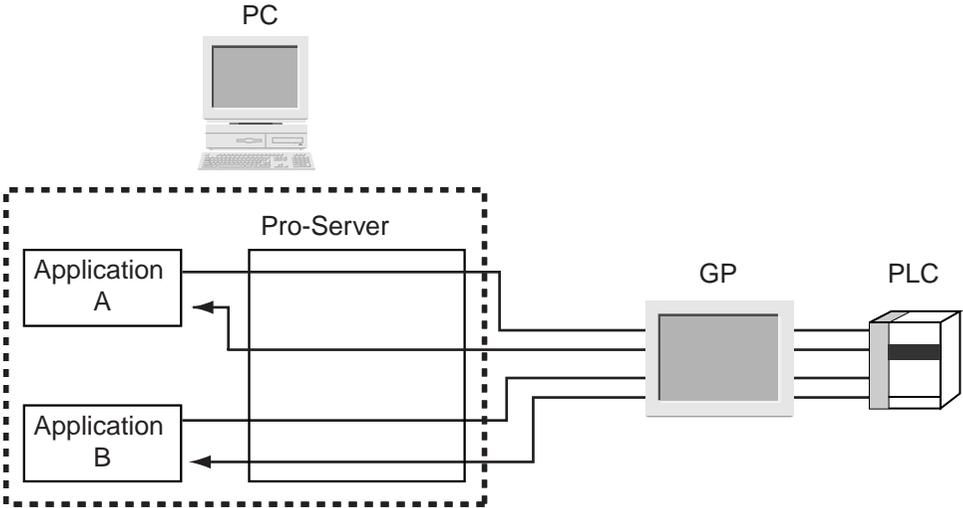
Next, for the read request from Application B, the cache read function returns data read for Application A and saved in a cache buffer. For detail, refer to “Details of Cache Read (Polling Time and Life Time)”



DDEs are all cache reads.

Direct Read

Independent of the cache status, this reads the latest data from PLC.



The direct read function name has upper case “D” or “DM” at the end.

Direct Write

The direct write function is to write data. The direct write function name has upper case “D” or “DM” at the end.

Write with Cache Refresh

In the case of the write with cache refresh function, when certain device data have been cached, after writing data, it reads from the corresponding device again and refreshes cache data.

The execution speed is slower than that of the direct write function. While a device is read using the cache read function, use the write with cache refresh function.

9.1.2 Device Read/Write Function

Single-Handle Cache Read Function

Bit data

```
INT WINAPI ReadDeviceBit(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,WORD* pwData,
WORD wCount);
```

16-bit data

```
INT WINAPI ReadDevice16(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,WORD* pwData,
WORD wCount);
```

32-bit data

```
INT WINAPI ReadDevice32(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,DWORD* pdwData,
WORD wCount);
```

16-bit BCD data

```
INT WINAPI ReadDeviceBCD16(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,WORD* pwData,
WORD wCount);
```

32-bit BCD data

```
INT WINAPI ReadDeviceBCD32(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,DWORD* pdwData,
WORD wCount);
```

Single-precision floating-point data

```
INT WINAPI ReadDeviceFloat(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,FLOAT* pflData,
WORD wCount);
```

Double-precision floating-point data

```
INT WINAPI ReadDeviceDouble(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,DOUBLE* pldData,
WORD wCount);
```

String data

```
INT WINAPI ReadDeviceStr(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,LPTSTR psData,
WORD wCount);
```

General-use data

```
INT WINAPI ReadDevice(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,LPVOID pData,WORD wCount,
WORD wAppKind);
```

General-use data(for VB)

```
INT WINAPI ReadDeviceVariant(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,LPVARIANT pData,
WORD wCount,WORD wAppKind);
```

Single-Handle Direct Read Function

Bit data

```
INT WINAPI ReadDeviceBitD(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,  
WORD* pData,WORD wCount);
```

16 bit data

```
INT WINAPI ReadDevice16D(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,  
WORD* pData,WORD wCount);
```

32 bit data

```
INT WINAPI ReadDevice32D(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,  
DWORD* pData,WORD wCount);
```

16 bit BCD data

```
INT WINAPI ReadDeviceBCD16D(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,  
WORD* pData,WORD wCount);
```

32 bit BCD data

```
INT WINAPI ReadDeviceBCD32D(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,  
DWORD* pData,WORD wCount);
```

Single precision floating-point data

```
INT WINAPI ReadDeviceFloatD(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,  
FLOAT* pData,WORD wCount);
```

Double precision floating-point data

```
INT WINAPI ReadDeviceDoubleD(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,  
DOUBLE* pData,WORD wCount);
```

String data

```
INT WINAPI ReadDeviceStrD(LPCTSTR bsNodeName, LPCTSTR bsDeviceName,  
LPTSTR pData, WORD wCount);
```

General-use data

```
INT WINAPI ReadDeviceD(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,  
LPVOID pData,WORD wCount,WORD wAppKind);
```

General-use data(for VB)

```
INT WINAPI ReadDeviceVariantD(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,  
LPVARIANT pData,WORD wCount,WORD wAppKind);
```

Single-Handle Direct Write Function

Bit data

```
INT WINAPI WriteDeviceBitD(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,WORD* pwData,
WORD wCount);
```

16-bit data

```
INT WINAPI WriteDevice16D(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,WORD* pwData,
WORD wCount);
```

32-bit data

```
INT WINAPI WriteDevice32D(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,DWORD* pdwData,
WORD wCount);
```

16-bit BCD data

```
INT WINAPI WriteDeviceBCD16D(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,WORD* pwData,
WORD wCount);
```

32-bit BCD data

```
INT WINAPI WriteDeviceBCD32D(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,DWORD* pdwData,
WORD wCount);
```

Single-precision floating-point data

```
INT WINAPI WriteDeviceFloatD(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,FLOAT* pflData,
WORD wCount);
```

Double-precision floating-point data

```
INT WINAPI WriteDeviceDoubleD(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,DOUBLE* pdbData,
WORD wCount);
```

String data

```
INT WINAPI WriteDeviceStrD(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,LPTSTR psData,
WORD wCount);
```

General-use data

```
INT WINAPI WriteDeviceD(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,LPOVOID pData,
WORD wCount,WORD wAppKind);
```

General-use data(for VB)

```
INT WINAPI WriteDeviceVariantD(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,LPVARIANT pData,
WORD wCount,WORD wAppKind);
```

Single-Handle Write with Cache Refresh Function

Bit data

```
INT WINAPI WriteDeviceBit(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,
WORD* pData,WORD wCount);
```

16 bit data

```
INT WINAPI WriteDevice16(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,
WORD* pData,WORD wCount);
```

32 bit data

```
INT WINAPI WriteDevice32(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,
DWORD* pData,WORD wCount);
```

16 bit BCD data

```
INT WINAPI WriteDeviceBCD16(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,
WORD* pData,WORD wCount);
```

32 bit BCD data

```
INT WINAPI WriteDeviceBCD32(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,
DWORD* pData,WORD wCount);
```

Single precision floating-point data

```
INT WINAPI WriteDeviceFloat(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,
FLOAT* pData,WORD wCount);
```

Double precision floating-point data

```
INT WINAPI WriteDeviceDouble(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,
DOUBLE* pData,WORD wCount);
```

String data

```
INT WINAPI WriteDeviceStr(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,
LPTSTR pData,WORD wCount);
```

General-use data

```
INT WINAPI WriteDevice(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,
LPVOID pData,WORD wCount,WORD wAppKind);
```

General-use data(for VB)

```
INT WINAPI WriteDeviceVariant(LPCTSTR bsNodeName,LPCTSTR bsDeviceName,
LPVARIANT pData,WORD wCount,WORD wAppKind);
```

Multi-Handle Cache Read Function

Bit data

```
INT WINAPI ReadDeviceBitM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,WORD* pData,WORD wCount);
```

16 bit data

```
INT WINAPI ReadDevice16M(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,WORD* pData,WORD wCount);
```

32 bit data

```
INT WINAPI ReadDevice32M(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,DWORD* pdwData,WORD wCount);
```

16 bit BCD data

```
INT WINAPI ReadDeviceBCD16M(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,WORD* pData,WORD wCount);
```

32 bit BCD data

```
INT WINAPI ReadDeviceBCD32M(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,DWORD* pdwData,WORD wCount);
```

Single precision floating-point data

```
INT WINAPI ReadDeviceFloatM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,FLOAT* pfData,WORD wCount);
```

Double precision floating-point data

```
INT WINAPI ReadDeviceDoubleM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,DOUBLE* pdbData,WORD wCount);
```

String data

```
INT WINAPI ReadDeviceStrM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,LPTSTR psData,WORD wCount);
```

General-use data

```
INT WINAPI ReadDeviceM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,LPVOID pData,WORD wCount,WORD wAppKind);
```

General-use data(for VB)

```
INT WINAPI ReadDeviceVariantM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,LPVARIANT pData,WORD wCount,WORD wAppKind);
```

Multi-Handle Direct Read Function

Bit data

```
INT WINAPI ReadDeviceBitDM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,WORD* pData,WORD wCount);
```

16 bit data

```
INT WINAPI ReadDevice16DM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,WORD* pData,WORD wCount);
```

32 bit data

```
INT WINAPI ReadDevice32DM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,DWORD* pData,WORD wCount);
```

16 bit BCD data

```
INT WINAPI ReadDeviceBCD16DM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,WORD* pData,WORD wCount);
```

32 bit BCD data

```
INT WINAPI ReadDeviceBCD32DM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,DWORD* pData,WORD wCount);
```

Single precision floating-point data

```
INT WINAPI ReadDeviceFloatDM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,FLOAT* pData,WORD wCount);
```

Double precision floating-point data

```
INT WINAPI ReadDeviceDoubleDM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,DOUBLE* pData,WORD wCount);
```

String data

```
INT WINAPI ReadDeviceStrDM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,LPTSTR pData,WORD wCount);
```

General-use data

```
INT WINAPI ReadDeviceDM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,LPVOID pData,WORD wCount,WORD wAppKind);
```

General-use data(for VB)

```
INT WINAPI ReadDeviceVariantDM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,LPVARIANT pData,WORD wCount,WORD wAppKind);
```

Multi-Handle Direct Write Function

Bit data

```
INT WINAPI WriteDeviceBitDM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,WORD* pwData,WORD wCount);
```

16-bit data

```
INT WINAPI WriteDevice16DM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,WORD* pwData,WORD wCount);
```

32-bit data

```
INT WINAPI WriteDevice32DM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,DWORD* pdwData,WORD wCount);
```

16-bit BCD data

```
INT WINAPI WriteDeviceBCD16DM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,WORD* pwData,WORD wCount);
```

32-bit BCD data

```
INT WINAPI WriteDeviceBCD32DM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,DWORD* pdwData,WORD wCount);
```

Single-precision floating-point data

```
INT WINAPI WriteDeviceFloatDM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,FLOAT* pflData,WORD wCount);
```

Double-precision floating-point data

```
INT WINAPI WriteDeviceDoubleDM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,DOUBLE* pdbData,WORD wCount);
```

String data

```
INT WINAPI WriteDeviceStrDM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,LPTSTR psData,WORD wCount);
```

General-use data

```
INT WINAPI WriteDeviceDM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,LPOVOID pData,WORD wCount,WORD wAppKind);
```

General-use data(for VB)

```
INT WINAPI WriteDeviceVariantDM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,LPVARIANT pData,WORD wCount,WORD wAppKind);
```

Multi-Handle Write with Cache Refresh Function

Bit data

```
INT WINAPI WriteDeviceBitM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,WORD* pwData,WORD wCount);
```

16 bit data

```
INT WINAPI WriteDevice16M(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,WORD* pwData,WORD wCount);
```

32 bit data

```
INT WINAPI WriteDevice32M(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,DWORD* pdwData,WORD wCount);
```

16 bit BCD data

```
INT WINAPI WriteDeviceBCD16M(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,WORD* pwData,WORD wCount);
```

32 bit BCD data

```
INT WINAPI WriteDeviceBCD32M(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,DWORD* pdwData,WORD wCount);
```

Single precision floating-point data

```
INT WINAPI WriteDeviceFloatM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,FLOAT* pflData,WORD wCount);
```

Double precision floating-point data

```
INT WINAPI WriteDeviceDoubleM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,DOUBLE* pdbData,WORD wCount);
```

String data

```
INT WINAPI WriteDeviceStrM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,LPTSTR psData,WORD wCount);
```

General-use data

```
INT WINAPI WriteDeviceM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,LPVOID pData,WORD wCount,WORD wAppKind);
```

General-use data (for VB)

```
INT WINAPI WriteDeviceVariantM(HANDLE hProServer,LPCTSTR bsNodeName,
LPCTSTR bsDeviceName,LPVARIANT pData,WORD wCount,WORD wAppKind);
```

Read/Write Function Parameters

<Return value>

Executed successfully: 0

Not executed successfully: Error code

<Arguments>

bsNodeName.....Pointer to the node name (char.string)

Specify directly the network node name registered with Pro-Studio or the IP address.

Ex.1) To specify the node name: "GP2"

Ex.2) To specify directly the IP address: "192.9.201.1"

MEMO

Even when specifying the IP address directly, Entry Nodes should be registered in advance.

bsDeviceName....Pointer to the symbol (char. string) to perform Read/Write

Specify directly the symbol name or the device address.

Ex.1) To specify the symbol: "SWITCH1"

Ex.2) To specify directly the device: "M100"

Function	Symbol Data Type							
	Bit	16Bit		32Bit		Float	Double	String
		S/U/HEX	BCD	S/U/HEX	BCD			
XXXDeviceBit	0	-	-	-	-	-	-	-
XXXDevice16	-	0	-	-	-	-	-	-
XXXDevice32	-	-	-	0	-	-	-	-
XXXDeviceBCD16	-	-	0	-	-	-	-	-
XXXDeviceBCD32	-	-	-	-	0	-	-	-
XXXDeviceFloat	-	-	-	-	-	0	-	-
XXXDeviceDouble	-	-	-	-	-	-	0	-
XXXDeviceStr	-	-	-	-	-	-	-	0
XXXDevice	0	0	0	0	0	0	0	0

pxxData.....Pointer to the Read/Write Data

The following table shows types of data to access and of arguments.

Type of data to access	Data Type
Bit data	WORD* pwData
16 bit data	WORD* pwData
32 bit data	DWORD* pdwData
16 bit BCD data	WORD* pwData
32 bit BCD data	DWORD* pdwData
Single precision floating-point data	FLOAT* pflData
Double precision floating-point data	DOUBLE* pdbData
String data	LPTSTR psData
General-use data	LPVOID pData
General-use data (for VB)	LPVARIANT pData

wCount....Read/Write data quantity

With the Read/WriteDeviceStr function, the quantity of string data is counted as the number of bytes. Always specify the data quantity as a multiple of 2 for devices with 16-bit data, and a multiple of 4 for devices with 32-bit data.

The following table shows the maximum numbers of read and write.

Type of data to access	Maximum number of read	Maximum number of write
Bit	255	16
16 bit	1020	1020
32 bit	510	510
16 bit BCD	1020	1020
32 bit BCD	510	510
Single precision floating-point	510	510
Double precision floating-point	255	255
Character string	1020 (single byte)	1020 (single byte)

wAppKindData type specification

Value	Data Type	Value	Data Type
1	Bit	7	Unsigned 32 Bit
2	Signed 16 Bit	8	HEX 32 Bit
3	Unsigned 16 Bit	9	BCD 32 Bit
4	HEX 16 Bit	10	Float
5	BCD 16 Bit	11	Double
6	Signed 32 Bit	12	Character string

The Read/WriteDevice function allows the data type to be changed dynamically because it is specified as a parameter.

<Supplement>**When Using Read/WriteDeviceBit Function:**

The function stores data as many as wCount from the D0 bit in pwData.

Example : When wCount is 20

	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
PwData	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
PwData+1	*	*	*	*	*	*	*	*	*	*	*	*	20	19	18	17

When handling sequential plural bit data, it is more effective to read/write in 16/32 bits using Read/WriteDevice16 or Read/WriteDevice32 than Read/WriteDeviceBit.

Irregular values are stored in the bits shown as “*”. Mask those using an application program.

When Using Read/WriteDeviceBCD16/32 Function:

Use these functions when handling data as BCD within PLC. However, data (contents of pxxData) to receive from and to give to these functions are not BCD but binary data (BCD conversion is performed within Pro-Server.). You cannot handle negative numbers.

Function Name	Decimal Expression	Hexadecimal Expression
Read/WriteDeviceBCD16	0 - 9999	0000 - 270F
Read/WriteDeviceBCD32	0 - 99999999	00000000 - 05F5E0FF

When Using Character String Data Function:

For variables to receive character string data, be sure to secure sufficient data area to be able to receive those data.

9.1.3 System and Other Control Functions

Acquiring Pro-Server Handle

```
HANDLE WINAPI CreateProServerHandle();
```

<Function>

Acquires the Pro-Server handle to use when utilizing multi-handle functions.

<Return value>

Executed successfully: Other than 0 (handle code)

Not executed successfully: 0

Releasing Pro-Server Handle

```
INT WINAPI DeleteProServerHandle (HANDLE hProServer);
```

<Function>

Releases the Pro-Server handle already acquired.

<Return value>

Executed successfully: 0

Not executed successfully: Error code

<Arguments>

hProServer Pro-Server handle to be released.

Loading Network Project File

Single

```
INT WINAPI EasyLoadNetworkproject (LPCTSTR sDBName, DWORD dwSetOrAdd = TRUE);
```

Multi

```
INT WINAPI EasyLoadNetworkprojectM (HANDLE hProServer, LPCTSTR sDBName, DWORD dwSetOrAdd = TRUE);
```

<Function>

Loads the network poroject file designated by an argument.

<Return value>

Executed successfully: 0

Not executed successfully: Error code

<Arguments>

sDBName Designate the full path to the network project file.

dwSetOrAdd Reserved (fixed to 1)

hProServer Pro-Server handle

Character String Conversion of Error Codes

```
BOOL WINAPI EasyLoadErrorMessage (INT iErrorCode, LPTSTR osErrorMessage);
```

<Function>

Converts error codes returned by Pro-Server's various functions to error messages.

<Return value>

Other than 0: Executed successfully

0: Failed in character string conversion. (e.g. unused error code)

<Arguments>

iErrorCode Error code returned by Pro-Server's functions.

osErrorMessage ... Pointer to the storage area for converted character strings.

(Secure the area more than 512 bytes.)

Reference → "Appendix Pro-Server with Pro-Studio for Windows Error Messages"

Reading SRAM Backup Data

Single

```
INT WINAPI EasyBackupDataRead(LPCTSTR sSaveFileName,LPCTSTR sNodeName,
INT BackupDataType,INT SaveMode);
```

Multi

```
INT WINAPI EasyBackupDataReadM(HANDLE hProServer,LPCTSTR sSaveFileName,
LPCTSTR sNodeName,INT BackupDataType,INT SaveMode);
```

<Function>

Reads SRAM data of GP/GLC, and stores in files on PCs.

<Return value>

Executed successfully: 0
 Not executed successfully: Error code

<Arguments>

sSaveFileName Pointer to the path name and file name(string)of the estination storage file
 sNodeName Pointer to the node name(string)
 BackupDataType.. Types of Readout Data

No.	Type
0	Reserved
1	Filing Data
2	Logging data
3	Line data
4	Sampling data
5	Alarm block 1
6	Alarm history data, Alarm block 2
7	Alarm log data, Alarm block 3
8	Alarm block 4
9	Alarm block 5
10	Alarm block 6
11	Alarm block 7
12	Alarm block 8
13 or above	Reserved

SaveMode Saving Method

No.	Mode	Note
0	Stores data as a new file.	If the file exists, deletes the existing contents and overwrites data.
1	Appends data to an existing file.	If the file does not exist, creates a new file.

Backup Data's Write Function

Single

```
INT WINAPI EasyBackupDataWrite(LPCTSTR sSourceFileName,LPCTSTR sNodeName,
INT BackupDataType);
```

Multi

```
INT WINAPI EasyBackupDataWriteM(HANDLE hProServer,LPCTSTR sSourceFileName,
LPCTSTR sNodeName,INT BackupDataType);
```

<Function>

Writes the designated binary file to SRAM within GP.

<Argument>

HProServerPro-Server handle

sSourceFileName File path for the value to be written to the GP's SRAM

sNodeName Node name of GP to be written to.(Node must be previously registered as a Pro-Server
Network Project.)

BackupDataType Designates the type of write file.(Must be the EasyBackupDataType_FILING
type[filig data]supported by Ver. 2.0)

<Return value>

Executed successfully: 0

Write Error: Error Code

Entry Node Status Read Function

Single

```
INT WINAPI GetNodeProperty (LPCTSTR sNodeName, DWORD dwTimeLimit, LPCTSTR GPType,
LPCTSTR SystemVersion, LPCTSTR ComVersion, LPCTSTR ECOMVersion)
```

Multi

```
INT WINAPI GetNodePropertyM (HANDLE hProServer, LPCTSTR sNodeName, DWORD dwTimeLimit,
LPCTSTR GPType, LPCTSTR SystemVersion, LPCTSTR ComVersion, LPCTSTR ECOMVersion)
```

<Function>

The connected GP status can be acquired. This can also be used to check a connection since the response timeout value can be a variable.

<Argument>

hProServer Pro-Server handle

sNodeName Node name of GP to be read from. (Node name must be previously registered as a Pro-Server network project.)

dwTimeLimit Response timeout setup value (If you designate 0, this will be defaulted to 3000 msec.)
The setup range is from 1 through 2,147,483,647. (unit:msec)

Secure the area more than 32 bytes for each of followings.

GpType: GP model code

SystemVersion: GP system version

ComVersion: PLC protocol driver version

ECOMVersion: 2-Way Driver version

<Return value>

Executed successfully: 0

Not executed successfully: Error codes (refer to the separate table)

CF Card Status Read Function**Single**

INT WINAPI EasyIsCFCard (LPCTSTR sNodeName)

Multi

INT WINAPI EasyIsCFCardM (HANDLE hProServer, LPCTSTR sNodeName)

<Function>

The CF Card connection status of the connect GP can be acquired.

<Argument>

hProServer Pro-Server handle

sNodeName Node name of GP to be read from. (Node name must be previously registered as a Pro-Server network project.)

<Return value>

0x00000000 (0)	-	A usable CF Card is inserted.
0x10000001 (268435457)	-	No CF Card available.
0x10000002 (268435458)	-	Unsupported Device was detected by the CF Card's driver.
0x10000004 (268435460)	-	CF Card's driver has detected a card error.
0x10000008 (268435464)	-	CF Card not initialized.
Other error codes	-	Refer to separate Error Code chart.

CF Card File List Read Function (Arbitrary Folder Name)

```
INT WINAPI EasyGetListInCfCard (LPCTSTR sNodeName, LPCTSTR sDirectory, INT* pioCount,
LPCTSTR szSaveFileName);
```

<Function>

Outputs the file list in CF Card inserted to GP/GLC to the file given via a parameter. You can designate the file type using a parameter.

An error occurs because GP77R Series does not support this function.

<Arguments>

sNodeName Node name of GP to be read from.

sDirectory Folder name to be acquired (upper case only).

pioCount The number of files read.

szSaveFileName

..... Name of the file that directory information read is stored to. Data stored to array in the stEasyDirInfo format as many as designated by pioCount are stored as binary data.

Moreover, the filename and the file extension are stored as upper case characters only.

```
struct stEasyDirInfo {
    BYTE bFileName [8+1];           // Filename (ends with 0)
    BYTE bExt[3+1];                 // File extension (ends with 0)
    BYTE bDummy [3];                // Dummy
    DWORD dwFileSize;               // File size
    BYTE bFileTimeStamp [8+1];      // File time stamp (ends with 0)
    BYTE bDummy2[3];                // Dummy2
};
```

<Return value>

Executed successfully: 0

Not executed successfully: Error code (refer to the separate table)

<Supplement>

As supplement of “bFileTimeStamp”, time and date are shown as hexadecimal character strings where upper 4bytes out of 8 bytes indicate time in MS-DOS and remaining lower 4 bytes indicate date also in MS-DOS.

The format of date and time in MS-DOS is as the following.

(Example : In the case of 20C42C22, 2C22 expressed as hexadecimal corresponds to date in MS-DOS, and 20C4 also expressed as hexadecimal corresponds to time in MS-DOS so that 20C42C22 indicates 2002/1/24:6:8.)

Designates date in MS-DOS. This date is packed as one 16 bits value according to the following format.

Bit	Contents
0 - 4	Day (1 - 31)
5 - 8	Month (1=January, 2=February, ..., 12=December)
9 - 15	Year. However, it is expressed as past years since 1980. The actual year can be obtained by adding 1980 on the value shown by these bits.

Designates time in MS-DOS. This time is packed as one 16 bits value according to the following format.

Bit	Contents
0 - 4	Value that seconds are divided by 2. (0 - 29)
5 - 10	Minute (0 - 59)
11 - 15	Hour (0 - 23 using 24 hours expression)

CF Card File List Read Function (Type Designation)

```
INT WINAPI EasyGetListInCard (LPCTSTR sNodeName, LPCTSTR sDirectory, INT* pioCount,
LPCTSTR szSaveFileName);
```

<Function>

Writes the file list in CF Card inserted to GP/GLC to the file designated via a parameter. The file list that can be read out is limited to those designated in “sDirectory”.

An error will occur if a GP77R Series unit is used with this function.

<Arguments>

sNodeName Node name of GP to be read from.

sDirectory Directory name to be acquired (upper case only). Only following directories are supported.

LOG (Logging Data)

TREND (Trend Data)

ALARM (Alarm Data)

CAPTURE (Capture Data)

FILE (Filing Data)

pioCount The number of files read.

szSaveFileName

..... Name of the file that read-out directory information is stored to. The amount of data stored to array in the stEasyDirInfo format as many as designated by pioCount are stored as binary data. Moreover, the filename and the file extension are stored as upper case characters only.

```
struct stEasyDirInfo {
```

```
    BYTE bFileName [8+1];           // Filename (ends with 0)
```

```
    BYTE bExt[3+1];                 // File extension (ends with 0)
```

```
    BYTE bDummy [3];               // Dummy
```

```
    DWORD dwFileSize;              // File size
```

```
    BYTE bFileTimeStamp [8+1];     // File time stamp (ends with 0)
```

```
    BYTE bDummy2[3];               // Dummy2
```

```
};
```

<Return value>

Executed successfully: 0

Not executed successfully: Error code (refer to the separate table)

CF Card File Read Function (Arbitrary File Name Designation)

INT WINAPI EasyFileReadInCfCard (LPCTSTR sNodeName, LPCTSTR sFolderName, LPCTSTR sFileName, LPCTSTR pWriteFileName, DWORD* podwFileSize);

<Function>

Reads the designated file from CF Card. Read out file can be arbitrarily (freely) designated. An error will occur if a GP77R Series unit is used with this function.

<Arguments>

sNodeName Node name of GP to be read from.

sFolderName Name of folder to be read from CF Card. (Max. 32 char single-byte.)

sFileName Name of a file to be read from CF Card. (Max. 8.3 format string - *****.*)

pWriteFileName Name of the file to save a CF file read. (full path)

podwFileSize Size of a CF file read.

<Return value>

Executed successfully: 0

Not executed successfully: Error code (refer to the separate table)

CF Card File Read Function (Type Designation)

INT WINAPI EasyFileReadCard (LPCTSTR sNodeName, LPCTSTR pReadFileType, WORD, wReadFileNo, LPCTSTR pWriteFileName, DWORD* podwFileSize);

<Function>

Reads the designated file from CF Card. Read file can only be files designated in “ pReadFileType”.

An error occurs because GP77R Series does not support this function data.

<Arguments>

- sNodeName Node name of GP to be read from.
- pReadFileType Type of a file to be read from CF Card.
- wReadFileNo No. of a file to be read from CF Card.
- pWriteFileName Name of the file to save a CF file read. (full path)
- podwFileSize Size of a CF file read.

<Return value>

- Executed successfully: 0
- Not executed successfully: Error code (refer to the separate table)

<Supplement>

Following 17 file types are supported. You can read only files saved in the designated folder in CF Card. The following table shows those types of file supported.

File Type	Folder	File Type	Folder
ZF	\FILE	ZL	\LOG
ZR	\FILE	ZG	\ALARM
ZI	\DATA	ZH	\ALARM
ZO	\DATA	ZA	\ALARM
ZT	\TREND	ZC	\MRM
ZS	\TREND	CP	\CAPTURE
Z4 to Z8	\ALARM	--	--

CF Card File Write Function (Arbitrary File Name Designation)

INT WINAPI EasyFileWriteInCfCard (LPCTSTR sNodeName, LPCTSTR pReadFileName, LPCTSTR sFolderName, LPCTSTR sFileName);

<Function>

Writes the designated file to the CF Card. Write file can be arbitrarily (freely) designated. An error will occur if a GP77R Series unit is used with this function.

<Arguments>

sNodeName Node name of GP to be written to.

pReadFileName Name of file to be read from. (full path)

sFolderName Folder name used when writing the file to CF Card (Max. 32 char single-byte.)

sFileName Name of the file to be written to CF Card. (Max. 8.3 format string - *****.*)

<Return value>

Executed successfully: 0

Not executed successfully: Error code (refer to the separate table)

CF Card File Write Function (Type Designation)

INT WINAPI EasyFileWriteCard (LPCSTR sNodeName, LPCTSTR pReadFileName, LPCTSTR pWriteFileType, WORD wWriteFileNo);

<Function>

Writes the designated file to CF Card. Write file can only be files designated in “pWriteFileType”.

An error occurs because GP77R Series does not support this function.

<Arguments>

sNodeName Node name of GP to be written to.

pReadFileName Filename of a write source to CF Card. (full path)

pWriteFileType Type of file to be written to CF Card. (Refer to the supplement of the CF Card file read function.)

wWriteFileNo No. of a file to be written to CF Card.

<Return value>

Executed successfully: 0

Not executed successfully: Error code (refer to the separate table)

CF Card File Delete Function (Arbitrary File Designation)

INT WINAPI EasyFileDeleteInCfCard (LPCTSTR sNodeName, LPCTSTR sFolderName, LPCTSTR sFileName);

<Function>

Deletes the designated file on the CF Card. Delete file can be arbitrarily (freely) designated. An error will occur if a GP77R Series unit is used with this function.

<Arguments>

sNodeName Node name of GP containing the data to be deleted.

sFolderName Name of the folder used when deleting the CF Card file (Max. 32 char single-byte.)

sFileName Name of file to be deleted from CF Card. (Max. 8.3 format string - *****.***)

<Return value>

Executed successfully: 0

Not executed successfully: Error code (refer to the separate table)

CF Card File Delete Function (Type Designation)

INT WINAPI EasyFileDeleteCard (LPCTSTR sNodeName, LPCTSTR pDeleteFileType, WORD wDeleteFileNo)

<Function>

Deletes the designated file on the CF Card. Files deleted are limited to those designated by “pDeleteFileType”. An error will occur if a GP77R Series unit is used with this function.

<Arguments>

sNodeName Node name of GP containing the data to be deleted.

pDeleteFileType Designates the type of file to be deleted (refer to supplemental table)

wDeleteFileNo No. of a file to be deleted from CF Card.

<Return value>

Executed successfully: 0

Not executed successfully: Error code (refer to the separate table)

<Supplement>

If the file does not exist and this function is performed, no error will occur and it will be completed normally. Following 17 file types are supported.

File Type	Folder	File Type	Folder
ZF	\FILE	ZL	\LOG
ZR	\FILE	ZG	\ALARM
ZI	\DATA	ZH	\ALARM
ZO	\DATA	ZA	\ALARM
ZT	\TREND	ZC	\MRM
ZS	\TREND	CP	\CAPTURE
Z4 to Z8	\ALARM	--	--

CF Card File Name Change Function

INT WINAPI EasyFileRenameInCfCard (LPCTSTR sNodeName, LPCTSTR sFolderName, LPCTSTR sFileName, LPCTSTR sFileReName);

<Function>

Renames the designated file on the CF Card. An error will occur if a GP77R Series unit is used with this function.

<Arguments>

- sNodeName Node name of GP containing the data to be written to.
- sFolderName Folder name of the CF Card file to be changed. (Max. 32 char.)
- sFileName Name of the file to be changed. (Max. 8.3 format string - *****.*)**)
- sFileReName File name used after name is changed. (Max. 8.3 format string - *****.*)**)

<Return value>

- Executed successfully: 0
- Not executed successfully: Error code (refer to the separate table)

CF Card Free Space Size Acquisition Function

INT WINAPI EasyGetCfFreeSpace (LPCTSTR sNodeName, INT* pioUnallocated);

<Function>

Acquires a free space size in CF Card connected to the designated entry node. If ECOM older than V4.1 is mounted on GP, an error occurs.

<Arguments>

- sNodeName Node name of GP to be read from.
- pioUnallocated Fee space size in CF Card. (acquired in byte)

<Return value>

- Executed successfully: 0
- Not executed successfully: Error code (refer to the separate table)

GP Time DWORD Type Read Function

DWORD WINAPI EasyGetGPTime (LPCTSTR sNodeName, DWORD* podwTime); (for VC)

<Function>

Acquires the current time of the designated node as number (DWORD type). However, this function is effective from LS2048 which saves time in 6 words.

<Arguments>

sNodeName Node name to acquire data from. (You cannot designate Windows computer nodes.)

podwTime Acquired time (time in DWORD type (actually acquired in time_t type defined by ANSI))

<Return value>

Executed successfully: 0

Not executed successfully: Error code (refer to the separate table)

GP Time VARIANT Type Read Function

DWORD WINAPI EasyGetGPTimeVariant (LPCTSTR sNodeName, LPVARIANT povTime); (for VB)

<Function>

Acquires the current time of the designated node as number (Variant type). However, this function is effective from LS2048 which saves time in 6 words.

<Arguments>

sNodeName Node name to acquire data from. (You cannot designate Windows computer nodes.)

povTime Acquired time (acquired time is in VARIANT type (internal process format is Date))

<Return value>

Executed successfully: 0

Not executed successfully: Error code (refer to the separate table)

GP Time STRING Type Read Function

DWORD WINAPI EasyGetGPTimeString (LPCTSTR sNodeName, LPCTSTR pFormat, LPTSTR posTime); (for VC)

<Function>

Acquires the current time of the designated node as character string (LPTSTR type). However, this function is effective from LS2048 which saves time in 6 words.

<Arguments>

sNodeName Node name to acquire data from. (You cannot designate Windows computer nodes.)

pFormat Format setup character string of time to be acquired as character string. The format designation code after the percentage sign (%) is converted as shown in the following supplement. Other characters will remain and be displayed as they are.

posTime Time acquired as character string. (However, if the area more than the acquired character string length plus 1 (NULL) is not secured, unexpected memory area damage will occur. If not secured, actions are not guaranteed.)

<Return value>

Executed successfully: 0

Not executed successfully: Error code (refer to the separate table)

<Supplement>

The format designation code after the percentage sign (%) is converted as the following. Other characters will remain and be displayed as they are. (They are internally given to the argument used by the member Format of the CTime class of MFC.) For example, if the actual time is 2002/1/2 12:34:56, the character string will be "2002_34 56" when designating "%Y_%M %S".

Format Designation Code	Folder
%a	Abbreviation of day of the week (*2)
%A	Complete name of day of the week (*2)
%b	Abbreviation of month (*2)
%B	Complete name of month (*2)
%c	Day and time expression according to the locale.
%#c	Long expression of day and time according to the locale.
%d	Day expressed in decimal (*1)
%H	Hour in 24 hours expression (00 - 23) (*1)
%I	Hour in 12 hours expression (01 - 12) (*1)
%j	Days in decimal since the year beginning (001 - 366) (*1)
%m	Month in decimal (01 - 12) (*1)
%M	Minute in decimal (00 - 59) (*1)
%p	AM/PM of the current locale (*2)
%S	Second in decimal (00 - 59) (*1)
%U	Sequential number of the week in decimal. Sunday is regarded as the first day of the week (00 - 53). (*1)
%w	Day of the week in decimal. Sunday is regarded as 0 (0 - 6). (*1)
%W	Sequential number of the week in decimal. Monday is regarded as the first day of the week (00 - 53). (*1)
%x	Day according to the current locale.
%#x	Long expression of day according to the current locale
%X	Time according to the current locale. (*2)
%y	The last 2 digits of year in decimal (00 - 99) (*1)
%Y	Year in 4 digits in decimal (*1)
%Z, %Z	Name or abbreviation of the time zone. If the time zone is unknown, do not enter any characters. (*2)
%%	Percent sign (*2)

*1 : If you add “#” before d, H, I, j, m, M, S, U, w, W, y or Y (e.g. %#d), leading zeros will be deleted if there are (e.g. 05 becomes 5).

*2 : If you add “#” before a, A, b, B, p, X, z, Z or % (e.g. %#a), “#” will be ignored.

GP Time STRING VARIANT Type Read Function

DWORD WINAPI EasyGetGPTimeStringVariant (LPCTSTR sNodeName, LPCTSTR pFormat, LPVARIANT povTime); (for VB)

<Function>

Acquires the current time of the designated node as character string (Variant Type). However, this function is effective from LS2048 which saves time in 6 words.

<Arguments>

sNodeName Node name to acquire data from. (You cannot designate Windows computer nodes.)
pFormat Format setup character string of time to be acquired as character string. The format designation code after the percentage sign (%) is converted as shown in the following supplement. Other characters will remain and be displayed as they are. (For details, refer to <Supplement> of “GP TIME STRING Type Read Function”.)
povTime Acquired time (acquired time is in VARIANT type (internal process format is Date))

<Return value>

Executed successfully: 0
Not executed successfully: Error code (refer to the separate table)

Simple DLL Initialization

INT WINAPI EasyInit();

<Function>

Initializes Simple DLL and declares the usage internally.

<Return value>

Executed successfully: 0
Not executed successfully: Error code(Refer to the attached table.)

For details, refer to “Precautions When Using Simple DLL in Multi-Thread Applications”. If you execute EasyInit () without starting Pro-Server, Pro-Server is automatically started.

Simple DLL Termination

INT WINAPI EasyTerm();

<Function>

Releases resource that Simple DLL holds.

<Return value>

Executed successfully: 0

Not executed successfully: Error code(Refer to the attached table.)

For details, refer to “Precautions When Using Simple DLL in Multi-Thread Applications”.

Even if you execute EasyTime (), Pro-Sever does not exit.

The Simple DLL function which exits Pro-Server is not supported.

Message Processing Suppression

Single

INT EasySetWaitType (DWORD dwMode)

Multi

INT EasySetWaitTypeM (HANDLE hProServerHandle, DWORD dwMode)

<Function>

If it takes time to process, most of Simple DLL functions process Windows messages within those functions, however, you can designate if you wish to suppress this Windows message processing.

If you suppress it, Windows messages are left in the message queue and will not be processed while executing functions.

As its result, you can avoid unexpected accident such as the double function call due to clicking icons while executing functions.

However, in this case, because all Windows message processing are suppressed in addition to that of the “Icon is clicked” message, be careful that important message processing will not be performed, either, such as redrawing of the timer or windows.

You can designate it per every Pro-Server handle if you suppress processing. The default is to execute processing.

<Return value>

Executed successfully: 0

Not executed successfully: Error code (refer to the separate table)

<Arguments>

HANDLE hProServerHandle Pro-Server handle to change the processing mode.

dwMode ... 1 for executing message processing.

2 for suppressing message processing.

Acquiring Message Processing Method

Single

INT EasyGetWaitType ()

Multi

INT EasyGetWaitTypeM (HANDLE hProServerHandle)

<Function>

This function is to acquire which mode the message processing method is currently set to. In the case of multi-handle, the function returns the current mode per handle.

<Arguments>

HANDLE hProServerHandle Handle to acquire the state.

<Return value>

- 1: Executes message processing.
- 2: Suppresses message processing.

9.1.4 Precautions When Using Function

Precautions When LPVARIANT Returns an Undefined Error at ProEasy.h Compilation by VC

When Visual C++ ver. 6 is used to compile Pro-SDK\VC\Public\ProEasy.h, or the header data copied to the clipboard via Pro-Studio's (Programming extension), [VC Text], the LPVARIANT may return an undefined error. Since the LPVARIANT is defined within afxdisp.h, if the data is not included, an error will occur. To avoid this error to occur, you should define "#include<afxdisp.h>" in stdafx.h in a normal case.

GLC 32 Bit Device Bit Access Method

The GLC unit's 32-bit addressing (integer variables, integer array variables) can access data in individual bit units. Adding a single space and a suffix (descriptor). Xm to a variable name allows this type of bit unit access. Also, adding the suffix<n>+ single space to a variable name allows you to designate individual array elements.

Therefore, if you wish to access the Integer_Array's n+1 element's m+1 position bit, you would write Integer_Array<n>_Xm.

Ex. To access the Integer_Variable's 7th position bit, you would write

Integer_Variables_X6.

Ex. To access the Integer_Array's 2nd element's 30th position bit, you would write

Integer_Array<1>_X29.

Precautions When Using Simple DLL in Multi-Thread Applications

All Simple DLL functions are synchronous (If a function is called once, the process will not return from a function until it is completed.).

Therefore, even if you access to more than one entry node, each access will be processed sequentially in the case of a single-thread program.

In the case of a multi-thread program, you can access to another node using another thread even while you access to a certain node using one thread.

Simple DLL supports multi-thread.

The following describes precautions when you build multi-thread programs.

1. Use multi-handle functions basically to multi-thread programs.
2. You need to acquire Pro-Server handle to use multi-handle functions. Acquire separate Pro-Serve handle per thread. Although you can acquire and use more than one Pro-Server handle within one thread, you may not use Pro-Server handle created by another thread. When you release Pro-Server handle, you should release it in the thread that you created the handle as well.

3. When using Simple DLL, you must call EasyInit () in the beginning and EasyTerm () at the end.

At this time, the thread to call EasyInit () must be same as that for EasyTerm ().

Most of Simple DLL functions automatically call EasyInit () internally if they are called before EasyInit () is called.

Moreover, when applications compete, Simple DLL will also exit automatically, however, if EasyTerm () is not called until then, Simple DLL will automatically call EasyTerm () internally.

According to these functionalities, in the case of single-thread, you do not have to consider (program) EasyInit () or EasyTerm ().

However, in the case of a multi-thread program, there are cases that the thread to call the Simple DLL function in the beginning is different from the last thread when an application exits, or when you do not know if they are same.

In such cases, you should insert EasyInit () and EasyTerm () in your program.

In most programs, the initially started thread (main thread) remains until the end, so insert EasyInit () in the beginning of the main thread and EasyTerm () at the end.

1. Execute EasyInit () and EasyTerm () once in one program, i.e. at the beginning and at the end of the main thread.
2. One or more Pro-Server handles should be created per thread and used only within the thread that each handle is created for. Furthermore, you should cancel the handle within the thread.

Processing Windows Messages

Most Windows programs are event driven programs which display dialogs or make sounds according to events such as “An icon is clicked.”, “A mouse is moved.”, “A key is pressed.” and so on.

When an event occurs, Windows sends the message indicating the event kind to an application.

An application recognizes an even occurrence by receiving the message and executes corresponding process.

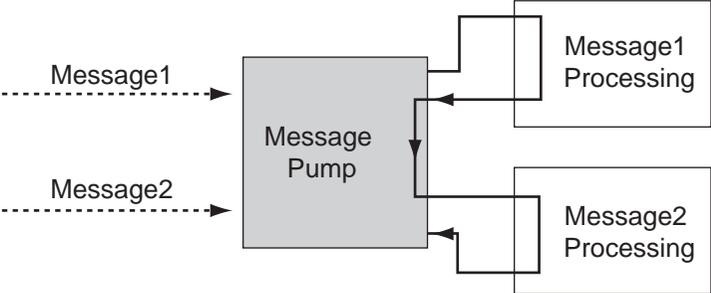
In this manual, the part where a message is received from Windows in turn and breaks up to each process (for VB, it corresponds to DoEvents, and for VC, it is the part where GetMessage () and DispatchMessage () are executed) is called the message pump.

When you normally program in VC or in VB, the message pump is concealed in the VC or VB framework so that you do not particularly worry about it, however, if this message pump does not run properly, Windows applications become awkward.

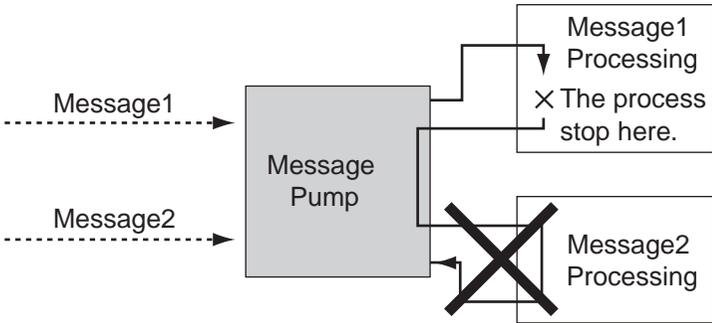
For example, when a routine takes time to process a certain message and the process does not return for a while, because an application cannot receive an event occurred during that time from Windows, an application cannot process the event.

Example) Suppose that messages are send from Windows according to the order of Message1 and then Message2.

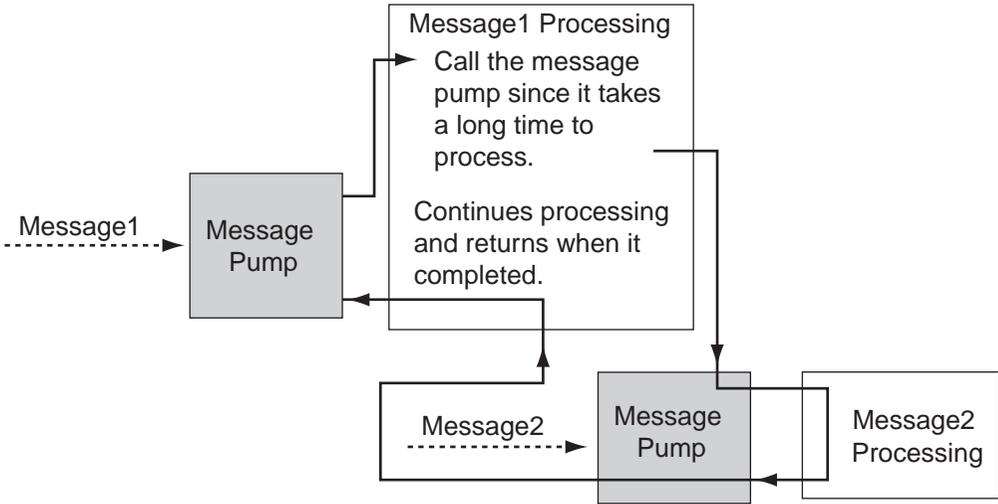
The message pump takes Message1 out and calls the subroutine for Message1. Then, after returning from the subroutine, it takes the next message (Message2) out and calls the subroutine for Message2.



At this time, suppose that it takes a long time to process Message1.
Then, Message2 cannot be processed because the process cannot return to the message pump.



In such a case, force the message pump run. (Call DoEvents for VB and call GetMessage() and DispatchMessage() for VC.)



The Windows application is the OS developed on the assumption that the application runs the message pump cleverly. Simple DLL functions run message pumps within themselves to avoid the thing described in the example for the process which takes a long time.

Prohibiting Function Double Call

Simple DLL functions prohibit to perform separate communication (double call) while they perform communication with certain partners (while calling Simple DLL functions). (It is possible using a multi-handle function. For details, refer to the section about multi-handle functions.)

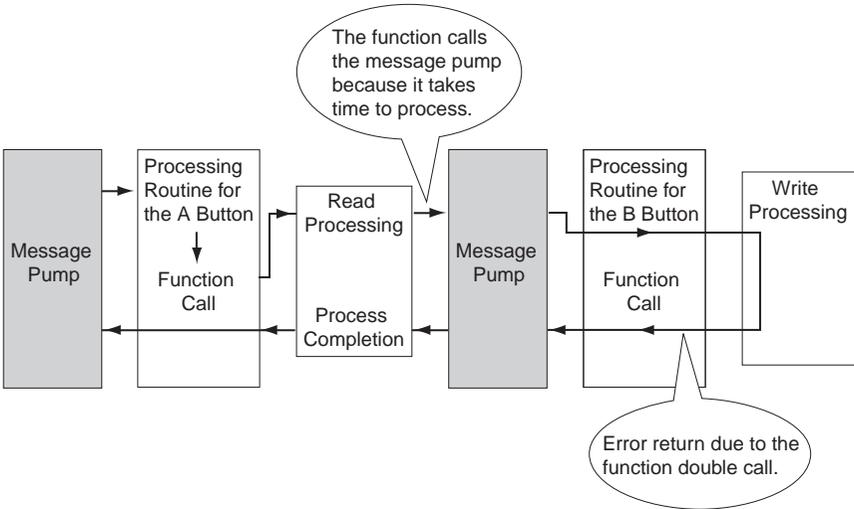
However, because Simple DLL functions run message pumps within themselves, applications will start when events occur.

If you call a function within the message process routine, the double call may occur. The following describes double call examples.

1. Double Call due to Pressing Two Buttons

Suppose that there are two buttons, A and B. If A is pressed, a device read function is called, and if B is pressed, a device write function is called.

In this case, if the B button is pressed while calling a device read function due to the A button pressed, a device write function is called. At that time, the function double call occurs and turned out to be an error.



2. Double Call due to Timer

When a periodical process is executed in Windows program, the timer event is frequently used. If you are not careful enough in programming using the timer event, the function double call may occur.

- ① Reads a device by calling a device read function once every second periodically, and displays data.
- ② Calls a device write function when a certain button is pressed, and writes data to a device.

These programs cause errors at the following timing.

- When the timer event occurred for ①, and the button mentioned in ② was pressed while reading, and then the process ② started.
- When the timer event occurred while writing (②), and reading is executed (①).

Avoiding Function Double Call

The following describes how to avoid the function double call.

- ① Improve the algorithm of the application to stop the function double call. For example:
 1. Be sure to cancel the timer in the beginning of timer and button processing routines.
 2. While process is executed due to a certain button pressed, ignore the event even if that button or another button is pressed.
- ② Use the multi-handle function.

If Pro-Server handle differs, it does not cause the function double call.

Use the multi-handle function, and use separate handle to the program which includes the function double call possibility.
- ③ Do not process messages within functions.

Call EasySetWaitType () using the argument 2, however, since messages other than those which cause the function double call will not be processed, applications may execute unexpected actions or may cause other problems.

Reading Character Strings in VB

There are following two methods to read character strings in VB.

- ① When reading character strings using ReadDeviceStr in VB:

In this case, you must designate (fix) the size of the area to save character strings read in advance.

```

Public Sub Sample1 ()
    Dim strData As String * 10 ' Correct designation method because it designates the size to read.
    'Dim strData As String    ' Incorrect designation method because it does not designate the character
                              ' string size.

    Dim IErr As Long
    IErr = ReadDeviceStr ("GPI", "LS100", strData, 10)
    If IErr <> 0 Then
        MsgBox "Read Error = " & IErr
    Else
        MsgBox "Read String = " & strData
    End If
End Sub

```

② When reading character strings using ReadDeviceVariant in VB:

If you do not designate the size of the area to save character strings read in advance, use the Variant type.

```
Public Sub Smaple2 ()
    Dim lErr As Long
    Dim vrData As Variant      ' Designate the Variant type to the area to save data read.
    lErr = ReadDeviceVariant ("GP1", "LS100", vrData, 10, EASY_AppKind_Str)
    If lErr <> 0 Then
        MsgBox "Read Error = " & lErr
    Else
        MsgBox "Read String = " & vrData
    End If
End Sub
```

Be careful that GP/GLC uses NULL characters to complete character strings. Therefore, if character strings acquired by the above method include NULL characters to complete character stirrings, you must shorten those.

The following shows the sample function to trim NULL characters.

```
Public Function TrimNull (strData As String) As String
    Dim i As Integer
    i = InStr (1, strData, Chr$(0), vbBinaryCompare)
    If 0 < i Then
        TrimNull = Left (strData, i - 1)
    Else
        TrimNull = strData
    End If
End Function
```

Details of Cache Read (Polling Time and Life Time)

Pro-Server has the feature internally to cache read data when it is requested to read a device by cache read. If the read request is raised to the same device, Pro-Server returns cached data. Pro-Server can respond quickly because it does not read data every time.

If a device does not change at all, Pro-Server can always return cache data. If not, it is necessary to reflect device changes to cache data.

Therefore, Pro-Server automatically reads devices to cache according to a particular interval and updates cache data. The action is called polling and the interval is called a polling time.

Polling is automatically executed when cache read is executed, and polling for the device that the usage is completed stops automatically.

After a certain device was read, if any read requests are not given to the device for a certain period, Pro-Server recognizes that the usage of the device is completed.

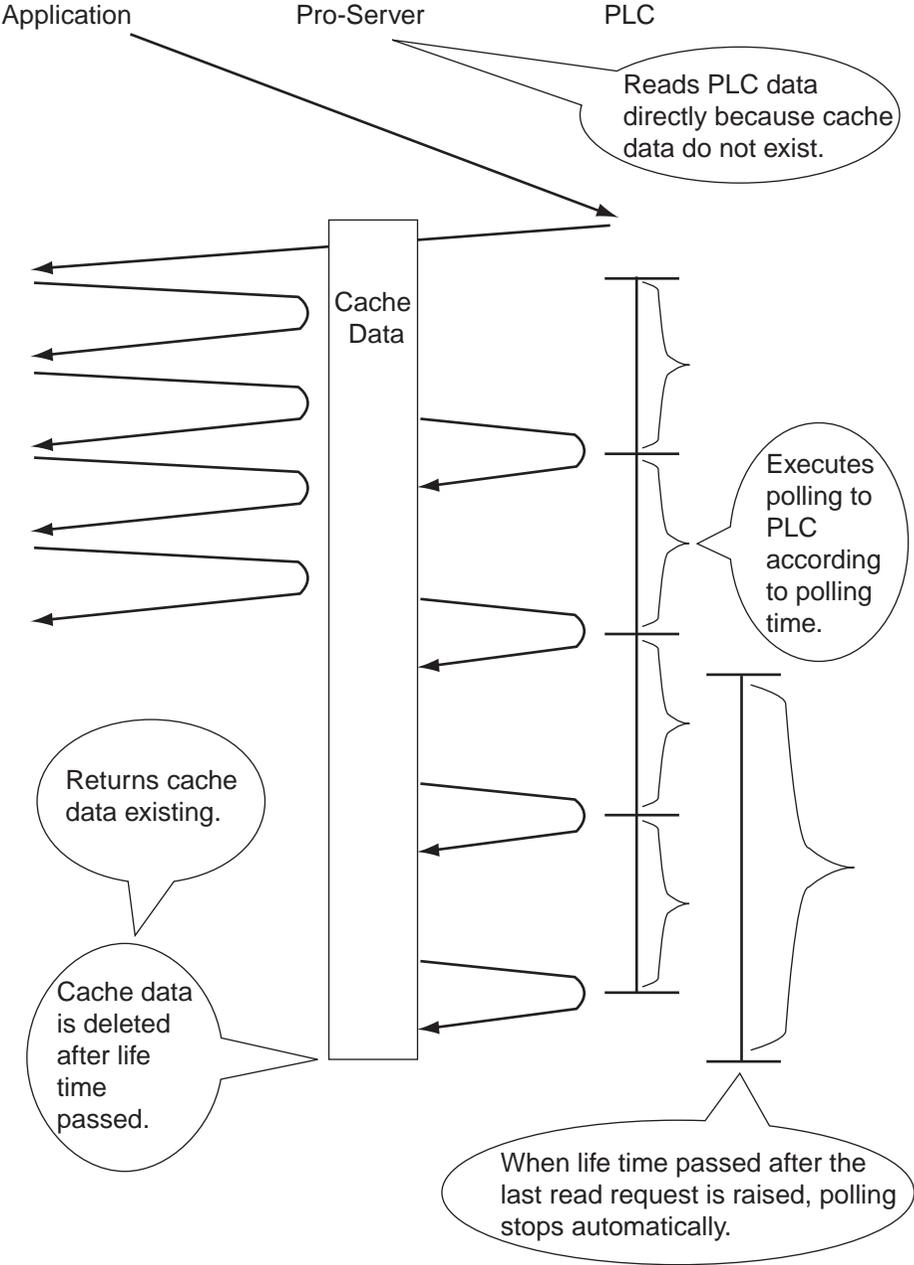
This period is called life time.

If any read requests are raised within life time, life time will be reset at that moment.

After life time passed, polling to the device stops automatically.

The figure on the next page shows Pro-Server's behavior when a cache read request is given from an application via Simple DLL.

Pro-Server's behavior when a cache read request is given from an application via Simple DLL



Designating Polling Time

Pro-Server decides polling time according to the following priority.

- ① Designating polling time directly using Simple DLL or DDE:

Designate it as part of character string to the device designation part of Simple DLL or DDE. The format is as the following.

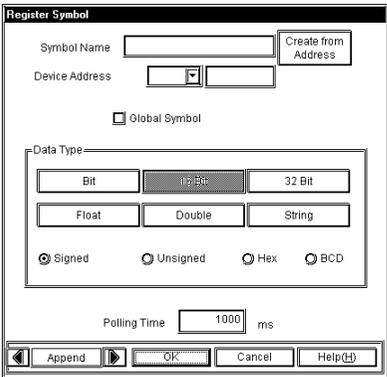
.<Polling Time>
<Polling Time> = Polling time value in ms

Example) When designating 20 seconds as polling time:

IErr=ReadDeviceVariant (“GP1”, “D100 .20000”, Data, 1, EASY_AppKind_SignedWord)
Separate this with blank space after a device (or a symbol) and designated it in ms after “.”.

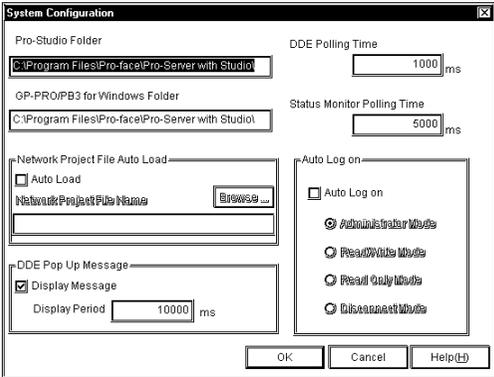
- ② When a device is registered as a symbol:

The [Polling Time] value in the [Register Symbol] dialog is used.



- ③ When a device is not registered as a symbol and designating polling time without polling time designation:

The [DDE Polling Time] value in the [System Configuration] dialog is used.



Designating Life Time

Although Pro-Server calculates life time automatically from polling time, you can designate any desired values. In this case, designate time as part of character strings in the device designation part of Simple DLL or DDE. The format is as the following.

.L<Life Time>

<Life Time> = Life time value in ms

Example) When designating 20 seconds as life time:

IErr=ReadDeviceVariant ("GP1", "D100 .L20000", Data, 1, EASY_AppKind_SignedWord)

Separate this with blank space after a device (or a symbol) and designated it in ms after ".L".

When using a Visual Studio .NET environment

This example uses a Visual Basic.NET sample. For details, refer to 9.2.3 Using simple DLL functions with Visual Basic .NET.

When using Visual C++.NET, the VCC++ sample can be compiled and run. However, when creating a new project, the method of designating an LIB file is different. For details 9.2.2 VC Function Help.

9.2 Examples of Simple DLL Function

Using read/write functions provided by Pro-Server allows you to read/write data from VB or VC applications.

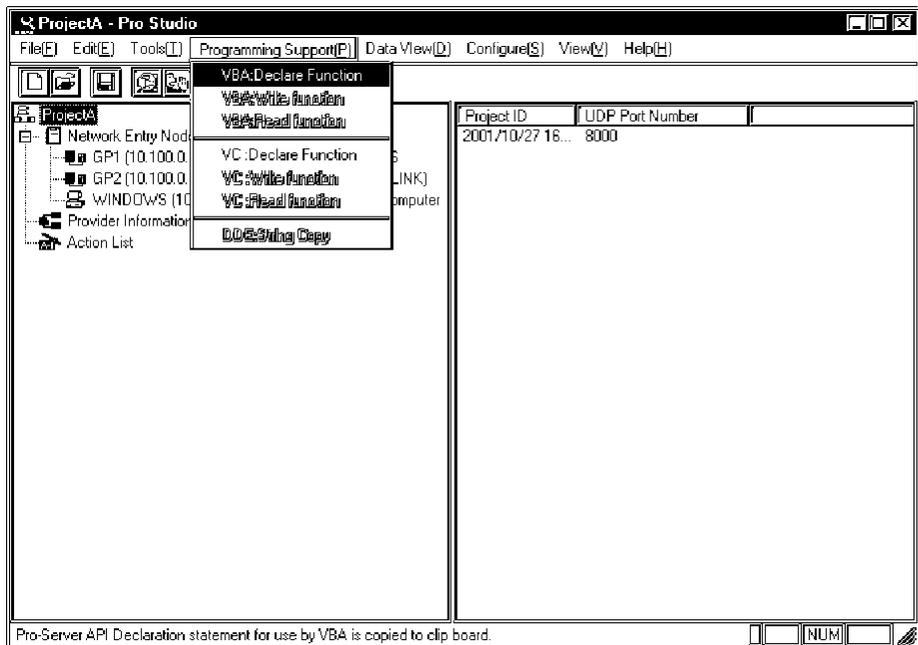
This section describes the procedure to read/write designated symbols using the programming help feature.

Procedures are different between VP and VC applications. They're described separately.

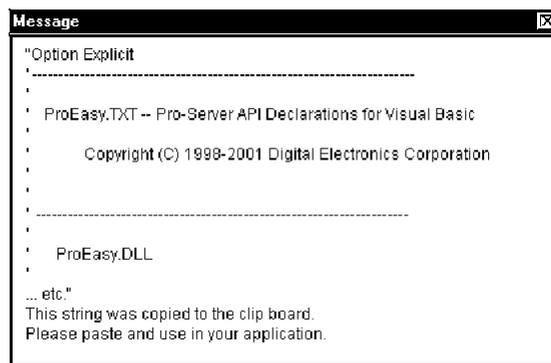
9.2.1 VB Feature Help

VBA: Declaration

1. Click [VBA: Declare Function] on [Programming Support].



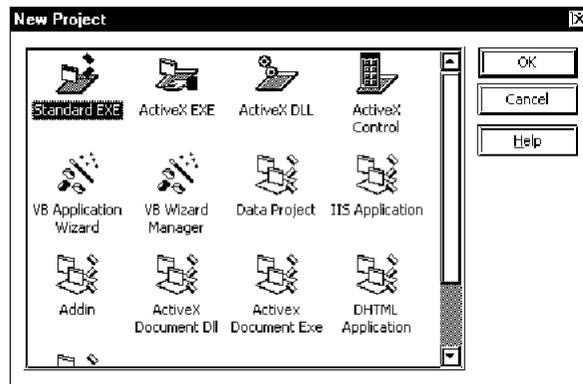
2. The declaration is copied to the Clipboard.



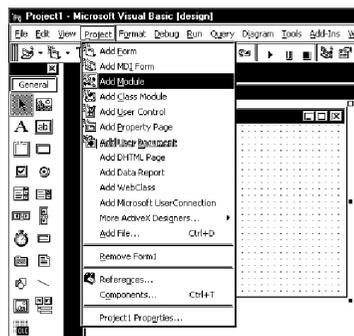
3. Start-up Microsoft Visual Basic, and then click [New Project] on [File] from the menu.



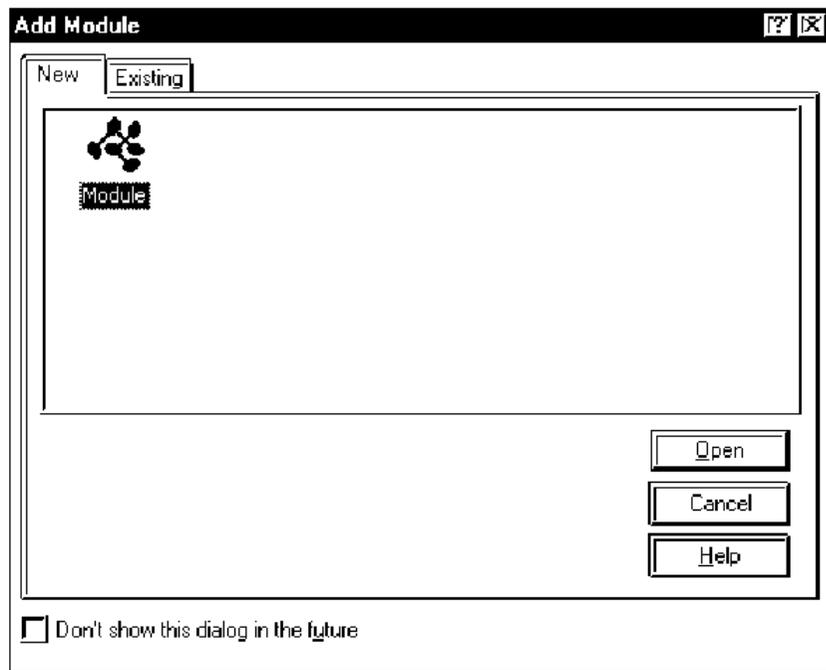
4. Select [Standard EXE], and then click [OK].



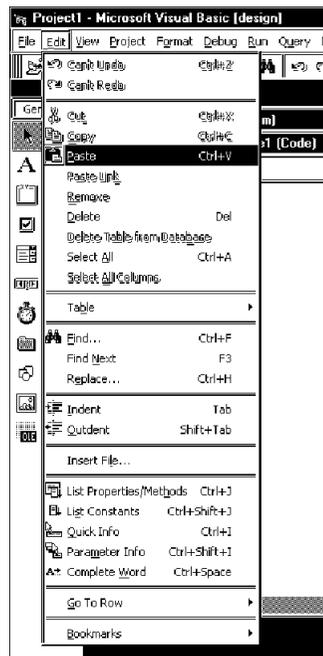
5. Click [Add Module] on [Project] of the Microsoft Visual Basic menu.



6. Select [Standard Module] on the [New] tab, and then click [Open].

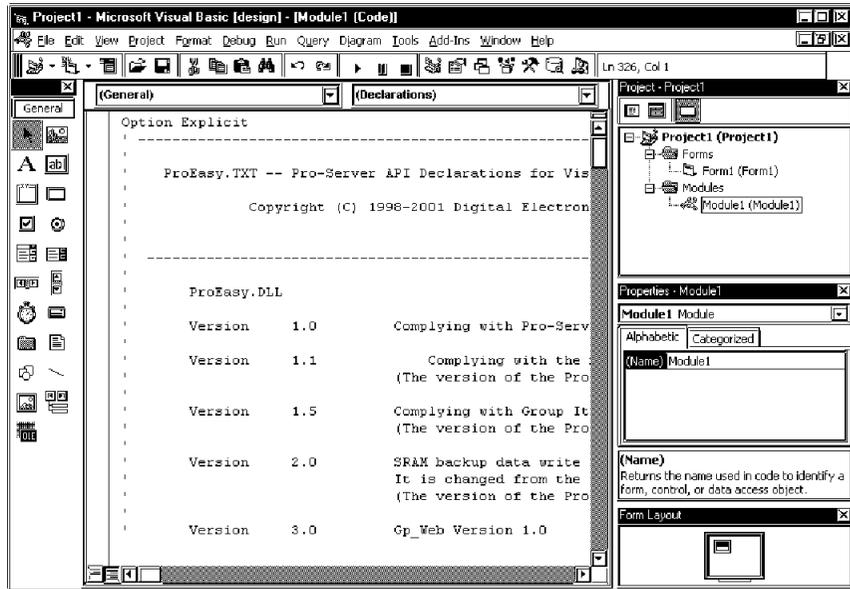


7. Click [Paste] on [Edit] of the Microsoft Visual Basic menu to paste the declaration (the contents in the Clipboard) to the added standard module.



8. The declaration will be pasted.

This completes function (read/write functions) declaration.



Operations from Step 1 through 8 mentioned above are common to both read and write.

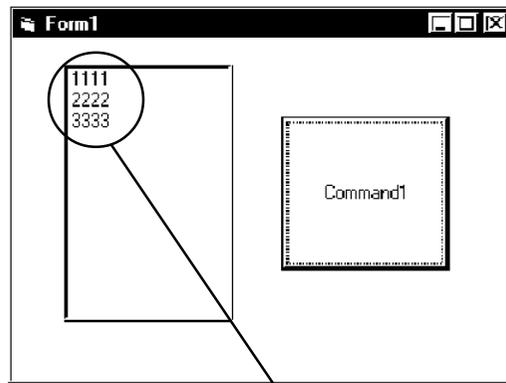
For the subsequent part, each procedure is described separately because procedures are different between read and write.

Refer to Step 9 through 21 to create the [Read] application.

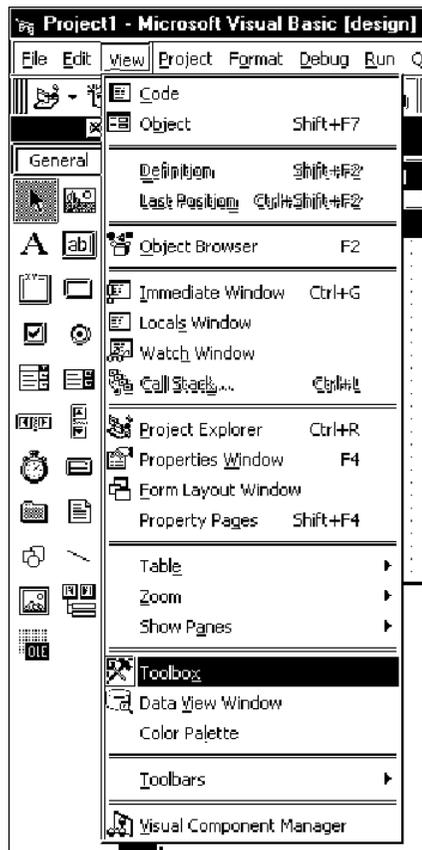
Refer to Step 22 through 33 to create the [Write] application.

Creating [Read] Application

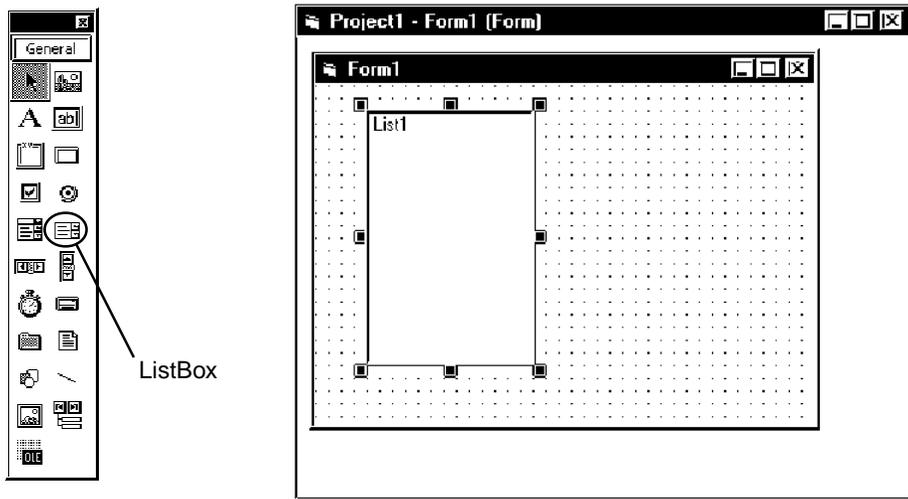
- This section describes the application to read and display three data (16 bits signed) when clicking [Command1].



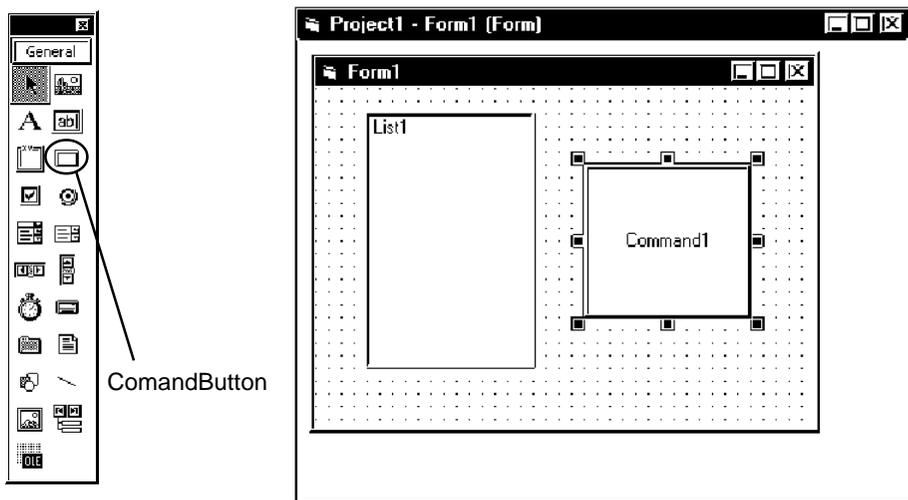
- Click [Toolbox] on [View] of the Microsoft Visual Basic menu.



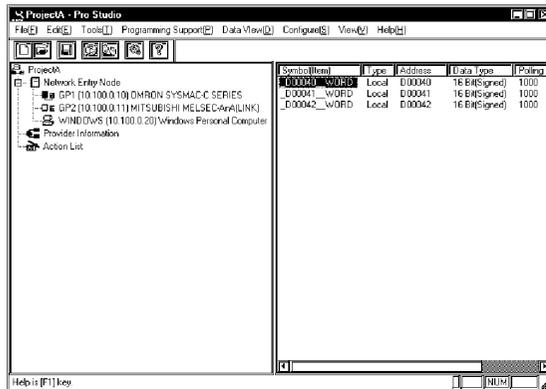
11. Select [ListBox], and then paste to [Form1].



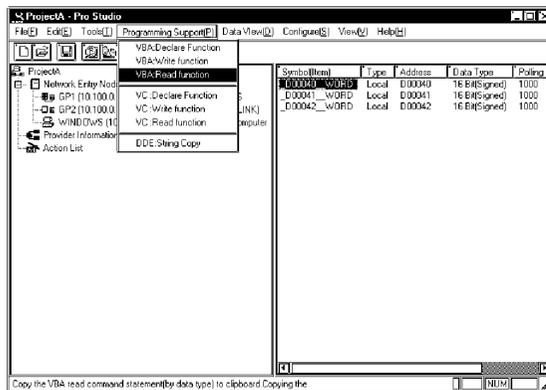
12. Select [CommandButton], and then paste to [Form1].



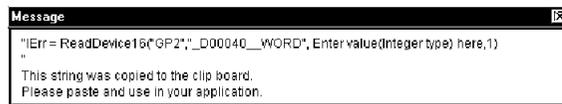
13. Select the symbol name that you wish to read among symbols registered on Pro-Studio
(Select the heading symbol to read from.).



14. Click [VBA: Read function] on [Programming Support] of the menu.



15. The read function will be copied into the Clipboard.



16. Double click [Command1] on [Form1] to paste the contents (read function) in the Clipboard between the Sub and the EndSub statements.



17. Declare the area to store read data. You should designate three or more area elements if the number of read data is three (The number of area elements is from 0 to 2 in this example). However, the area type (Integer in this example) needs to be matched to the symbol data type to use.

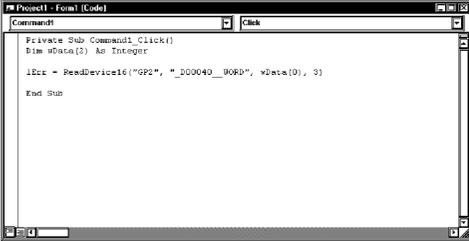


```

Private Sub Command1_Click()
    Dim wData(2) As Integer

    End Sub
  
```

18. Designate the header area to store read data (wData (0)), and also designate 3 as the number of read data.



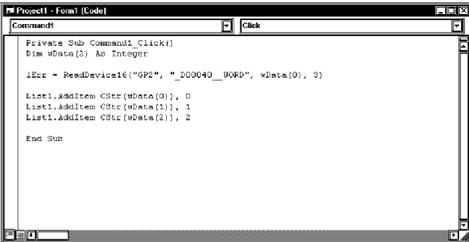
```

Private Sub Command1_Click()
    Dim wData(2) As Integer

    !Dir = ReadDevice16("GP2", "D00040_00RD", wData(0), 3)

    End Sub
  
```

19. Set three data read (wData(0), wData(1), wData(2)) in the ListBox one after another.



```

Private Sub Command1_Click()
    Dim wData(2) As Integer

    !Dir = ReadDevice16("GP2", "D00040_00RD", wData(0), 3)

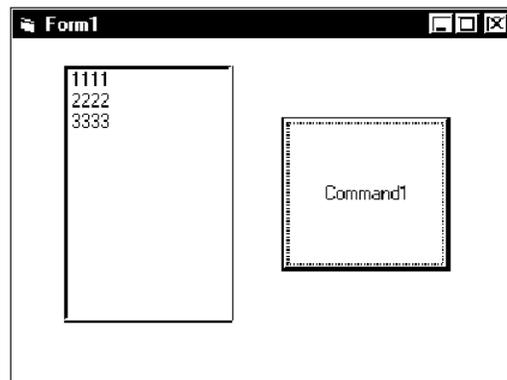
    List1.AddItem CStr(wData(0)), 0
    List1.AddItem CStr(wData(1)), 1
    List1.AddItem CStr(wData(2)), 2

    End Sub
  
```

20. Click [Start] on [Run] of the Microsoft Visual Basic menu.

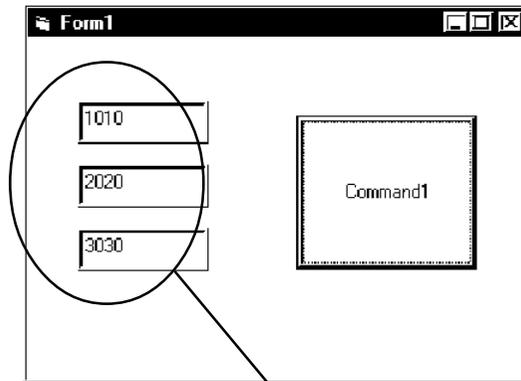


21. Click [Command1] to display three data form the symbol “_D40_WORD” in the ListBox.



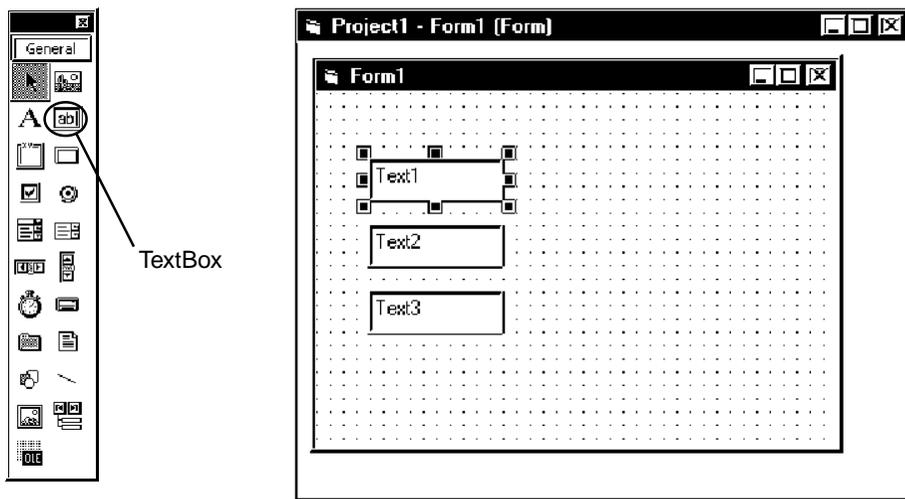
Creating [Write] Application

22. This section describes the application to write three data (16 bits signed) read when clicking [Command1].

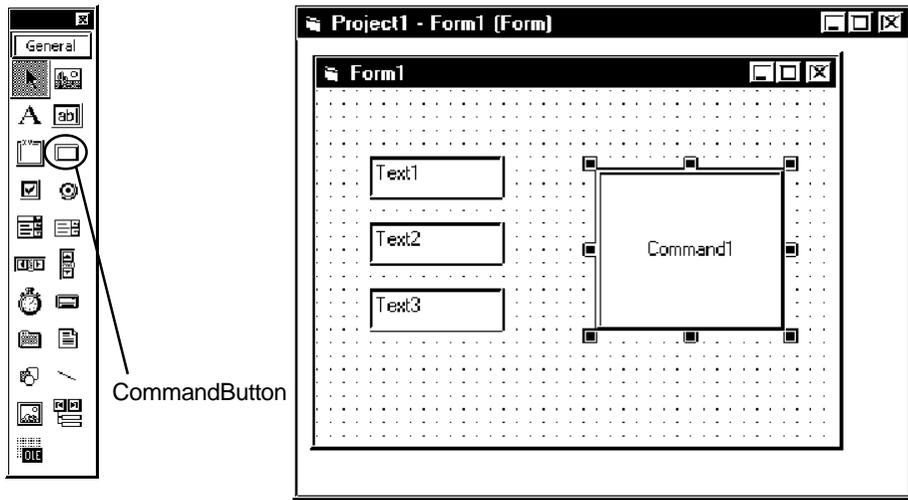


Writes three data.

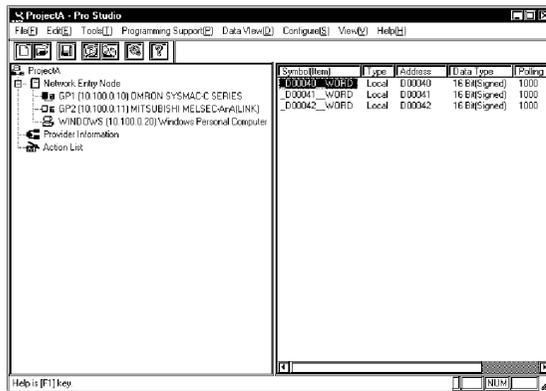
23. Select [TextBox], and then paste in [Form1]. Paste three [TextBox]s.



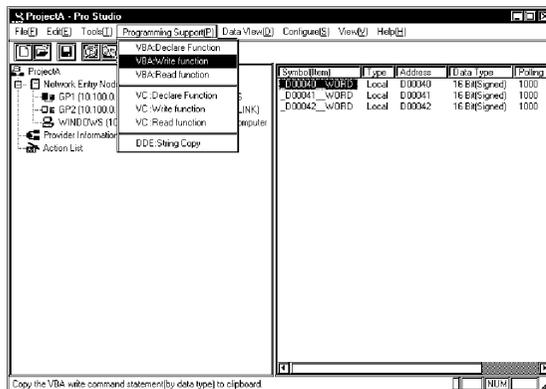
24. Select [CommandButton], and then paste to [Form1].



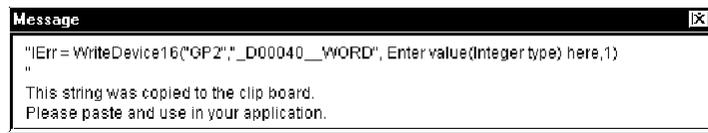
25. Select the symbol name that you wish to write to among symbols registered on Pro-Studio
(Select the heading symbol to write to).



26. Click [VBA: Write function] on [Programming Support] of the menu.



27. The write function will be copied into the Clipboard.

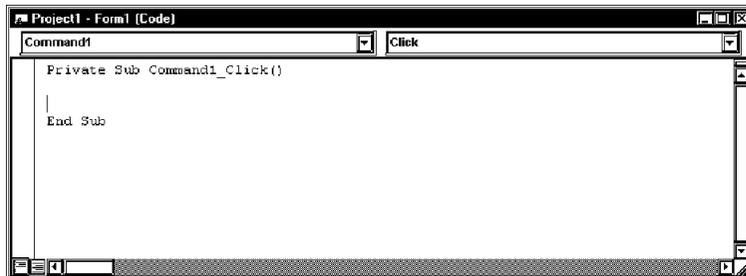


```

Message
"lErr = WriteDevice16("GP 2","_D00040__WORD", Enter value(Integer type) here,1)
"
This string was copied to the clip board.
Please paste and use in your application.

```

28. Double click [Command1] on [Form1] to paste the contents (write function) in the Clipboard between the Sub and the EndSub statements.

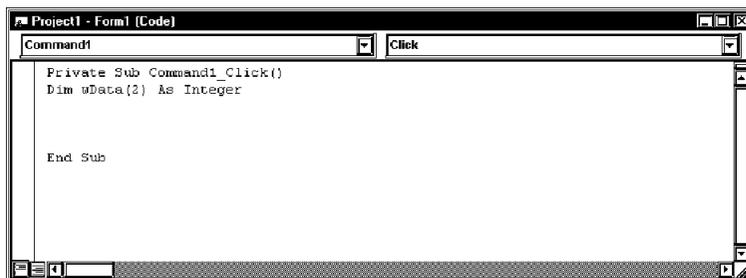


```

Project1 - Form1 (Code)
Command1 Click
Private Sub Command1_Click()
|
End Sub

```

29. Declare the area to store data to write. You should designate three or more area elements if the number of write data is three (The number of area elements is from 0 to 2 in this example). However, the area type (Integer in this example) needs to be matched to the symbol data type to use.



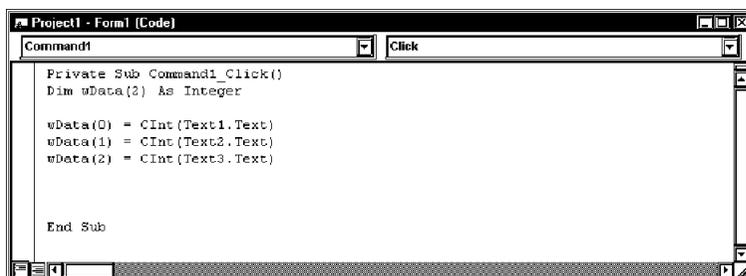
```

Project1 - Form1 (Code)
Command1 Click
Private Sub Command1_Click()
Dim wData(2) As Integer

End Sub

```

30. Set entered data in [TextBox] to the area.



```

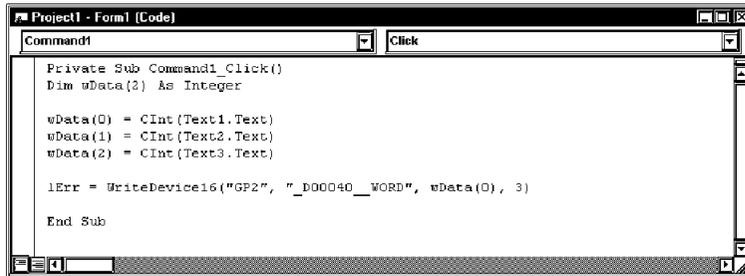
Project1 - Form1 (Code)
Command1 Click
Private Sub Command1_Click()
Dim wData(2) As Integer

wData(0) = CInt(Text1.Text)
wData(1) = CInt(Text2.Text)
wData(2) = CInt(Text3.Text)

End Sub

```

31. Designate the header area (wData (0)) where written data have been set. Also designate three as the number of write data.



```

Private Sub Command1_Click()
    Dim wData(2) As Integer

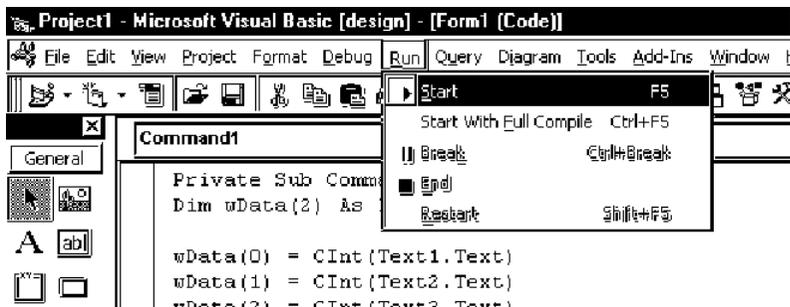
    wData(0) = CInt(Text1.Text)
    wData(1) = CInt(Text2.Text)
    wData(2) = CInt(Text3.Text)

    !Err = WriteDevice16("GP2", "_D00040__WORD", wData(0), 3)

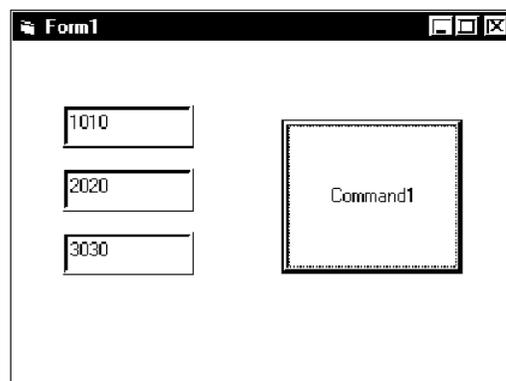
End Sub

```

32. Click [Start] on [Run] of the Microsoft Visual Basic menu.



33. After entering three data to write in [TextBox], click [Command1] to write three data form the symbol, "_D40_WORD".



MEMO

When using VB.NET, if you insert the declaration according to this procedure, an error will occur when executing it.

You cannot use VBA: Declaration directly because data sizes of Integer or Long are different between VB.NET and Visual Basic.

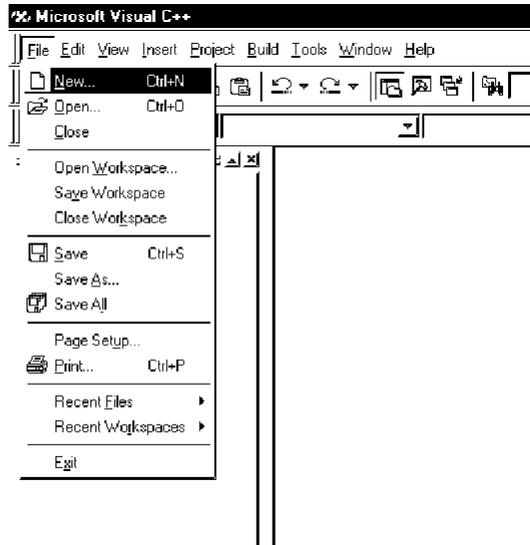
VBA: Declaration is for Visual Basic or Basic for Application.

9.2.2 VC Function Help

This section describes how to create the dialog-based application example using MFC (Microsoft Foundation Class).

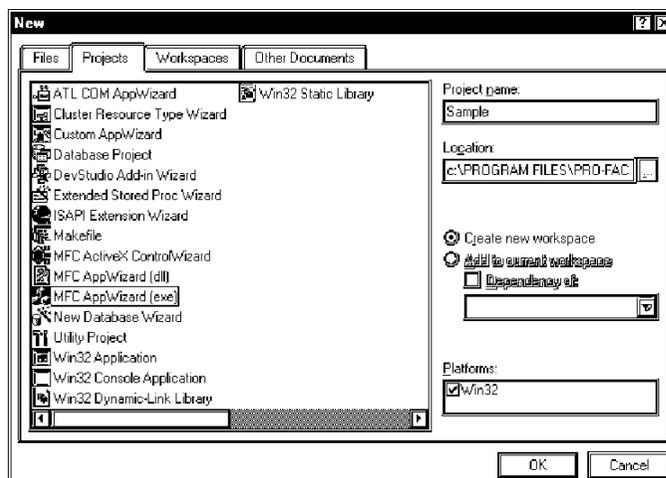
VC: Declaration

1. Start Microsoft Visual C++, and then click [New] on [File].

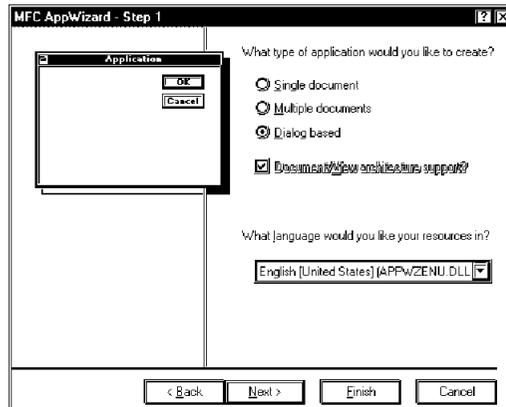


2. Select [MFCAppWizard (exe)] in the [Projects] tab, enter [Project name] and [Location], and then click [OK].

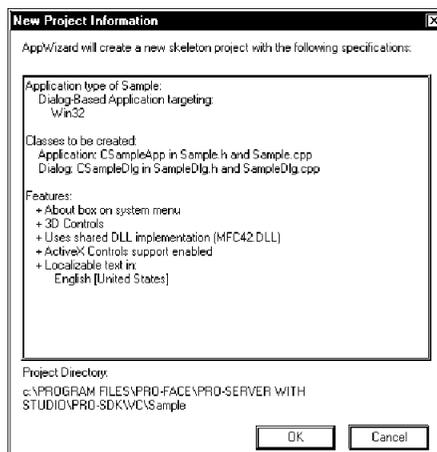
This example uses “Sample” for [Project name] and “C:\Program Files\Pro-Server with Studio\Pro-SDK\VC” for [Location].



3. Select [Dialog based] in the “What type of application would you like to create?” field, and then click [Finish].

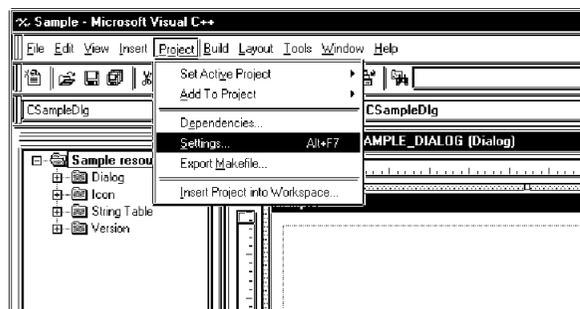


4. Click [OK] to complete the project.

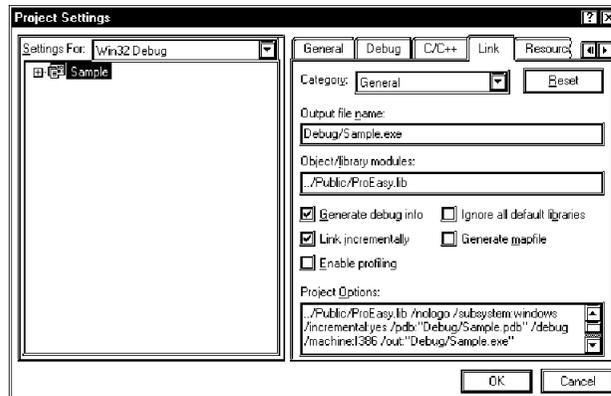


5. Pro-Serer provides read/write functions as DLLs. You should designate the LIB file to use those DLLs.

Click [Setting] on [Project] of the Microsoft Visual C++ menu.

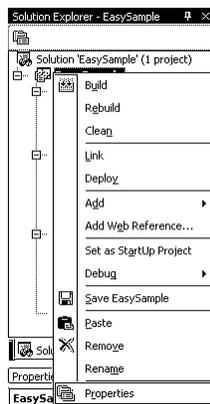


6. Designate the LIB file using [Object/library modules] in the [Link] tab, and then click [OK].
 “Pro-SDK\Vc\Public\ProEasy.lib” is designated in this example because the LIB file (ProEasy.lib) exists in “Pro-SDK\Vc\Public” under the folder where Pro-Server has been installed.

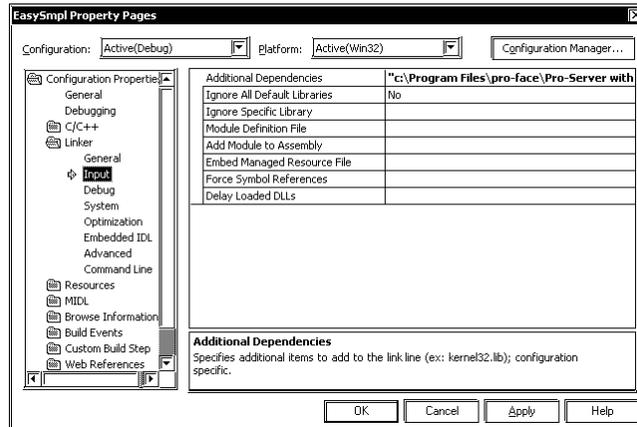
**MEMO**

Designating LIB files via Visual C++ .NET

When designating LIB files using Microsoft Visual C++ .NET, right-click the project's name within the [Solution Explorer] window (shown below), and select [Properties].

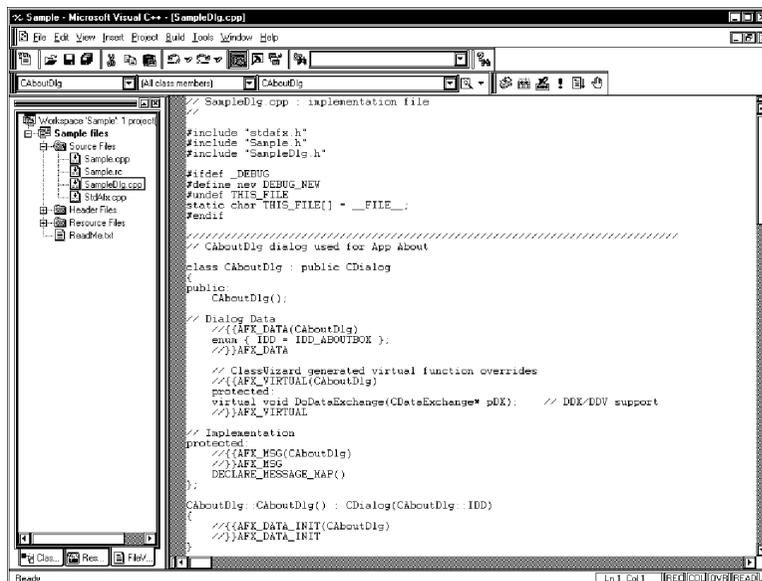


In the resulting Property Pages, select [Linker | Input]. Designate the LIB file (ProEasy.lib) in the [Additional Dependencies] column. ProEasy.lib is located in the [Install] folder's [Pro-SDK\Vc\Public] sub-folder. (C:\Program Files\Pro-face\Pro-Server with Pro-Studio\Pro-SDK\Vc\ProEasy.lib in the following figure.)

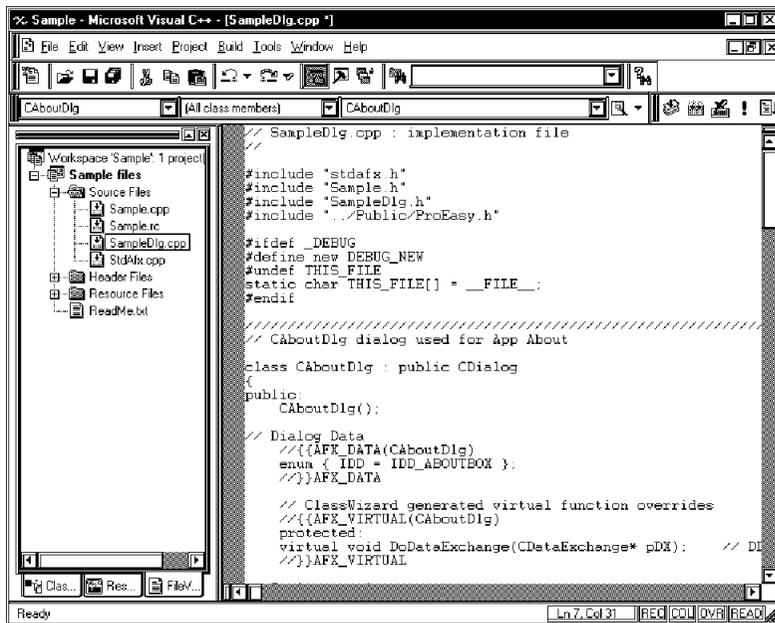


7. You should install the header file (ProEasy.h) to use read/write functions provided by Pro-Server. Click the [FileView] tab in the Microsoft Visual C++ [Workspace] window, and then double click the SampleDig.cpp file.

In this example, read/write functions are used in the SampleDig.cpp file.



8. Add #include "Pro-SDK\Public\ProEasy.h" in the SampleDlg.cpp file to complete the read/write function declaration.



Operations from step 1 through 8 mentioned above are common to both read and write.

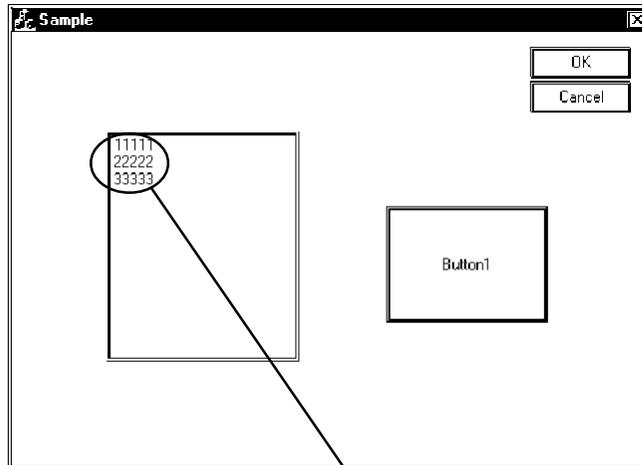
For the subsequent part, each procedure is described separately because procedures are different between read and write.

Refer to step 9 through 32 to create the [Read] application.

Refer to step 33 through 51 to create the [Write] application.

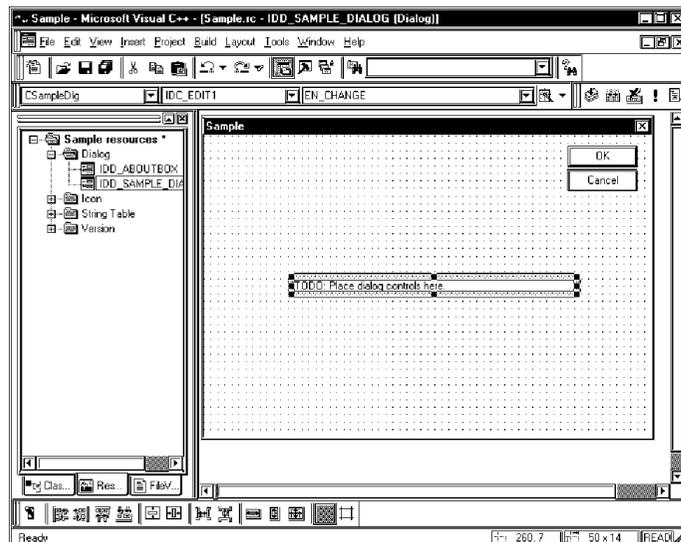
Creating [Read] Application

- This section describes the application to read and display three data (16 bits signed) when clicking [Button1].

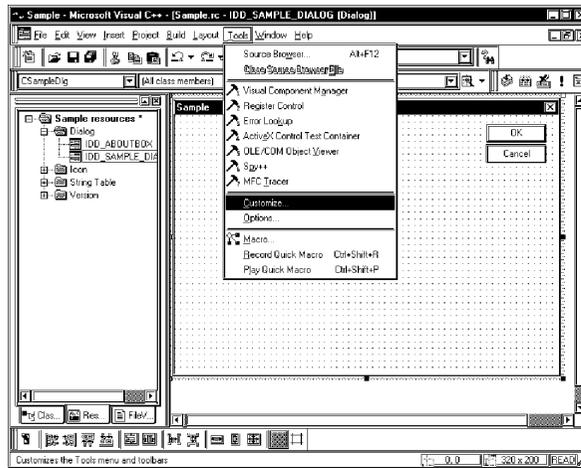


Displays three read data.

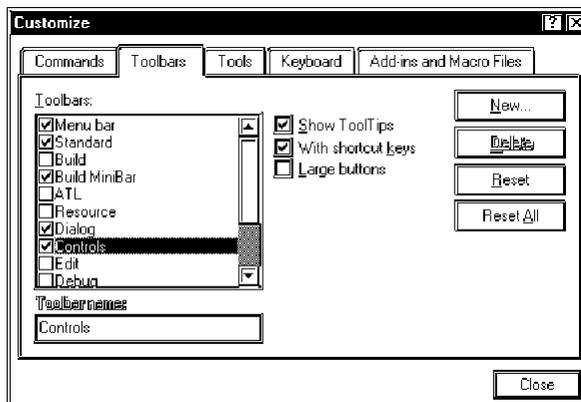
- Click the [ResourceView] tab in the Microsoft Visual C++ [Workspace] window, and then double click [IDD_SAMPLE_DIALOG].
Select and delete [Static Text] in the center of the dialog.



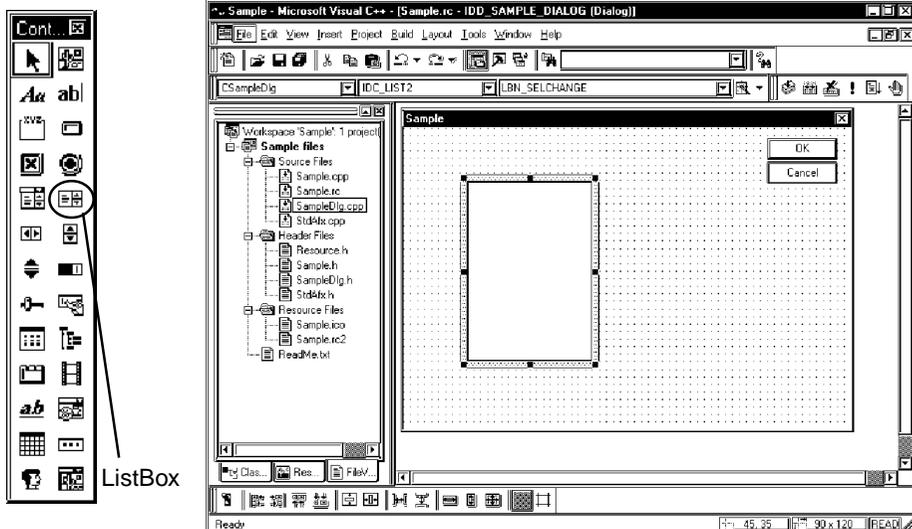
11. Click [Customize] on [Tools] of the Microsoft Visual C++ menu.



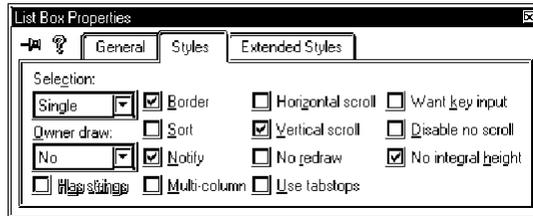
12. Check [Controls] in the [Toolbars] tab, and then click [Close].



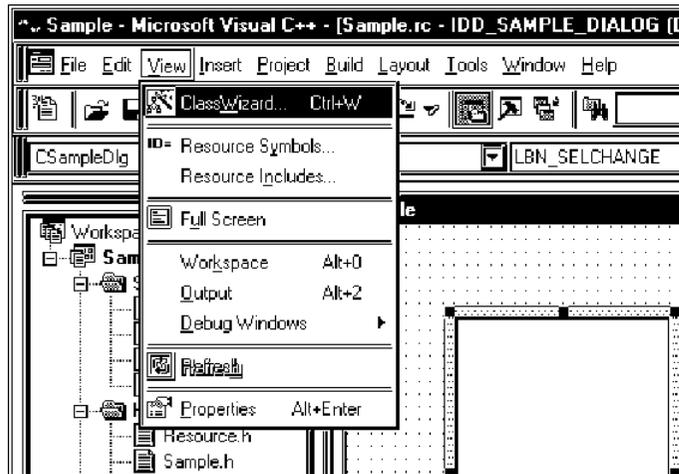
13. Select [ListBox], and then paste it in the dialog.



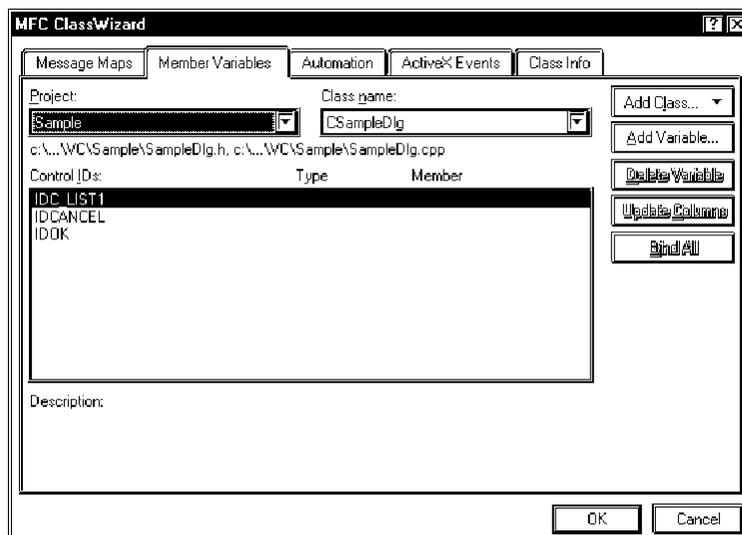
14. Right-click the pasted [ListBox], and then select [Property]. After the [ListBox Properties] window appears, uncheck [Sort].



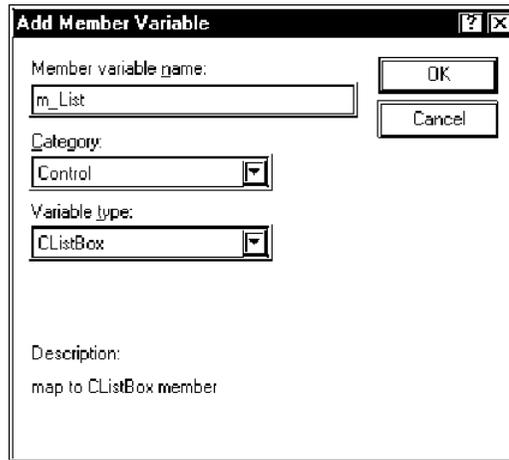
15. Click [ClassWizard] on [View] of the Microsoft Visual C++ menu.



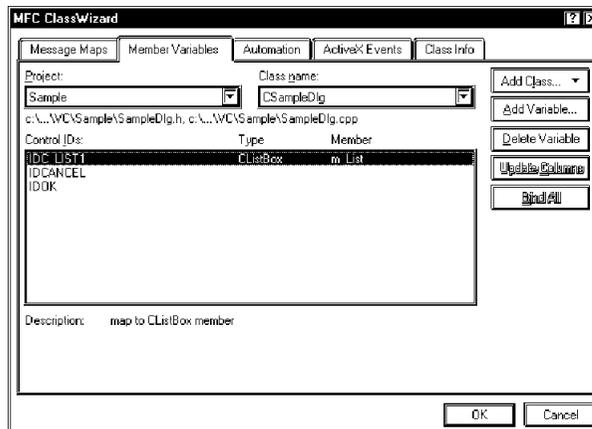
16. Select the [Member Variables] tab, and then select "IDC_LIST1" in [Control ID].



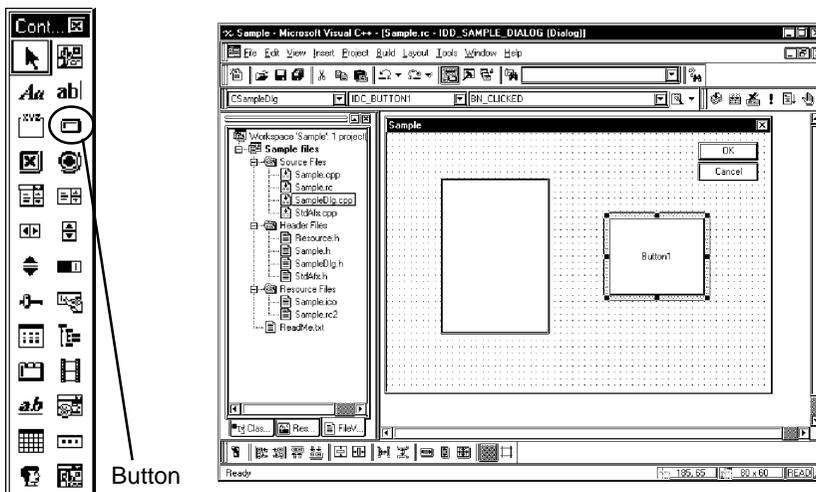
17. Click [Add Variable...], and then enter “m_List” in [Member Variable name]. Select “Control” in [Category], and then click [OK].



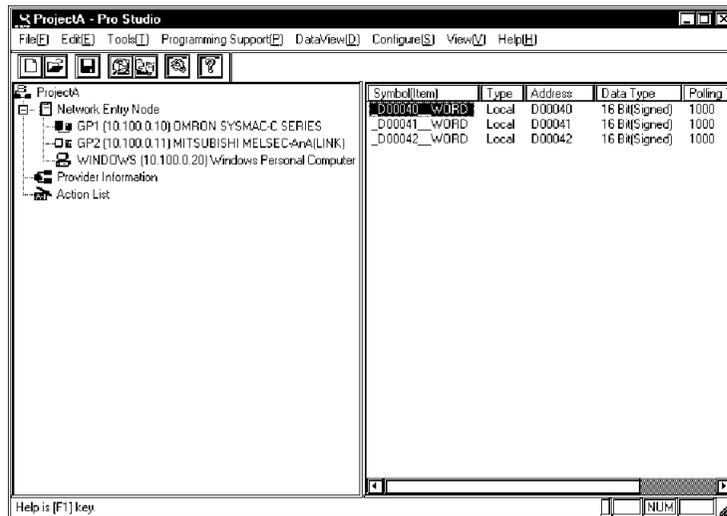
18. Make sure if the member variable has been added, and then click [OK].



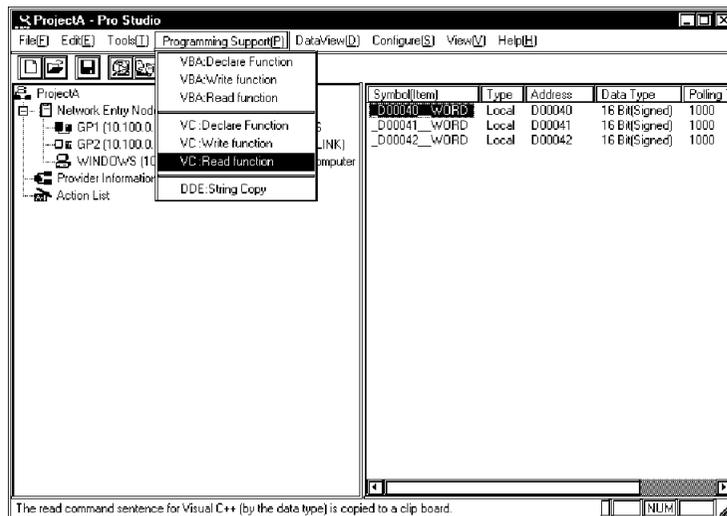
19. Select [Button], and then paste it in the dialog.



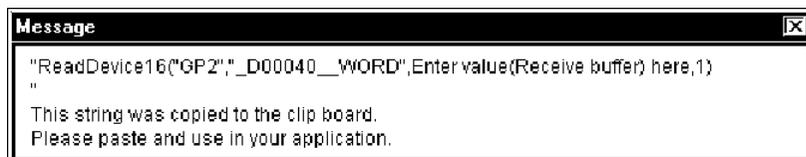
20. Select the symbol name that you wish to read among symbols registered on Pro-Server
(Select the heading symbol to read from.).



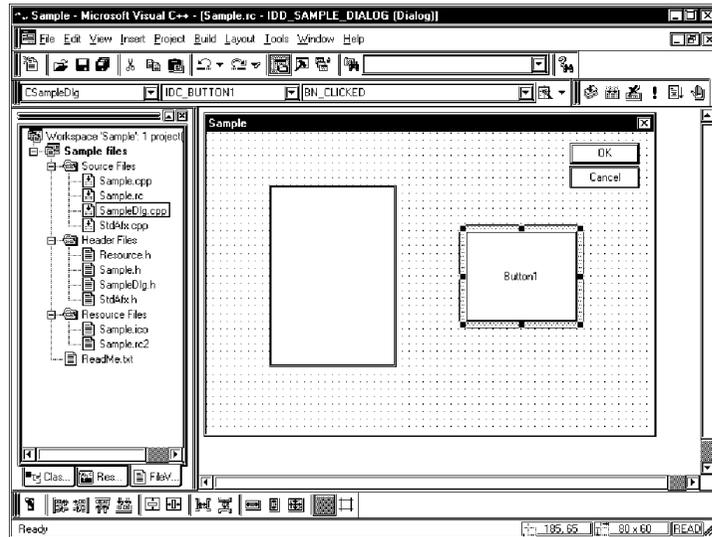
21. Click [VC: Read Function] on [Programming Support] of the menu.



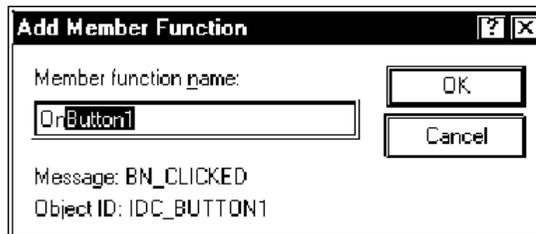
22. The read function will be copied into the Clipboard.



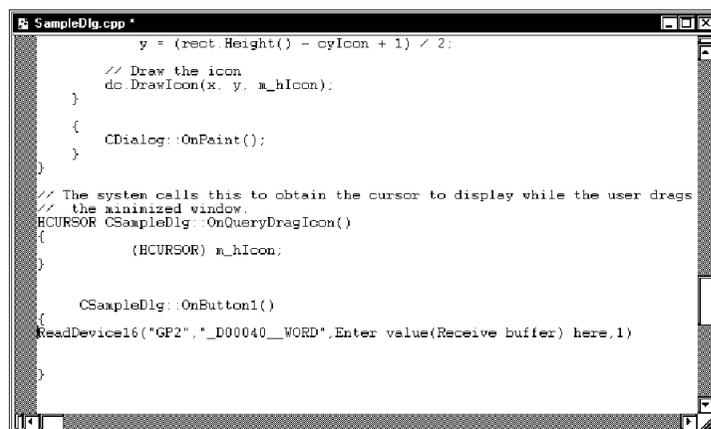
23. Double click [Button1] pasted to [Dialog] of the Microsoft Visual C++ menu.



24. Click [OK].



25. Paste the contents of the Clipboard (read function) into the OnButton1 member function.



26. Declare the area to store read data. You should designate three or more area elements if the number of read data is three.

```

SampleDlg.cpp
y = (rect.Height() - cyIcon + 1) / 2;
// Draw the icon
dc.DrawIcon(x, y, m_hIcon);
}
{
  CDialog::OnPaint();
}
}
// The system calls this to obtain the cursor to display while the user drags
// the minimized window.
HCURSOR CSampleDlg::OnQueryDragIcon()
{
  (HCURSOR) m_hIcon;
}

CSampleDlg::OnButton1()
{
  WORD wData[3];
  ReadDevice16("GP2", "_D00040__WORD", Enter value(Receive buffer) here, 1)
}
}

```

27. Designate the header area to store read data (wData(0)), and 3 as the number of read data. You should also add a semicolon (;) at the end of the read function.

```

SampleDlg.cpp
y = (rect.Height() - cyIcon + 1) / 2;
// Draw the icon
dc.DrawIcon(x, y, m_hIcon);
}
{
  CDialog::OnPaint();
}
}
// The system calls this to obtain the cursor to display while the user drags
// the minimized window.
HCURSOR CSampleDlg::OnQueryDragIcon()
{
  (HCURSOR) m_hIcon;
}

CSampleDlg::OnButton1()
{
  WORD wData[3];
  ReadDevice16("GP2", "_D00040__WORD", wData, 3);
}
}

```

28. Convert read data to CString type characters once to display three read data (wData(0), wData(1), wData(2)) in the ListBox.

```

SampleDlg.cpp
{
  CDialog::OnPaint();
}
}
// The system calls this to obtain the cursor to display while the user drags
// the minimized window.
HCURSOR CSampleDlg::OnQueryDragIcon()
{
  (HCURSOR) m_hIcon;
}

CSampleDlg::OnButton1()
{
  WORD wData[3];
  ReadDevice16("GP2", "_D00040__WORD", wData, 3);
  CString str[3];
  str[0] Format("%d", wData[0]);
  str[1] Format("%d", wData[1]);
  str[2] Format("%d", wData[2]);
}
}

```

29. Set three data read (wData(0), wData(1), wData(2)) in the ListBox one after another.

```

}
}
// The system calls this to obtain the cursor to display while the user drags
// the minimized window
HCURSOR CSampleDlg::OnQueryDragIcon()
{
    (HCURSOR) m_hIcon;
}

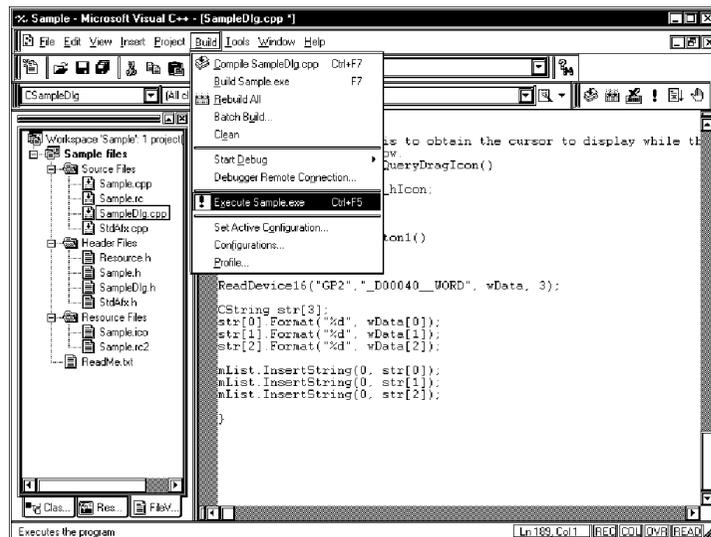
CSampleDlg::OnButton()
{
    WORD wData[3];
    ReadDevice16("GP2", "_D00040__WORD", wData, 3);

    CString str[3];
    str[0].Format("%d", wData[0]);
    str[1].Format("%d", wData[1]);
    str[2].Format("%d", wData[2]);

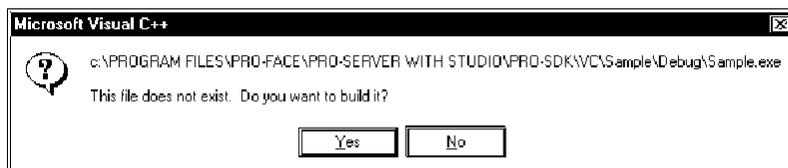
    mList.InsertString(0, str[0]);
    mList.InsertString(0, str[1]);
    mList.InsertString(0, str[2]);
}
}
}

```

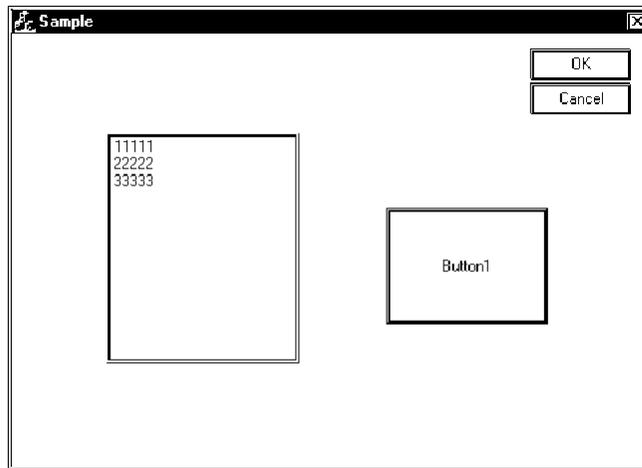
30. Click [Execute Sample.exe] on [Build] of the Microsoft Visual C++ menu.



31. Click [Yes].

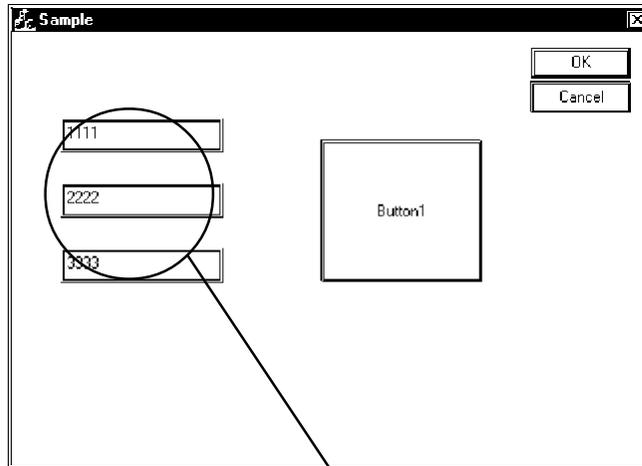


32. Click [Button1] to display three data from the symbol “_D40_WORD” in the ListBox.



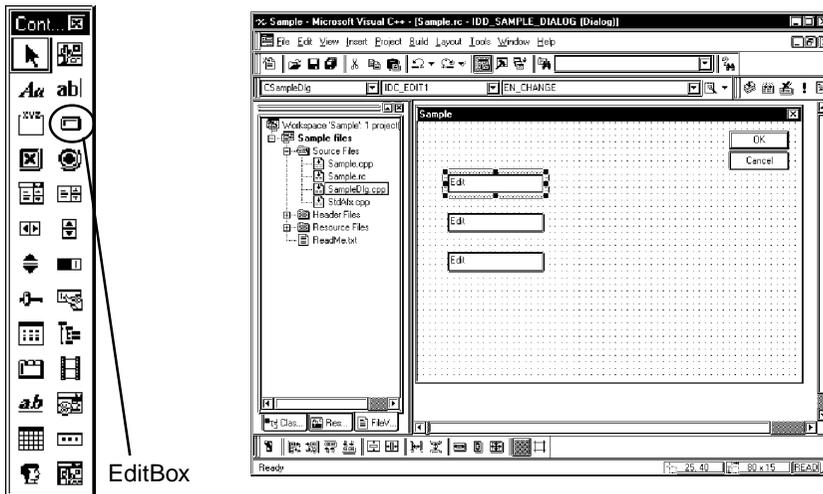
Creating Write Application

33. This section describes the application to write three read data when clicking [Button1].
Execute the same operations, step 10 through 12, as in “Creating Read Application”.



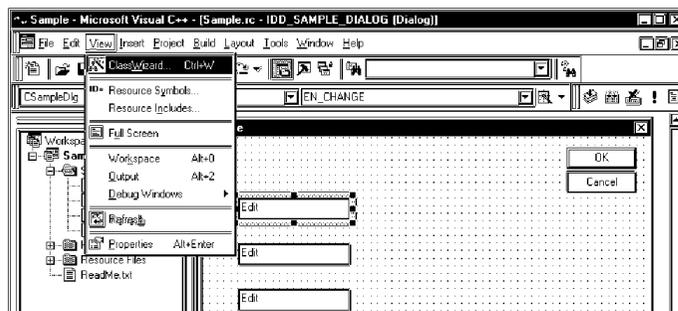
Write three read data.

34. Select [EditBox], and then paste it in [Dialog]. You should paste three [EditBox]s.

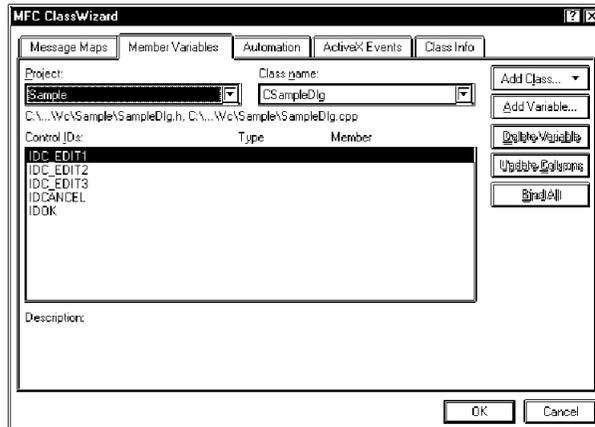


EditBox

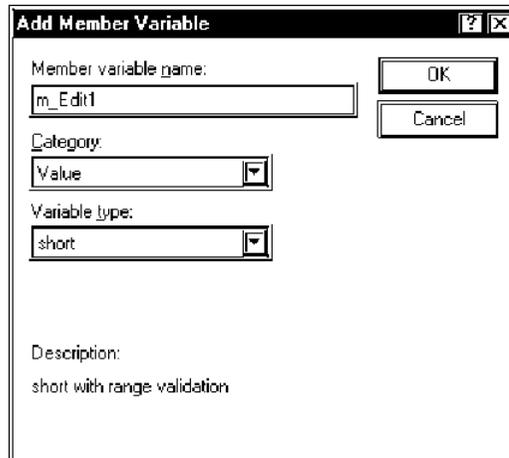
35. Click [Class Wizard] on [View] of the Microsoft Visual C++ menu.



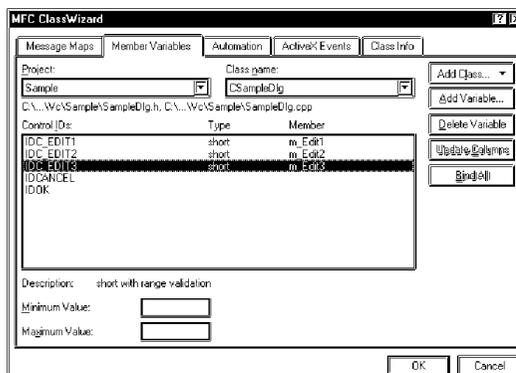
36. Select “IDC_EDIT1” in [Control IDs] of the [Member Variables] tab, and then click [Add Variable...].



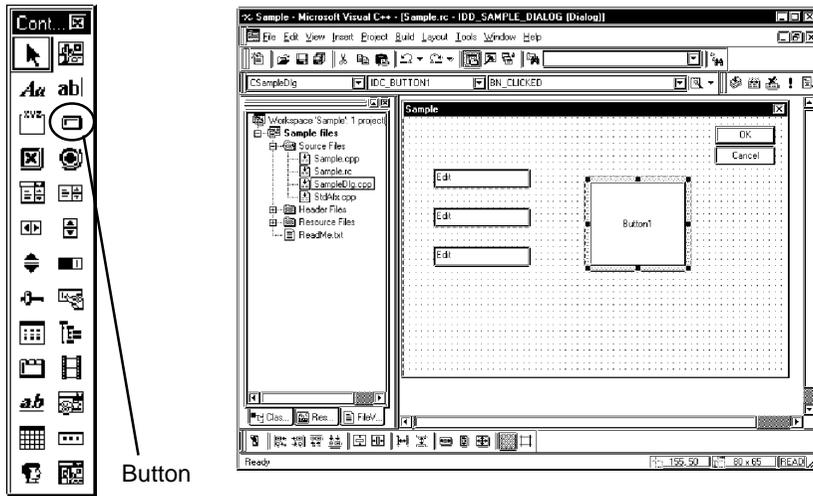
37. Enter “m_Edit1” in [Member variable name], select “short” in [Variable type], and then click [OK]. Repeat step 36 and 37 for other two [EditBox]s. However, you should designate their member variables as “m_Edit2” and “m_Edit3” respectively.



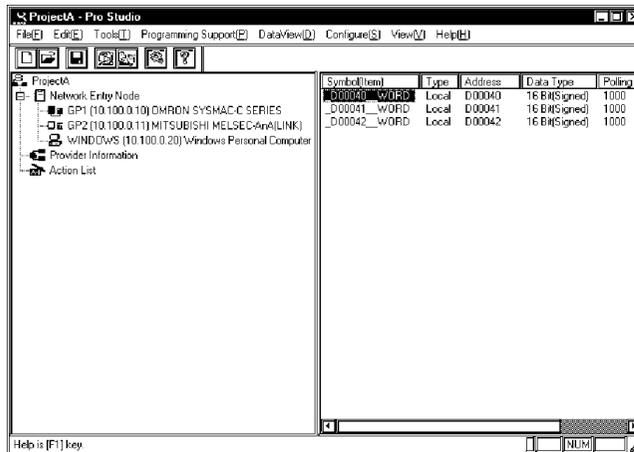
38. Click [OK].



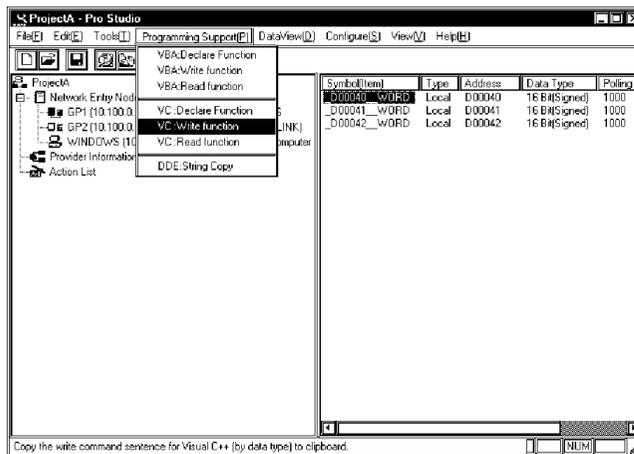
39. Select [Button] and paste it to [Dialog].



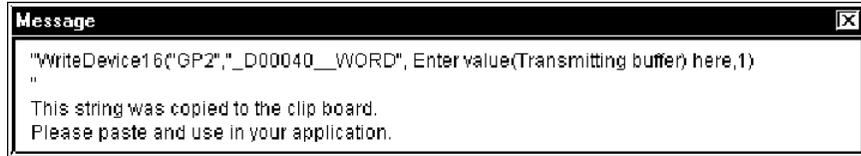
40. Select the symbol name to write to among symbols registered on Pro-Server (Select the heading symbol to write to.).



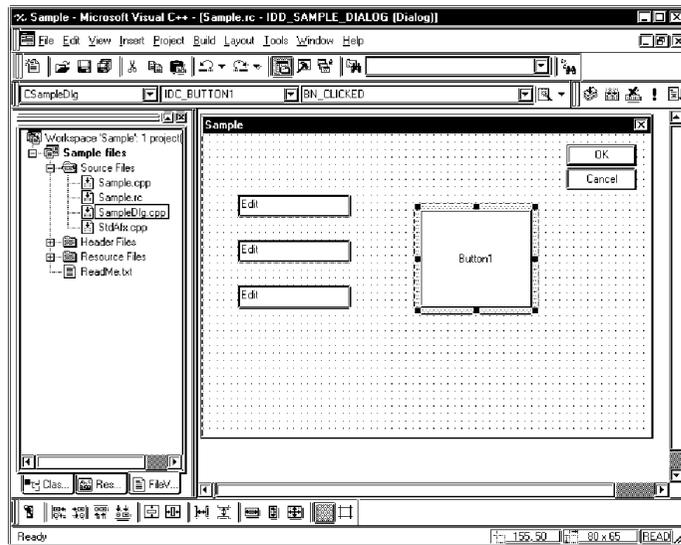
41. Click [VC: Write Function] on [Programming Support] of the menu.



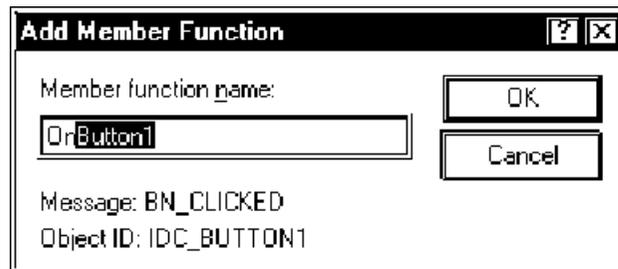
42. The write function will be copied into the Clipboard.



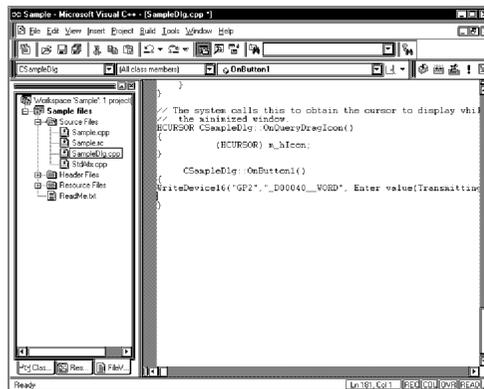
43. Double click [Button1] pasted on [Dialog] of the Microsoft Visual C++ menu.



44. Click [OK].



45. Paste the contents of the Clipboard (write function) into the OnButton1 member function.



```

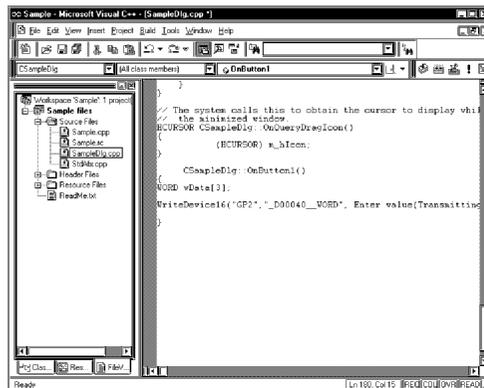
class CSampleDlg {
public:
    CSampleDlg(CWnd* pParent = NULL);
    ~CSampleDlg();

protected:
    // The system calls this to obtain the cursor to display when
    // the minimized window
    HCURSOR CSampleDlg::OnQueryDragIcon()
    {
        return (HCURSOR) m_hIcon;
    }

public:
    CSampleDlg::OnButton1()
    {
        WriteDevice16("GP2", "_D00040__WORD", Enter value[Transmittin
    }
}

```

46. Declare the area to store write data. You should designate three or more area elements if the number of write data is three.



```

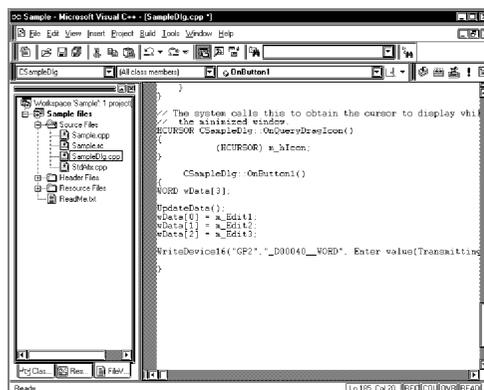
class CSampleDlg {
public:
    CSampleDlg(CWnd* pParent = NULL);
    ~CSampleDlg();

protected:
    // The system calls this to obtain the cursor to display when
    // the minimized window
    HCURSOR CSampleDlg::OnQueryDragIcon()
    {
        return (HCURSOR) m_hIcon;
    }

public:
    CSampleDlg::OnButton1()
    {
        WORD vData[3];
        WriteDevice16("GP2", "_D00040__WORD", Enter value[Transmittin
    }
}

```

47. Set three write data entered into the EditBox to the area.



```

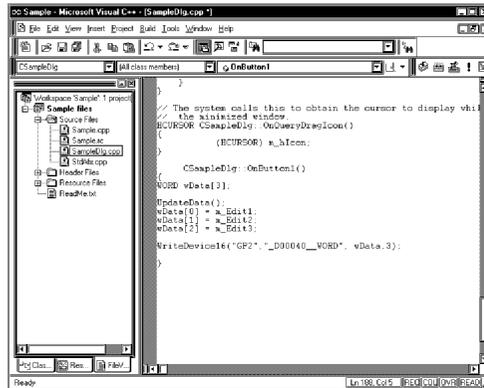
class CSampleDlg {
public:
    CSampleDlg(CWnd* pParent = NULL);
    ~CSampleDlg();

protected:
    // The system calls this to obtain the cursor to display when
    // the minimized window
    HCURSOR CSampleDlg::OnQueryDragIcon()
    {
        return (HCURSOR) m_hIcon;
    }

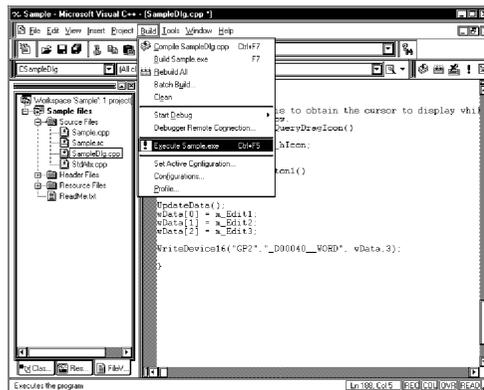
public:
    CSampleDlg::OnButton1()
    {
        UpdateData();
        vData[0] = m_Edit1;
        vData[1] = m_Edit2;
        vData[2] = m_Edit3;
        WriteDevice16("GP2", "_D00040__WORD", Enter value[Transmittin
    }
}

```

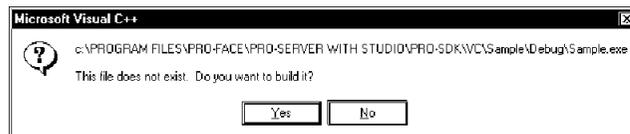
48. Designate the header area where write data have been set (wData(0)), and 3 as the number of read data. You should also add a semicolon (;) at the end of the write function.



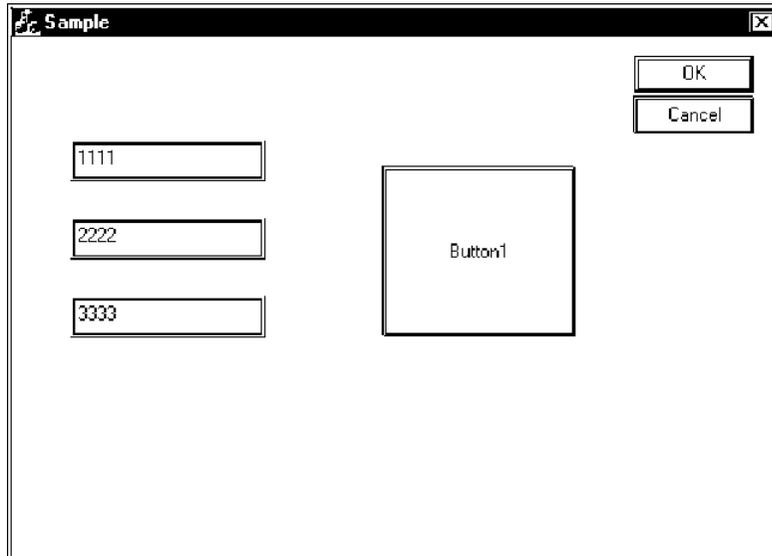
49. Click [Execute Sample.exe] on [Build] of the Microsoft Visual C++ menu.



50. Click [Yes].



51. After entering three write data to [EditBox]s, click [Button1] to execute writing three data from the symbol “_D40_WORD”.



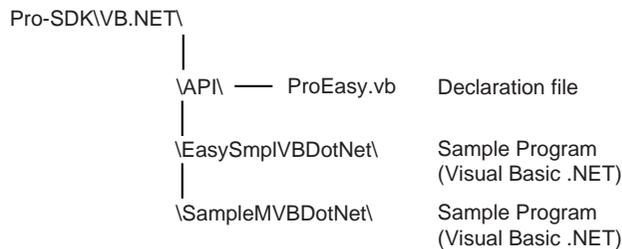
9.2.3 Using simple DLL functions with Visual Basic .NET

Visual Basic .NET differs from Visual Basic 6.0 regarding format specifications for Integers, etc. Therefore, Pro-Studio's [VBA: Declare Function] cannot be used. When using Visual Basic .NET, instead of [VBA: Declare Function] be sure to use the ProEasy.vb file, located in the [Install] folder.

Structure of Pro-SDK

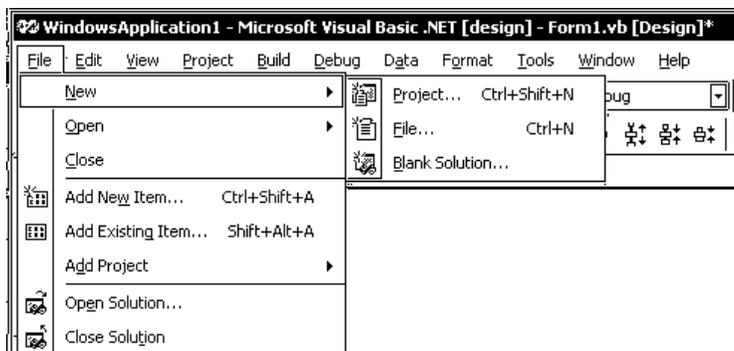
Included in the [Install] folder are the declaration file and sample program, to enable easy use of DLLs with Visual Basic .NET.

The diagram below shows the structure of Visual Basic .NET related files in the [Install] folder:

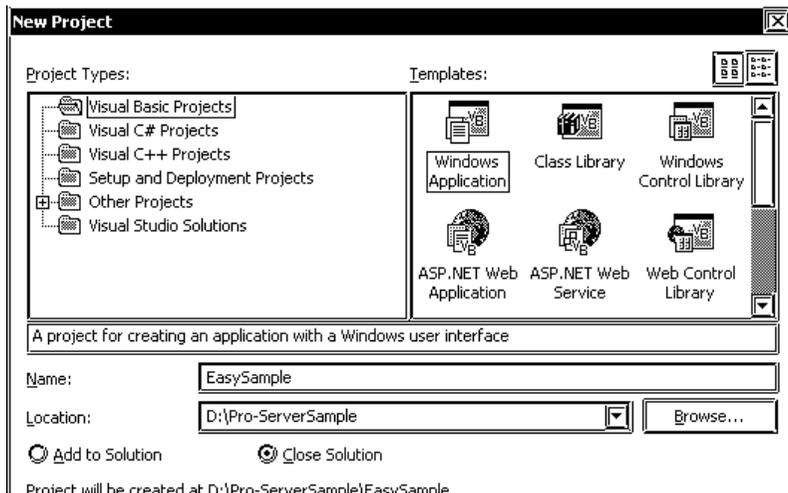


Example Visual Basic .NET Project

1. Start up Microsoft Visual Studio .NET, and select the [File | New | Project] menu item.

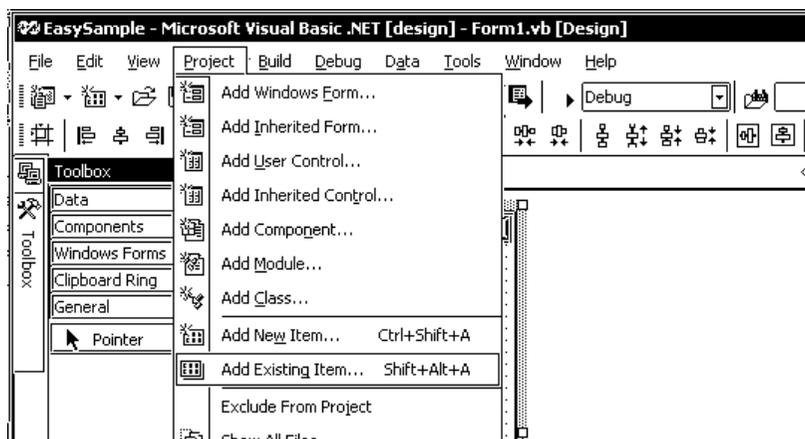


2. Select [Visual Basic Projects] for the [Project Types], and [Windows Application] for the [Templates].

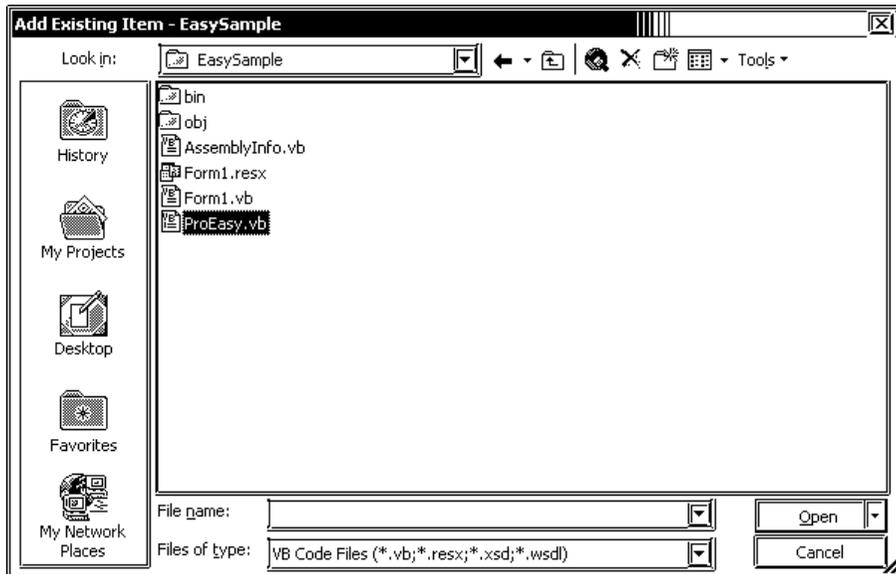


Declare Function

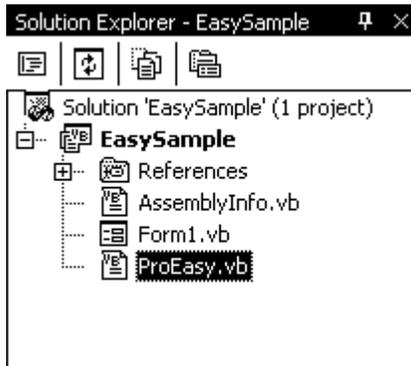
3. Copy the [Pro-SDK\VB.NET\API\ProEasy.vb] file from Pro-Server with ProStudio's [Install] folder to the new project.
4. To add the copied ProEasy.vb file to the project, open Visual Basic .NET and select [Project | Add Existing Item].



5. Select [ProEasy.vb], and click [Open].

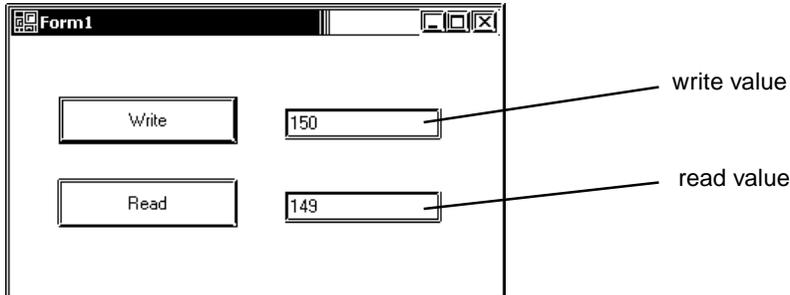


6. Declare Function is now added to the project and Function declaration is complete.

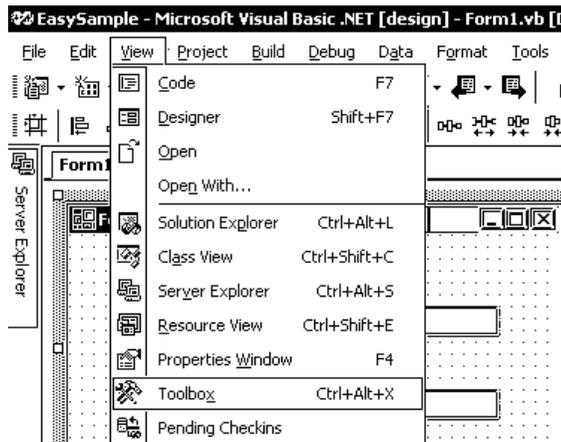


Creating the Device Access Section – Example

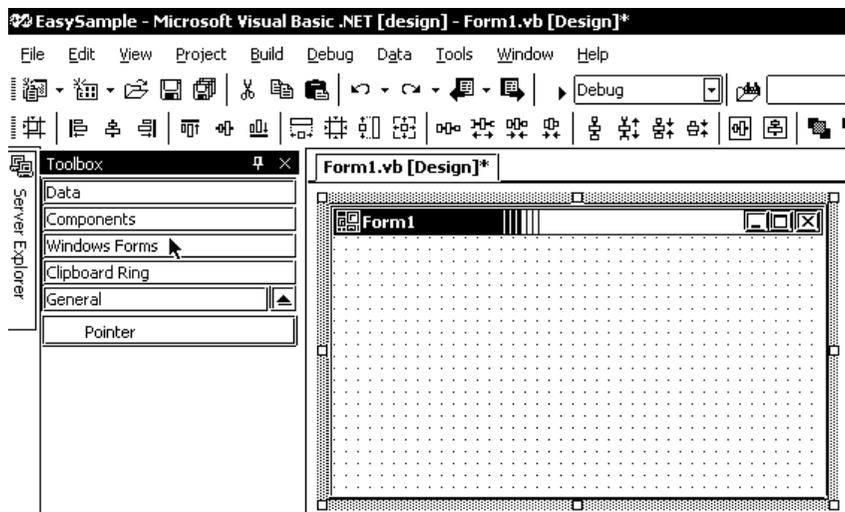
- The application to be created has the following features – clicking the [Write] button writes signed 16-bit data, and clicking the [Read] button reads signed 16-bit data.



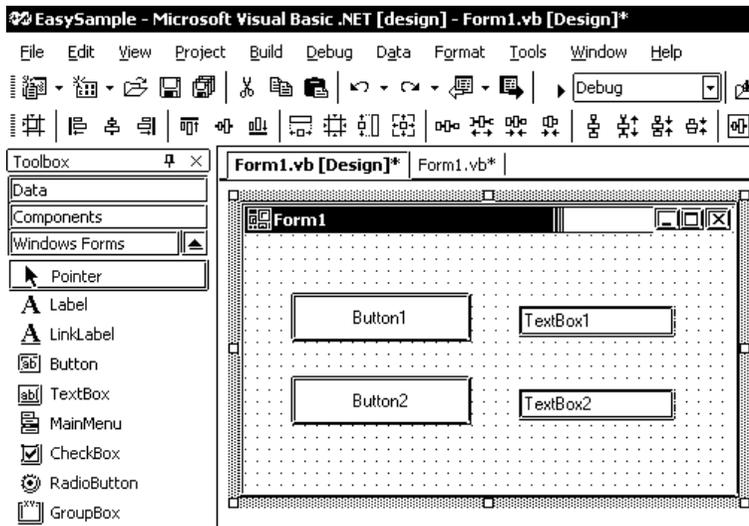
- Select the [View | Toolbox] menu item.



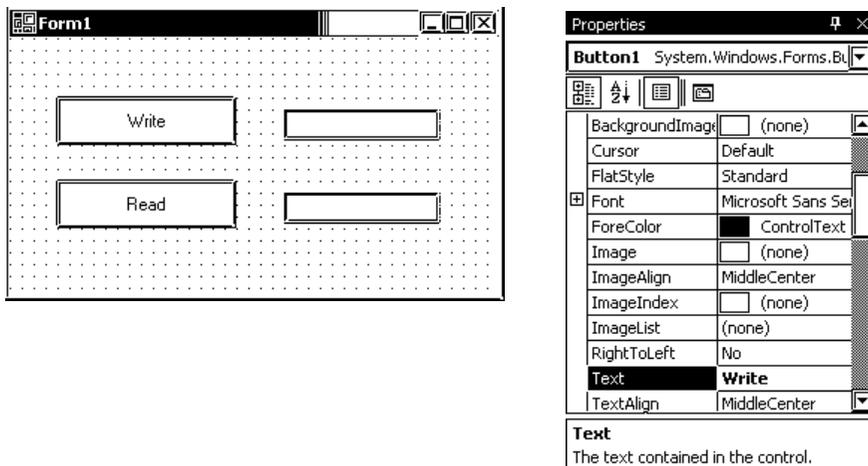
- When the Toolbox appears, click [Windows Forms].



10. Place two Buttons and two TextBoxes on [Form1].



11. Right-click on the Buttons and TextBoxes, and select [Properties]. Enter "Write" for Button1's [Text] property, and "Read" for Button2's [Text] property. Delete TextBox1 and TextBox2's default [Text] property values. Set TextBox2's [ReadOnly] property to [True].



12. Double-click Form1's [Write] button (Button1). Enter the code for 16-bit device write (WriteDevice16) between the Sub and End Sub statements.

Here, the TextBox value is converted to a numeric value. The data will be written into a device designated by [PC] node's [_LS0100_WORD] symbol.

```

Public Class Form1
    Inherits System.Windows.Forms.Form
    Windows Form Designer generated code
    Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As System.EventArgs)
        Dim TextData(1) As Short
        TextData(0) = Val(TextBox1.Text)
        WriteDevice16("PC", "_LS0100_WORD", TextData, 1)
    End Sub
End Class

```

13. Double-click Form1's [Read] button (Button2). Enter the code for 16-bit device read (ReadDevice16) between the Sub and End Sub statements.

The data stored in the device designated by [PC] node's [_LS0100_WORD] is read and displayed in TextBox2.

```

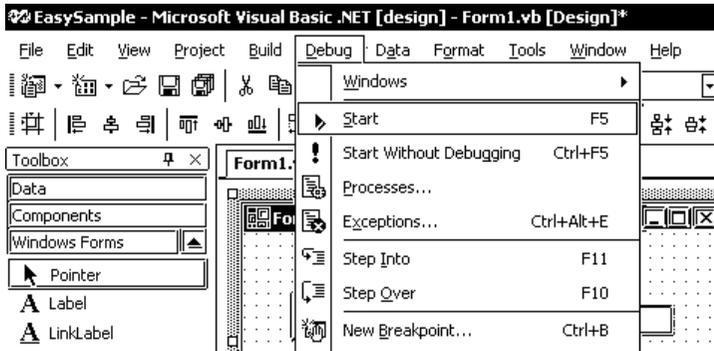
Private Sub Button2_Click(ByVal sender As System.Object, ByVal e As System.EventArgs)
    Dim TextData(1) As Short
    ReadDevice16("PC", "_LS0100_WORD", TextData, 1)
    TextBox2.Text = Str(TextData(0))
End Sub

```

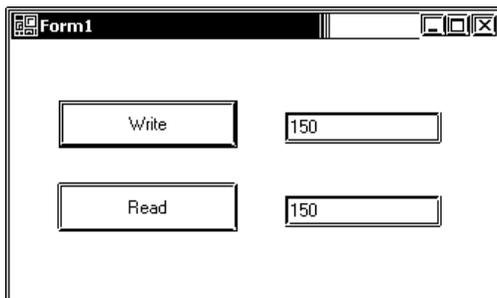
This completes the program.

Executing the Program

14. Before executing this program, start up Pro-Studio and create and load the NPJ file where [PC] is registered as the node and [_LS0100_WORD] is registered as the symbol.
15. To run the program, start up Visual Basic .NET, and select the [Debug | Start] menu item.



16. Entering the value in TextBox1 and clicking [Write] will write the value to the device. Clicking [Read] will read the current value from the device and display it in TextBox2.



10 | OPC Server

This chapter describes OPC server for Pro-Server.

10.1 OPC Server

10.2 Connecting from an OPC Client

10.1 OPC Server

Installing the Pro-Server OPC Server allows you to use applications which contain the OPC Client feature(ex. Intellution's iFIX, etc.).

- The OPC I/F functions like a DLL to the OPC Client(In-Process Server)
- EXE format is used for OPC I/F for an OPC Client existing in the same PC(Local Server)
- EXE format is used for the OPC I/F for an OPC Client existing in a remote PC(Remote Server)

Read/Write Functions

The Read/Write functions can be used either synchronously or asynchronously. The Read function can use either CACHE or DEVICE, and the Write function can use only DEVICE.

Synchronous

This method will require other processing to wait while the OPC Client is either reading or writing data to/from the OPC Server.

Asynchronous

This method utilizes a CALLBACK to acknowledge to the Client the reception and completion of a Client's read/write requests. This allows the OPC Client to perform other processing while waiting for the CALLBACK notice.

CACHE

CACHE means the storage and handling method used for processing requests (collected periodically from the Clients) in the OPC Server. With Pro-Server, this means the polling tool's internal data. This method, while it allows the returning of data at high speed to a Client, does not allow Real-Time processing.

DEVICE

Device data refers to handling of data from the final target (PLC). Current target data can be provided in real time, however, the response to that data is usually slower than the CACHE method.

OPC Server's Operating Environment

OS Requirement (Japanese or English)	Windows XP Windows NT Windows 2000
Hard disk capacity	100MB or more
Required memory	64MB or more

MEMO

- OPC cannot be used on Windows 98, Windows 98 SE or Windows Me.
- When using Windows XP, the security level should be set to the same level as Windows 2000. For setup procedures, refer to Appendix 6 Changing Windows XP Security Level.

The following data explains the settings required when using the OPC Server. These settings should be entered in each of the OPC Clients used.

ItemID

The ItemID format is as follows:

ItemID = "XXX:DDDDD,SIG(NUMCHAR),SCL,SCH,EGUL,EGUH"

- XXX Node name to be accessed
- DDDDD Symbol name to be accessed or applicable PLC's device address
- SIG Signal condition (Can be omitted. When omitted, this becomes "NONE")
Corresponding signal condition type: LIN, BCD, and SQRT
- NUMCHAR When the Item's data type is set to VT_BSTR, the NUMCHAR value is used to place a character string in the position designated by the SCL value. Using VT_BSTR will automatically disable all options after SCL. Designate the character string using byte values. The default value is 40 bytes.
- SCL Lower limit value before scale conversion(Can be omitted. When omitted, this becomes "0")
- SCH Upper limit value before scale conversion(Can be omitted. When omitted, this becomes "65535")
- EGUL EGU's lower limit value(Can be omitted. When omitted, this becomes "0")
- EGUH EGU's upper limit value(Can be omitted. When omitted, this becomes "65535")

MEMO

When the data type is set to VT_BSTR, designate the number of characters(NUMCHAR)for SIG as the value of bytes. In that case, optional items(values)after SIG will become ineffective. The default value is 40 bytes.

Ex.)

When converting D100(from 0 to 4096)of PLC connected to GP1(node name)to LIN(0 to 100)and accessing:

ItemID = "GP1:D100,LIN,0,4096,0,100"

Program ID

The accompanying OPC server's Program ID is as follows:

"DIGITAL.OPCPRO.1"

Since CLSID is automatically registered to the registry at program installation, use this Program ID to perform the connection.

Initialization File

You can change initial values by editing the OPCPRO.INI file. The contents of the OPCPRO.INI file is as the following. Values are initial values.

[Server]

Server_MAX=10 (Number of servers.)
Group_MAX=10 (Number of servers.)
Item_MAX=100 (Number of items.)
InproSvr_ScanRate=250 (Scan interval for the In-Proc server unit:ms)
LocalSvr_ScanRate=500 (Scan interval for the Local server unit:ms)

[Client]

CharacterStringCode=0 (Character string format 0:UNICODE, 1:muti-bytes)
ItemID_Separator=.:! (Designating the separator for ItemIDs)

Data Type

The following describes VARIANT data types supported by attached OPC server.

For the I/O driver, all analog data are internally process by being converted to 4 bytes real numbers.

Therefore, VT_I2, VT_I4, VT_U12, VT_U14 and VT_R8 are converted to VT_R4.

- VT_I4 4 bytes signed integer
- VT_I2 2 bytes signed integer
- VT_UI2 2 bytes unsigned integer
- VT_UI4 4 bytes unsigned integer
- VT_R4 4 bytes real
- VT_R8 8 bytes real
- VT_BSTR character string
- VT_BOOL BOOL

Interface

Interfaces that this software's OPC server supports are as follows:

Object	Interface	Method	Status	Remaek
OPCServer	IOPCServer	AddGroup	○	
		GetErrorString	○	
		GetGroupByName	○	
		GetStatus	○	
		RemoveGroup	○	
		CreateGroupEnumerator	○	
	IOPCServerPublicGroups (Optional)	GetPublicGroupByName	×	
		RemovePublicGroup	×	
	IOPCBrowsServerAddressSpace (Optional)	QueryOrganization	○	Supports only Flat
		ChangeBrowsePosition	○	Always returns an error due to supporting only Flat
		BrowseOPCItemIDs	○	Supports only Flat
		GetItemID	×	
		BrowseAccessPaths	×	
	IPersistFile (Optional)	IsDirty	×	
		Load	×	
		Save	×	
		SaveComplated	×	
		GetCurFile	×	
	IOPCItemProperties	QueryAvailableItemProperties	○	
		GetItemProperties	○	
LookupItemID		○		
OPCGroup	IOPCGroupStateMgt	GetState	○	
		SetState	○	
		SetName	○	
		CloneGroup	○	
		GetState	×	
	IOPCPublicGroupsStateMgt (Optional)	MoveToPublic	×	
		Read	○	
	IOPCSyncIO	Write	○	
		Read	○	
	IOPCAsyncIO (Optional)	Write	○	
		Refresh	○	
		Cancel	○	
	IOPCAsyncIO2	Read	○	
		Write	○	
		Refresh	○	
		Cancel2	○	
		SetEnable	○	
		GetEnable	○	
	IOPCItemMgt	AddItems	○	
		ValidateItems	○	
		RemoveItems	○	
		SetActiveState	○	
		SetClientHandles	○	
		SetDatatypes	○	
		CreateEnumerator	○	
		Dadvise	○	
	IDataObject (Optional)	Dunadvise	○	
		EnumConnectionPoints	○	
	IConnectionPointContainer	FindConnectionPoints	○	
		GetConnectionInterface	○	
IConnectionPoint	GetConnectionPointContainer	○		
	Advise	○		
	Unadvise	○		
	EnumConnections	○		
	Next	○		
IEnumOPCItemAttributes	Skip	○		
	Reset	○		
	Clone	○		
	Next	○		
IEnumString	Skip	○		
	Reset	○		
	Clone	○		
	Next	○		
IEnumUnknown	Skip	○		
	Reset	○		
	Clone	○		
	Next	○		

○ :Supported × :Not supported

10.2 Connecting from an OPC Client

[Server Items]

- Use the OPC Client program's Server designation to designate the OPC server's unique program ID as the program ID. When using the OPC server for Pro-Server, enter "digital.opcpro.1".
- Next, designate the server type. If an In-Process server is used, enter "in process", if a Local server is used, enter "local", and if a Remote server is used, enter "remote".
- If "remote" is entered as the server type, enter the PC name or IP address (***.***.***.**) of the computer used for the OPC server.

[Group Items]

- In the OPC Client program's group section, the OPC server's group object designation is performed. The OPC server supports read/write in group units.
- The group name can be any text string, however, please be sure the name used is unique and not already in use. Even if the name is abbreviated, the OPC server will arbitrarily allocate a group name.
- Readout of data can be performed synchronously or asynchronously. If synchronous is used, the OPC client must wait until the "return" is received from the OPC server. If asynchronous is used, since the OPC server will use a callback to inform of completion, the OPC client does not need to wait for a response.
- If asynchronous is used, the connection method must be selected. With asynchronous communication, OPC DA (Data Access) Ver. 1.0 standard IDataObject I/F and OPC DA Ver. 2.0 standard IConnectionPoints I/F are available. Depending on the OPC client, there are cases where only one of the I/F methods is supported, so be sure to check the type of I/F supported when making this selection.

[Item-ID]

- This performs the OPC Server's Item-ID allocation. Designate the Item-ID.
When using OPC Server for Pro-Server, enter the data as "Node:PLC device (or symbol name). (option)". The option section can be abbreviated. For detailed option information, refer to the OPCPRO Help feature's "Item-ID Settings" section. An example is. "test:tag1". Entering this setting means that a participating node will use "test" to access the symbol "tag1". The option can be abbreviated.
- When using OPC Server for Pro-Server, the feature "access path" is not supported by OPC Server and no setting is required.
- Enter "VARIANT" for the "Data Type". Since certain OPC Servers do not support VARIANT, be sure to confirm this setting before entering. This data, for example, can be used for the 1 byte signed data type.

After entering and registering the above items, the OPC Client will connect to the OPC Server and begin collecting data.



Appendices

- A.1 DDE Function Details
- A.2 Error Messages
- A.3 Scale Conversion using Excel
- A.4 GP Ethernet Settings
- A.5 Optimizing Communication Speed
- A.6 Changing Windows XP Security Level

A.1 DDE Function Details

The Pro-Server software contains the DDE server function and can therefore exchange data with applications that support the DDE client function.

A.1.1 DDE Address

Sending/receiving data to/from the DDE server is accomplished by specifying an address that consists of three components; the application name, the topic name, and the item name.

Address components required for connecting to a DDE server

Application Name.....The name of the DDE server application. To have access to Pro-Server data, use the name "PROSERVER".

Topic Name.....The name of the data group in the DDE server. In Pro-Server, specify the node name of the GP on the network.

Item Name.....The actual data name used in the data group on the DDE server. In Pro-Server, specify the device address of the PLC connected to the GP. You can use the symbol name defined in Pro-Studio for this name.

Address example

=PROSERVER|GP's Node Name!Symbol Name

Example:

To read the data stored in address D100 of a Mitsubishi PLC, which is connected to a GP running the Mitsubishi protocol and with an IP address of 160.187.2.101, enter the following data:

=PROSERVER|' 160.187.2.101'!' D100'

MEMO

When creating names, do not use cell names and an identifier character.

A.1.2 Device Address Options

If you use symbol names defined in Pro-Studio, the data type and the sampling frequency for the symbols will be set automatically. However, when the device address is specified directly, you can specify the data type and the sampling frequency as options.

Available Data Types

The available data types are as follows.

Data Type	Contents	
	Data Format	Value
Bit Data	.BIT	0 or 1
Unsigned Word(Default)	.WORD	0 to 65,535
Signed Word	+.WORD	-32,768 to 32,767
HEX Word	.HEX	0000 to FFFF
BCD Word	.BCD	0 to 9,999
Unsigned Long Word	.DWORD	0 to 4,294,967,295
Signed Long Word	+.DWORD	-2,147,483,648 to 2,147,483,647
HEX Long Word	.HEXDWORD	00000000 to FFFFFFFF
BCD Long Word	.BCDDWORD	0 to 99,999,999
Float	.FLOAT	-9.9E+16 to 9.9E+16
String	.STRING.*length*1	String(default length = 1)

*1 If the data type is "String", the data length is the maximum number of characters. If Null Data is included, the characters up to that point will be sent/received as data.

Polling Time

.Polling Time: Polling Time is designated in ms units.

Device Designation Example

Here, the Device Address D100 is BCD data and the sampling frequency is 500 ms.

```
=PROSERVR|GP Node Name!' D100 .BCD .500'
```

When designating the data type or polling time, be sure to put a space () in front of the period (.).

A.2 Error Messages

A.2.1 Pro-Server with Pro-Studio for Windows Error Messages

This section describes Pro-Server with Pro-Studio's error messages.

The error codes and error messages will be displayed on the personal computer where Pro-Server is currently operating. In addition, these error codes will be used when the simple DLL completes abnormally. “%s” indicates character strings, and “%??x” indicates hexadecimal values.

Error Code		Meaning
Decimal	Hex.	
9300	2454h	Cannot find network project file.
9301	2455h	Reserved
:	:	
9329	2471h	
9330	2472h	Cannot execute the command because resources are insufficient. Terminated program.
9331	2473h	The system resource was dead-locked. Terminated program.
9332	2474h	System error
9333	2475h	Cannot execute the command because program versions do not match.
9334	2476h	Reserved
:	:	
9339	247Bh	
9340	247Ch	An error occurred when accessing the <%s> file.
9341	247Dh	Pro-Server is being used by too many applications.
9342	247Eh	OS resources are insufficient (insufficient memory).
9343	247Fh	The set connector is used by another application.
9344	2480h	Pro-Server has not been started. Could not reference data.
9345	2481h	Pro-Server has been terminated. Could not reference data.
9346	2482h	Cannot continue - Pro-Server has been terminated.
9347	2483h	Cannot continue - Pro-Server has been terminated.
9348	2484h	Could not start Pro-Server.
9349	2485h	Could not start Pro-Studio.
9350	2486h	Unsupported command. Cannot continue.
9351	2487h	Failed in loading the network project file.
9352	2488h	The entered node name has already been registered.
9353	2489h	The entered node name has not been registered.
9354	248Ah	Backup data type specified is not supported.
9355	248Bh	Failed to writing to the file.
9356	248Ch	Could not create a file to store the SRAM backup data.
9357	248Dh	The node name entered has not been registered.
9358	248Eh	Pro-Server is already operating. Cannot start two copies.
9359	248Fh	Reserved
9360	2490h	'%s'has not been entered.
9361	2491h	0 cannot be entered in '%s'.
9362	2492h	'%s'should be: "xxx.xxx.xxx.xxx" format; where xxx is a value between 0 and 255.
9363	2493h	An invalid value has been entered in '%s'.
9364	2494h	A character unavailable for '%s' is involved.
9365	2495h	'%s'has not been entered yet.
9366	2496h	Cannot start a new process until the process result is returned from the server.
9367	2497h	Cannot terminate the application while waiting for the process result.
9368	2498h	Read permission required to execute this command. Log on to the network again.
9369	2499h	Write permission required to execute this command. Log on to the network again.
9370	249Ah	Administrator permission required to execute this command. Log on to the network again.

Error Code		Meaning
Decimal	Hex.	
9371	249Bh	The specified number is not registered.
9372	249Ch	Reserved
:	:	
9375	249Fh	
9376	24A0h	Cannot read the file (Core.ID)
9377	24A1h	Reserved
:	:	
9389	24ADh	
9390	24AEh	"Mode of Appointed handle is EASY_TB_STATUS_NOW or EASY_TB_STATUS_LAST_READ. Please execute after changing its mode to EASY_TB_STATUS_PAST or EASY_TB_STATUS_INDEX."
9391	24AFh	"Unable to open the designated LS Area"
9392	24B0h	"Designated LS Area is not open"
9393	24B1h	"Failed to aquire CF Card's File List"
9394	24B2h	"Failed to read CF Card's file(s)"
9395	24B3h	"Failed to write CF Card's file(s)"
9396	24B4h	"CF Card is not inserted"
9397	24B5h	"CF Card is not initialized"
9398	24B6h	"CF Card is damaged"
9399	24B7h	"Unable to access the designated file"
9400	24B8h	The function of Pro-Easy.DLL was doubly called up.
9401	24B9h	The specified access handle for Pro-Server is not effective.
9402	24BAh	Pro-Server has stopped and can not perform processing.
9403	24BBh	The error occurred in the function of OLE. Data cannot be converted.
9404	24BCh	The effective data for the specified data-type variant does not exist in the original data, or is not enough.
9405	24BDh	Original data and destination data types cannot be converted by data-type variant.
9406	24BEh	The specified argument is not enabled.
9407	24BFh	Can not create the time bar.
9408	24C0h	The symbol name is not registered.
9409	24C1h	Public memory of provide sheet could not open.
9410	24C2h	The specified time bar has already been locked.
9411	24C3h	The specified handle has already been linked.
9412	24C4h	The specified handle is not linked.
9413	24C5h	The specified handle is not linked to the database
9414	24C6h	Specified handle is locked or played, Please excute after clearing to its status.
9415	24C7h	Designate the internal format of the argument's Variant as either "date" type, or comatible with "date".
9416	24C8h	The specified time is out of the valid range.
9417	24C9h	The invalid argument has been set.
9418	24CAh	Database of appinted handle is closed.
9419	24CBh	Database access error.
9420	24CCh	INI file ('%s') in the action contents cannot be opened.
9421	24CDh	'%s' of INI file ('%s') in the action contents cannot be analyzed.
9422	24CEh	Action '%s' uses action contents not yet installed in the network project.
9423	24CFh	There are too many actions to register.
9424	24D0h	The specified action has already been registered.
9425	24D1h	The action contents which action '%s' uses cannot be started.
9426	24D2h	The designated action is not registered.
9427	24D3h	An error occurred on the Active-X IF.
9428	24D4h	The designated action has been registered in the registry.
9429	24D5h	Reserved
:	:	
9449	24E9h	
9450	24EAh	The node name or symbol name is not specified.
9451	24EBh	The node name is not specified.
9452	24ECh	The data type setting is not valid.

Error Code		Meaning
Decimal	Hex.	
9453	24EDh	The node name and symbol is not delimited with '!'.
9454	24EEh	The symbol name has not been registered or it is not a valid device address.
9455	24EFh	Cannot continue the process - no valid device is specified.
9456	24F0h	Cannot make word-access to 32-bit devices.
9457	24F1h	The address is out of the valid range.
9458	24F2h	The No. of points setting is invalid.
9459	24F3h	The No. of points setting is 0 or exceeds the setting range.
9460	24F4h	Cannot convert the set symbol into a device address.
9461	24F5h	A value input error occurred. Enter a correct value.
9462	24F6h	The specified lifetime is invalid.
9463	24F7h	The designated bit location is incorrect.
9464	24F8h	Reserved
:	:	
9469	24FDh	
9470	24FEh	Unable to connect to designated Node
9471	24FFh	Node is a Windows PC. Unable to perform processing.
9472	2500h	Failed to save captured screen data as JPEG file
9473	2501h	Screen Capture is not supported
9474	2502h	Capture Approval Flag is not ON
9475	2503h	Failed to acquire CF Card free space data
9476	2504h	Data Transfer is not supported
9477	2505h	ProNet.dll has not been installed properly
9478	2506h	Unable to perform due to the 2-Way Driver's version not being 4.50 or higher
9479	2507h	Reserved
9480	2508h	Failed to delete CF Card's file
9481	2509h	Failed to change CF Card's internal file
9482	250Ah	File exceeds 256 characters - reduce number of characters
9483	250Bh	Reserved
:	:	
9499	251Bh	
9500	251Ch	Pro-Server schedule management thread initialization error
9501	251Dh	Pro-Server LAN management thread initialization error
9502	251Eh	Pro-Server timer management thread initialization error
9503	251Fh	Pro-Server DDE control thread initialization error
9504	2520h	Pro-Server API control thread initialization error
9505	2521h	Pro-Server API parameter error
9506	2522h	Response time out
9507	2523h	Pro-Server failed in initializing the LAN.
9508	2524h	No data
9509	2525h	Invalid device
9510	2526h	Invalid address
9511	2527h	The address is out of the valid range.
9512	2528h	Data type error
9513	2529h	Transmission message error
9514	252Ah	Cannot initialize Pro-Server cache function.
9515	252Bh	Cannot load the network project because the database is used.
9516	252Ch	Reserved
:	:	
9559	2557h	
9560	2558h	DLL load error.
9561	2559h	Cannot find a function in DLL.
9562	255Ah	System error can be considered if this occurs.
9563	255Bh	The designated property ID is not defined.
9564	255Ch	Value conversion error. Incorrect characters as numbers are designated.
9565	255Dh	Too many characters.
9566	255Eh	The number is too large.
9567	255Fh	Cannot start COMM.
9568	2560h	Cannot start GJ.
9569	2561h	Cannot open the %s file.
9570	2562h	File read error.
9571	2563h	File write error.
9572	2564h	No tags exist. (No parameter class declarations exist.)

Error Code		Meaning
Decimal	Hex.	
9573	2565h	No end tags exist. (No parameter class declarations exist.)
9574	2566h	Found the unexpected end tag.
9575	2567h	Signatures do not match.
9576	2568h	Unsupported parameter.
9577	2569h	Reached the file end.
9578	256Ah	The incorrect structure.
9579	256Bh	Cannot continue the process due to a memory lack.
9580	256Ch	Cannot analyze the device name.
9581	256Dh	DB name is not designated.
9582	256Eh	Cannot access to DB.
9583	256Fh	Cannot edit DB because it is locked (edited) by another program (e.g. Data View).
9584	2570h	Either the node name or the device name is not designated.
9585	2571h	Cannot use DB because it has been closed. (DB in use is automatically closed once when NPJ is saved/loaded.)
9586	2572h	The database may be broken.
9587	2573h	Data not saved.
9588	2574h	Cannot find data at the designated time.
9589	2575h	No polling setups exist.
9590	2576h	The database has not been opened. (Or it has already been closed.)
9591	2577h	Already polling start.
9592	2578h	Old data will be overwritten, instead of newest data.
9593	2579h	Delete recode.
9594	257Ah	Exceeds designated file size.
9595	257Bh	Designated file number does not exist
9596	257Ch	Reserved
:	:	
9599	257Fh	
9600	2580h	Cannot continue the process due to a resource lack in GP.
9601	2581h	Reserved
:	:	
9619	2593h	
9620	2594h	The network project item has been registered redundantly. (The network project file has been broken.)
9621	2595h	Reserved
:	:	
9639	25A7h	
9640	25A8h	The Provider information data that is not registered in the network project file were sent from other node. (Network projects differ between the Provider and the Receiver nodes.)
9641	25A9h	Either that the device write failed at the Receiver node or that no partner nodes exist while providing data.
9642	25AAh	Reserved
:	:	
9659	25BBh	
9660	25BCh	Data Read failed.
9661	25BDh	Invalid access range of the read device.
9662	25BEh	Reserved
:	:	
9669	25C5h	
9670	25C6h	It is an access range wrong point by the write of device.
9671	25C7h	Reserved
:	:	
9699	25E3h	
9700	25E4h	Received the first trigger establish command for non-existing provider information.
9701	25E5h	Reserved
:	:	
9709	25EDh	

For information about 2580h, 25A8h, 25A9h, refer to “2-Way Driver Error Messages and Syslog Features”.

Error Code		Meaning
Decimal	Hex.	
9710	25EEh	Received the second trigger establish command for non-existing provider information.
9711	25EFh	Reserved
:	:	
9729	2601h	
9730	2602h	The GP is busy sending screen data or saving SRAM backup data to another PC.
9731	2603h	An error occurred in reading the SRAM backup data. (The item ID differs from the previous ID.)
9732	2604h	An error occurred in reading the SRAM backup data. (The data type differs from the previous type.)
9733	2605h	An error occurred in reading the SRAM backup data. (The block No. differs from the previous No.)
9734	2606h	SRAM backup data read error. (The requested data amount is 0 or differs from the previous amount.)
9735	2607h	Reserved
:	:	
9739	260Bh	
9740	260Ch	The GP is busy sending screen data or saving SRAM backup data to another PC.
9741	260Dh	An error occurred in reading the SRAM backup data. (The item ID differs from the previous ID.)
9742	260Eh	An error occurred in reading the SRAM backup data. (The data type differs from the previous type.)
9743	260Fh	An error occurred in reading the SRAM backup data. (The block No. differs from the previous No.)
9744	2610h	SRAM backup data read error. (The requested data amount is 0 or differs from the previous amount.)
9745	2611h	Reserved
:	:	
9749	2615h	
9750	2616h	CF command error.
9751	2617h	CF Access error
9752	2618h	No CF card unit.
9753	2619h	Reserved
:	:	
9779	2633h	
9780	2634h	Transmission error occurred with PLC during data write. (Code:%02x:%04x)
9781	2635h	The designated SRAM backup data is not in the GP.
9782	2636h	The GP's SRAM backup data is incorrect. (Code:%04x)
9783	2637h	Reserved
:	:	
9789	263Dh	
9790	263Eh	No remote access right (not connected remotely)
9800	2648h	Parameter error.
9801	2649h	Data count is over.
9802	264Ah	File create error.
9803	264Bh	EXCEL sheet create error.
9804	264Ch	Write file error.
9805	264Dh	File open error.
9806	264Eh	Read only file.
9807	264Fh	Print out error.
9808	2650h	Save folder access error.
9809	2651h	Reserved
9810	2652h	Unable to find message table file.
9811	2653h	Unable to open message table file.
9812	2654h	Unable to find designated sheet in message table file.
9813	2655h	Message table is incorrect.
9814	2656h	No equivalent enabled code.
9815	2657h	Error occurred during POP confirmation. For details see the Log Viewer.
9816	2658h	Unable to send mail. For details see the Log Viewer.
9817	2659h	Unable to send portion of mail. For details see the Log Viewer.

Error Code		Meaning
Decimal	Hex.	
9818	265Ah	Reserved
9819	265Bh	
9820	265Ch	Unable to find designated database
9821	265Dh	Unable to find designated Table. Or, there are no records in the designated Table
9822	265Eh	Unable to find the designated field name
9823	265Fh	Unable to find the designated data
9824	2660h	Field data is incorrect
9825	2661h	Validation failed
9826	2662h	Error occurred while accessing the database
9827	2663h	Unable to create the Pro-Server handle
9828	2664h	There are no character data
9829	2665h	Reserved
:	:	
9839	266Fh	
9840	2670h	Unable to open Action Report Sheet Template, or unable to append sheet
9841	2671h	Failed to start EXCEL
9842	2672h	Unable to open Template Book
9843	2673h	Action System Error
9844	2674h	Unable to save Output Book
9845	2675h	Designated Template Sheet(%s) does not exist in Template Book
9846	2676h	Failed to append sheet
9847	2677h	Unable to interpret command (%s) and cannot execute
9848	2678h	Failed to print
9849	2679h	Designated data type is not supported
9850	267Ah	Pro-Server version is old and cannot be started
9851	267Bh	Action Report sheet is corrupted
9852	267Ch	Designated group does not exist
9853	267Dh	Unable to paste image
9854	267Eh	File header is corrupted - unable to read
9855	267Fh	Unable to open designated CSV file (%s)
9856	2680h	Action Area Size is too small
9857	2681h	Unable to create or read temporary file
9858	2682h	No usable files exist in GP/GLC
9859	2683h	Designated data type is not supported
9860	2684h	A file name is too long, and Output Book can't be make
9861	2685h	An error occurred while macro run. Refer to Log Viewer for the details
9862	2686h	Unable to save GP Screen Capture data.
9863	2687h	Check if the Permission Flag has turned ON.
9864	2688h	The file name is error.
9865	2689h	The specified file does not exist in the CF card.
9866	268Ah	Not the browser application's designated folder. Browser cannot be displayed.
9870	268Eh	Error downloading Binary file
9871	268Fh	Binary file Read failed
9872	2690h	Binary file Open error
9873	2691h	Binary file Analysis failed
9874	2692h	Error writing to Excel file
9875	2693h	Error writing to CSV file
9876	2694h	Error creating Binary file
9877	2695h	Designated file does not exist
9878	2696h	Conversion from Excel file to Binary file failed
9879	2697h	Conversion from CSV file to Binary file failed
9880	2698h	Provided data is outside range

Error Code		Meaning
Decimal	Hex.	
9881	2699h	Failed in GP log data upload.
9882	269Ah	There is no data to support.
9883	269Bh	This data requires more than one sheet.
9884	269Ch	Microsoft Excel is not installed on this machine.
9885	269Dh	Wrong parameter is designated.
9886	269Eh	Failed to write data.
9887	269Fh	Failed to read CSV file.
9888	26A0h	An error occurred in deleting an unnecessary file.
9889	26A1h	Action Failed.
9891	26A3h	No corresponding data in ACCESS file.
9892	26A4h	Command error.
9893	26A5h	Failed in automatic upload of ACCESS data.
9894	26A6h	Cannot open the specified table.

A.2.2 2-Way Driver Error Messages and Syslog Features

The ECOM task displays the following error information on the lower left of the screen.

Screen Display	Meaning
SYSTEM ERROR	System call error
2Way ERROR	2-Way Driver error

System Errors

A system error is a fatal error.

2-Way Errors

A 2-Way error is an error that has occurred due to the 2-Way Driver.

When a 2-Way error occurs, the [2-Way Transfer Error Code] is saved to the GP unit's LS2075 address.

Syntax: 2Way ERROR(<Cause No.>:<Error No. 1>:<Error No. 2>:<Error No. 3>)

Reason Code	Error Type	Error No.			Reason	Workaround	2-Way Error Code
		1	2	3			
30	Fatal	Unused	Unused	Unused	Insufficient GP resources.	Internal problem. Please call the support dial when it occurred.	FF30
31	Fatal	Unused	Unused	Unused	Cannot release GP resources	Internal problem. Please call the support dial when it occurred.	FF31
32	Fatal	Unused	Unused	Unused	Cannot release GP resources	Internal problem. Please call the support dial when it occurred.	FF32
40	Fatal	Unused	Unused	Unused	IP address & Port number are not registered.	Either the GP's IP address or the port number has not been set. Reset it such as on the offline screen.	FF40
41	Fatal	Unused	Unused	Unused	The symbol state is different than GLC control.	The GLC symbol differs from the symbol imported to the network project of Pro-Server. Import the latest symbol to the network project, and then transfer it to GLC.	FF41
51	Fatal	Unused	Unused	Refer to protocol stack error codes	Protocol Stack Call up error.	This means that an error occurred with the GP's communication program (TCP/IP). Indicates that an error occurred with the GP communication program (TCP/IP). Check the contents of the Ethernet setting in the offline screen.	FF51
F0	Warning	0	Unused	2580	After transmit command was sent, Device Read was ignored due to insufficient Receiver memory.	Receiving memories may lack at the node to be provided. Either lengthen the issuing interval of the provider command or decrease the volume of sending data.	2580
		0	Unused	25A8	After transmit command was sent, Receiver unable to find data.	Network project files are different between the node to be provided and the provider source. Transfer the same network project file.	25A8
		0	Unused	25A9	After transmit command (with reply) was sent, no reply was received from Receiver.	Either communication damage has occurred or provider information may differ. Either check communication state or transfer the network project file again.	25A9
		0	Unused	Code is different from above	Refer to "A.2.1 Pro-Server with Pro-Studio for Windows Error Messages"		Code is different from above
		1	GP error	Refer to the manual of each PC maker.	After issuing a provider command, device write failed at the node to be provided. (Refer to the manual of each PC maker.)	Write failed due to a communication error occurred with PLC. Refer to the operation manual of the PLC maker and check workaround corresponding to the error code.	FFF0

Protocol Stack Error Codes

The following protocol stack error codes are displayed on the GP screen.

Error Code	Meaning	Workaround
1000	Current node IP Address entry failed during initialization	The IP address setup of the self node is incorrect. Reset it such as on the offline screen.
1005	Initialization failed	Check if the Ethernet unit is normally set.
1006	Transmit Halt processing failed	Internal problem. Please call the support dial when it occurred.
1007	Initialization is performed again, without previous initialization being completely terminated	Internal problem. Please call the support dial when it occurred.
1008	Provider Node Port number error.	The port number of the self node is out the designated range. Reset it such as on the offline screen.
1009	Receiver Node port number error.	The port number of the partner node is out the designated range. Reset it such as on the offline screen.
100A	Receiver Node IP Address error.	The IP address setup of the partner node is incorrect. Reset it such as on the offline screen.
100B	UDP was used to register this port number.	The port number of PLC communication overlaps with that for 2Way. Check the setup of the self node port.
100C	TCP was used to connect an adjacent port with a port having the same number.	The TCP port is used for the same partner node using the same port number. Check if the port number of the partner node is duplicated.
100D	Protocol Stack establishment refused	Internal problem. Please call the support dial when it occurred.
100E	Protocol Stack Open Failure(value)was returned	Internal problem. Please call the support dial when it occurred.
100F	The(communication)connection has been cut.	The TCP connection is closed by the partner node. Check if there are any problems with the communication setup.
1010	All connections are currently in use.	The communication connection with GP is at maximum. Exit one application, and then reconnect it.
1013	Receiver has aborted(communication).	The TCP connection is aborted by the partner node. Check if there are any problems with the communication setup.
101D	No Ethernet controller	Expansion Ethernet unit is required when using GP-2401/GP-2501/GP-2601 Series units
1030	No response from the protocol stack.	Internal problem. Please call the support dial when it occurred.
1032	No response from the Receiver.	A problem occurred on communication with the partner node. Check the connection state including cables.

MEMO

- When the error type is fatal, the 2-Way Driver cannot be restored.
- When the error type is Warning, the 2-Way Driver continues to operate. Once the cause of the error is removed, the error display will disappear when the GP's screen changes.
- When the Reason Code is "F0" the "Alarm Issued Time" and "Receiver IP Address" will also be displayed.

SYSLOG

If the SYSLOG file(SYSLOG.EXE), located inside the Pro-Server's system folder, is started, the following data can be checked. The 2-Way Driver downloaded to the GP can perform a variety of tasks, among them being the output of SYSLOG data.

You can select the type of SYSLOG data output via the GP OFFLINE mode's[SYSLOG Information Settings]. The correspondence of the Output Level and the output producing SYSLOG Priority level is shown below.

Output Level	SYSLOG Output Priority Level
0	No correspondence
1	INFO,
2	INFO,NOTICE
3	INFO,NOTICE,WARNING
4	INFO,NOTICE,WARNING,DEBUG

SYSLOG Output Information

SYSLOG Level	ECOM Response	SYSLOG Text
INFO	Starts ONLINE	gp[17]: start online
INFO	Starts OFFLINE	gp[17]: start offline
WARNING	Processing Failed	gp[17]: bel: fail, <Processing Failed Text> <Argument1>
DEBUG	Device Read	gp[17]: rdev: <Argument2>
DEBUG	Device Write	gp[17]: wdev: <Argument2>
DEBUG	Command Received	gp[17]: bel: <Command Text1>, recv from <IP address><port><Argument3>
DEBUG	Command Sent	gp[17]: bel: <Command Text2>, send to <IP address><port><Argument3>
DEBUG	s201 File Read	gp[17]: bel: <Command Text3> <Argument4> send to <IP address>

Failed Processing String	Meaning
read device	Failed in reading from the device
write device	Failed in writing to the device.
sync provide, response timeout	No return data received from the receiver node after providing data.
sync provide, fail to read device	Failed in reading from the device when providing data.
lack memory	Command ignored due to insufficient 2-Way driver memory.
first trigger on	The command to enable the first trigger failed.
second trigger on	The command to enable the second trigger failed.
backup data read	Failed in reading the backup data.

Command String 1	Contents
response	Receives the response.
sync provide	Provides the data.
read device	Reads from the device.
write device	Writes to the device.
get node property	Reads the node property.
first trigger on	Enables the first trigger.
second trigger on	Enables the second trigger.
backup data read	Reads the backup data.

Command String 2	Contents
sync provide, broadcast	Provides the data(Broadcast, no response).
sync provide, send each	Provides the data(Peer to Peer, no response).
sync provide, broadcast and wait for response	Provides the data(Broadcast, with response).
sync provide, send each and wait for response	Provides the data(Peer to Peer, with response).
sync provide, response	Provide data response.
read device, response	Device read response.
write device, response	Device write response.
write device, response(retry)	Write to device(Retry)response.
get node property, response	Read node property response.
first trigger on, response	First trigger enable response.
second trigger on, response	Second trigger enable response.
backup data read, response	Read backup data response.

Command String 3	Contents
register as sender	Registers provide data command as sender(provider).
register as receiver	Registers provide data command as receiver.

Argument1(<String>=<Value>)

String	Value	Value display format
err	Error No.	Hex.
pr	ProjectID	Hex.
ow	OwnerApp	Hex.
ma	MajorNo	Hex.
mi	MinorNo	Hex.

Argument2(<String>=<Value>)

String	Value	Value display format
code	Device code	Hex.
addr	Device address	Hex.
pack	DataPack	Hex.
kind	DataKind	Hex.
count	Data count by word	Hex.
d0	First data (1WORD)	Hex.

Argument3(<String>=<Value>)

String	Value	Value display format
pr	ProjectID	Hex.
ow	OwnerApp	Hex.
ma	MajorNo	Hex.
mi	MinorNo	Hex.
dl	DataLen	Hex.
va	Validity	Hex.

Argument4(<String>=<Value>)

String	Value	Value display format
rn	ResourceNo	Hex.
pack	DataPack	Hex.
kind	DataKind	Hex.
count	ProvidCount	Hex.
howto	HowTo	Hex.
ext	ExtDevType	Hex.
code	Device code	Hex.
addr	Device address	Hex.
retry	RetryCount	Hex.
wait	RetryWaitTime	Hex.

A.3 Scale Conversion using Excel

This section explains the use of Microsoft Excel's scale conversion feature for input data.

The following example converts a range of 1 to 1000 to a range of 1 to 100.

	A	B	C	D	E	F	G	H	I
1									
2			1	1000	1	100			
3									
4				500				50	
5									
6									
7									

C2: Minimum input value

D2: Maximum input value

E2: Minimum conversion value

F2: Maximum conversion value

D4: Input value

H4: Conversion value

The formula for H4 is as follows:

=IF(((D4/(D2/F2))<1),1,QUOTIENT(D4/(D2/F2),1))

MEMO

To use the abovementioned formula, you must first install Excel's [Analysis ToolPack]. To do this, us Excel's [Tools] -> [Add-Ins] dialog to add the [Analysis ToolPack].

A.4 GP Ethernet Settings

Prior to sending data to the GP, the proper settings must be entered. After data transfer or setup are finished, the GP's OFFLINE menu will appear. Select[INITIALIZE], [SETUP OPERATION SURROUNDINGS], and then[EXTENDED SETTINGS]and the following screen will appear.

MEMO

When using the 2-Way driver, perform self-diagnosis of the Ethernet unit from the following Extended Settings screen, not from the OFFLINE mode's Main Menu screen.

Extended Settings

The screens shown here are setup examples.

The image shows two screenshots of the GP's setup interface. The top screenshot is a main menu with four options: 1. ETHERNET SETUP, 2. SYSLOG SETUP, 3. OTHERS SETUP, and 4. SELF-DIAGNOSIS. A vertical line connects the '1. ETHERNET SETUP' option to a larger screenshot below. This larger screenshot is titled '[1]ETHERNET SETUP' and contains the following fields:

ETHERNET SETUP		PREVIOUS	NEXT
MY IP ADDRESS	[] [] [] [] [] []		
SUBNET MASK	[] [] [] [] [] []		
MY PORT NO.	[]		
GATEWAY	[] [] [] [] [] []		

• MY IP ADDRESS

Designate the IP address on your GP node.

The IP addresses 32 bits used are divided into 4 groups of 8. Use Base 10 numbers only.

• SUBNET MASK

Designate the subnet mask.

If unused, enter all zeroes here.

• MY PORT NO.

Designate the port no. on your node.

Port number range is from 1024 to 65535. Sequential ten ports from MY PORT NO. are used.

• GATEWAY

Designate the IP address of gateway.

If unused, enter all zeroes here. There is only one GATEWAY setting. If unused, enter all zeroes here.

[2]SYSLOG SETUP

SYSLOG SETUP		PREVIOUS	NEXT
HOST IP ADDRESS	[] [] [] [] [] []		
FACILITY	[]		
OUTPUT LEVEL	[]		

- **HOST IP ADDRESS**

Designate the IP address for the SYSLOG destination output. (Where GPSYSLOG.EXE is running.)

- **FACILITY**

(Default value:1) reserved

You may not change the default value.

- **OUTPUT LEVEL**

Designate the output level.

(Setting range: 0 to 4, Default value: 0)

[3]OTHERS SETUP

OTHERS SETUP			PREVIOUS	NEXT
BUZZER ON ERROR	ON	OFF		
DISPLAY WARNING	ON	OFF		

- **BUZZER ON ERROR**

Select if buzzer sounds when a 2-Way Driver error occurs.

(Default value: ON)

- **DISPLAY WARNING**

Select if warning messages are displayed on the GP's screen.

A.5 Optimizing Communication Speed

If there are any problems with the processing speed of the system related to Pro-Server, optimize the processing speed according to the following contents.

Optimizing Provider Data Count

If there are many number of provider data, the processing speed of 2Way Driver/Pro-Server becomes slow. For provider data, the address of device which executes provider processing should be put together in a sequential way as much as possible so that it can be provided at one time.

Bit device should be put together in word data rather than setting provider record/provider data per bit so that it can be provided at one time.

Optimizing Providing Condition

When you have set “Interval” in “Providing Condition” of provider information, if you set interval short (e.g. 0ms), 2Way Driver/Pro-Server will be dedicated to it and the overall system speed will become slow.

If it is not necessary for the provider sheet to check provider trigger frequently, designate check interval as long as possible according to the system specification.

Optimizing Action Item Count

If you register one action on Pro-Server, one thread will be created. If more than one thread is created, overall application processing will become slow in a PC. You should design the same action contents to be covered by one action registration as much as possible.

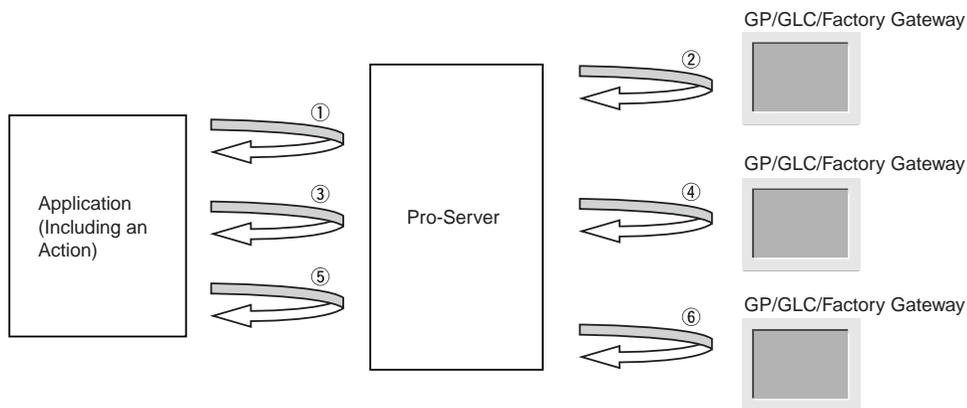
Streamlining Check Interval Setting

When providing more than one device, if you set check interval separately, check interval does not overlap so that it can reduce a burden on the system.

Optimizing Device Access

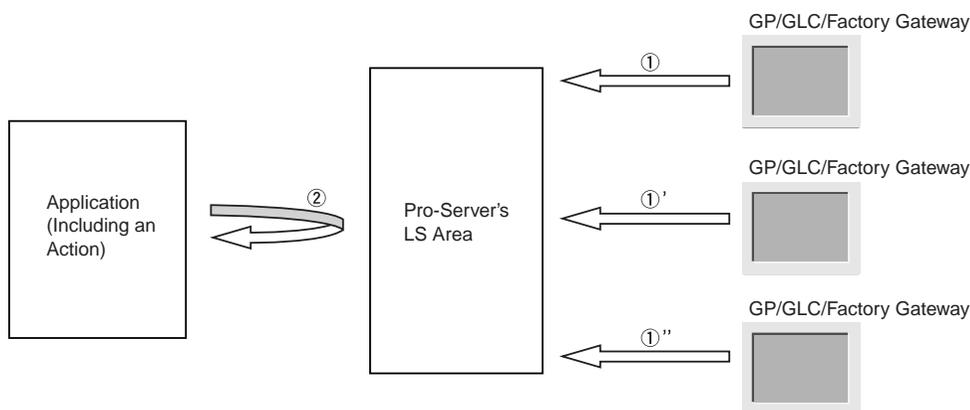
When you access to more than one device of more than one node on Pro-Server, you should put data together in the internal LS area of Pro-Server using provider processing than accessing to device directly per node. For an application (including an action), you can ease the communication burden by establishing the system to access to the internal LS area where data are put together.

<Slow Case>



To check data of 3 nodes, ① - ⑥ time is required.

<Improved Case>



Because ①, ①' and ①'' are done simultaneously, data of 3 nodes can be check during ① plus ② time.

A.6 Changing Windows XP Security Level

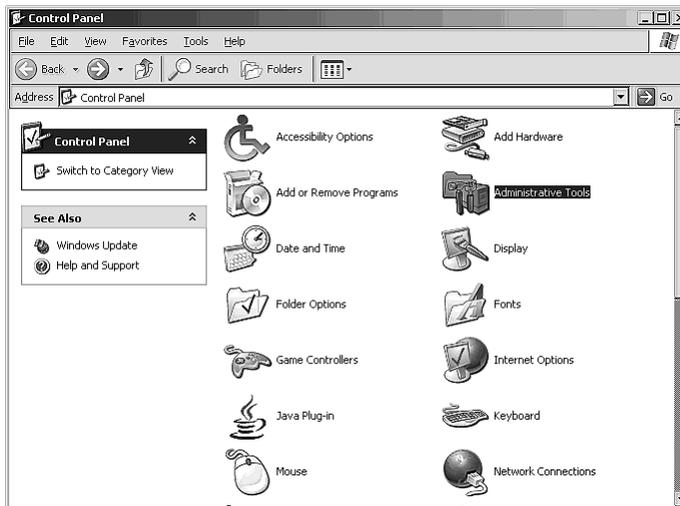
When using the OPC interface feature, the security level must be set to the same level as Windows 2000. The following explanation describes how to set this level.

MEMO

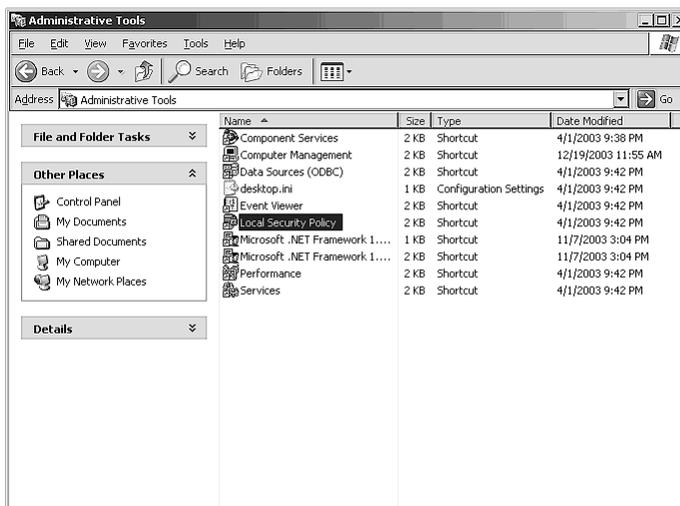
When changing the Windows XP security level to the level of Windows 2000, the security level will be reduced.

Security Level Change Procedure

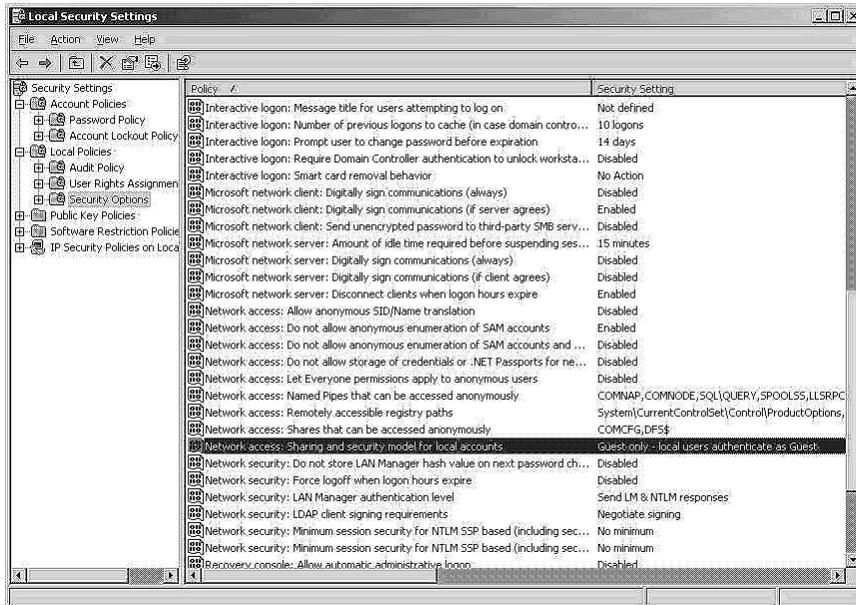
1. Select "Administrative Tools" from the Control Panel.



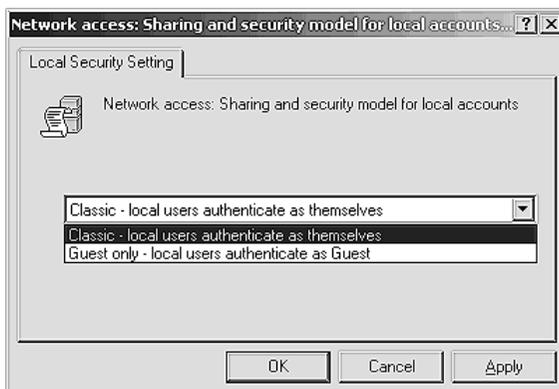
2. Select "Local Security Policy".



3. Select “Network access: Sharing and security model for local accounts” from the Local Security Policy menu.



4. Select “Classic - local users authenticate as themselves” and click the OK button.



5. Check that the Security Settings is changed to “Classic - local users authenticate as themselves” and close the Local Security Settings dialog box.

