

GP-PRO/PBIII for Windows Device/PLC CONNECTION MANUAL

ADDITIONAL MANUAL Rockwell (Allen-Bradley) SLC500 Series (Ethernet)



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Pro-face
Human Machine Interface

Reading the GP-PRO/PBIII Device/PLC Connection Manual

This document is designed as an addition to the latest GP-PRO/PBIII for Windows Device/PLC Connection manual's Rockwell (Allen-Bradley)'s SLC500 Series (Ethernet) data.

When connecting a Factory Gateway unit, please substitute the words "Factory Gateway" for this document's "GP/GLC".

Installation

This CD-ROM includes all the protocol files required by the GP/GLC to communicate with a Allen-Bradley (Rockwell)'s PLC. Also, you will need to have one or more of the following software applications installed, the screen and data transfer file included in the CD-ROM must be installed in each of those applications. For information about the installation of the software, refer to that software's Operation Manual.

■ Software Applications

- GP-PRO/PBIII for Windows Ver.6.1 or later
- Pro-Server with Pro-Studio for Windows Ver.4.1 or later ^{*1}

- 1) Be sure to confirm that GP-PRO/PBIII for Windows is installed in your PC prior to starting this driver installation.
- 2) To install the new driver, double-click on "SLC505E.exe" when using an SLC500 Series unit Ethernet connection.
- 3) Once the installation program starts, follow the instructions given to install the protocol files.



When using the SLC500 Series unit Ethernet protocol , select [Others] - [Allen Bradley SLC5/05(ETHER)] for the " Device/PLC Type" .

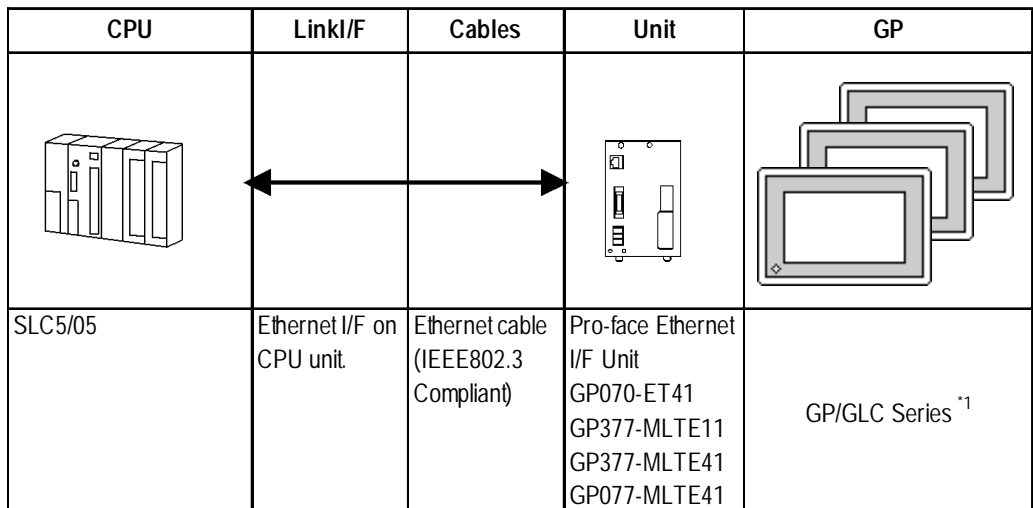
***1 When using the Factory Gateway unit, GP-Web Ver.1.0 or later or GP-Viewer Ver.1.0 or later, be sure to select the Pro-Server with Pro-Studio for Windows as the "Destination Folder".**

7.8 Rockwell (Allen-Bradley)

7.8.1 System Structure for Ethernet Connection

This section explains the system structures available for the Ethernet connection between Rockwell (Allen-Bradley) PLCs and GP/GLC units.

■ **SLC500 Series**



*1 When using GP/GLC and the optional Ethernet I/F unit, refer to the following List of Connectable GP/GLC Units.

Series Name		Product Name	Optional Ethernet I/F Unit	Built-in Ethernet Port
GP77R Series	GP-377R Series	GP-377RT	○ ^{*1*2}	x
	GP-477R Series	GP-477RE	○ ^{*2}	x
	GP-577R Series	GP-577RS	○ ^{*2}	x
		GP-577RT	○ ^{*2}	x
GP2000 Series	GP-2300 Series	GP-2300L	x	○
		GP-2300T	x	○
	GP-2400 Series	GP-2400T	x	○
	GP-2500 Series	GP-2500L	○ ^{*3*4}	○
		GP-2500S	○ ^{*3*4}	○
		GP-2500T	○ ^{*3*4}	○
	GP-2501 Series	GP-2501S	○ ^{*2*3}	x
		GP-2501T	○ ^{*2*3}	x
GP-2600 Series	GP-2600T	○ ^{*3*4}	○	
GLC2000 Series	GLC-2300 Series	GLC-2300L	x	○
		GLC-2300T	x	○
	GLC-2400 Series	GLC-2400T	x	○
	GLC-2600 Series	GLC-2600T	○ ^{*3*4}	○

*1 Only the Multi Unit can be used.

*2 The 2-Way Driver (Pro-Server, GP-Web and others) cannot be used.

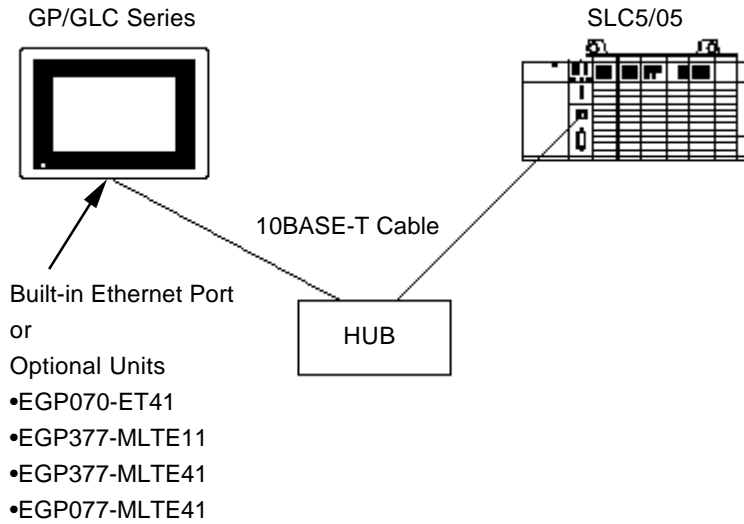
- *3 When using optional Ethernet I/F unit, a bus conversion unit (PSL-CONV000) is required.
- *4 Using the optional Ethernet I/F Unit allows you to set up separate Class and Net No.s for 2-Way Driver applications (Pro-Server, GP-Web and others) and the PLC. When doing this, data transfer with the PLC is performed through the optional Ethernet I/F Unit.



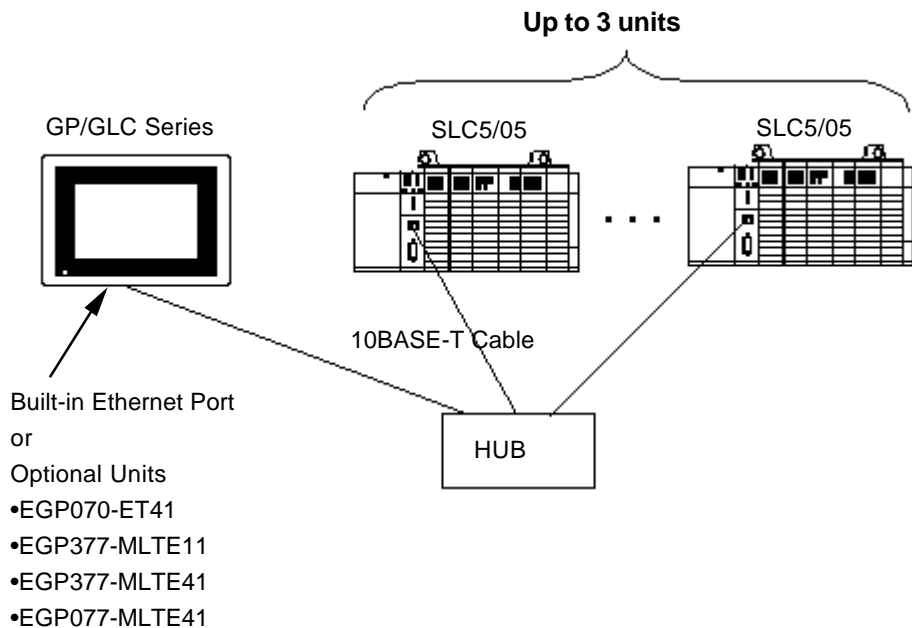
Note: For cable connection and Optional Unit information, refer to the user's manual for each optional unit. For GP2000 and GLC2000 series units, and refer to that unit's User Manual.

◆ Connection Structure

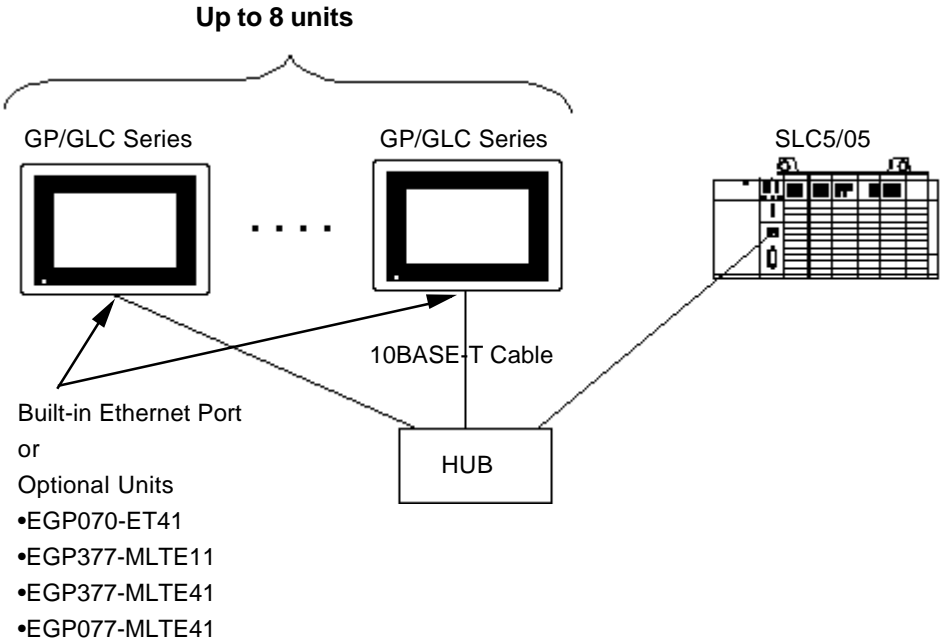
<1 : 1 connection>



<1:n connection>



<n:1 connection>



7.8.2 Supported Devices

The following list shows the range of devices supported by the GP/GLC.

■ **SLC500 Series**

Setup System Area here.

Device	Bit Address	Word Address	Others
Bit	B3:0/0 - B3:255/15 B9:0/0 - B255:255/15	B3:0 - B3:255 B9:0 - B255:255	H/L
Timer (TT : Timing Bit)	T4:0/TT - T4:255/TT T9:0/TT - T255:255/TT	-	L/H
Timer (DN : Complete Bit)	T4:0/DN - T4:255/DN T9:0/DN - T255:255/DN	-	
Timer (EN : Enable)	T4:0/EN - T4:255/EN T9:0/EN - T255:255/EN	-	
Timer (PRE : Setup Value)	-	T4:0.PRE - TP4.255.PRE T9:0.PRE - T255.255.PRE	
Timer (ACC : Current Value)	-	T4:0.ACC - T4:255.ACC T9:0.ACC - T255:255.ACC	
Counter (CU : Up Count)	C5:0/CU - C5:255/CU C9:0/CU - C255:255/CU	-	
Counter (CD : Down Count)	C5:0/CD - C5:255/CD C9:0/CD - C255:255/CD	-	
Counter (DN : Complete Bit)	C5:0/DN - C5:255/DN C9:0/DN - C255:255/DN	-	
Counter (OV : Overflow)	C5:0/OV - C5:255/OV C9:0/OV - C255:255/OV	-	
Counter (UN : Underflow)	C5:0/UN - C5:255/UN C9:0/UN - C255:255/UN	-	
Counter (UA : Update)	C5:0/UA - C5:255/UA C9:0/UA - C255:255/UA	-	
Counter (PRE : Setup Value)	-	C5:0.PRE - C5.255.PRE C9:0.PRE - C255:255.PRE	
Counter (ACC : Current Value)	-	C5:0.ACC - C5:255.ACC C9:0.ACC - C255:255.ACC	
Control (DN : Complete Bit)	R6:0/DN - R6:255/DN R9:0/DN - R255:255/DN	-	
Control (EN : Enable)	R6:0/EN - R6:255/EN R9:0/EN - R255:255/EN	-	
Control (ER : Error)	R6:0/ER - R6:255/ER R9:0/ER - R255:255/ER	-	
Control (UL : Unload)	R6:0/UL - R6:255/UL R9:0/UL - R255:255/UL	-	
Control (IN : In High Bit)	R6:0/IN - R6:255/IN R9:0/IN - R255:255/IN	-	
Control (FD : Found)	R6:0/FD - R6:255/FD R9:0/FD - R255:255/FD	-	
Control (EU : Unload Enabled)	R6:0/EU - R6:255/EU R9:0/EU - R255:255/EU	-	
Control (EM : Empty Stack)	R6:0/EM - R6:255/EM R9:0/EM - R255:255/EM	-	
Control (LEN : Length)	-	R6:0.LEN - R6:255.LEN R9:0.LEN - R255:255.LEN	
Control (POS : Position)	-	R6:0.POS - R6:255.POS R9:0.POS - R255:255.POS	
Integer	-	N7:0 - N7:255 N9:0 - N255:255	H/L
Floating Decimal Point	-	F8:0 - F255:255	L/H



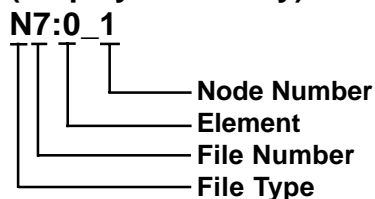
When using Pro-Server with Pro-Studio:

- **To access any of the above devices, Pro-Server with Pro-Studio Ver. 4.1 or higher is required. Also, additional settings are required. For setting details, please refer to the Pro-Server with Pro-Studio Ver. 4.1 or higher software's Operation Manual.**
- **Using versions prior to Pro-Server with Pro-Studio Ver. 4.1 allows you to only access the LS Area.**



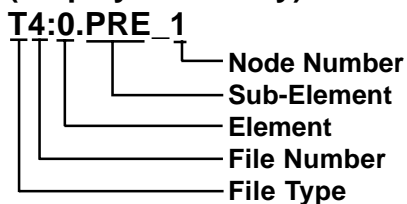
- **Rockwell (Allen-Bradley) PLC device data consists of elements. When entering devices and addresses in GP-PRO/PBIII for Windows, use the following method.**
- **When using Word Device N, B or F**

(Display after entry)



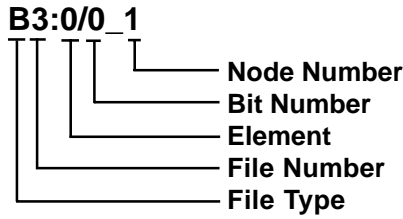
- **When using Word Device T, C or R**

(Display after entry)



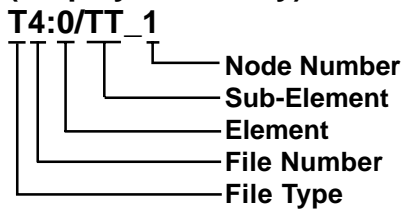
- When using Word Device N or B

(Display after entry)




- When using Bit Device T, C or R

(Display after entry)

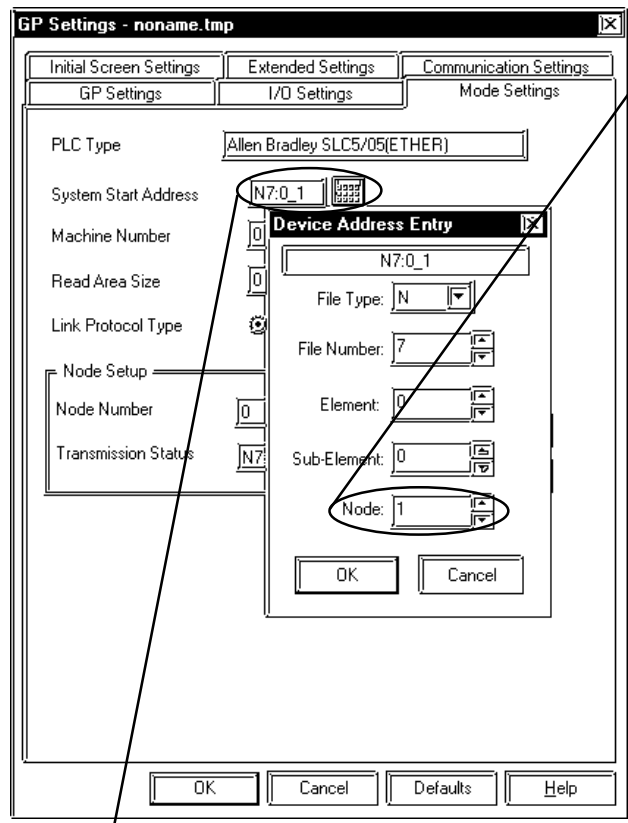


◆ **When setting Parts or Tags from GP Screen Editor (GP-PRO/PBIII for Windows)**

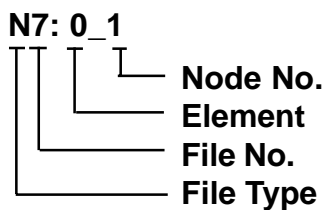
Before setting up Parts or Tags, Network Information settings must be entered. Network Information Setting can be entered from the [GP SYSTEM SETTING]->[MODE SETTING]->[Network Information] screen.

Reference  this manual, 7.8.3 Environment Setup

Setting Up parts or tags by specifying the PLC's Node Address allows the specified PLC's Device to be read out.



The System Area and Read Area are assigned to the PLC node designated here.



■ SLC500 Series Ethernet Protocol Limitation

Even though the SLC500 Series Ethernet Protocol can access more than one CPU, the following limitations apply.

1. Device Address and Node Number Limitations

When a different File Number or Node Number is set, the number of available device addresses will vary. The GP uses internal records to set the device addresses. These records are limited to 64. For example, when the N7:0 device address is set, a single record is used in the GP. For detailed examples, refer to the following chart.

Ex1.) Number of records used when designating tag setting numbers.

Setting No.	Node No.	Device Address	Remaining Number of records in GP-PRO/PBIII	Remarks
1	1	N7:0	63	Uses one record
2	1	N9:0	62	Uses one record
3	2	B10:0	61	Uses one record
4	2	B11:0	60	Uses one record
5	1	N7:255	60	Since the node number and element number range already exist as setting No.1, no records will be used.
6	2	B10:255	60	Since the node number and element number range already exist as setting No.3, no records will be used.
7	3	N12:0	58	Uses one record

When using a different Node Number or File Number, GP internal records are used.

Ex2.) When setting tags from N10 to N19 (File Number), a total of 10 records will be used. Therefore, when setting tags continuously from N10 (File Number), File Numbers can be used up to N73.



When the number of records is over 65, the following error message will appear on the GP Screen Editor software (GP-PRO/PBIII for Windows).

“Address entry limit reached. No more can be entered”

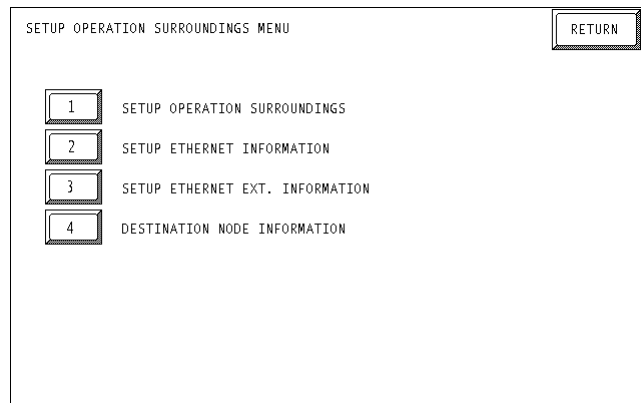
7.8.3 Environment Setup

■ GP Settings

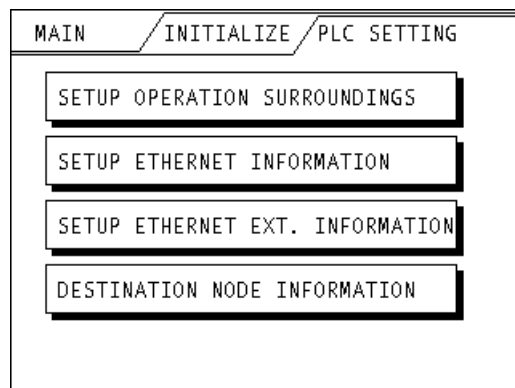
The following screens show the GP's communication settings, which are required for communication via an Ethernet Network:

◆ SET UP OPERATION SURROUNDINGS MENU

<GP-477R/GP-577R/GP-2400/GP-2500/GP-2501/GP-2600/GLC2400/GLC2600 Series>



<GP-377R/GP-2300/GLC2300 Series>



• SET UP OPERATION SURROUNDINGS

<<GP-477R/GP-577R/GP-2400/GP-2500/GP-2501/GP-2600/GLC2400/GLC2600Series>

SET UP OPERATION SURROUNDINGS		SET	CANCEL									
STARTING ADDRESS OF SYSTEM DATA AREA	[N											
SYSTEM AREA READING AREA SIZE (0-256)	[]											
RESET GP ON DATA WRITE ERROR	ON OFF											
<p>Note! The system start address cannot be changed on GP. Please use GP-PRO/PB3 to set this data and re-send to the GP.</p>												
1	2	3	4	5	6	7	8	9	0	↑	↓	BS
										←	→	

<<GP-377R/GP-2300/GLC2300 Series>

SETUP OPERATION SURROUNDINGS	SET	ESC
SYSTEM AREA START ADR N	<input type="text"/>	
SYSTEM AREA READ SIZE	<input type="text"/>	
RESET GP ON WRITE ERROR	<input type="text"/>	
<p>Please use GP-PRO/PB3 to modify the system start address.</p>		



The System Area Start Address settings cannot be changed from the GP's OFFLINE mode. Be sure to make these settings from the GP Screen Editor's [GP SYSTEM SETUP] -> [MODE SETUP] setting area.



This manual, 7.8.3 Environment Setup ■GP-PRO/PBIII for Windows Settings

◆ **SETUP ETHERNET INFORMATION**

Enter each item in the SET UP ETHERNET INFORMATION screen.

<GP-477R/GP-577R/GP-2400/GP-2500/GP-2501/GP-2600/GLC2400/GLC2600 Series>

<GP-377R/GP-2300/GLC2300 Series>

- **SRC IP ADDRESS (0 to 255)**

Enter the IP address for your station’s GP unit. To do this, separate the 32 bits of the IP address into four segments of eight bits each, separate those segments with a dot and then enter them as decimal numbers.

- **SRC PORT NO. (1024 to 65535)**

Enter your GP’s Port No.



Do not specify duplicate IP addresses. Contact your network manager about assigning IP addresses.



- When using the built-in Ethernet port on a GP2000 Series unit, be sure not to enter duplicate "SRC PORT No." values.

Check the 2-Way driver's "SRC PORT No." Setting via the following menu:

GP OFFLINE mode's Main menu [INITIALIZE] -> [SETUP OPERATION SURROUNDINGS] -> [EXTENDED SETTINGS] -> [SETUP ETHERNET INFORMATION] screen.

The default value is 8000. The 2-Way driver uses this port and the following nine ports for a total of 10 (8000 ~ 8009).

When "SRC IP ADDRESS" is [0.0.0.0], the IP ADDRESS set in 2-Way Driver is enabled.

◆SET UP NETWORK EXT. INFORMATION

<GP-477R/GP-577R/GP-2400/GP-2500/GP-2501/GP-2600/GLC2400/GLC2600 Series>

SETUP ETHERNET EXT. INFORMATION		SET	CANCEL
SEND WAIT TIME	[] (ms)		
TIMEOUT	[] (x 2sec)		
IP ROUTER ADDRESS	[] . [] . [] . []		
SUBNET MASK	[] . [] . [] . []		
UDP RETRY COUNT(0-255)	[]		

	1	2	3	4	5	6	7	8	9	0			↑	↓	BS
													←	→	

<GP-377R/GP-2300/GLC2300 Series>

SETUP NETWORK EXT. INFORMATION		SET	ESC
SEND WAIT TIME	[] (ms)		
TIMEOUT	[] (x 2sec)		
IP ROUTER ADD.	[] . [] . [] . []		
SUBNET MASK	[] . [] . [] . []		
UDP RETRY COUNT(0-255)	[]		

- **SEND WAIT TIME (0 to 255)**

Wait time can be added when a command is transmitted from the GP. Use the wait time if the traffic on the communications line is heavy. If no wait time is required, enter “0.”

- **TIMEOUT (0 to 65535)**

Enter the desired timeout value. If no response is received from the other station within the specified time, a timeout occurs. If “0” is specified, the default time is 5 seconds with UDP/IP communication.

- **IP ROUTER ADDRESS**

Enter the IP address of the router (only one). If no router is used, enter “0” in all fields.

- **SUBNET MASK**

Enter the subnet mask settings. If no subnet mask is used, enter “0” in all fields.

- **UDP RETRY COUNT (0 to 255)**

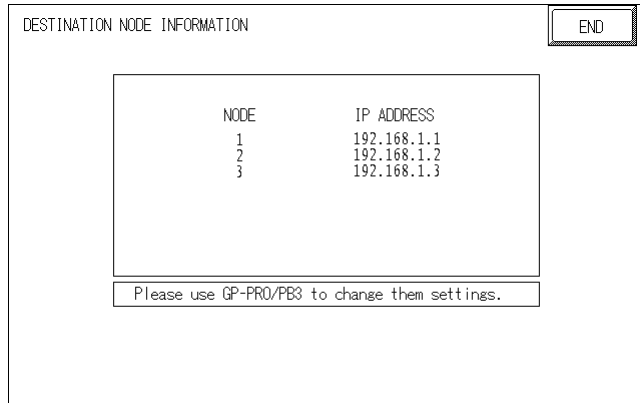
This setting cannot be used, and the setting value is disabled.



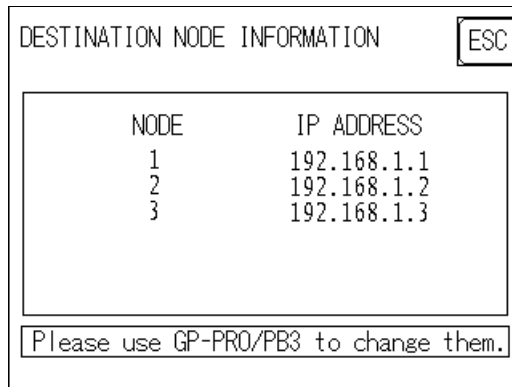
If GP memory is initialized in OFFLINE mode, random values may be included. Download the GP System Setting data from GP-PRO/PBIII for Windows.

• **DESTINATION NODE INFORMATION**

<GP-477R/GP-577R/GP-2400/GP-2500/GP-2501/GP-2600/GLC2400/GLC2600 Series>



<GP-377R/GP-2300/GLC2300 Series>



• **DESTINATION NODE INFORMATION**

The Destination (PLC) Network Address, Destination Node Address and IP Address are displayed here.



The DESTINATION NODE INFORMATION cannot be set or changed from OFFLINE mode. Set or change these values from GP-PRO/PBIII for Windows [GP SYSTEM SETTINGS]-> [MODE SETTINGS]-> [NETWORK INFORMATION SETTINGS].

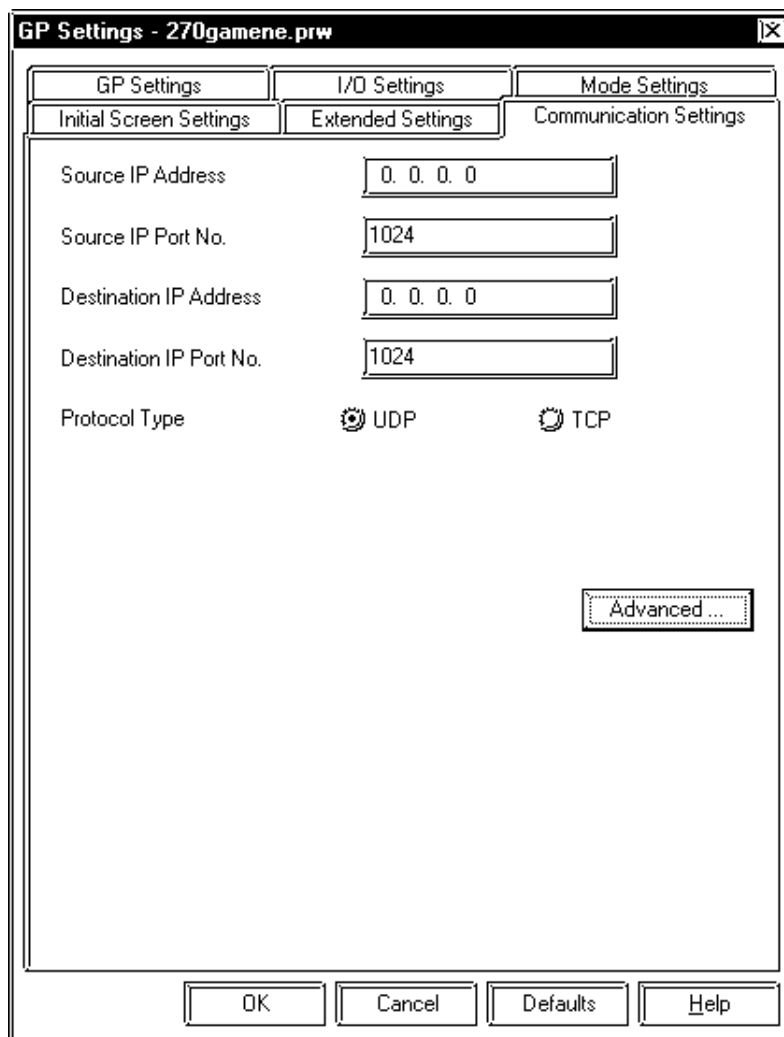
Reference This manual, 7.8.3 **Environment Setup** ■GP-PRO/PBIII for Windows Settings

■ GP-PRO/PBIII for Windows settings

The following items can be entered from GP-PRO/PBIII for Windows [GP SYSTEM SETTINGS] -> [MODE SETTING] area.

Menu	Sub Menu	Item
Communication Settings	_____	Source IP Address
		Source IP Port No.
	Advanced Communication Settings	Send Wait Time
		Time Out
		IP Router Address
		Subnet Mask
		UDP Retry Count
Mode Settings	_____	System Start Address
		Read Area Size
	Network...	Destination Node No.
		Destination Ip Address

◆ COMMUNICATION SETTINGS



- **Source IP Address (0 to 255)**

Enter the IP address for your station's GP unit. To do this, separate the 32 bits of the IP address into four segments of eight bits each, separate those segments with a dot and then enter them as decimal numbers.

- **Source IP Port No. (1024 to 65535)**

Enter the GP's Port No.

- **Destination IP Address (0 to 255)**

This setting cannot be used, and the setting value is disabled.

- **Destination IP Port No. (1024 to 65535)**

This setting cannot be used, and the setting value is disabled.

- **Protocol Type**

This setting cannot be used, and the setting value is disabled.

- **ADVANCED COMMUNICATION SETTINGS**

- **Send Wait Time (0 to 255)**

Wait time can be added when a command is transmitted from the GP. Use the wait time if the traffic on the communication line is heavy. If no wait time is required, enter "0."

- **Time Out (0 to 65535)**

Enter the desired timeout value. If no response is received from the other station within the specified time, a timeout occurs. If "0" is specified, the default time is 5 seconds with UDP/IP communication.

- **IP Router Address**

Enter the IP address of the router (only one). If no router is used, enter "0" in all fields.

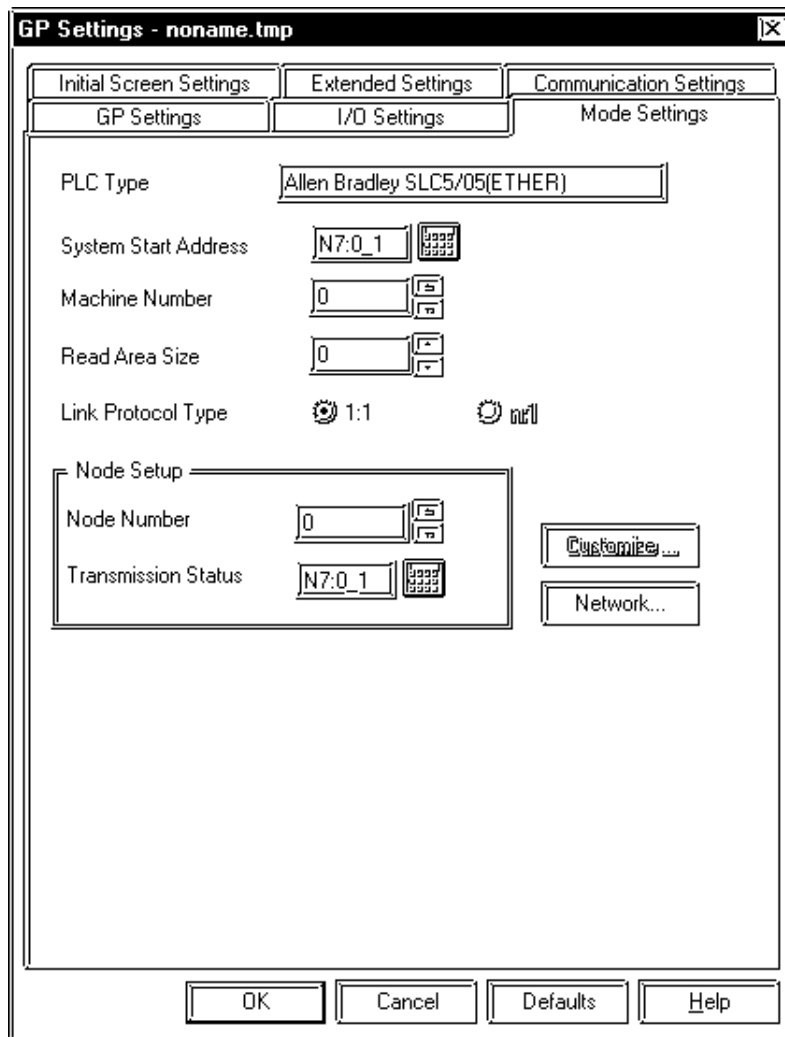
- **Subnet Mask**

Enter the subnet mask settings. If no subnet mask is used, enter "0" in all fields.

- **UDP Retry Count (0 to 255)**

This setting cannot be used, and the setting value is disabled.

◆MODE SETTINGS



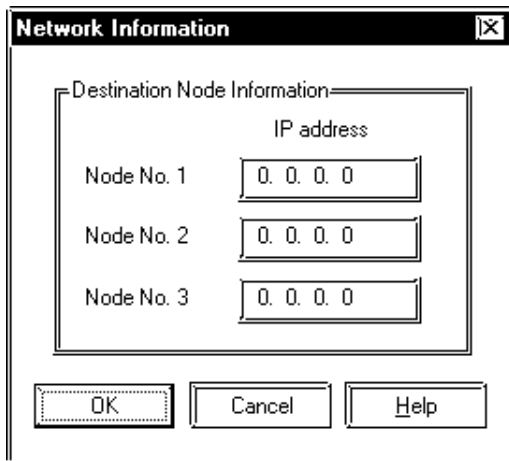
• **System Start Address**

The System Start Address is assigned to the PLC node designated here. For setting procedures, refer to 7.8.2 Supported Devices.

• **NETWORK INFORMATION SETTINGS**

Click the [Network...] button from [GP System Setting]-[Mode Setting] tab, and the Network Information window will appear.

Enter or edit the Destination Node Information.



• **Destination Node Information**

Register IP Address to each destination PLC Node number. The Maximum number of Nodes is 3. The Destination Node IP Address needs to be set to the same address as the target PLC or the junction (intermediate) PLC's IP address.

■ **PLC SETTINGS**

◆ **SLC500 Series**

GP Settings		PLC Settings	
Source IP Address	GP IP Address ^{*1}	-	-
Source Node Address	GP Port No. ^{*2}	-	-
Network Information Setting	Target PLC IP Address ^{*1}	IP Address	PLC IP Address

**1 Contact your network administrator about setting values.*

**2 When using the following function on a GP2000 Series unit, be sure not to use duplicate port number values. Check the 2-Way driver's port number setting via the following menu:*

From the GP OFFLINE mode's Main menu [INITIALIZE] -> [SETUP OPERATION SURROUNDINGS] -> [EXTENDED SETTINGS] -> [SETUP ETHERNET INFORMATION].

The default value is 8000. The 2-Way driver uses this port and the following nine ports for a total of 10 (8000 ~ 8009).



• **PLC's Port No. is 2222 (fixed). Protocol Type is TCP/IP Connection.**

7.8.4 Error Code

Reference *About the GP Ethernet Specific Error Codes, refer to the end of this Chapter, “Protocol Stack Error Codes”.*

■PLC SPECIFIC ERROR CODES

The PLC error codes are displayed by the “Host Communication Error (02:**:##)”, and are indicated in the left lower corner of the GP screen. (** indicates the PLC error codes. ## indicates the PLC node number.)

Error Code	Contents
10	The devices are not designated or the designated addresses are out of range.

Reference *For information about error codes, refer to Rockwell (Allen-Bradley)’s User Manual for SLC500 Series.*



A1

Maximum Number of Consecutive PLC Addresses

The following lists the maximum number of consecutive addresses that can be read by each PLC. Refer to these tables to utilize *Block Transfer*.

■ SLC500 Series

Device	Max. No. of Consecutive Address
Bit	126 words
Timer(TT : Timing Bit)	42 words
Timer(DN : Complete Bit)	
Timer(EN : Enable)	
Timer(PRE : Setup Value)	
Timer(ACC : Current Value)	
Counter(CU : Up Count)	
Counter(CD : Down Count)	
Counter(DN : Complete Bit)	
Counter(OV : Overflow)	
Counter(UN : Underflow)	
Counter(UA : Update)	
Counter(PRE : Setup Value)	
Counter(ACC : Current Valu)	
Control (DN : Complete Bit)	
Control (EN : Enable)	
Control (ER : Error)	
Control (UL : Unload)	
Control (IN : In Hight Bit)	
Control (FD : Found)	
Control (LEN : Length)	
Control (EU:Unload Enabled)	
Control (EM:Empty Stack)	
Control (POS : Position)	
Integer	126 words
Floating Decimal Point	63 words

A2

Device Codes and Address Codes

E-tag or K-tag indirect addresses cannot be designated by a SLC500 Series unit on an Ethernet network.

A3

Address Conversion Tables

The following lists the address global replacement.

- : When the selected conversion mode is [Word], both word and bit addresses are converted. When the [Bit] is selected, only bit addresses are converted.
- △: When the selected conversion mode is [Word], only word addresses are converted. When the [Bit] is selected, only bit addresses are converted.
- ☆: When the [Word] mode is selected, only word addresses are converted.
- : When the [Bit] mode is selected, only bit addresses are converted.
- Blank: Cannot be converted.

■ SLC500Series

		After Conversion									
		B	T (TT/DN/ /EN)	C (CU/CD/ DN/OV/ UN/UA)	R (DN/EN/ ER/UK/ IN/FD/ EU/EM)	T (PRE/ ACC)	C (PRE/ ACC)	R (LEN/ POS)	N	F	LS
Before Conversion	Bit	○	□	□	□	☆	☆	☆	○	☆	○
	Timer TT/DN/EN	□	□	□	□				□		□
	Counter CU/CD/DN/OV/UN/UA	□	□	□	□				□		□
	Control DN/EN/ER/UK/ IN/FD/EU/EM	□	□	□	□				□		□
	Timer PRE/ACC	☆				☆	☆	☆	☆	☆	☆
	Counter PRE/ACC	☆				☆	☆	☆	☆	☆	☆
	Control LEN/POS	☆				☆	☆	☆	☆	☆	☆
	Integer	○	□	□	□	☆	☆	☆	○	☆	○
	Floating Decimal Point	☆				☆	☆	☆	☆	☆	☆
	LS Area	○	□	□	□	☆	☆	☆	○	☆	○