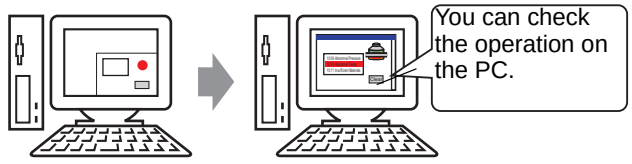
31 Simulation

This chapter provides an overview of the "Simulation" feature and the basic operation for the simulation.
Begin reading “31.1 Settings Menu” (page 31-2) and proceed to the description of the desired section.

31.1 Settings Menu 31-2
31.2 Checking the Display operation on the PC. 31-3
31.3 Checking the operation of the I/O driver on the PC 31-8
31.4 Settings Guide.....31-14
31.5 Restrictions 31-23

31.1 Settings Menu

Checking the Display operation on the PC.	
	☞ Setup Procedure (page 31-4) ☞ Details (page 31-3)

Checking the operation of the I/O driver on the PC	
	☞ Setup Procedure (page 31-9) ☞ Details (page 31-8)

31.2 Checking the Display operation on the PC.

31.2.1 Details

Using the simulation feature, you can verify how the project operates before transferring it to the device/PLC. You do not have to save the project before simulating, making it ideal for debugging as you edit and create the project. You can even keep simulation running while you open and edit a different project in GP-Pro EX.

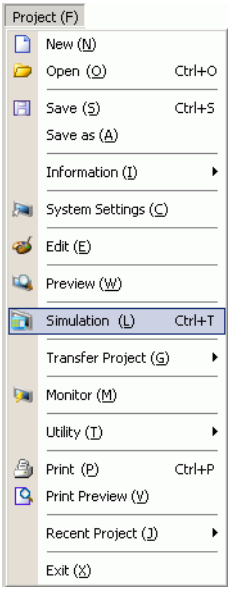
31.2.2 Procedure

NOTE

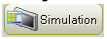
- Please refer to the settings guide for details.

☞ "31.4.1 Setting Guide for [GP-Pro EX Simulation]" (page 31-14)
☞ "31.4.2 [Address View] Settings Guide" (page 31-18)

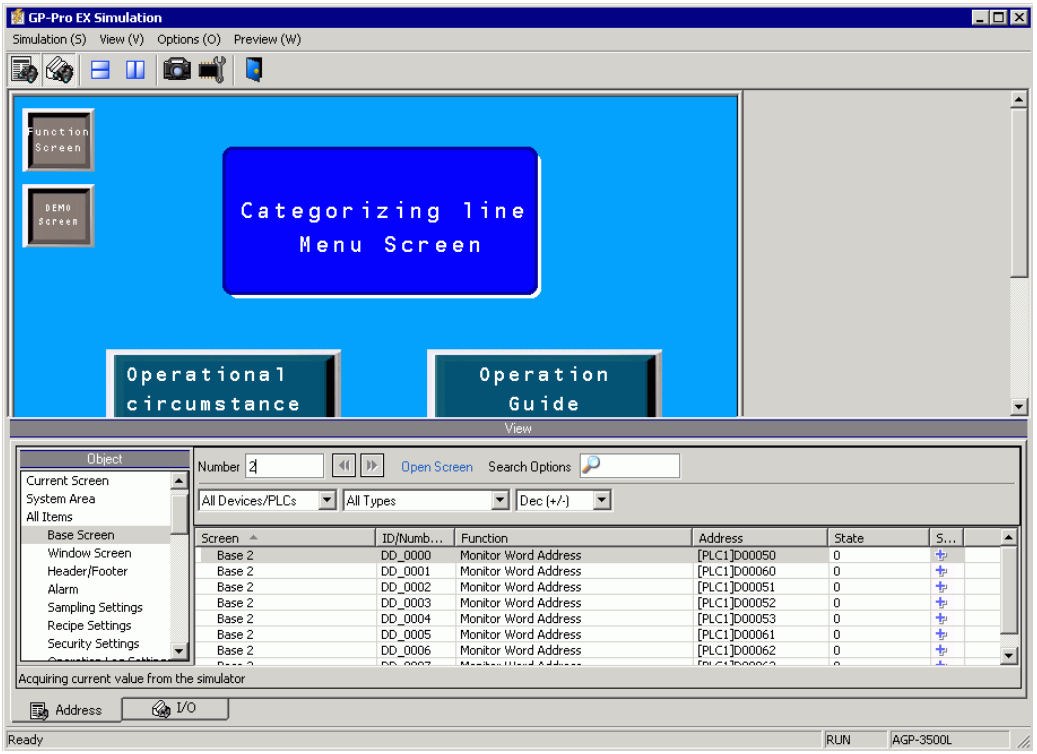
1 Open the project file you want to simulate. From the [Project (F)] menu, select [Simulation(L)].



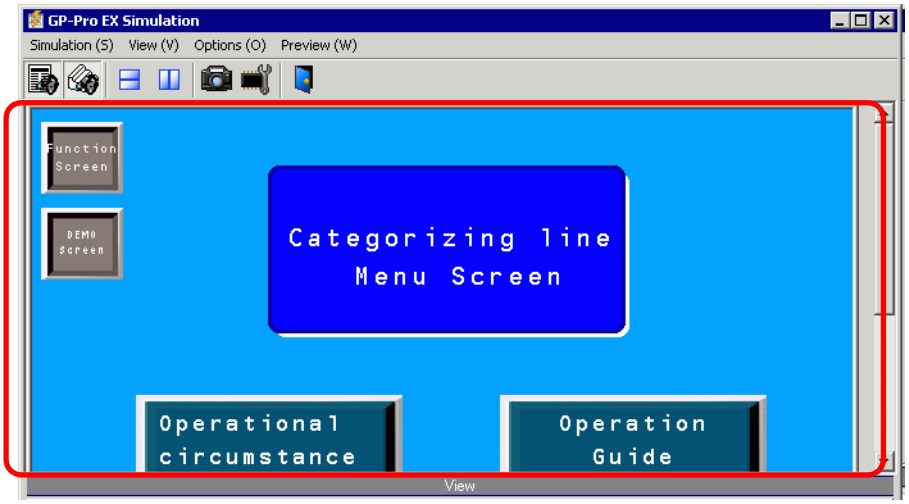
NOTE

- You can also use the keyboard shortcut Ctrl+T to start simulation.
- You can also click  from the State bar to start simulation.

2 [GP-Pro EX Simulation] appears.



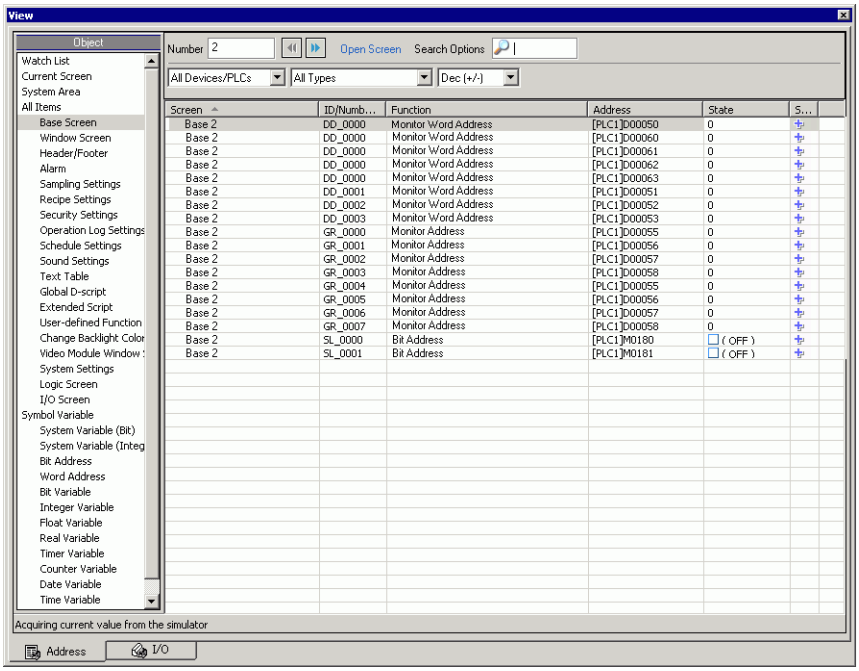
3 You can check the operation of the project file in progress through [GP-Pro EX Simulation] located at the top of the screen.



NOTE

- If you simulate a different project file or the current project file after you make edits, select [Simulation(L)] from the [Project (F)] menu again.

4 [Address View] allows you to display a list and edit the current value of the virtual device/ PLC address used for simulation. Select the item you want to view from [Object].

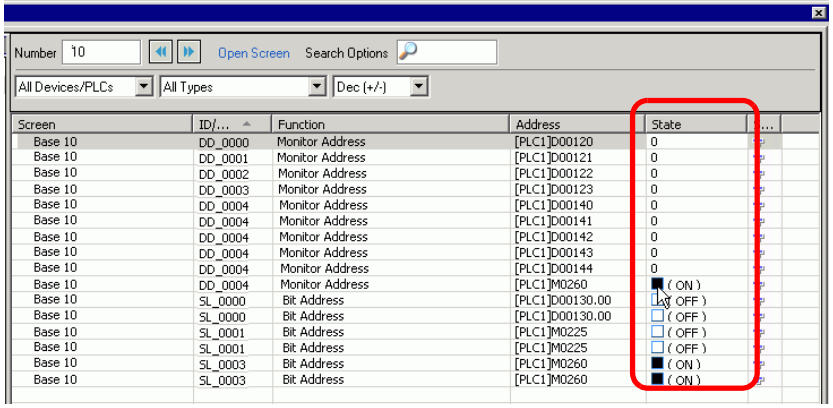


NOTE

- If [Address View] does not display, select [View(W)] and then [Address(D)] from the [View(V)] menu, or click .

5 In the [Address View], set the screen number from [Number] to switch the address display screen.
(For example: 10)

6 To toggle the bit address ON or OFF, click ☐ in the [State] field. To change the value in a word address in [Address View], select the value in the [State] field and make the change.



7 Select [Exit from Simulation(X)] from the [Simulation(S)] menu or click to exit the simulation feature. [GP-Pro EX Simulation] and [Address View] will be closed.

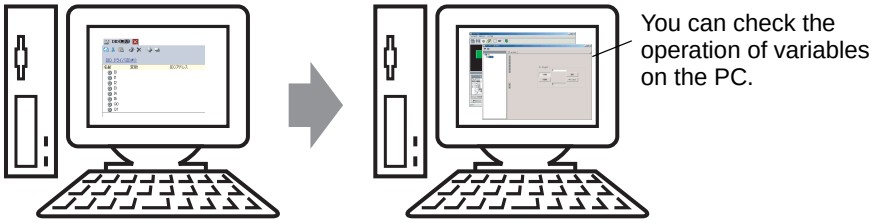
NOTE

- The data for which a backup has been taken in the for SRAM file during the simulation will disappear after the simulation ends. To save the backup data, from the [Option(O)] menu select [Configure Memory(M)] or click . If you select the [Backup the PLC device] check box from the [Configure Device Memory] dialog box, the data of the same address can be read when the same file is opened again.

31.3 Checking the operation of the I/O driver on the PC

31.3.1 Details

Before transferring the project file, you can confirm the current address value by simulating the address allocated to the I/O Terminal of the I/O Driver to control external I/O. Some I/O Drivers allow you to switch Input ON/OFF and update the current value when you enter a value.



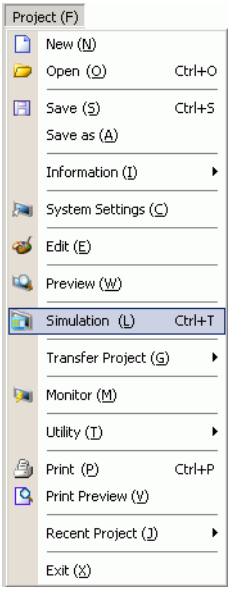
31.3.2 Procedure

NOTE

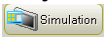
- Please refer to the settings guide for details.

☞ "31.4.1 Setting Guide for [GP-Pro EX Simulation]" (page 31-14)
☞ "31.4.3 [I/O View] Settings Guide" (page 31-21)

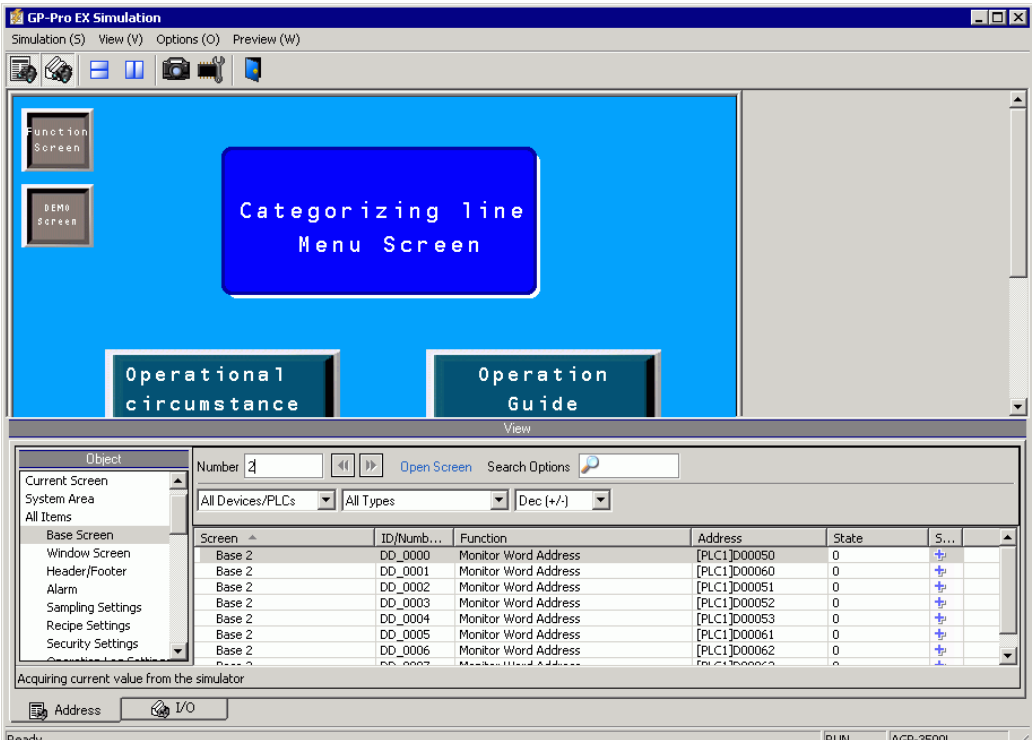
1 Open the project file you want to simulate. From the [Project (F)] menu, select [Simulation(L)].



NOTE

- You can also use the keyboard shortcut Ctrl+T to start simulation.
- You can also click  from the State bar to start simulation.

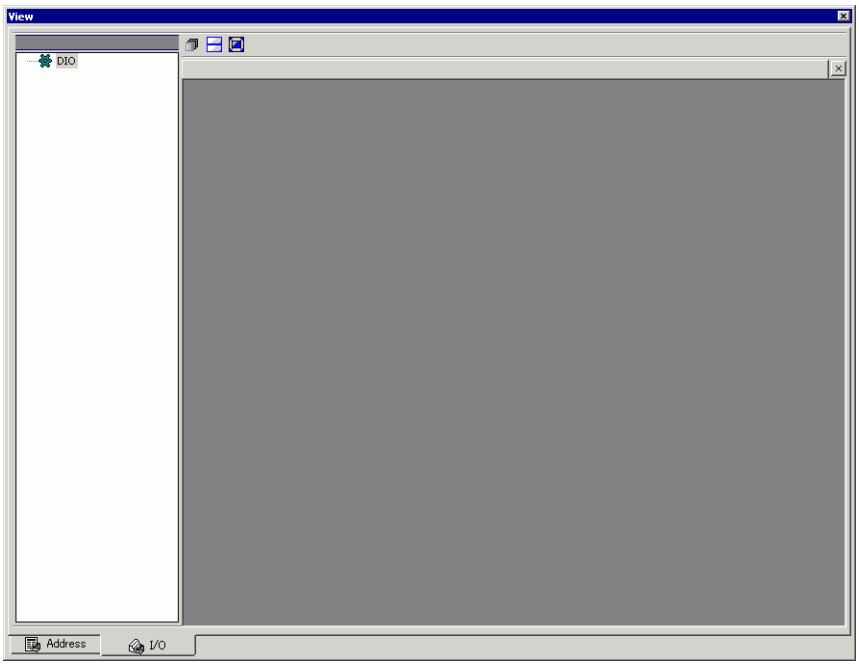
2 [GP-Pro EX Simulation] appears.



NOTE

- If you simulate a different project file or the current project file after you make edits, select [Simulation(L)] from the [Project (F)] menu again.

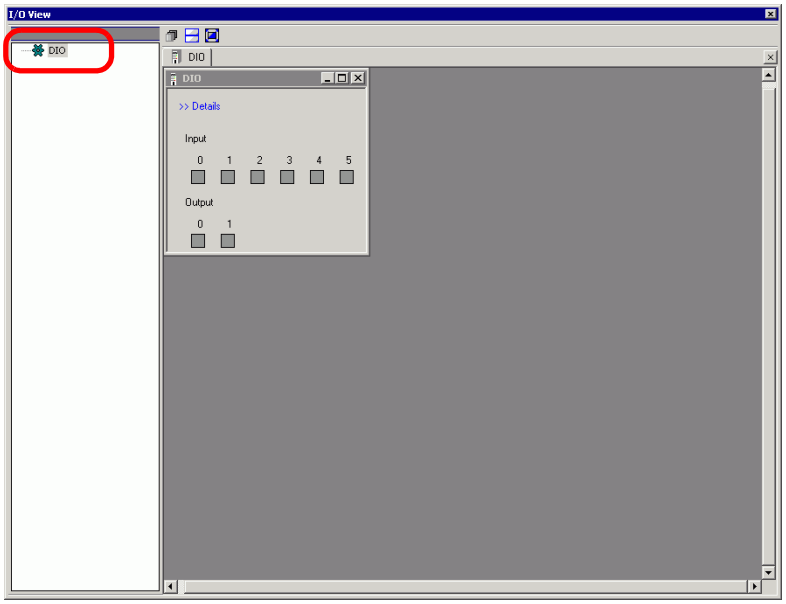
3 Select [View(W)] and point to [I/O(I)] from the [View(V)] menu, or click . [I/O View] appears.



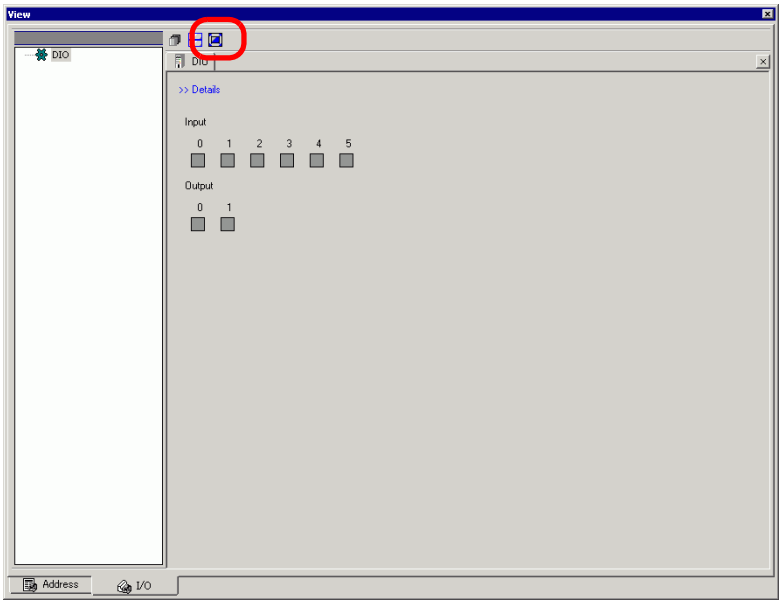
NOTE

- Click the [I/O] tab to display the [I/O View].

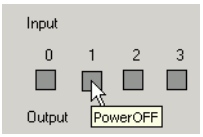
4 In [I/O View], you can view or change the current value of the address allocated to the I/O Terminal of the I/O Driver. Select the I/O Driver to display from [I/O Driver List]. The Basic screen of the I/O Driver displays.
(For example: DIO Driver)



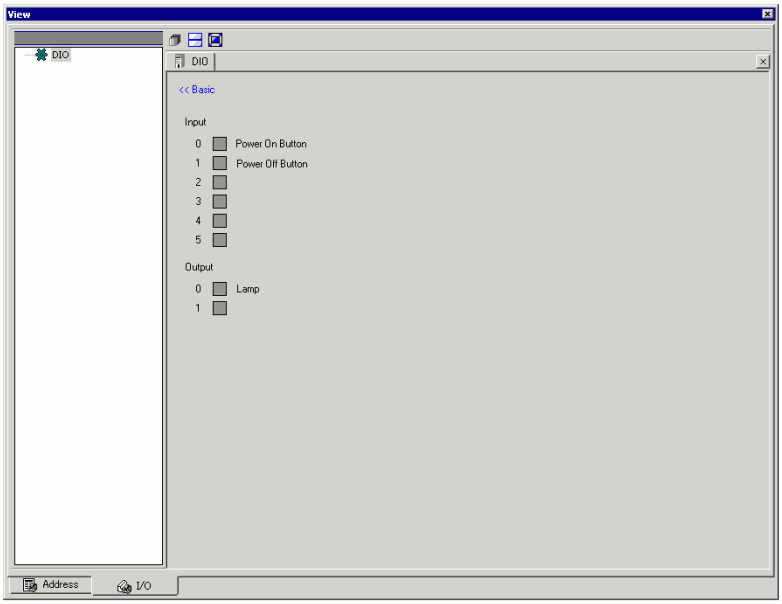
5 Click to extend the window of the Driver display area over the entire screen.



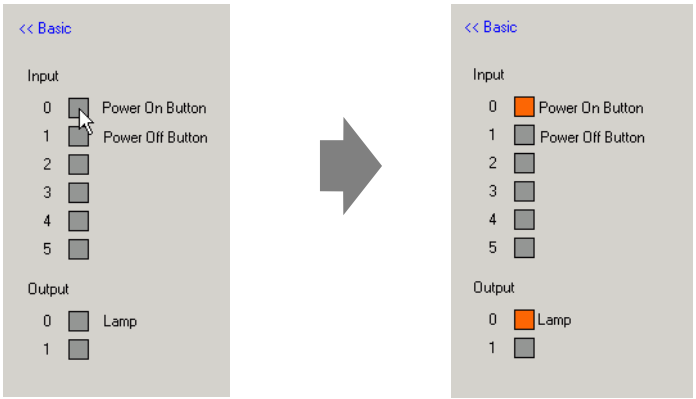
6 By pointing the cursor to the icon, the name of the variable displays.



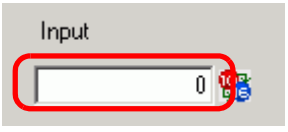
7 By clicking [>>Details], the detail screen of the I/O Driver displays.



8 Click when you want to switch ON/OFF the bit address.



9 To enter a new value for the current Integer type address, enter the value and then press the [ENTER] key.



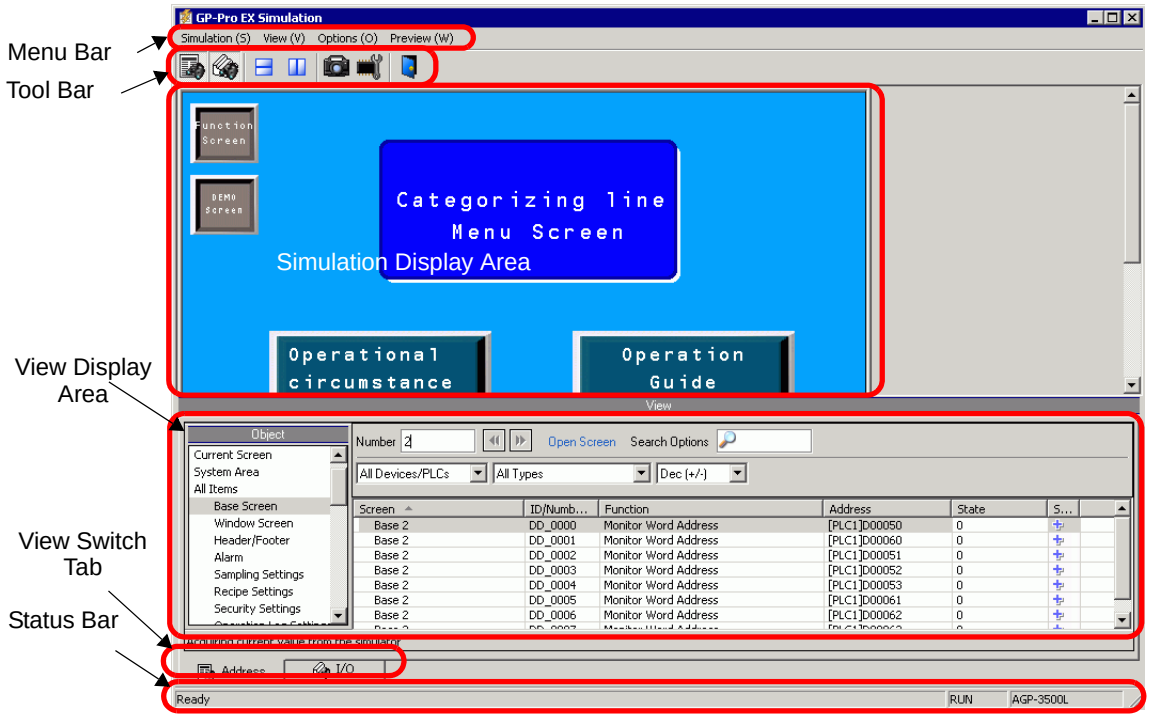
10 Select [Exit from Simulation(X)] from the [Simulation(S)] menu of [GP-Pro EX Simulation] or click to exit the simulation feature. [GP-Pro EX Simulation], [Address View], and [I/O View] will close.

NOTE

- The backup file data for SRAM disappears after the simulation ends. To save the backup file, select [Configure Memory(M)] from the [Option(O)] menu or click . If you select the [Backup the PLC device] check box in the [Device Memory Settings] dialog box, the data of the same address can be read when the same file is re-opened.

31.4 Settings Guide

31.4.1 Setting Guide for [GP-Pro EX Simulation]

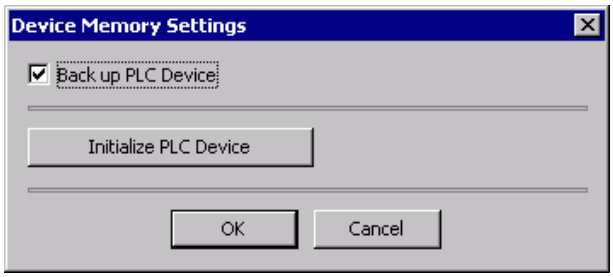


Setting	Description
Menu Bar	The menu to simulate displays. When you point to a menu item, a pull-down menu appears.

Continued

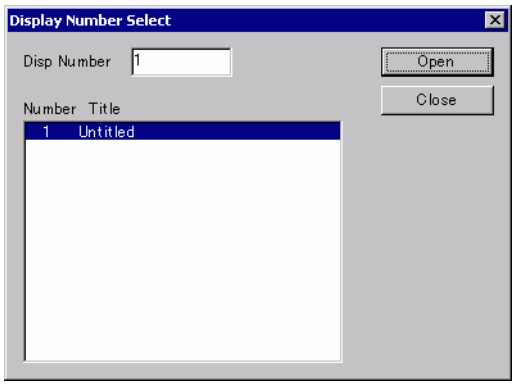
Setting		Description
Menu Bar	Simulation	• In [Simulation screen], select [Utility] and point to [Save Screen] Or click to saves the screen image in a JPEG file format. **NOTE** • You can specify the quality of the screen capture screen to save in the [Screen/Video Capture Settings]'s [Capture Image Quality] field. Save in C:\Program Files\Pro-face\GP-Pro EX ***\CFA00\>CAPTURE (*** stores the version number) File Name "CAP + year, month, day, hours, minutes, seconds, and automatically generated three digit number + .jpg". You cannot change how this filename is generated. • [Simulation Exit] Exit simulation. **NOTE** • You can exit the simulation by using any of the following methods: •Click in [GP-Pro EX Simulation] •Click on the tool bar •Right-click the simulation display area. Select [Close] from the menu.
	Display	• [Toolbar] Switch the display/hide for the Toolbar. • [Status Bar] Switch the display/hide for the Status. • Select [View] and point to [Address]/[I/O] •Address View Switch the display/hide for the Address View. This displays or hides the current value of the virtual device/PLC address for the simulation function. Click to display/hide. For more information on [Address View], see the following. ☞ "31.4.2 [Address View] Settings Guide" (page 31-18) •I/O View This displays or hides the current value of the virtual device/PLC address set in the I/O View screen. Click to display/hide. For more information on [I/O View], see the following. ☞ "31.4.2 [Address View] Settings Guide" (page 31-18)

Continued

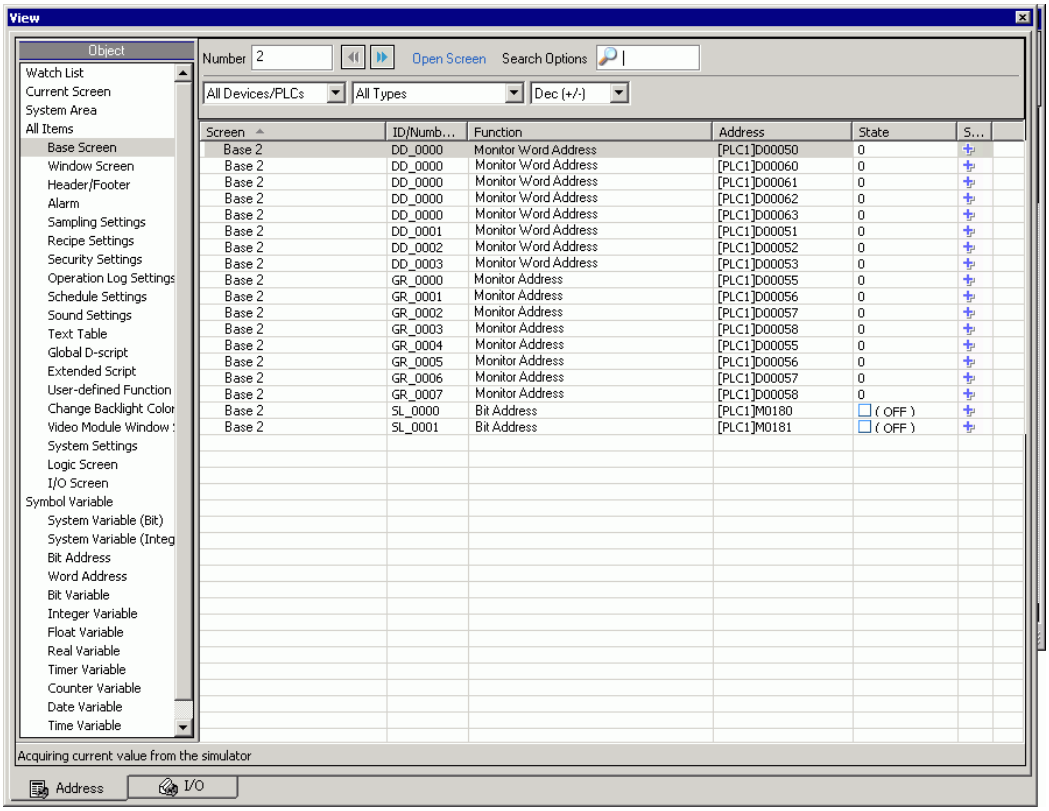
Setting		Description
Menu Bar	Option	• Memory settings When you select this, the [Device Memory Settings] dialog appear as follows. You can backup or initialize the data of the virtual device/PLC address. You can click to open the dialog box.  •Back up PLC Device When you exit the simulation, specify whether to back up the virtual device/PLC address. By backing up, you can retrieve the data from the same address when you open the same file. •Initialize PLC Device Select [Initialize PLC Device] to clear all of the virtual device/PLC address data to 0.
	View	• [Tile Horizontally] When you display multiple views, windows appear tiled from top to bottom. You can click to do the same operation. • [Tile Vertically] When you display multiple views, the views can be laid out into a right and left half. You can click to do the same operation.
Tool Bar		• Select the display/hide of Address View. • Select the display/hide of I/O View. • Divide views horizontally. • Divide views vertically. • Produce hard copy of an HMI screen. • Configure Device Memory. • Exit simulation.
Simulation Display Area		Displays the simulation results for the project file on the Edit screen, where you can check the operation of the file.
View Display Area		This is the area to display [Address View] and [I/O View]. [Address View] and [I/O View] can be separated from [GP-Pro EX Simulation] when you drag and drop.
View Switch Tab		Tabs of the Views on the screen display. Click a tab to change the view.
Status Bar		Displays the model of display unit.

■ The right-click menu

The following menu appears when you right-click the simulation view screen.

Setting		Description
Screen Change		The [Display Number Select] dialog box appears. You can switch the display screen. 
	Display Number	Specify the base screen number that you want to switch to in the range of 1 to 9999. Only screens in the project can be opened in the Simulation.
	List	Displays the screen number and title.
	Open	Open the selected screen.
	Close	Close the dialog box.

31.4.2 [Address View] Settings Guide



Setting	Description
Object	Select the object items of the address you want to display in [Address View]. **NOTE** • If the objects are other than [Symbol Variable], the variables which are not used do not display in [Address View] of simulation even though you have registered variables. When the objects are [Symbol Variable], all variables display regardless of whether they are used or not.
Number	Define the screen number you want to view with 5 digits or less. **NOTE** • You can only specify this when selecting [Base Screen], [Window Screen], or [Video Module Window] as the [Object]. • If you set up a [Screen Number] that cannot be saved, the number will appear in red.
	The address information of the connected device for the screen before or after the screen input in [Screen Number].
Open Screen	Displays the screen that contains the [Screen Number] on [Simulation View].

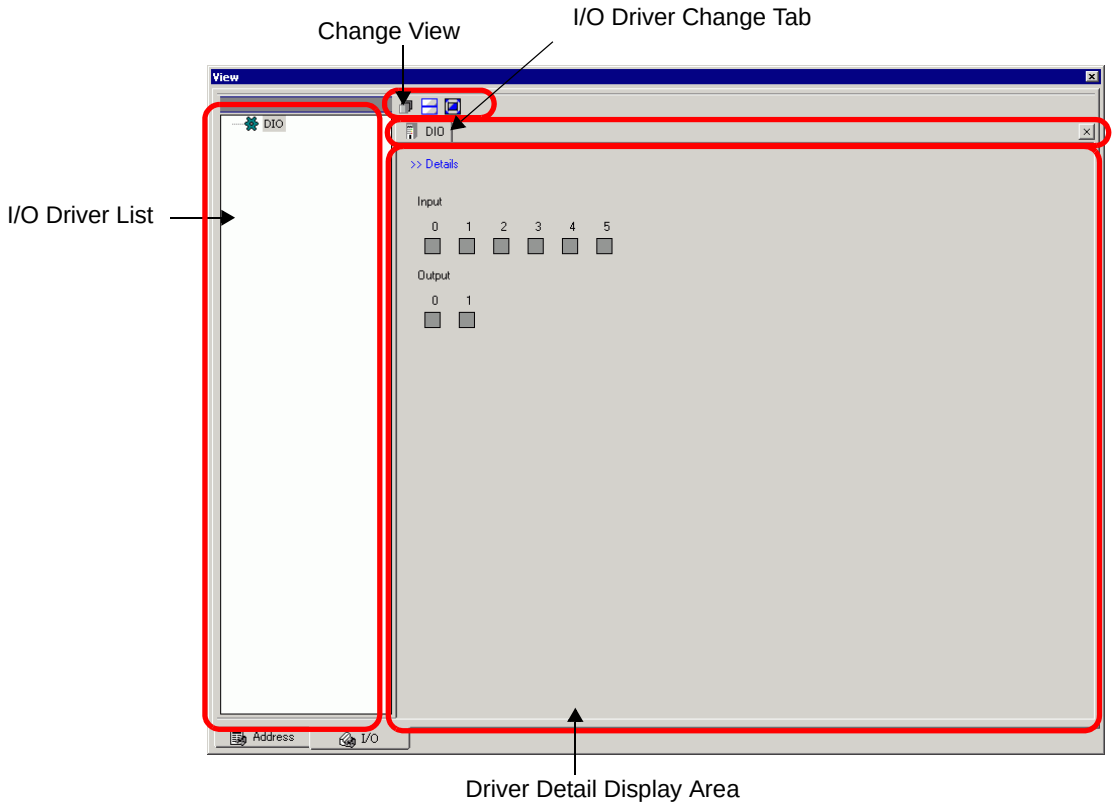
Continued

<table>
<tr><th>Setting</th><th>Description</th></tr>
<tr><td>Search Options</td><td>If you search for a string in [Screen], [ID No./Rung], [Function], and [Address], all address information that includes the string is displayed.</td></tr>
<tr><td>Device/PLC</td><td>Select the device/PLC in the project that you want to view: [All Devices/PLCs], [PLC1], [#INTERNAL], or [Symbol Variable].</td></tr>
<tr><td>Type</td><td>Select the address type to display.
When you select [All Types], all types of addresses display.</td></tr>
<tr><td>Format</td><td>For the display [State] and data input formats, select [Oct], [Dec], [Dec (+/−)], [Hex], [BCD] or [Float].
<table>
<tr><th>Bit Length</th><th>Data Type</th><th>Input/Display Range</th></tr>
<tr><td rowspan="8">16 Bit</td><td>Dec</td><td>0 to 65535</td></tr>
<tr><td>Dec(+/−)</td><td>−32,768 to 32,767</td></tr>
<tr><td rowspan="2">Hex</td><td>0 to FFFF(h)</td></tr>
<tr><td>0 to FFFF(h)</td></tr>
<tr><td rowspan="2">Oct</td><td>0 to 177777(o)</td></tr>
<tr><td>0 to 177777(o)</td></tr>
<tr><td>BCD</td><td>0 to 9999</td></tr>
<tr><td rowspan="8">32 bit</td><td>Dec</td><td>0 to 4294967295</td></tr>
<tr><td>Dec(+/−)</td><td>−2147483648 to 2147483647</td></tr>
<tr><td rowspan="2">Hex</td><td>0 to FFFFFFFF(h)</td></tr>
<tr><td>0 to FFFFFFFF(h)</td></tr>
<tr><td>BCD</td><td>0 to 99999999</td></tr>
<tr><td>Float</td><td>1.175494351e−38 to 3.402823466e+38</td></tr>
</table>
</td></tr>
<tr><td>Display Select Area</td><td>The address information selected from [Object], [Number], [Device/PLC] and [Type] is displayed. You can select one line at the same time.
• Screen
The active screen number and the settings are displayed.
• Location
The ID of components in use, the group of address, the block number and the line number are displayed.
• Feature
Displays which address is used by each function.
• Address
Displays the device/PLC name and address
• State
The current value changed to a [Type] string is displayed. If the current value cannot be displayed, [Retrieving] is displayed.
• Saves the watch list/Delete watch list
Saves or deletes the active device/PLC address.
NOTE
• When you select [Watch List] in [Object], you can [Delete].</td></tr>
</table>

Continued

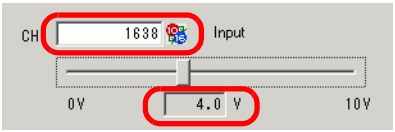
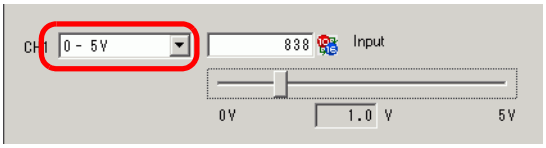
Setting	Description
Save watch list	Saves the active device/PLC address in the watch list. When you save addresses in the watch list, you can confirm all addresses at one time. **NOTE** • When you select [Watch List] in [Object], you can only [delete]. • The Watch List is common for all projects. Once an address is added to the watch list, that item is not removed unless specified. When a previously added address is not used in the current simulated project, then the address appears in red. Although you cannot display or edit red address values, you can remove them.
Current Value Editing	Change the current value. The assignable value range varies by the selected [Format].
Status Bar	The following message shows the communication status of the simulation. Initialize: Starting communication with the simulator. Communication (Normally):Retrieving current value from the simulator. Communication Error:Unable to connect to the simulator.

31.4.3 [I/O View] Settings Guide



Setting	Description
I/O Driver List	Displays the list of the I/O Driver registered in the current edited project file. Select the I/O Driver to display in the Driver Detail Display Area.
Driver Detail Display Area	From the simulation, you can check the performance operation of the I/O Driver selected from the I/O Driver List. The Display Method differs depending on the selected I/O Driver.
Detail	Change the Detail Screen/Basic Screen.
Current Value	• Bit Type ■Displays (ON)/■(OFF). **NOTE** • When you click ■, it switches ON/OFF for some I/O Drivers. You cannot perform output operations. • DIO Driver, FLEX NETWORK Driver's DIO, LT Built-in DIO (STD) Driver's standard IO, EX module (EXM) Driver's DIO IO When the status is ■, you can move the focus with the [TAB], [Up], [Down], [Left], [Right] key. Also, you can switch ON/OFF with the [SPACE] key. • LT Built-in DIO Driver (STD)'s PWM Output/PLS Output, EXM Module (EXM) Driver's Analogue IO When the status is ■, you can move the focus with [TAB].

Continued

Setting		Description
Driver Detail Display Area	Current Value	• Integer Type Displays numeric values. When you start typing, the current value display stops. Enter numeric values and press the [ENTER] key. If you press a key other than the [ENTER] key or do other operations, anything you type is canceled. •Switch Decimal/Hexadecimal Decimal and hexadecimal systems are supported. Click to display the numeric numbers in hexadecimal and click to display them in decimal. You can switch the decimal/hexadecimal for every variable. •Slider Bar When you select the FLEX NETWORK Driver, you can move the slider bar to display the current value in the edit box and the box below the slider bar depending on the position of the knob. Click the [ENTER] key to update the current value on the slider position.  **NOTE** • 1638 You can move the focus by [TAB]. • Range When you select the analogue of the FLEX NETWORK Driver, select the Input/Output range. 
I/O Driver Change Tab		Displays tabs of displayed I/O drivers. Click a tab to switch to the individual I/O Driver settings.
Change View		• Displays the windows in Driver Display Area in layers. • Displays the windows in Driver Display Area in the upper and lower half. • Maximizes the windows in Driver Display Area.

31.5 Restrictions

- To simulate a different project file, select [Simulation] from the [Project (F)] menu again.
- The contents that display in [Address View] matches the [Cross Reference(R)]. You cannot display or change an address (including an indirect address) that does not display in [Cross Reference (R)].
- The following lists features unsupported in Simulation.

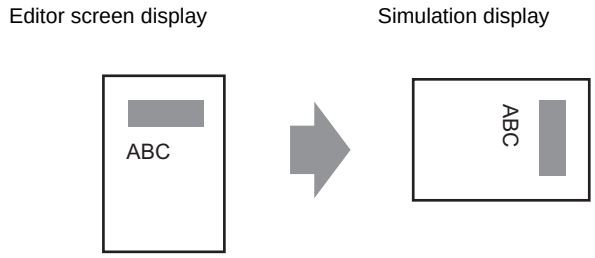
Feature	Details/Menu
System menu	• [Offline], [CF Start], [IP Address], [RGB Settings], [Address Monitor], [Logic Monitor], [Device Monitor], [Ladder Monitor]
Offline	• Cannot display the offline screen.
Print Feature	• Printing alarm banner, alarm history, and sampling data, printing associated with CSV display parts, printing commands in scripts, and printing screen images does not work.
Bar Code Reader	• Cannot read in data from a bar code reader.
AUX Output	• Cannot run AUX Output.
Playing Movies	• The Movie Player does not display. • When using a [File Manager] part set to [Select Movie], the File Manager will not display. • The Save to CF or FTP and the Event Recorder functions do not work.
SRAM Backup	• All data stored in SRAM, such as alarm history, sampling data, recipes, internal device backup, and the Japanese FEP converter, is deleted when existing Simulation.
Brightness/Contrast Settings	• The Brightness and Contrast adjustment bar does not display.
Reverse Display	• Even when [Reverse Display] is set in a Monochrome model, the display of the simulation is not reversed.
Standby Mode	• The Standby Mode function does not work.
Retentive Variables	• In the [Edit Symbol Variables] dialog box, even though the Symbol is set to Retentive, the data is erased when exiting Simulation.
Detect Backlight	• Detecting if the backlight is burned out does not work.
Remote PC Access	• The Remote PC Access Window Display does not display.
Change Backlight	• Changing the backlight color does not work.
Monitor	• Address Monitor, Logic Monitor, Device Monitor, and Ladder Monitor features do not work.
Cross-hairs Cursor	• The cross-hairs cursor feature does not work.
WinGP	• Device access APIs and handling APIs do not work, and error messages do not save.

Continued

Feature	Details/Menu
Logic	• Logic, Scan Time, #L_Clock100ms, #L_Clock1sec, #L_Clock1min, Timer Instruction, PID Instruction, and Constant Number System may differ from the actual actions. • Watch Dog Timer, Logic Monitor, and Address Monitor features do not work. • The action of Logic (Ladder) does not display. • The calculation system of Ladder Instructions may differ from the Display. (For example, Instructions dealing with real numbers, SCL Instructions, AVG Instructions)
Online Monitor	• Online monitor does not work.
Transfer	• [Transfer] tool's LAN/USB Transfer • [Memory Loader] tool's CF Card/USB Transfer

- The SRAM backup data during simulation is cleared after you exit the simulation.
- Simulation does not work while WinGP is running.
- If the objects are other than [Symbol Variable], the variables which are not in use are not displayed in [Address View] of simulation, even if you have registered variables.
- There are restrictions for the current value of [I/O View] as follows.
  - Output operations cannot be performed.
  - Analog data of the FLEX NETWORK Driver can display to one decimal place.
  - When [Data Range] is set to [Fixed] in the EXM Driver (Model: EXM-AMM3HT), the operations for the higher and the lower limit cannot be performed.
  - When you select the STD, EXM , and CANopen drivers, I/O Driver-dependent display is not performed. Registered variables display and non-allocated terminals do not display.
- Some unsupported functions in the model may operate in the simulation because the simulation does not identify the display model (For example, a project file may have sound settings for models with sound output functions (AGP-3550T) and the model changes to another model(AGP-3500T). When the project file is simulated, the sound output function does not run.). See the following description of the support function for each model.
  ☞ "1.3 List of Supported Functions by Device" (page 1-5)
- You cannot directly input the device address to [Watch List] on [Address View].
- You cannot display or edit D-Script temporary addresses.
- You can simulate the read-write function to CF or USB by D script.
- The read only or write only addresses allow you to read or write.
- The virtual device/PLC backup file cannot be read when a simulation of a different project file is running, or when the device/PLC configuration has changed in the same project file. The simulation is activated without the previously stored data.
- When running screen captures, files are stored in the following location:
  C:\Program Files\Pro-face\GP-Pro EX ***\CFA00\CAPTURE (*** stores the version number)

- When setting the display orientation to [Portrait], the display is rotated 90-degrees when you perform the simulation.



- When the installation destination of the GP-Pro EX has more than 200 letters and a simulation is activated, the error message "You cannot activate the simulation because the maximum number of letters has been exceeded" appears. The simulation does not run normally. Reinstall the GP-Pro EX to an installation destination with path of less than 200 letters in English one byte characters.
- You cannot exit GP-Pro EX while executing a simulation.
- You can run Simulation on one project at a time.
- During Simulation, if you use the [Display] menu's [Option Settings] command to change the language settings, an error message prevents the operation. To change the language, you need to exit Simulation.
- The communication scan value is always set to zero because the simulation does not communicate with the device/PLC. The communication status information is not received correctly in the simulation.
- In the [Display Unit]'s [System Area] tab, if the [System Area Start Address] is not set up, the project cannot display the System Area data.
- If the project does not pass the error check (from the [Project (F)] menu point to [Utility (T)] and select [Error Check (E)]), it will not run in Simulation.
- With Microsoft Windows XP Service Pack 2, when you start Simulation it may display an error message indicating that the Windows firewall is blocking the application. In that case, select [Release Block] and continue with the Simulation operation.
- In Simulation, you cannot set up clocks or calendars that use the System Area or system variables.