

# Chapter 14 Simulation

14.1. Applied PLC and Specification for PC .....	14-1
14.2. Create a Program .....	14-1
14.3. Available Program for Simulation .....	14-1
14.4. Start Simulation .....	14-1
14.5. Build a I/O Module .....	14-2
14.6 Add/Remove Module .....	14-3
14.7. Simulation of I/O Module .....	14-3
14.8. Power Simulation.....	14-3
14.9. A/D, D/A Simulation .....	14-3
14.10. Function by Online Menu.....	14-5
14.11. Debugging .....	14-6
14.12. Stop Simulation .....	14-6



# Chapter 14. Simulation

GMWIN allows you to simulate the program logically you've created without PLC or I/O system.

## 14.1. Applied PLC and Specification for PC

### 14.1.1. Applied PLC

GLOFA GM1, GM2, GM3, GM4, GM5

### 14.1.2. Specification for PC

- O/S : Window 95
- Memory : 16M bytes or more
- HDD : 30M bytes or more

## 14.2. Create a Program

Creating a Program is same as the program in GMWIN.

According to the type of program, the number of program is limited as below.

- . Scan Program: Max. 256 Programs
- . Task Program: Single : Max. 32 Programs
  - Interval : Max. 16 Programs
  - Interrupt : Max. 16 Programs

## 14.3. Available Program for Simulation

- . Program : All programs defined in a Project of GMWIN
- . Standard Function/Function Block
  - (Only Function/Function Block of A/D and D/A modules are available for simulation)
- . User Defined Function/Function Block
  - ( Not available for Function/Function Block having special functions)
- . If the compiled code for Simulator does not exist, You must compile the program again.

## 14.4. Start Simulation

To start Simulation,

- . Select **Project- Start Simulation** in the pull-down menu.
- . When you select **Start Simulation**, GMWIN executes Compile+Link+Connect+ Download+ Stop+Monitor Start Functions simultaneously.
- . Run Mode in Simulation : Impossible to edit Monitor Mode
- . Debug Mode : Keeps the current data of the previous mode

- . Timer : Run Mode :: PC Clock base
- . Debug :: Accumulated as much as the running time.

## 14.5. Build an I/O module

- . If I/O variables or Direct variables are used in editing a Program, they are displayed in the appropriate base and slot when starting Simulation.

Data Type	16Points	32Points	64Points
X	0 ~ 15	16 ~ 31	32 ~ 63
B	0 ~ 1	2 ~ 3	4 ~ 7
W	0	1	2 ~ 3
D	X	0	1
L	X	X	0

- . I/O Modules are set as 16 points as default.

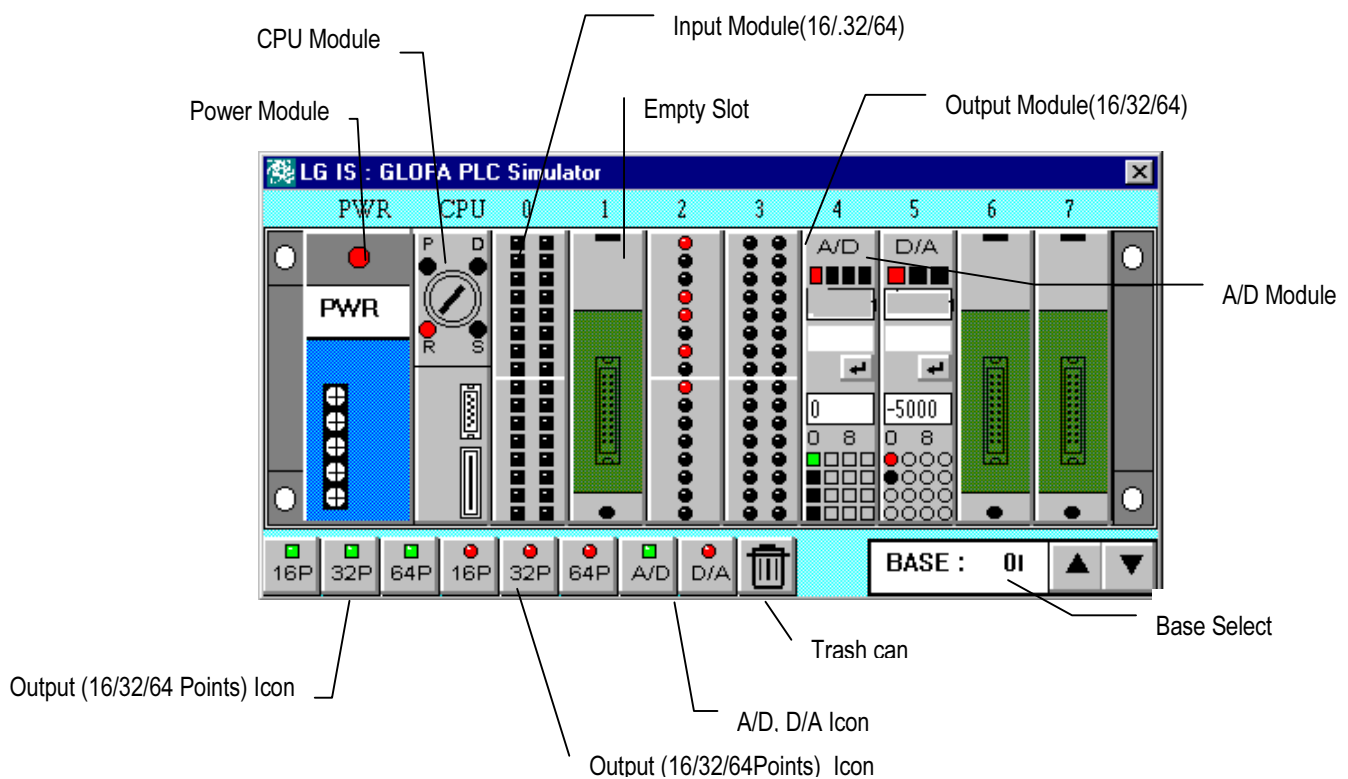
If input and output contacts are used together, draw an output module.

16/32/64 I/O modules are all applicable for Input or Output module.

A/D module : Square (ON:GREEN / OFF : BLACK)

D/A module : Circle (ON:RED / OFF : BLACK)


Base : Supported as type of combination box



## 14.6. Add/Remove Module

To add or remove a module, the PLC mode must be **Stop** mode,

. Add : Drag and drop the icon which you want to add on the appropriate slot

. Remove : Drag the appropriate slot and throw it to the trash can(  )

## 14.7. Simulation of I/O Module

To turn the Input/output contacts ON/OFF,

. Click the appropriate contact on the I/O module directly.

## 14.8. Power Simulation

This function is only available in **Run** mode.

. When Simulator begins to start, the power gets On.

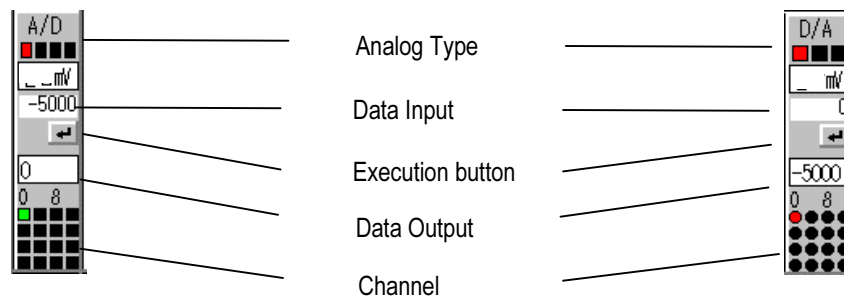
. If you click the red lamp on the power module, the power gets Off and gets On in a few moment.

This function is almost same as the power turns to be Off in a second.

If there is a program defined as Hot Restart, the program is executed.

## 14.9. A/D, D/A Simulation

### 14.9.1. Shape



- Analog Type : Kind of A/D Input range, D/A Output range
- Data Input : Input box for Analog data of A/D or digital data of D/A
- Execution button: Converted to the inputted data
- Data Output : Display the converted data
- Channel : Currently selected channel .

## 14.9.2. Simulation

- . A/D, D/A Simulation retains the data such as base, slot, channel and data type among the data set in the initial function block ( AD?INI / DA?INI ) for A/D, D/A module. Others are ignored.
- . If you mount the A/D or D/A module on the slot, which is not used in the program, the base and slot are effective. But, the data type is all '0' i.e., DT=0 (0~16,000) and all channels are supposed to be used
- . After entering the data in data input position, click execution button.

## 14.9.3. Analog type of A/D, D/A module

- . A/D Input : +- 5V, +-10V, +-20mA, 4 ~ 20mA
- . D/A Output : +- 5V, +-10V, 4 ~ 20mA

## 14.9.4. Change of Analog type and Display of converted data by channel

- . Change of analog type is only available in Stop mode
- . The selected channel is changed into the property of changed channel.
- . Change of channel is available in all modes and the converted data of the changed channel is displayed.
- . According to each channel of A/D module, the kind of analog can be set.  
If a channel is changed, the property of the channel is also changed.
- . In case of D/A module, Only one type of analog for all channels is available.  
(You can't setup the type of analog by channel.)

## 14.9.5. Analog Input of A/D module and Display of converted data

- . Input Unit - Voltage: mV, Current : uA
- . Input value for the input data window in A/D module is analog data.  
The value can't exceed the range of the current analog type. If the value exceeds the maximum upper limit, the data will be the maximum upper limit.  
Example) Let's say Analog type is +-5V(DT=0). If inputted analog value is -6,000, the data is regarded as -5,000. The converted digital data is displayed as '0'.

### 14.9.6. Digital Input of D/A module and Display of converted data

. Input Range : It is up to Data type (DT) of D/A module.

DT = 0 : 0 ~ 16000, DT = 1 : -8000 ~ 8000

. Input value for the input data window in D/A module is digital data.

The value can't exceed the range of the current digital type. If the value exceeds the maximum upper limit, the data will be the maximum upper limit.

Example) Let's say Analog type is +5V(DT=0). If inputted digital value is 17,000, the data is regarded as 16,000 and the converted analog data is displayed as 5,000.

#### # A/D Simulation Step

1. Add A/D module : Stop Mode
2. Change of Analog type : Stop Mode. Executes whenever it is necessary.
3. Run : Executes whenever it is necessary.
4. Select Channel : Display analog type and converted data
5. Enter the analog value : consider the input range
6. Click execution button : Execute the conversion!
7. Display the converted data : Display the digital data according to DT

1 ~ 6 Step : Executed by user

7Step : Executed in the Simulator

## 14.10. Function by Online menu

Refer to Chapter 7. Online for the detail information.

### 14.10.1. Monitor

- . Program Monitor
- . Variable Monitor
- . Time Chart Monitor
- . I/O Monitor

### 14.10.2. Forced I/O Setup

- . I/O Flag, Data Setup
- . Forced I/O Enable

### 14.10.3. Data Clear

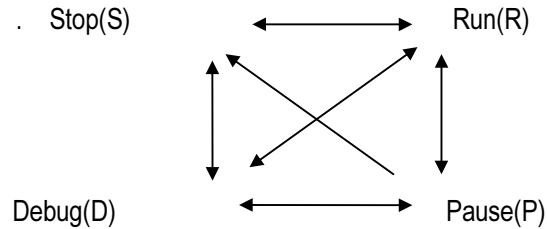
- . Only available in Stop mode.
- . Clear the current data into zero.

### 14.10.4. Reset

- . Reset/Overall Reset

### 14.10.5. Mode Change

- . GMWIN : **Online – Mode Change**
- . Simulator : Click each mode in CPU module.
- . Stop → Pause mode is not available. .



### 14.11. Debugging

Refer to Chapter 9 Debugging for the detail information.

- . GMWIN : **Debugging**
  - Simulator : Click Debug (D) Mode in CPU Module
- . Debug function in Simulator is same as GMWIN excluding Variable Break.
- .. When each mode is changed to Debug mode, the current value is retained.
  - . Debug Start/Stop
  - . Debug Run/Pause
  - . Step Over/Step In/Step Out
  - . Run to Cursor
  - . Add/Remove Break Point
  - . Break Point List/Condition
  - . Task Enable

### 14.12. Stop Simulation

- . GMWIN : **Project – Stop Simulation**
  - Simulator : Click (X) to close the simulator window.