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Chapter 1 EasyBuilder 8000 Installation and Startup Guide

1.1 EasyBuilder 8000 Installation

Software:

Download EasyBuilder 8000 configuration software from EasyBuilder 8000 CD or visiting Weintek Labs, Inc.'s website at http://www.weintek.com to obtain all software versions available (including Simplified Chinese, Traditional Chinese, French, Korean, Italian, Spanish and English version) and latest upgraded files.

Hardware Requirements (Recommended):

CPU: INTEL Pentium II or above
Memory: 64MB or above
Hard Disk: 2.5GB or above (Disc space available at least 10MB)
CD-ROM: 4X or above
Display: 256 color SVGA with 800 x 600 resolution or greater
Keyboard and Mouse
Ethernet: for project downloading/uploading
RS-232 COM: At least one available RS-232 serial port required for on-line simulation
Printer

Operating System:

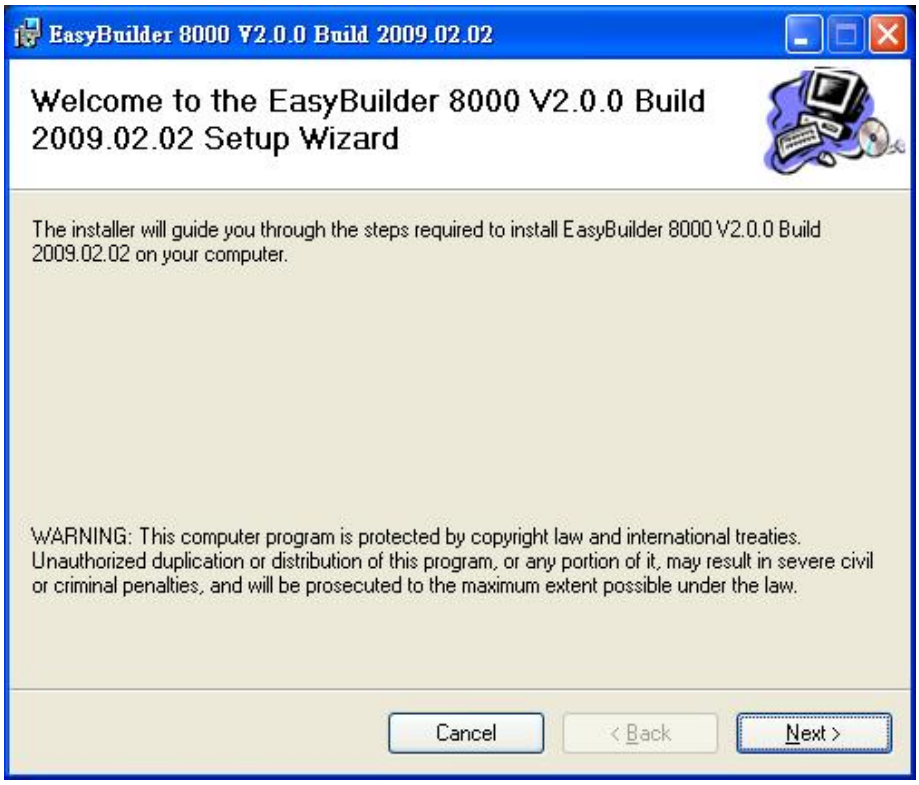
Windows 2000/Windows NT/Windows XP/Windows Vista

1.2 Steps to Install EasyBuilder 8000

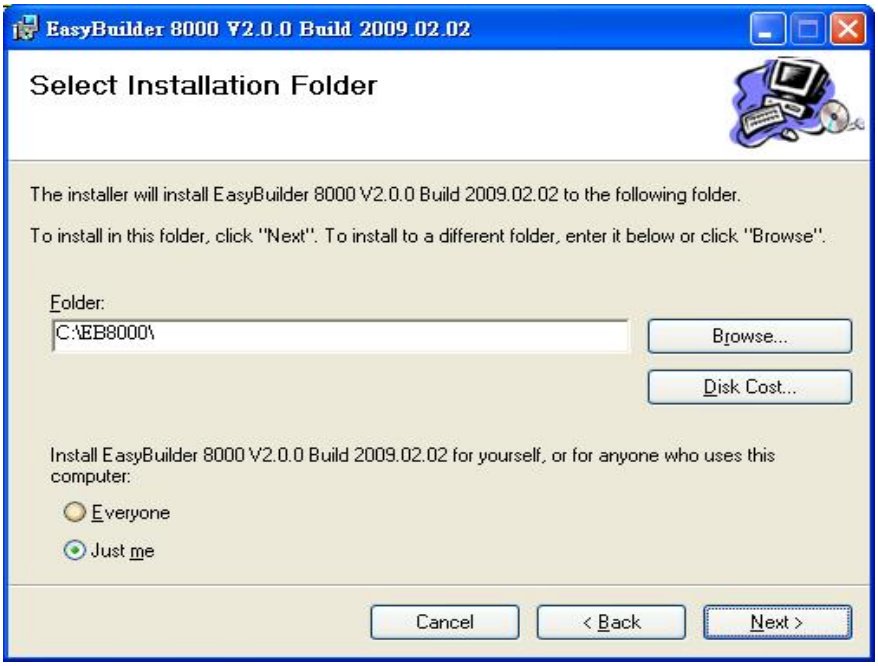
1. Installing EasyBuilder 8000:

Put the EasyBuilder Installation CD into the CD drive. The autorun should bring up a screen showing an area to click to begin the Easybuilder installation. If the Autorun sequence does not start, browse the CD, find the root directory of [Autorun.exe] manually.

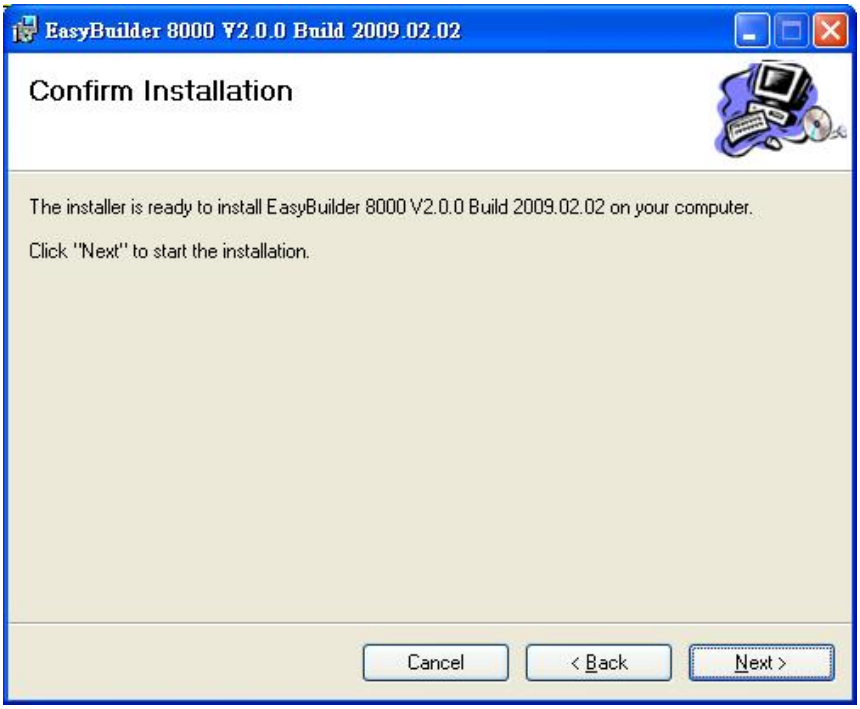
2. Choose [Install] and click “Next” to follow the installation instructions.



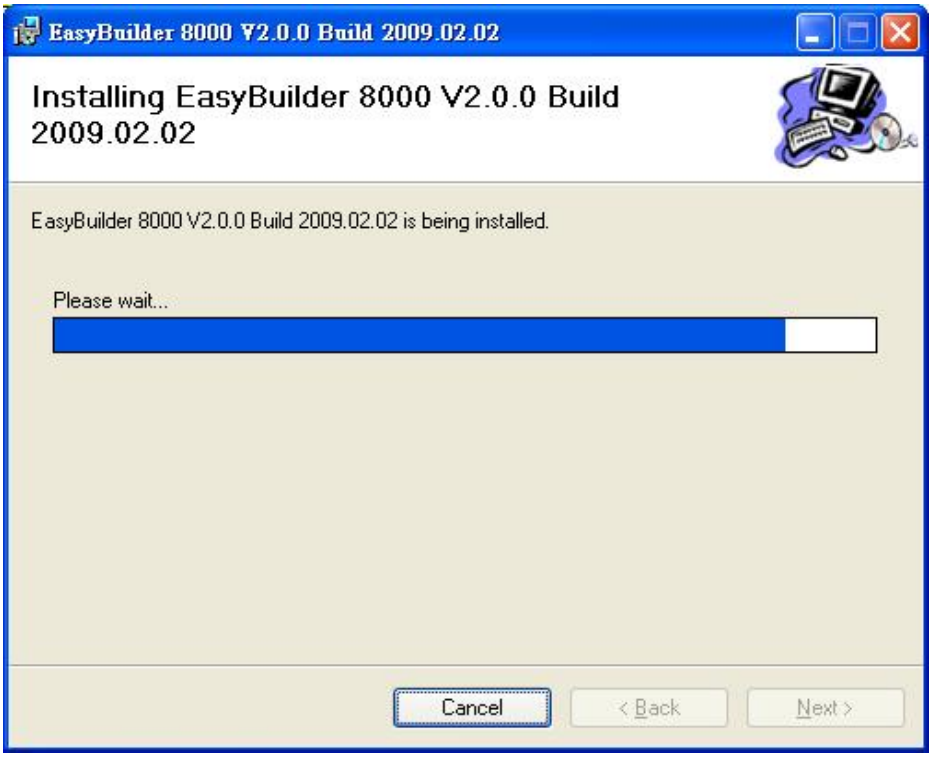
3. Designate the folder for EB8000 installation or choose the folder recommended and then click “Next”.



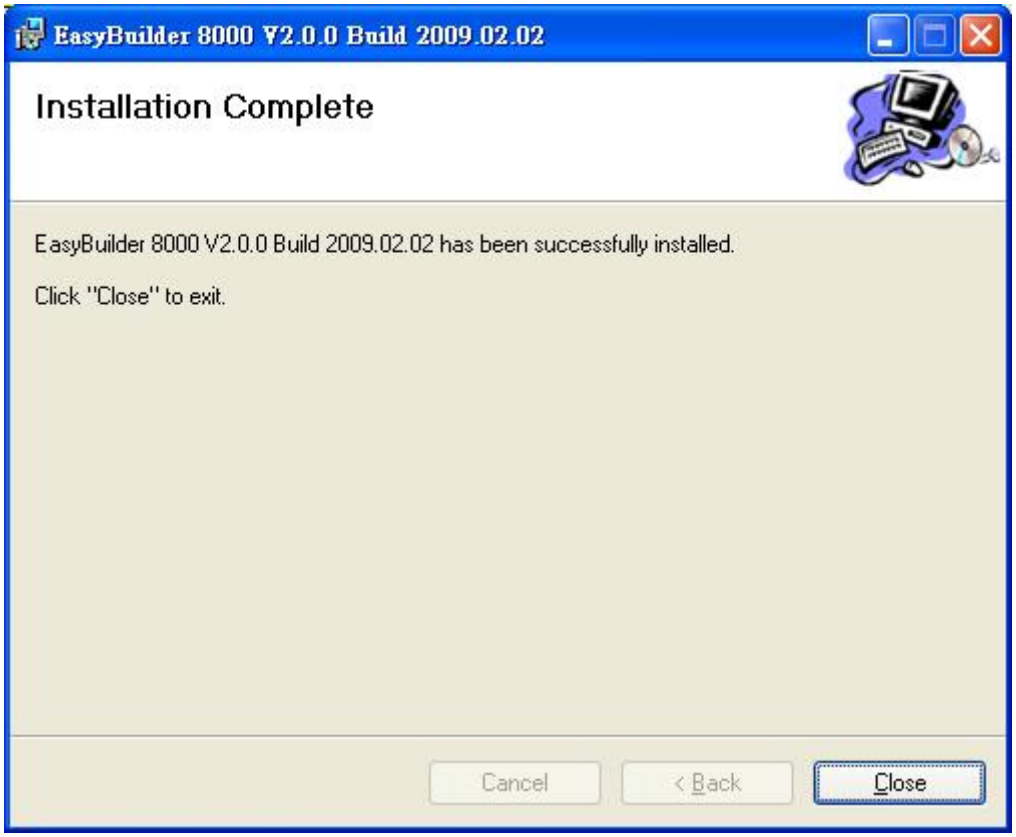
4. Click “Next” to confirm the installation.



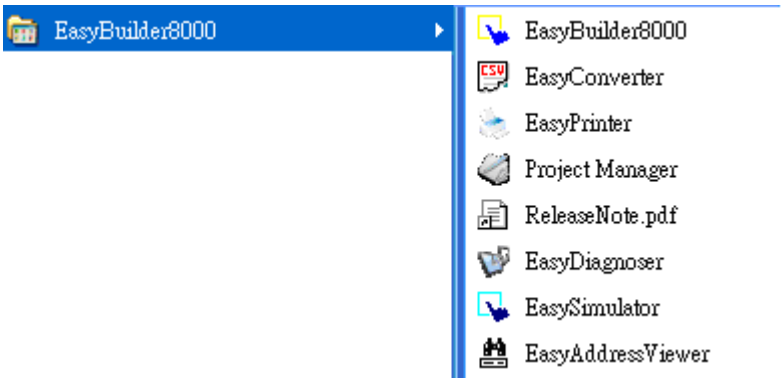
5. Installation processing.



6. Click" Close" to complete the installation.



7. From menu [Start] / [Programs] / [EasyBuilder8000] to start a EB8000 project.



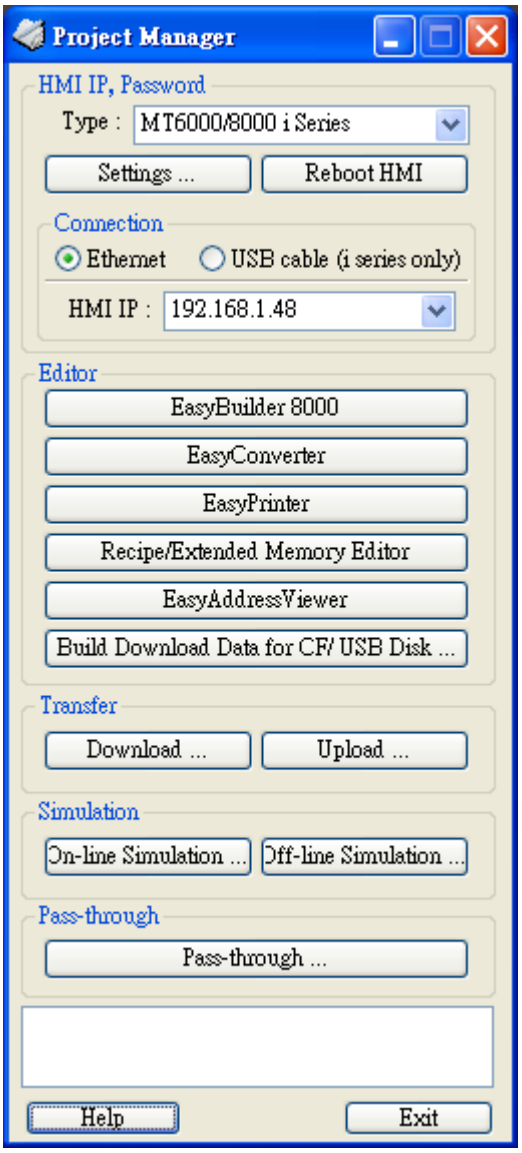
The definition of each menu under EB8000 catalog:

EasyBuilder8000	EB8000 editing software
EasyConverter	Conversion tool for Data sampling and Event Log
EasyPrinter	Remote printer server
Project Manager	EB8000 project management
ReleaseNote.pdf	Note of EB8000 version and latest information
EasyDiagnoser	Communication monitoring tool via online simulation
EasySimulator	Tool for executing simulation without installing EB8000
EasyAddressViewer	Review the register range of device types for each PLC supported

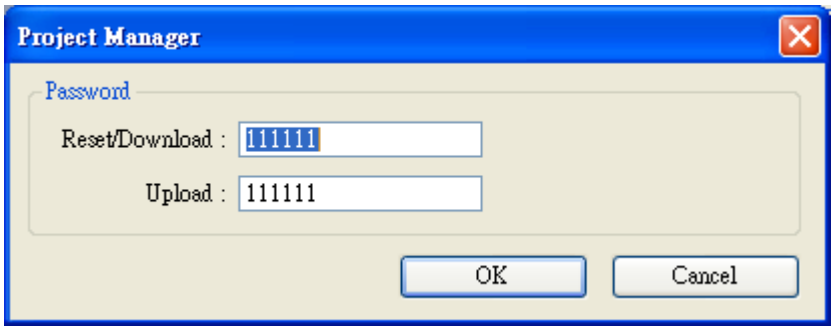
Chapter 2 Project Manager Operations

The Project Manager is a software shell for launching several utilities. Some functions are duplicated in the EasyBuilder 8000 screen-editing program. Project Manager program can be run as a stand-alone program.

In this chapter, each function will be introduced respectively.



2.1 HMI IP, Password



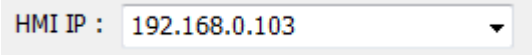
When operating HMI by Ethernet, users need to designate the correct IP address and password in HMI. “Reset” and “Download” functions share a set of password while “Upload” function uses another set.

The password provides protection against unauthorized access to the HMI. Be sure to record any password change. If resetting password to default, the project and data on the HMI will be completely erased.

Reboot HMI

The "Reboot HMI" feature is designed for users to reboot the project.

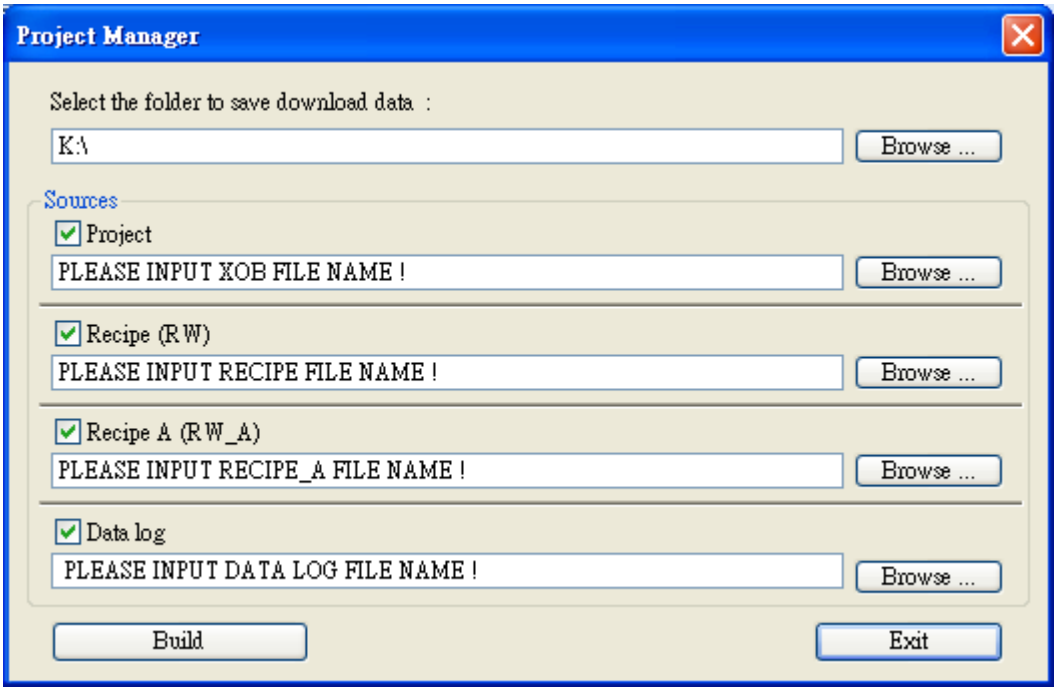
Set the correct IP address when operate HMI via Ethernet.



2.2 Editor

EasyBuilder 8000	To launch the EasyBuilder 8000 screen editor
EasyConverter	Conversion tool for Data Sampling and Event Log
EasyPrinter	Remote printer server.
Recipe / Extend Memory Editor	Provide file format conversion and data editing function for Recipe/Extend Memory
EasyAddressViewer	Review the register range of device types for each PLC supported
Build Download Data for CF Card/USB Disk	Except for Ethernet and USB cable, the project and data can be downloaded to the HMI by CF card or USB memory stick

∗ **Build Download Data for CF Card/USB Disk**



Select the folder to save download data	Insert CF card or USB stick to PC and press **[Browse…]** to assign the file path (or directory name) and then press **[Build].** The whole content of the source files will be downloaded to USB stick or CF card
Project	Press **[Browse…]** to assign the desired specific files for downloading.
Recipe (RW)	
Recipe A (RW_A)	
Data log	

The path of download data should be the name of directory and avoid designating only root directory. For example, either “c:\\” or “f:\\” is illegal name.

2.2.1 Step by Step to Download Project Via USB or CF Card

Take downloading data to the folder named as “**123” (K:\123)** in USB stick for example.

When USB stick (project or recipe included) is inserted to the HMI, a pop-up Download / Upload dialog will appears after few seconds. Please select Download and input Download Password.

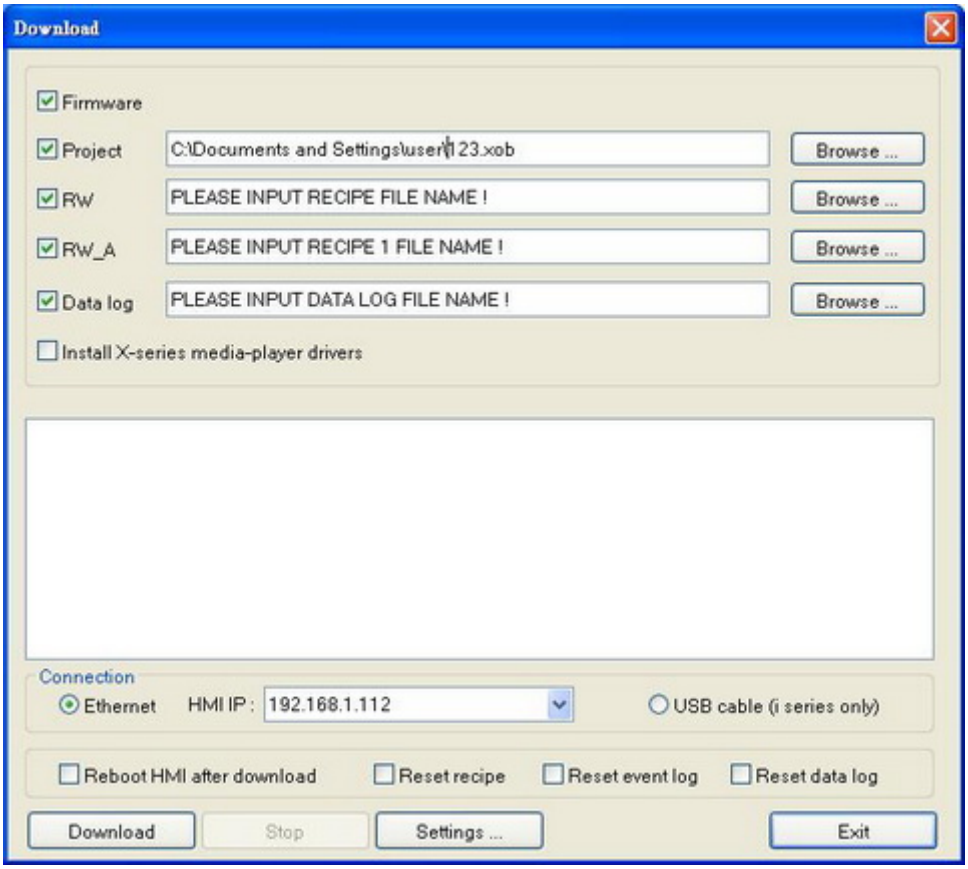
Check Download project files and Download historical files on Download Settings dialog, and then press OK. After that, Pick a Directory dialog will appear. Please select directory: ***usbdisk/device-0/123*** and then press OK**.** Project will be automatically updated.

Note: It's necessary to reboot HMI even if historical file is downloaded only.

2.3 Transfer

2.3.1 Download

Download source files to the HMI through Ethernet or USB cable. Press the [Download] button and the dialog displays as below:

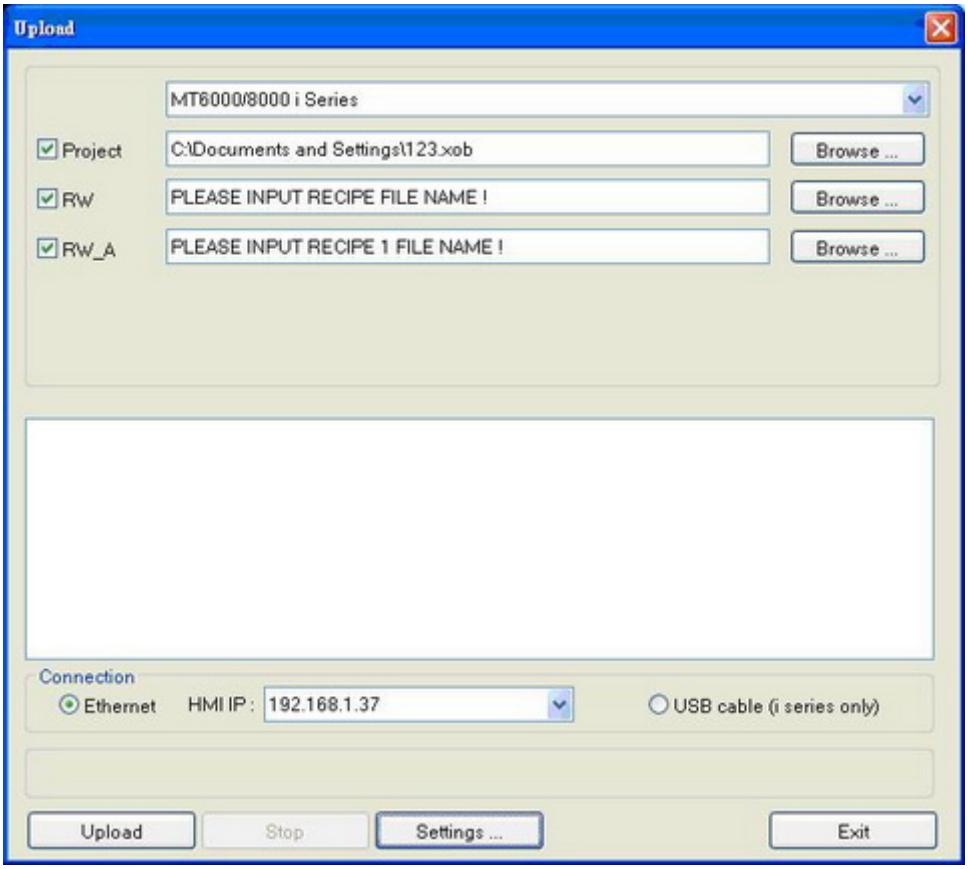


Firmware	Check [Firmware] to update all of the kernel programs of HMI.

	Note: It is necessary when the latest EB8000 version is first-time download.
Project	To assign the desired specific path for file downloading
RW	
RW_A	
Data log	
Install X-series media-player drivers	It is necessary when the EB8000 is first-time download to X series.
Reboot HMI after download	Automatically reboot HMI after downloading
Reset recipe	Check the box to erase the specific files in HMI before downloading process
Reset event log	
Reset data log	

2.3.2 Upload

Upload files from HMI to PC by Ethernet or USB cable and the dialog box shows as below:



Project	To assign the desired path for file storage before uploading.
RW	
RW_A	

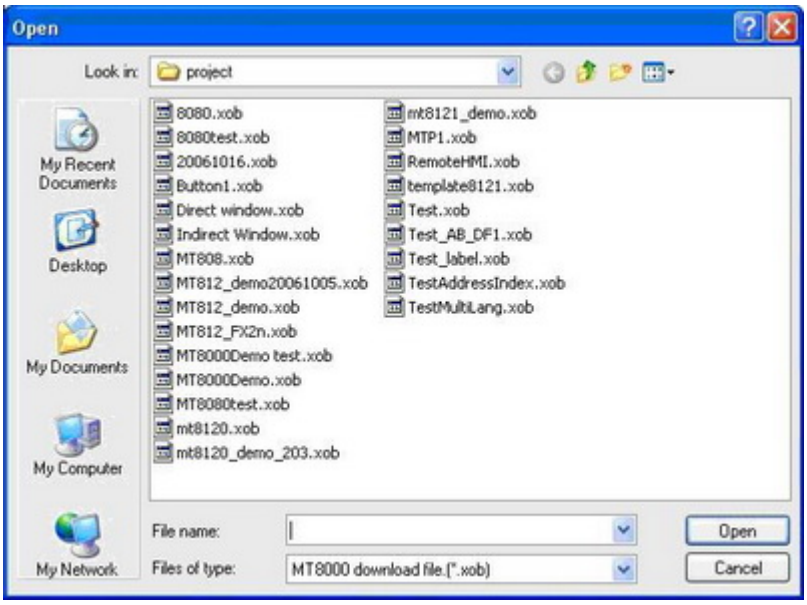
2.4 Simulation

2.4.1 On-line Simulation/Off-line Simulation

There are two types of simulations: Off-line simulation & On-line simulation.

By virtual device, PC simulates the operations of PLC without connecting to PLC. On the contrary, On-line simulation is executed by connecting PC with PLC and accurately setting the communication parameters. When simulating on PC, if the control target is a local PLC (i.e. the PLC directly connected to PC), there is **10 mins simulation limit.**

When using On-line/Off-line Simulation feature, select the source of *.xob file before executing the function.

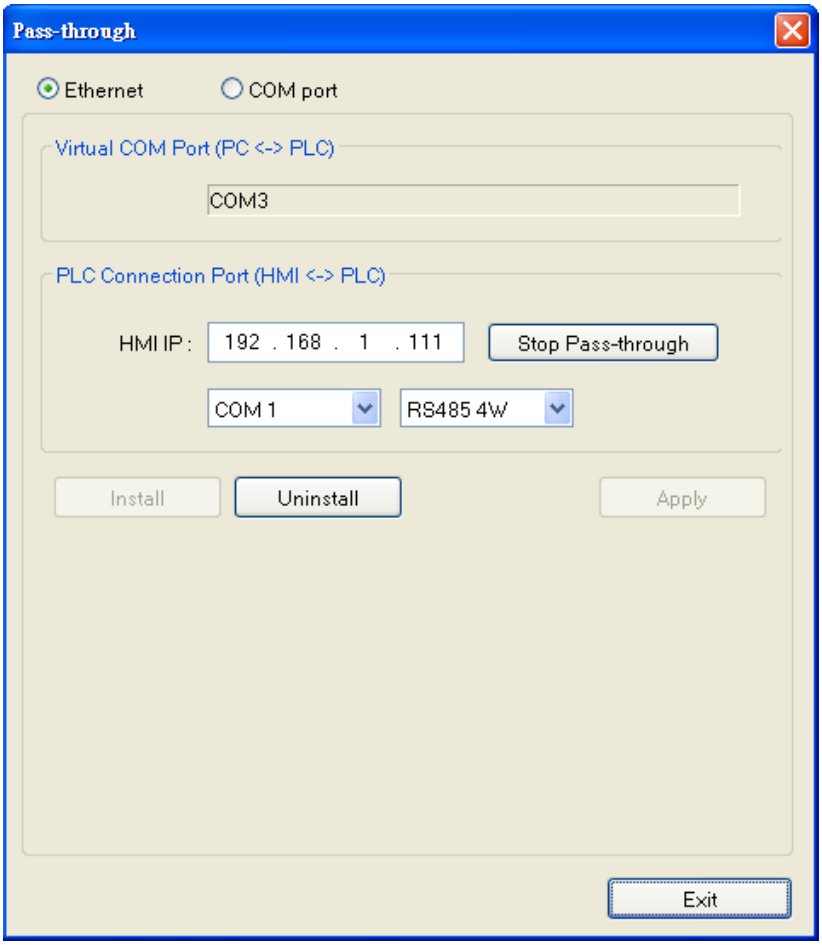


2.5 Pass-Through

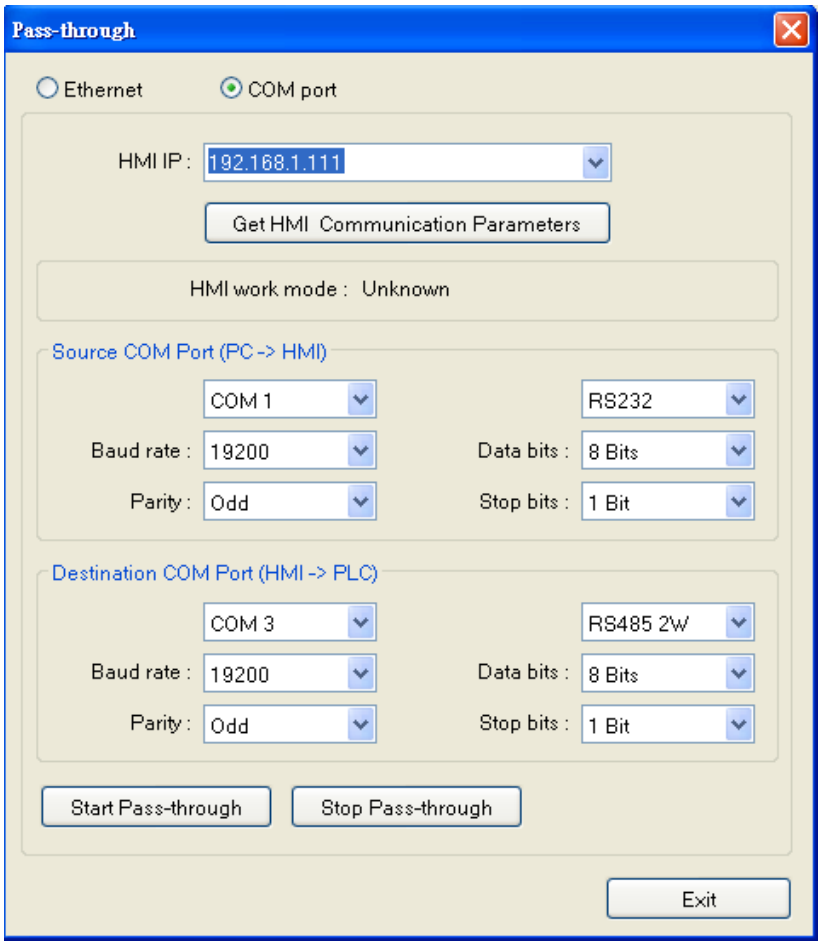
The pass-through function is allowed the PC application to connect PLC via HMI. In the pass-through function, the HMI is acting as a converter.

Pass-through provides two types of modes: Ethernet and COM port. Click Pass-through button on Project Manager to start the settings.

2.5.1 Ethernet Mode



2.5.2 COM Port Mode

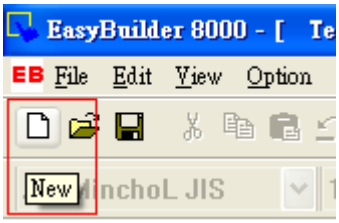


Chapter 3 Create a EasyBuilder 8000 Project

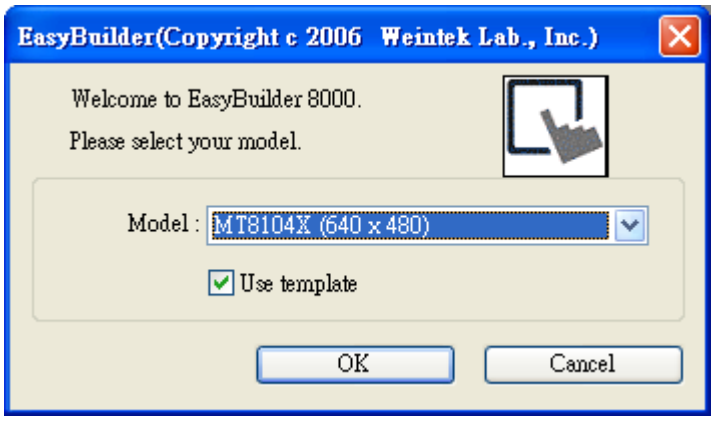
In this Chapter, we will take Mitsubishi PLC as an example to illustrate how to create and compile a new EB8000 project, do the simulation on PC and download the project to the HMI.

3.1 Create a New Project

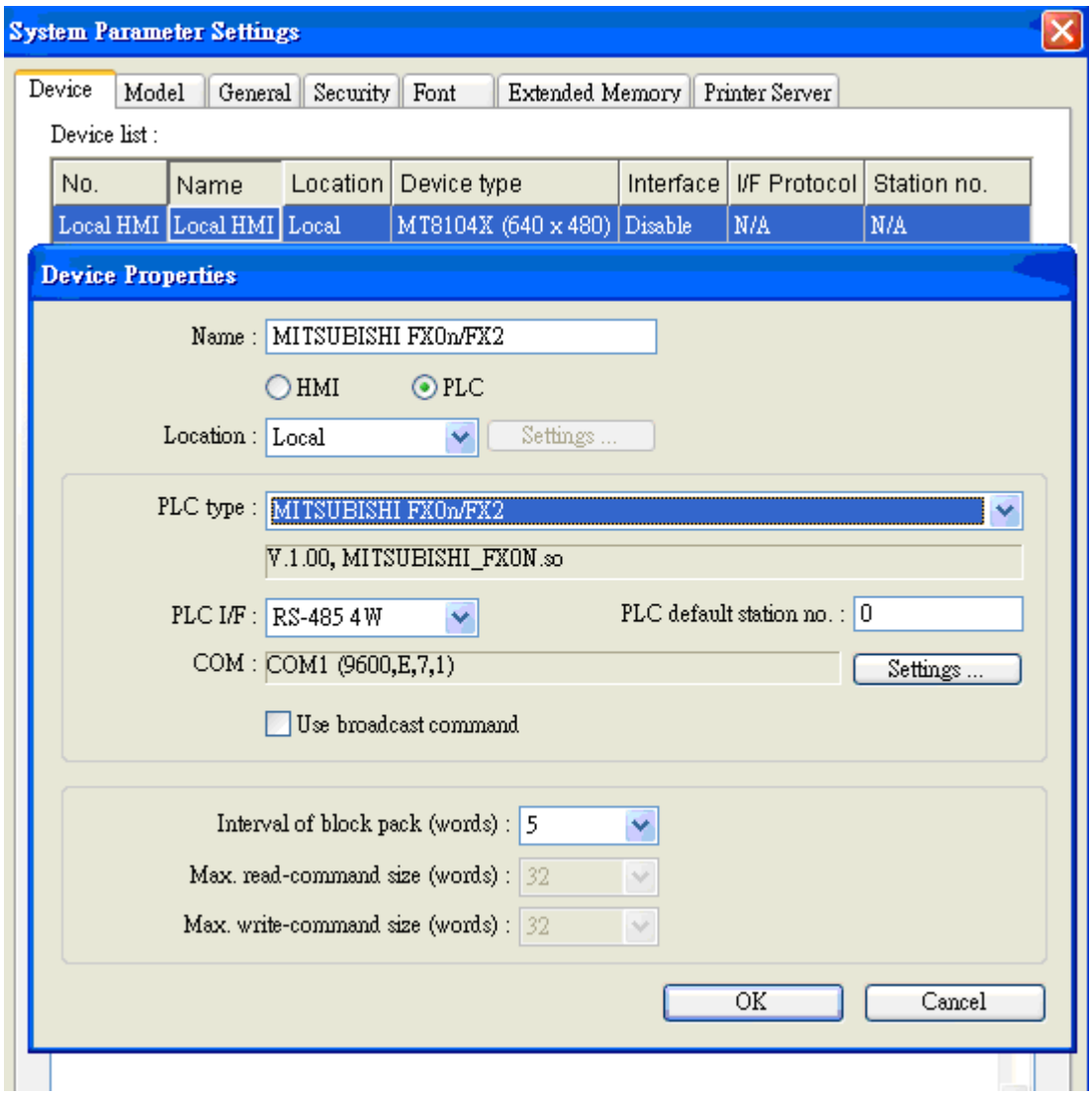
First of all, click **[New]** icon on the toolbar to create a new project.



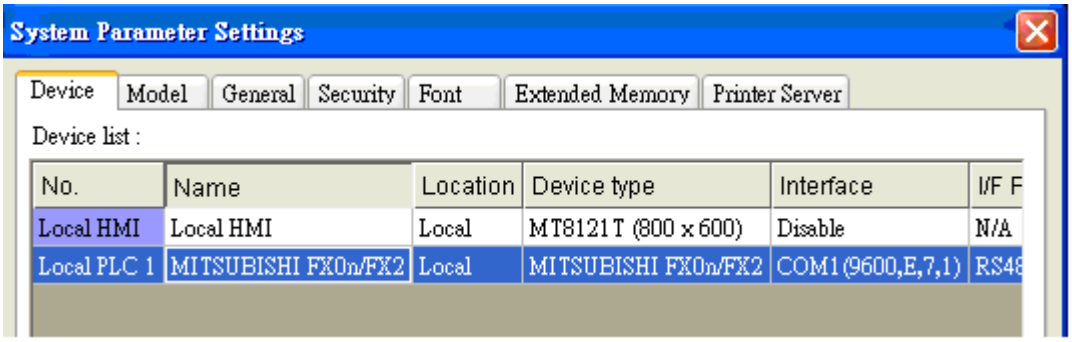
Select HMI Model, check Use template and then click OK.



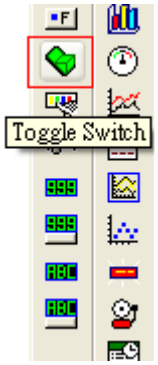
Under **Device** Tab, click **[New…]** button to correctly set up the device property for communicating to the PLC.



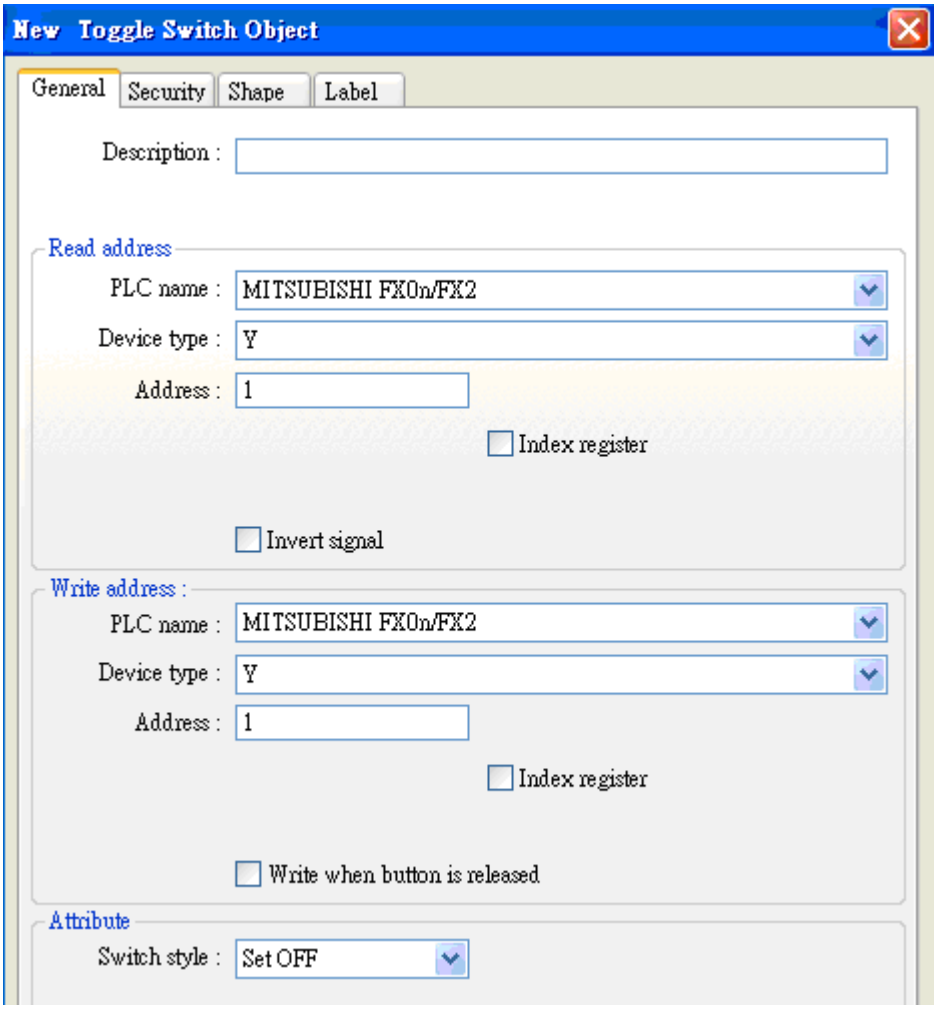
Device “MISUBISHI FX0n/FX2” is added to the Device Table after click OK.



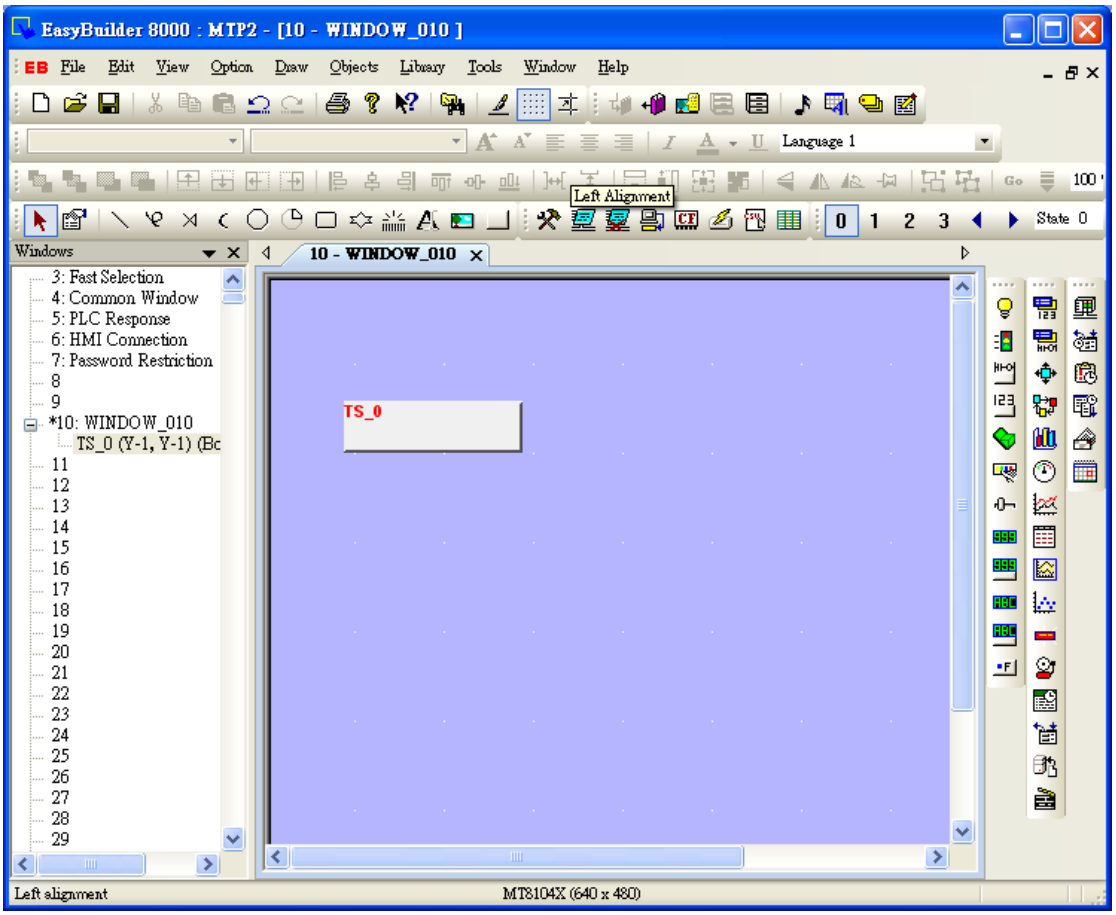
Now, if users would like to add a new object, such as Toggle Switch, click the icon on the tool bar.



A new Toggle Switch Object dialog will display as the illustration. Correctly set the parameters of the object, click OK and place the object to the desired position of the screen.



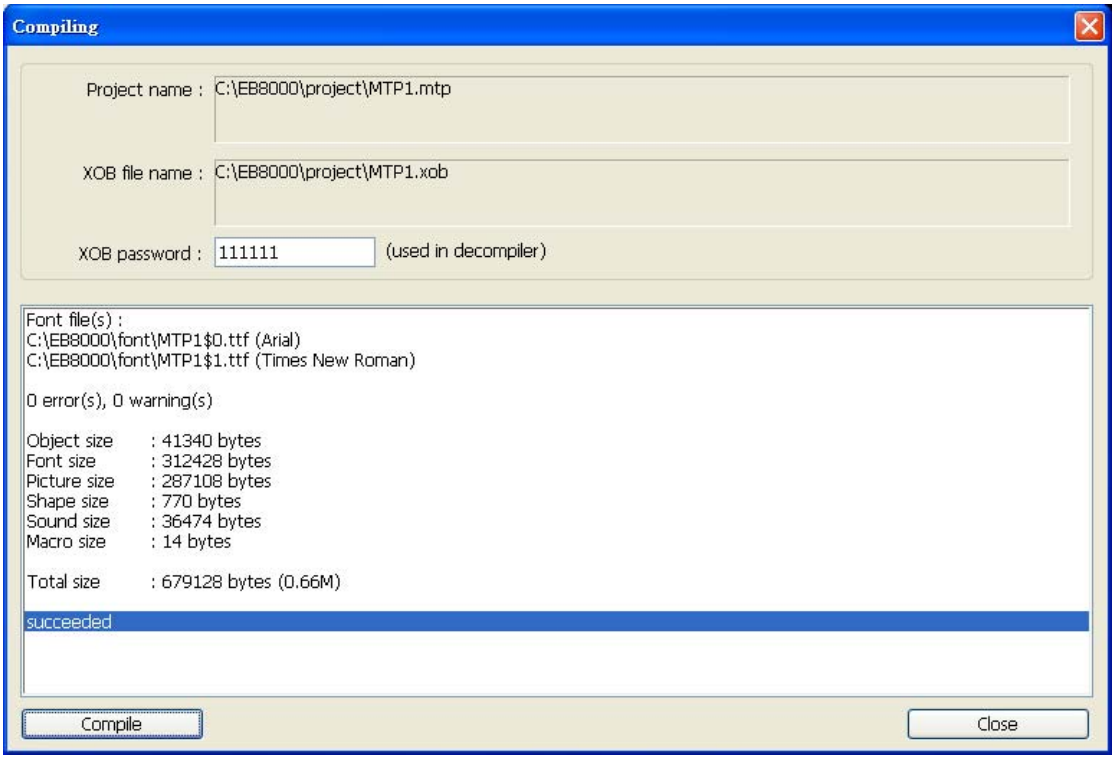
A project with an object is completed.



3.2 Save and Compile the Project

In the menu, select **File/Save** to save the project. After the .mtp file is saved, select **Tools/Compile** or click **[Compile]** icon to compile the project and check if the screen configuration is correct. A .xob file will be obtained after compiling.

A successfully compiled file will get the dialog as below:



3.3 Simulate the Project Either On-line or Off-line

There are two types of simulation: Off-line simulation & On-line simulation. By virtual device, PC simulates the operations of PLC without connecting to PLC. On the contrary, On-line simulation is executed by connecting PC with PLC and accurately setting the communication parameters. When simulating on PC, if the control target is a local PLC (i.e. the PLC directly connected to PC), there's a **10 minutes** limit.

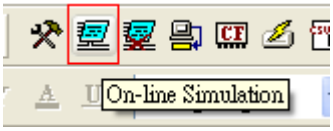
3.3.1 Off-line Simulation

Click **[Off-line Simulation]** icon to execute the Off-line Simulation.

From this example, we got the Off-line simulation screen as below.

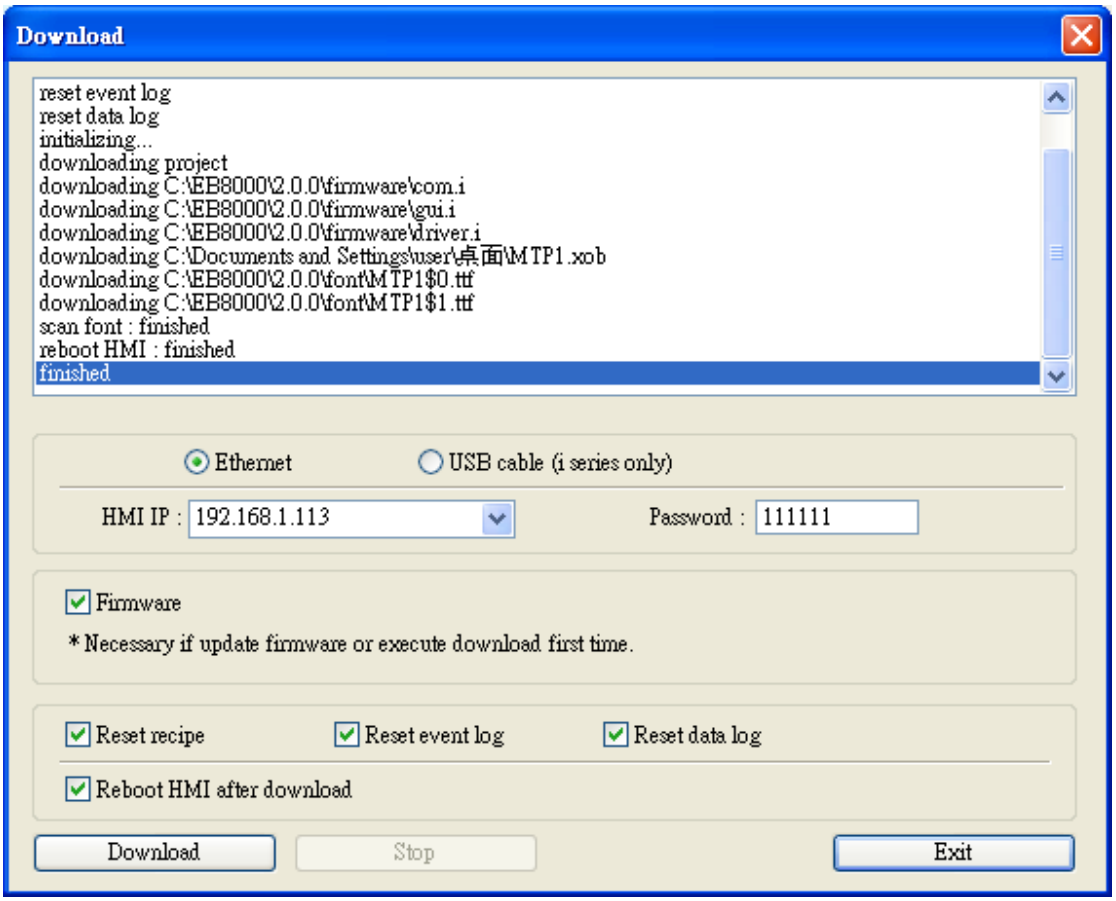
3.3.2 On-line Simulation

Click [On-line Simulation] icon to do the on-line simulation after correct connecting the device.



3.4 Download the Project

In the menu, select **Tool/Download…**or click **[Download]** icon from tool bar to load the image file into the HMI. Before downloading, be sure to check the selections in the dialog correctly.

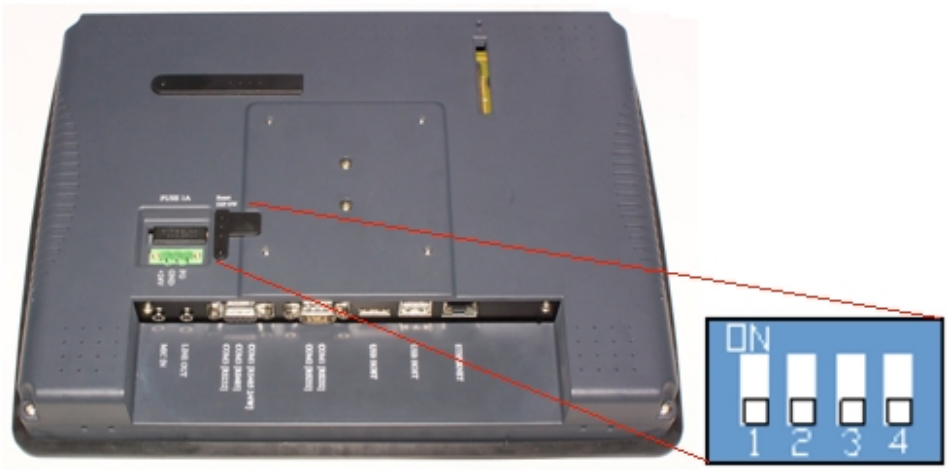


HMI IP	Assign the IP address of HMI
Password	Input the password
Firmware	It's necessary if update the firmware or download the project at first time
Reset recipe	If the selection is checked, the file will be erased before downloading
Reset event log	
Reset data log	
Reboot HMI after download	If the selection is checked, HMI will reboots after downloading is done

Click Download button to start downloading the project.

Chapter 4 Hardware Settings

4.1 I/O Ports of HMI



a. USB Host

Support devices with USB interfaces, such as mouse, keyboard, USB stick, printer…etc.

b. Ethernet Port

Connect devices with Ethernet communication interface, such as PLC, laptop…etc; support exchanging data via Network.

c. Compact Flash Card

Support the download/ upload of a project, including recipe transfer, Event Log Data…etc.

d. Serial I/O Port

COM ports, RS-232, RS485-2w/4w, can be connected to PLC or other peripheral devices. Here we view RS-422 as the same as RS-485 (4 wire). Please refer to the PLC connecting guide appendix in the manual to make sure the correct connection between PLC and HMI. Meanwhile, please make sure all DIP switches are on “OFF” (down) position (default value) in HMI operations.

In addition, Weintek provides [MT8-COM1 Multi-Connector cable] and [MT8-COM3 Multi-Connector cable] to expand one COM port to multiple independent COM ports so that the efficiency of the operation will be improved.

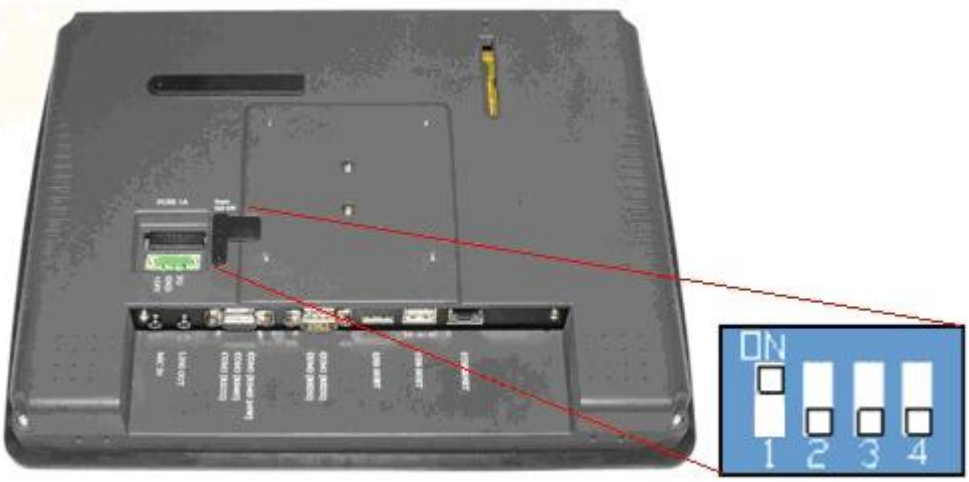
4.2 HMI System Settings

Before operating HMI, users have to complete the HMI system settings. After the setup, use EB80000 editing software to develop a personal operation interface. The following illustrates each system setting respectively.

4.2.1 System Reset

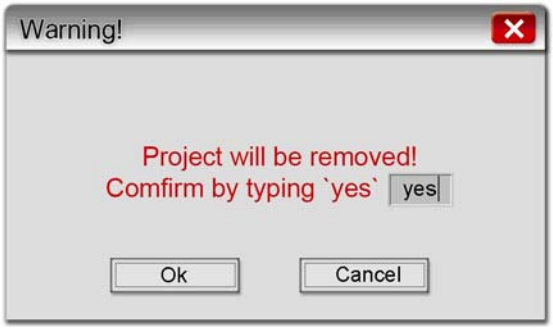
Each HMI is equipped with a set of reset button and DIP switch. When users use DIP switch to change modes, corresponding functions will be triggered.

If losing or forgetting the system password, users can set DIP Switch 1 to “ON” and the rest DIPs remain “OFF”. Then reboot HMI.



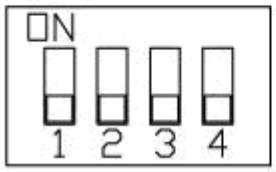
HMI will jump to Touch Adjust (Touch screen calibration) mode. After calibration, the pop-up window appears as the illustration below. Users will be inquired if they would like to restore the system password to the default.

When “YES” is chosen, another pop-up dialog appears as below. Users will be confirmed again if restoring the system password to the default is correct by inputting ”yes”. Then click OK. (The default password is 111111. However, other passwords, including download and upload password, have to be reset.)



Note: The project and data in the HMI will all be erased if the reset action is proceeded.

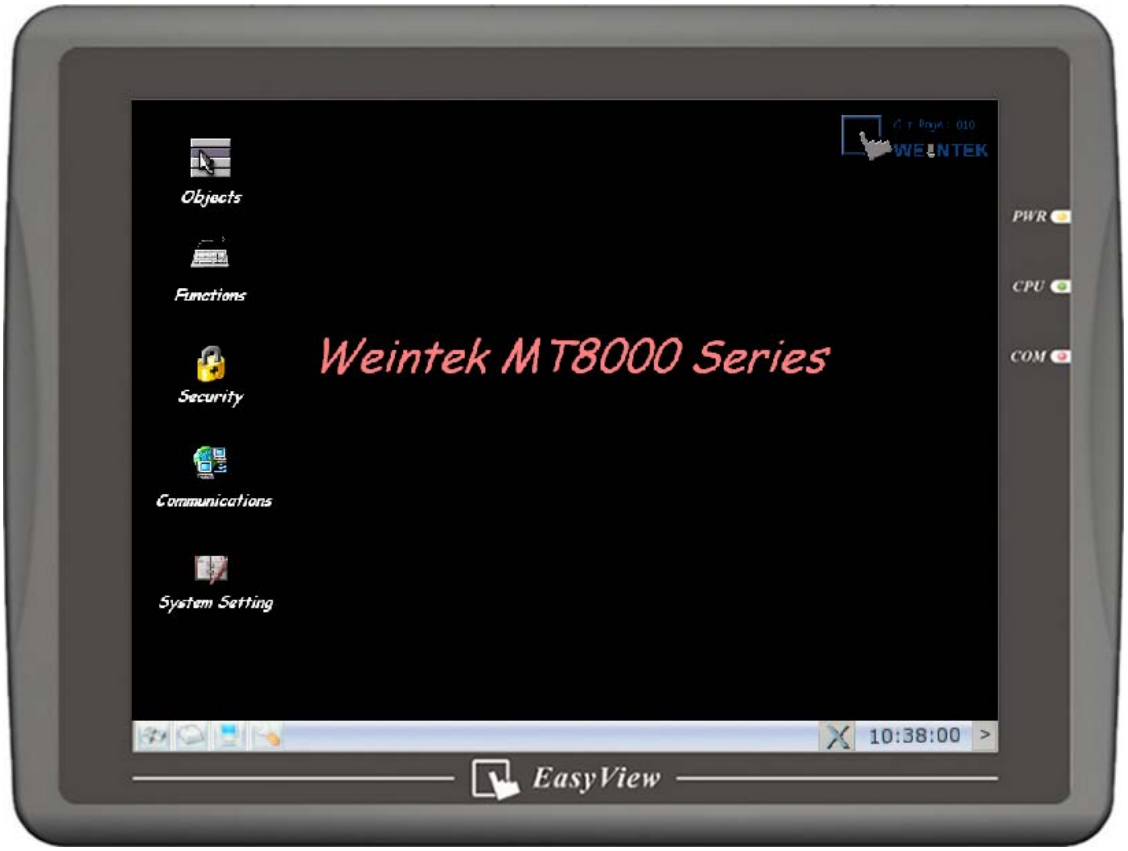
Dip Switch



SW1	SW2	SW3	SW4	Mode
ON	OFF	OFF	OFF	Touch Screen Calibrate mode
OFF	ON	OFF	OFF	Reserve
OFF	OFF	ON	OFF	Boot Loader mode
OFF	OFF	OFF	ON	Reserve
OFF	OFF	OFF	OFF	Normal

4.2.2 Tool bar

When the HMI is booted, user can set the system by using the mouse to click tool bar at the bottom of the screen. Normally, tool bar is hidden automatically. Only by touching the target at the corner of the right-bottom will the tool bar pops up.



4.2.2.1 Large Keyboard 

Use large keyboard to input the text information.

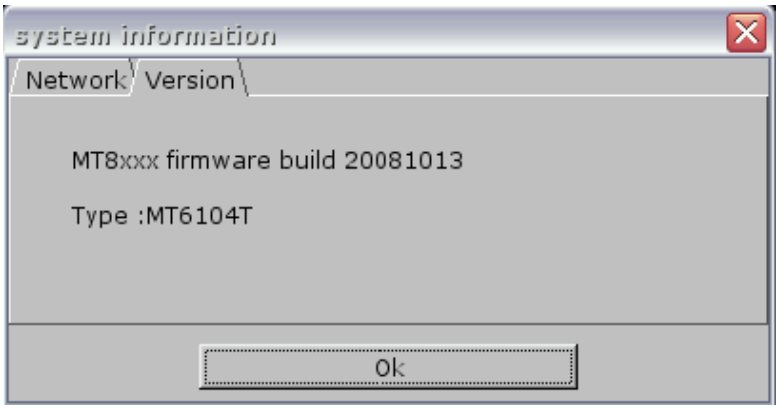
4.2.2.2 Small Keyboard 

Use small keyboard to input the numerical information.

4.2.2.3 System Information 

Network: Display Network information, including HMI IP address and other network information.

Version: Display information of the system version.



4.2.2.4 System Setting 

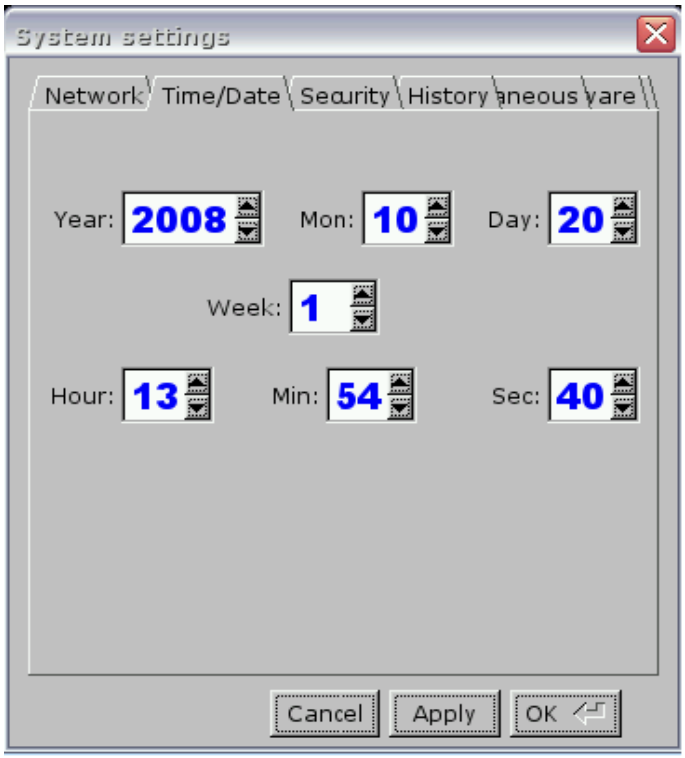
Set or modify system parameters. Password has to be confirmed in view of security.

a. Network

A project can be downloaded to HMI via Ethernet. The IP address of target (HMI) must be correctly set. If “Auto Get IP Address” is selected, IP address will be automatically assigned from local DHCP network. While if “IP address get from below” is selected, IP address and other network information have to be inputted.

b. Time/Date

System time/date will be displayed at the corner of the bottom-right after being set up.



c. Security

The default of the password is 111111. EB8000 provides strict security protection for the HMI.

Local Password
Password for entering the system

Upload Password
Password for uploading the project

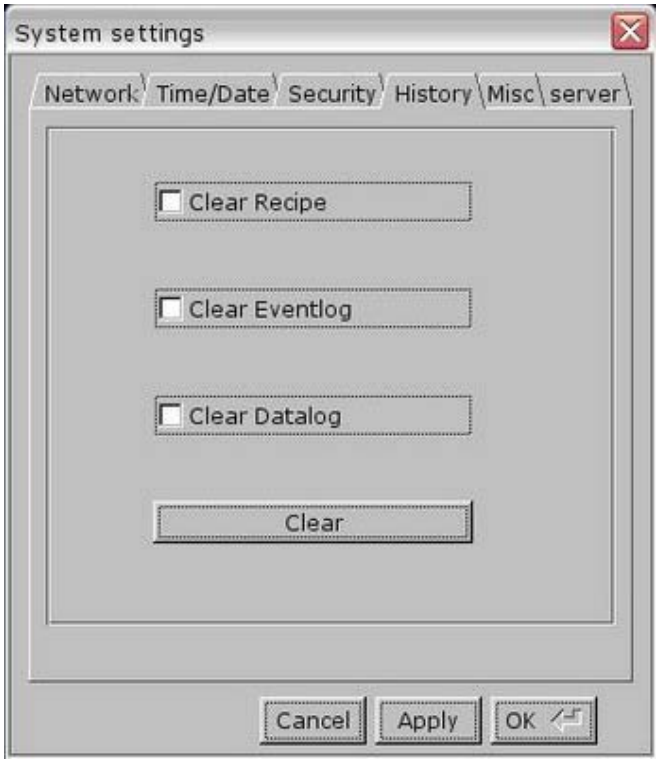
Download Password
Password for downloading the project

Upload (History) Password
Password for uploading the historical data

Password confirmation:

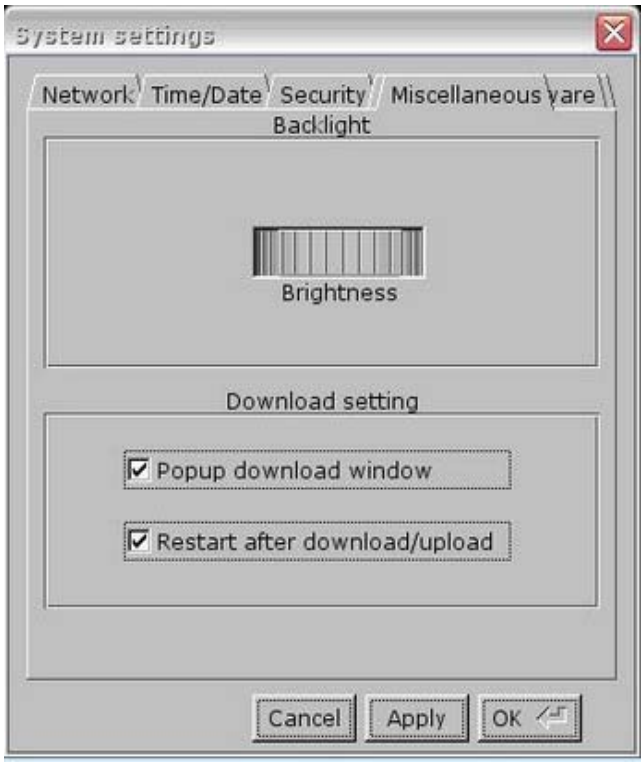
d. History

The tab to clear the historical data in the HMI: Recipe, Event log and Data log.



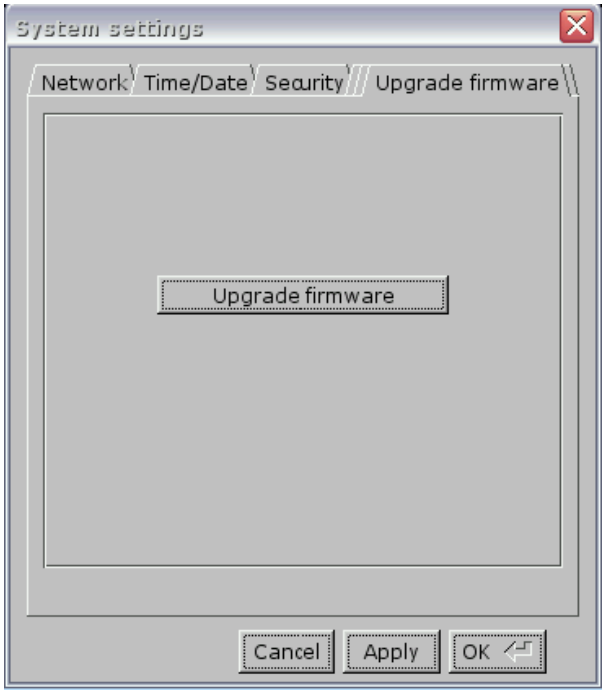
e. Miscellaneous

Use the rolling bottom on the screen to adjust the brightness of the LCD.



f. Upgrade firmware

The function for users to upgrade the firmware.



g. CF card Status

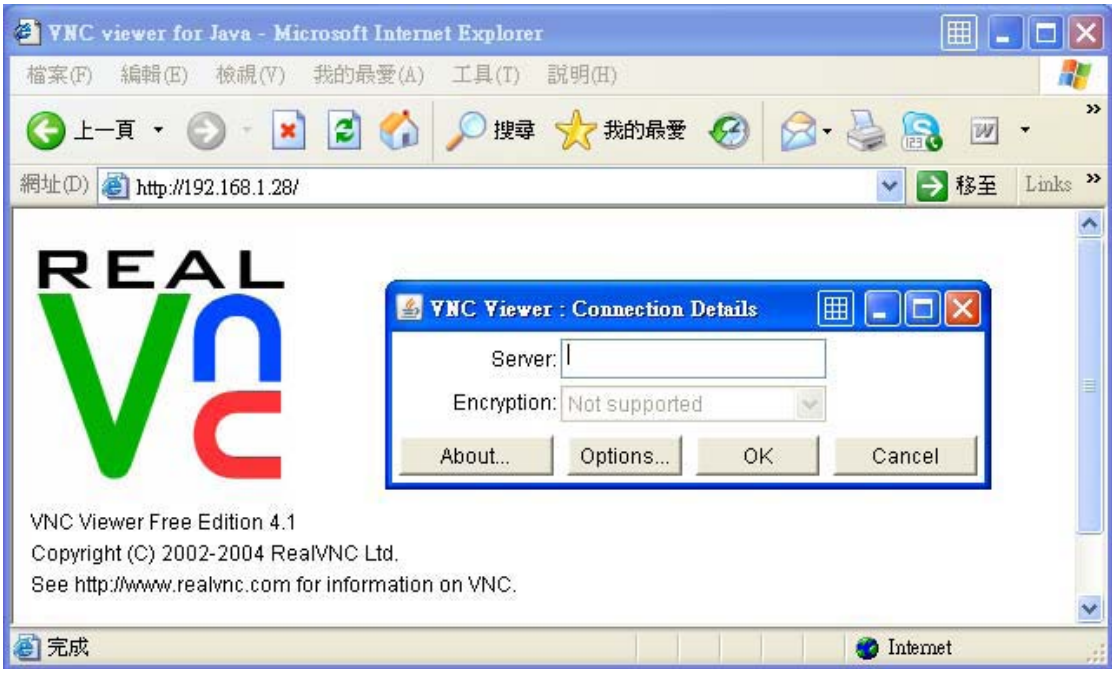
When new CF card device is detected, this function will be enabled.

h. VNC server (for X series and i series)

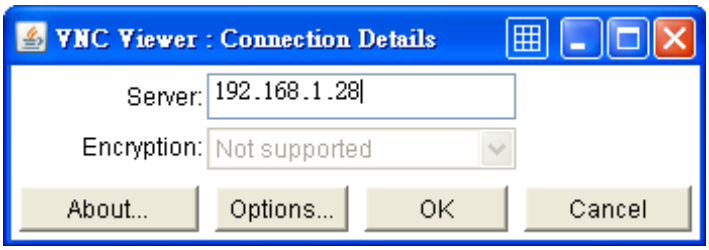
The function is to monitor and control the remote HMI through Ethernet.

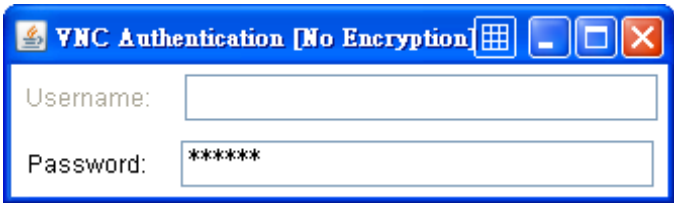
1. Enable VNC server and set the password.
2. Install Java for Internet Explorer or install VNC viewer.

For IE, enter HMI IP: http://192.168.1.28



For VNC viewer, enter HMI IP address and the password.





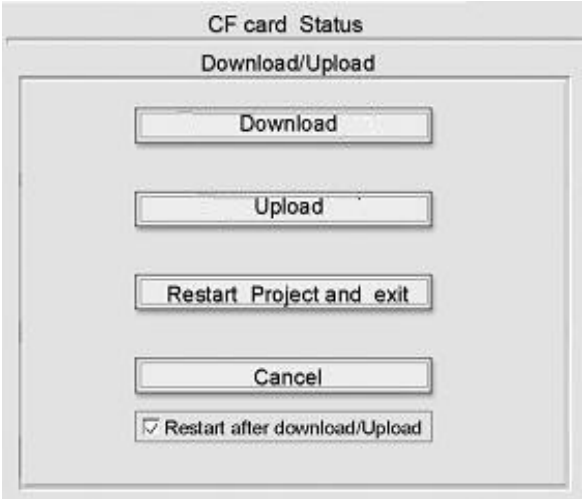
Note:

(1) Only allow one user to log in to VNC at one time.

(2) HMI will reject VNC connection after one hour without operations.

4.3 HMI Download Settings

A project or data can be downloaded to HMI via CF card or USB stick. Insert CF card or USB stick and designate the directory path. All contexts under the directory will be downloaded to the HMI. When HMI detects new peripheral devices, the following screen appears:



Several functions can be selected at this time and some of them need password confirmation. Please refer to the illustration below:

After the password is confirmed, directory names of the CF card…etc will be displayed. (PCcard: CF Card ; USB disk: USB device)

Select the download path and click OK for downloading.

Note: Users have to create download data from [Build Download Data for CF/USB Disk] from Project Manager.

Generally speaking, Project Manager divides the downloaded files into two directories:

MT8000

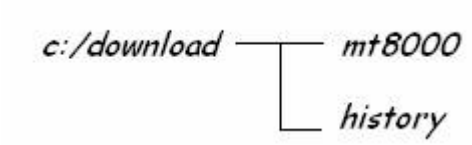
Project storage

History

When users download the historical data, the directory will be created.

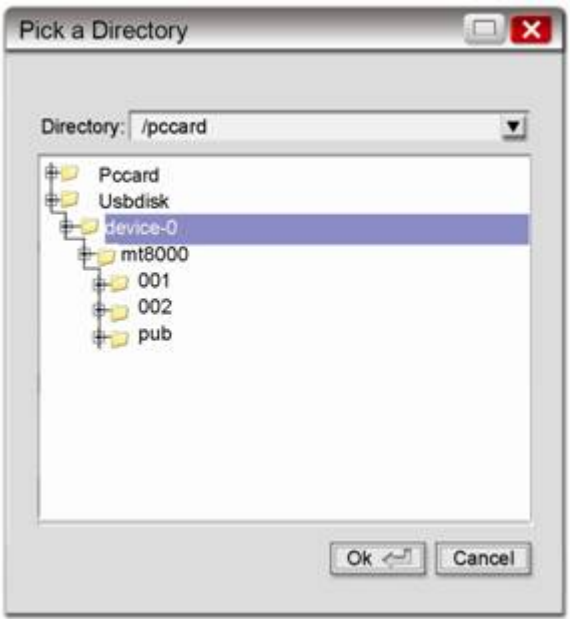
In other words, if the directory of the target file as below,

The data structure is like below diagram:



Users have to select the upper layer of the directory of the target file when downloading. In other words, take the structure above as an example, ***download*** must be selected. Choosing ***mt8000*** or ***history*** is invalid.

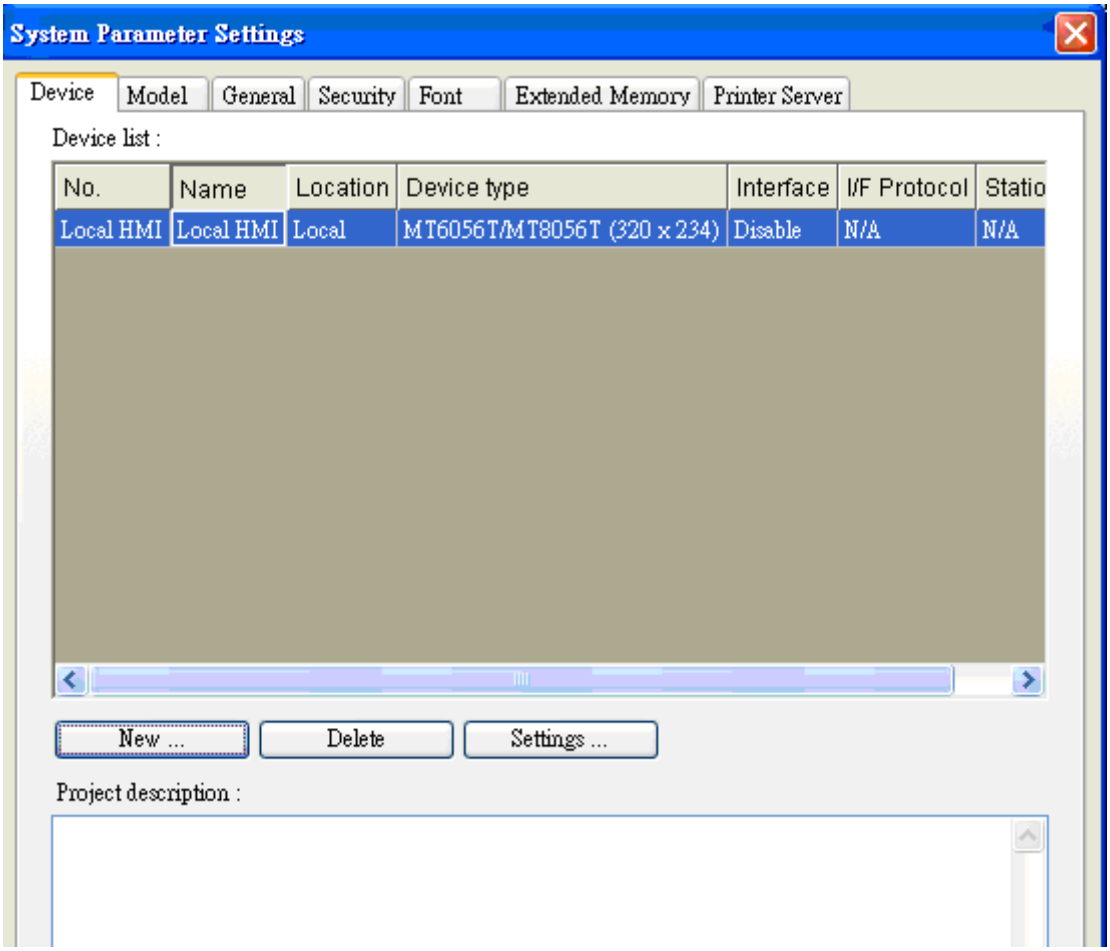
Take the illustration below as another example: USB disk only store mt8000 directory but don't includes history. In this case, user must choose ***device-0*** to correctly download the file.



The startup screen appears after a successful project downloading.

Chapter 5 System Parameters

In the EB8000, select menu [Edit] / [System Parameters…] and the **System Parameter Settings** dialog appears:



System Parameter Settings are divided into seven parts: **[Device]**, **[Model]**, **[General]**, **[Security]**, **[Font]**, **[Extend Memory]** and **[Printer Server],** which are introduced respectively in this chapter.

5.1 Device

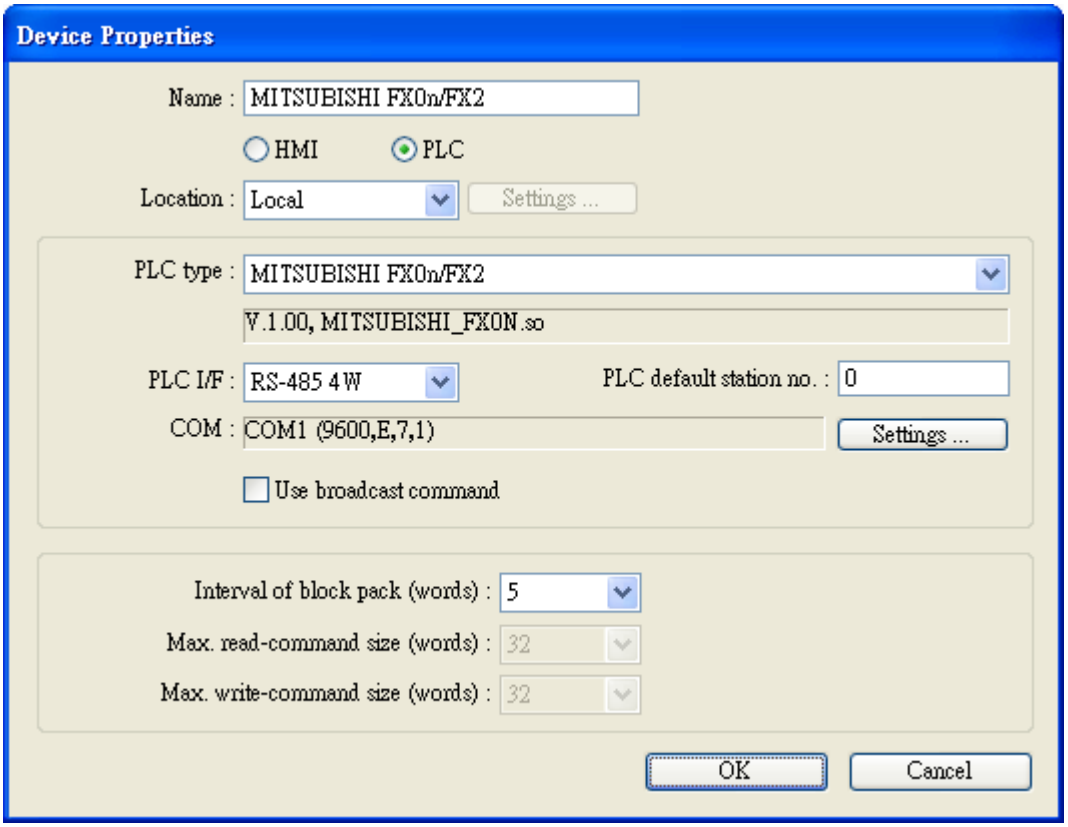
[Device] parameters determine all of the characteristics of each device controlled by a HMI. The device can be a PLC, remote HMI or PC. When opening a new *.mtp file, a default device: “Local HMI” is shown in the table. That is to say the device table must have a “Local HMI” at least, and it is used to identify current HMI.

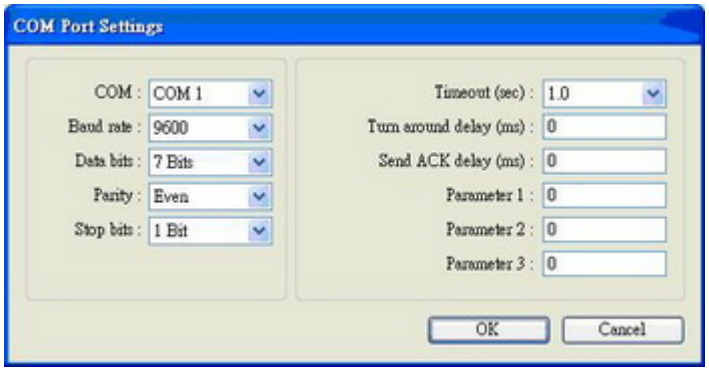
The procedure to create a new device:

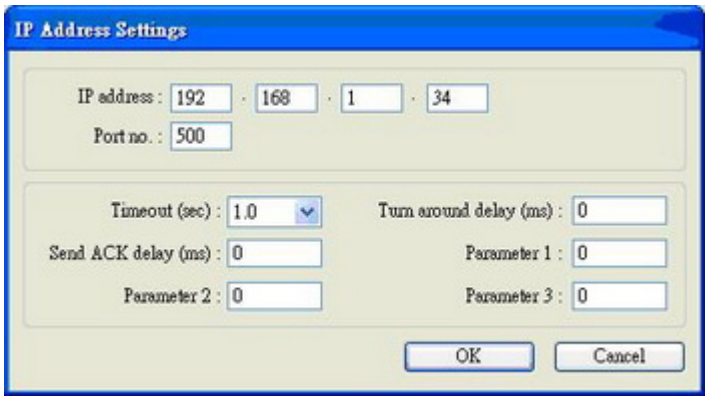
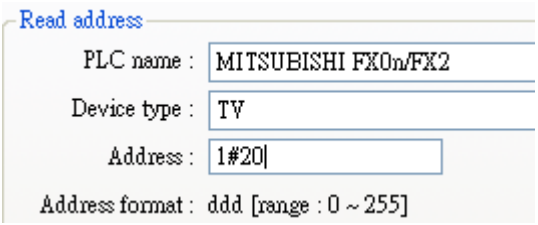
5.1.1 How to Control a Local PLC

So-called “local PLC” means a PLC which is connected to a local HMI directly. To control a local PLC, users need to add this type of device first. Click [New…] and the [Device Properties] dialog appears. Correctly filling in all of the properties is required.

Here is an example of MITSUBISHI FX0n/FX2 local PLC:



Name	The name of the device
HMI or PLC	Device type. Select [PLC] in this case.
Location	Position of the device. Select [Local]in this case.
PLC type	Type of PLC. Select MITSUBISHI FX0n/FX2 in this case
PLC I/F	Four PLC interfaces are available: [RS-232], [RS-485 2W], [RS-485 4W], and [Ethernet]. If the interface is [RS-232], [RS-485 2W],or [RS-485 4W], click [Settings…] and then [Com Port Settings] dialog appears. Users need to correctly set the COM port communication parameters. 

	[Timeout] Window No.5 will pop up and appear the “PLC No Response” message once the response time from PLC to HMI over timeout setting. **[Turn around delay]** The delayed interval of two commands. i.e. the next command will be delayed as the setting required to be sent out after the previous command is sent. If no specific request, the default setting is 0. If the interface is [Ethernet], click [Settings…] and then [IP Address Settings] appears. Users need to correctly set IP address and Port No. of the PLC. 
PLC default station no.	If the device address of the object doesn’t include station no., EB8000 will use PLC default setting no. as PLC station no. In addition, PLC station no. can put in device address directly, for example, 1#20  “1” means PLC station no, and has to be named more than 0 and less than 255. “20” means PLC address, the “#” sign is to separate station no. and address.
Use broadcast	For example, set broadcast value as 255.For device address of 255#20, the

command	HMI will send command to PLC but PLC won't deliver any response to HMI.
Interval of block pack (words)	If the interval of read out address between different commands is less than this value, these commands can be combined to one. But combination function is disabled if this value is 0. For example, the interval value is set as 5 and users would like to read out 1 word from LW3 and 2 words from LW6 respectively. Since the interval of addresses between LW3 and LW6 is less than 5, these two commands can be combined to one. The contents of combination command therefore becomes 5 consecutive words from LW3 (read out from LW3~LW7). Note: Max. combination command must less than [Max. read-command size].
Max. read-command size (words)	The Max. data size to be read out from device at one time. Unit: word
Max. write-command size (words)	The Max. data size to be wrote in to device at one time. Unit: word.

After all settings are completed, a new name "Local PLC" device is listed on the table.

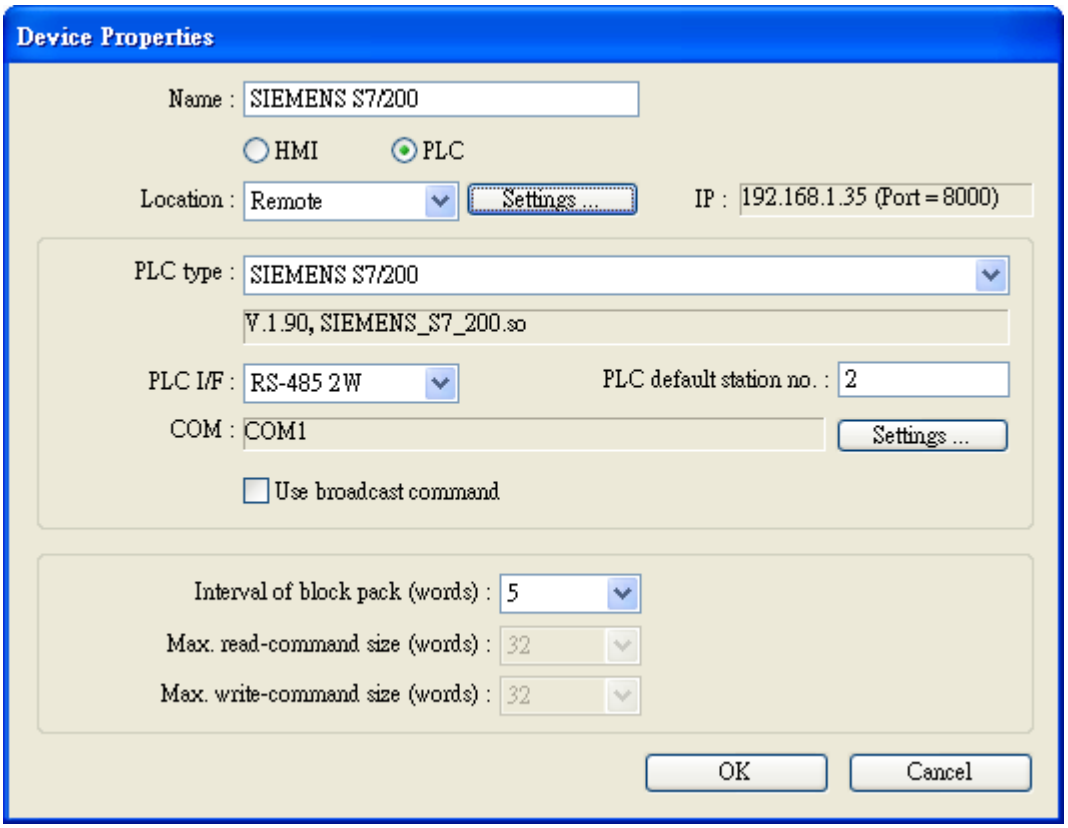
Device list :

No.	Name	Location	Device type	Interface	I/F Protoc
Local HMI	Local HMI	Local	MT8121T (800 x 600)	Disable	N/A
Local PLC 1	MITSUBISHI FX0...	Local	MITSUBISHI FX0n/...	COM1(9600,E,7,1)	RS485 4W

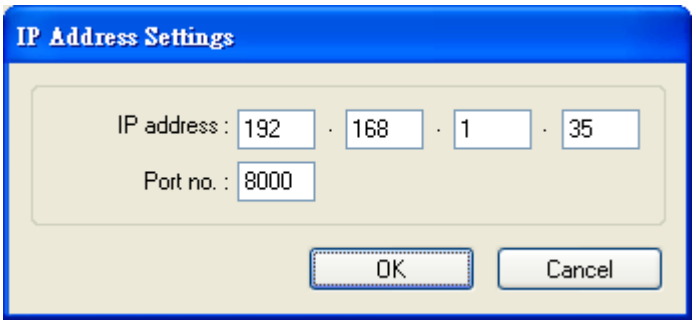
5.1.2 How to Control a Remote PLC

So-called “remote PLC” means a PLC connected to a remote HMI. To control a remote PLC, users need to add this type of device. Click [New…] and the following [Device Properties] dialog appears. Correctly fill in all of the properties are required.

Here take a remote PLC, SIEMENS S7/200, as an example:

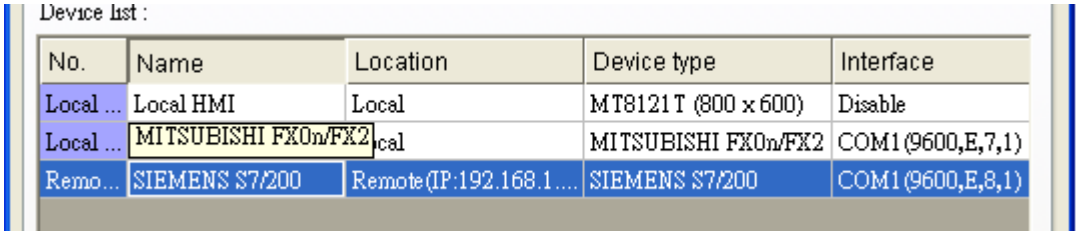


Each of parameters is introduced as follows:

Location	Select [Remote] in this case and set the IP address of the remote HMI which is connected to SIEMENS S7/200 PLC. Click [Settings…] to set the IP address of the remote HMI 
PLC Type	Type of PLC. Select SIEMENS S7/200 in this case.

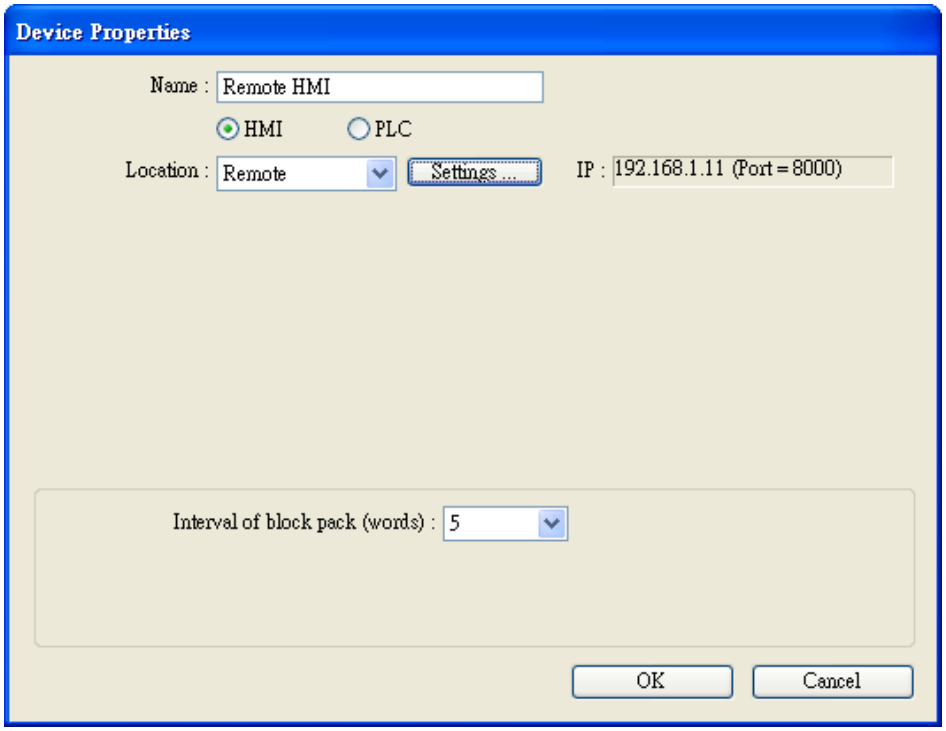
PLC I/F	The setting defines which interface the remote PLC uses.
COM	The setting defines which COM port the remote PLC uses.
PLC default station no.	The setting defines which the PLC default station the remote PLC uses.

After all settings are completed, a new name “Remote PLC” device is listed on the table.

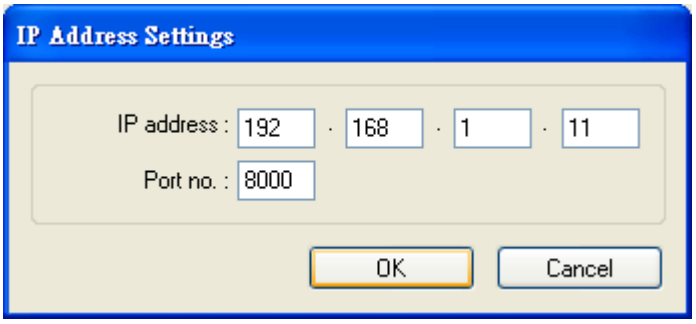


5.1.3 How to Control a Remote HMI

So-called “a remote HMI” means through network, the HMI is controlled by a local HMI or a PC running on-line simulation. To control a remote HMI, users should add this type of device. Click [New…] and the following [Device Properties] dialog appears. Correctly fill in all of the properties are required.



Each of settings is introduced as follows:

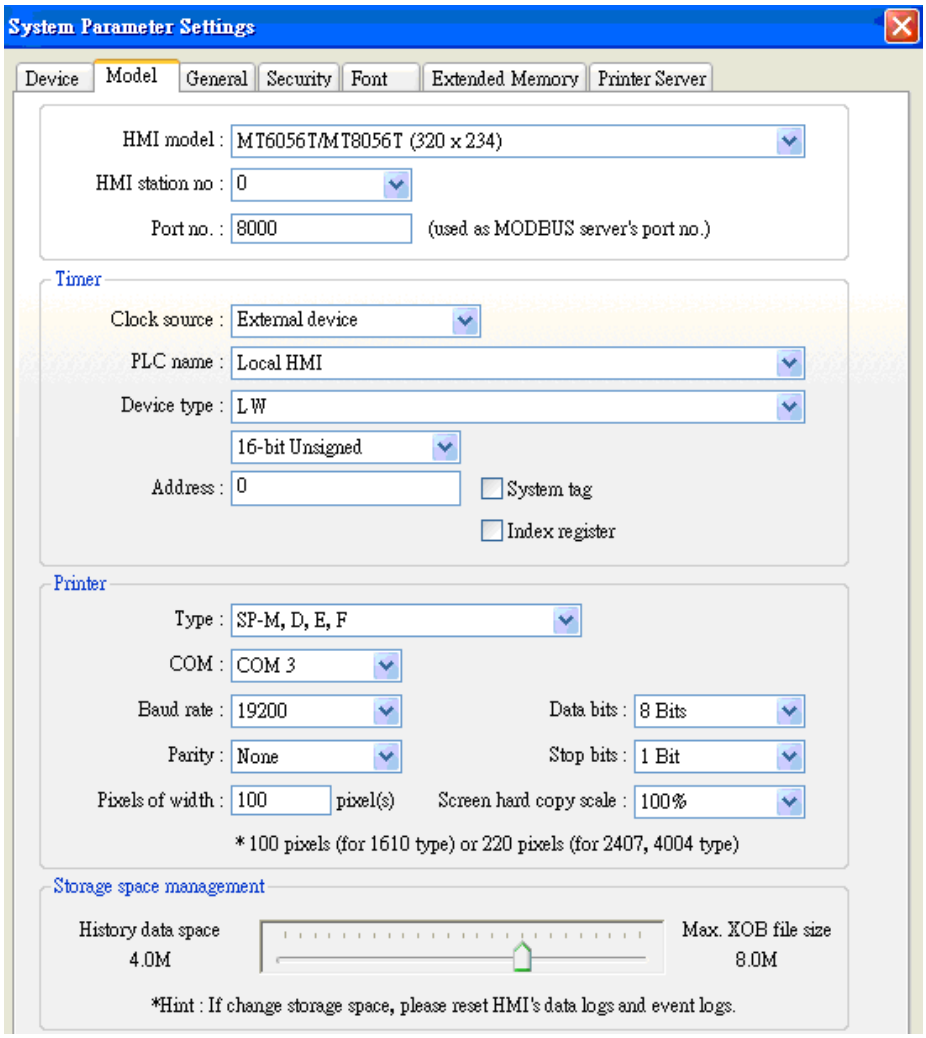
HMI or PLC	Type of device. Select HMI in this case.
Location	Select [Remote] in this case and click [Settings…] to set IP address of remote HMI and Port no. The port no. of remote HMI and local HMI must be same. 

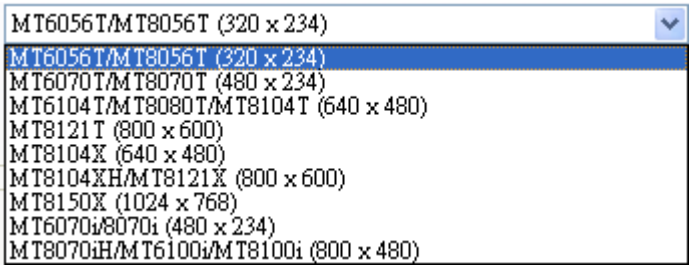
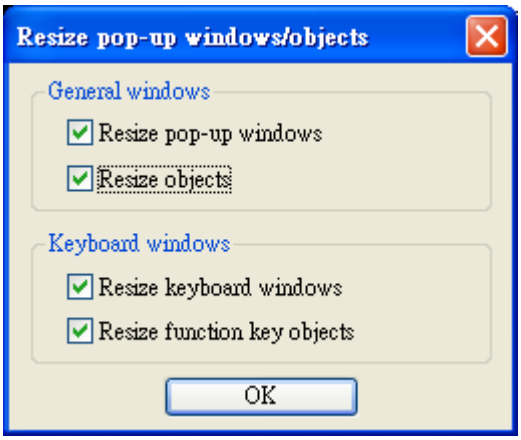
After all settings are completed, a new name “Remote HMI” device is listed on the table.

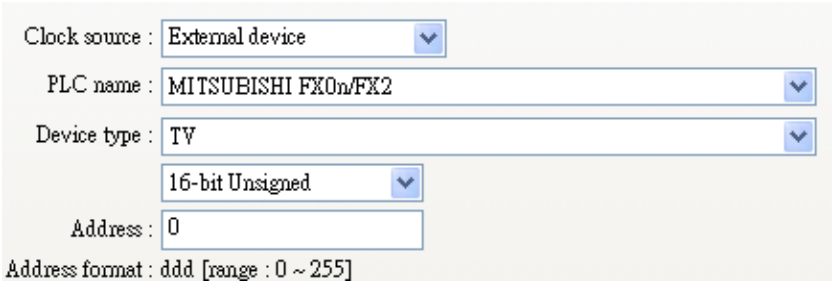
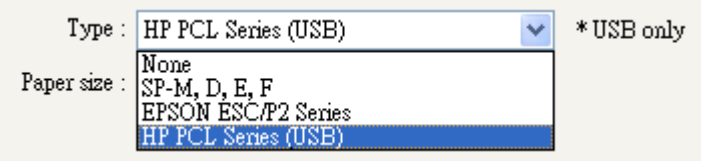
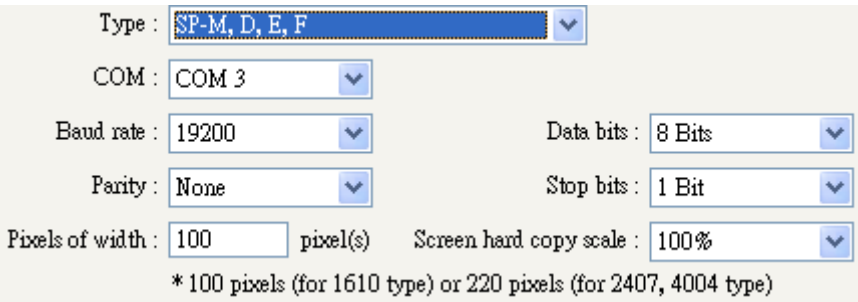
No.	Name	Location	Device type	Interface	I/F ...	St...
Local...	Local HMI	Local	MT8xxx	N/A	N/A	N/A
Local...	MITSUBISHI F...	Local	MITSUBISHI F...	COM1(96...	RS4...	0
Rem...	SIEMENS S7/200	Remote(IP:192.168.1.10, P...	SIEMENS S7/2...	COM1(96...	RS4...	2
Rem...	Remote HMI	Remote(IP:192.168.1.11, P...	MT8xxx	Ethernet	TC...	N/A

5.2 Model

Parameters on [Model] tab determine the HMI model, timer source and printer.



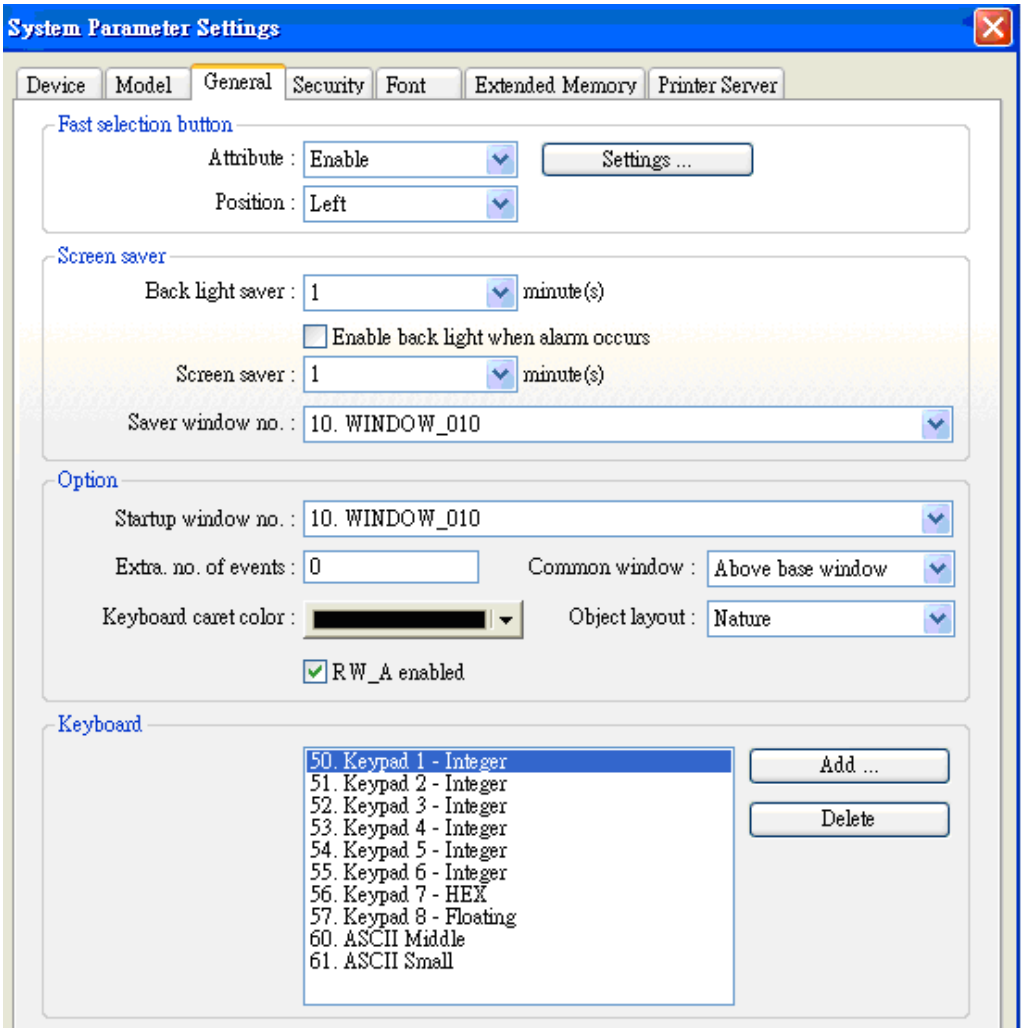
HMI model	Select current HMI model as illustration below.  Users are able to resize pop-up windows or objects when configuring the project. 
HMI station no.	Set the no. of HMI station. If with no particular purpose, select default.
Port no.	Set the port no. for HMI. It is used as MODBUS server's port no. If with no particular purpose, select default.
Timer	**[Clock source]**  Set the source of timer. The timer is used by such as [Data Log], [Event Log] ….etc. objects which need the time records. a. "HMI RTC" means the time signal comes from internal clock of the HMI. b. "External device" means the time signal comes from external device. The correct address of time source is necessary. Take the illustration below as

	an example: "TV" indicates the time from Local PLC. The context of 6 consecutives addresses starting from 0 shows as follows: TV 0 → Sec. TV 1 → Min. TV 2 → Hr. TV 3 → Day TV 4 → Month TV 5 → Year 
Printer	**[Type]** Display printer supported. For HP PCL Series, it has to use USB interface while other printers have to use COM interface. For more details, please refer to the "MT8000 support printer" chapter.  Using COM port to connect printer has to set accurate parameters. When the type of printer is SP-M, D, E, F, the [pixels of width] has to set accurately, i.e. the setting can not exceed printer's default setting. Otherwise the printing result will be incorrect. 
Storage space	1. Storage space available for the project and historical data is 12MB. By

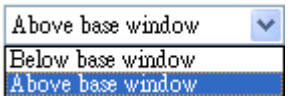
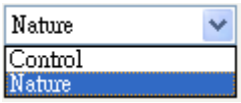
management (For T series only)	adjusting the space of two parts, users can reach their memory requirements. For example, for smaller project, it can get bigger memory space for historical data. 2. Minimum Project size is 6MB; Maximum Project size is 10 MB (default is 8MB).Minimum Historical data size is 2MB; Maximum Historical data size is 6 MB (default is 4MB). 3. Users have batter to copy and erase the original historical data in HMI before the storage space is changed. 

5.3 General

Parameters in [General] tab determine all properties related to screen operations.



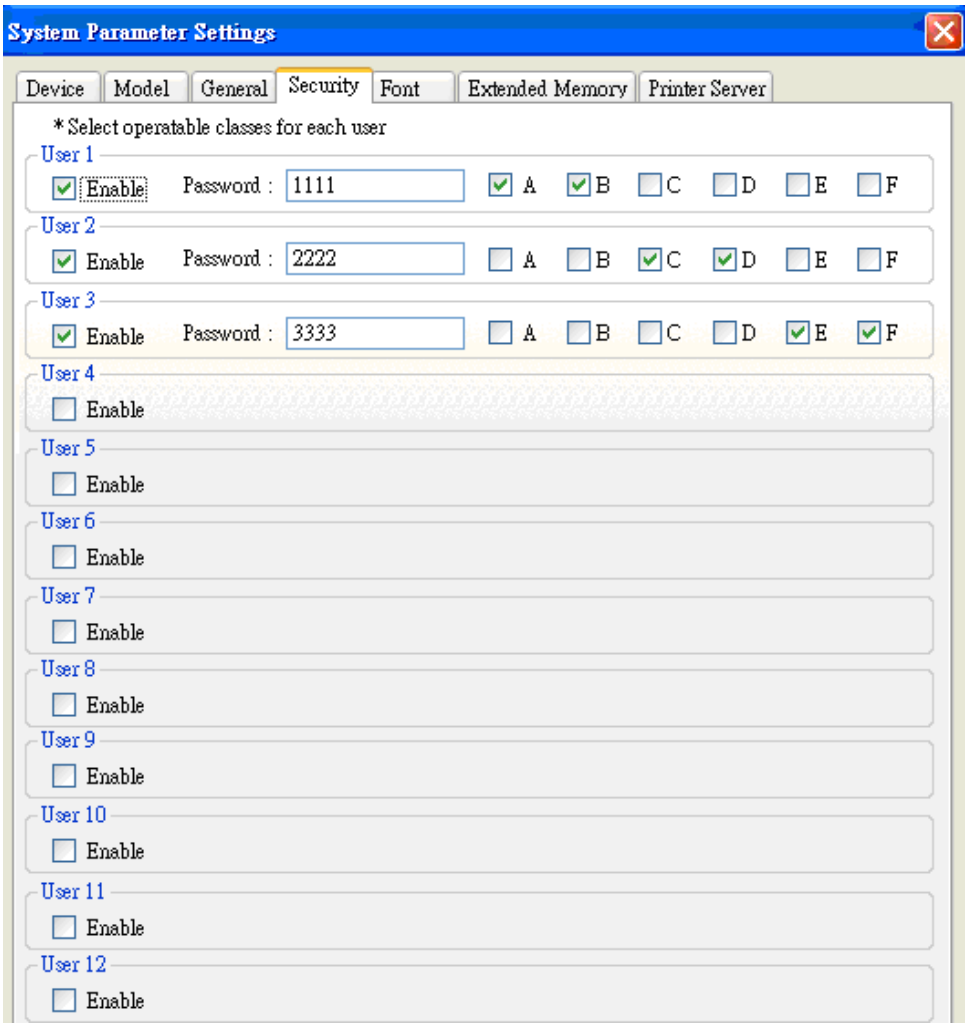
Fast selection button	Define the settings of all attributes for fast selection window which is designated as window number 3. **[Attribute]** Enable or disable fast selection window. Select “Enable” and click [Settings…] to set the attributes of the button, including color and text. **[Position]** Select the location of the fast select button. If “Left” is chosen, the button will show up at the corner of the left-bottom; if “Right” is chosen, the button will show up at the corner of the right-bottom.
Screen saver	**[Back light saver]** If the duration of no touch operation on screen is equal to this value, back light will be turned off. The setting unit is minute. Back light will be turned on when the screen is touched again.

	[Screen saver] If the duration of no touch operation on screen is equal to this value, the current screen automatically switches to the assigned [Saver window no.]. The setting unit is minute. If “none” value is selected, [Saver window no.] function is disabled.
Option	**[Startup window no.]** Designate the window no. after HMI is started up. **[Extra no. of events]** The default number of the event in the system is 1000. If users would like to add more records, the setting value can be modified up to 10000. **[Common window]**  The objects on the common window (window 4) will be shown on each base window. This selection determines the layers these objects are placed above or below the objects of the base window. **[Keyboard caret color]** Set the color of input caret. **[Object layout]**  If “Control” mode is selected, when HMI is operated, [Animation] and [Moving Shape] will display above other kinds of objects which is with no relation to the sequence of the object created. If “Nature” mode is selected, the display sequence of objects will follow the creation sequence of the objects. **[RW_A enabled]** Enable or disable the recipe data RW_A. After activating RW_A, an object can control the content of RW_A. The size of RW_A is 64K.

Keyboard	 If users would like to create a new keyboard, keyboard should be configured on the existing window. Select [Add…] to add these windows to the list. Please refer to the “designing and using keypad” chapter for details.

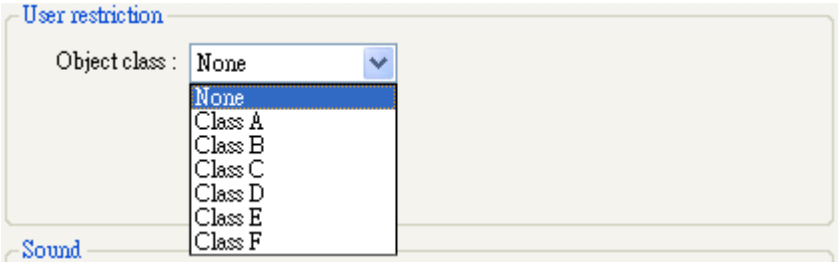
5.4 Security

Parameters in [Security] tab determine the classes accessible for each user and users’ passwords. Up to twelve passwords can be set. Only numerals are acceptable for the password and the range is from 0~999999999.



According to the security setting, EB8000 will control the classes accessibility for each user.

In EB8000, “None” and “class A to class F”, 7 class choices in total, are provided.

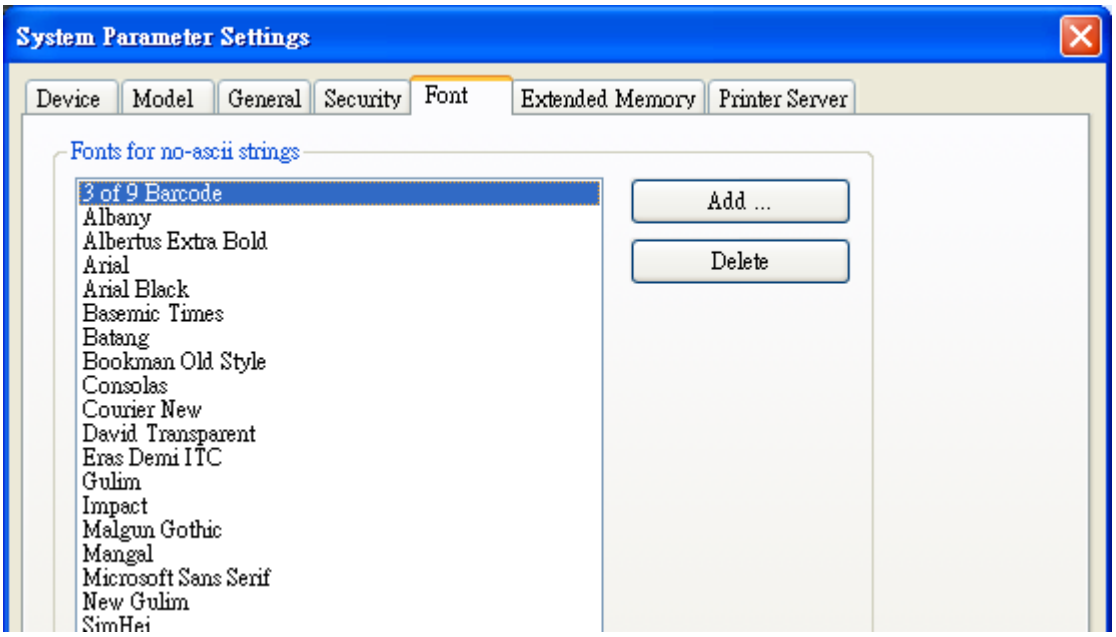


For example, when the security of User 1 is set as below, only can he/she access to None, A, C, and E class.

Please refer to the “Object’s Security Guard” chapter for more details.

5.5 Font

Parameters in [Font] tab determine the font of no-ASCII which is used on EB8000



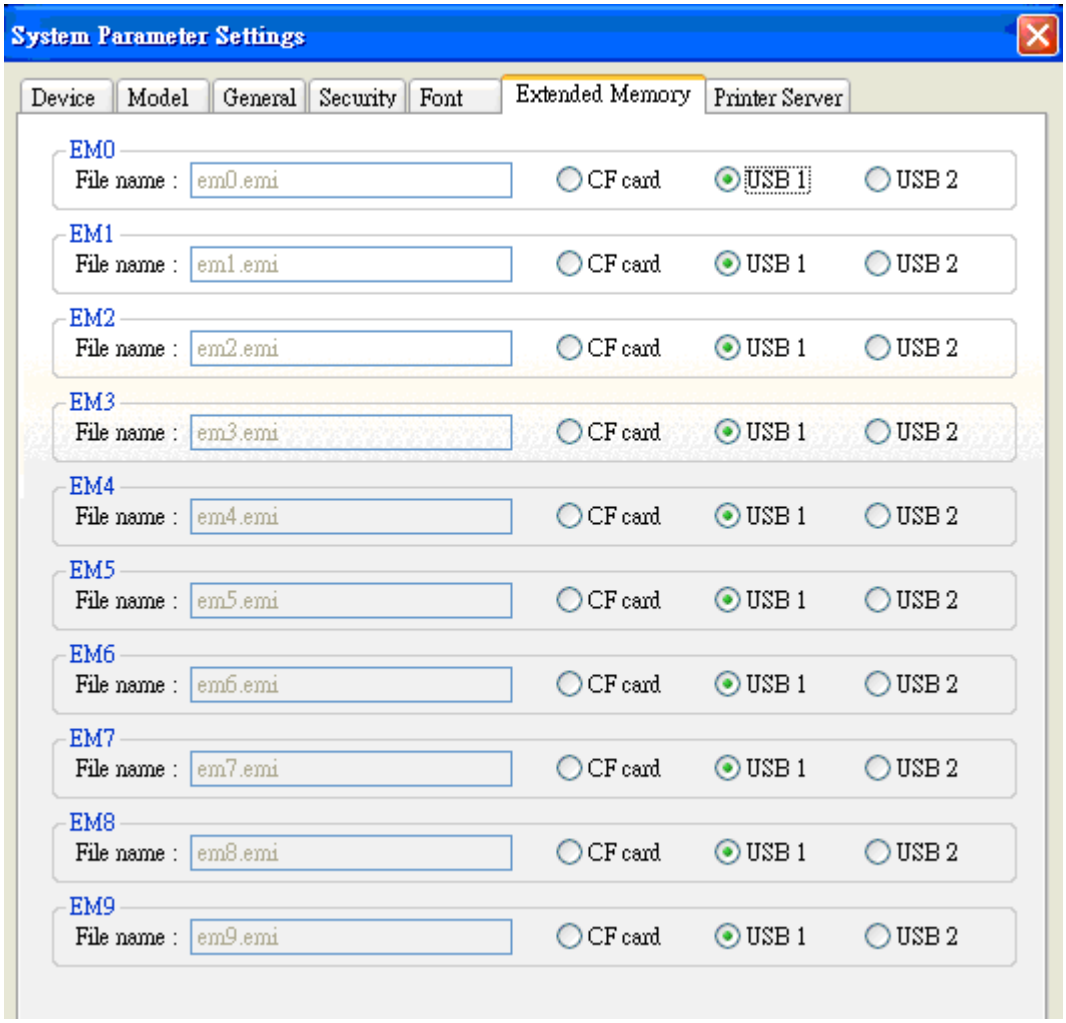
[Fonts for no-ascii strings]

Fonts for no-ascii strings are listed above. When users use a no-ascii font which isn’t listed on [Fonts for no-ascii strings] table, EB8000 will select a font in the list to substitute the front automatically.

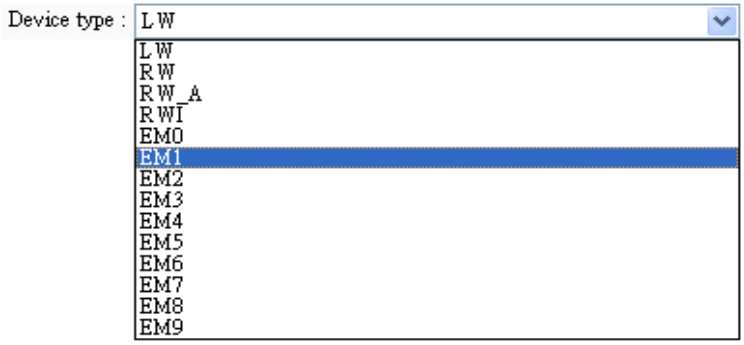
User also can test which no-ASCII strings of Windows can be used in HMI and add them to [Fonts for no-ascii strings] table.

5.6 Extended Memory

Parameters in [Extended Memory] tab determine the file path of the extended memory.



Extended Memory is numbered from EM1 to EM9. Method to use in extended memory is similar to that in other devices (i.e. Lw or RW address type). Size of each extended memory is up to 2G word.



Data in extended memory is in the form of a file and stores in CF card, USB1 or USB2.The file name of EM0~EM9 are entitled as em0.emi~em9.emi.Users can use RecipeEditor.exe to open the file and edit the data in the extended memory.

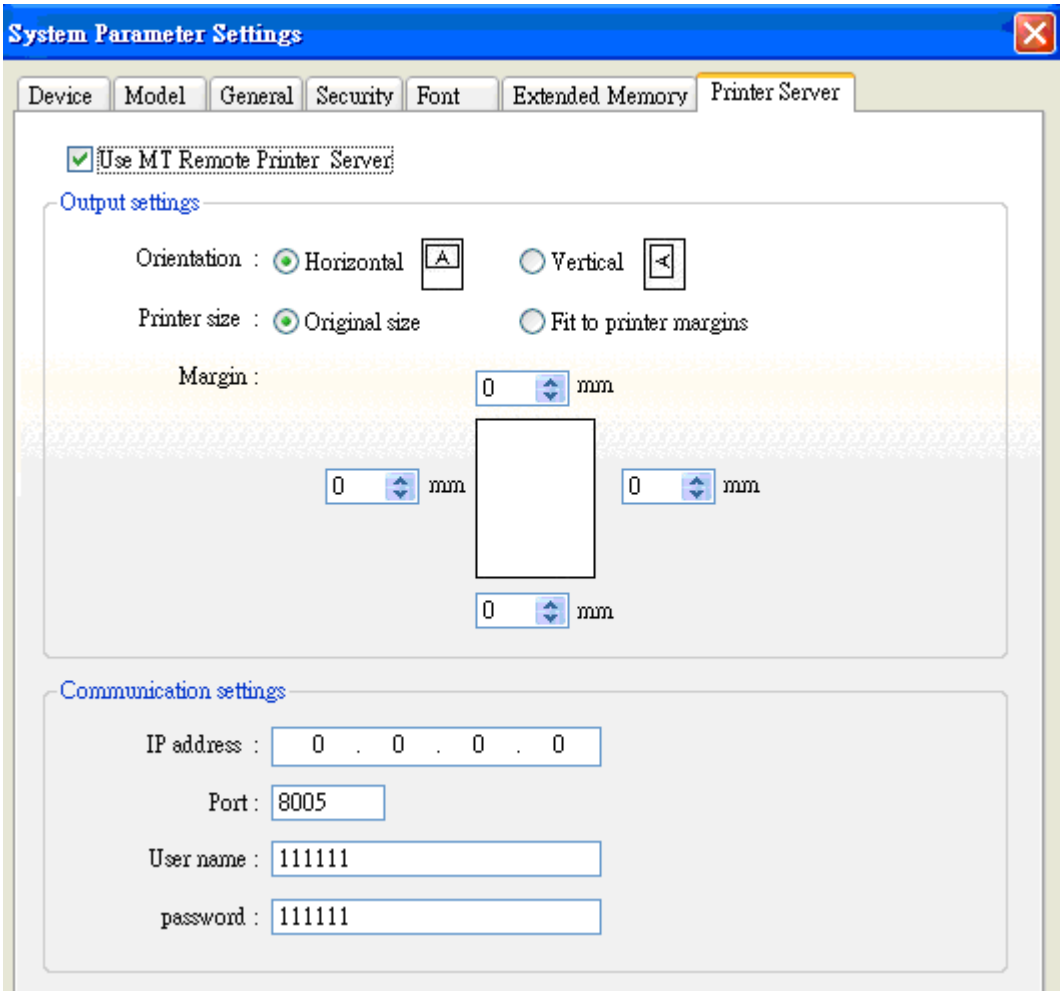
External devices such as CF Card and USB memory stick are not affected by power loss. Data stored in these devices is retained regardless of HMI power conditions.

If users would like to read out the data from external device when the external device is removed, the content will be viewed as 0; if users would like to write in the data to external device when the external device is removed, the "PLC no response" message will appear.

The HMI supports "hot swapping" of CF Card and USB devices. There is no need to interrupt operations to change CF Card or USB devices.

5.7 Printer Server

Parameters in [Printer Server] tab are to set up a MT remote printer.



Output settings	[Orientation] Set the orientation of the words or pictures to be printed out. [Printer size] Set the paper size to be original or to fit the printer margin. [Margin] Set the borderline of the paper, including top, bottom, right and left.
Communication settings	[IP address] Assign the IP address of a remote printer via network. [Port], [User name], [Password] Assign the access information. Port can be set from 1 to 65535. Max. length of user name or password is 12 characters.

※ Please refer to the appendix Easy Printer for details.

Chapter 6 Window Operations

6.1 Window Types

The basic component of a HMI screen is a Window. Users are able to configure 1997 windows or screens. According to function and usage, there are 4 types of windows in the EB8000.

a. Base Window
b. Common Window
c. Fast Selection Window
d. System Message Window

6.1.1 Base Window

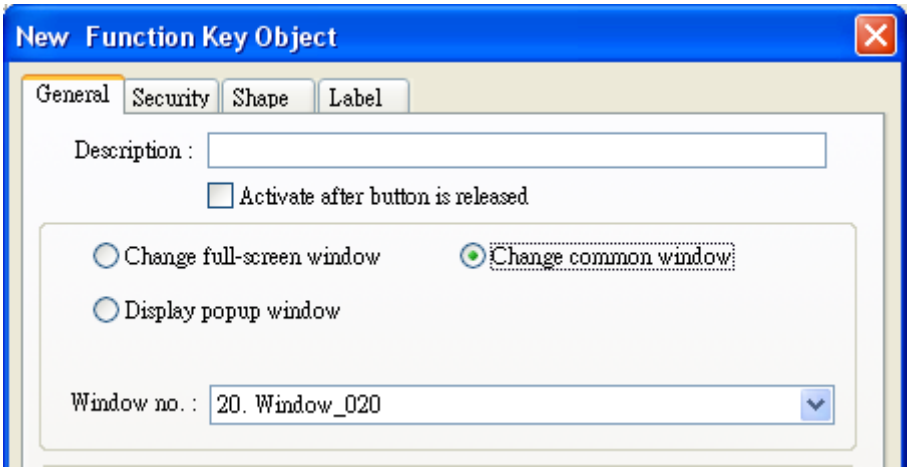
Base window is the frequently-used type of window.
Except for primary screen, it is also used on:

a. Foundation base: used as the background for other windows
b. Keyboard window
c. Pop-up window for function key object
d. Pop-up window for direct and indirect window
e. Screen saver

The illustration below shows the startup screen which uses base window.

6.1.2 Common Window

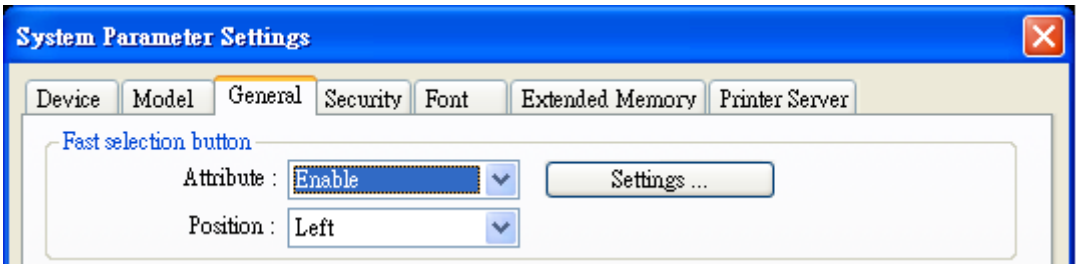
Window 4 is the default of common window. Objects on this window will be displayed on all of other windows so that users always place the shared objects on the common window. When system is in the operation, [Change common window] mode of the function key can be used to change the source of the common window. For example, users can change the common window from window 4 to window 20.



6.1.3 Fast Selection Window

Window 3 is defined as the Fast Selection Window. This window can coexist with base window. Generally speaking, it is used by the frequently-used operation buttons as the picture below:

When using the Fast Selection Window, except to create window 3 first, uses need to set each function of Fast Selection. The [Startup] on the picture above is the Fast Selection button which is used to enable/disable the Fast Selection. Every setting of the Fast Selection button is in System Parameter Settings. Please refer to the dialog below.



Except switching the attribute of the Fast Selection by Fast Selection button, system register also provides the following addresses for uses to designate the values in the address to control Fast Selection and Fast Selection button. Please refer to “system register” for more details.

[LB9013] FS window control [Enable (ON) / Disable (OFF)]
[LB9014] FS button control [Enable (ON) / Disable (OFF)]
[LB9015] FS window / button control [Enable (ON) / Disable (OFF)]

6.1.4 System Message Window

Window 5, Window 6, Window 7 and Window 8 are the defaults of system message windows.

Window 5 is the "**PLC Response**" message window	When the communication between PLC and HMI discontinues, the message window will pop up automatically
Window 6 is the message window for "**HMI connection**"	When connection of remote HMI fails, the message window will pop up automatically
Window 7 is set for "**Password Restriction**" message window	If the user who doesn't have enough authority to access the object, window 7 will pop up according to the security setting content.
Window 8 is set for "**Free Space Insufficient"** message window	When HMI built-in memory, USB memory stick or CF card runs out of storage space, the message window will pop up automatically. Users can use system tag to review the free memory space of HMI, CF card and USB device. [LW 9072] HMI current free space (K bytes) [LW 9074] CF current free space (K bytes) [LW 9076] USB 1 current free space (K bytes) [LW 9078] USB 2 current free space (K bytes) EB8000 also provides warning message to review the memory space insufficient. [LB 9035] HMI free space insufficiency alarm (when ON) [LB 9036] CF free space insufficiency alarm (when ON) [LB 9037] USB 1 free space insufficiency alarm (when ON) [LB 9038] USB 2 free space insufficiency alarm (when ON)

Note:

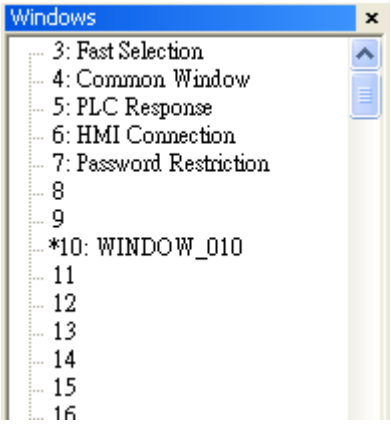
(1) A screen can display max. 16 pop-up windows simultaneously which include System Message Window, Direct window and Indirect window.

(2) A window only can be display once simultaneously. It is illegal by using many direct/indirect windows to display the same window in the base window.

(3) Windows 0~9 are for system use only while windows 10~1999 are for user operation.

6.2 Create, Delete and Set a Window

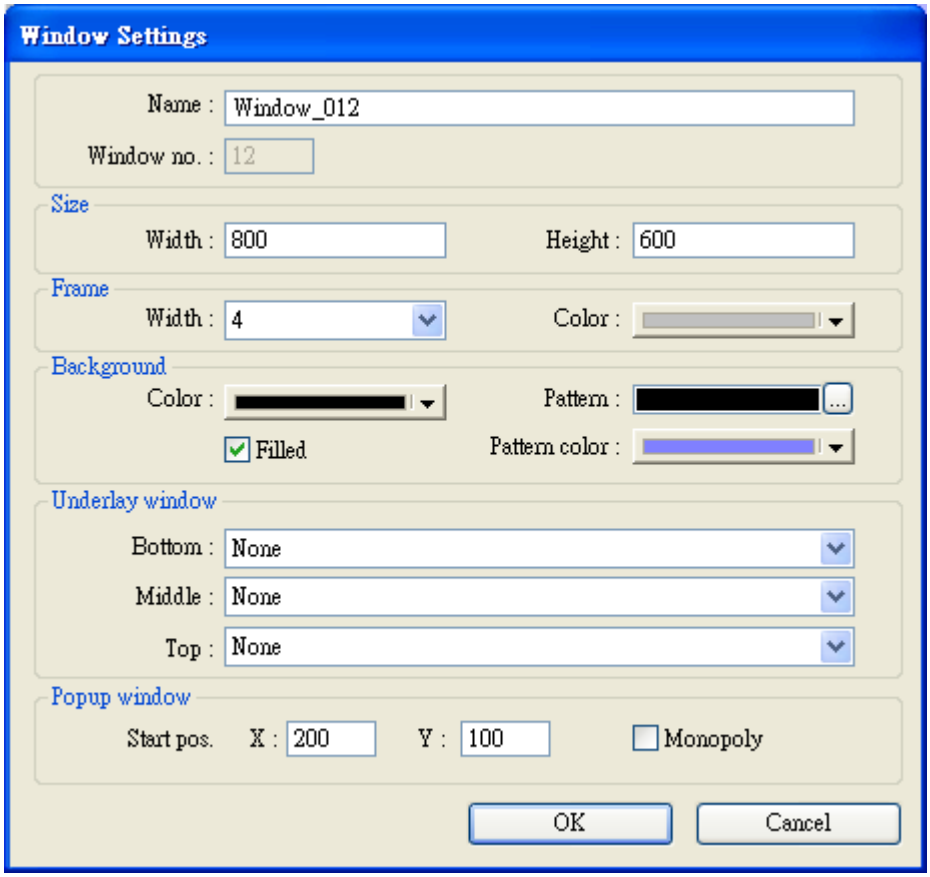
The picture below shows the window information in the EB8000. The following section introduces how to create and set these windows.



6.2.1 Create a Window

There are two ways to create a window:

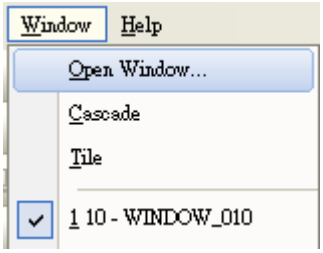
One is selecting a window number on the window tree and right click. Select [New] on the message dialog and click OK after the completion of all settings. Please refer to the example as below:

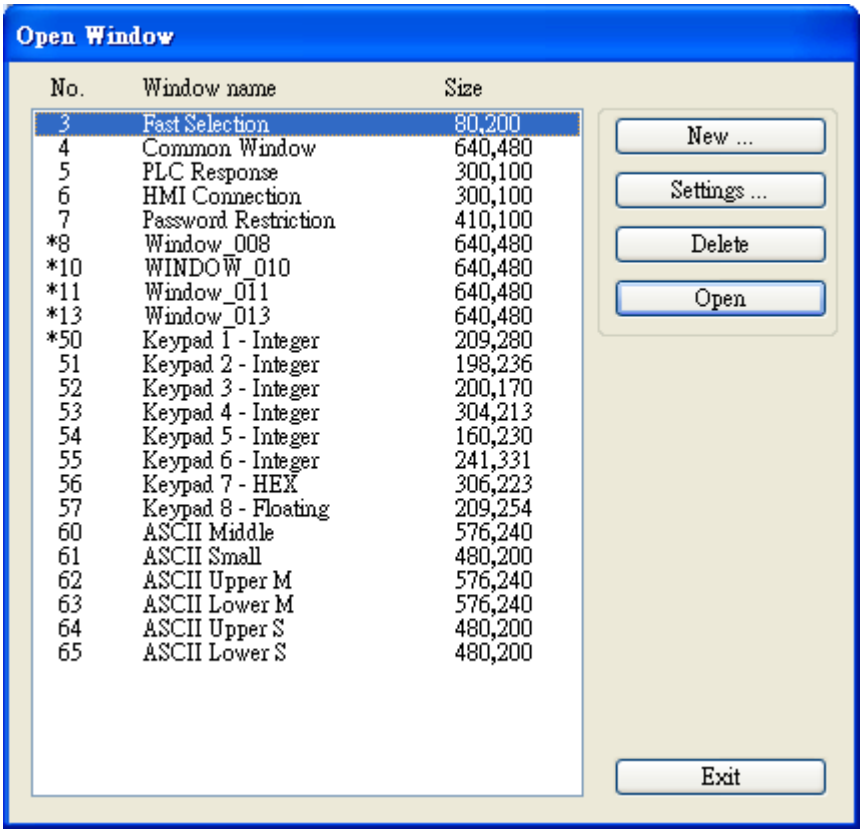


Name	The name of the window
Window no.	The number of the window, from 3 to 1999
Size	The [Width] and [Height] of the window
Frame	[Width] The width of the frame [Color] The color of the frame

	
Background	[Color] The color of the background [Pattern] The pattern of the background [Pattern color] The color of the pattern [Filled] The option to determine if a window is filled with the color and pattern of the background
Underlay window	[Bottom], [Middle], [Top] Up to three windows can be specified as underlay windows for each base window, from [Bottom] to [Top]. The objects on the underlay windows are displayed in order on the base window.
Popup window	[X], [Y] Base window can also be used as pop-up window. Use [X] and [Y] to set the location of the popup window in the base window [Monopoly] If the option is checked, when a base window used as a pop-up window appears, users are not allowed to operate other windows before the base window is closed. If a base window is used as a keyboard window," Monopoly "property is automatically enabled.

Another way to create a window is select [Open Window] from menu and [Open Window] dialog appears. Please refer to the illustration below.





Window No., Window Name and Window Size are listed on the message table.

Click [New…] and choose window type from [Select Window Style] dialog. New window can be created after click OK.

6.2.2 Window Settings

EB8000 provides two methods to modify window attributes:

a. Right click on the assigned window from window tree and select [Settings] to change the window properties.

b. Select [Open Window] from menu and [Open Window] dialog appears. Select [Settings] to change the window properties.

6.2.3 Open, Close and Delete a Window

To open an existing window, except double click the window No. from the window tree, users can right click the assigned window from the window tree and choose [Open] to open the window.

Similarly, close or delete an existing window as the procedure above .Please note that the window to be deleted has to be in close status.

Chapter 7 Event Log

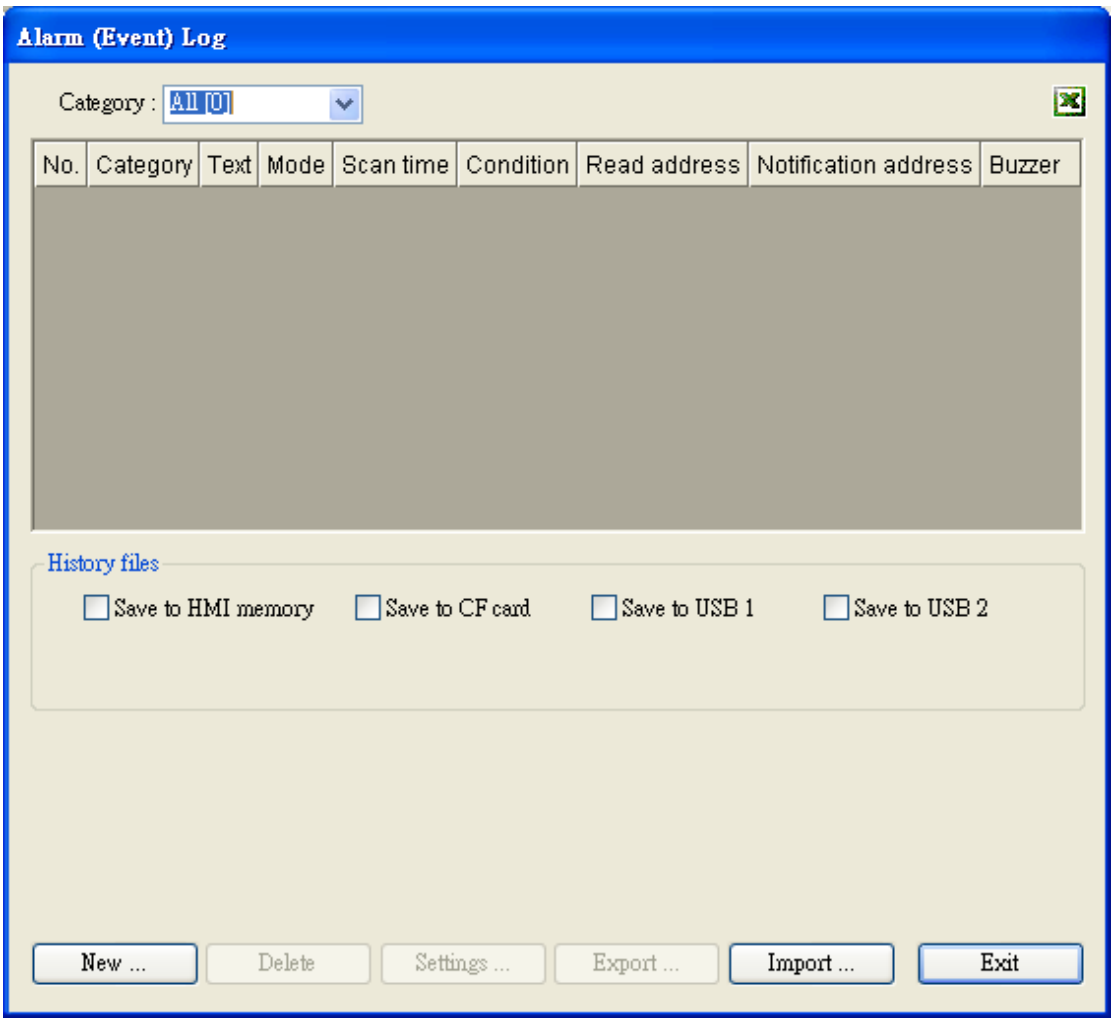
"Event log" is used to identify the content of an event and the conditions triggering this event. In addition, the triggered event (also called as "alarm") and the processing procedure of the event can be saved to the designate areas (such as HMI memory or external storage devices) in the form of EL_yyyymmdd.evt where yyyymmdd indicates the time of the file created set by the system automatically. For example, a file name of event, EL_20061127.evt, means the file was created on Nov. 27th , 2006.

EB8000 also provides the following system registers to manage the event log:
[LB 9021] reset current event log (set ON)
[LB 9022] delete the oldest event log file (set ON)
[LB 9023] delete all event log files (set ON)
[LB 9024] refresh event log statistic information (set ON)
[LW 9060] total number of the event log files
[LW 9061] total size of the event log files

7.1 Event Log Management

Used with [alarm bar], [alarm display] and [event display]…etc., users are able to clearly understand the life cycle of the whole event from happening, waiting for processing, alarm cleared. Before using these objects, the content of an event has to be identified first.

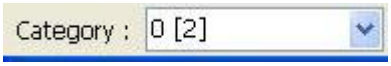
Click the [Alarm (Event Log)] icon, and [Event Log] dialog appears as below:



[Category]

EB8000 provides classification feature. All events can divided into 0~255 classifications. Alarm Bar, Alarm Display and Event Display can be assigned toe be displayed in certain the classifications.

[Category] determines the event log catalog of current event.



The [2] of 0[2] in the above illustration demonstrates two existing identified events in the category 0.

[History files]

Determine the storage device of an event log. However, when users simulate the project on PC, files will be saved on the same event log subdirectory as EasyBuilder8000.exe.

[Save to HMI memory]

Save the event log data to MT8000 memory.

[Save to CF card]

Save the event log data to CF card.

[Save to USB 1]

Save the event log data to USB disk 1. Numbering rule of USB disk is: the disk inserted to the USB interface in the first place is numbered 1, next is numbered 2 and the last is numbered 3. There's no relation to the interface position.

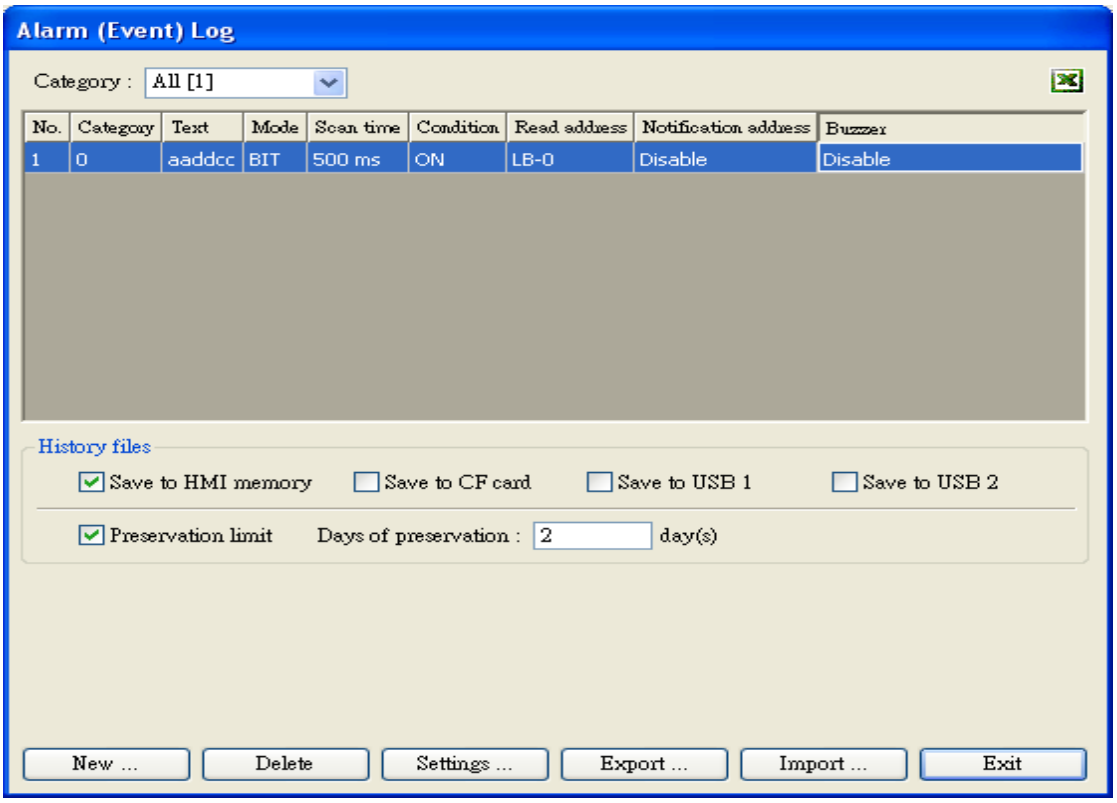
[Save to USB 2]

Save the event log data to USB disk 2.

[Preservation limit]

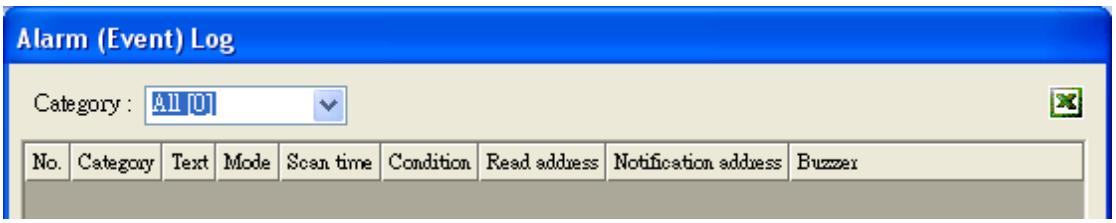
After choosing the device to save the Event log, you can see the "Preservation limit" selection. This setting determines the days of the data preserved. As below picture, the preservation time is two days, which means HMI memory will keep the data of yesterday and the day before yesterday. The data out of this time range will be deleted automatically to prevent the storage space from using up.

For example, today is 7/1, the HMI will keep 6/30, 6/29 data in the memory and 6/28 will be deleted from the memory.



Print	Users need to set Printer on system parameter/model, and message will print out when alarm occurs in order.
New	Create a new event.
Delete	Delete a specific event.
Settings	Modify the definition of a specific event.

7.1.1 Excel Editing



There is an Excel icon on the up-right corner of the Alarm (Event Log) dialog for users to edit an Event log. An editing design procedure includes: Excel Edit, Import from Excel and Export to Excel.

7.1.1.1 Excel Edit

Weintek provides a standard Excel template in C:\EB8000\EventLogExample.xls for users to edit alarm (event) log. The template includes some dropdown lists for easily usage.

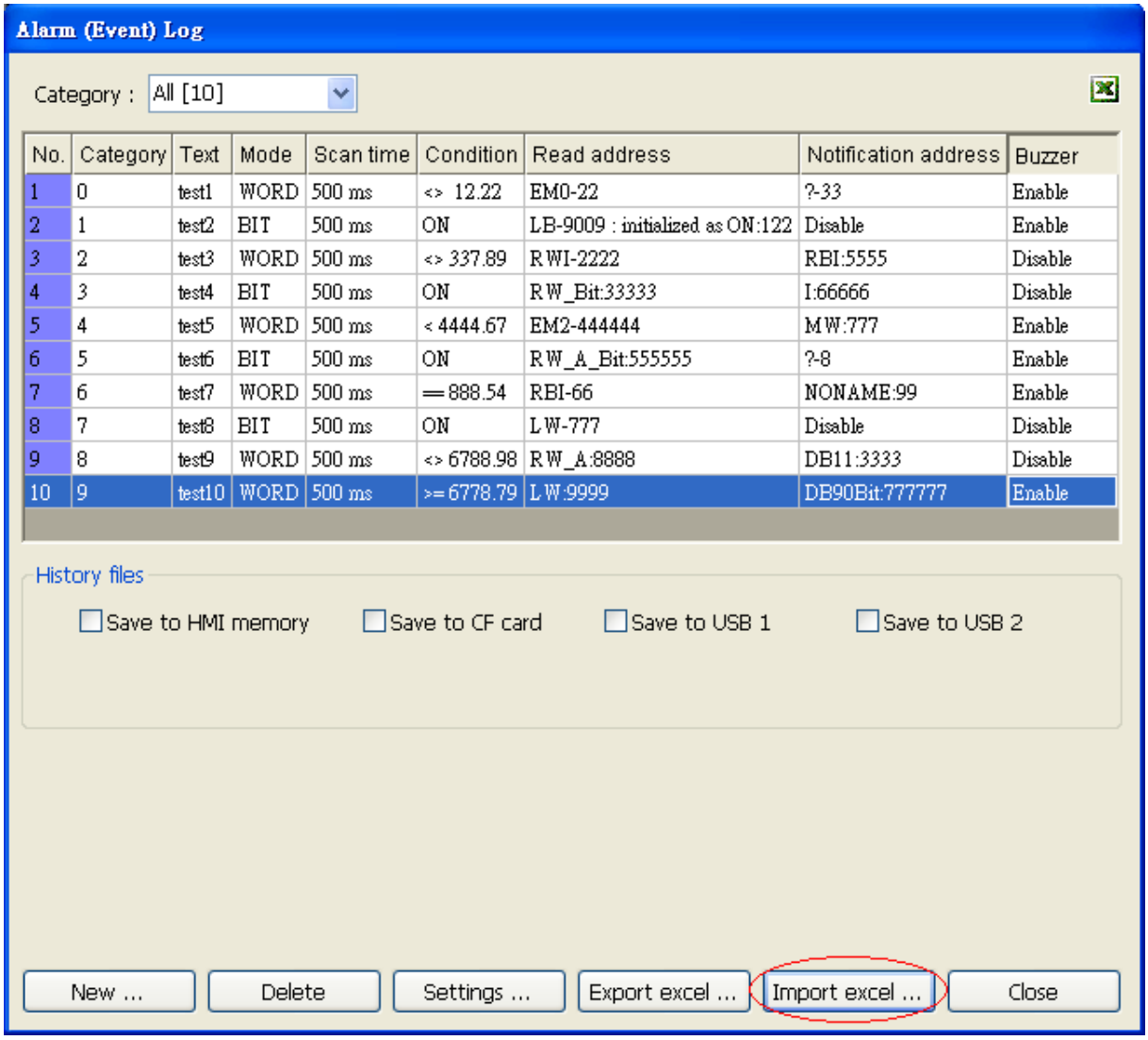
	A	B	C	D	E	F	G	H	I	J	K
1	Category	Priority level	Address type	PLC name	Device type	System tag	User-defined tag	Address	Index	Data Format	Enab
2	0	Middle	Word	Local HMI	EM0	False	False	22	null	32-bit Signed	True
3	1	Low	Bit	Local HMI	LB-9009 : initialized as ON	True	True	122	IDX 1	16-bit BCD	False
4	2	High	Word	Local HMI	RWI	False	False	2222	IDX 4	32-bit BCD	ue
5										16-bit BCD	
6										32-bit BCD	
7										16-bit Unsigned	
										16-bit Singed	
										32-bit Unsigned	
										32-bit Signed	

Caution:

1. System tag and User-defined tag can not be set as true simultaneously. If both of them are set as true, the system will view System tag to be true and User-defined tag to be false. If Device type is set as User-defined tag, please set the System tag to be false.
2. The format of Color is R:G:B where and the values of R,G,B are between integer 0~255 .
3. Click Excel icon to open the EventLogExample.xls

A . Import to Event Log

Click import button to import excel file.



No.	Category	Text	Mode	Scan time	Condition	Read address	Notification address	Buzzer
1	0	test1	WORD	500 ms	<> 12.22	EM0-22	?-33	Enable
2	1	test2	BIT	500 ms	ON	LB-9009 : initialized as ON:122	Disable	Enable
3	2	test3	WORD	500 ms	<> 337.89	RWI-2222	RBI:5555	Disable
4	3	test4	BIT	500 ms	ON	RW_Bit:33333	I:66666	Disable
5	4	test5	WORD	500 ms	< 4444.67	EM2-444444	MW:777	Enable
6	5	test6	BIT	500 ms	ON	RW_A_Bit:555555	?-8	Enable
7	6	test7	WORD	500 ms	== 888.54	RBI-66	NONAME:99	Enable
8	7	test8	BIT	500 ms	ON	LW-777	Disable	Disable
9	8	test9	WORD	500 ms	<> 6788.98	RW_A:8888	DB11:3333	Disable
10	9	test10	WORD	500 ms	>= 6778.79	LW:9999	DB90Bit:777777	Enable

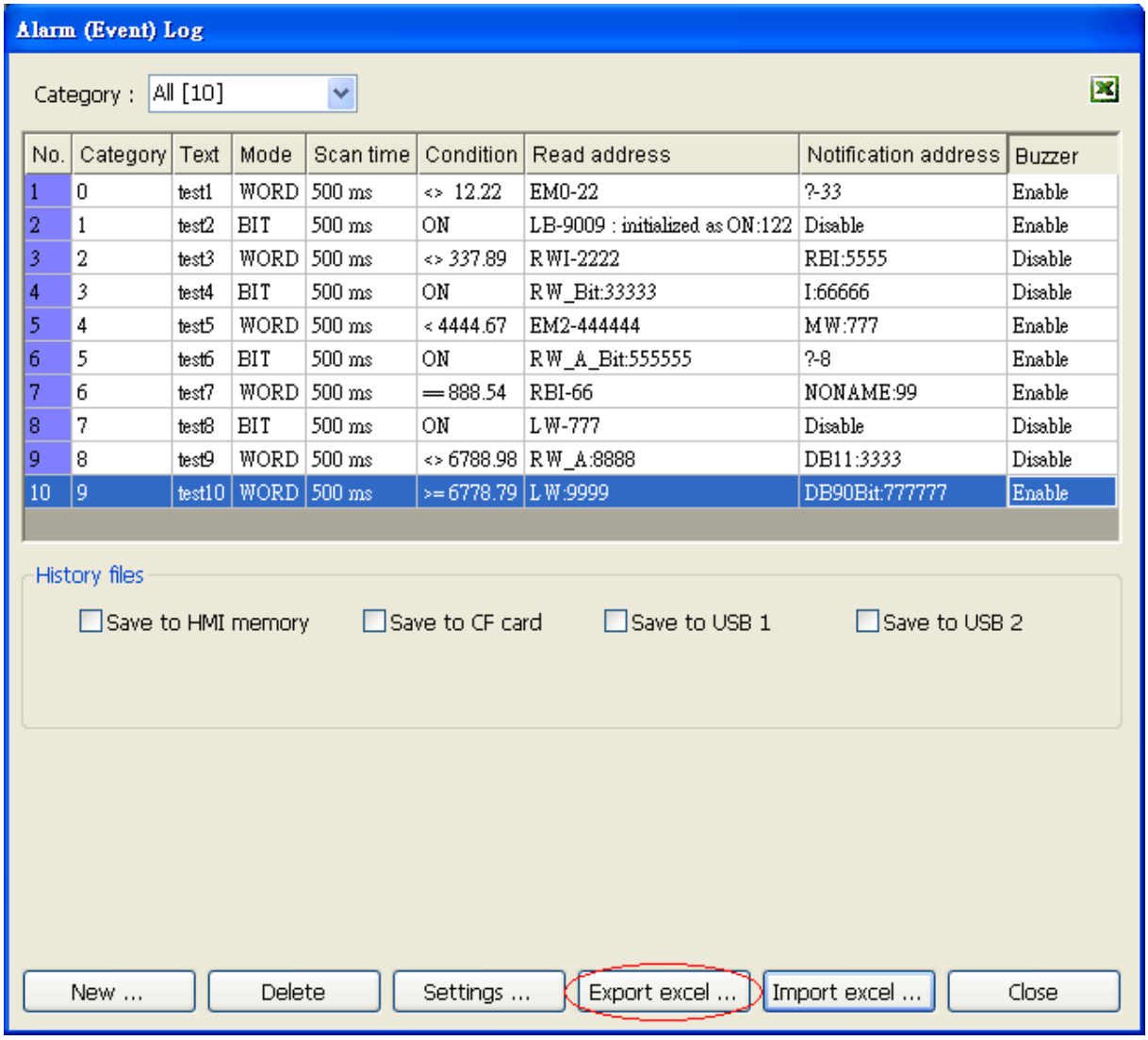
Caution:

1. When user-defined tag is set as true in the Excel, if device type can not match with the user-defined tag, system will set false value in user-defined tag.

2. Before importing library (label library and sound library), please make sure library names exist in the system, otherwise those library will not be imported.

B. Export to Excel

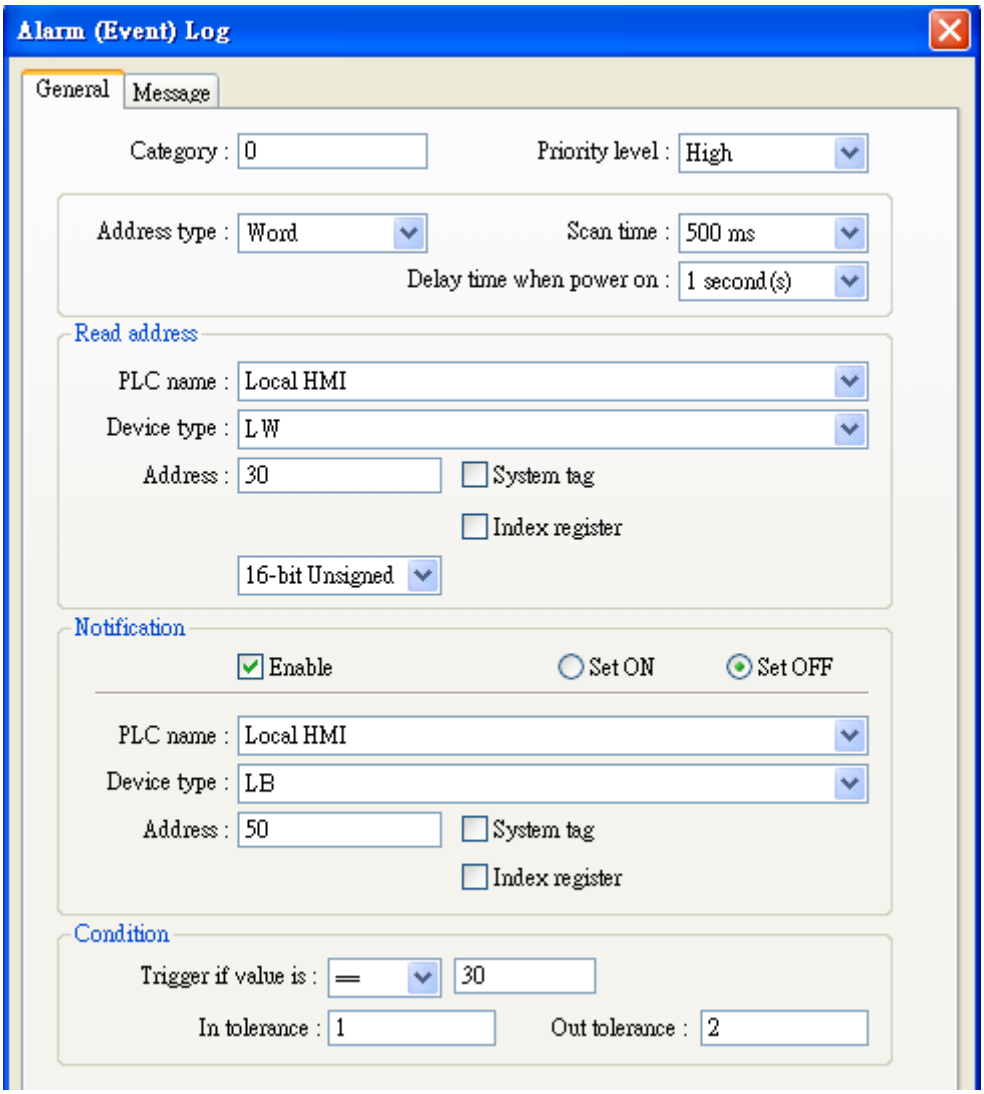
Click Export excel button to export data in an excel file.



7.2 Create a New Event Log

Click [New…], [Event Log] dialog appears with two tabs.

[General] tab:



[Category]

The category of an event.

[Priority level]

The priority of an event: According to the degrees of importance, users can choose ”Low”, “Middle”, “High”, or “Emergency”. When the number of event log is more than max number available in the system (the default is 1000, please refer to [General] of System Parameters to add additional records), less important events (lower priority) will be deleted and new events will be added in.

[Address type]

The type of address—Bit or Word mode.

[Scan time]

The time interval an event to be examined. System checks if an event is satisfied with the triggered conditions via scan time.

[Delay time when power on]

The delay time an event to be examined. If be set, system delays certain time after rebooting so that it's able to check if an event is satisfied with the triggered condition and avoids the unnecessary event log record.

[Read address]

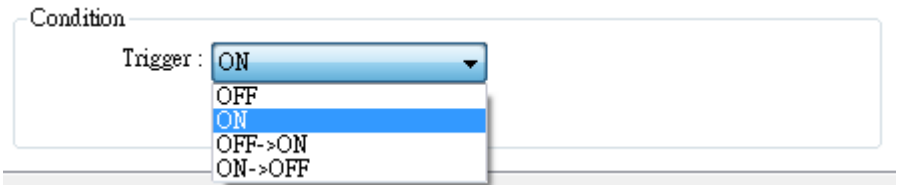
By reading the read address, system obtains the value and check if an event is satisfied with the triggered condition. Please refer to Parts/General Settings for further details.

[Notification]

When an event is triggered, the specific message is sent out from Notification address. Select [Set ON] to send ON message out from the address. While select [Set OFF], Off message is sent out. Please refer to Parts/General Settings for further information.

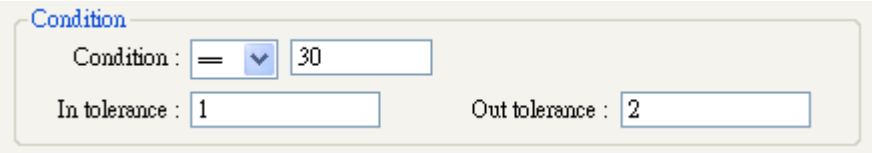
[Condition]

The trigger condition of an event. When the condition of [Address type] of an event is a "Bit", "ON" or "OFF" in Trigger can be selected. The illustration below shows if Trigger [On] is selected, i.e. the status of [Read address] changes from OFF to ON, an event will be triggered and generate an event log record (or an alarm).



When the condition of [Address type] of an event is a "Word", several selections are available as follows:

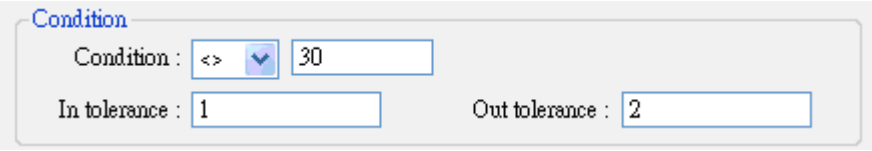
Under the condition, system will read values from [Read address] and then compare them with the trigger conditions to decide if an event needs to be trigged. Especially if the trigger condition is set as "==" or "<>", [In tolerance] and [Out tolerance] need be set where [In tolerance] is used for trigger condition and [Out tolerance] is used for system's normal condition.



From the example, the illustration above indicates that if the value of [Read address] is bigger or equal to 29(=30-1) or smaller or equal to 31(=30+1), the event will be triggered.

29 <= [Read address] value <=31

After the event is triggered, only when the value of [Read address] is bigger than 32(=30+2) or smaller than 28(=30-2) will the system return to the normal condition.
[Read address] value < 28 or [Read address] value >32



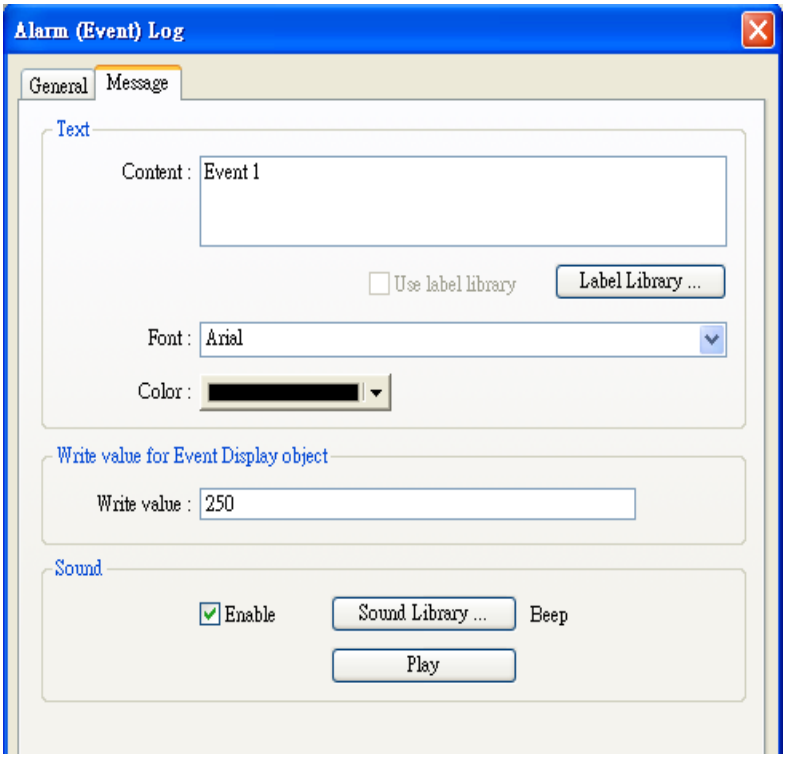
Take another example above, it indicates that system is triggered when the value of [Read address] is less then 29(=30-1) or greater then 31(=30+1).

[Read address] value <29 or [Read address] value >31

When the event is triggered, system returns to normal condition only when the value of [Read address] is bigger or equal to 28(=30-2) and smaller than 32(=30+2).

28 <= [Read address] value <= 32

[Message] tab:



Text

[Content]

The text content showed on [alarm bar], [alarm display] and [event display].

Display the content of LW address of being triggered object.

Format: **%#d**

%: initial sign

: LW's address

d : end sign

For example, if the content is set as "High Temperature = %20d", when an event is triggered, the value of LW20 will be displayed. i.e. if the value of LW20 is 13 when an event is trigger, the display content of the [event display] will be "High Temperature = 13".

Except for LW, it can also show the content of Device type in Read address.

Format: **$#d**

$: initial sign

: PLC's address

d : end sign

For example, if Device type in Read address is MW, when message is set as “High Temperature = $15d” and the value in MW15 is 42, the display content of the [event display] will be “High Temperature = 42”.

[Font][Color]

Users can set Font and color for each event. The font and color of an alarm display or event display object comes from this setting. As below illustration, these two events use different colors and font styles.

[Write value for event display]

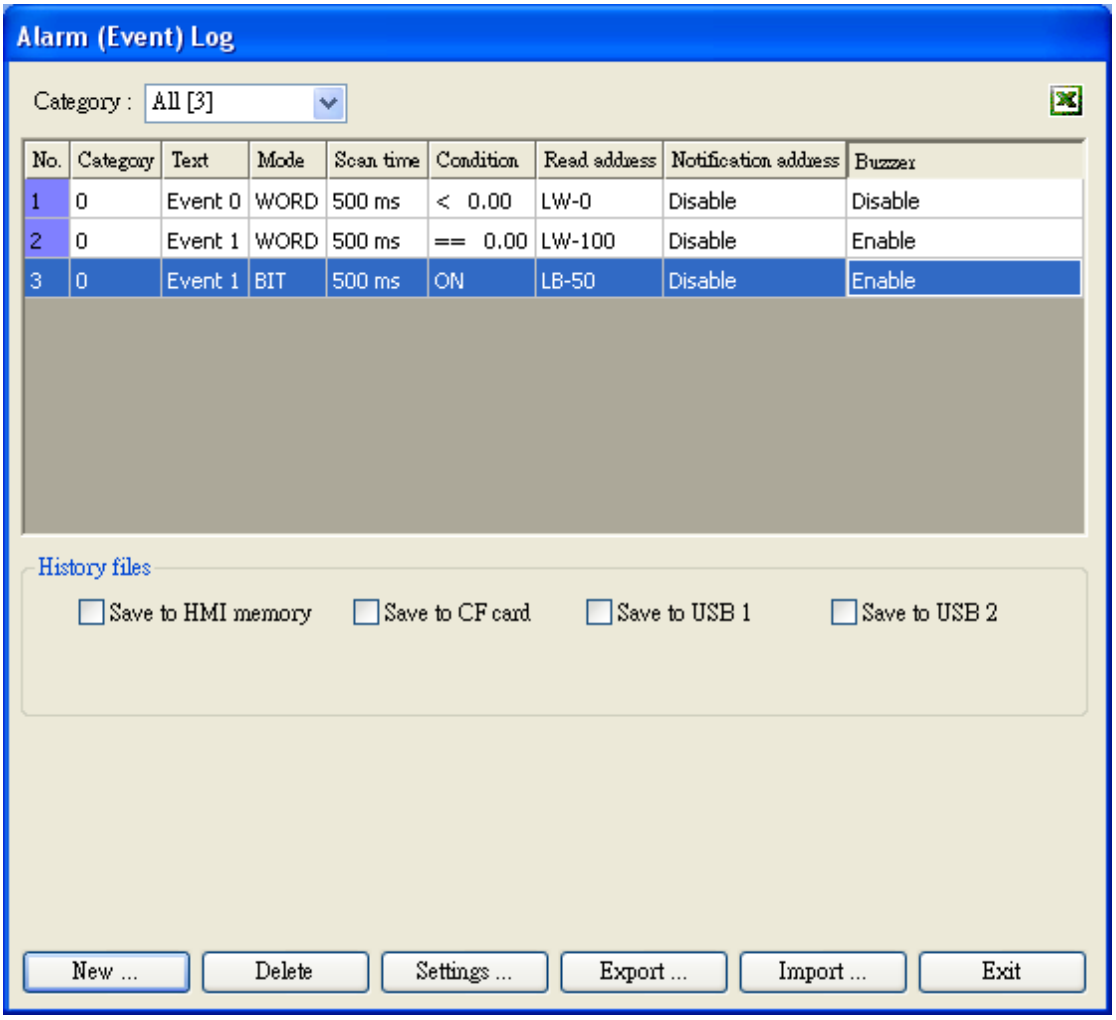
When an event item in an event display object is touched, the value is written to the assigned address. Please refer to event display in [Object] chapter for more details.

[Sound]

The warning alarm can be selected when an event is triggered.

Click “Sound Library” to choose warning sound, and click “Play” to check the sound.

After the completion of each setting, a new event definition can be added as below:


Alarm (Event) Log
Category : All [3]
No. Category Text Mode Scan time Condition Read address Notification address Buzzer
1 0 Event 0 WORD 500 ms < 0.00 LW-0 Disable Disable
2 0 Event 1 WORD 500 ms == 0.00 LW-100 Disable Enable
3 0 Event 1 BIT 500 ms ON LB-50 Disable Enable
History files
Save to HMI memory
Save to CF card
Save to USB 1
Save to USB 2
New ...
Delete
Settings ...
Export ...
Import ...
Exit

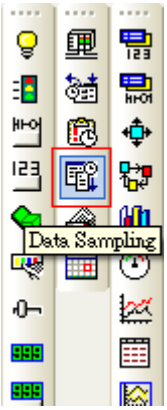
Chapter 8 Data Sampling

"Data Sampling" identifies the method of data sampling, including sampling time and sampling location. In addition, EB8000 saves the sample data to the user assigned location and in the form of [Storage location]\[filename]\yyyymmdd.dtl where [storage location] can be HMI, CF card, USB1 or USB2, [filename] is defined by user as a meaningful name and yyyymmdd is the built time set by the system automatically.

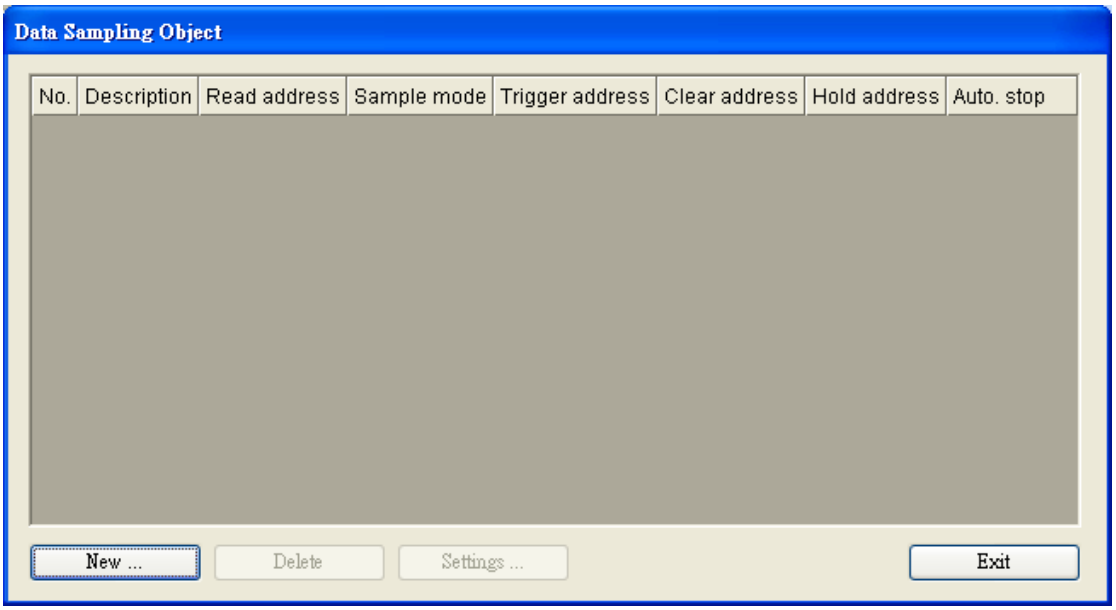
EB8000 provides following system registers for data sampling management:

[LB 9025] delete the oldest data sampling file (set ON)
[LB 9026] delete all data sampling files (set ON)
[LB 9027] refresh data sampling statistic information (set ON)
[LW 9063] the number of data sampling files
[LW 9064] total size of data sampling files

8.1 Data Sampling Management



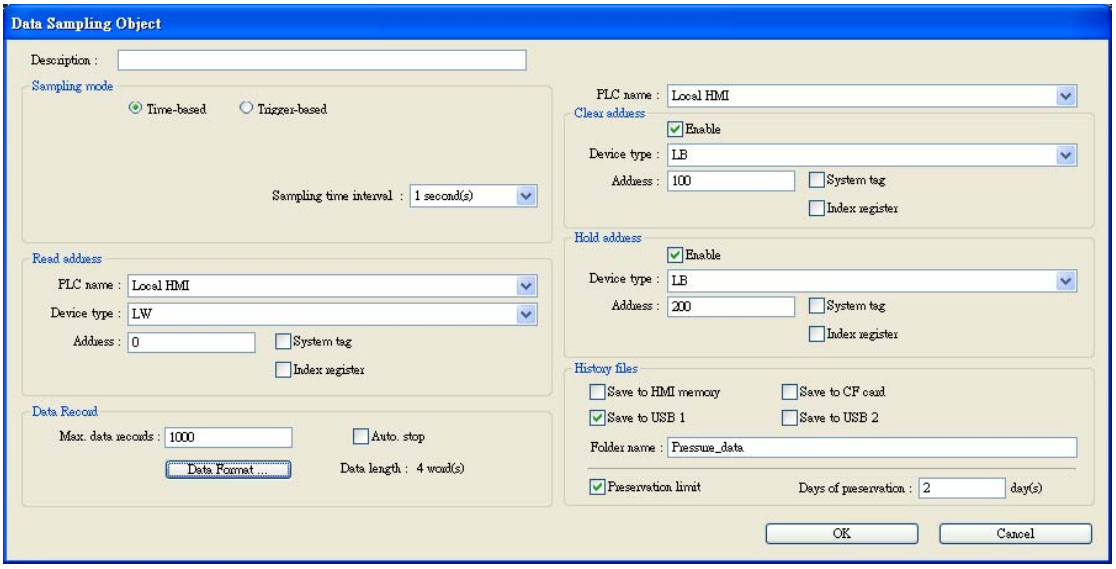
Before using Trend display or History data display to review the content of data sampling, the method of data sampling has to be defined. Click [Data Sampling] from toolbar and then Data Sampling Object dialog appears as below.



New	Add a new “data sampling” definition.
Delete	Delete a specific “data sampling”.
Settings	Modify the definition of a “data sampling”.

8.2 Create a New Data Sampling

Click [New…] and the Data Sampling Object setting dialog appears as below:



Read address

[Max. data records]

Max data records can be saved to a data sampling definition.

Example:

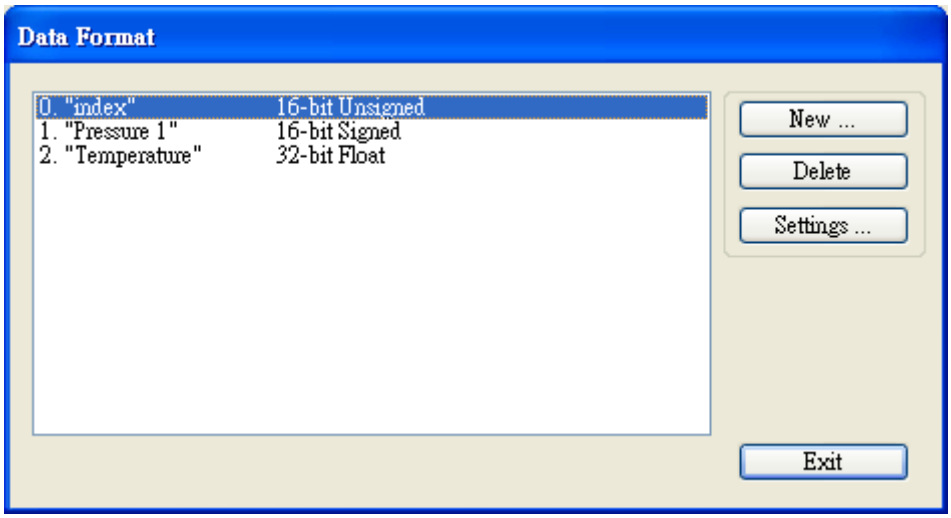
Condition	Set Max. data records as 10 without check “auto. stop”	Set Max. data records as 10 with check “auto. stop”
Trend display – real time	The data will keep latest 10 records on the screen	Stop displaying
Data sampling	Keep recording and delete the oldest data	Stop recording

[Data Format …]

The format of a data sampling: A data sampling may include more than one type of records. EB8000 is able to retrieve different types of records at the same time. After clicking [Data Format], user use “Data Format” dialog to define the content of a record.

Take the following as an example, users define three types of data: “Index” (16-bit Unsigned)、“Pressure 1”(16-bit Signed) and “Temperature”(32-bit Float) respectively and 4 word length in total. In other words, EB8000 retrieves the length of 4 words as a record starting from the assign address.

Please refer to Parts—General Settings for more details.



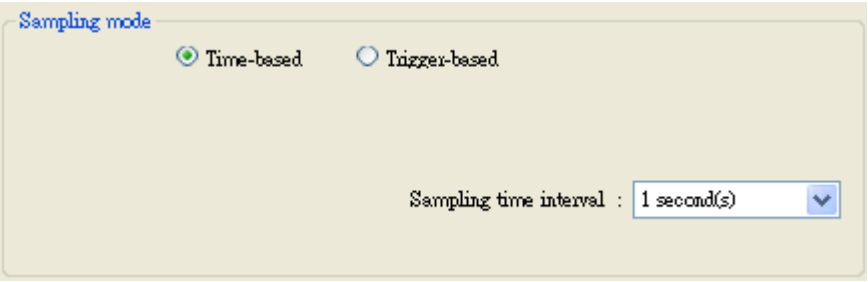
Caution:
After executing off-line simulation, if users need to change data format, please delete data log file in the C:\EB8000\datalog and then run off-line simulation again.

[PLC name]
Select the target PLC of data sampling.

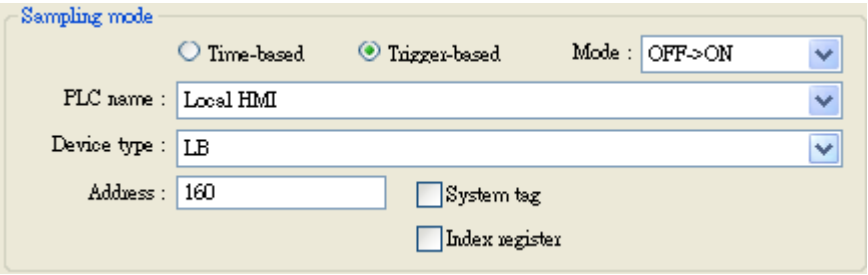
[Clear address]
If the status of the assigned address is ON, obtained data will be cleared and the number of data sampling will be set to zero.
Caution: the [clear address] is used for "real time" mode of trend display only.

[Hold address]
If the status of the assigned address is ON, sampling will be paused until the status of assigned address returns to OFF. Please refer to Parts—General Settings for other details.

Sampling mode
EB8000 provides two methods in data sampling: "Time-based" and "Trigger-based". If "Time-based" mode is selected, EB8000 samples the data in a fixed frequency. Users have to set the "sampling time interval".



If "Trigger-based" mode is selected, users can use a status of specific address to trigger the data sampling.



[Mode]
Conditions to trigger the data sampling:

"OFF → ON" If the status of assigned address is from OFF to ON, data sampling is triggered.
"ON → OFF" If the status of assigned address is from ON to OFF, data sampling is triggered.
"ON←→ OFF" If the status of assigned address is changed, data sampling is triggered.

Please refer to Parts—General Settings for more details.

[Auto stop]
When the number of data sampling is equal to [Max. data records], if the Auto stop option is selected, HMI will stop doing data sampling automatically.

1. If the data source in the [trend display] is real-time mode, the oldest record will be deleted and new record will be added and displayed in the [trend display] object.
2. If the data source in the [trend display] is historical mode, the data keeps being sampled.

History files
Assign the storage location. But when users do the simulation on PC, data is saved to the same subdirectory as Easy Builder 8000.exe.

[Save to HMI memory]
Save the sampling to MT8000 display.

Caution:
The data can be saved when the size of data is more than 4kb, otherwise, users need to use LB-9034 to force the data to be stored.

[Save to CF card]
Save the sampling to CF card.

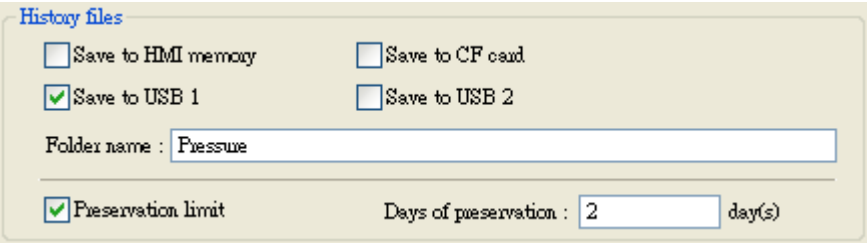
[Save to USB 1]
Save the sampling to USB stick 1. The USB stick numbering rule is: the device inserted to the USB interface in the first place is numbered 1, next is numbered 2 and the last is numbered 3. There's no relation to the interface position.

[Save to USB 2]
Save the sampling to USB stick 2.

[Folder name]
Set the file name of the data sampling.

Preservation limit: decide the days of preservation for sampled data.
If the preservation time is two days as below, USB1 memory stick will keep the data of yesterday and the day before yesterday.

For example, today is July 1st, the HMI will keep the data of June 30th and June 20th in the memory but the data of June 28th will be deleted.



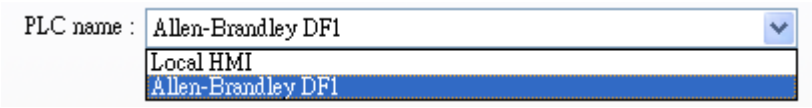
Chapter 9 Object General Properties

The contents of object's general properties setting include:

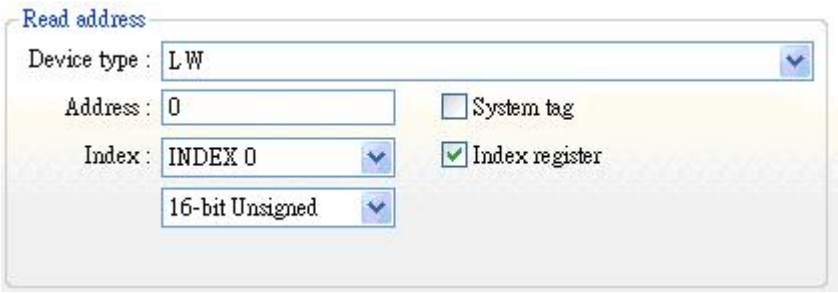
1. Selecting the connection PLC device
2. Setting the reading and writing address
3. Using shape library and picture library
4. Setting text content
5. Adjusting profile size

9.1 Selecting the Connection PLC Device

When using some objects, select the connection PLC device is required. See the picture below, [PLC name] is to assign the name of the connection PLC device. The picture shows that there are two PLC devices available for selection: "Local HMI" and "Allen-Brandley DF1." These listed available PLC devices are sourced from "device table" in "System Parameters."



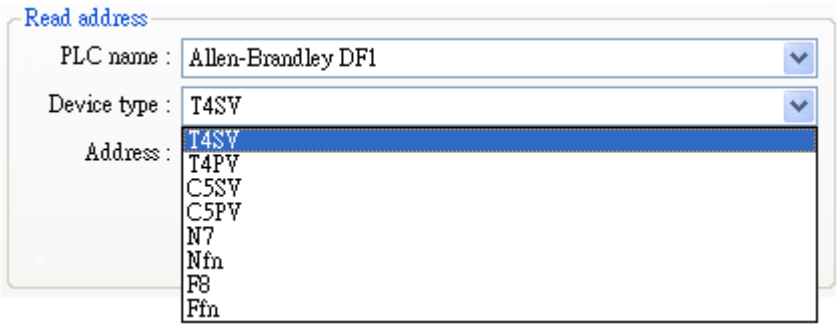
9.1.1 Setting the Reading and Writing Address



The above picture shows that the following items are contained in reading and writing address settings:

[Device type]

In selection of device types, when the connection PLC device is different, there will be different device types for selection.

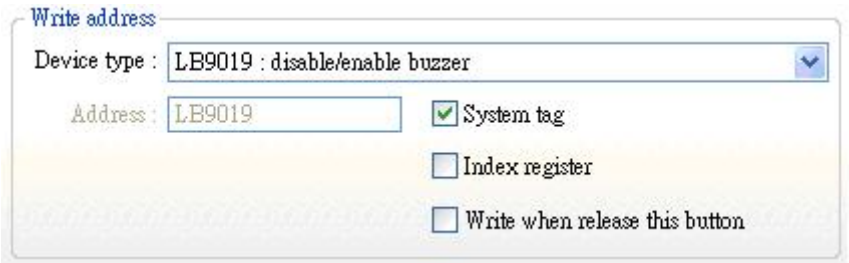


[Address]

Setting the reading and writing address.

[System tag]

Address tag includes "system tag" and "user-defined tag." System tag, including bit address system tag and word address system tag, is to reserve the addresses of particular purposes for the system. When selecting "system tag," in addition to that [Device type] will show the content of "system tag," [Address] will indicate the selected system tag. Refer to the picture below.

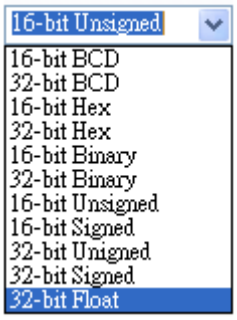


The following pictures show partial contents of bit address system tag and word address system tag respectively, and for further information, please refer to the illustrations in the "label library" section.

[Index register]

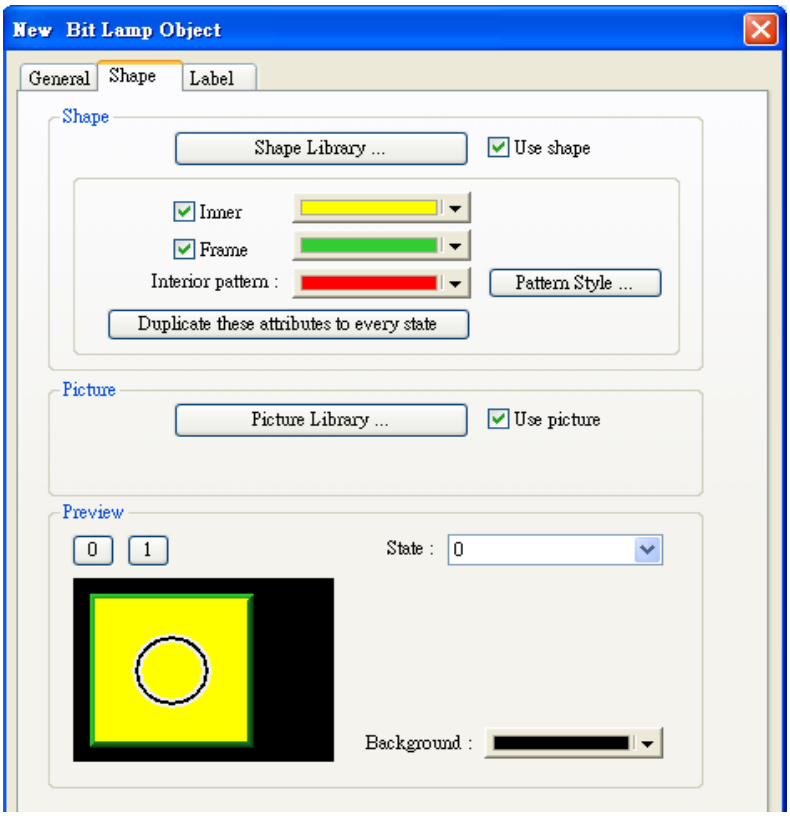
Refer to the illustrations in "index register" section for information on if it is necessary to select "index register" or not.

The EB8000 supports the following listed numeric types. It is necessary to select the proper numeric type, especially when using address tag.



9.2 Using Shape Library and Picture Library

Shape Library and Picture Library are used for an object to enhance its visual effect. Go to the [New Bit Lamp Object]/ [Shape] tab to set up Shape Library and Picture Library.

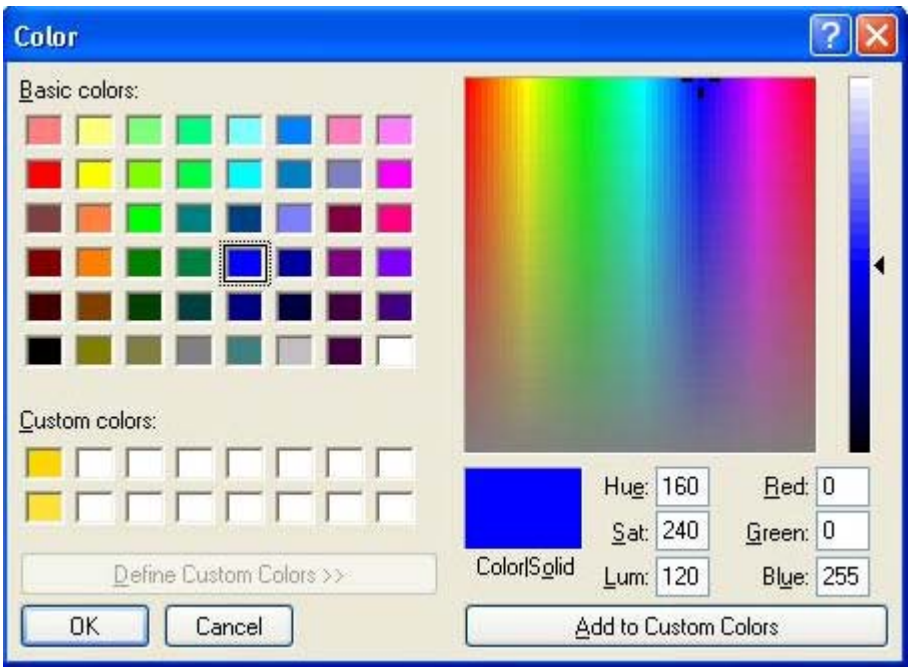


9.2.1 Settings of Shape Library

[Shape Library…]
Select the shape from the library.

[Use Shape]
Use the shape from shape library if checked.

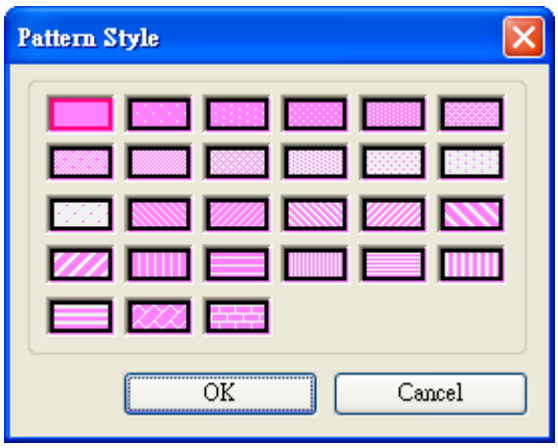
[Inner]
Select the color of an object's color. Click [Color] dropdown to choose the color.



[Frame]
Select the color of the object's Frame. Click [Color] dropdown to choose the color.

[Interior Pattern]
Select the style of the interior pattern. Click [Color] dropdown to choose the color.

[Pattern Style]
Click [Pattern Style] button to select the style of the pattern.



[Duplicate these attributes to every state]

Duplicate all attributes of the current state to other states.

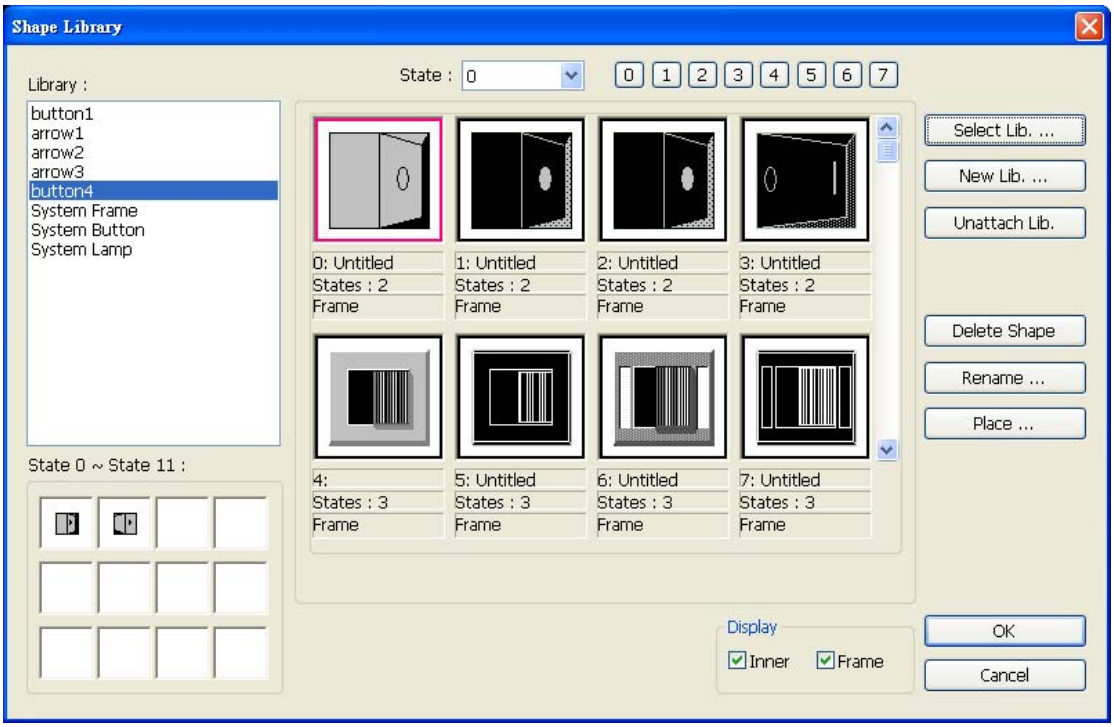
9.2.2 Settings of Picture Library

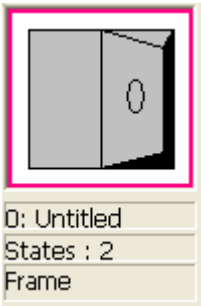
[Picture Library]

Select the picture from the library.

How to set [Shape Library…]

Click [Shape Library…] button, the following dialog appears. The currently selected shape is marked by a red frame.

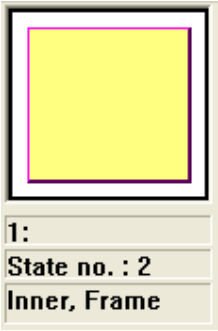




The above illustration gives information of one of the Shapes in the Shape Library as follows:

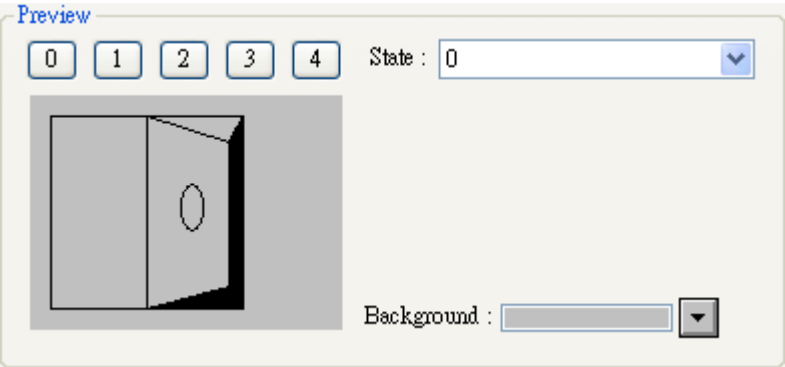
0: Untitled	The Shape's name and number in the library.
State no.: 2	The number of the Shape's states. In this case, it shows the Shape possesses two states.
Frame	Indicate that the Shape is set with "frame" only.

The Shape below shows that the Shape is set with "inner" and "frame."



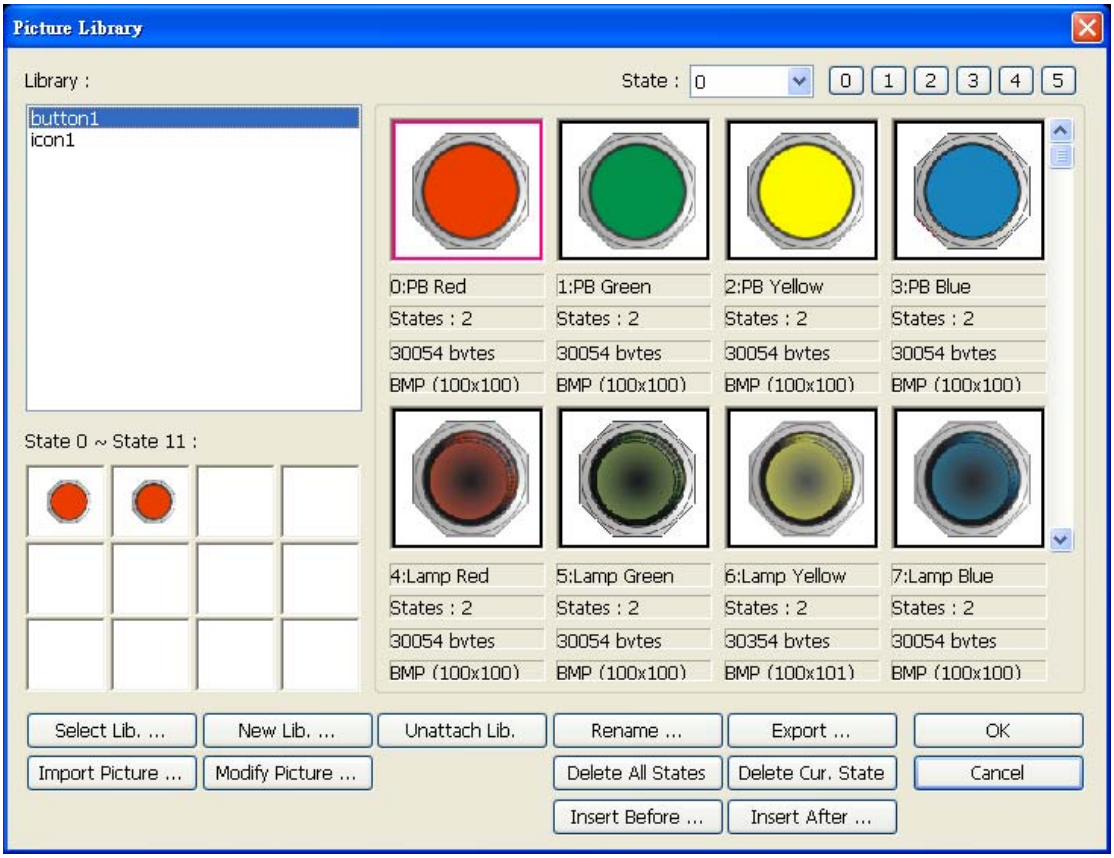
Note: Refer to the illustrations in the “Setting-up and using Shape Library and Picture Library” section for the details about all of the settings in the “Shape Library’s setting dialog box.”

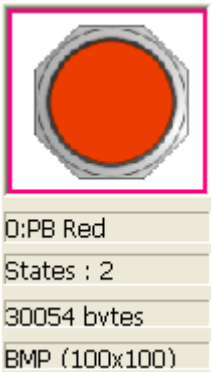
Click [OK] and preview the design of the shape after the complication of the settings.



How to set [Picture Library…]

Click [Picture Library…] button and picture library dialog appears. The currently selected picture is marked by a “red” frame.



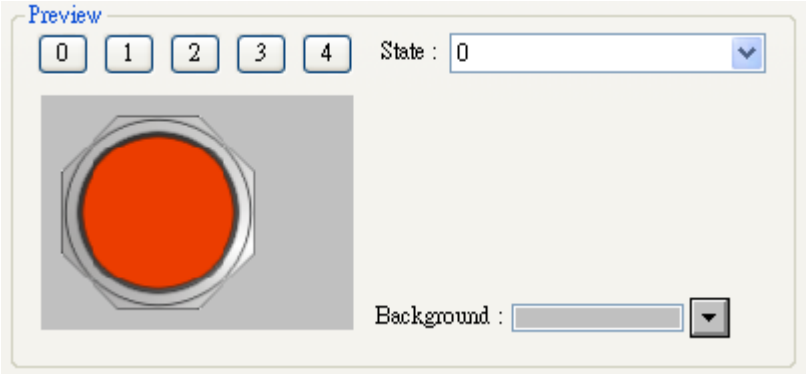


The above illustration gives information of one of the Picture in the Picture Library as follows:

Picture name	0 : PB Red	The name of the Picture
Total states	2	The number of the Picture states
Image size	30054	The size of the Picture
Image format	BMP	The format of the Picture; BMP means bitmap Picture and its format can be JPG or GIF.

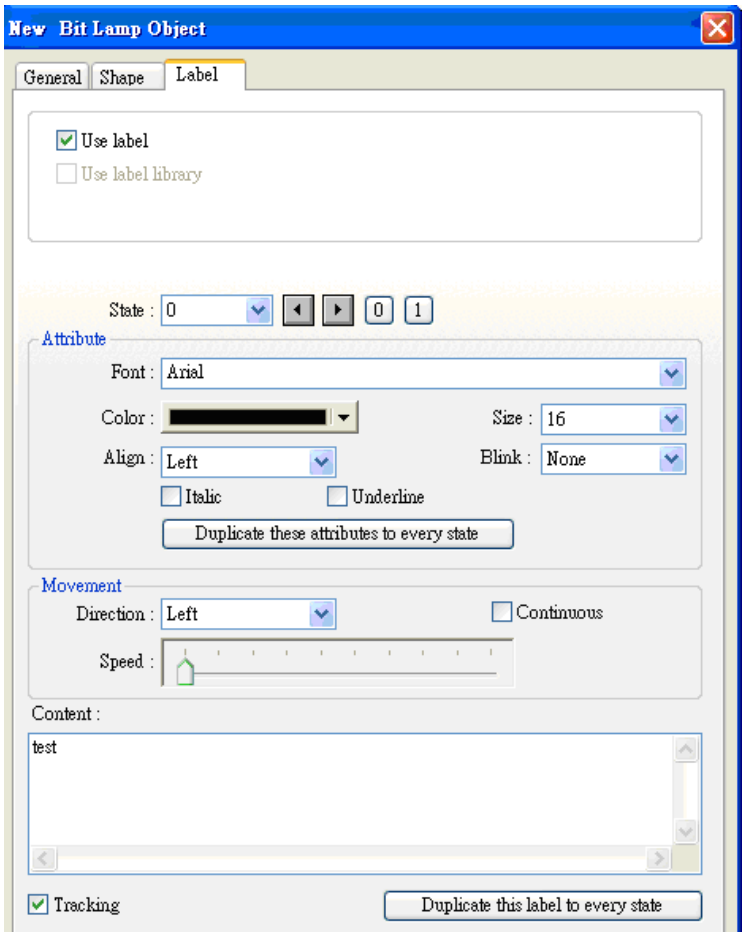
Refer to the illustrations in the “Setting-up and using Shape Library and Picture Library” section for the details about all of the settings in the “Picture Library’s setting dialog box.”

Click [OK] and preview the design of the picture after the complication of the settings.



9.3 Setting Text Content

Go to the [New Bit Lamp Object]/ [Label] tab to set the text content of the object.

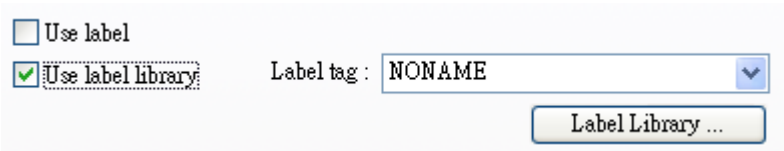


[Use label]

Check [Use label] and click [Label Library] button to add and edit the text. The EB8000 supports Windows true-font.

[Use label library]

Check [Use label library] and Label tag dropdown whose resource comes from label library appears.



[Label Library…]

Refer to the illustrations in the "Setting-up and using Text and Label Library" section to view the usage of label library.

[Font]

Select font style in font list.

[Color]

Select the font color for the text.

[Size]

Select the font size for the text. The EB8000 supports all the text sizes.

[Align]

Select the alignment method of the text for multiple lines.

The picture below shows how the text to be aligned when “Left” in [Align] is set.

```
111
222222
333333333
```

The picture below shows how the text to be aligned when “Center” in [Align] is set.

```
  111
 222222
333333333
```

The picture below shows how the text to be aligned when “Right” in [Align] is set.

```
    111
  222222
333333333
```

[Blink]

Select the blink feature of the text:

Choose [None] to disable the feature or choose blinking period as “1 second” or “0.5 seconds”.

[Italic]
Use Italic font.

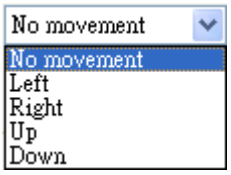
Italic Label

[Underline]
Use Underline font.

Underline Label

[Movement] setting

[Direction]
Set the direction of the movement of the marquee effect.



Two options for the marquee to be displayed:
[Continuous]

When [Continuous] isn't be checked, the next text appears only after the previous text disappears completely. See the picture below.

When [Continuous] is selected, the text will be displayed continuously.

[Speed]
Set the speed of the text movement.

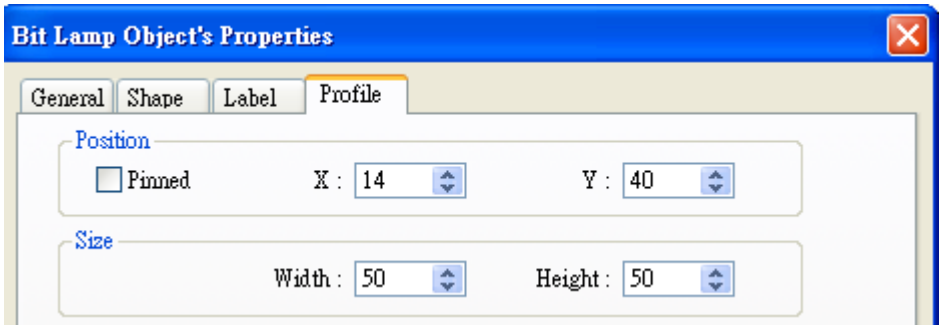
[Content]
Set the content of the text. If using the Label Library, the content will be sourced from the Label Library.

[Duplicate this label to other states]
This function is used to duplicate the current text content to the other states.

[Tracking]
When [Tracking] is selected, moving the text of one state will also move the text of other states.

9.3.1 Adjusting Profile Size

When a bit lamp is created, double click the object. Go to the [Bit Lamp Object's properties] / [Profile] tab to adjust the position and size of the object.



a. Position

Pin the position and size of the object. When checked, the position and size of the object will not be able to be changed.X and Y mean the [X] and [Y] coordinate of the top left-hand corner of the object.

b. Size

Adjust the width and height of the object.

9.4 Station Number's Variable

EB8000 V1.31 or above provides variable settings in PLC station number.
As below picture, the var2 is one of 16 station number variables.

The syntax of Station number's variable:

varN#address

The range of N is the integer from 0~15; address is PLC's address.
Examples:

var5#234 (var5 is station number, 234 is PLC's address)
var15#456 (var15 is station number, 456 is PLC's address)

16 station numbers are availble：var0 ~ var15. The station variables read values from LW10000~LW10015. The list below is variable and its corresponding system reserved address LW：

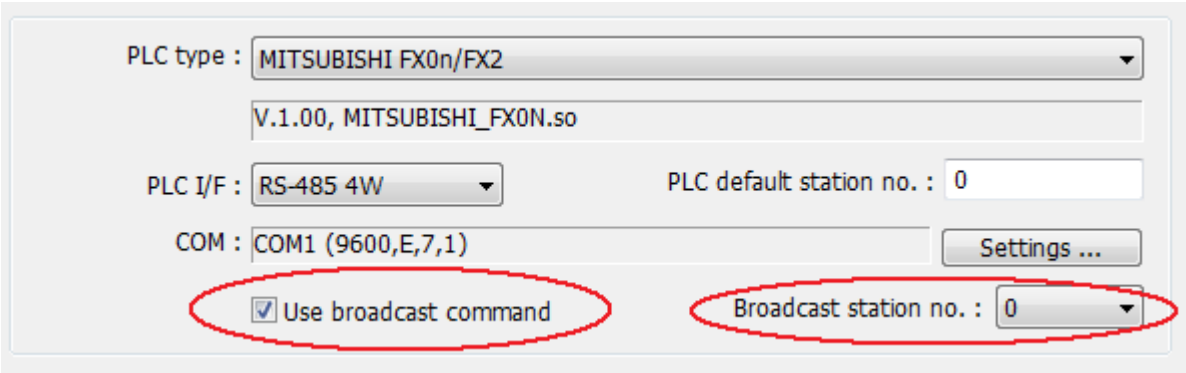
var0	LW10000
var1	LW10001
var2	LW10002
var3	LW10003
var4	LW10004
var5	LW10005
var6	LW10006
var7	LW10007
var8	LW10008
var9	LW10009
var10	LW10010
var11	LW10011
var12	LW10012
var13	LW10013

var14 LW10014
var15 LW10015

For example, var0 reads value from LW10000, when LW10000 is 32, var0#234 = 32#234 (the station number is 32); similarly, var13 reads value from LW10013, when LW10013 is 5, var13#234 = 5#234。

9.4.1 Broadcast Station No.

MT6000/8000 provides two ways for users to use broadcast command. First one is to directly set the broadcast in EB8000/Edit/System parameters/Device as below:



Second one is to use system tag to enable or disable broadcast station no and change broadcast station no. Corresponding system tag is listed as below:

LB9065 disable/enable COM 1 broadcast station no.
LB9066 disable/enable COM 2 broadcast station no.
LB9067 disable/enable COM 3 broadcast station no.

LW9565 COM 1 broadcast station no.
LW9566 COM 2 broadcast station no.
LW9567 COM 3 broadcast station no.

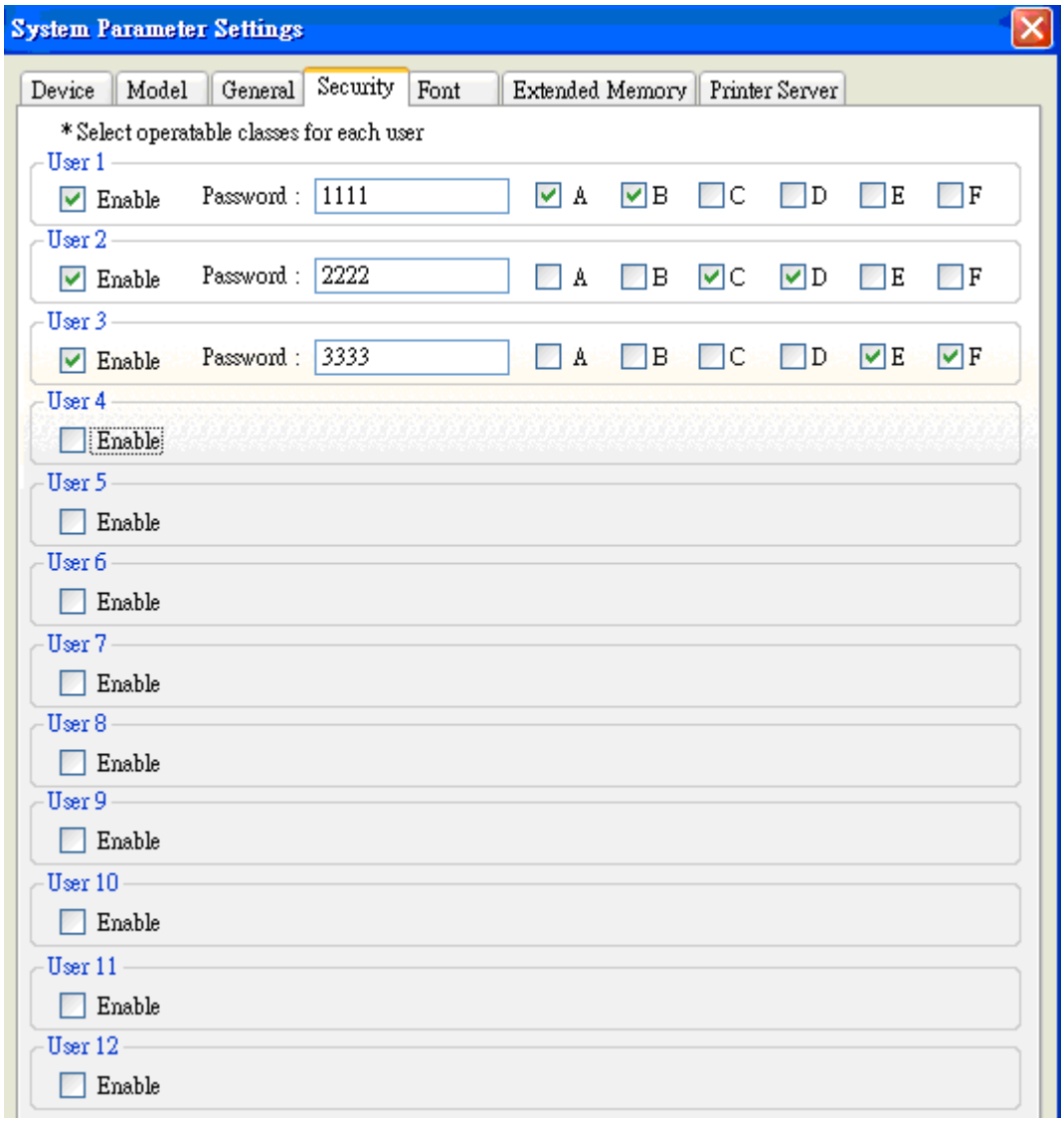
Chapter 10 Security

EB8000 security includes two parts:

1. User security and whose operable classes
2. Object's Security

10.1 Settings of Password and Classes

Go to [Edit]/ [System Parameter Settings]/ [Security] to set user security. There are seven levels of user security, including "none", and "A~F". Password are Digital only (0-9) and up to 12 sets of user password available.



After the password is entered, the operable objects for the user are decided by security setting. For example, the security setting of user 1 is as below. That's means the user is permitted to operate the objects with security level of "None", and A, C, E.

In addition to inputting the passwords to the system reserved register [LW9220: password], which is a double words value (32 bits), a correct process of password setting requires users to appoint the users by using [LW9219], single word value (16 bits) where digit 1~12 represents User 1 ~ User 12 respectively.

If the password is wrong, [LB 9060: password error] state will be set to ON; if password is correct, [LB 9060] is set to OFF.

The passwords of from user1 to user 12 can be obtained from system reserved registers [LW9500] to [LW 9522], 24 words in total.

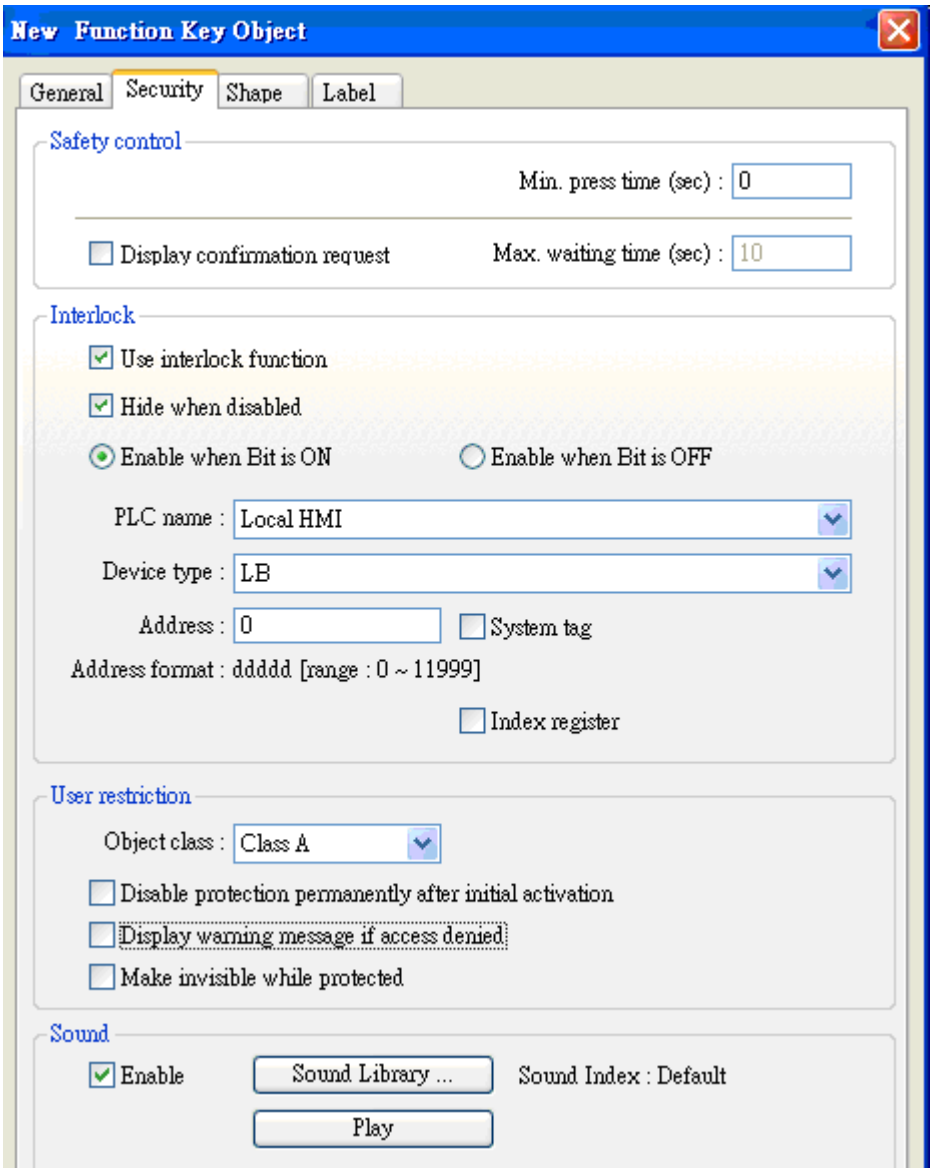
Users can change passwords even when the HMI is in operation. By the system reserved register [LB9061: update password (set ON)], when its state is switched from OFF to ON, the EB8000 will use the data saved in the system reserved registers from [LW9500] to [LW9522] to update the password table and create the new passwords.

Note: The user operable class won't be changed due to the change of password.

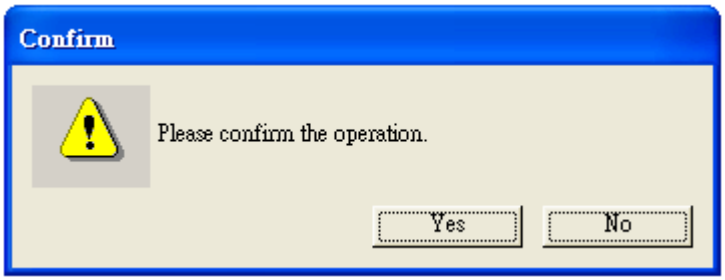
When the state of [LB9050] (user logout) is changed from ON to OFF, current users will be forced to log out the system. At this time, only the object defined as "None" class can be operated.

[LW9222: classes can be operated for current user] records the operable class for current users: bit0 = 1 means the operable object for current users is class A; bit1=1 means the operable object for current users is class B and so on.

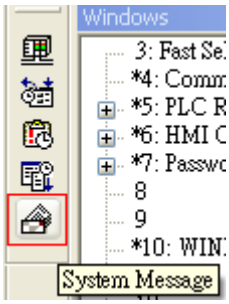
10.2 Object's Security

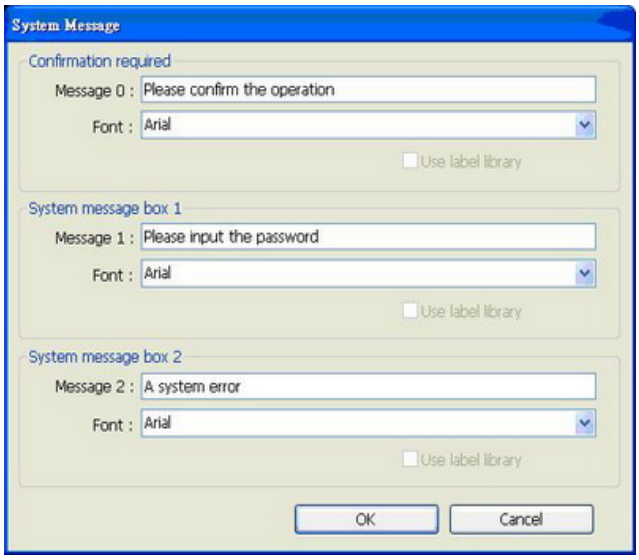


Safety control	"Safety control" is mainly used to prevent operator from mis-operating an object accidentally. There are two methods for protection: [Min. press time (sec)] Only continuous pressing time no less than this value can an object be activated successfully. [Display confirmation request] After pressing the object, a confirm dialog will appear. Users need to click "Yes" to make sure the operation execution. If response to confirm dialog longer than the value of [Max. waiting time (sec)], the dialog will disappear automatically and cancel the operation.

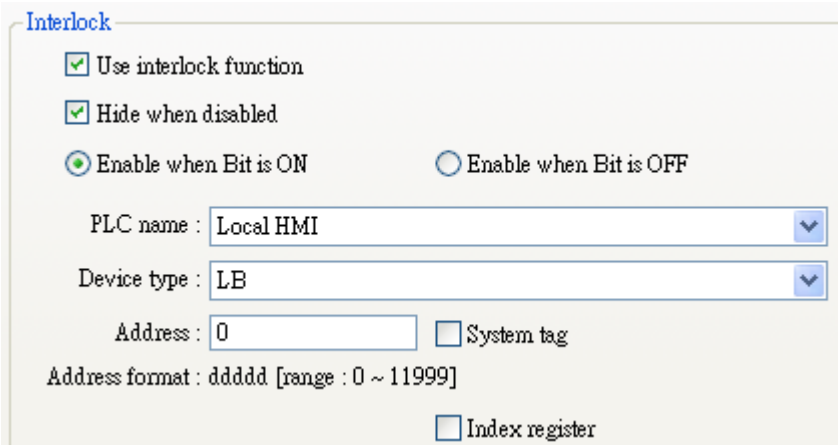
<table>
<tr>
<td></td>
<td>


Message text (“Please confirm the operation.”) in the window is defined in [System Message]. Text can be changed from [System Message] dialog. Click System Message icon from tool bar and then System Message dialog appears where the first part is set for the content of operation confirmation.





</td>
</tr>
<tr>
<td>Interlock</td>
<td>When the feature is applied to an object, whether or not an object is allowed to be operated is decided by the state of appointed bit address (or called “Enable” address). ”Enable” address must be in the form of Bit address. The content of the address is set in the following dialog.</td>
</tr>
</table>

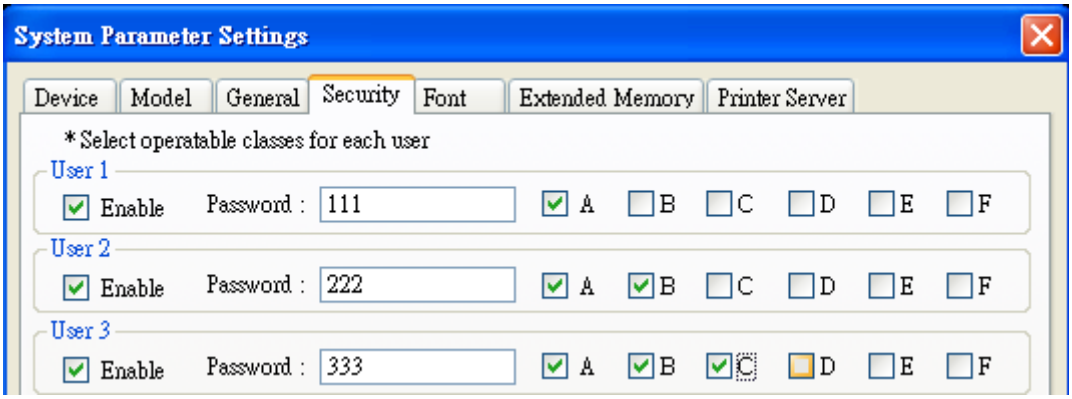
	 Fox example, supposed “Use interlock function” is checked and the “Enable” bit address is set to [LB0].The object can be operated only when the state of [LB0] is ON. The “Interlock” feature also provides the following settings. **[Use interlock function]** Enable/disable the interlock function. **[Hide when disabled]** When the state of [interlock] function is OFF, hide the object.
User restriction	This function is used to set the object’s security: define the users permitted to operate the object. When “Operator class” is selected as ”None”, the object operation is open to the users with all security levels. The following settings are also provided in the function: **[Disable protection permanently after initial activation]** Once the operator’s operation class has ever conformed to the security of the object, the system permanently stop checking the security of the object. Even if the security level of the users is changed will not affect the operation of the object. **[Display warning message if access denied]** When the user’s current security level does not conform to the security level of the object, a warning dialog appears.

	 Window 7 is set as an alert message for authority security. Users can design the content of the message. **[Make invisible while protected]** When a user's security level does not conform to the security level of the object, the object will be hidden.

10.3 Example of Security

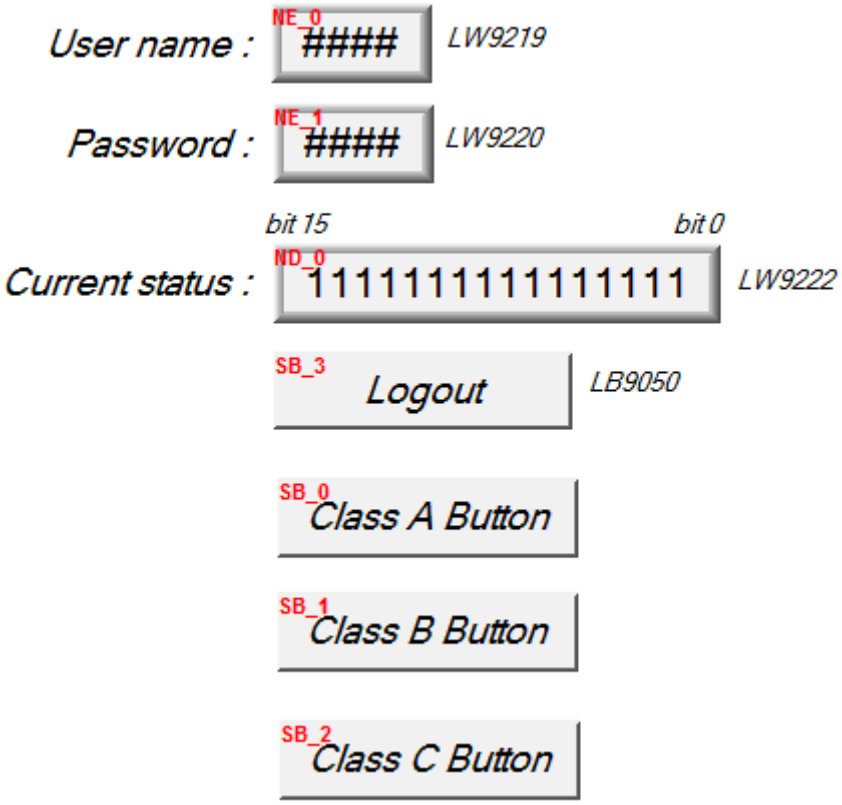
The following is an example to illustrate the steps of security feature:

Step1: First of all, create a new project. Go to System parameter/Security, add three users and set different passwords and classes.



User 1 can operate objects with class A, user 2 can operate objects with class A and B, and user 3 can operate objects with class A, B, and C.

Step2: Set objects in Window_10 as below:

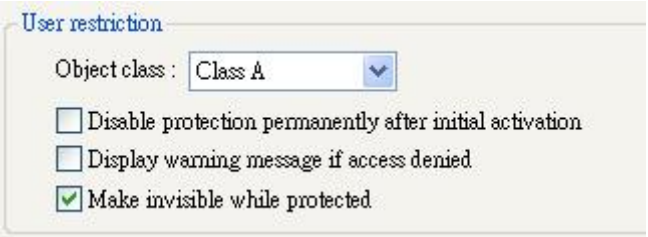


[NE_0] and [NE_1] are numeric input objects where address are [LW9219] and [LW9220: password] for inputting user ID and password. [LW9219] is for entering user ID (1~12), with the length of 1 word, in the form of 16-bit Unsigned as below.

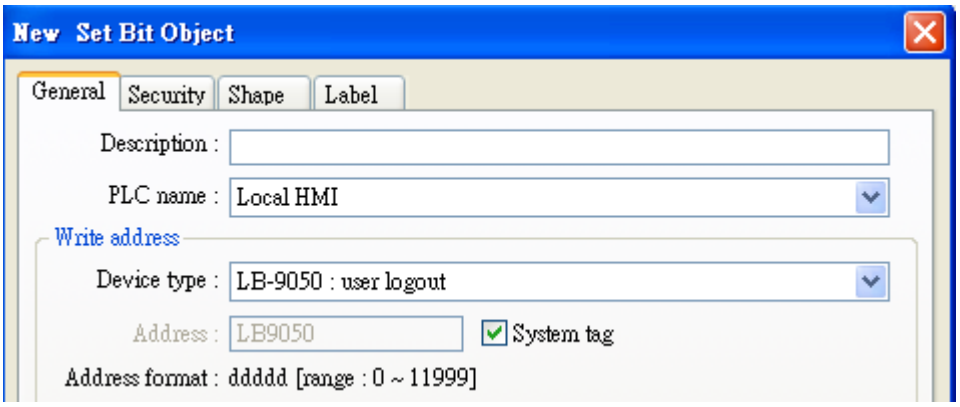
[LW9220] is for entering user password with the length of 2 words, in the form of 32-bit Unsigned as below.

[ND_0] is numeric display object with address [LW9222: classes can be operated for current user] to indicate user's state. The data is in the form of 16-bit Binary.

[SB_0]~[SB_2] are Set Bit objects which are set with different classes but selected "Make invisible while protected". i.e. [SB_0] is class A, [SB_1] is class B, [SB_2] is class C. The setting of [SB_0] object:

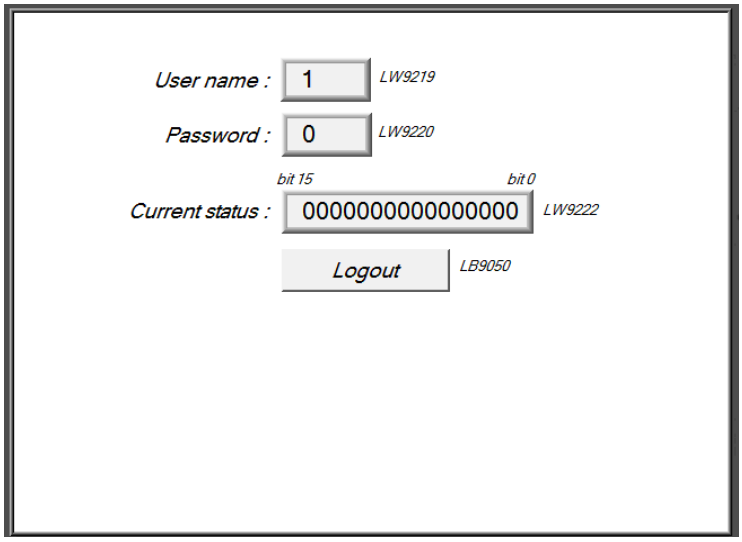


The Set Bit object (SB_3, LB9050: user logout) is for user logout as below:

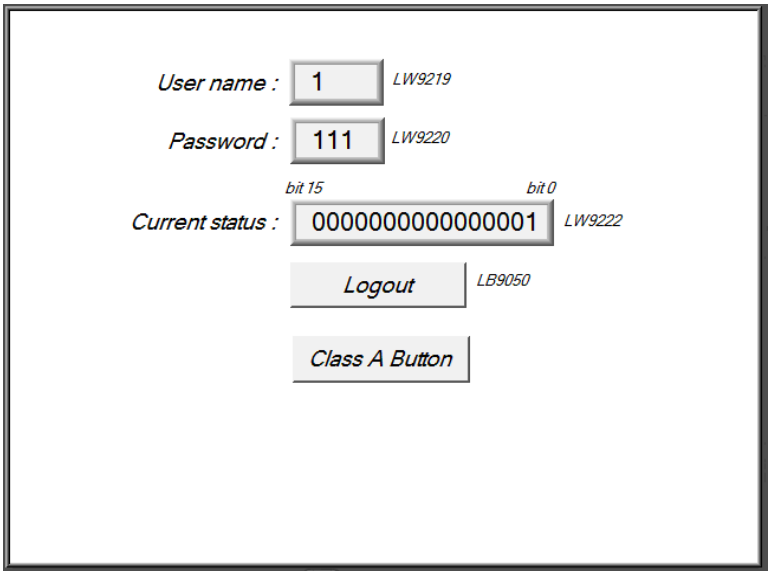


Step 3: After complete the design and settings of the objects, save, compile and do the off-line simulation for the project. The illustration as below is initial screen of off-line simulation. At this time, no password is entered.

[LW9222] shown "0000000000000000" means current user only can use object with "none" class. Moreover, [SB_0]~[SB_2] are the objects with the security levels of class A~ class C and at the same time "Make invisible while protected" is selected, therefore, [SB_0]~[SB_2] objects are hidden by the system.

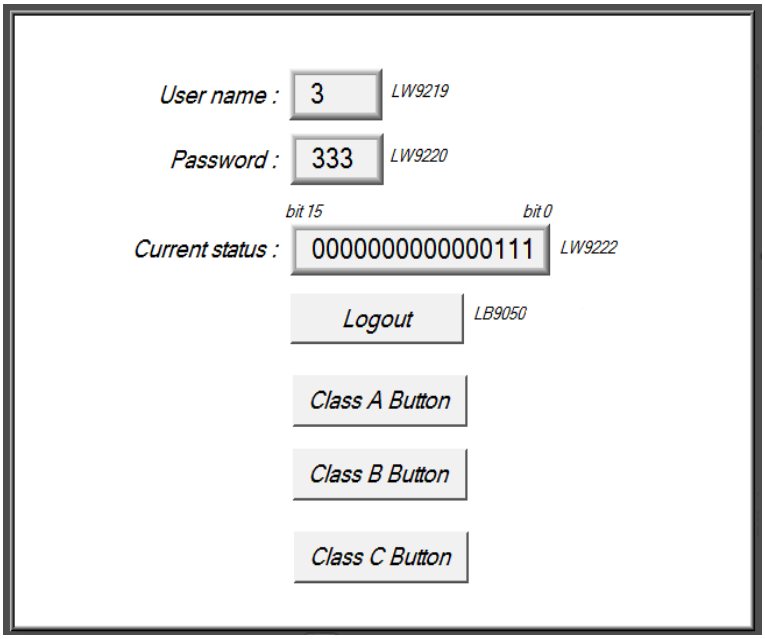


Step 4: When the user enters the password "111", the screen will become:



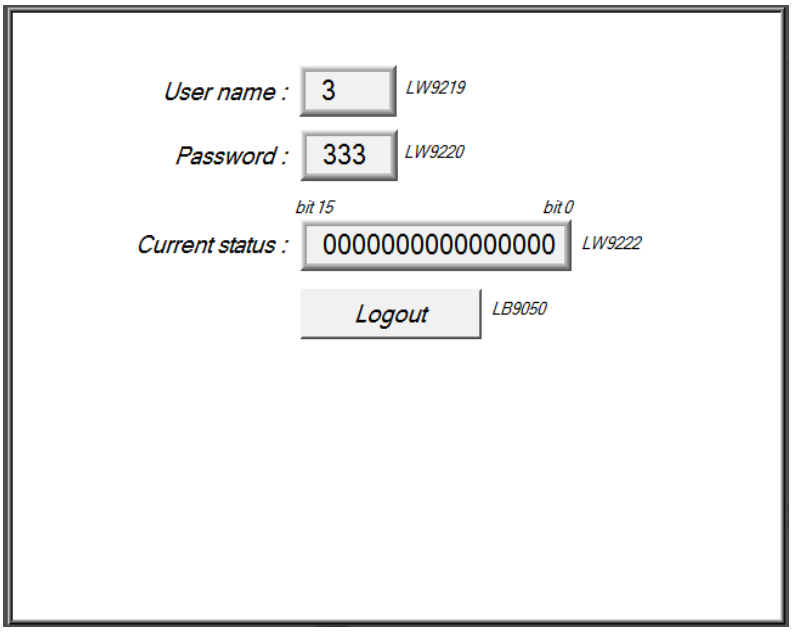
The user 1 is permitted to use object with class A. Consequently, [SB_0] appears and allows user to operate. Now, bit 0 in [LW9222] becomes 1.

Step 5: Next, when the user enters the user 3's password (333), t the screen will become:



The user 3 is permitted to use object with class A,B,C. Now, bit 0 ~ bit 3 in [LW9222] become 1 to confirm the current user is allowed to use objects with class A,B,C.

Step 6: At this time, if [LB9050] is pressed and force current user to logout, the system will return to initial state. In other words, current user only can use object with "none" class.


User name :
3
LW9219
Password :
333
LW9220
bit 15
bit 0
Current status :
0000000000000000
LW9222
Logout
LB9050

Chapter 11 Index Register

11.1 Introduction

The EB8000 provides 32 index registers for users to use addresses more flexible. Via index register, users can update object's read / write address without changing content of the object under the machine in operation.

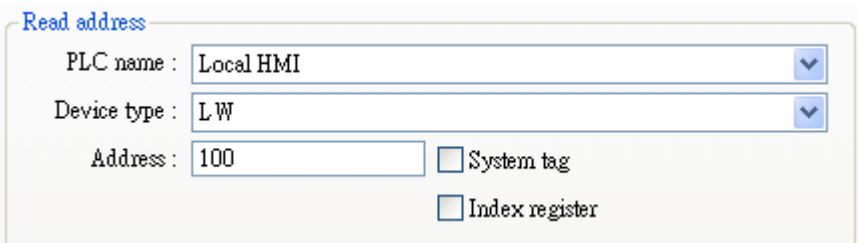
The addresses of the 32 index registers are as follows:

INDEX 0 [LW9200] (16-bit)
……
……
INDEX 15 [LW9215] (16-bit)
INDEX 16 [LW9230] (32-bit)
……
……
INDEX 31 [LW9260] (32-bit)

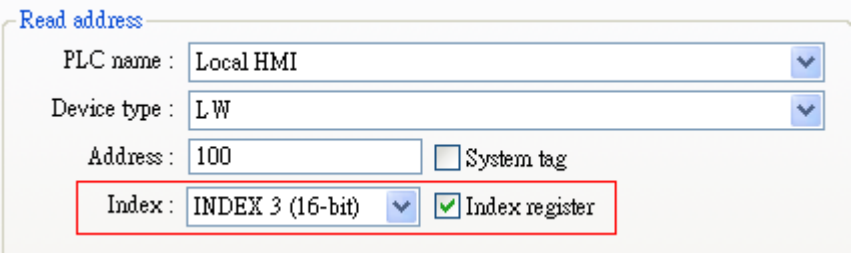
INDEX 0 ~ INDEX 15 are 16-bit registers with the range up to 65536 words; INDEX 16 ~ INDEX 31 are 32-bit register with the range up to 4G words.

11.2 Example of Index Register

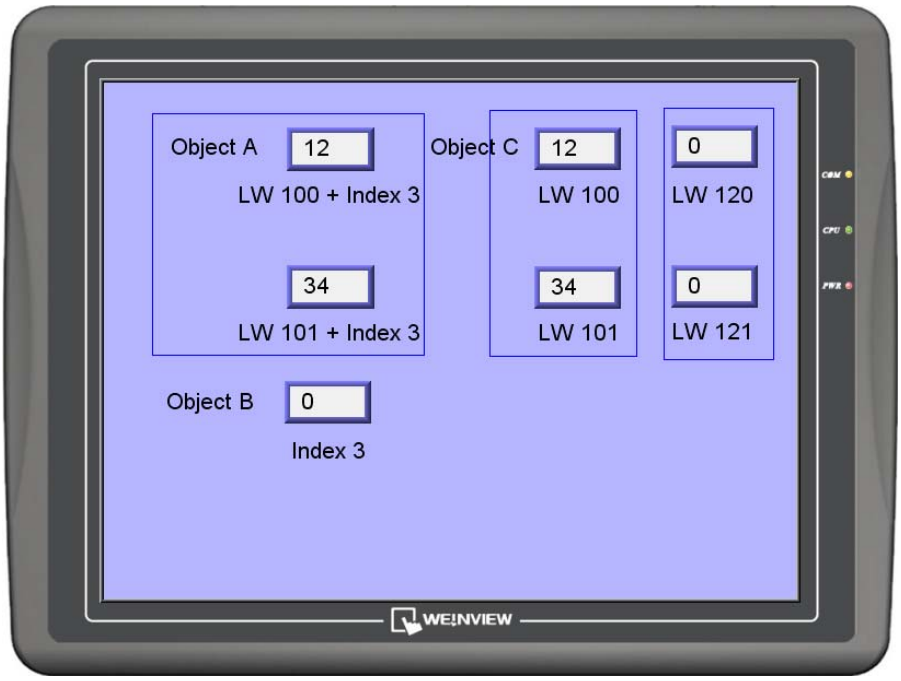
Here is an example to describe how to use the index registers.
The "Read address" will be [LW100] when [Index register] is not checked.



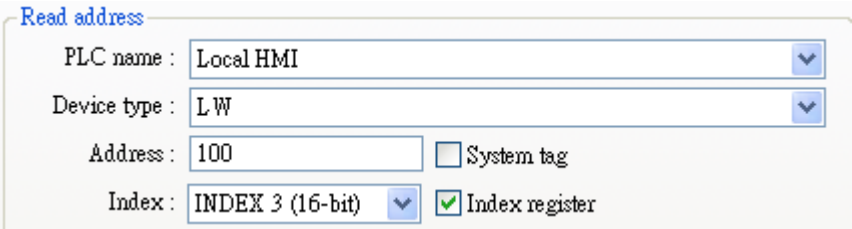
But in the illustration below, the “Read address” becomes [LW (100 + Index 3)] when [Index register] is checked. “Index 3” represents the value at INDEX 3: LW9203 (16bit) ; in other words, if the value at the [LW9203] is 5, the “Read address” in the becomes [LW105], i.e. [LW100+5].



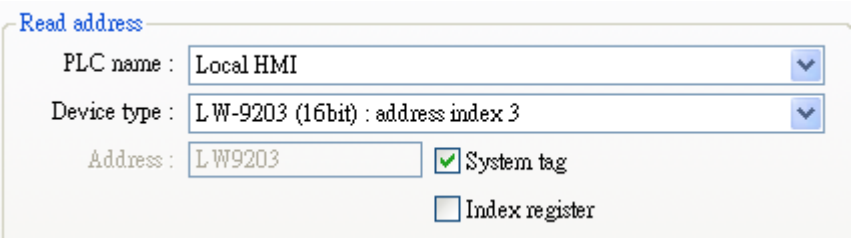
By using index registers, users can change object’s reading and writing addresses in operation without changing the object’s content. For example as below, set Index 3 as 0, i.e. the value at the [LW9203] address is 0. Under this situation, the contents of [LW100 + Index 3] and [LW101 + Index 3] are the same as those of the [LW100] and [LW101].



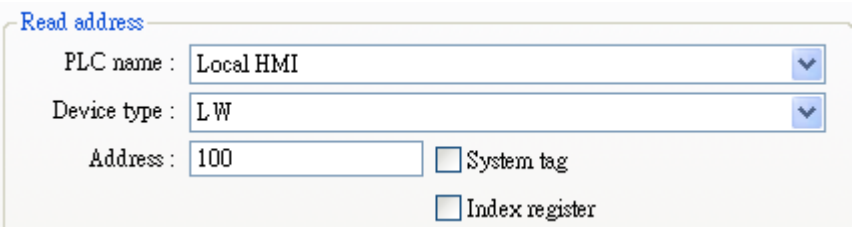
At this time, the setting of Object A’s “Read address” is:



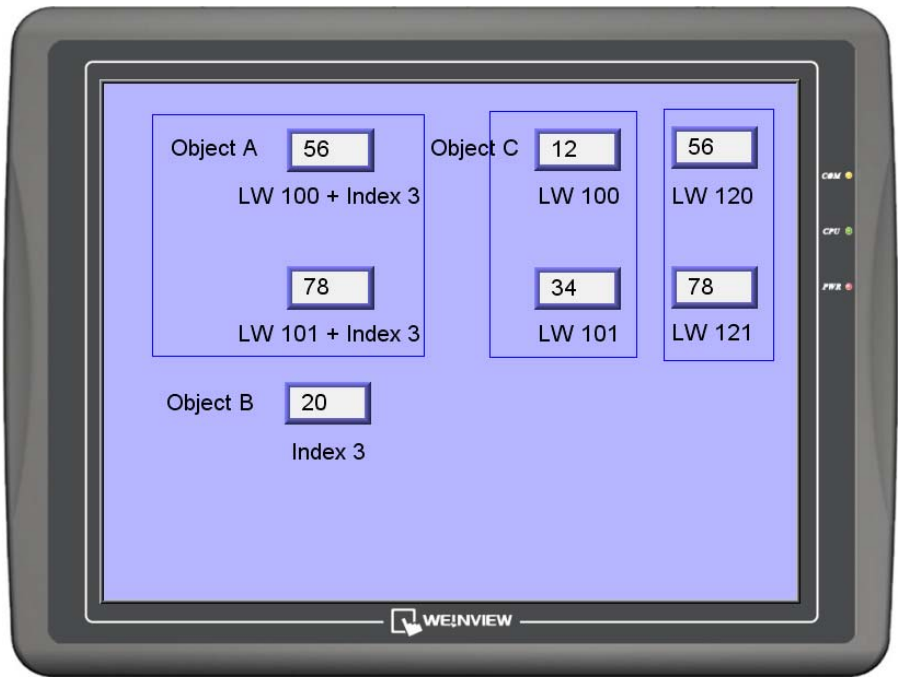
The setting of Object B's "Read address" is:



The setting of Object C's "Read address" is:



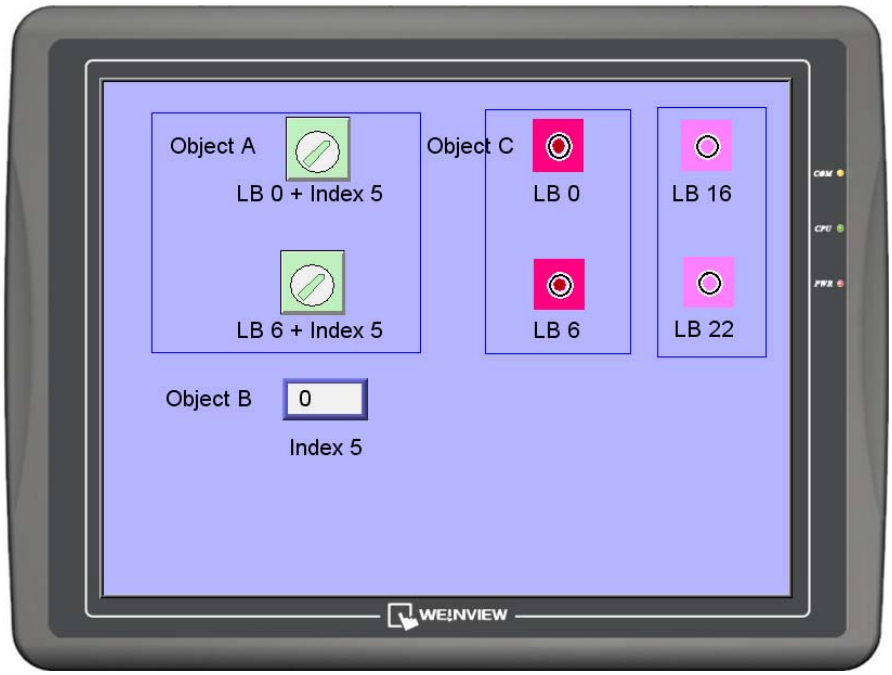
Now, if the user changes Index 3 value to 20, the contents of [LW100 + Index 3] and [LW101 + Index 3] will become those of [LW120] and [LW121], i.e. the values in [LW100+20=LW120] and [LW101+20=LW121].



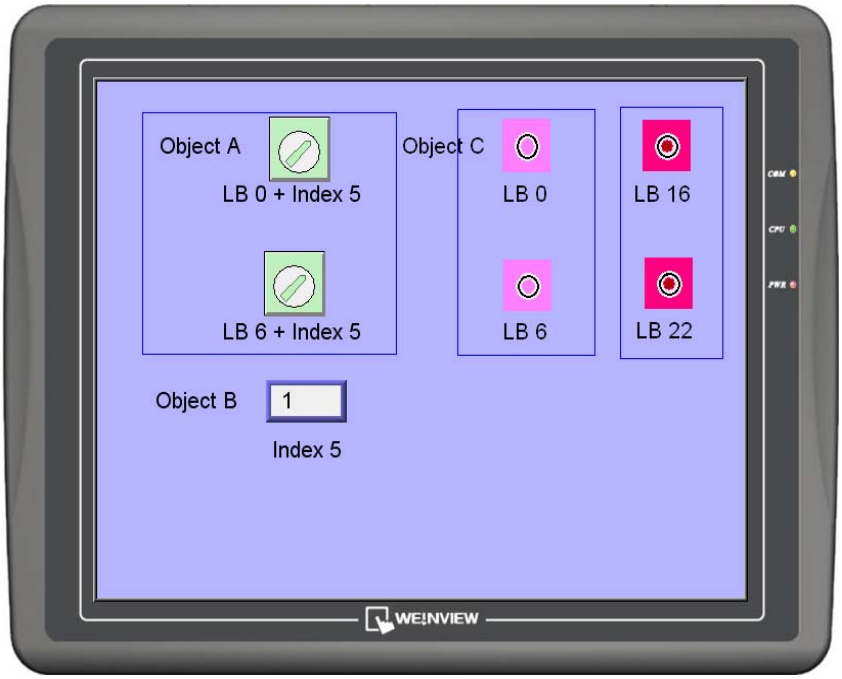
Similarly, the index register can also work with LB.

1 word = 16 bit, 1 value change of index register means the change of 16 bits.

See the example below. When Index 5 is set as 0, the contents of “Bit Lamp” of [LB0] and [LB6] are the same as those of “Toggle Switch” of [LB0+Index 5] and [LB6+Index 5]



Now, if users change Index 5 value to 1, and then the contents of Toggle Switch are the same as those of [LB16] and [LB22], i.e.[LB0+16=LB16] and [LB6+16=LB22].



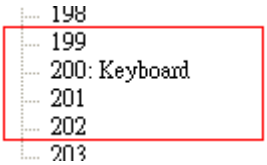
Chapter 12 Keypad Design and Usage

Both “Numeric Input” and “ASCII Input” objects have to use keypad as input tool. Except calling up the keyboard to the screen, users can design a fixed personalized keypad in the same window as input objects.

12.1 Steps to Design a Pop-up Keypad

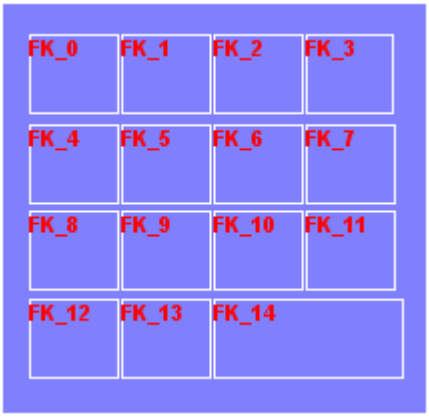
Step 1

Create and open a window for a keypad to be added. For example, set WINDOW 200 as the window for a keypad.



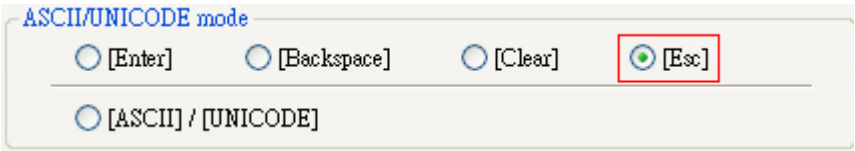
Step 2

Adjust the height and width of WINDOW 200 and create a variety of kinds of objects as Function Keys. Input signals will be triggered by pressing Function Keys.



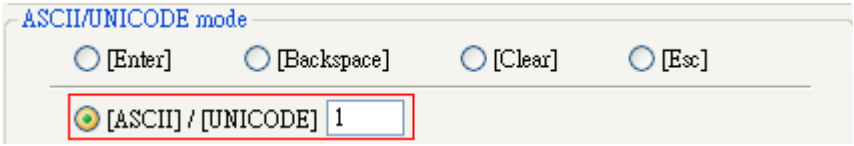
The Function Key objects on WINDOW 200 are arranged as above which must to be set as [ASCII/UNICODE mode].

Where FK_11 is used as the “Escape (Esc)” key and its setting is:



FK_14 is used as the “ENTER” key and its setting is:

Most of the other Function Keys are used as number or text inputs. For example, FK_0 is used to trigger signal of input number “1” and its setting is:

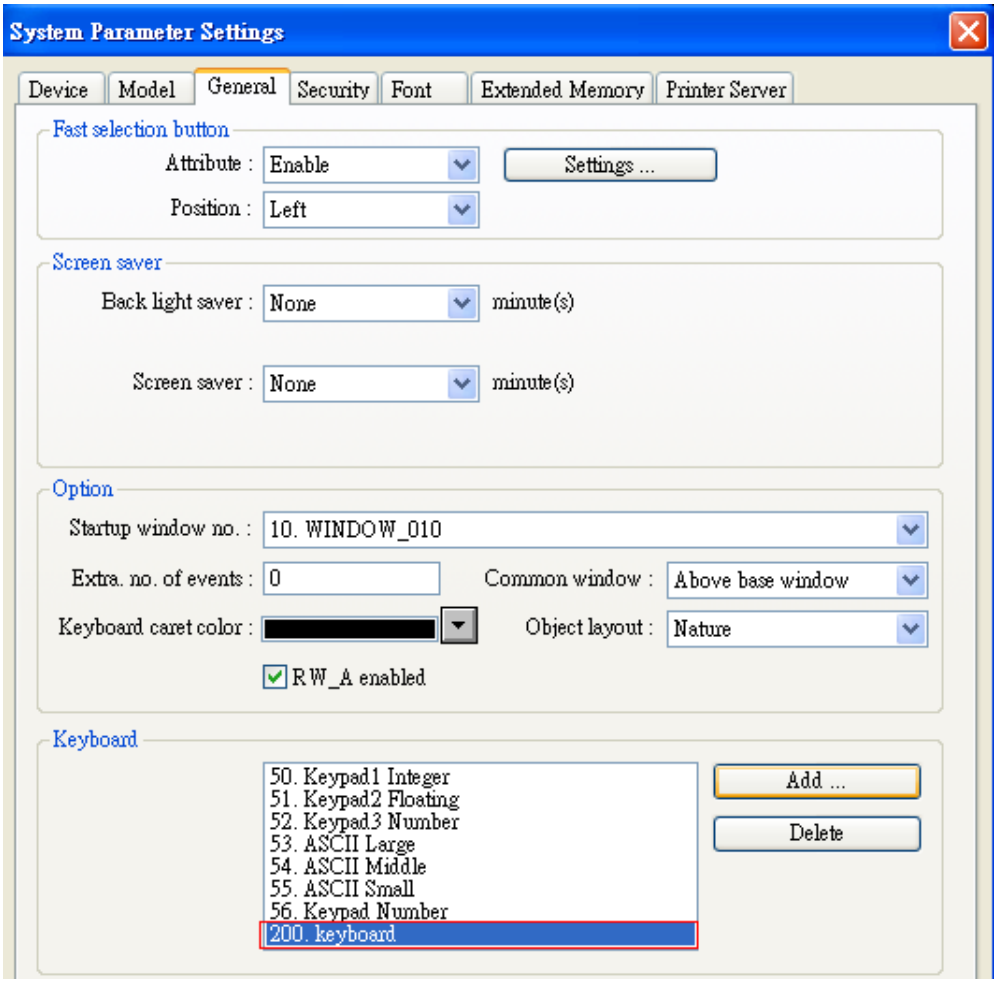


At last, select a suitable Picture for each Function Key object. GP_0 is a “picture” object where is place at the lowest layer as the background.

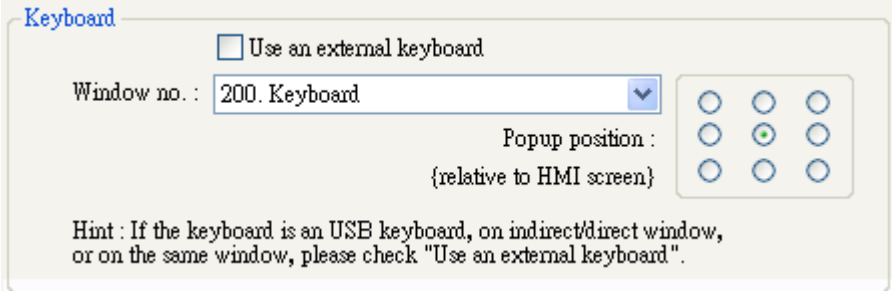
Step 3

Go to [General] tab in “System Parameter Settings” and click [Add…] in [Keyboard]. [Add a keyboard] dialog appears. Select WINDOW 200 and press “OK”.

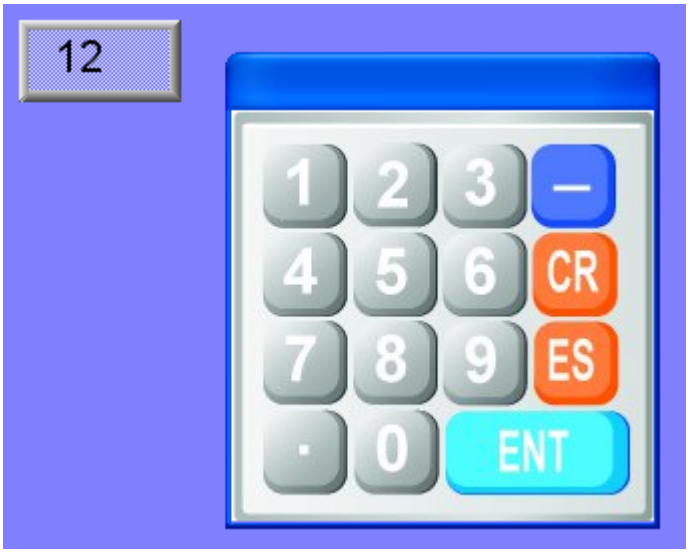
As illustration shown as below, a new item: “200.Keyboard” will be added to [Keyboard] in [General] tab in “System Parameter Settings.”



After a Keypad object is created, when open the object of “Numeric Input” or “ASCII Input”, “200.Keyboard” can be found in [Keyboard] setting tab, as shown below. [Popup Position] is used to decide the display position of the Keypad in a screen where EB8000 divides the screen into 9 areas.



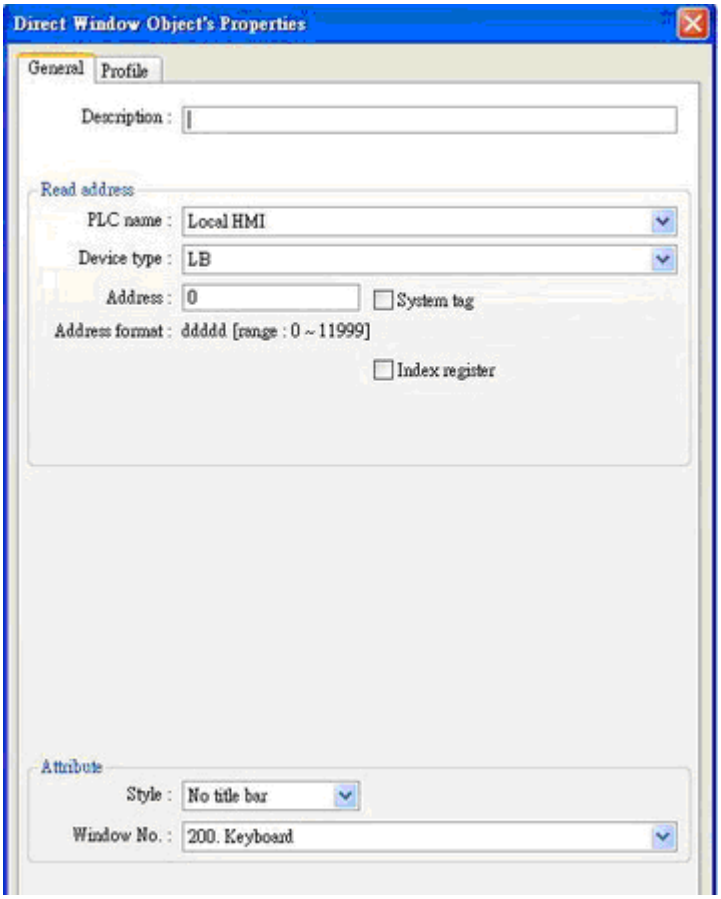
Selecting “200.Keyboard,” when users press “Numeric Input” or “ASCII Input” object. WINDOW 200 will pop up on the HMI screen.



12.2 Steps to Use Keypad without Title Bar

Step 1

Create a Direct window. Set a read address to activate a direct window (ex: LB0).In [General]/[Attribute], select “No title bar” and Window no.

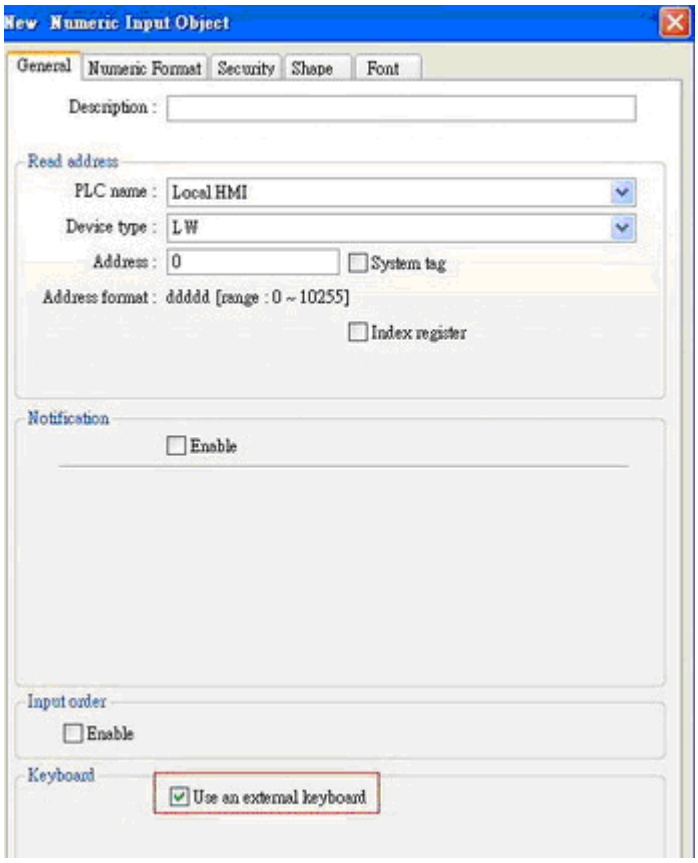


Step 2

Set WINDOW 200 the same size as keypad.

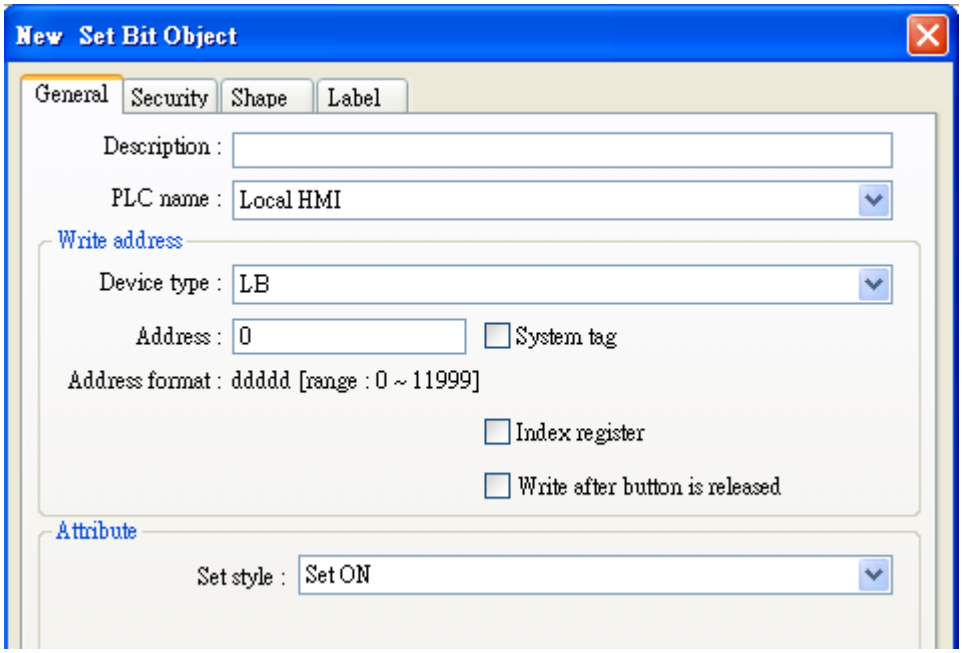
Step 3

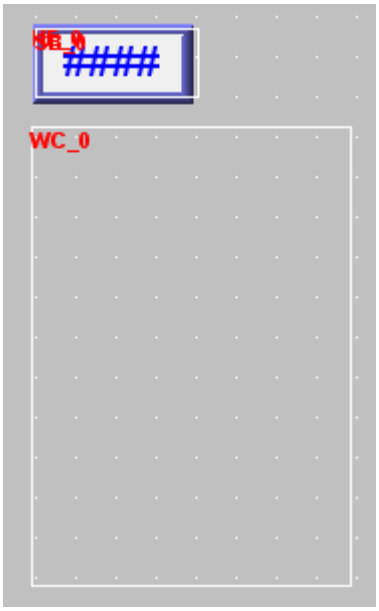
Create a Numeric Input object, select “Use an external keyboard”.



Step 4

Add a Set Bit object, set the LB 0 as ON and overlay it on the Numeric Input object. If the user does not want to use the keypad, set LB0 as OFF to disable the feature.



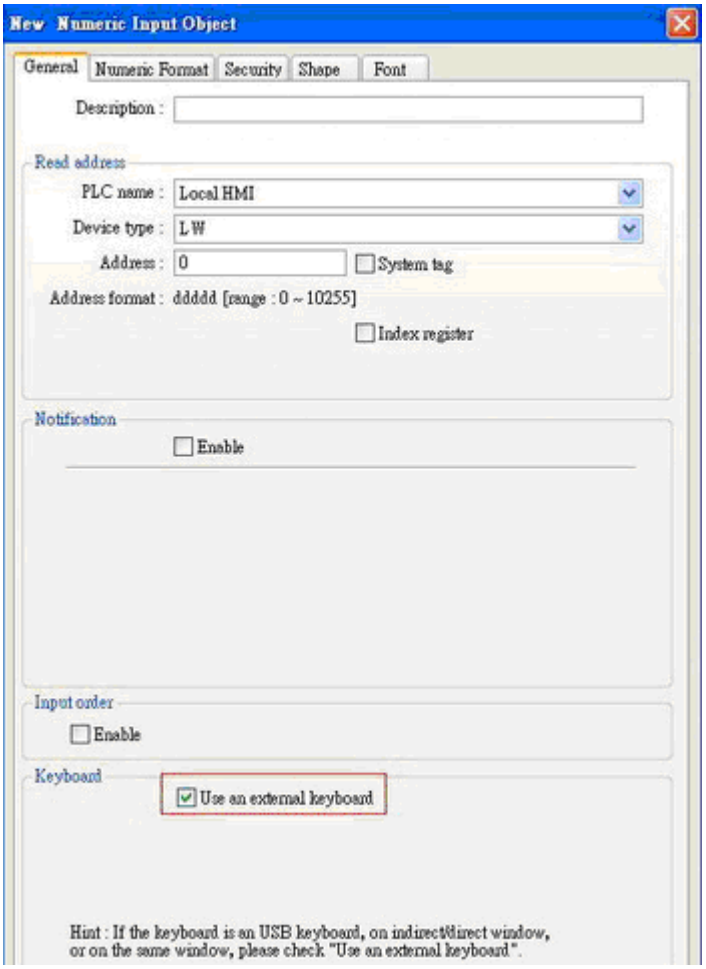


12.3 Steps to Use Fixed Keypad

Users can also place a fixed keypad in the same window as input objects. In this way, keypad can't be moved or disable.

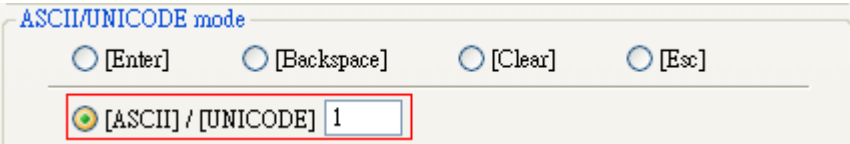
Step 1

Create a Numeric Input object, and select [Use an external keyboard].



Step 2

Design a keyboard by function keys and place it on the screen.



Step 3

Design the keypad by function key objects and place the keypad on the window.


1
1
2
3
4
5
6
7
8
9
Baskspace
Enter

Chapter 13 Object

This chapter is to illustrate the ways of using and setting all kinds of objects. For those settings generic for all the objects, such as index register, label, shape, and so on, please refer to the chapter "Object's General Attributes".

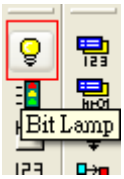
13.1 Bit Lamp Object

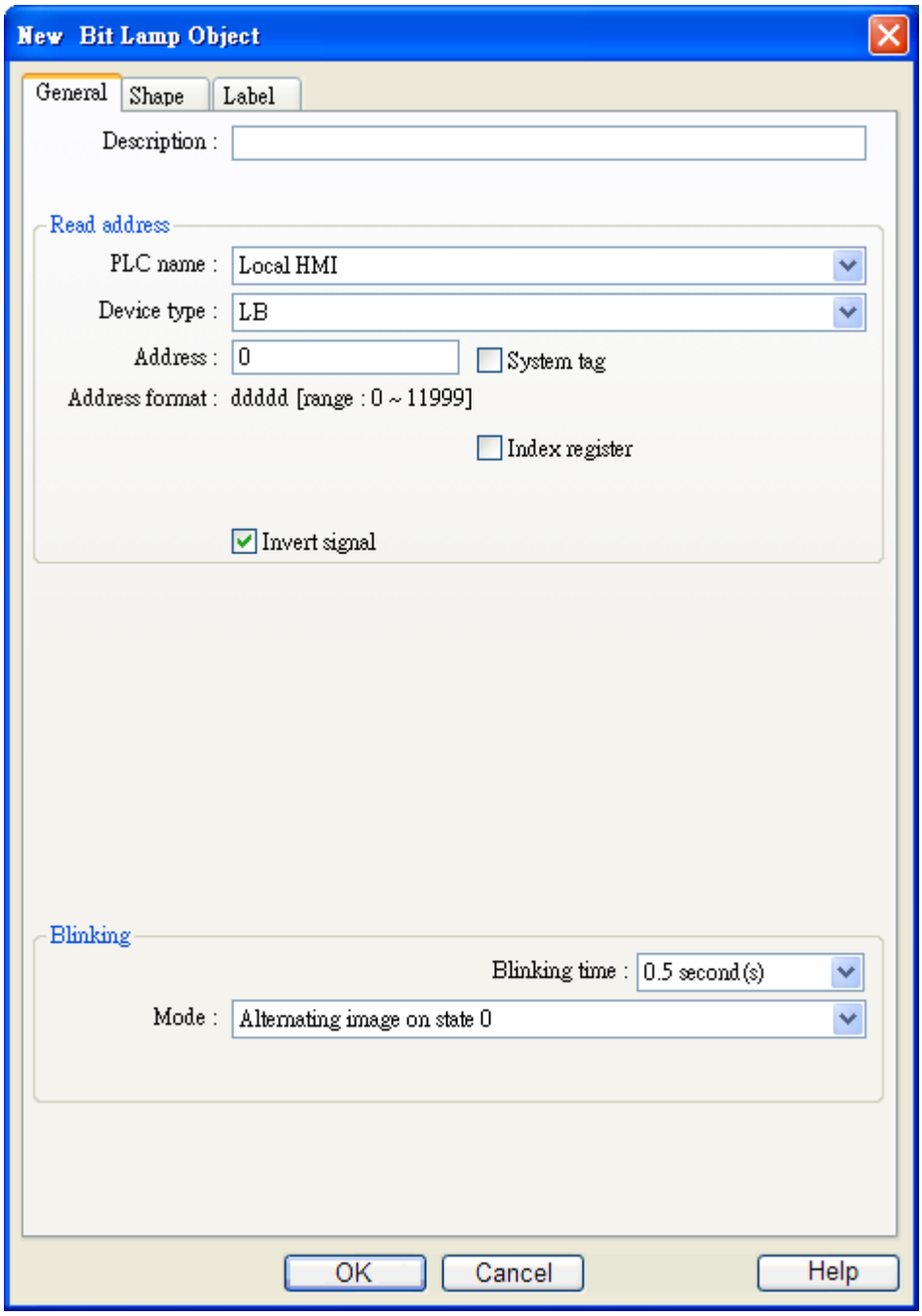
13.1.1 Overview

Bit Lamp object displays the ON and OFF states of a bit address. If the bit state is OFF, the State 0 shape will be displayed. If the bit state is ON, the State 1 shape will be displayed

13.1.2 Configuration

Click the "bit lamp" icon on the toolbar and the "Bit Lamp Object's Properties" dialogue box will appear, fill in the content of dialogue box and press OK button, a new bit lamp object will be created. See the pictures below.





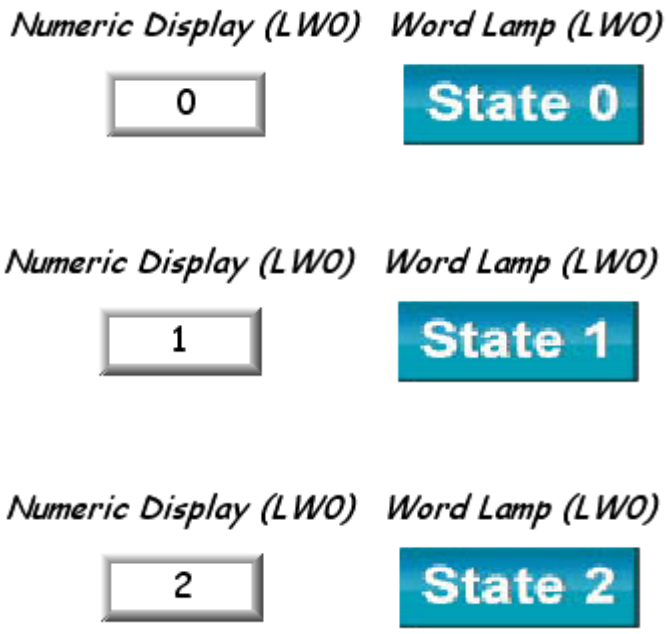
Description	A reference name that assigned with the object, the system does not take use of this reference name, it is for user document only.
Read address	Select the **[PLC name] [device type][address]** of the bit device that controls the bit lamp object.
	[Invert signal] Display shape with inverse states; for example, the present state is “OFF”, but it displays the shape of “ON” state.
Blinking	Set blinking attribute of bit lamp.
Blinking time	Set the frequency of blinking

Blinking mode	
None	No blinking.
Alternating image on state 0	Alternatively display the shape of state 0 and state 1 when the bit value is OFF (state 0)
Alternating image on state 1	Alternatively display the shape of state 0 and state 1 when the bit value is ON (state 1)
Blinking on state 0	Display the shape of state 0 in blinking when the bit value is OFF (state 0).
Blinking on state 1	Display the shape of state 1 in blinking when the bit value is ON (state 1).

13.2 Word Lamp Object

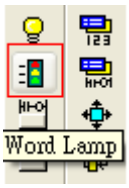
13.2.1 Overview

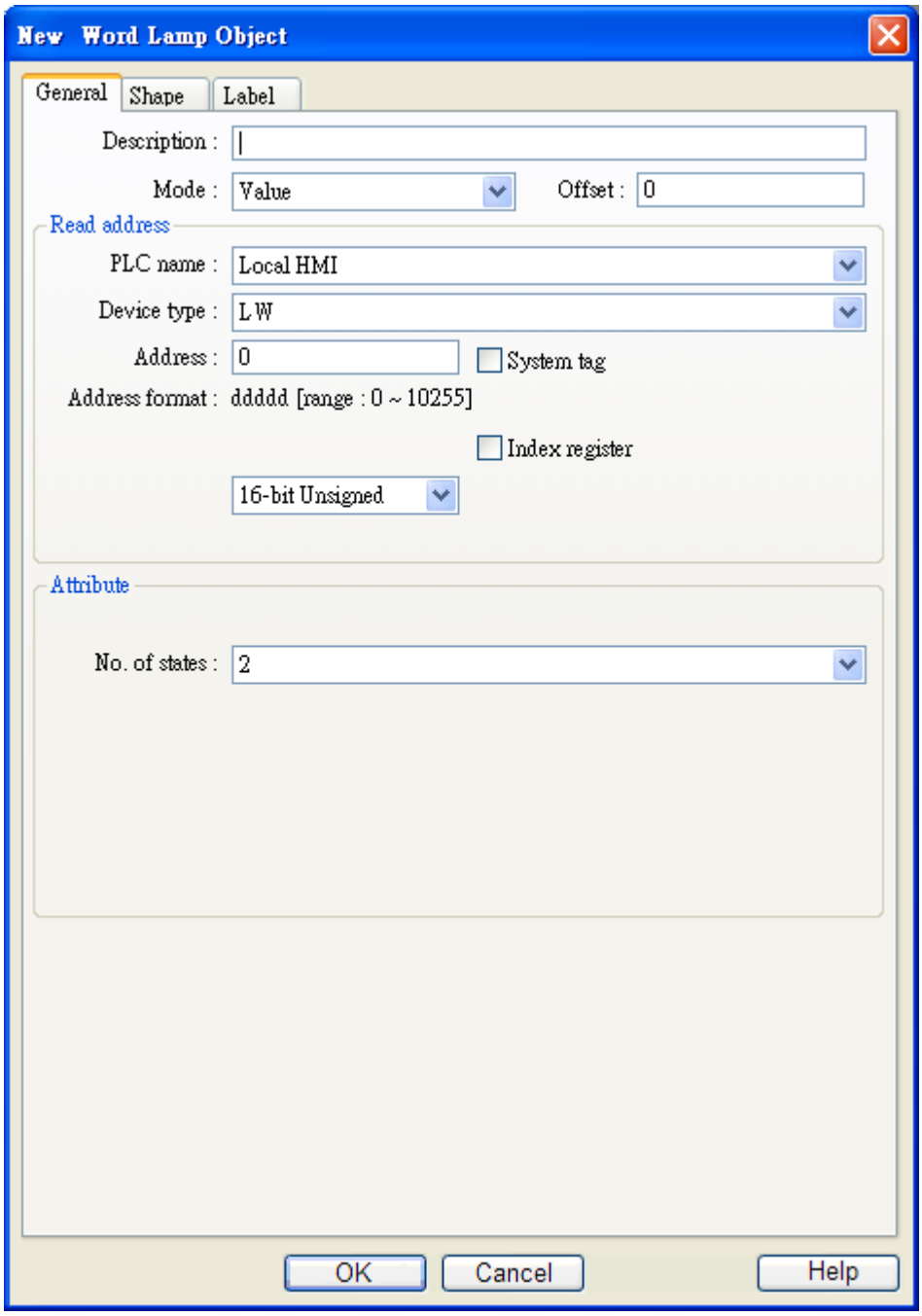
A Word Lamp object displays the corresponding shape according to the value in the designated word address. (up to maximum of 256 states)



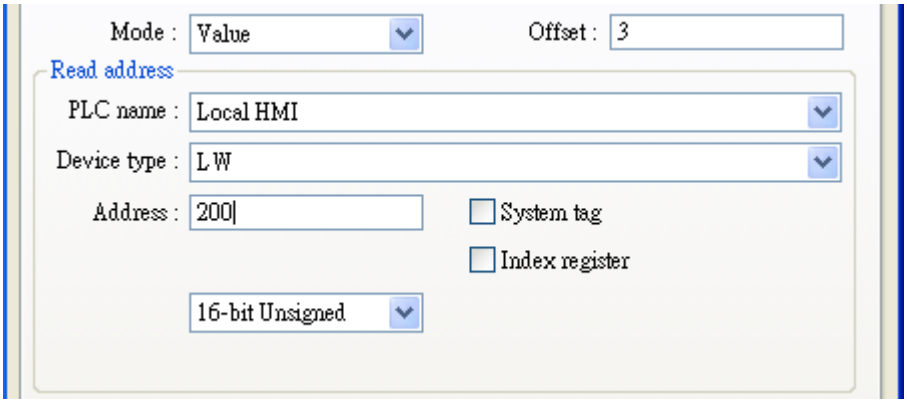
13.2.2 Configuration

Click the “Word lamp” icon on the toolbar and the “Word Lamp Object’s Properties” dialogue box will appear, fill in each items and press OK button, a new word lamp object will be created. See the pictures below.





Description	A reference name that assigned with the object, the system does not take use of this reference name, it is for user document only.
Mode and Offset	
Word lamp object offers the following three modes of selection:	
a. "Value" display mode	Calculate result of word value to subtract [offset] and displays its corresponding shape.

<table>
<tr>
<td></td>
<td>


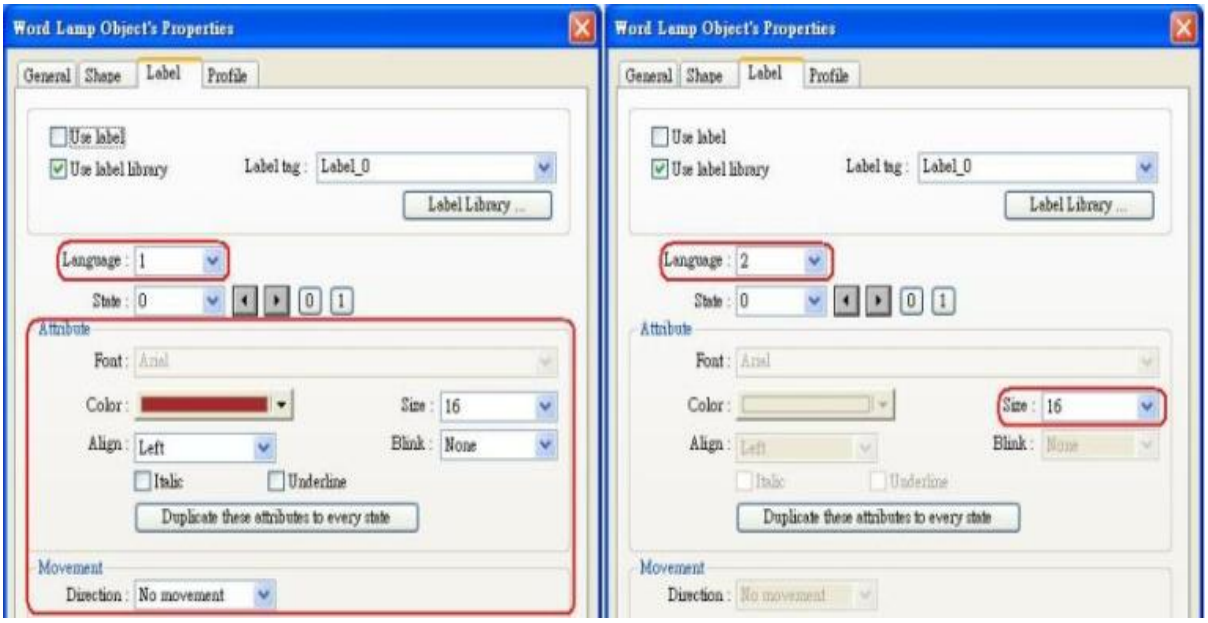
In the above setting, if the value of [LW200] is 5, the shape of sate 2 is displayed. See the picture below.


</td>
</tr>
<tr>
<td>b. “LSB” display mode</td>
<td>
Transfer the word value to binary, the lowest bit other than value 0 designate the current state. Please refer to the following table for illustration.
<table>
<tr><th>Decimal System</th><th>Binary System</th><th>Mapping State</th></tr>
<tr><td>0</td><td>0000</td><td>All bits are 0, display the shape of state 0</td></tr>
<tr><td>1</td><td>0001</td><td>The lowest bit other than 0 is bit 0, display the shape of state 1</td></tr>
<tr><td>2</td><td>0010</td><td>The lowest bit other than 0 is bit 1, display the shape of state 2</td></tr>
<tr><td>3</td><td>0011</td><td>The lowest bit other than 0 is bit 0, display the shape of state 1</td></tr>
<tr><td>4</td><td>0100</td><td>The lowest bit other than 0 is bit 2, display the shape of state 3</td></tr>
<tr><td>7</td><td>0111</td><td>The lowest bit other than 0 is bit 0, display the shape of state 1</td></tr>
<tr><td>8</td><td>1000</td><td>The lowest bit other than 0 is bit 3, display the shape of state 4</td></tr>
</table>
</td>
</tr>
<tr>
<td>c. “Change state by time” display mode</td>
<td>The states of the object have nothing to do with the word value. The system display different shape of states in according to time frequency.</td>
</tr>
</table>

	
Read address	Select the **[PLC name] [device type][address]** of the word device that controls the word lamp object.
Attribute **No. of states**	The number of the object's states. The state number begins from 0 to [no. of States] - 1. Supposed that the number of the states is 8, the valid states will be 0, 1, 2,…, 7. When the word value is more than [no. of states] - 1, the system will display the shape of last state.

13.2.3 Restrictions

In label dialog, Language 1 is able to change attribute settings, for Language 2~8 only font size can be changed and other settings follows language 1.



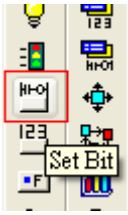
13.3 Set Bit Object

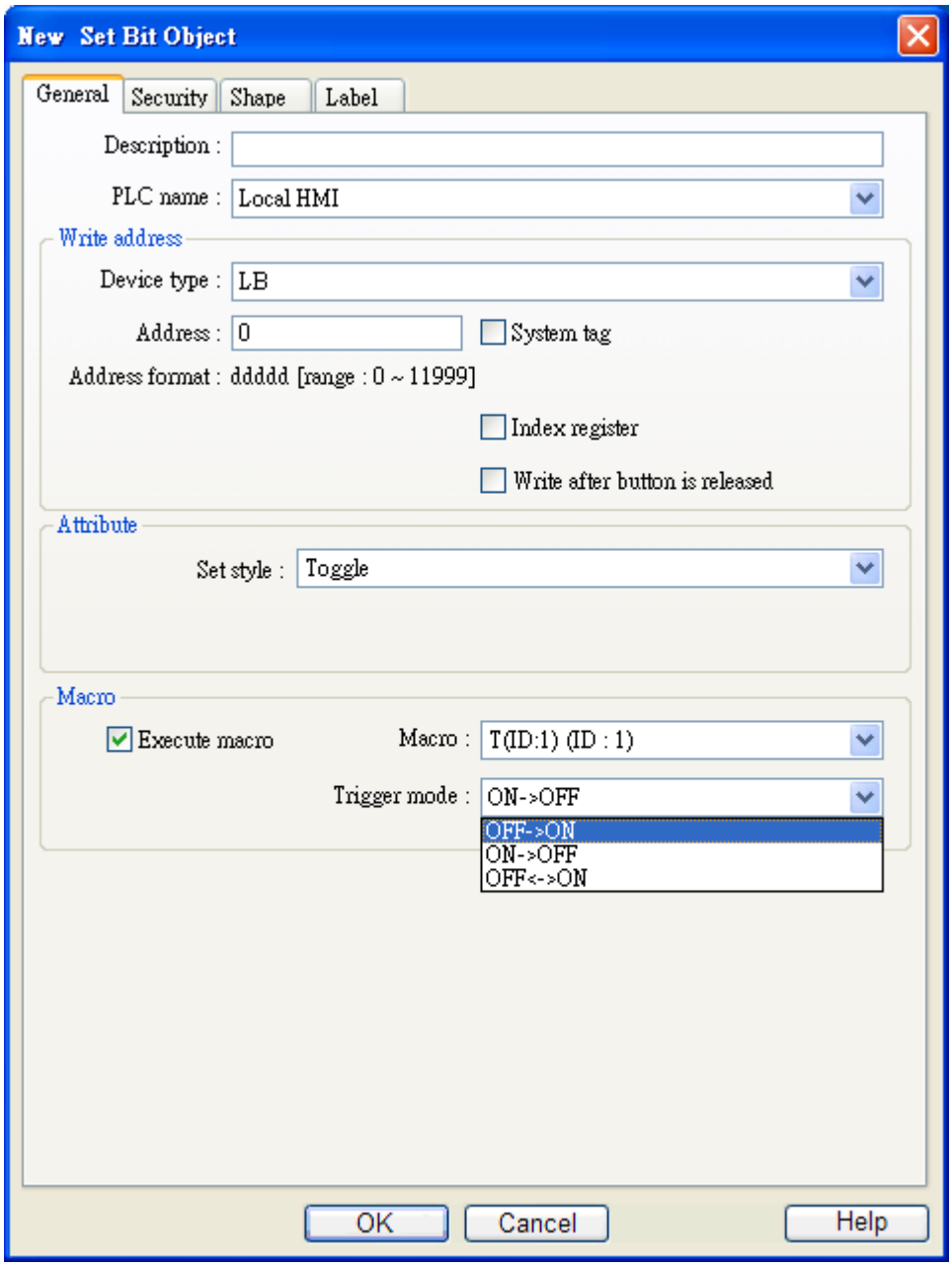
13.3.1 Overview

The Set Bit object provides two operation modes: the “manual operation” mode defines a touch area, users can activate the touch area to set the state of the bit device to be ON or OFF. When users select the “automatic operation” mode, the operation will be automatically activated in pre-configured conditions, the touch area is no action at any circumstance.

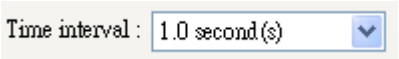
13.3.2 Configuration

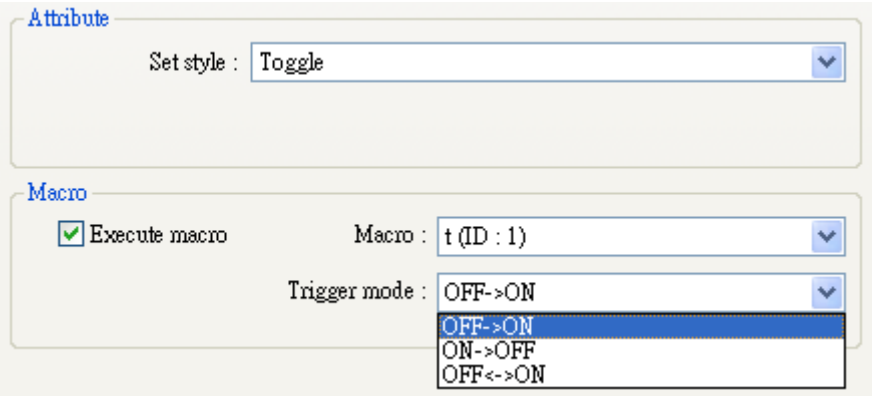
Click the “Set Bit” icon in the toolbar and the “New Set Bit Object” dialogue box will appear, fill in each items and press OK button, a new Set Bit object will be created. See the pictures below.





Description	A reference name that assigned with the object, the system does not take use of this reference name, it is for user document only.
Write address	Select the **[PLC name] [device type][address]** of the bit device that system set value to .
Write after button is released	If this function is selected, the operation is activated at touch up. If the function is not selected, the operation is activated at touch down. If the “Momentary” switch is selected as the operation mode, the [Write after button is released] function will be ignored.
Attribute Set Style	Please refer to the following description for different type of operation mode.

	Set ON	When the operation is activated, the bit device will be set to ON.
	Set OFF	When the operation is activated, the bit device will be set to OFF.
	Toggle	When the operation is activated, the bit device will be set to opposite.
	Momentary	When touch down the area, the bit device will be set to ON, when touch up the bit device will be set to OFF.
	Periodical toggle	The state of the bit device will be switched between ON and OFF periodically. Operation's time interval can be selected in the combo box showed in the picture below: 
	Set ON when window open	When the window containing the Set Bit object is opened, the bit device will be automatically set to ON.
	Set OFF when window open	When the window containing the Set Bit object is opened, the bit device will be automatically set to OFF.
	Set ON when window close	When the window containing the Set Bit object is closed, the bit device will be automatically set to ON.
	Set OFF when window close	When the window containing the Set Bit object is closed, the bit device will be automatically set to OFF.
	Set ON when backlight on	When the backlight is turned on, the bit device is automatically set ON.
	Set OFF when backlight on	When the backlight is turned on, the bit device is automatically set OFF.
	Set ON when backlight off	When the backlight is turned off, the bit device is automatically set ON.
	Set OFF when backlight off	When the backlight is turned off, the bit device is automatically set OFF.
Macro	Users can use set bit object to activate macro commands. Macro commands have	

	to be built before configure this function. Please refer to related chapter on how to edit Macros.
Set style	 When “Set style” is selected as “Toggle”, there are three different modes to trig macro command, i.e. OFF->ON, ON->OFF or ON<->OFF.

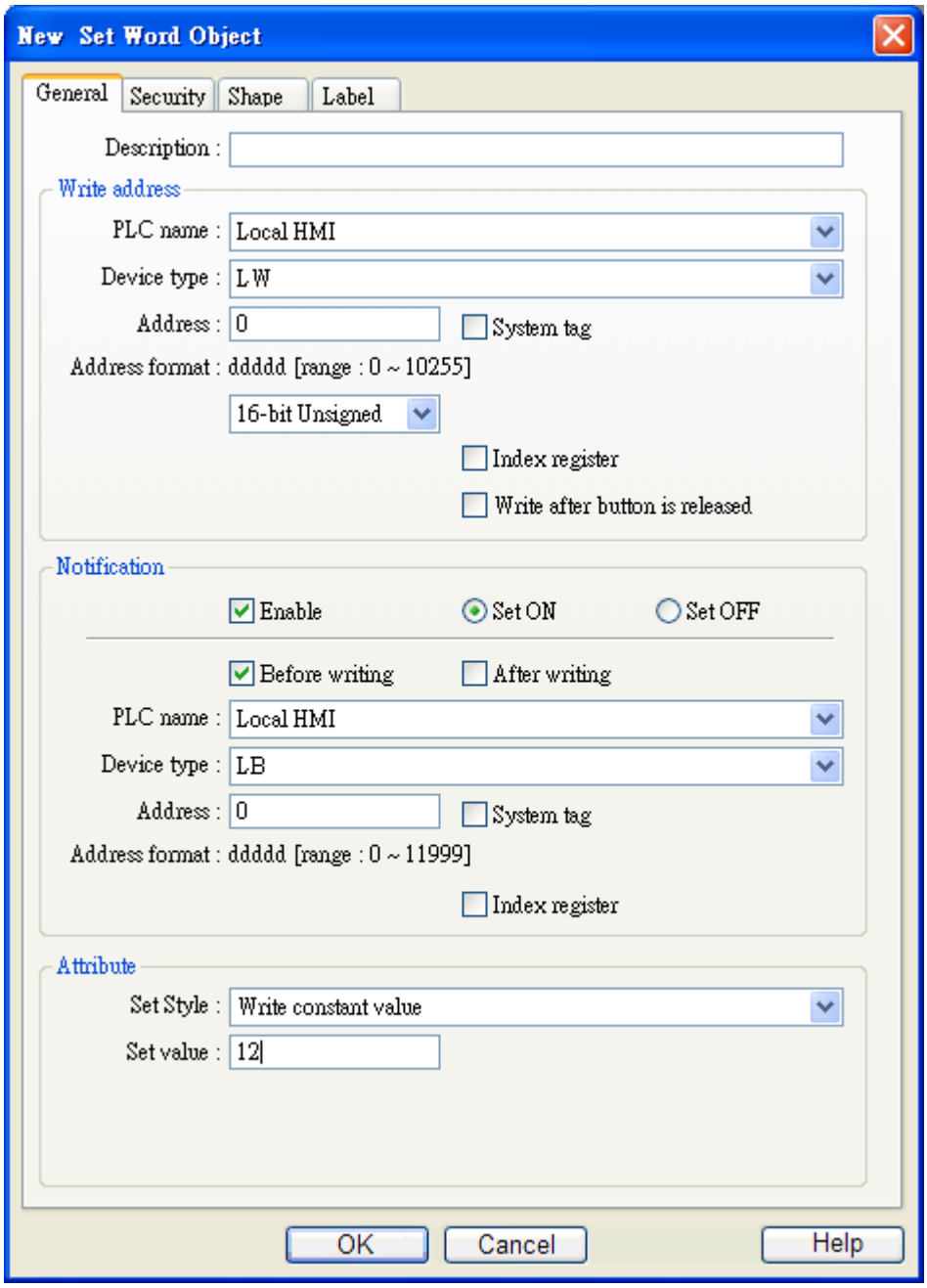
13.4 Set Word Object

13.4.1 Overview

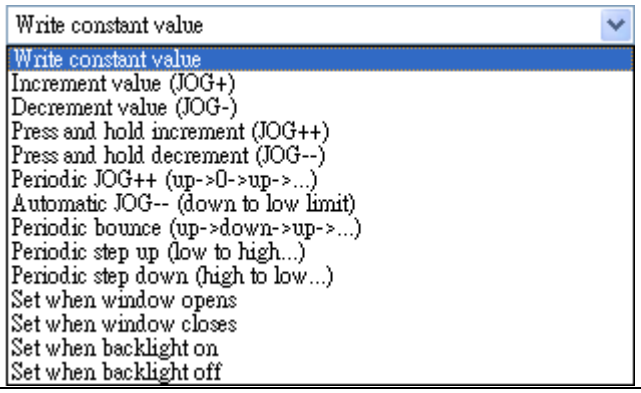
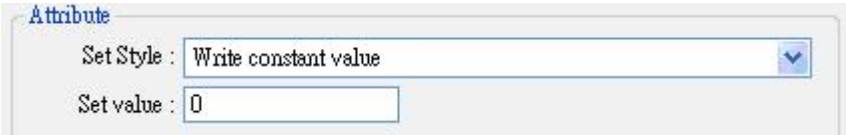
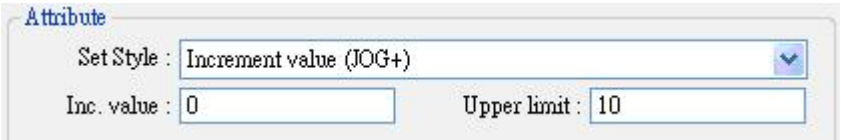
The Set Word object provides two operation modes: the “manual operation” mode and the “automatic operation” mode. The “manual operation” mode defines a touch area, and users can activate the area to set the value of the word device. When users select the “automatic operation” mode, the operation will be automatically activated in pre-configured conditions, the touch area is no action at any circumstance.

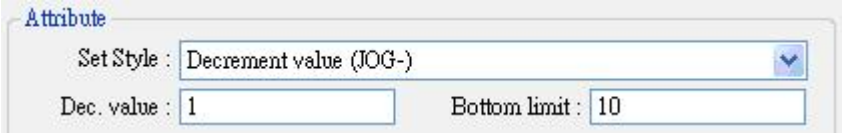
13.4.2 Configuration

Click the “Set Word” icon on the toolbar and the “New Set Word Object” dialogue box will appear, fill in each items and press OK button, a new Set Word object will be created. See the pictures below.



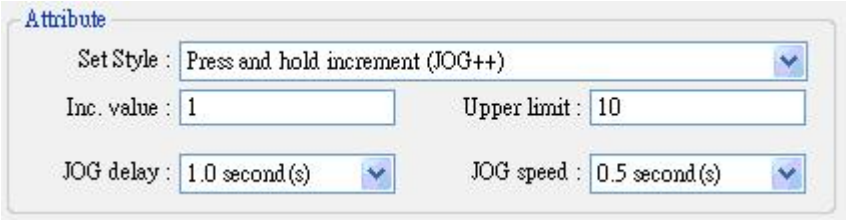
Write address	Select the **[PLC name] [device type][address]** of the word device that system set value to .
[Write after button is released]	If this function is selected, the operation is activated at touch up. If the function is not selected, the operation is activated at touch down.
Notification	When this function is selected, in the "manual operation" mode, the state of the designated bit device will be set to [ON] or [OFF] at the same time that the operation is completed.
[Enable]	Click to select notification function.

[Before writing]	To set the state of the designated bit device before write to word device
[After writing]	To set the state of the designated bit device after write to word device
Attribute	
[Set style]	To set the operation mode. The available modes for selection are listed as follows: 
	a. "Write constant value" Set constant function. When the operation is activated, the [Set value] will be written into the word device. The constant's format (16-bit BCD, 32-bit BCD, …) depends on the format of "Write address". 
	"Increment value (JOG+)" Increase value function. When the operation is activated, the [Inc. value] will be added to the value of the word device, on the condition that the result is not larger than the value [Upper limit]. 
	b. "Decrement Value (JOG-)" Decrease value function. When the operation is activated, the [Dec. value] will be subtracted from the value of the word device, on the condition that the result is not less than the value [Bottom limit].



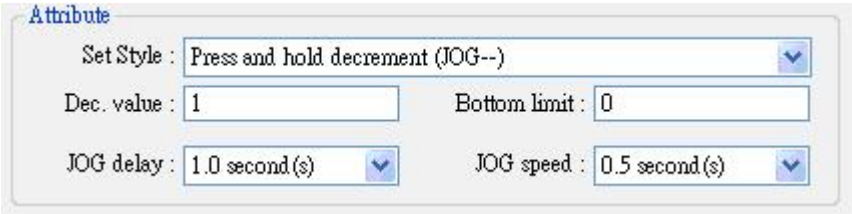
c. "Press and hold increment (JOG++)"

Press and hold increment function. When the touch down is held longer than the time set in [JOG delay], the value of the word device will be added by the value set in [Inc. value] at the speed set in [JOG speed], on the condition that the result is not larger than the value in [Upper limit].



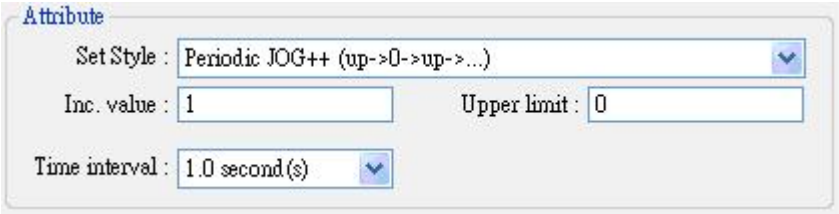
e. "Press and hold increment (JOG--)"

Press and hold decrement function. When the touch down is held longer than the time set in [JOG delay], the value of the word device will be subtracted by the value set in [Dec. value] at the speed set in [JOG speed], on the condition that the result is not smaller than the value in [Bottom limit].



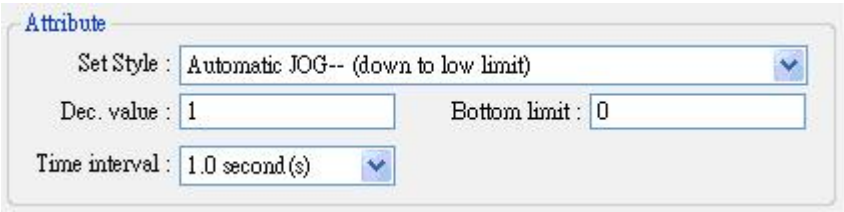
f. "Periodical JOG++"

Periodically increment function. A set word object can use the interval set in [Break time] and the value set in [Inc. value] to automatically increase the value of the word device, on the condition that the result is not larger than the value in [Upper limit].



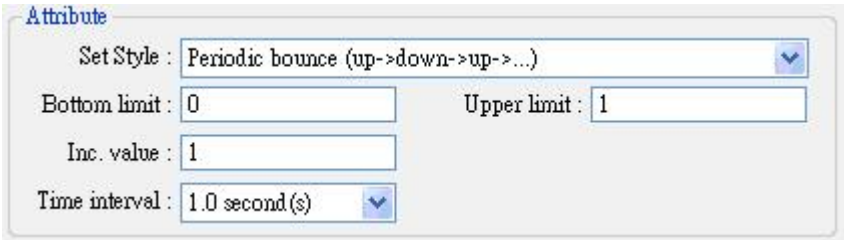
g. "Automatic JOG--"

Periodically decrement function. A set word object can use the interval set in [Break time] and the value set in [Dec. value] to automatically increase the value of the word device, on the condition that the result is not smaller than the value in [Bottom limit].



h. "Periodical bounce"

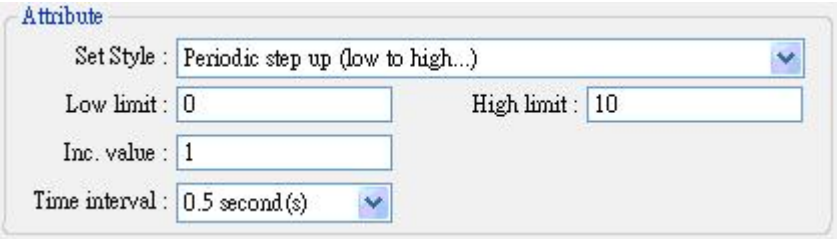
Periodically bouncing function. A Set word object will add the value set in [Inc. value] to the value of the word device at the regular intervals set in [Break time] until the resulting value reaches the value in the [Upper limit], and then subtract the value set in [Inc. value] from the value of the word device at the same intervals until the result value reaches the value in the [Bottom limit]. In the example shown below, the value in the word device will change periodically in order of 0, 1, 2.., 9, 10, 9, 8, 7,…, 1, 0, 1, 2……



i. "Periodical step up"

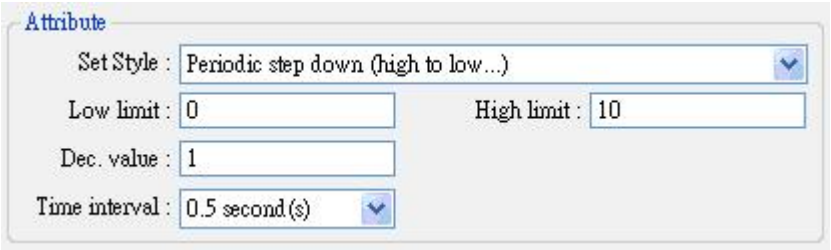
Stepping up function. A Set word object will add the value set in [Inc. value] to the value of the word device at the regular intervals set in [Break time] until the result value reaches the value in the [Upper limit], and the value of the word device will return to the value of the [Bottom value] and then repeat the action to keep the value

in an active state. In the example shown below, the value of the word device will change periodically in order of 0, 1, 2,…, 9, 10, 0, 1, 2, ……



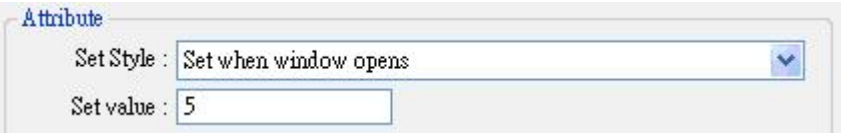
j. "Periodical step down"

Stepping down function. A Set word object will subtract the value set in [Dec. value] from the value of the word device at the regular intervals set in [Break time] until the result value reaches the value of the [Bottom limit], and the value of the word device will return to the value of the [Upper value] and then repeat the action to keep the value in an active state. In the example shown below, the value of the word device will change periodically in order of 10, 9, 8,…, 1, 0, 10, 9, 8, ……



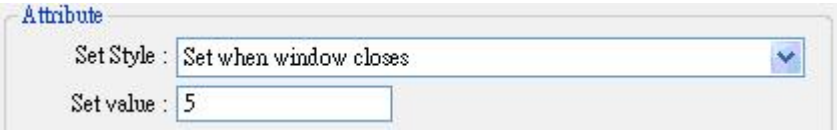
k. "Set when window open"

When the window containing the object is opened, the value of [Set value] will be automatically written into the word device.

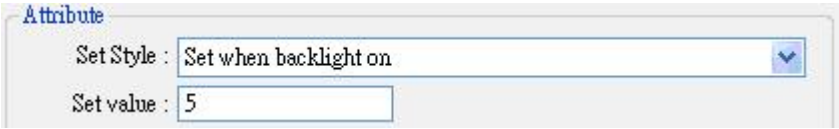


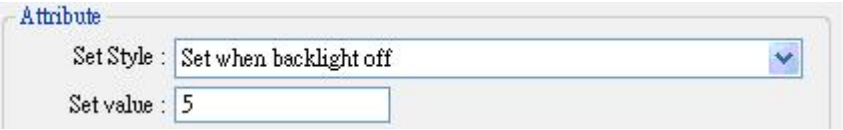
l. "Set when window close"

When the window containing the object is closed, the value of [Set value] will be automatically written into the word device .

<table>
<tr><td rowspan="3"></td><td> 
</td></tr>
<tr><td>m. ”Set when backlight on”

When the backlight is turned from off to on, the value of [Set value] will be automatically written into the word device.

 
</td></tr>
<tr><td>n. “Set when backlight off”
When the backlight is turned from on to off, the value of [Set value] will be automatically written into the word device.

 
</td></tr>
</table>

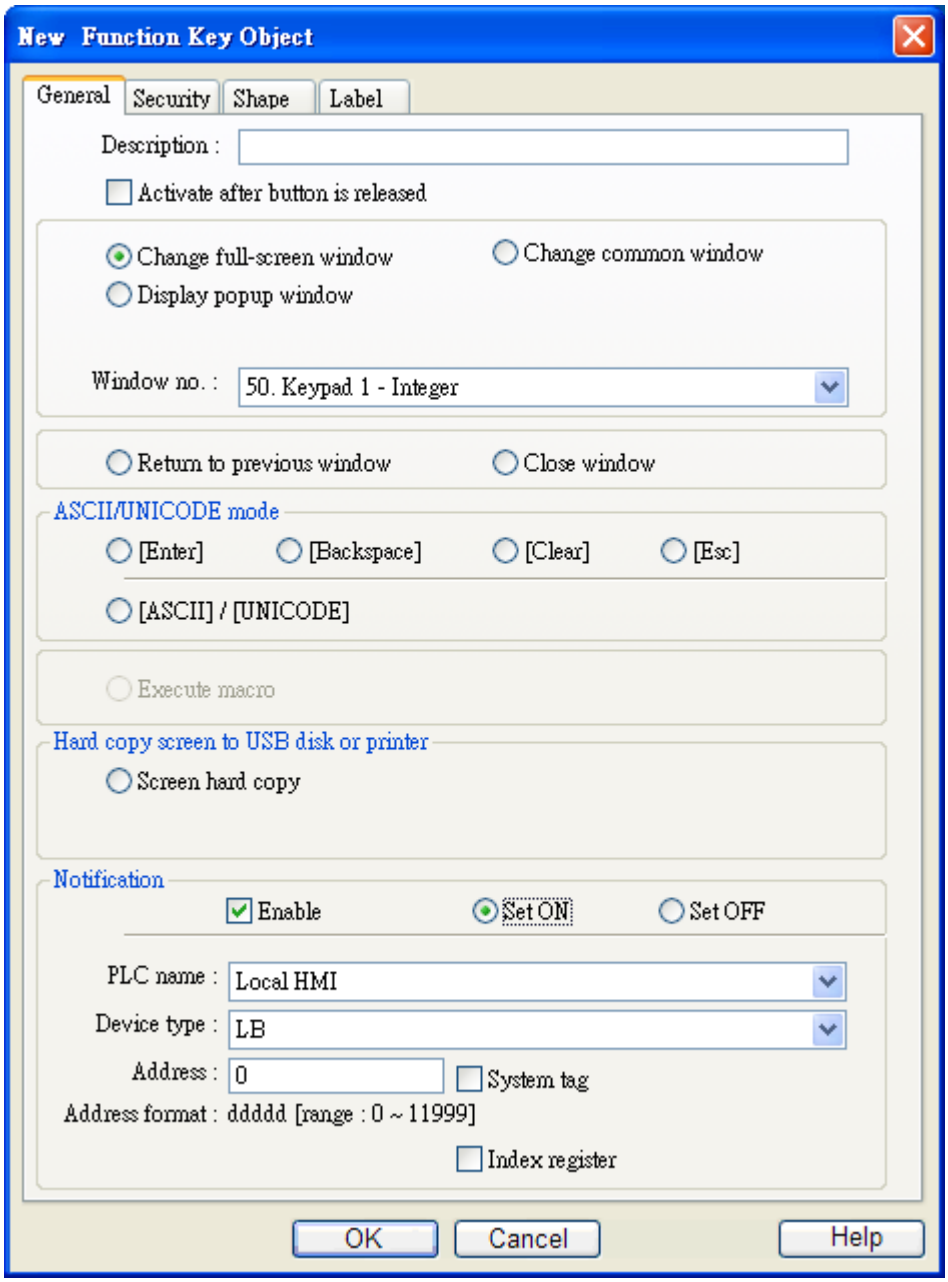
13.5 Function Key Object

13.5.1 Overview

Function key object is used to change base window, pop-up window and close windows. It can also be used to design the keypad buttons.

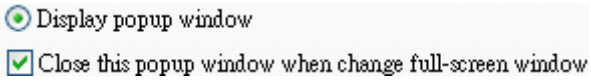
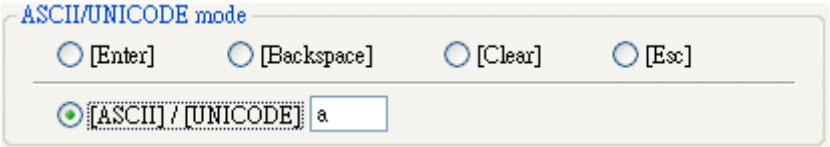
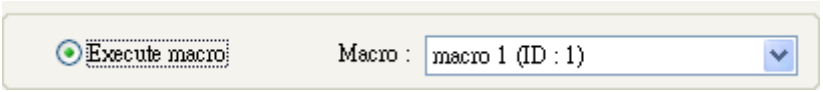
13.5.2 Configuration

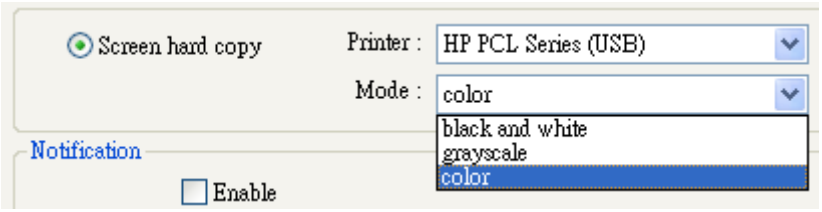
Click the “Function Key” icon on the toolbar and the “Function Key Object’s Properties” dialogue box will appear, fill in each items and press the OK button, a new function key object will be created. See the pictures below.



Function Key object provides the following operation modes:

[Active after button is released]	If this function is selected, the operation is activated at touch up. If the function is not selected, the operation is activated at touch down.
[Change full-screen Window]	Change base window. **NOTE:** Do not use this function to pop up the window which has been opened by direct / indirect window object.
[Change Common	Change common window; refer to the "windows" chapter for related information.

Window]	
[Display Popup Window]	Pop up window. The pop up window must be on the top of the base window. There is a [Close when change window] option with this function, see the picture below; when the function is selected, the pop up window will be closed when executing change base window. Otherwise, users have to set a "Close" button on the pop-up window to close the window. 
[Window no.]	This is used to select the window no. when performing "change base window", "change common window", and "pop up the window"
[Return to Previous Window]	This is used to return to the previous base window. Fox example, when changing window 10 to window 20, users can use this function to return to window 10. This function is only available for base window change.
[Close window]	Close the pop-up windows on the top of the base window.
Items in ASCII mode	[ASCII mode] is used as element to configure a keypad, the keypad is used where numbers or texts are needed to input to the numeric input object or ASCII input object. Refer to the "Designing and Using Keypad" chapter for detailed information. 
	[Enter] Same as the keyboard's "enter" function.
	[Backspace] Same as the keyboard's "backspace" function.
	[Clear] To clear the temperate input alphanumeric strings stored in the buffer. **[Esc]** Same as the [Close window] function, it is used to close the keyboard window.
	[ASCII] To set the characters that are input in the numeric input object and the ASCII input object. Digital characters such as 0,1,2… or ASCII characters like a,b,c,… etc. are available for selection.
	[Execute Macro] 

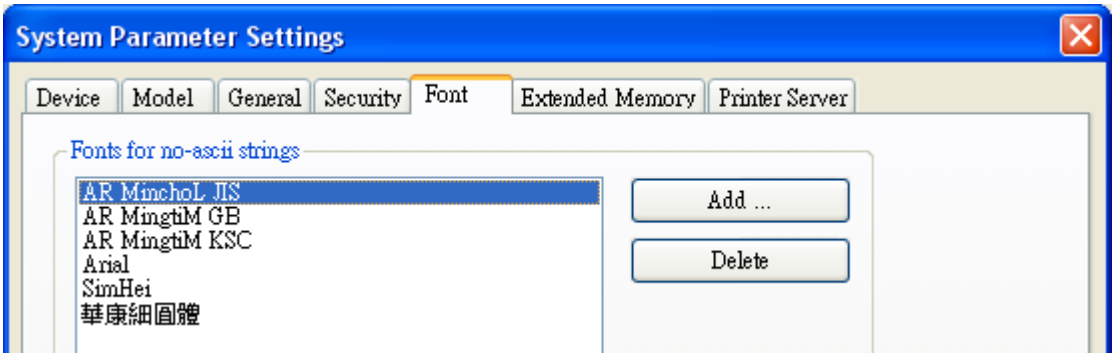
	Macro commands are executed with this selection. Macro commands have to be built before users choose this function. Please refer to related chapter on how to edit Macros.
	[Screen hard copy] Hardcopy current display screen to the printer attached with MT8000. Before using this function, please choose printer model in System Parameter / Model / printer. If printer does not support color, user can select grayscale to have a better printout effect. Black and white is for improving text printing quality. 
Notification	
[Enable]	When the function is selected, the MT8000 will set the state of the designated bit device to [ON] or [OFF] after the action is completed.

13.5.3 Non-ASCII character input

Below we illustrate the method to input non-ascii character such as Traditional Chinese, Simplified Chinese, Japanese, Greece and so on.

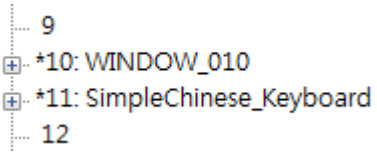
Step1: Setting non-ascii fonts

Go to System parameter/Font and add non-ascii fonts in the “Fonts for non-ascii strings” list. For example, use “AR MinchoL JIS” for Japanese, ” AR MingtiM GB” for simplified Chinese, ” AR MingtiM KSC” for Korean, ” Arial” for Greek, please refer illustration below.

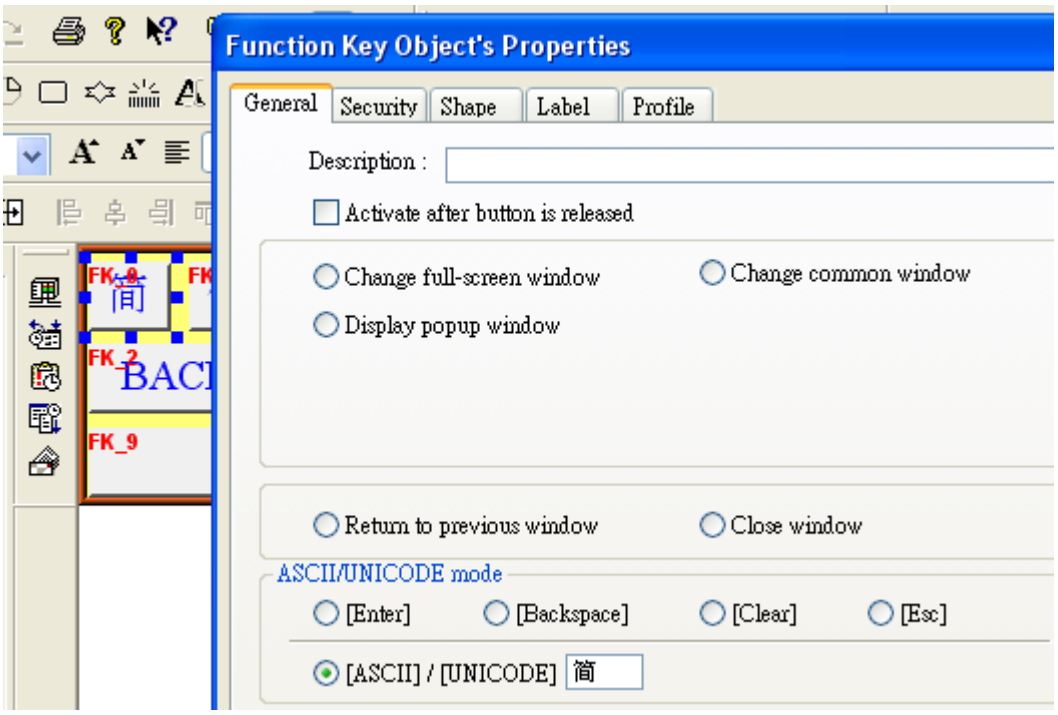


Step2: Design non-ascii input keypad

Create “window11” for non-ascii input keypad, keypad design is shown below.



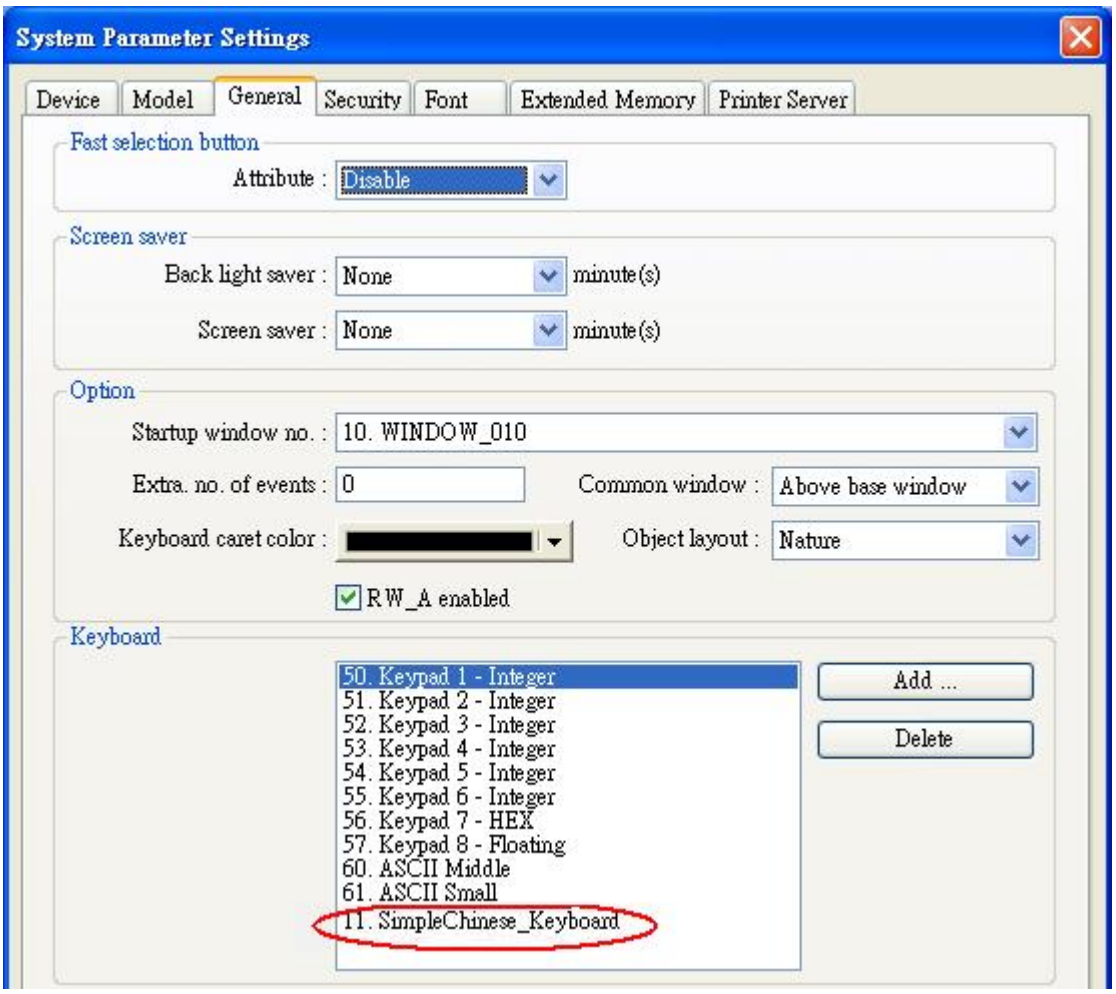
Those object on the window are function keys with input code in accord with the label . For example, to input ”简” function key, create a function key object/General/[ASCII]/[UNICODE] mode, type in ”简” in the column as below illustration.



Go to Function key/Label and then select “Use label”, type ”简” in the content and in the Attribute/Font select ” AR MingtiM GB”, it must be the same as setp1’s setting, as illustrated below.

The label of non-ascii function key must use the same Font. For example, in simplified Chinese keypad, the fonts all use ” AR MingtiM GB”.

After complete the keypad configuration, add window11 into System Parameters / General / keyboard as illustration below.


System Parameter Settings
Device
Model
General
Security
Font
Extended Memory
Printer Server
Fast selection button
Attribute :
Disable
Screen saver
Back light saver :
None
minute(s)
Screen saver :
None
minute(s)
Option
Startup window no. :
10. WINDOW_010
Extra. no. of events :
0
Common window :
Above base window
Keyboard caret color :
Object layout :
Nature
RW_A enabled
Keyboard
50. Keypad 1 - Integer
51. Keypad 2 - Integer
52. Keypad 3 - Integer
53. Keypad 4 - Integer
54. Keypad 5 - Integer
55. Keypad 6 - Integer
56. Keypad 7 - HEX
57. Keypad 8 - Floating
60. ASCII Middle
61. ASCII Small
11. SimpleChinese_Keyboard
Add ...
Delete

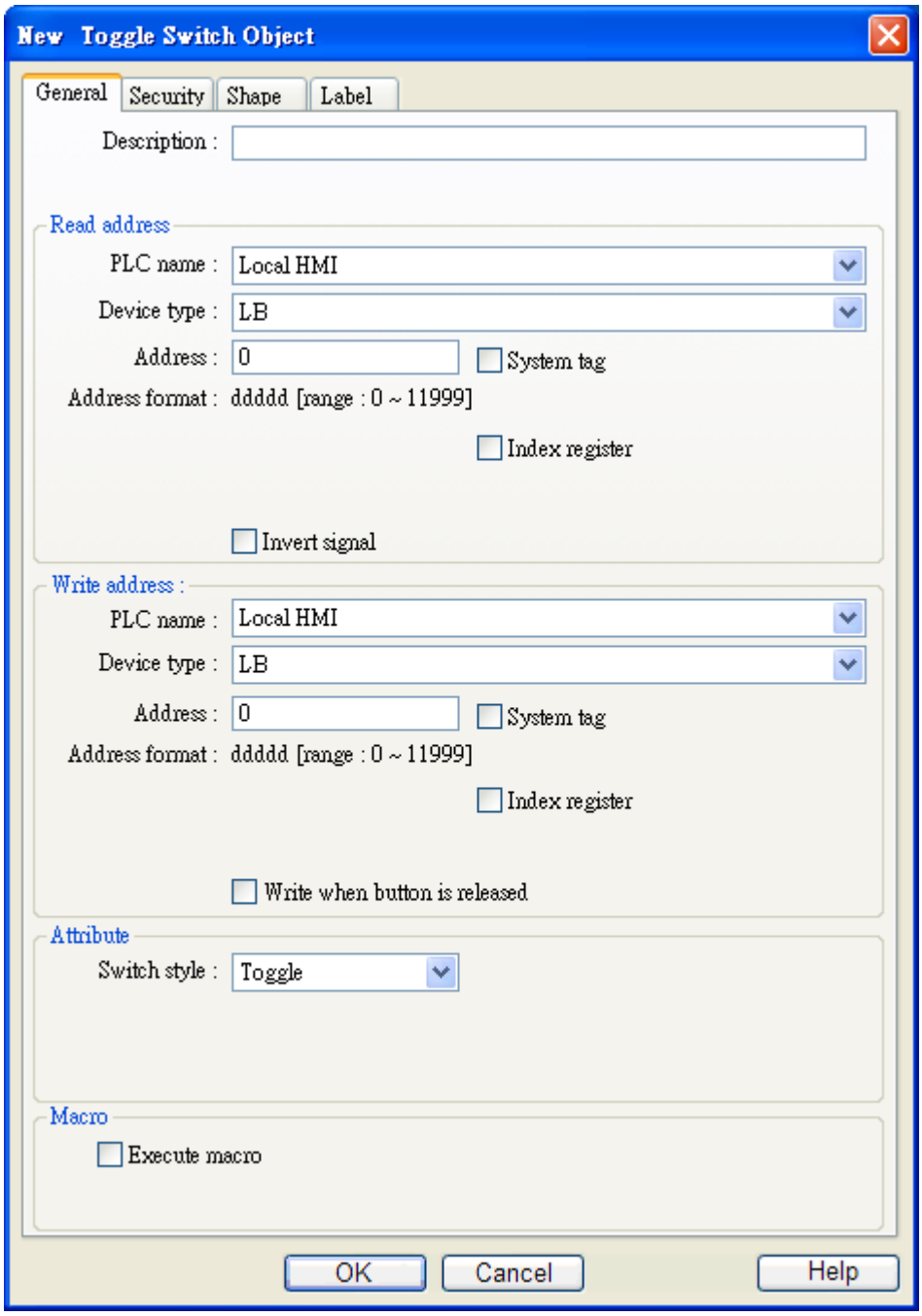
13.6 Toggle Switch Object

13.6.1 Overview

Toggle Switch object is a combination of bit lamp object and set bit object. The object can be used not only to display the state of a bit device but also to define a touch area, when activated, the state of the bit device will be set to “ON” or “OFF”.

13.6.2 Configuration

Click the “Toggle Switch” icon on the toolbar and the “New Toggle Switch Object” dialogue box appear, fill in each item, and press OK button, a new toggle switch object will be created. See the pictures below.



Read address	Select the **[PLC name] [device type][address]** of the bit device that control the display of toggle switch state.
Write address	Select the **[PLC name] [device type][address]** of the bit device that system set value to. The write address can be the same as or different from the read address
	[Write when button is released] Refer to the "Set Bit Object" section of this chapter for related information.
Attribute	This is used to select the operation mode. The available operation modes for

	selection include “Set ON”, “Set OFF”, ”Toggle”, and ”Momentary”. Refer to the illustrations in the “Set Bit Object” section of this chapter for related information.
Macro Commands	Users can execute macro command by trigging toggle switch. This function is the same as that of set bit object. Please refer to “the chapter of set bit object”.

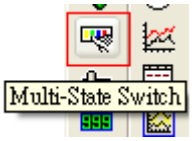
13.7 Multi-Switch Object

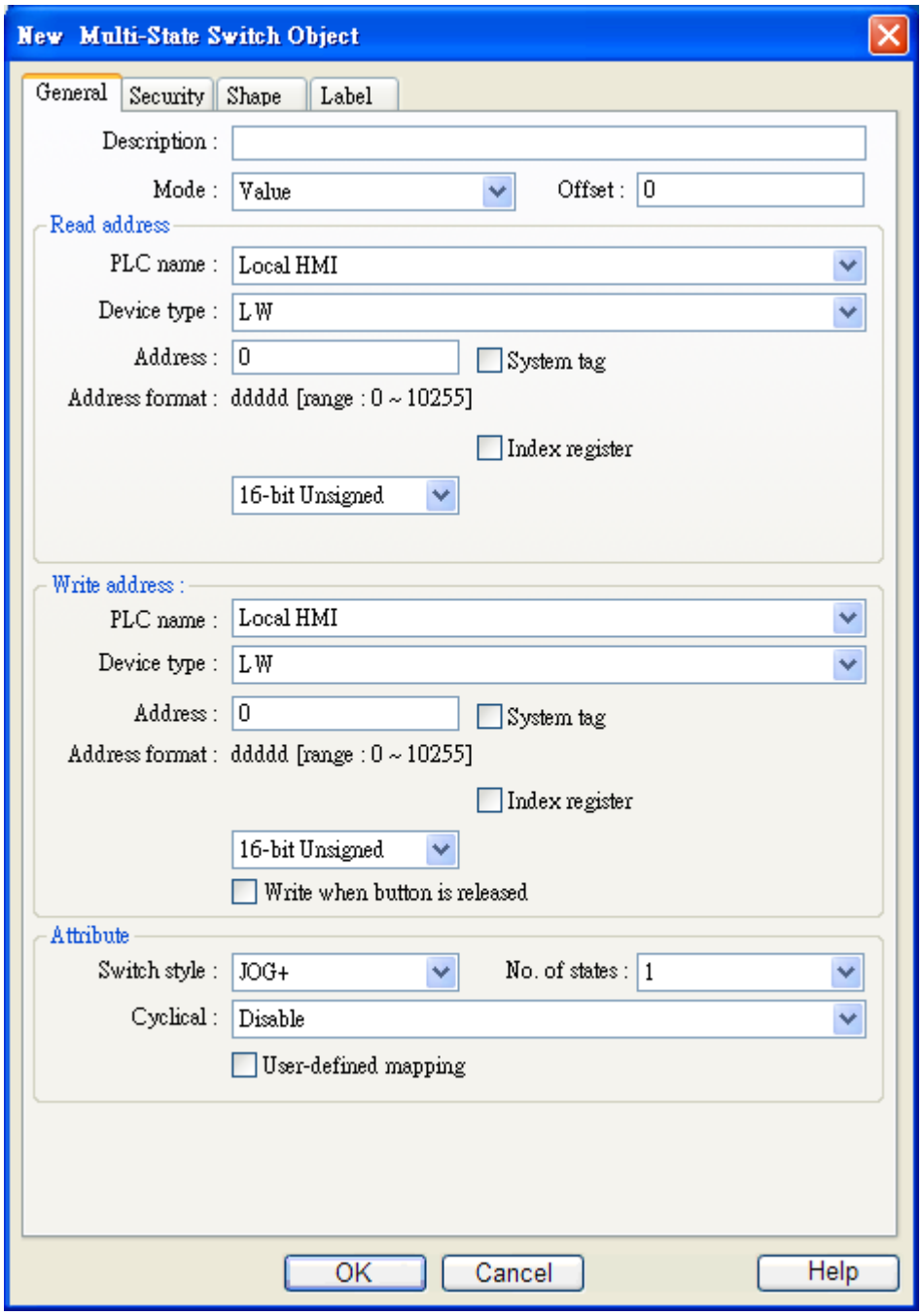
13.7.1 Overview

Multi-State Switch object is a combination of word lamp object and set word object. The object can be used not only to display the state of a word device but also to define a touch area, when activated the value of the word device can be set.

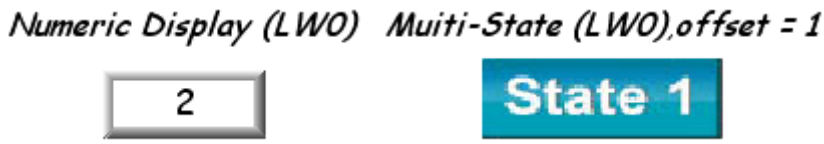
13.7.2 Configuration

Click the “Multi-State Switch” icon on the toolbar and the “New Multi-State Switch Object” dialogue box will appear, fill in each item, then click OK button, a new Multi-State Switch object will be created. See the pictures below.





[Mode]	There are “Value” and “LSB” display mode. Refer to the “Word Lamp Object” section of this chapter for related information.
[Offset]	It is used in the “Value” display mode. Refer to the “Word Lamp Object” section of this chapter for related information.
Read address	Select the **[PLC name] [device type][address]** of the word device that controls the display of multi-state switch..
Write address	Select the [PLC name] [device type][address] of the word device that system set value to. The write address can be the same as or different from the read address.

	[Write when button is released] Refer to the "Set Bit Object" section of this chapter for related information.
Attribute	Select the object's operation mode.
[Switch style]	There are "JOG+" and "JOG-" for selection. When the read address is the same as the write address, the minimum value of the word value is [Offset] (state 0), and the maximum value is "[no. of state] -1 + [Offset]". See the picture below. 
	a. "JOG+" When the Multi-State Switch object is activated, the value of the write address will be added by 1. In the "Value" display mode, if the resulting value is equal to or larger than the value of [No. of States] + [Offset] and "Enable" in [Cyclic] is selected, the value of the write address will return to [Offset] and show the state 0; otherwise the value of the write address will maintain as ([No. of states] – 1) + [Offset] and shows the state ([No. of states no.] – 1). **NOTE**: Like the word lamp object, the state shown by Multi-State Switch object is the value of the word device subtracts [Offset]. 
	b. "JOG-" When the Multi-State Switch object is activated, the value of the write address will be subtracted by 1. In the "Value" display mode, if the resulting value is smaller than the value of [Offset] and "Enable" in [Cyclic] is selected, the value of the register will change to ([No. of states] – 1) + [Offset] and shows the state ([No. of states no.] – 1); otherwise the value of the word device will remain in [Offset] and shows the state 0.

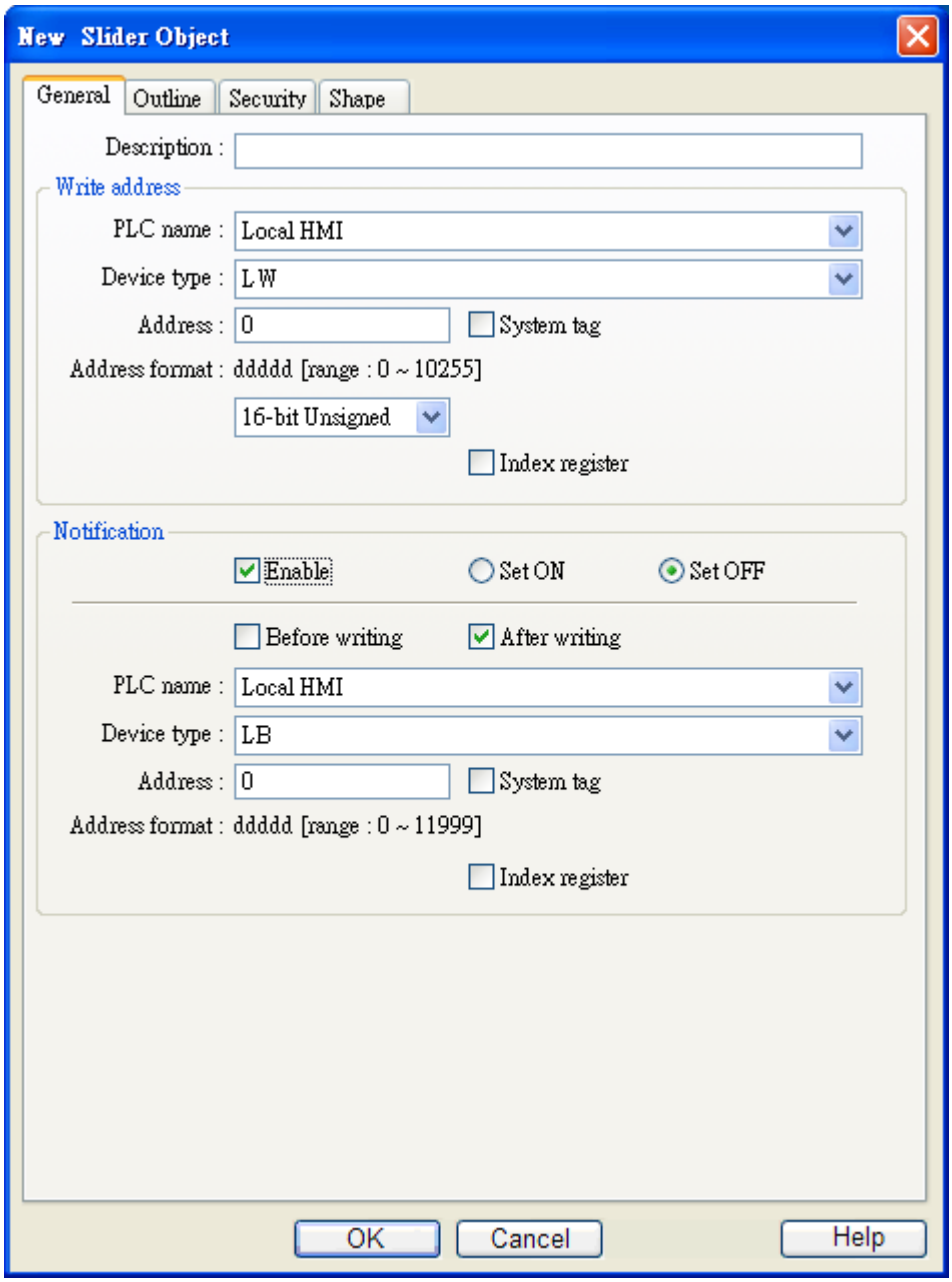
13.8 Slide Object

13.8.1 Overview

The slide object can be used to display the value of word device.

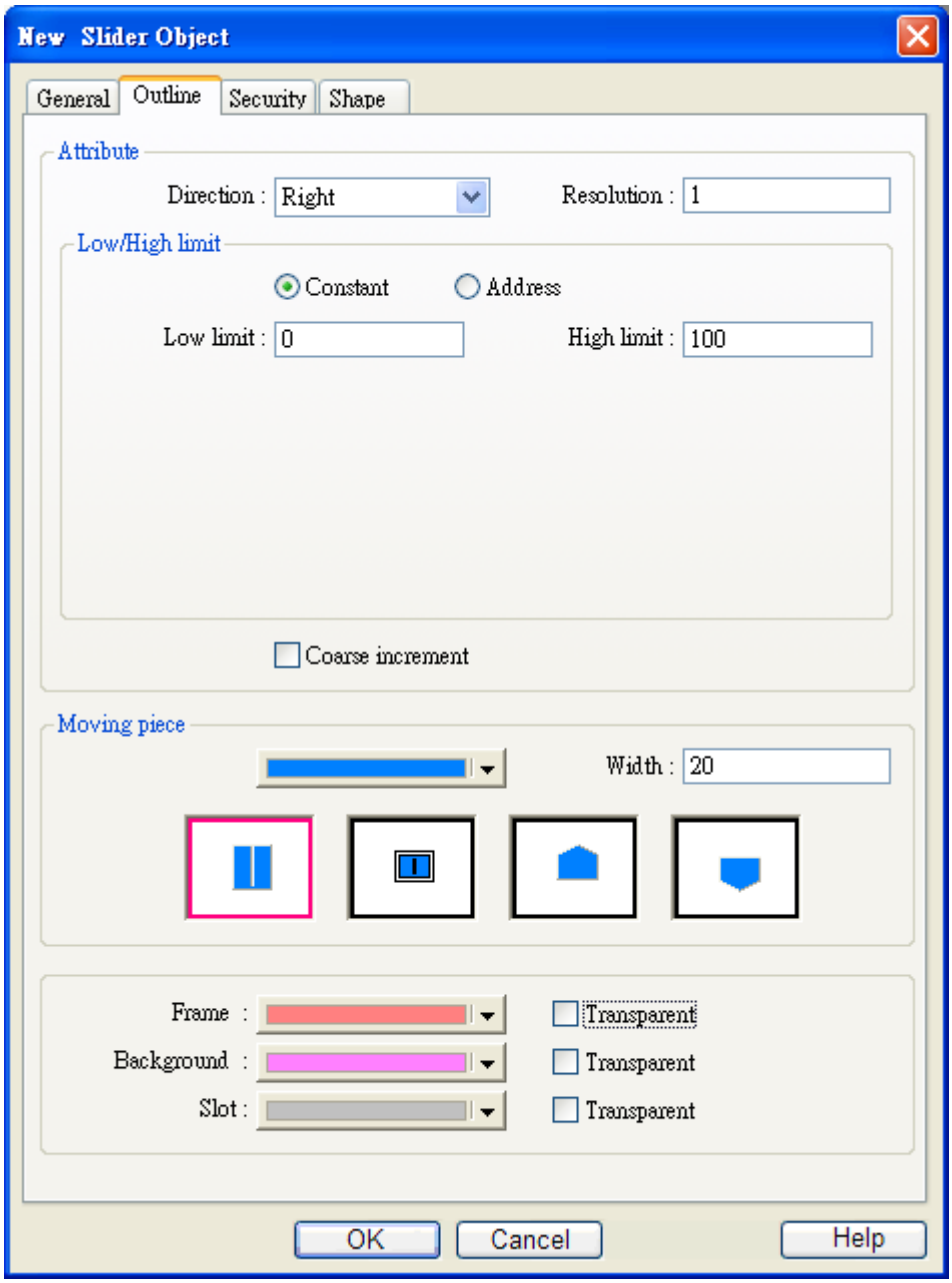
13.8.2 Configuration

Click the “slide object” icon on the toolbar and the dialogue box will appear, fill in each items and click OK button, a new slide object will be created. See the picture below.

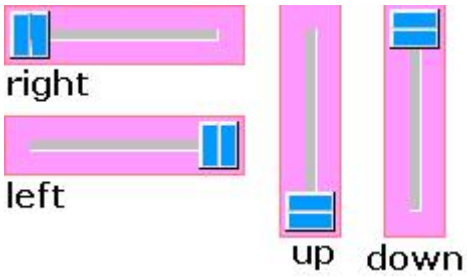


Write address	Select the **[PLC name] [device type][address]** of the word device that system set value to
Notification	When this function is selected, the state of the designated bit device can be set at the same time as the operation is completed. There are [ON] and [OFF] selection to set the state.
	[Enable] This is to select whether or not to use the function.
	[Before writing] To set the state of the designated register before write to the word device.

	[After writing] To set the state of the designated register after write to the word device.



Attribute	
	[Direction:] The bar on the slide direction, i.e. left, right, up and down.



[Resolution:]

The slider will move in every [N] lines step, where [N] is the resolution.

For example,

if [N] = 10, every 10th line will be displayed

if [N] = 5, every 5th line will be displayed

if [N] = 1, every line will be displayed

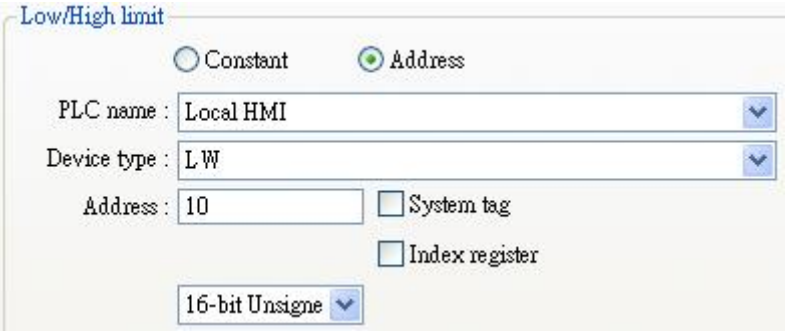
[Low limit & High limit:]

a. Constant

The low limit and high limit of the word device is set as constant value. i.e. [Input low] and [Input high]

b. Address

The low / high limit of the word device is controlled by an designated address.



Control address	Low Limit	High Limit
16-bit format	Address+0	Address+1
32-bit format	Address+0	Address+2

[Coarse increment:]

If this option is selected, the word value will increase/decrease one [increment] value for every touch activation. If not, the word value will be set the value in accord with the touch activated point.

Moving piece	There are four moving piece for selection. You also can adjust the width of moving piece.
Frame/Background/Slot	This is use to select slide object frame, background and slot's color.

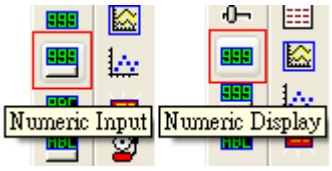
13.9 Numeric Input and Numeric Display Objects

13.9.1 Overview

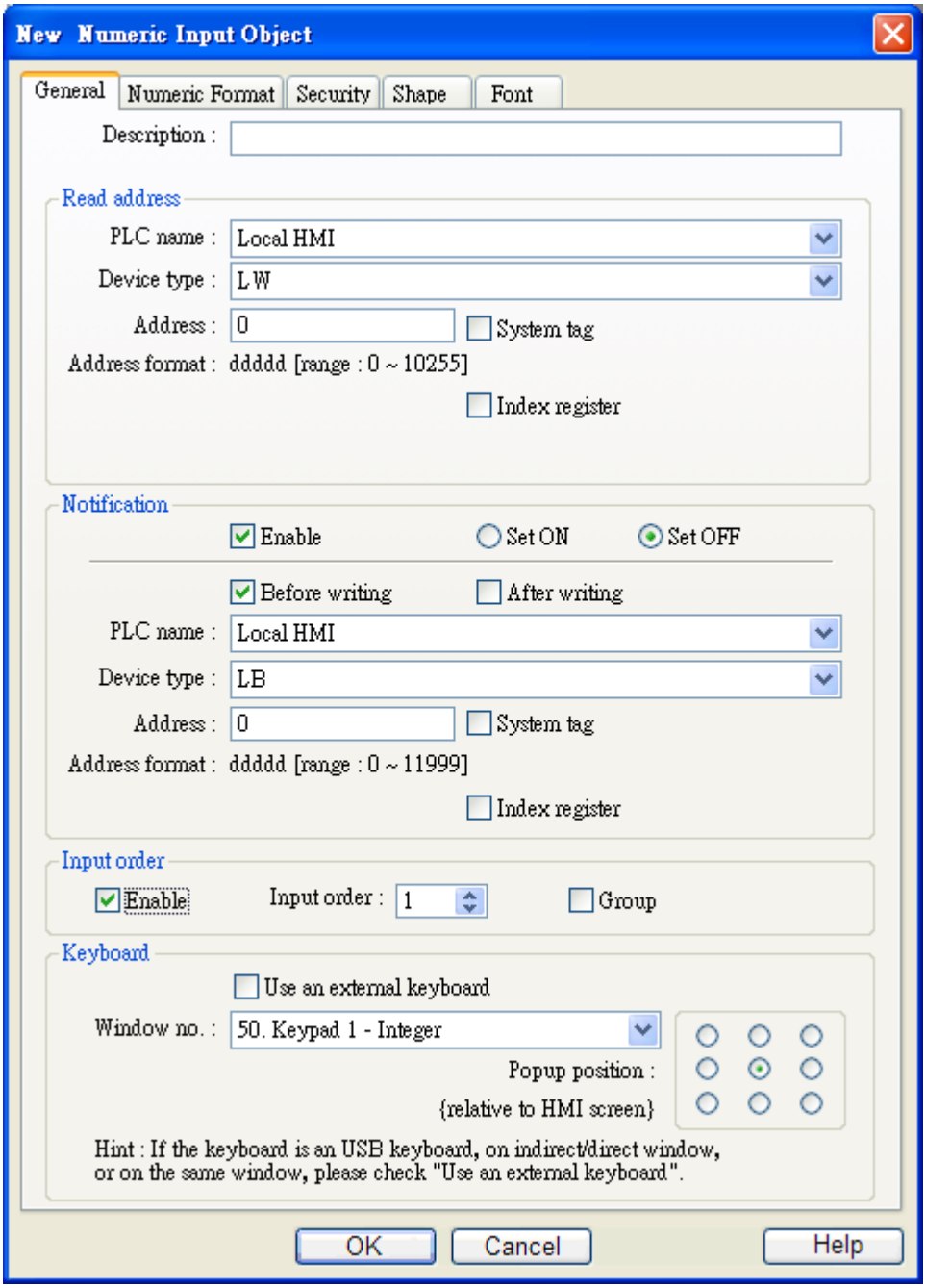
Both of the Numeric Input object and the numeric display object can be used to display the value of the word devices. The difference is the numeric input object can be used to input data from the keypad, the input value is written to the designated word devices.

13.9.2 Configuration

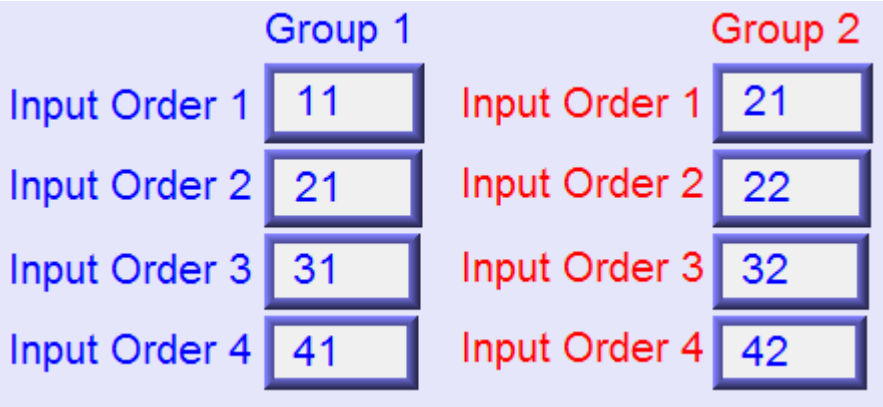
Click the “numeric input” or “numeric display” icon on the toolbar and the “New Numeric Input Object” or “New Numeric Display Object” dialogue box will appear, fill in each items, click OK button and a new “Numeric Input Object” or “Numeric Display Object” will be created. See the pictures below.

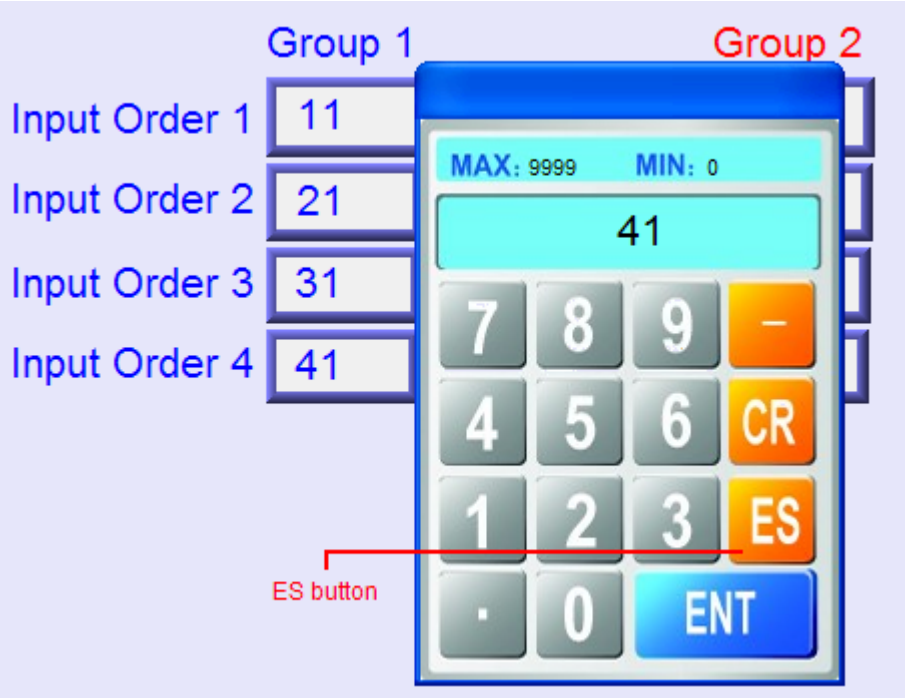


The difference between the “New Numeric Input Object” and “New Numeric Display Object” dialogue boxes is that the latter has the settings for ”Notification” and keypad input while the former doesn’t have. The picture below shows the [General] tab in “New Numeric Display Object.”



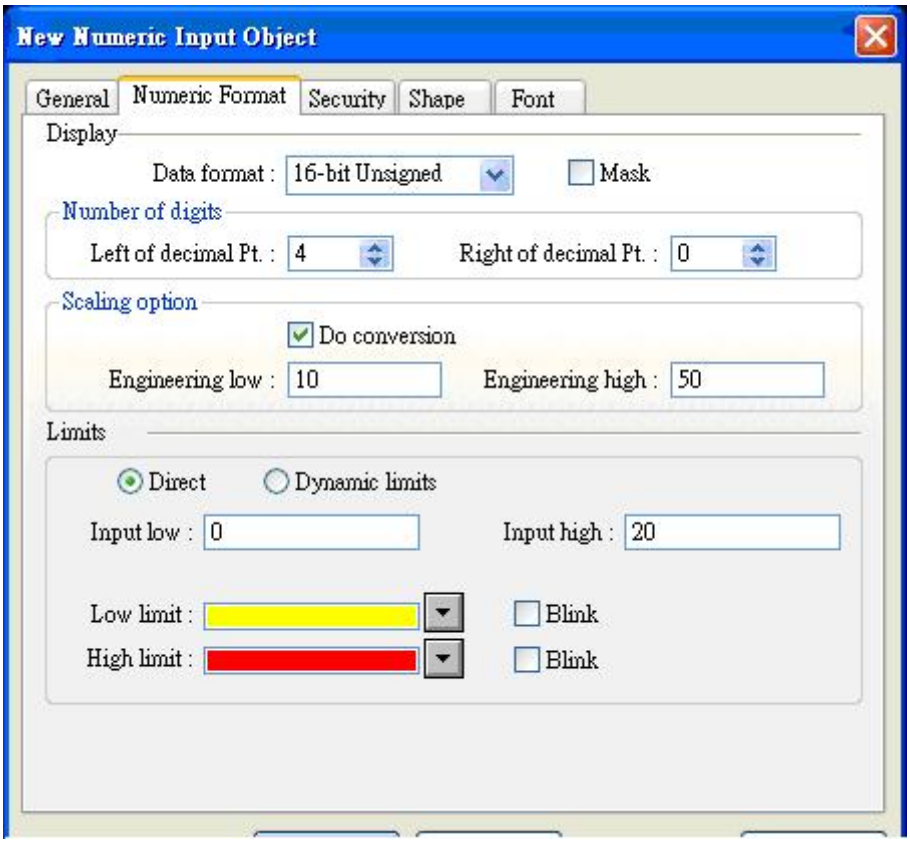
Read address	Select the **[PLC name] [device type][address]** of the word device that system display its value and write new data to it.
Notification	When this function is selected, the state of the designated bit device will be set to [ON] or [OFF] after the value of the register is changed successfully.
	[Enable] Click to enable notification function.
	[Before writing] To set the state of the designated bit device before update the word device..
	[After writing]

	To set the state of the designated bit device after update the word device.
Input Order	When user input value into “Numeric input” or “ASCII input” and then press ENT, the system will automatically search next active Numeric or ASCII input object.
[Input Order]	
	a. Check Input order [Numeric input] has a [Input order] and [Group], click “Enable” to active this function. In the [Input order], input the sequence number for each input object, and the system will follow this order to the next object.
	b. Check Group User can define separate input objects to different group. The system will only search the next object in the same group. 
	c. In online operation, please click ES button to stop the system searhing for the NI object.

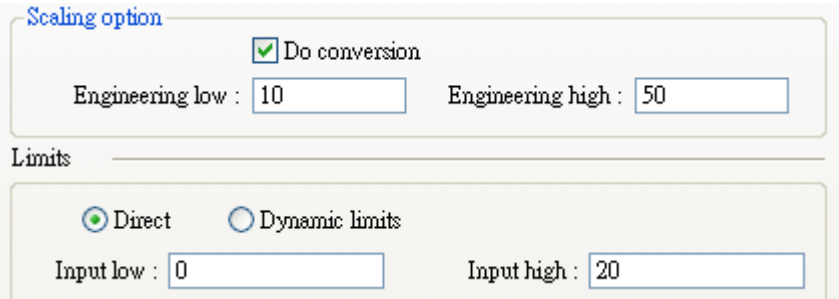
	
	NOTE :If one of input object has set "interlock" function, this object will be skip in the "next input object search". ● [Input order] range from 1 to 511 [Group] range from 1 to 15
Keyboard	There are two ways to display keyboard, one is to use system parameter/ General/ keyboard, to include standard keyboard into the project. The another is to select "external keyboard" and use direct window to display customized keyboard. The customized keyboard is composed of function key.
	When using the Numeric Input Object, you may select the keypad style. Then select the window where the keypad displayed and set the position in the window. When the Numeric Input object is activated, the popup window of keypad will appear automatically. Refer to the "Designing and Using Keypad" chapter for further information.

The picture below shows the [Numeric Format] tab, included in both of the numeric input object and the numeric display object, which is to set the data display format.



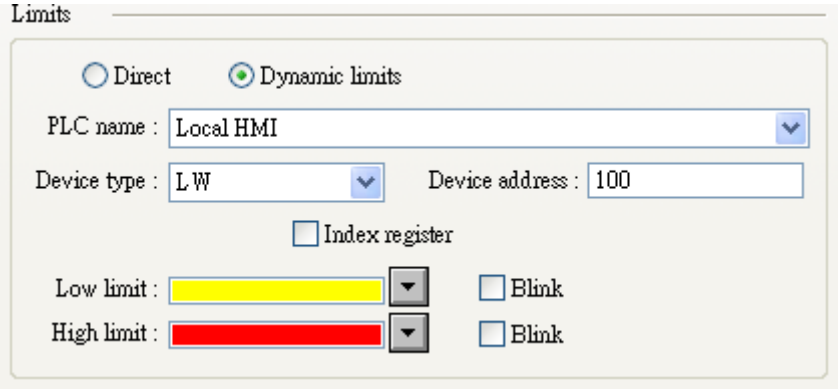
Display	**[Data format]** To select the data format of the word device designated by the "Read address". The selection list is shown as follows:

	16-bit BCD 32-bit BCD 16-bit Hex 32-bit Hex 16-bit Binary 32-bit Binary 16-bit Unsigned 16-bit Signed 32-bit Unigned 32-bit Signed 32-bit Float
	[Mask] When the data is displayed, "*" will be used to replace all digitals and the color warning function will be cancelled.
Number of digits	**[Left of decimal Pt]** The number of digits before the decimal point.
	[Right of decimal Pt] The number of digits after the decimal point.
Scaling option	**[Do conversion]** The data displayed on the screen is the result of processing the raw data from the word address designated by the "Read address." When the function is selected, it is required to set [Engineering low], [Engineering high], and [Input low] and [Input high] in the "Limitation". Supposed that "A" represents the raw data and "B" represents the result data, the converting formula is as follows: B = [Engineering low] + (A - [Input low]) × ratio where, the ratio = ([Engineering high] - [Engineering low]) / ([Input high] - [Input low]) See the example in the picture below, the raw data is 15, after being converted by the above formula as 10 + (15 – 0) × (50 – 10) / (20 - 0) = 40, and the result "40" will be displayed on the numeric input object. 
Limits	To set the source of the range for the input data and to set the warning color effect.

[Direct]

The low limit and high limit of the input data can be set in [Input low] and [Input high] respectively. If the input data is out of the defined range, the input value will be ignored.

[Dynamic limits]



Set the low limit and high limit of the input data to be derived from the designated register. The data length of the designated register is the same as the input object itself. In the above example, the low limit and high limit are derived from [LW100] and the following explains the usage of the low limit and high limit from designated address.

a. If the input object data format is “32-bitBCD”, then

[LW100]	low limit position (32-bit BCD)
[LW100 + 2]	high limit position (32-bit BCD)

b. If the input object data format is “16-bit unsigned”, then

[LW100]	low limit position (16-bit unsigned)
[LW100 + 1]	high limit position (16-bit unsigned)

c. If the input object data format is “32-bitfloat”, then

[LW100]	low limit position (32-bit float)
[LW100 + 2]	high limit position (32-bit float)

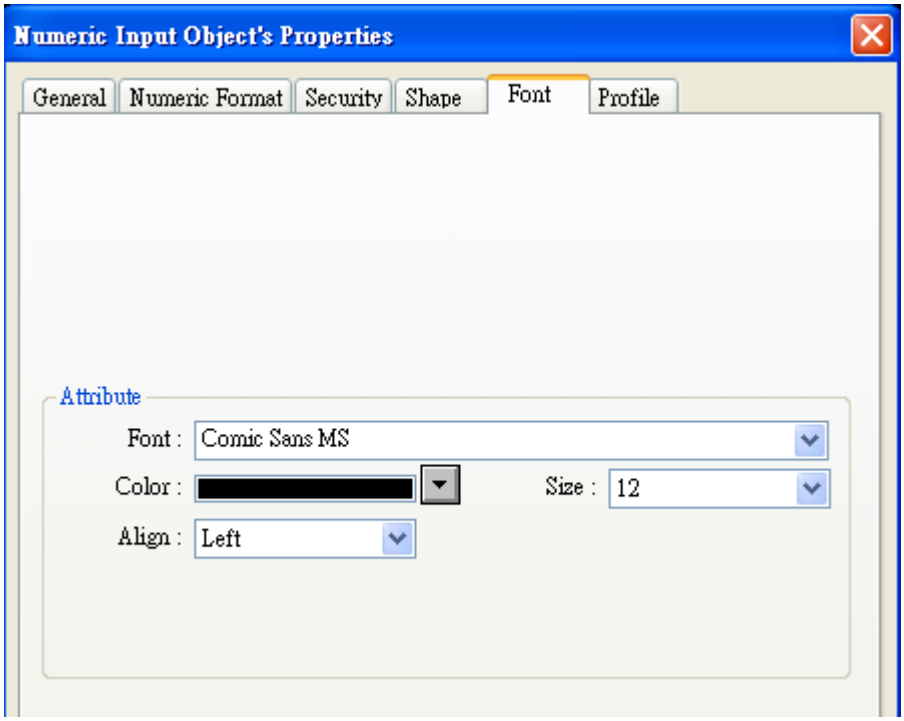
[Low limit]

When the value of the PLC’s register is smaller than [Low limit], the value is displayed with pre-defined color.

[High limit]

When the value of the PLC’s register is larger than [High limit], the value is

	displayed with pre-defined color..
	[Blink] When the value of the PLC's register is smaller than [Low limit] or larger than [High limit], the object will display data with Blinking. The picture below shows the [Font] tab, available in both of the numeric input object and the numeric display object to set font, font size , color, and aligning mode.



Attribute	**[Color]** When the data is within high and low limit, it will be displayed with this color..
	[Align] There are three aligning modes: "Left", "Leading zero", and "Right". The picture below shows the style of each modes. *Left* 12 *Leading zero* 0012 *Right* 12
	[Size] Set font size

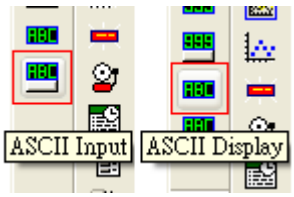
13.10 ASCII Input and ASCII Display Objects

13.10.1 Overview

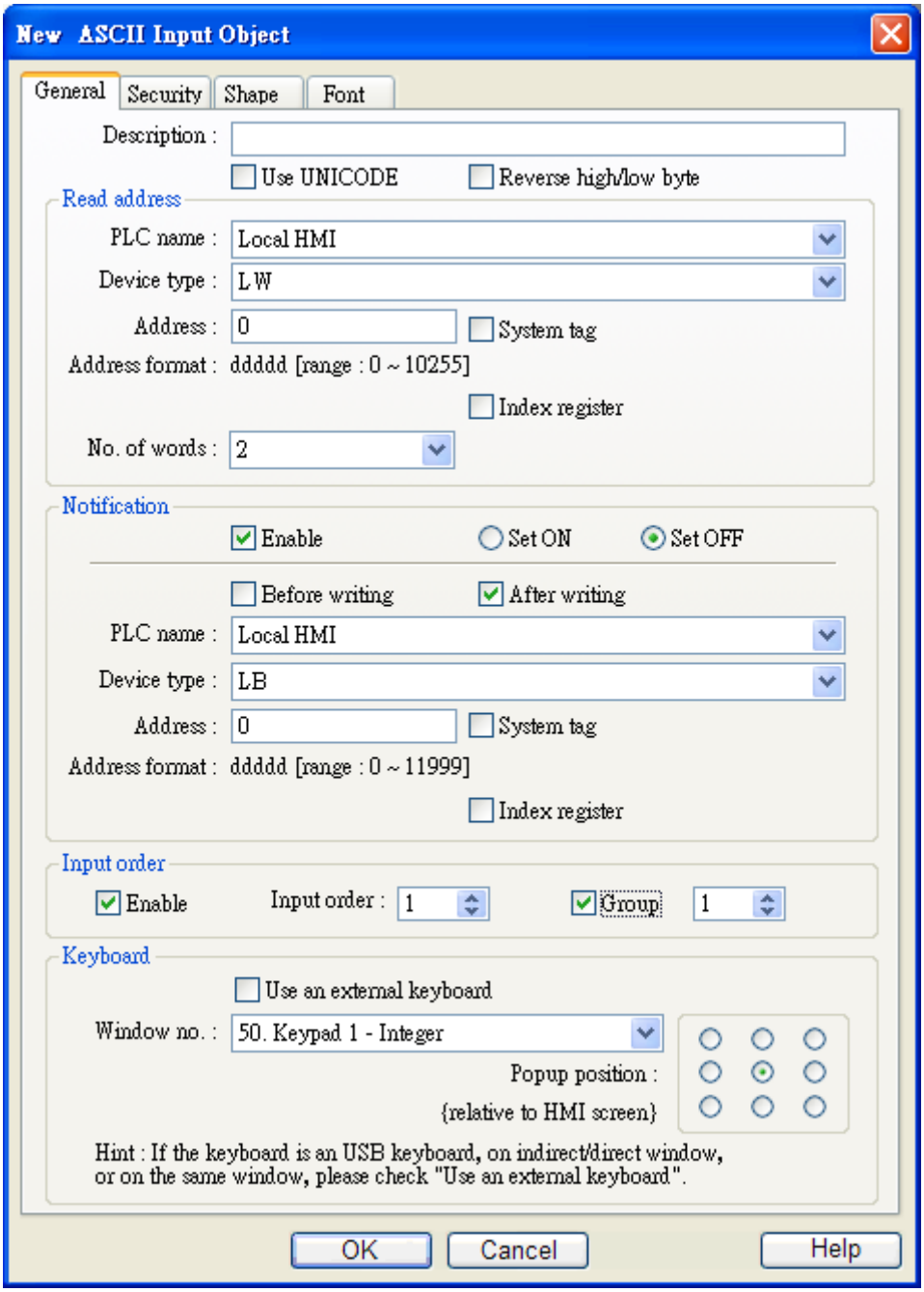
Both of the ASCII input object and the ASCII display object can display the value of the designated word devices in ASCII format. The ASCII input object can also accept the data input from the keypad and change the value of the word devices.

13.10.2 Configuration

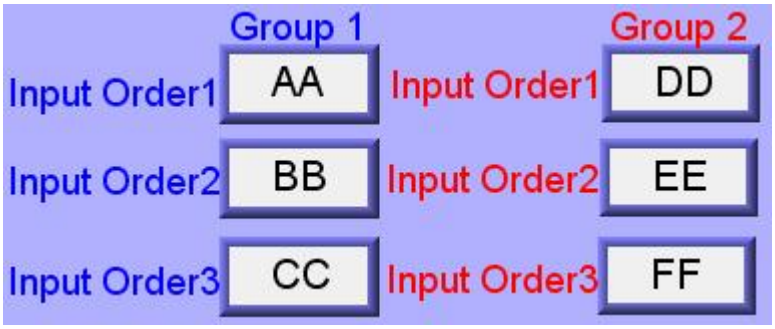
Click the “ASCII Input” or “ASCII Display” icon on the toolbar and the “New ASCII Input Object” or “New ASCII Display Object” dialogue box will appear, fill in each items, press OK button, a new “ASCII Input Object” or “ASCII Display Object” will be created. See the pictures below.

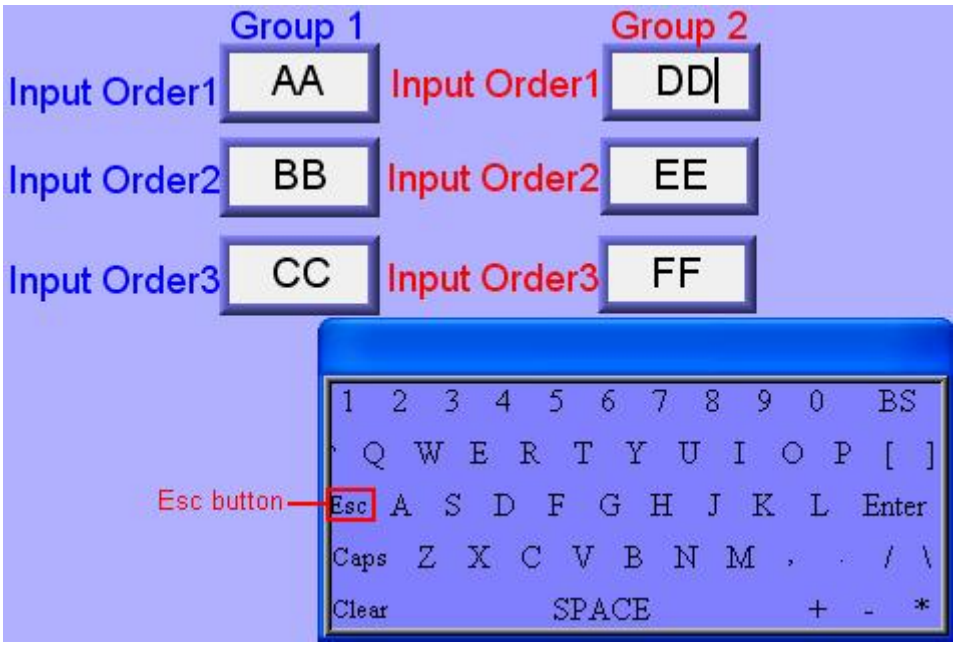


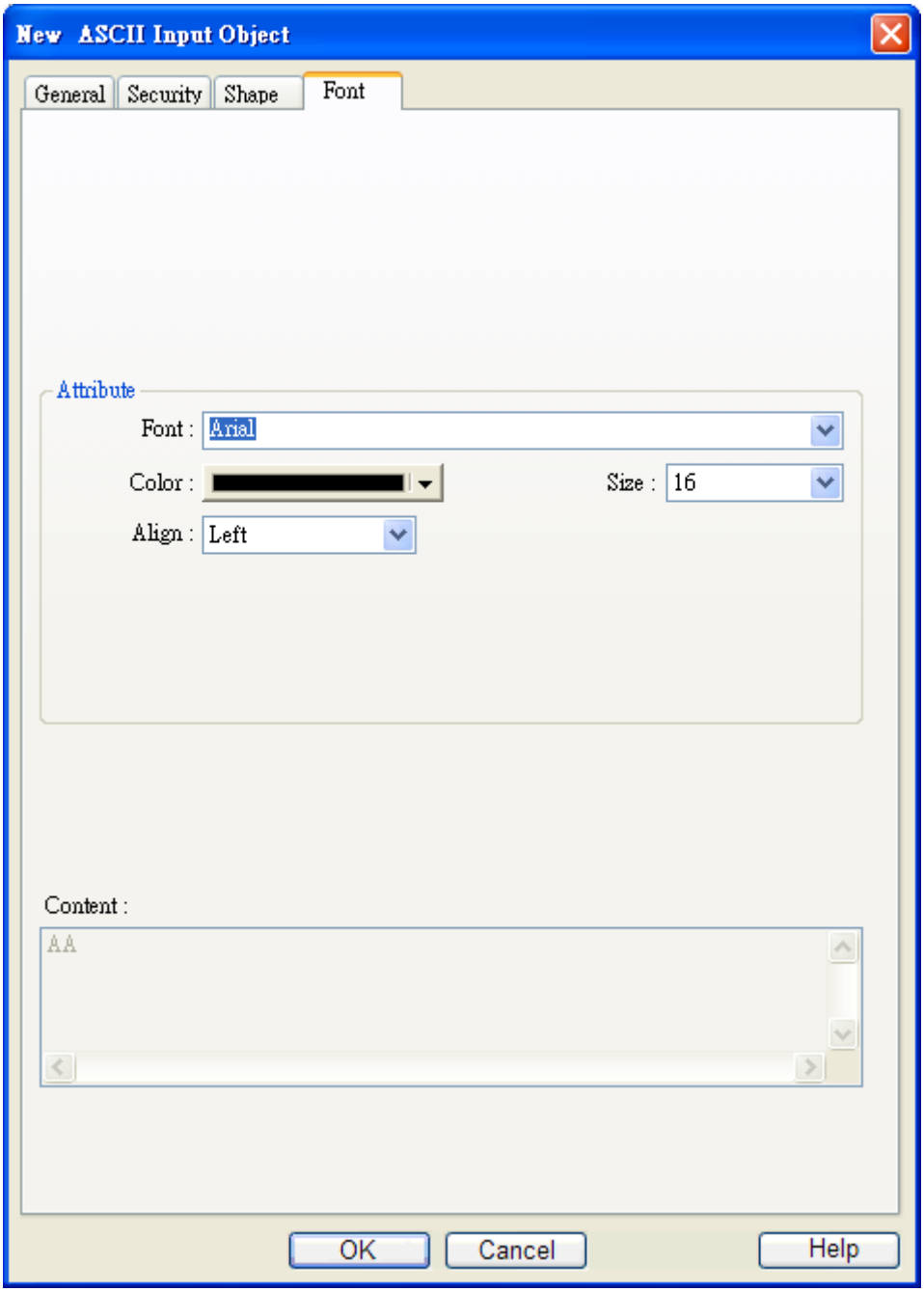
The difference between the “New ASCII Input Object” and “New ASCII Display Object” dialogue boxes is that the latter has the settings for “Notification” and keypad input while the former doesn’t have. The picture below shows the [General] tab of the “New ASCII Input Object.”



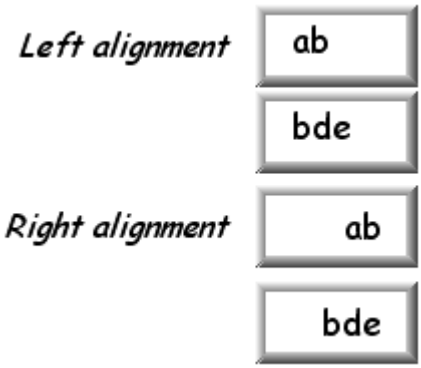
Use UNICODE	Click “Use UNICODE” to display data in UNICODE format. Otherwise the system displays the character in ASCII format. This feature can be used with function key [UNICODE]. Not every Unicode has corresponding font stored in the system. The font of UNICODE is only available for those Unicode character that registered function key.
Reverse high/low byte	In normal condition, the ASCII code is displayed in “low byte”, “high byte” order. The reverse selection make the system display ASCII characters in “high byte”, “low byte” order.
Read address	Select the **[PLC name] [device type][address]** of the word device that system

	display its value and write new data to it.
	[No. of words] To set the length of ASCII data in the unit of words. Each ASCII character take one byte, each word contains two ASCII characters. In the example shown below, the object will display 3 * 2 = 6 characters. 
Notification	When this function is selected, the state of the designated bit device will be set to [ON] or [OFF] after the value of the word devices are changed successfully.
	[Enable] Make notification selection enable.
	[Before writing] To set the state of the bit device before update the ASCII data.
	[After writing] To set the state of the bit device after update the ASCII data.
Input order	When user input value into “Numeric input” or “ASCII input” and then press ENT, the system will automatically search next active Numeric or ASCII input object.
	1. Check Input order [ASCII input] has a [Input order] and [Group], click “Enable” to active this function. In the [Input order], input the sequence number for each input object, and the system will follow this order to the next object.
	2. Check Group User can define separate the input objects to different group. The system will only search the next object in the same group. 
	To stop the system searching for the next objects, please click Esc button.

	 If one of input object has set “interlock” function, this object will be skip in the “next input object search”. ● [Input order] range from 1 to 511 ● [Group] range from 1 to 15
Keyboard	There are two ways to display keyboard, one is to use system parameter/ General/ keyboard, to include standard keyboard into the project. The other is to select “external keyboard” and use direct window to display customized keyboard. The customized keyboard is composed of function key.
	When using the ASCII Input Object, you may select the keypad style. Then select the window where the keypad displayed and set the position in the window. When the ASCII Input object is activated, the popup window of keypad will appear automatically. Refer to the “Designing and Using Keypad” chapter for further information.



Attribute	The picture shows the [Font] tab of the ASCII Input object and the ASCII display object. Users can set the font, font size and color, and aligning mode. 
	[Align] There are two aligning modes: “Left” and “Right”. The picture below shows

	how each mode performs. 
	[Size] Set font size.

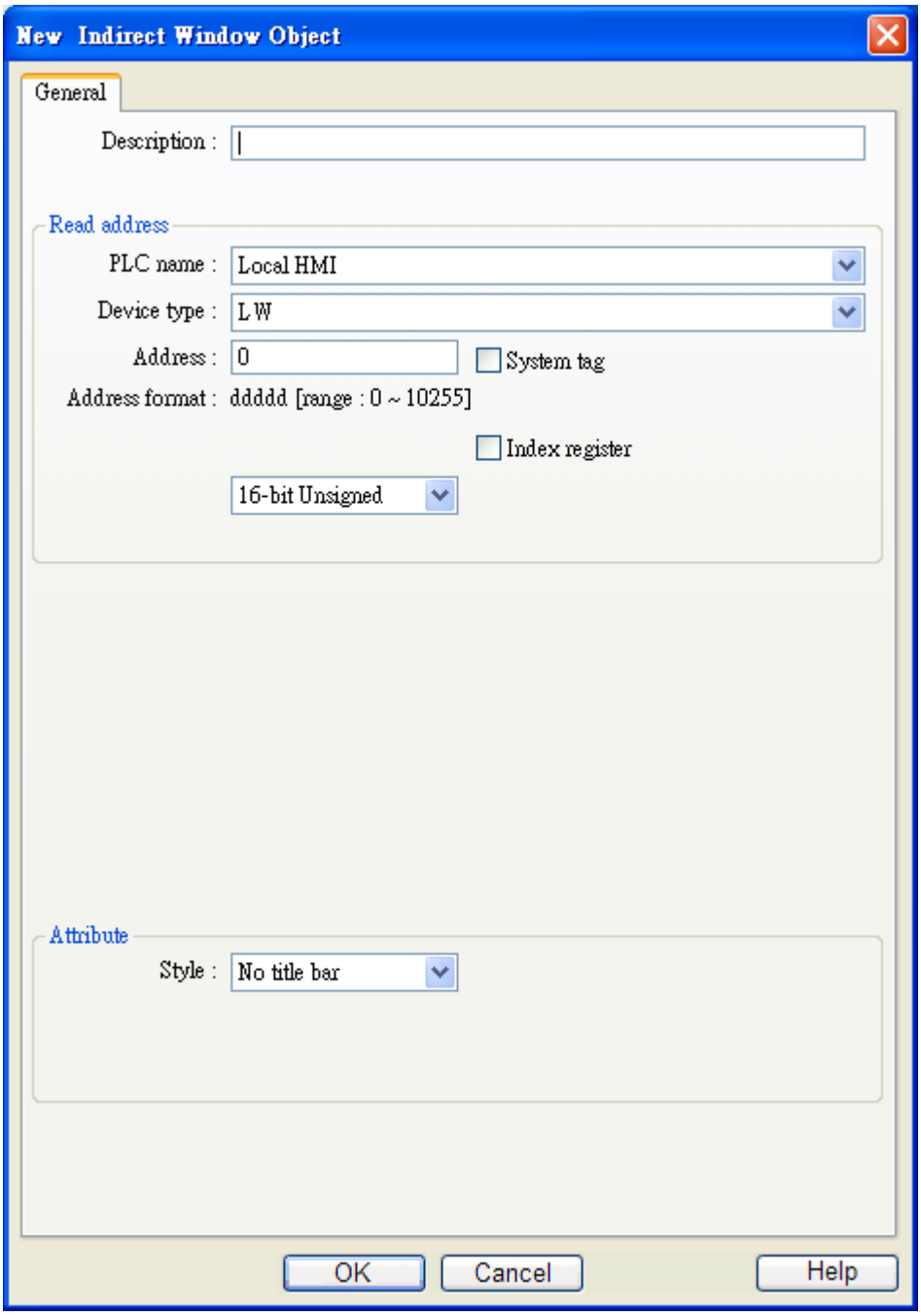
13.11 Indirect Window Object

13.11.1 Overview

“Indirect window” object is to define a popup window location (position / size) and a word device. When the content of the word device is written a valid window number, the window will be popup in the predefined location. The popup window will be closed when the value of the word device is reset (0). The system will only take action when the content of word device is changed (0 → valid window number, nonzero → 0, A → B valid window number).

13.11.2 Configuration

Click the “indirect window” icon on the toolbar and the “New Indirect Window Object” dialogue box will appear, fill in each items, click OK button , a new “Indirect Window Object” will be created. See the pictures below.

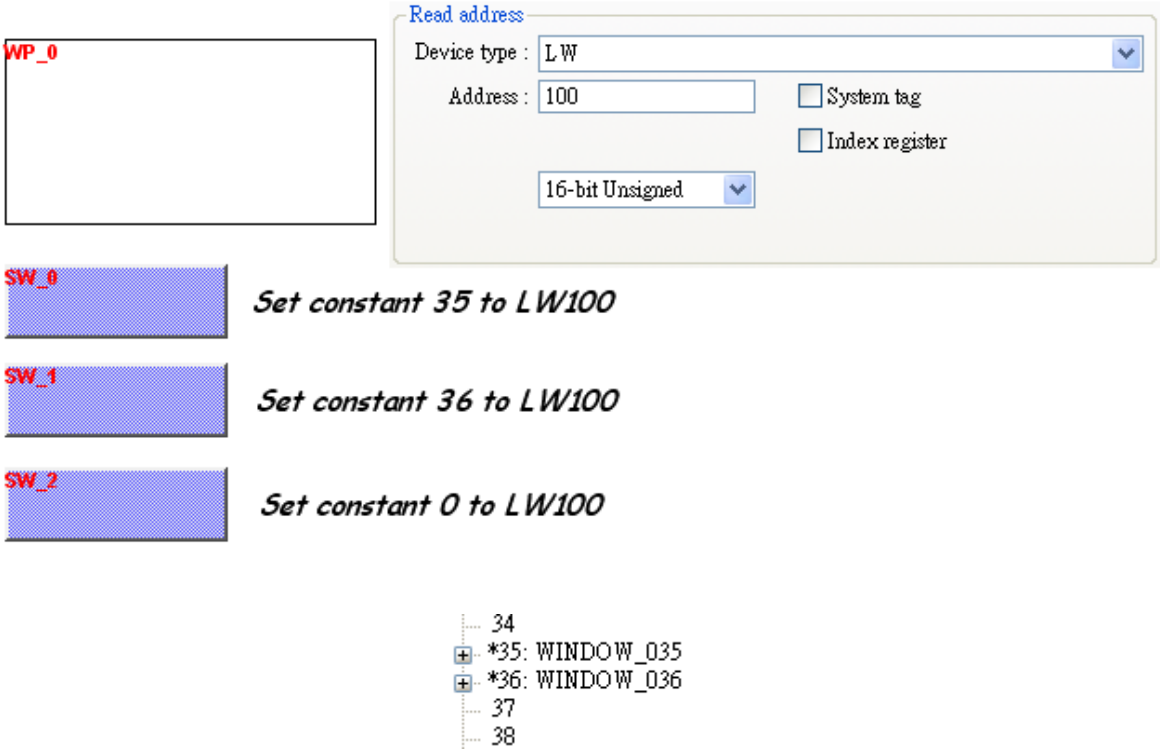


Read address	Select the **[PLC name] [device type][address]** of the word device that control the window popup.
Attribute	**[Style]** To set the display style of the popup window. There are two styles, “No title bar” and “With title bar”.
	a. “No title bar” The popup window does not have title bar, and its position is fix as predefined in configuration.

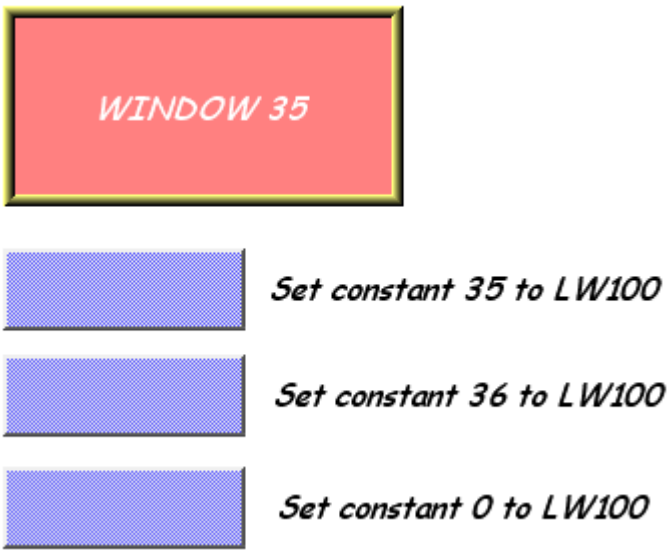
	
	b. “With title bar” The Popup window contains title bar, and its position can be dragged at online operation. 

13.11.3 Example to use indirect window

Here is a simple example to illustrate indirect window object. The pictures show how to configure an indirect window and use the word device [LW100] to change the popup window.

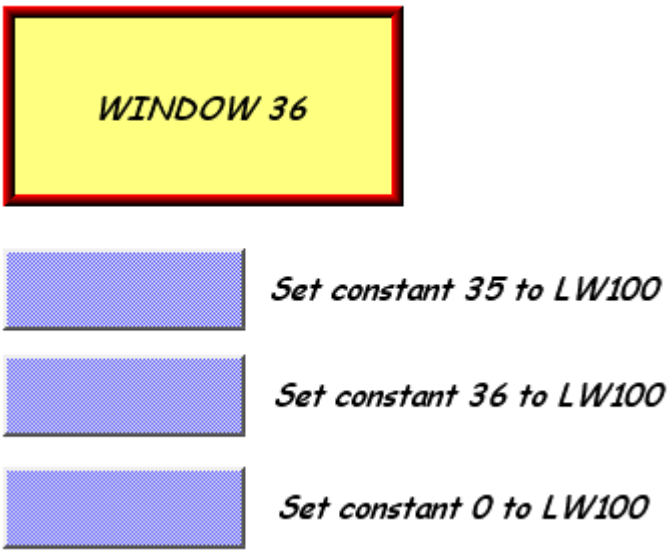


Use the set word object SW_0 to set the value of [LW100] as 35, and the location of indirect window will display window 35.



Use the set word object SW_1 to set the value of [LW100] as 36, and the location of indirect window will display window 36.

.



No matter window 35 or 36 is displayed on the indirect window location, press SW_2 to set the value of [LW100] to 0 will close the popup window. The other way to close the popup window from indirect window object is to configure a function key with [close window]. Once you press the function key the popup window will be closed.

NOTE: Do not use this function to open the window when the same window has been opened by function key or direct window.

13.12 Direct Window Object

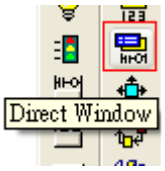
13.12.1 Overview

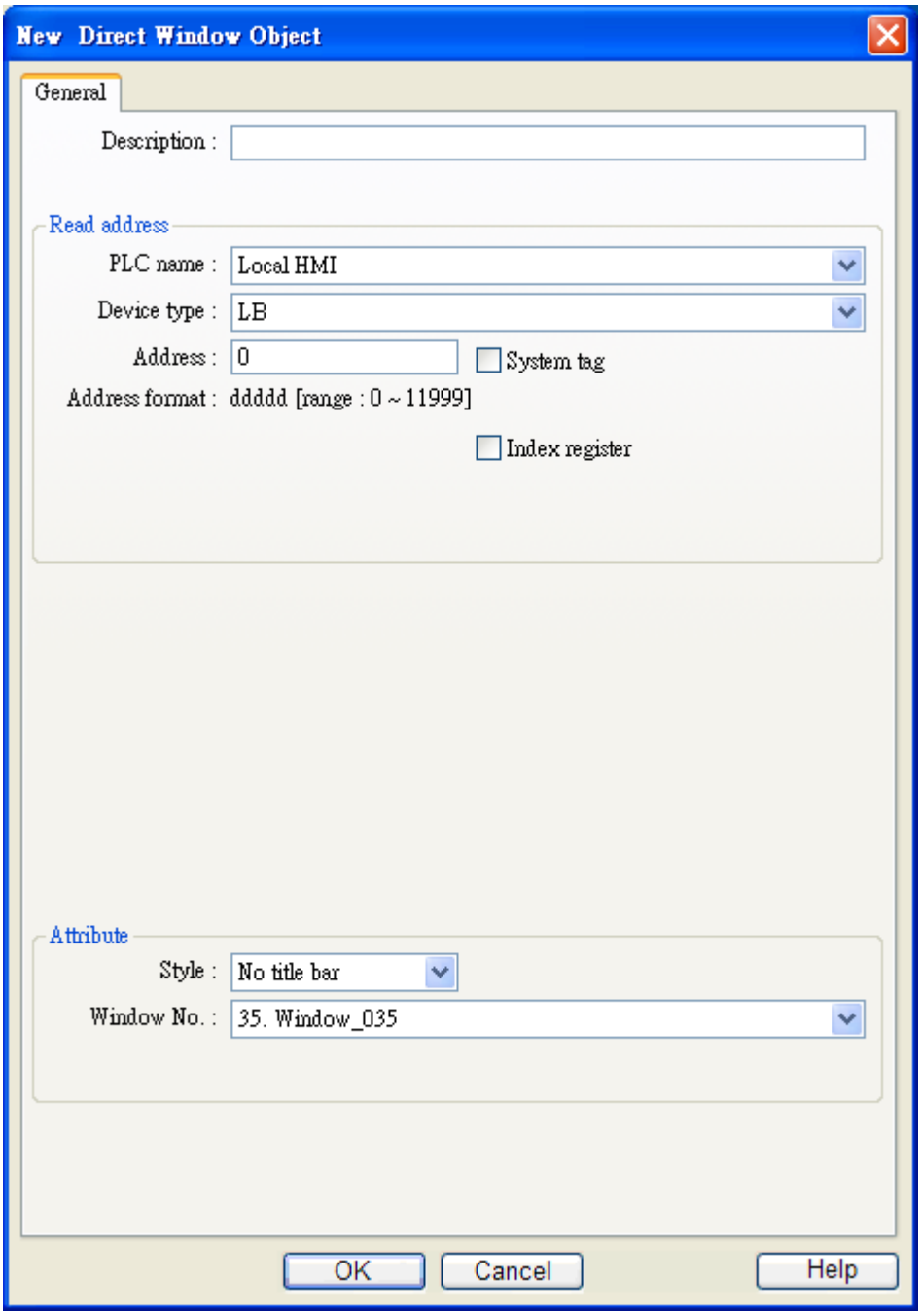
“Direct window” object is to define a popup window location (position / size) , a bit device and a predefined valid window number . When the content of the bit device is set ON, the window will be popup in the predefined location. The popup window will be closed when the content of the bit device is reset (0).The system will only take action when the content of bit device is changed (OFF → ON, ON → OFF).

The difference between the “Direct window” and the “Indirect window” is that the direct window object sets the popup window in configuration. When system is in operation, users can use the state of the designated register to control popup or close the window.

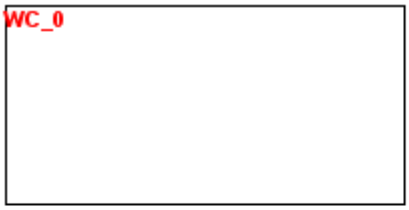
13.12.2 Configuration

Click the “Direct window” icon on the toolbar and the “New Direct Window Object” dialogue box will appear, fill in each items, press OK button, and a new “Direct Window Object” will be created. See the pictures below.



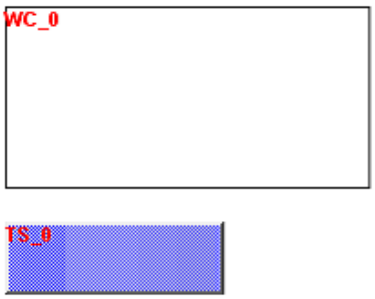


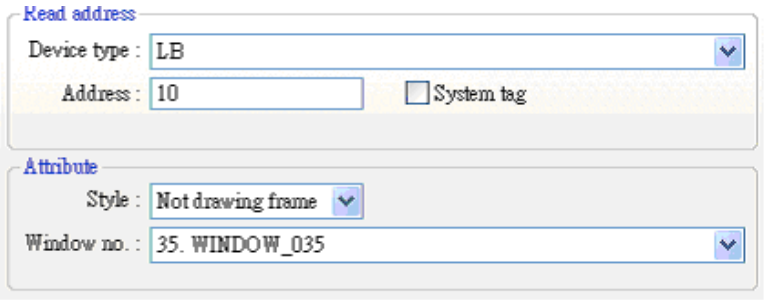
Read address	Select the **[PLC name] [device type][address]** of the bit device that control the window popup .
Attribute	**[Style]** Refer to the “Indirect Window Object” for related information.
	[Window no.] Set the popup window number.

	  *Toggle Switch* *Read address : LB10, Write address :LB10* *Mode : "Toggle"*

13.12.3 Example

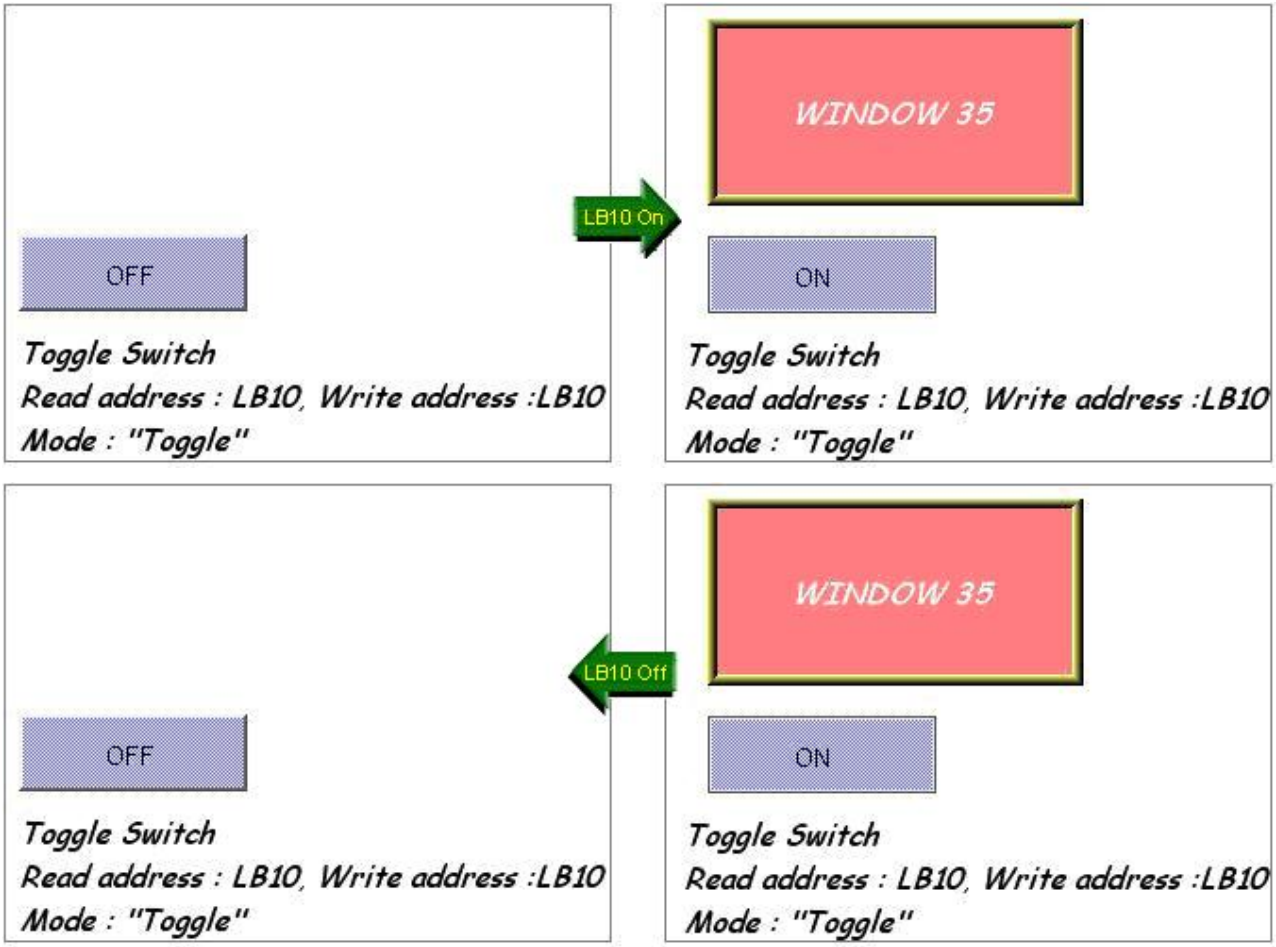
Here is an example to explain how to use the direct window object. The picture below shows the settings of the direct window object. In the example, use [LB10] to call up the window 35.





Toggle Switch
Read address : LB10, Write address :LB10
Mode : "Toggle"

When the state of LB10 is to ON, the window 35 will be popup; when the state of LB10 is OFF, the window 35 will be closed. See the picture below.



NOTE: Do not use this function to open the window when the same window has been opened by function key or indirect window.

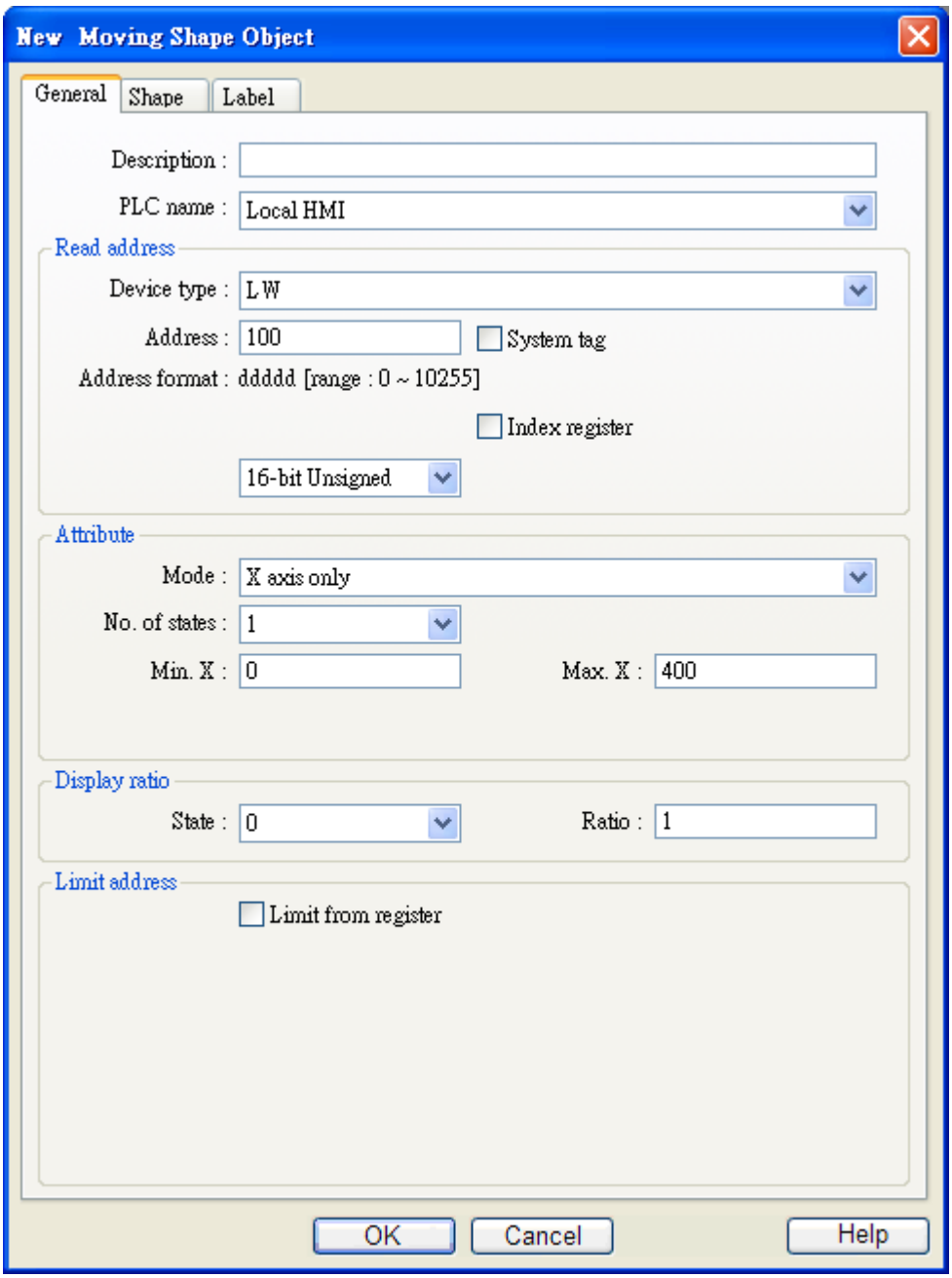
13.13 Moving Shape Object

13.13.1 Overview

Moving Shape object is used to define the object's state and moving distance. The Moving shape object is used to place an object in a window at a location specified by the PLC. The state and the absolute location of the shape in the window depend on the current values of three continuous PLC registers. Typically, the first register controls the state of the object, the second register controls the horizontal position (X), and the third register controls the vertical position (Y).

13.13.2 Configuration

Click the "Moving Shape" icon on the toolbar and "New Moving Shape Object" dialogue box will appear, fill in each items, press OK button, and a new "Moving Shape Object" will be created. See the pictures below.



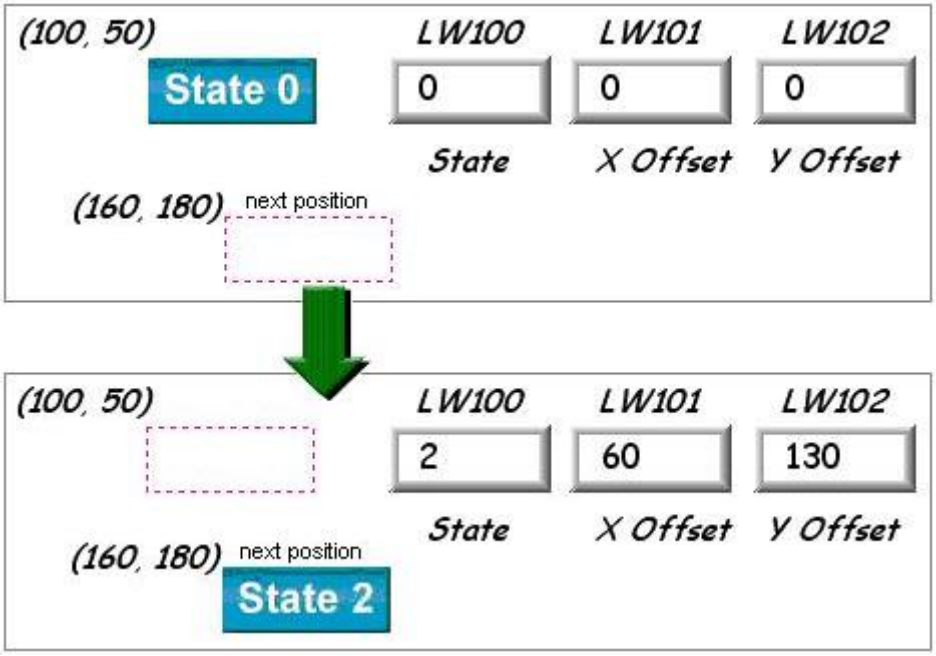
Read address	Select the **[PLC name] [device type][address]** of the word devices that control the display of object's state and moving distance. The table below shows the address to control object's states and moving distance in each different data format.

Data format	address to control object state	Address to control Moving Distance on the X-axis	Address to control Moving distance on the Y-axis
16-bit BCD	Address	Address + 1	Address + 2
32-bit BCD	Address	Address + 2	Address + 4

16-bit Unsigned	Address	Address + 1	Address + 2
16-bit Signed	Address	Address + 1	Address + 2
32-bit Unsigned	Address	Address + 2	Address + 4
32-bit Signed	Address	Address + 2	Address + 4

For example, if the object's read address is [LW100] and the data format is "16-bit Unsigned", [LW100] is to control the object's state, [LW101] is to control the object's moving distance on the X-axis, and [LW102] is to control the object's moving distance on the Y-axis.

The picture below shows that the object's read address is [LW100] and initial position is (100, 50). Supposed you want the object moved to the position (160, 180) and be displayed in the shape of State 2, the value of [LW100] must be set to 2, [LW101] = 160–100 = 60, [LW102] = 180–50 = 130.

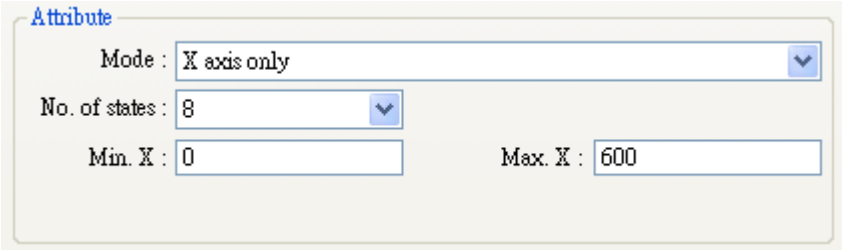


Attribute

To select the object's movement mode and range.

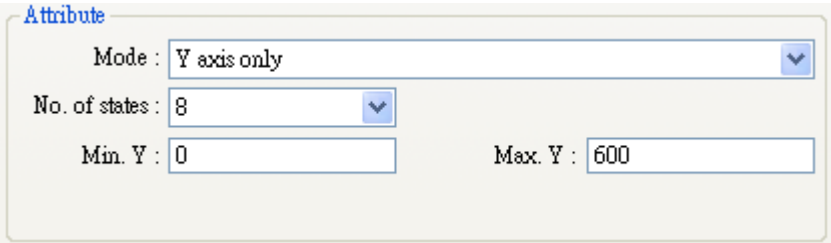
a. X axis only

The object is only allowed to move along the X-axis. The moving range is defined by [Min. X] and [Max. X].



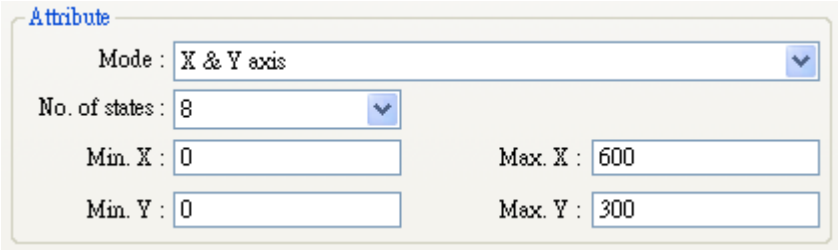
b. Y axis only

The object is only allowed to move along the Y-axis. The moving range is defined by [Min. Y] and [Max. Y].



c. X & Y axis

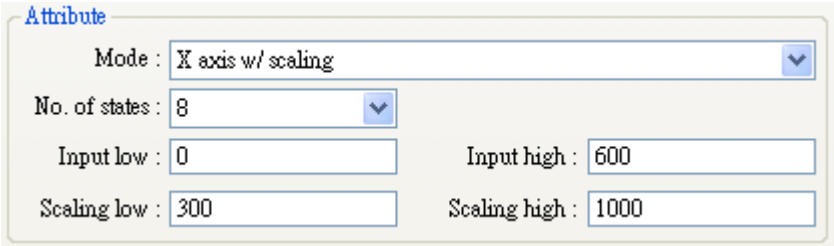
The object is allowed to move along the X-axis and Y-axis. The moving range in XY direction is defined by [Min. X], [Max. X] and [Min. Y], [Max. Y] respectively.



d. X axis w/ scaling

The object is for X axis movement with scale. Supposed that the value of the designated register is DATA, the system use the following formula to calculate the moving distance on the X-axis.

X axis move distance =
(DATA – [Input low]) * ([Scaling high – Scaling low]) / ([Input high] – [input low])



For example, the object is only allowed to move within 0~600, but the range of the register's value is 300~1000, set [Input low] to 300 and [Input high] to 1000, and set [Scaling low] to 0 and [Scaling high] to 600, and the object will move within

	the range.
	e. Y axis w/ scaling The object is for Y axis movement with scale. and the formula to calculate the moving distance on the Y-axis is the same as the one in “X axis w/ scaling.”
	f. X axis w/ reverse scaling This function is the same as “X axis w/ scaling”, but the moving direction is in reverse.
	g. Y axis w/ reverse scaling This function is the same as “Y axis w/ scaling”, but the moving direction is in reverse.
Display ratio	The size of shape in different states can be set individually as shown in the picture below. 
Limit address	The object’s moving range can be set not only by [Min. X], [Max. X] and [Min. Y] [Max. Y], but also by the designated registers. Supposed that the object’s moving range is set by the value of the designated register “Address”, then the address of [Min. X], [Max. X] and [Min. Y] [Max. Y] are listed in the following table.

Data format	[Min. X] address	[Max. X] Address	[Min. Y] address	[Max. Y] Address
16-bit BCD	Address	Address + 1	Address + 2	Address + 3
32-bit BCD	Address	Address + 2	Address + 4	Address + 6
16-bit Unsigned	Address	Address + 1	Address + 2	Address + 3
16-bit Signed	Address	Address + 1	Address + 2	Address + 3
32-bit Unsigned	Address	Address + 2	Address + 4	Address + 6
32-bit Signed	Address	Address + 2	Address + 4	Address + 6

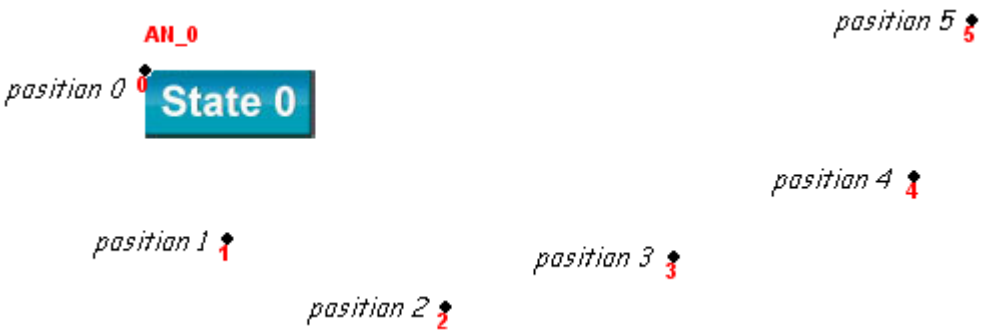
13.14 Animation Object

13.14.1 Overview

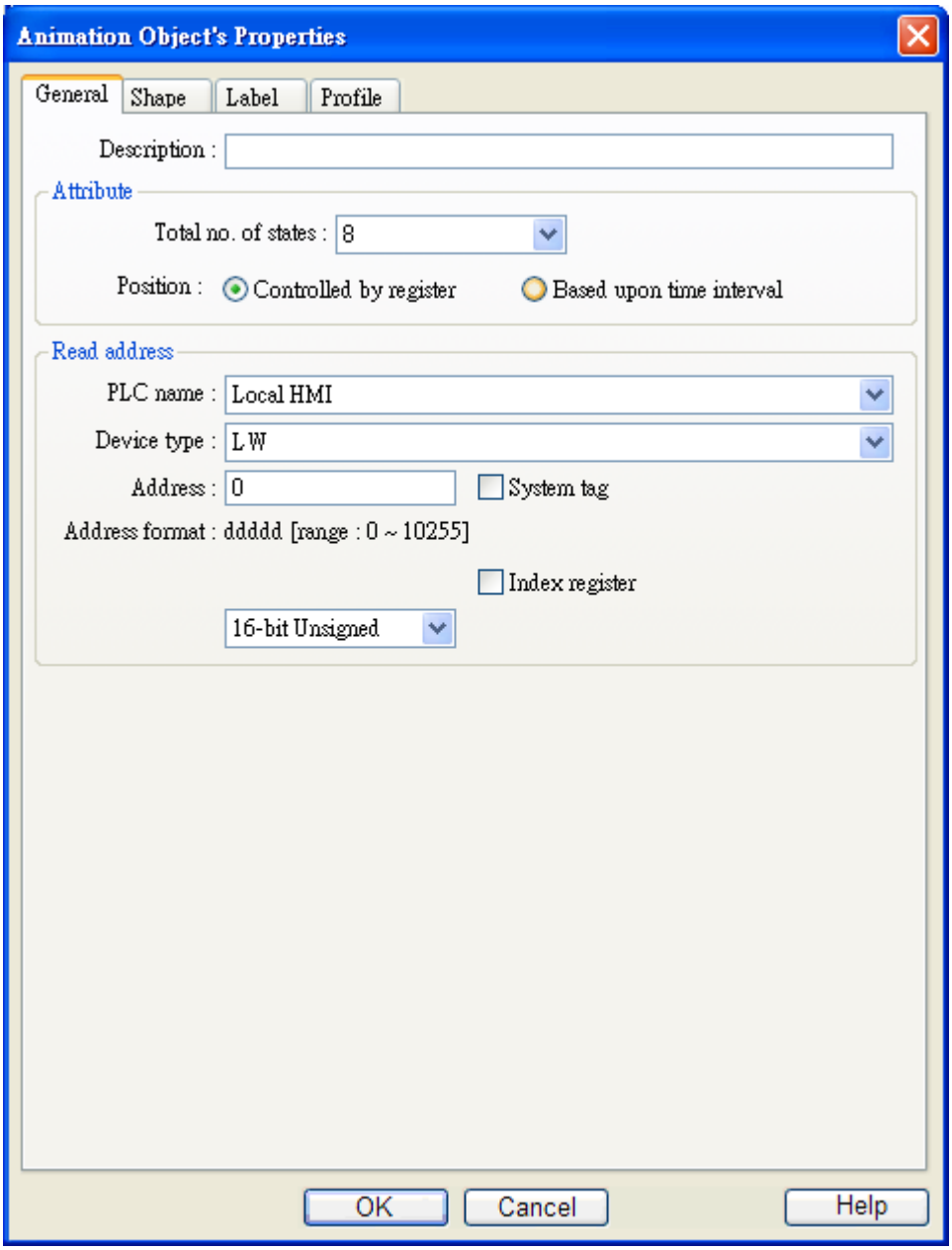
The Animation object is used to place an object on the screen at a specified location determined by a predefined path and data in the PLC. The state and the absolute location of the shape on the screen depend on current reading value of two continuous PLC registers. Typically, the first register controls the state of the object and the second register controls the position along the predefined path. As the PLC position register changes value. The shape or picture jumps to the next position along the path.

13.14.2 Configuration

Click the "Animation" icon on the toolbar, move the mouse to each moving position and click the left button to define all moving positions one by one. When settings of all moving positions are completed, click the right button of the mouse, a new animation object will be created. See the picture below.



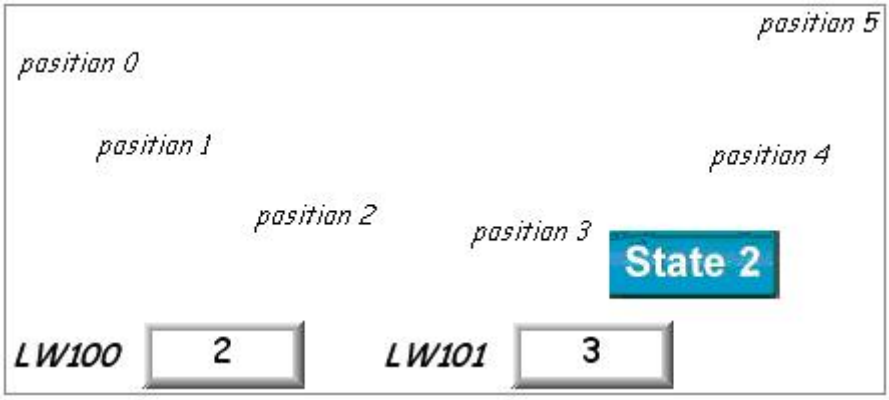
To change the object's attributes, you can double click the left button of the mouse on the object, and the "Animation Object's Properties" dialogue box, as shown in the picture below, will appear.



Attribute	
[Total no. of State no.]	To set the number of the states for this number.
[Position]	**a. Controlled by register** When select "Controlled by register", the designated register controls the object's state and position.
Read address	If select "Controlled by register" option, it is necessary to set the read address. In the table below, it describes the address that control shape's state and position in different data format.

Data Format	Address to control object's state	Address to control object's position
16-bit BCD	Address	Address + 1
32-bit BCD	Address	Address + 2
16-bit Unsigned	Address	Address + 1
16-bit Signed	Address	Address + 1
32-bit Unsigned	Address	Address + 2
32-bit Signed	Address	Address + 2

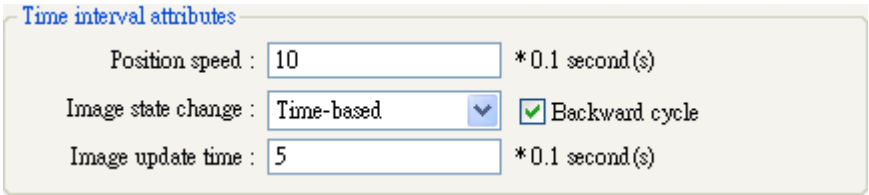
For example, if the designated register is [LW100] and the data format is "16-bit Unsigned", then [LW100] represents object's state, [LW101] represents position. In the picture below, [LW100] = 2, [LW101] = 3, so the object's state is 2 and position is 3.



[Position]

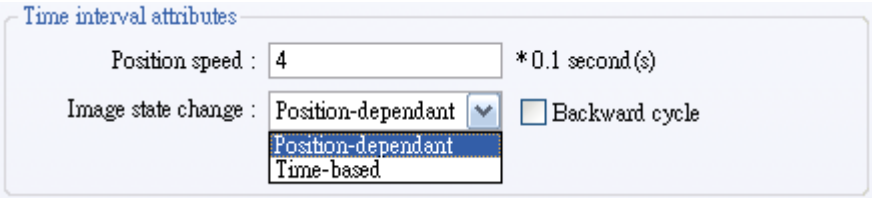
b. Time interval attributes

If "Based upon time interval" is chosen, the object automatically changes status and display location. "Time interval attributes" is to set the time interval for states and position.

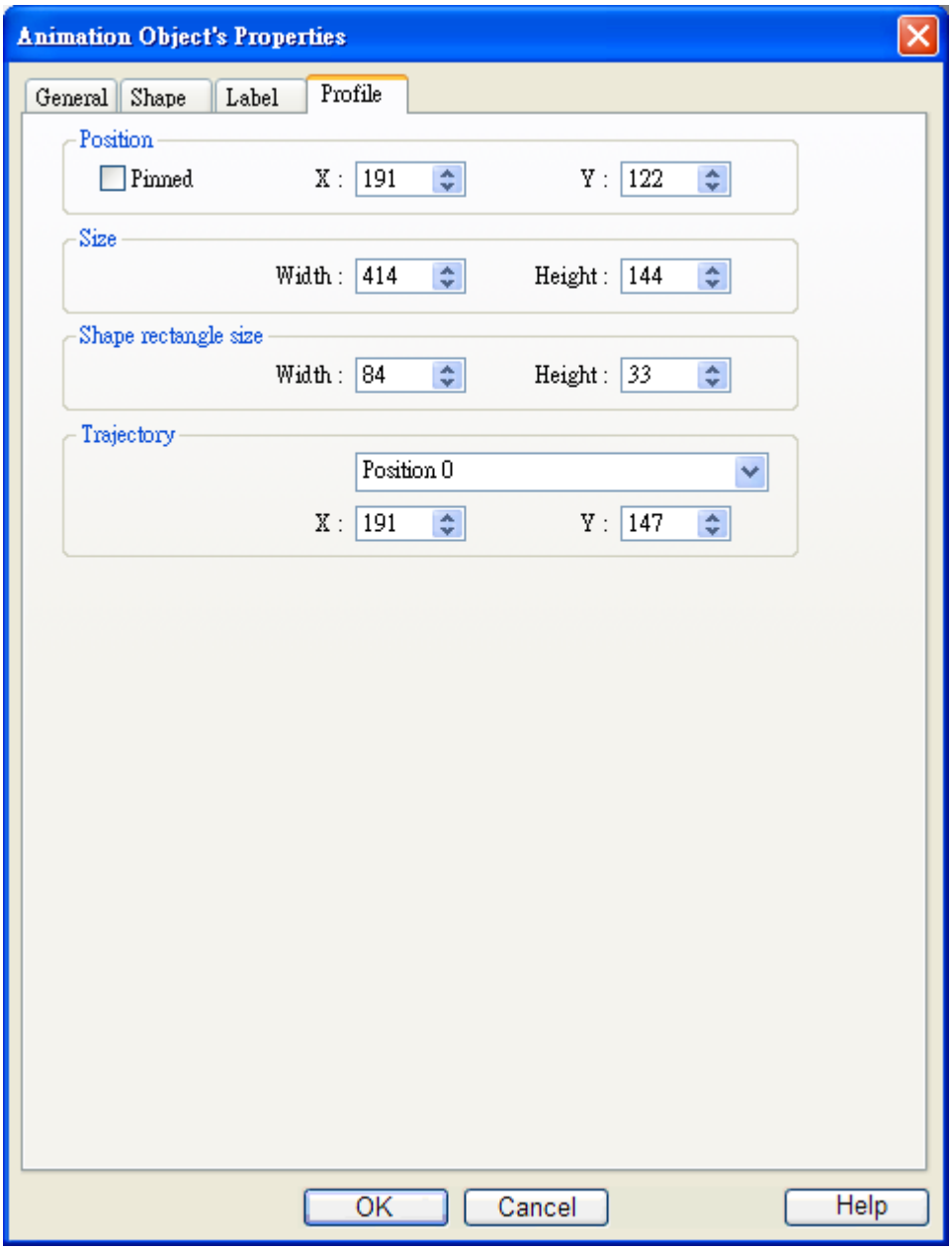


[Speed]

Position changes speed, the unit is 0.1 second. Supposed that [Speed] is set to 10, the object will change its position every 1 second.

	[Backward] If the object has four positions: position 0, position 1, position 2, and position 3, and [Backward] is not selected. In this case when the object moves to the last position (position 3), next position will be back to the initial position 0, and repeat the action over again. The moving path is shown as follows: position 0 → position 1 → position 2 → position 3 → position 0 → position 1 → position 2… If [Backward] is selected, when the object moves to the last position (position 3), it will move backwards to the initial position 0, and repeat the moving mode over again. The moving path is shown as follows. position 0 → position 1 → position 2 → position 3 → position 2 → position 1 → position 0…
	[Image state change] State change mode. There are "Position dependant" and "Time-based" options. When "Position dependant" is selected, it means that following the change of position, the state will change too. When "Time-based" is selected, it means that the position will change based on "Position speed" and shape state will change based on "Image update time" 

The following dialog shows size setup of animation object. Call up the animation object dialogue box by double clicking.



Shape rectangle size	To set the size of the shape.
Trajectory	To set the position of each point on the moving path.

13.15 Bar Graph Object

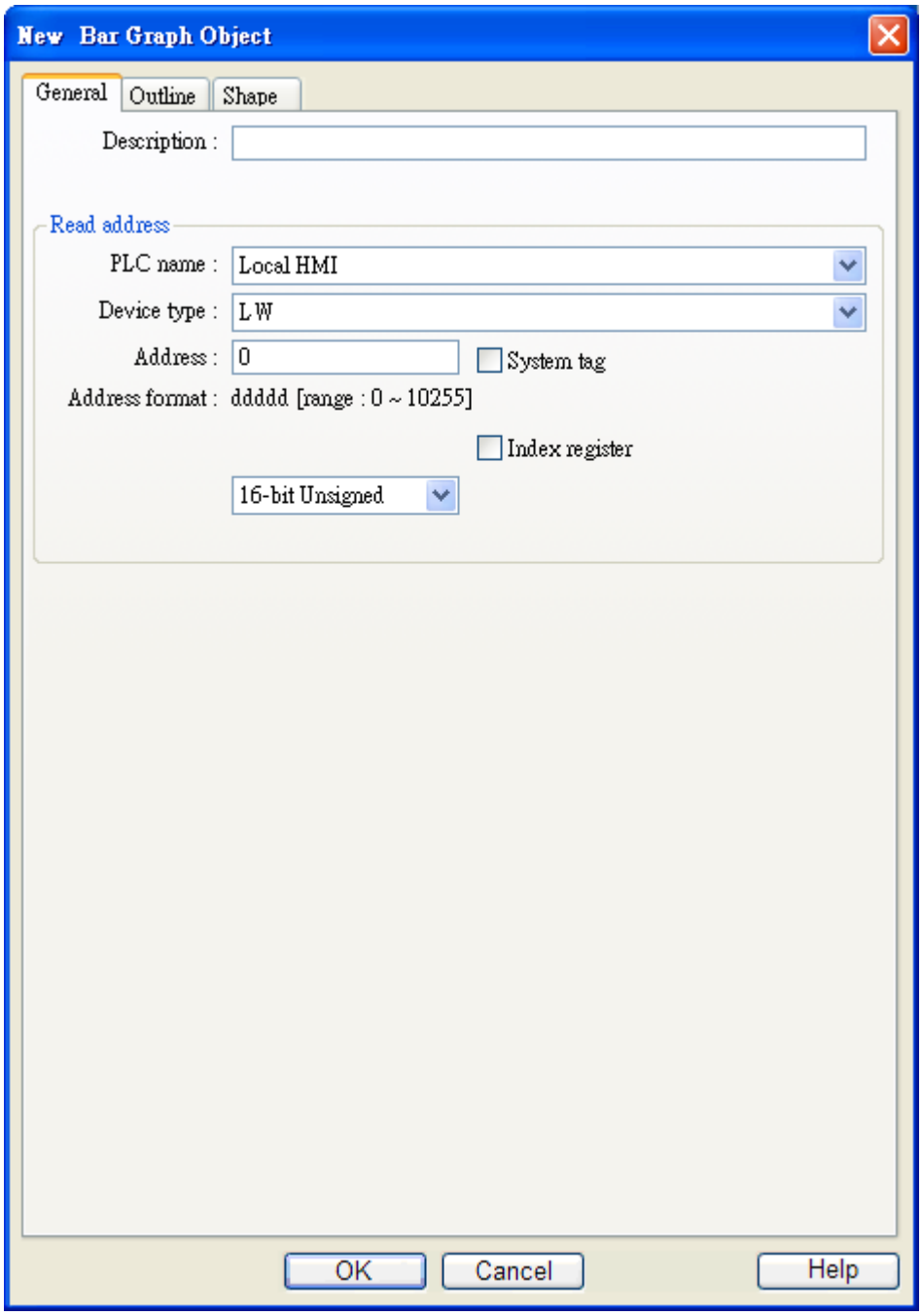
13.15.1 Overview

Bar graph object displays PLC register data as a bar graph in proportion to its value.

13.15.2 Configuration

Click the “Bar Graph” icon on the toolbar, the “Bar Graph” dialogue box will be shown up, fill in each items of settings, click OK button, a new “Bar Graph Object” will be created. See the picture below.

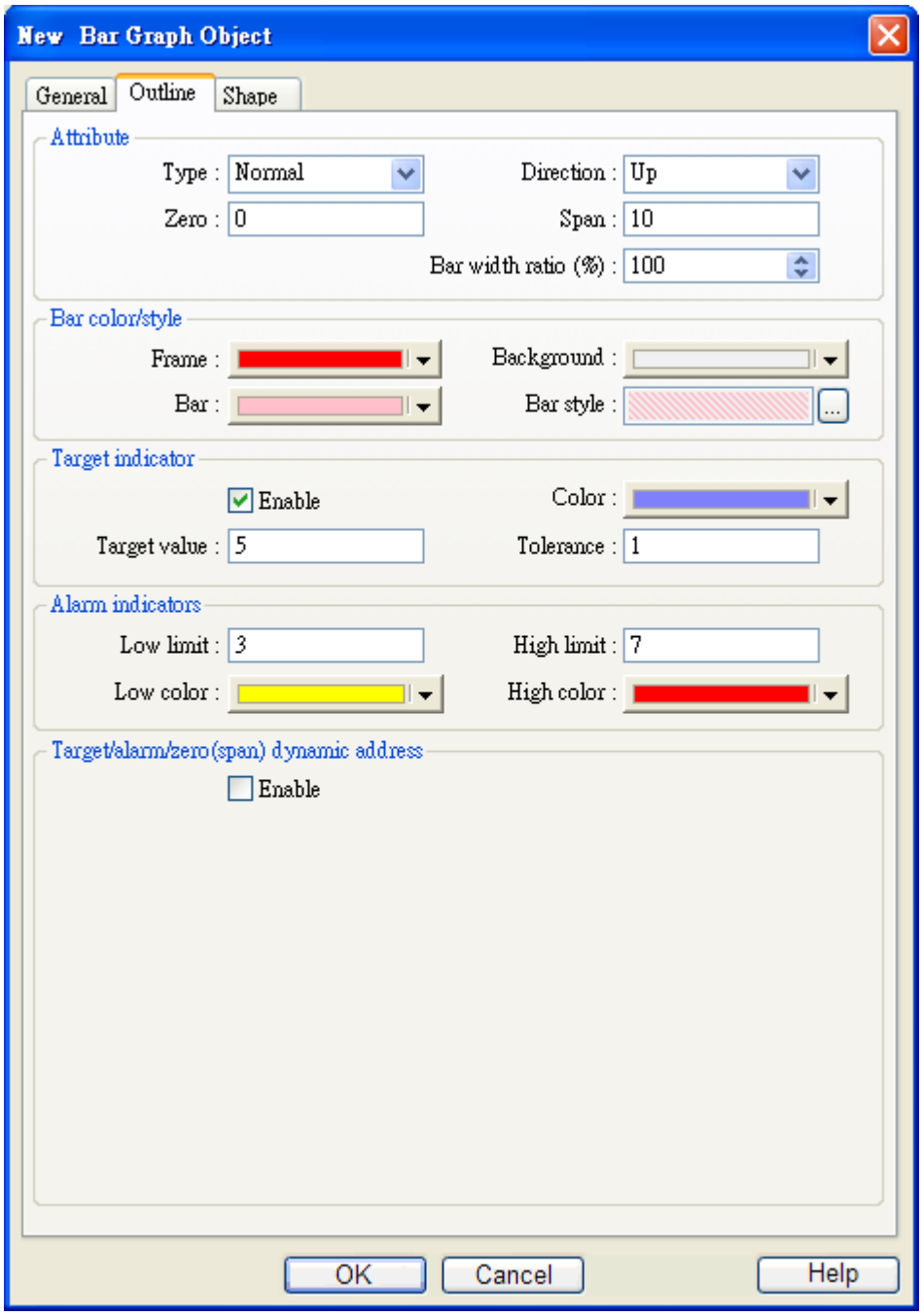
The following picture shows the “General” tab of the bar graph object.

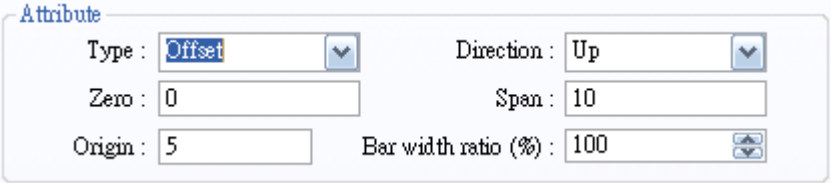


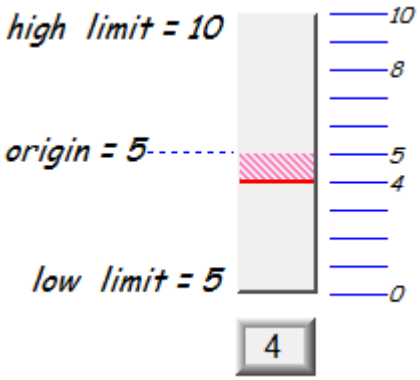
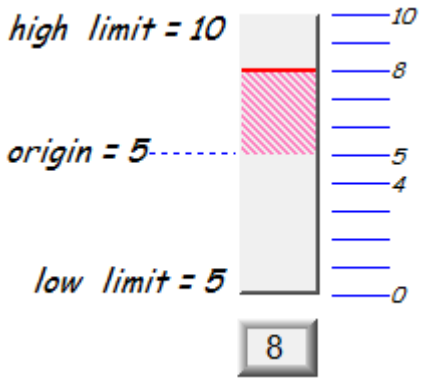
Read address

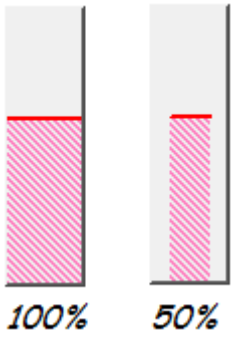
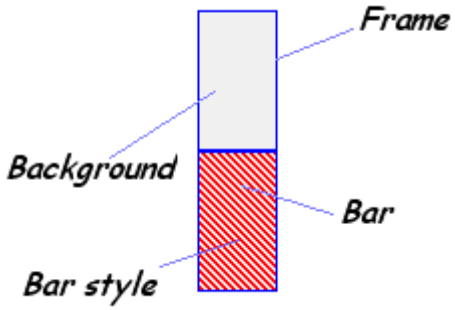
Select the **[PLC name] [device type][address]** of the word devices that control the bar graph display.

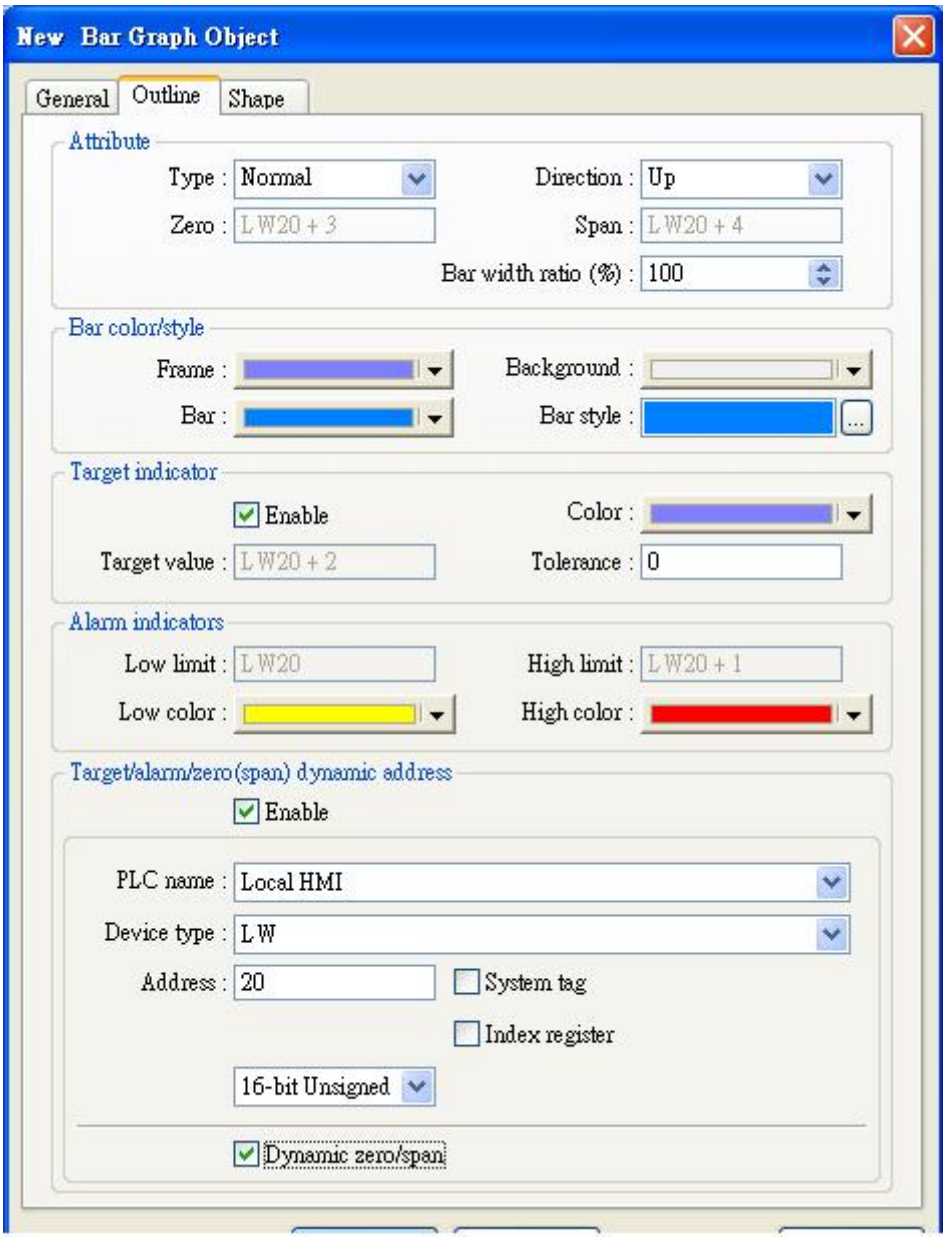
The following picture shows the “Outline” tab of the bar graph object.



Attribute	
[Type]	There are “Normal” and “Offset” for selection. When select “Offset”, there must be a original value for reference. Please refer the illustration below. 
[Direction]	To select the bar graph direction, and there are ”Up”, “Down”, “Right”, and “Left” for selection.

[Zero]、[Span]	The filled bar percentage can be calculated with the following formula: The filled bar percentage = (Register value – Zero) / [Span] – [Zero]) * 100% When select "Offset", if (Register value – Zero) > 0, the bar will fill up from origin setting; if (Register value – Zero) < 0, the bar will fill up but down side from origin setting. For example, Origin =5, Span=10, Zero=0 and use different value in read address, it will display as illustration below. When read address value is 4,  When read address value is 8, 
[Bar width ratio(%)]	To display the ratio between bar and object width. Below illustration displays two ratio, 50% and 100%.

	
Bar color/style	To set the bar's Frame, Background color, Bar style, and Bar color. See the picture below. 
Target Indicator	When the register value meets the following condition, the color of filled area will change to the "Destination color" [Desti. Value] - [Tolerance] < = Register value < = [Desti. Value] + [Tolerance] See the picture below, in here [Desti. Value] = 5, [Tolerance] = 1, if the register value is equal to or larger than 5-1=4 and equal to or less than 5+1=6, the filled area's color of the bar will change to the "Destination color" 

Alarm Indicator	When register's value is larger than [High limit], the color of filled area will change to [High color], when register's value is smaller than [Low limit], the color of filled area will change to [Low color].
Target/Alarm Dynamic Address	When select [Enable], the [Low limit] and [High limit] of "Limitation alarm" and the [Desti. Value] of "Destination" all come from designated register. See the picture below.  The following table shows the read address of low limit, high limit, and destination. The "Address" means the device address, for example, if the device address is [LW20] and data format is 16-bit, The Alarm Low limit is LW 20. / The Alarm High limit is LW21

The Target indicator is LW22. / The Zero is LW23 / The Span is LW24.

Data Format	Alarm Low limit	Alarm High limit	Target indicator	Zero	Span
16-bit BCD	Address	Address + 1	Address + 2	Address + 3	Address + 4
32-bit BCD	Address	Address + 2	Address + 4	Address + 6	Address + 8
16-bit Unsigned	Address	Address + 1	Address + 2	Address + 3	Address + 4
16-bit Signed	Address	Address + 1	Address + 2	Address + 3	Address + 4
32-bit Unsigned	Address	Address + 2	Address + 4	Address + 6	Address + 8
32-bit Signed	Address	Address + 2	Address + 4	Address + 6	Address + 8

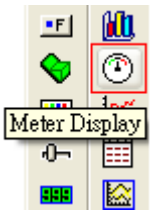
13.16 Meter Display Object

13.16.1 Overview

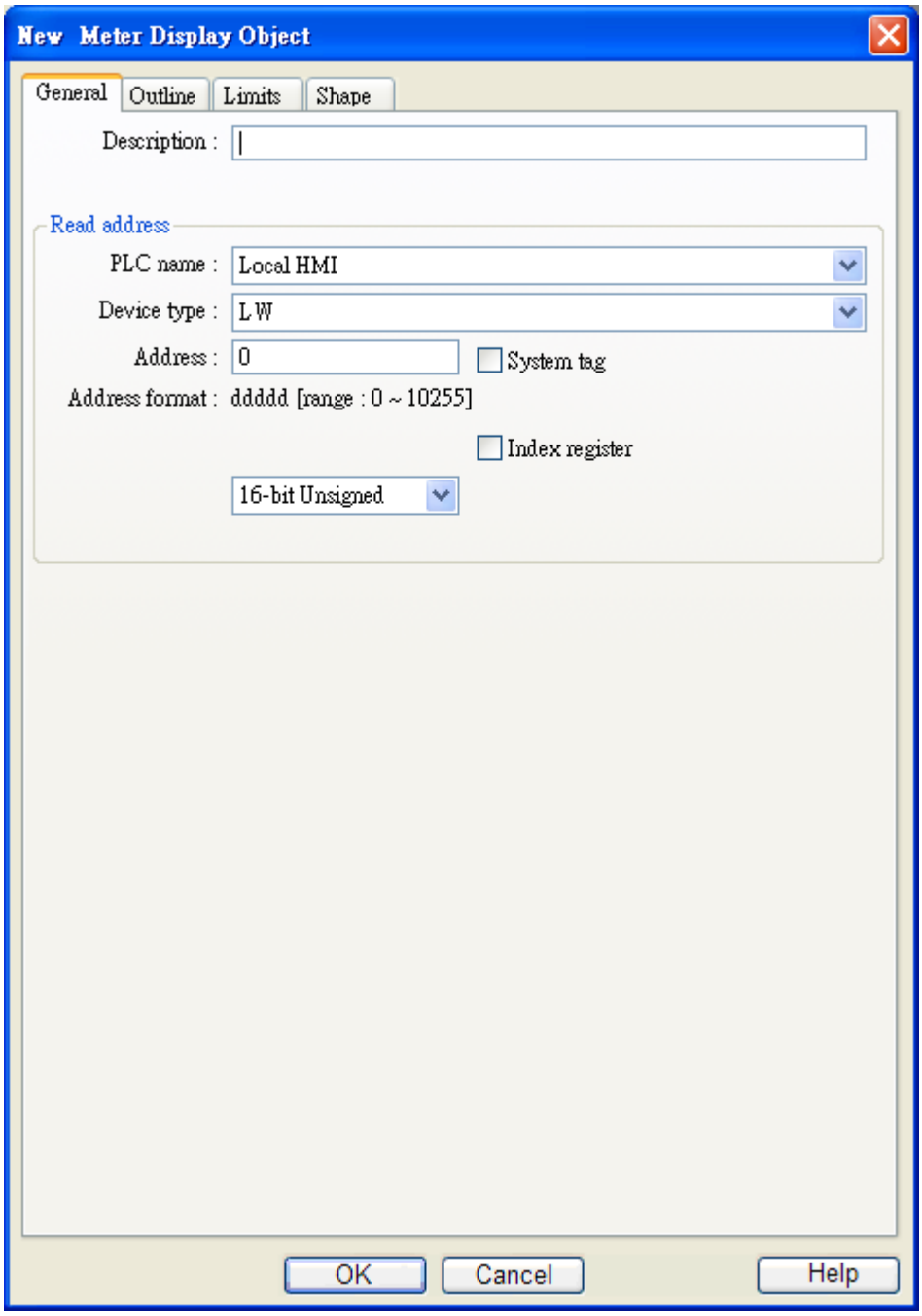
The meter display object can displays the value of word device with meter.

13.16.2 Configuration

Click the “Meter Display” icon on the toolbar and the “Meter Display Object’s Properties” dialogue box will appear, fill in each items, press OK button, and a new “Meter Display Object” will be created. See the picture below.

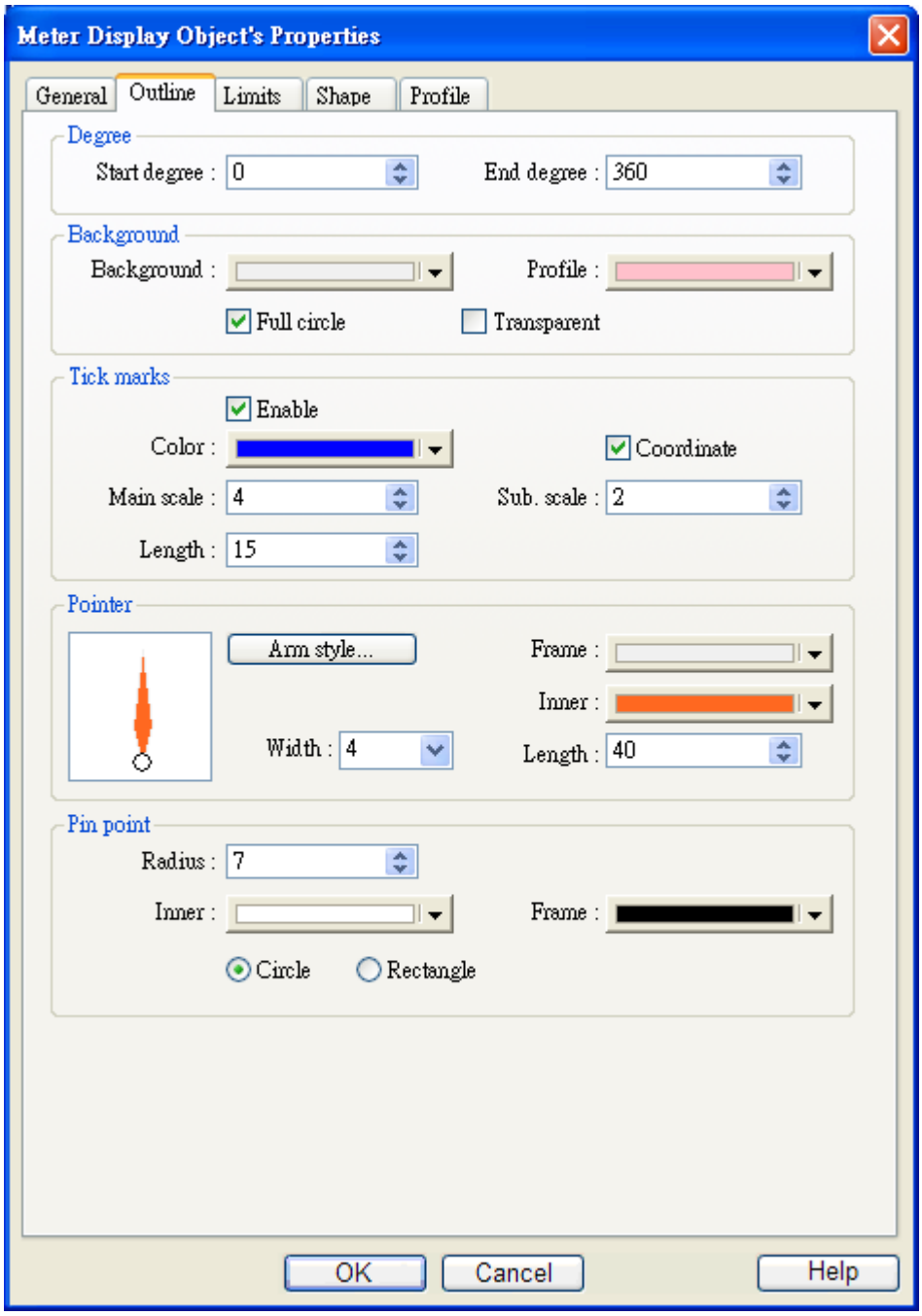


The picture below shows the “General” tab in the “Meter Display Object’s Properties” dialogue box.

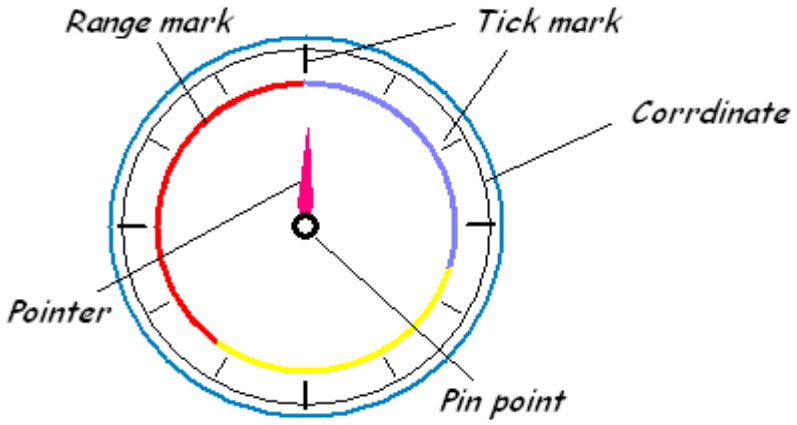


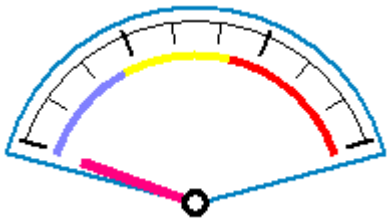
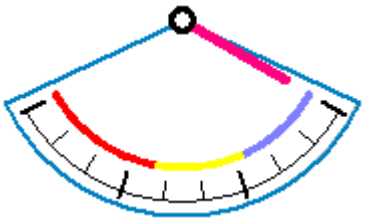
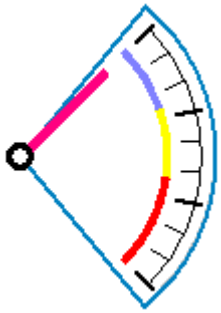
Read address

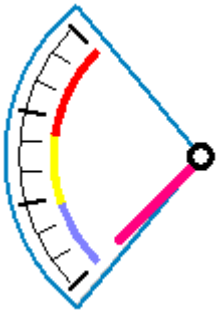
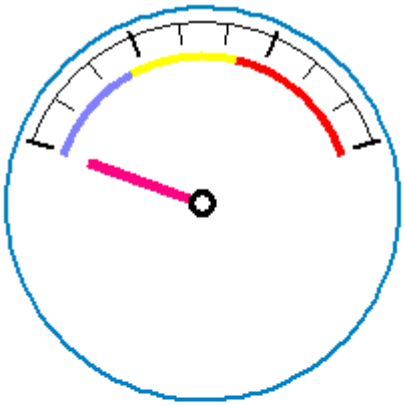
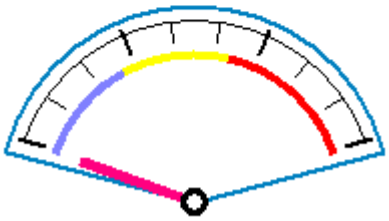
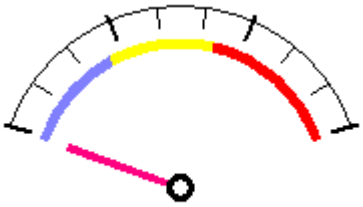
Select the **[PLC name] [device type][address]** of the word devices that control the display of meter.



In the above dialogue box, users can set the meter display object's outline. Refer to the picture below for the names of each part of the meter.

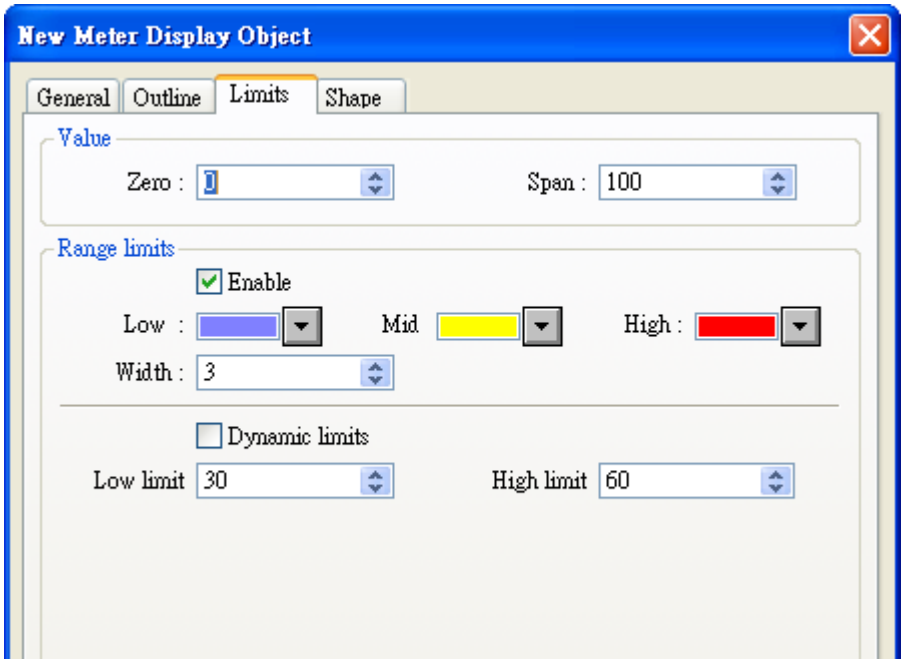


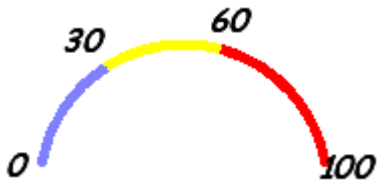
Degree	Set the object's "start degree" and "end degree", the angle range is 0-360 degrees. The following pictures show several results of different settings.  [Start degree] = 290, [End degree] = 70  [Start degree] = 45, [End degree] = 240  [Start degree] = 120, [End degree] = 135

	 [Start degree] = 225, [End degree] = 315
Background	Set the object's background color and profile color.
[Full circle]	When the "Full circle" is selected, the object will display the whole circle, otherwise the object will display the defined degree range. See the picture below.  *Full circle*  *non-full circle*
[Transparent]	When the "Transparent" is selected, the object will not display the background and profile color. See the picture below.  *Transparent*

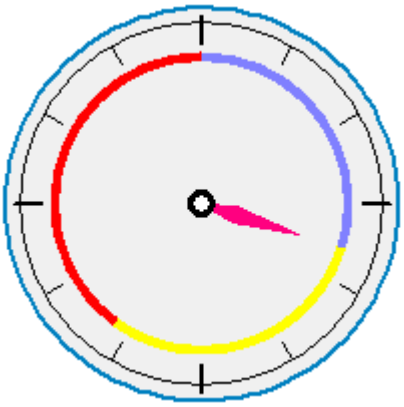
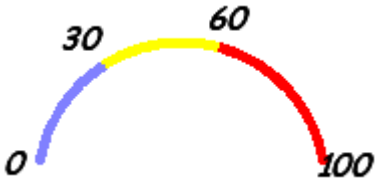
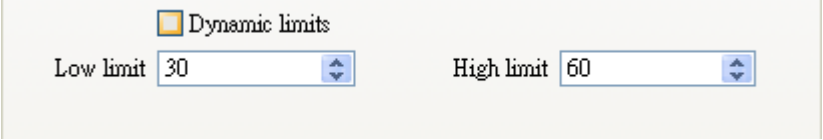
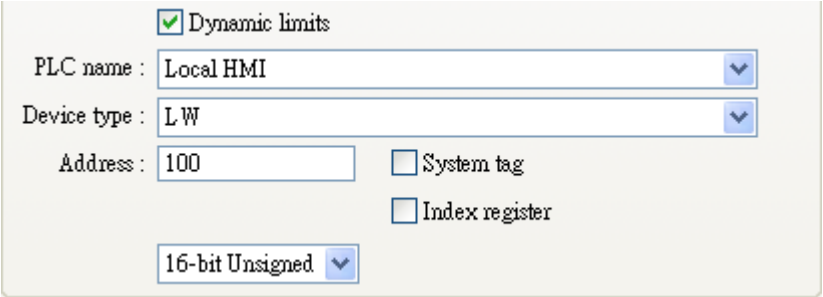
Tick marks	To set the tick mark's number and color.
Pointer	To set Pointer's style, length, width, and color.
Pin point	To set pin point's style, radius, and color

The following pictures show the "Limit" tab and the sign of low and high limit set in the "Limit" tab.





Value	To set object's display range. Meter display object will use the value of [Zero] and [Span] and the value of register to calculate the pointer's indication position. For example, supposed that [Zero] = 0, [Span] = 100, when the value of register is 30 and [Start degree] = 0, [End degree] = 360, then the degree indicated by pointer is: {(30 – [Zero])/([Span] – [Zero])} * ([[End degree] - [Start degree]] = {(30 – 0) / (100 - 0)} * (360 – 0) = 108 Pointer will indicate the position of 108 degrees. See the picture below.

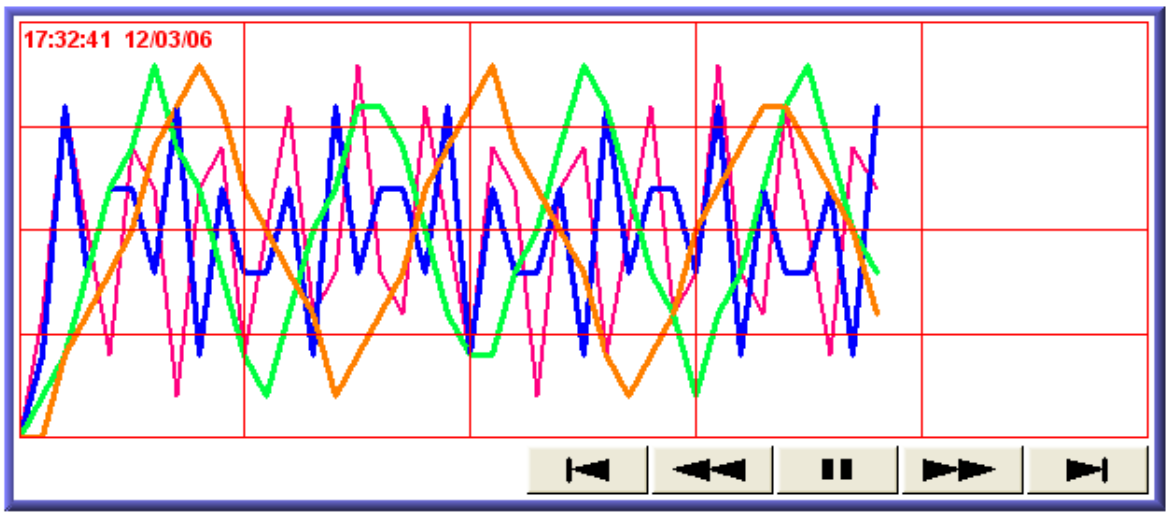
	
Range limit	To set the value of low and high limit, the display color, width of the sign of low, high limit. Below illustration use above setting to display the range mark. 
[Dynamic Limits] / uncheck	When "Dynamic Limits" is not selected, the low limit and high limit are fixed value, which directly comes from the settings. See the example below, the low limit is 30 and high limit is 60. 
[Dynamic Limits] / check	When Dynamic Limits is selected, the low limit and high limit are decided by the register. Please refer to the following dialog.  There following table shows the read address of low limit and high limit. The "Address" means the register's address. If the register is [LW100], the "Address" is 100.

Data format	High limit's read address	Low limit's read address
16-bit BCD	Address	Address + 1
32-bit BCD	Address	Address + 2
16-bit Unsigned	Address	Address + 1
16-bit Signed	Address	Address + 1
32-bit Unsigned	Address	Address + 2
32-bit Signed	Address	Address + 2

13.17 Trend Display Object

13.17.1 Overview

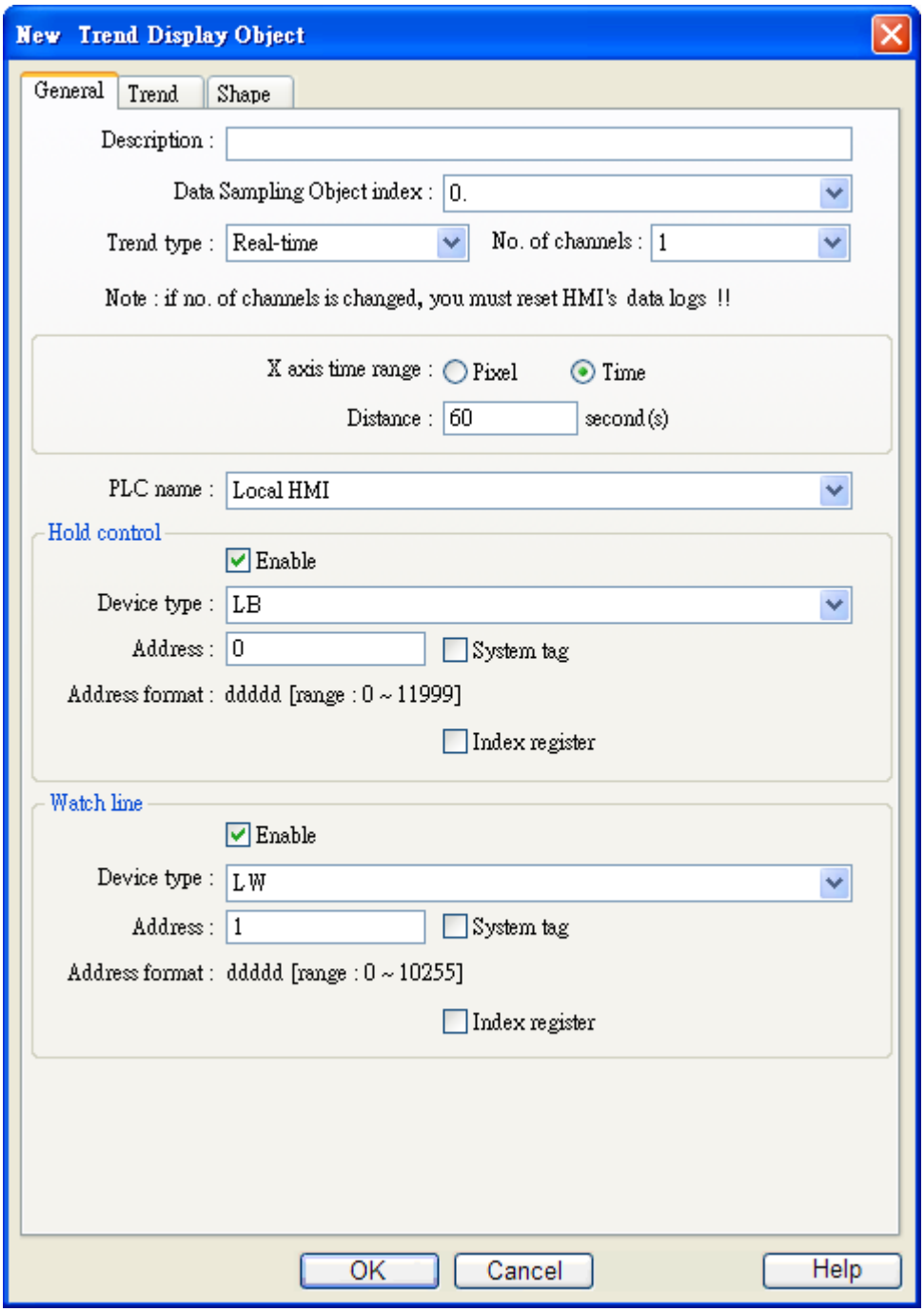
Trend display object can use the curve to represent the data recorded by data sampling object. The sampling operation is conducted by data sampling objects. The trend display object display the result of sampling. The following picture shows an example of trend display object.



13.17.2 Configuration

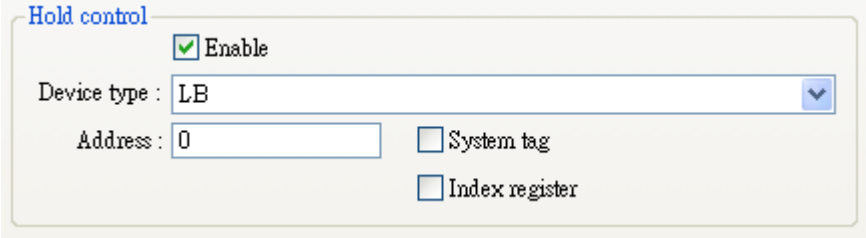
Click the “Trend Display” icon on the toolbar and the “Trend Display Object’s Properties” dialogue box will appear, fill in each items, press the OK button and a new “Trend Display Object” will be created. See the picture below.

The following picture shows the “General” tab in the “Trend Display Object’s Properties” dialogue box.



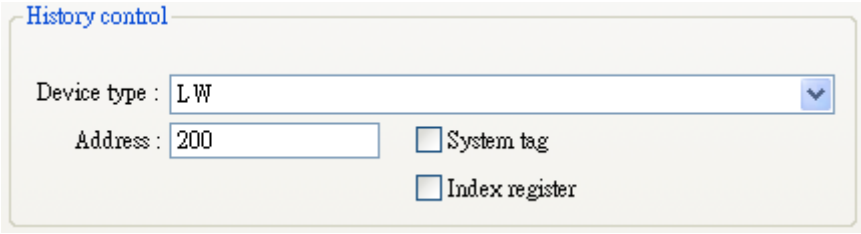
[Data Sampling Object index]	To select data sampling object as the source of data. Refer to the "data sampling" section for related information.
[Trend mode]	To select the mode of data source. There are "Real-time" and "History" for selection.
	a. Real-time In this mode, it can display the sampling data from the beginning of the MT8000 operation to the present time. If previous data are required, you must select the "History" mode to read the data from historical record.

you can use the “Hold control” object to pause the update of trend display, but it is only pause the update of the trend display, and it will not stop the operation of data sampling object. The picture below shows the “Hold control” setting page. Set the state of the designated register to ON, it will pause the updating of the trend display.



b. History

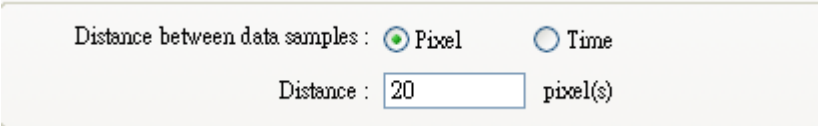
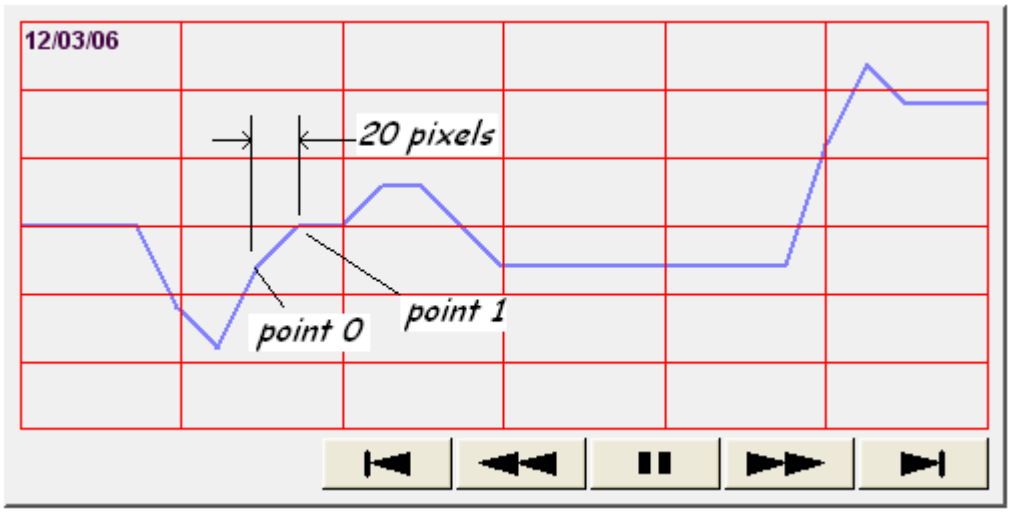
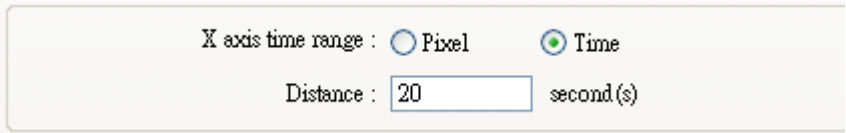
In this mode, the data come from the historical record of the designated data sampling object in [Data sampling index]. Data sampling object will use the sampling data which was sorted in according to dates. The system use “History control” to select the historical records that are created by the same data sampling object. The picture below shows the “History control” setting page.

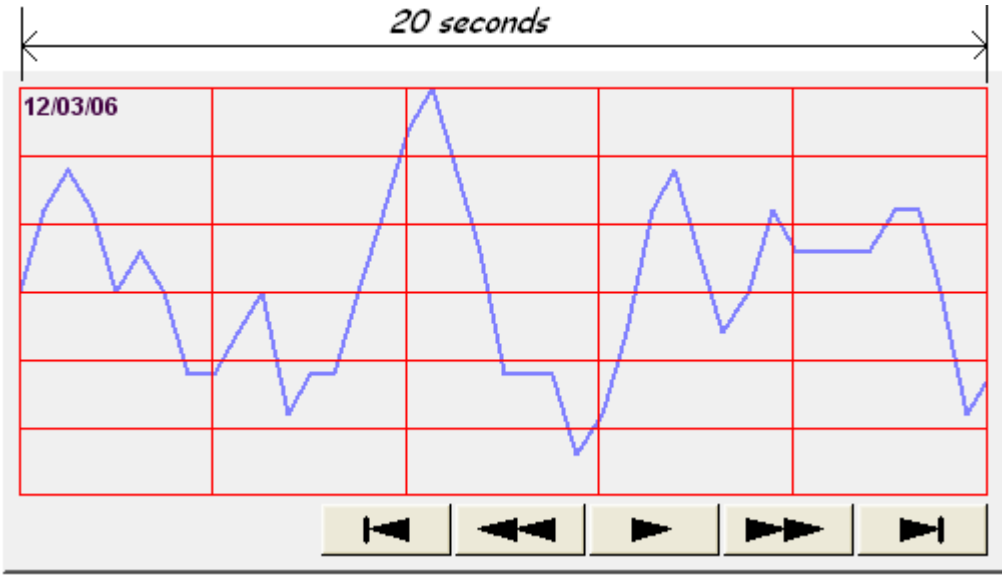
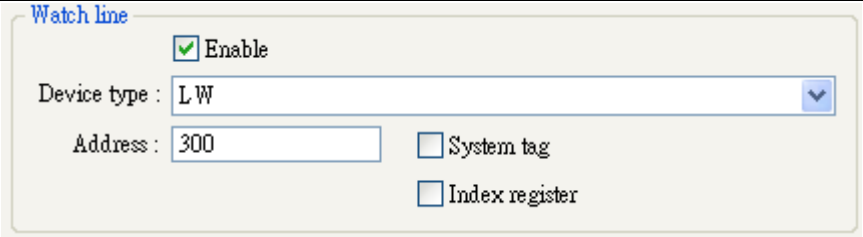


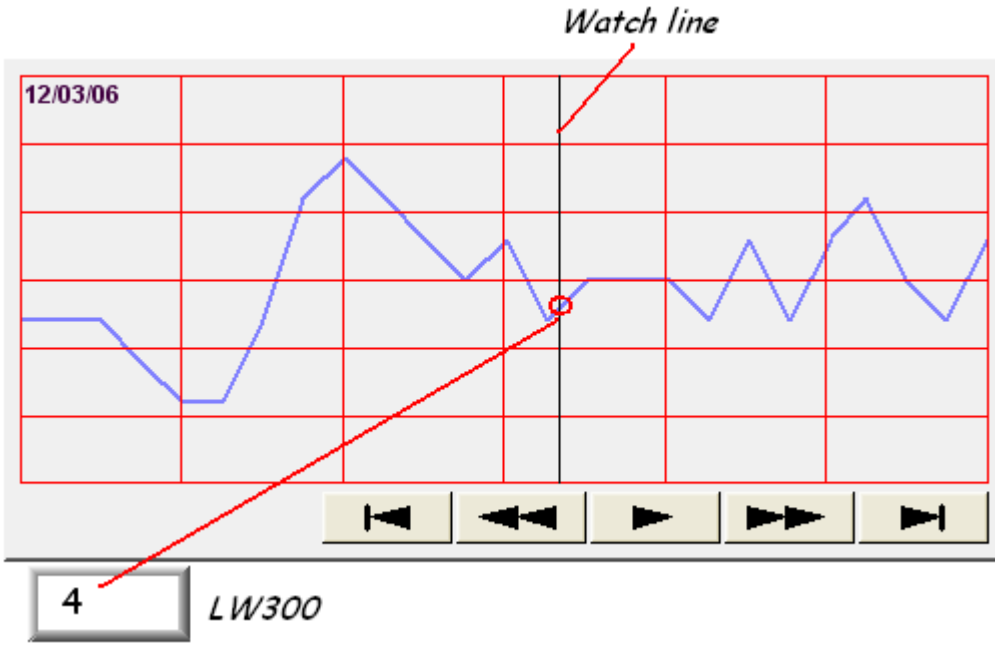
The system sorts the historical records of sampling data by date; the latest file is record 0 (In normal condition it is sampling data today), the second latest file is record 1, and so on.

If the value of designated register in “History control” is n, the trend display object will display data record n.

Here is an example to explain usage of “History control.” In the above picture, the designated register is [LW200], if the sampling data available in the files are pressure_20061120.dtl, pressure_20061123.dtl, pressure_20061127.dtl, and pressure_20061203.dtl and it is 2006/12/3 today. Based on the value of [LW200], the sampling data files selected by the trend display object is shown as follows:

	<table><tr><td>Value of [LW200]</td><td>The files of the sampling data from the historical record</td></tr><tr><td>0</td><td>pressure_20061203.dtl</td></tr><tr><td>1</td><td>pressure_20061127.dtl</td></tr><tr><td>2</td><td>pressure_20061123.dtl</td></tr><tr><td>3</td><td>pressure_20061120.dtl</td></tr></table>
[No.of channels]	This is the number of channel displayed on the trend display. Each channel represents the sampling data from one word device. The max. channel is up to 20 channels.
[Distance between data samples:] / Pixel	**[Pixel]**  Select [Pixel], the [Distance] can be used to set the distance between two sampling points. See the picture below. 
[X axis time range] / Time	**[Time]**  Select [Time], the [Distance] is used to set the X-axis in unit of time elapsed. See the picture below.

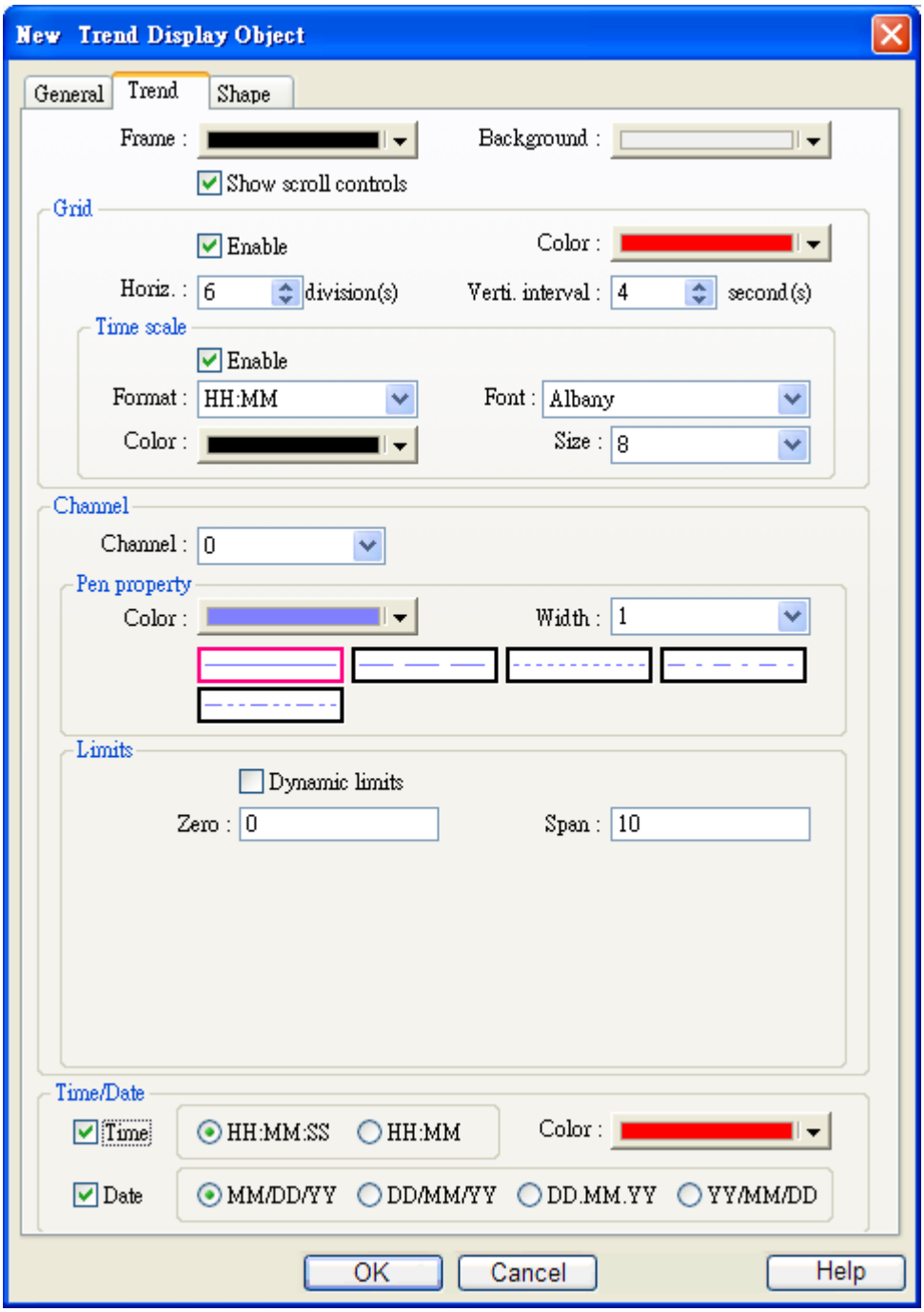
	 Otherwise, select Time for X axis time range and go to Trend/Grid for enable "Time scale" function. Please refer "Time scale" on the following.
Watch line	 Using the "Watch line" function, when user touches the trend display object, it will display a "watch line", and export the sampling data at the position of watch line to the designated word device. You may register a numeric display object to display the result. Please refer to the following pictures



"Watch line" function also can export sampling data of multiple channels, The address registered in "watch line" is the start address and those sampling data will be exported to the word devices starting from "start address" The data format of each channel may be different, the corresponding address of each channel is arranged from the first to the last in sequence Please refer to the following pictures.

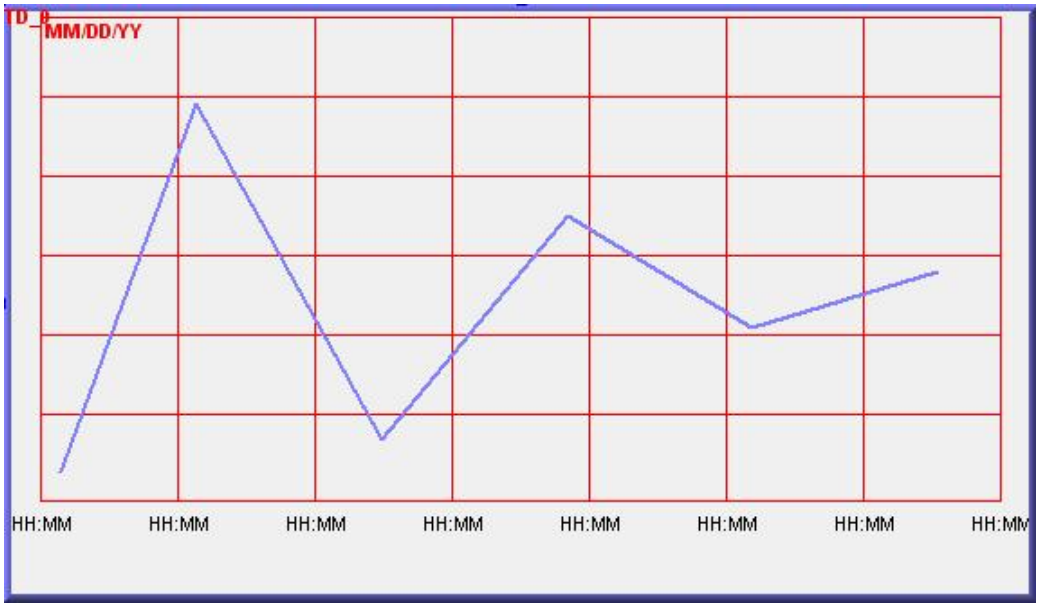
[LW300]	Ch. 0 : 16-bit Unsigned	(1 words)
[LW301]	Ch. 1 : 32-bit Unsigned	(2 words)
[LW303]	Ch. 2 : 32-bit Unsigned	(2 words)
[LW305]	Ch. 3 : 16-bit Signed	(1 words)

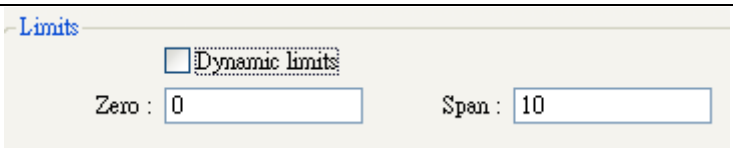
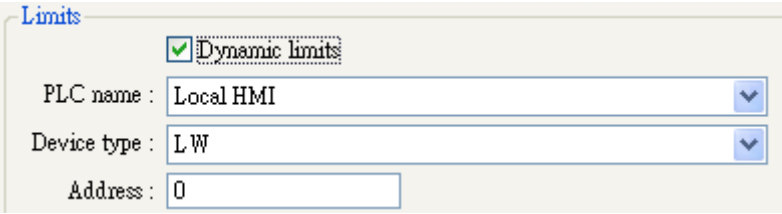
The picture below shows the attribute of "trend display".



Frame	The color of frame.
Background	The color of background.
Show scroll controls	To enable / disable scroll control on the trend display. 
Grid	Set the distance and the color of grid.
Grid/	Enable / disable grid.

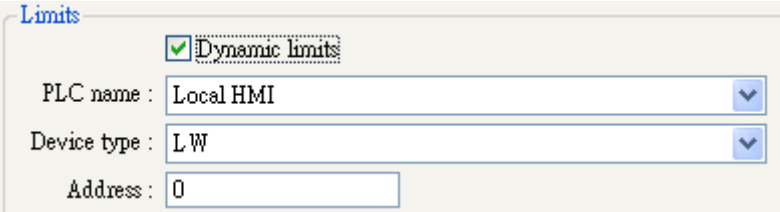
[Enable]	**[Horiz.]** Set the number of horizontal line.
	[Verti. interval] **a. Pixel** Point distances : ◉ Pixel ○ Time When select [pixel] to set the display interval (see note on the above graph and "General" tab), the [Verti. interval] is used to select how many sampling point will be included between two vertical grid line. See the picture below. Verti. interval : 4 point(s) **b. Time** When select [Time] to set the time range of display data, the [Verti. interval] is used to select the time range between two vertical grid lines. See the picture below. Verti. interval : 4 second(s) According to these settings, the system will calculate the number of vertical grid line automatically.
	[Time Scale] To enable the time scale on the bottom of trend display **[Format]** To select time scale as HH:MM or HH:MM:SS **[Font]** To select font style **[Size]** To select font size. Recommend use font size: 8.

	
Channel	Set each sampling line's format and color, and the display data's low limit and high limit.
Limit / uncheck "Dynamic limits"	[Zero]、[Span] [Zero] and [Span] are used to set the low limit and high limit of sampling data, So if the low limit is 50 and high limit is 100 for one sampling line, then [Zero] and [Span] must be set as [50] and [100], so all the sampling data can be displayed in the trend display object. The data length of the word device for limits is related to the data format of object. In the example belwo, the low limit and high limit are sourced from [LW0] and the following explains the addresses of the low limit and high limit. a. If the format of data displayed is "32-bitBCD", then [LW0] low limit position (32-bit BCD) [LW0 + 2] high limit position (32-bit BCD) b. If the format of data displayed is "16-bit unsigned", then [LW0] low limit position (16-bit unsigned) [LW0 + 1] high limit position (16-bit unsigned) c. If the format of data displayed is "32-bitfloat", then [LW0] low limit position (32-bit float) [LW0 + 2] high limit position (32-bit float)

	
Limit / check "Dynamic limits"	When Dynamic Limits is selected, the low limit and high limit are derived from the designated word device. An extended function is zoom in and zoom out function. Please refer 17.3 Example. 
Time / Data	The time of latest sampling data will be marked on the top left corner of the object. It is used to set the time display format and color.

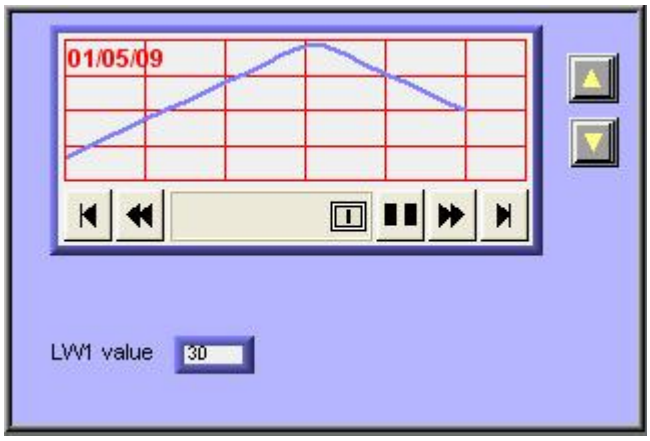
13.17.3 Example

For zoom in / out the trend graph, user has to check the Limit/Dynamic limits as picture below.

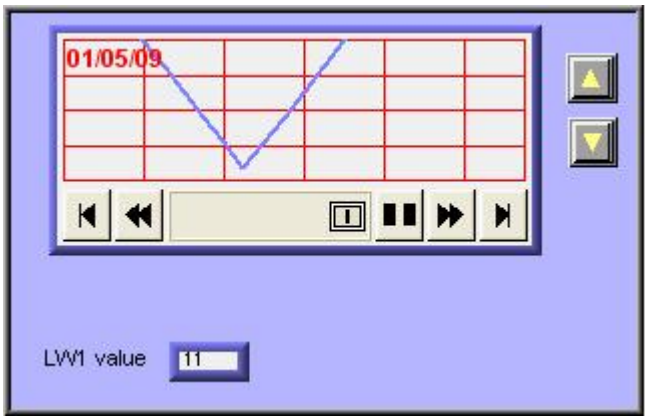


For example, the LW0 and LW1 are to control low limit and high limit, you may change the value of LW1 to zoom in / out.

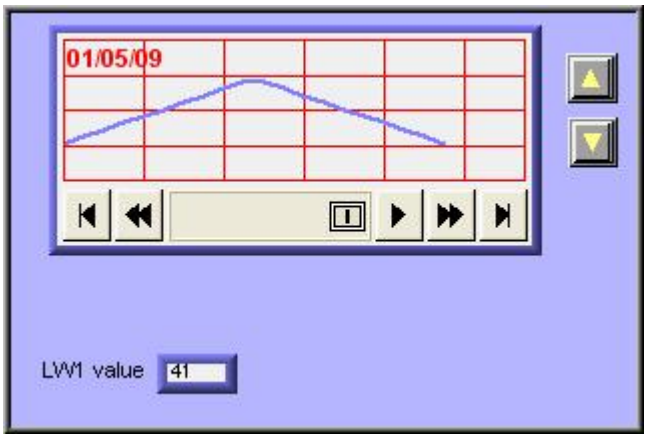
This following picture is in original size. The range of trend is between 0~30. The arrow on the right side are set word (LW1, increment (JOG+) and LW1, decrement (JOG-)) for control the zoom in and zoom out function.



Decrease LW1's value to exhibit zoom in function as shown below:
The value of LW1 decreased to 11.



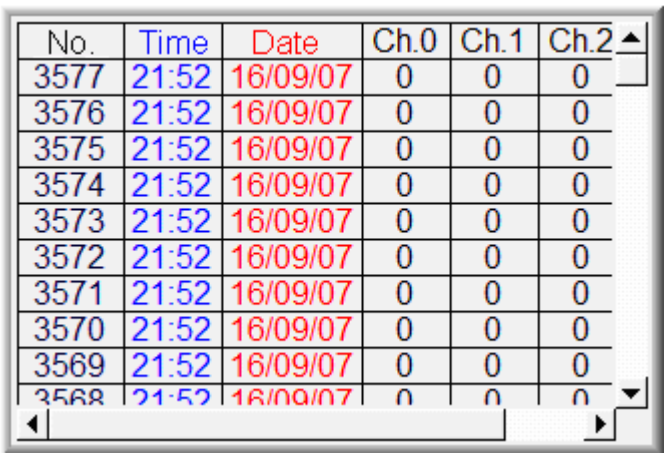
Increase LW1's value to exhibit zoom out function as shown below:
The value of LW1 increased to 41.



13.18 History Data Display

13.18.1 Overview

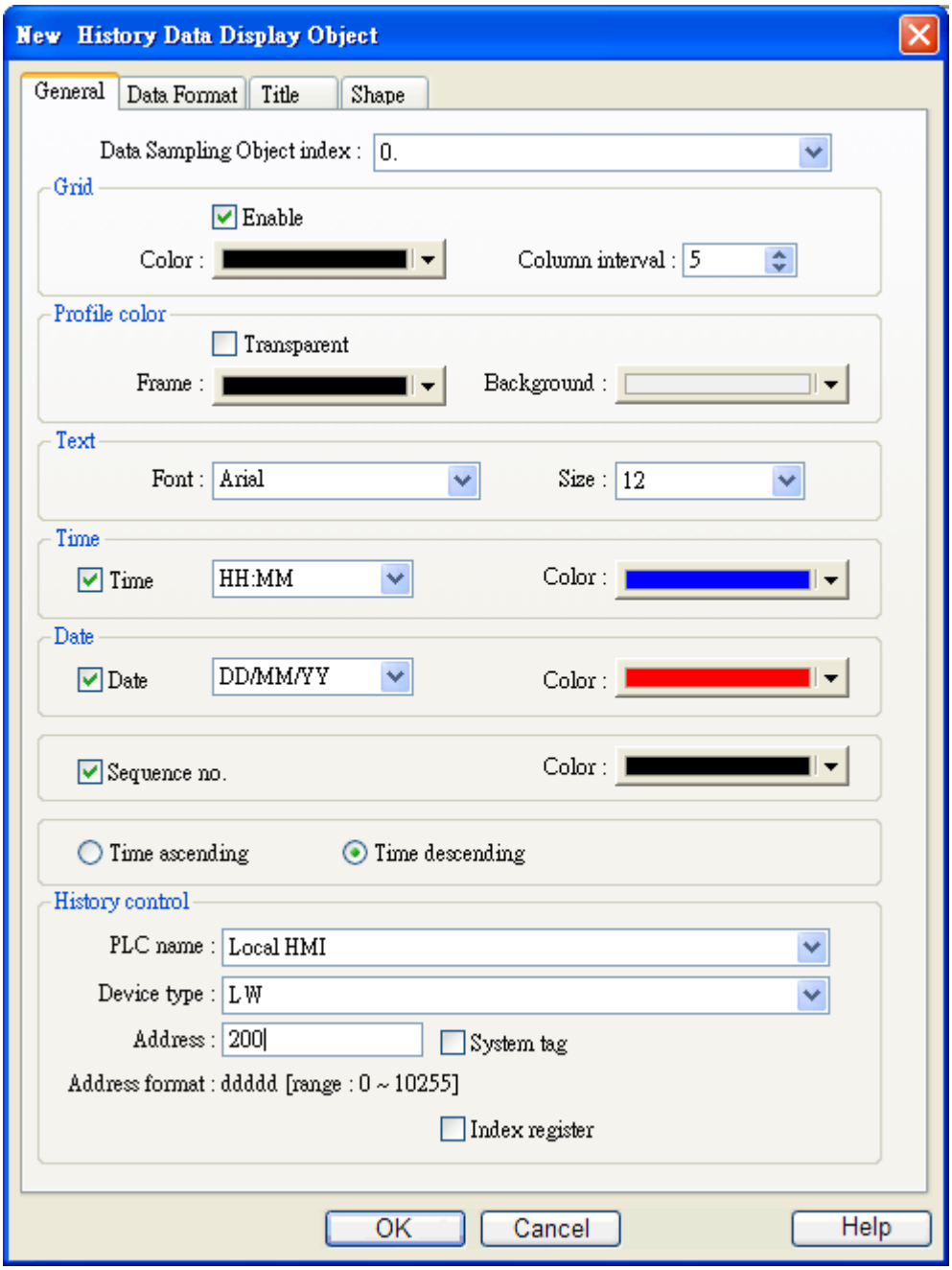
"History Data Display" object display data stored by data sampling object. It displays history data in numeric format. Please note that the history data display will not refresh automatically, it only retrieve the data from the designated record and display at the time window popup. If the content of the designated record is updated, the history data display will not change accordingly.



No.	Time	Date	Ch.0	Ch.1	Ch.2
3577	21:52	16/09/07	0	0	0
3576	21:52	16/09/07	0	0	0
3575	21:52	16/09/07	0	0	0
3574	21:52	16/09/07	0	0	0
3573	21:52	16/09/07	0	0	0
3572	21:52	16/09/07	0	0	0
3571	21:52	16/09/07	0	0	0
3570	21:52	16/09/07	0	0	0
3569	21:52	16/09/07	0	0	0
3568	21:52	16/09/07	0	0	0

13.18.2 Configuration

Click the "History Data Display" icon on the toolbar, the "History Data Display" dialogue box show up on the screen. Fill in each items and click OK button, a new object will be created. See the pictures below.



[Data Sampling object index]	Select the corresponding “Data sampling object” where the history data comes from. .
Grid	Set grid enable or disable.

<table>
<tr><td></td><td>

No.	Time	Date	Ch.0	Ch.1	Ch.2
3582	21:52	16/09/07	2	2	0
3581	21:52	16/09/07	2	2	0
3580	21:52	16/09/07	2	2	0
3579	21:52	16/09/07	2	2	0
3578	21:52	16/09/07	2	2	0
3577	21:52	16/09/07	0	0	0
3576	21:52	16/09/07	0	0	0
3575	21:52	16/09/07	0	0	0
3574	21:52	16/09/07	0	0	0
3573	21:52	16/09/07	0	0	0

</td></tr>
<tr><td rowspan="2">Grid</td><td>[Color]
Set color of grid.</td></tr>
<tr><td>[Column interval]
Set space of column.

No.	Time	Date	Ch.0	Ch.1	Ch.2
3667	21:57	16/09/07	1	0	0
3666	21:57	16/09/07	1	0	0
3665	21:57	16/09/07	1	0	0
3664	21:57	16/09/07	1	0	0
3663	21:57	16/09/07	1	0	0
3662	21:57	16/09/07	1	0	0
3661	21:57	16/09/07	1	0	0
3660	21:56	16/09/07	0	0	0
3659	21:56	16/09/07	0	0	0
3658	21:56	16/09/07	0	0	0

No.	Time	Date
3667	21:57	16/09/07
3666	21:57	16/09/07
3665	21:57	16/09/07
3664	21:57	16/09/07
3663	21:57	16/09/07
3662	21:57	16/09/07
3661	21:57	16/09/07
3660	21:56	16/09/07
3659	21:56	16/09/07
3658	21:56	16/09/07

</td></tr>
<tr><td>Profile color</td><td>Set color of frame and background. If it is set as transparent, the frame and background will be ignored.

No.	Time	Date	Ch.0	Ch.1	Ch.2
3982	22:02	16/09/07	0	0	0
3981	22:02	16/09/07	0	0	0
3980	22:02	16/09/07	0	0	0
3979	22:02	16/09/07	0	0	0
3978	22:02	16/09/07	0	0	0
3977	22:02	16/09/07	0	0	0
3976	22:02	16/09/07	0	0	0
3975	22:02	16/09/07	0	0	0
3974	22:02	16/09/07	0	0	0
3973	22:02	16/09/07	0	0	0

</td></tr>
<tr><td rowspan="2">Time and Date</td><td>Enable or disable the time and date of data sampling and format.</td></tr>
<tr><td>[Time ascending]
“Time ascending” means to put the earlier data in the top and the latest data in the bottom.</td></tr>
</table>

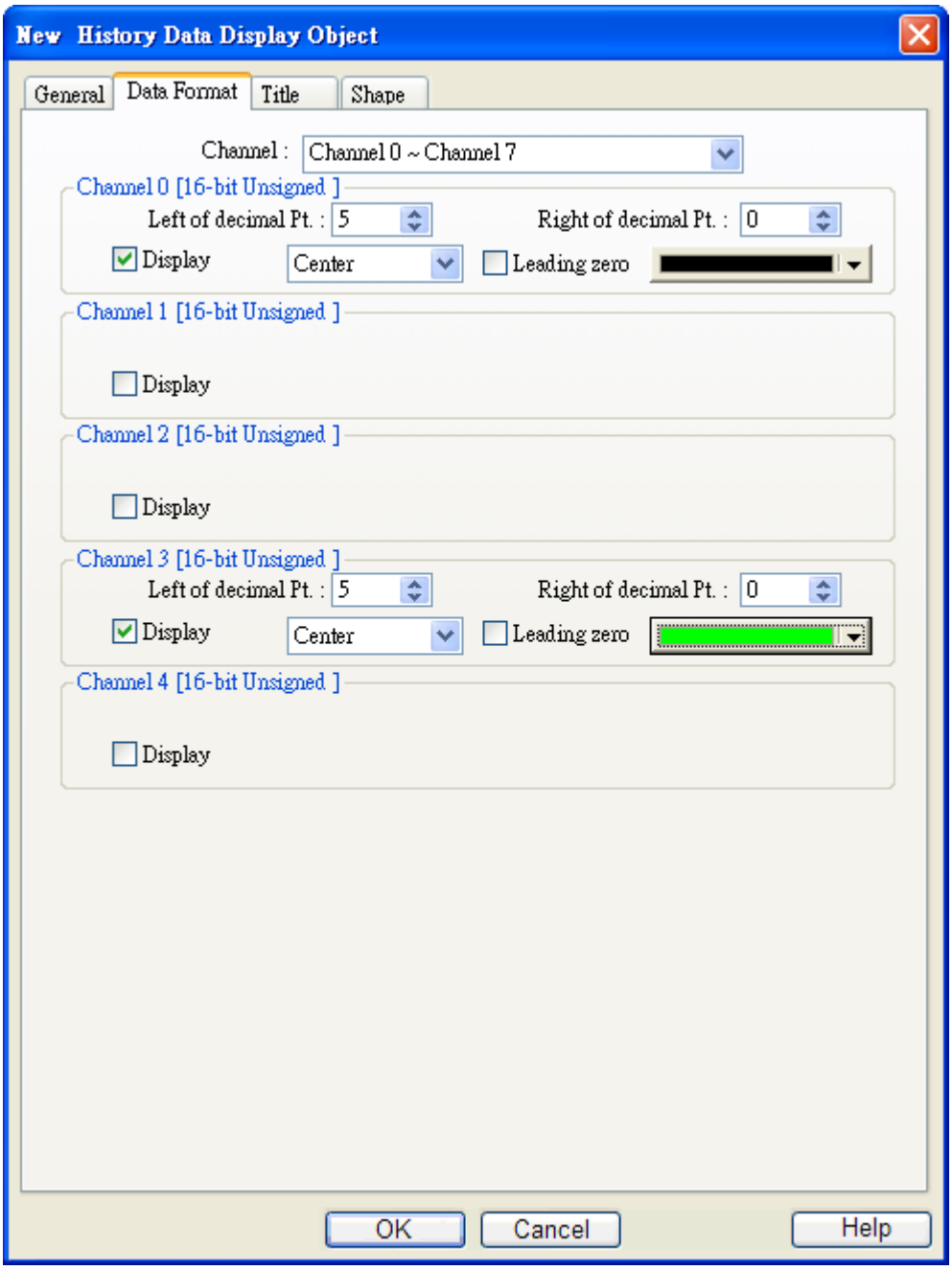
<table>
<tr><td rowspan="2"></td><td>
<table>
<tr><th>No.</th><th>Time</th><th>Date</th><th>Ch.0</th><th>Ch.1</th><th>C</th></tr>
<tr><td>1</td><td>00:24:27</td><td>16/09/07</td><td>2</td><td>2</td><td></td></tr>
<tr><td>2</td><td>00:24:28</td><td>16/09/07</td><td>4</td><td>4</td><td></td></tr>
<tr><td>3</td><td>00:24:29</td><td>16/09/07</td><td>7</td><td>6</td><td></td></tr>
<tr><td>4</td><td>00:24:30</td><td>16/09/07</td><td>9</td><td>8</td><td></td></tr>
<tr><td>5</td><td>00:24:31</td><td>16/09/07</td><td>6</td><td>4</td><td></td></tr>
<tr><td>6</td><td>00:24:32</td><td>16/09/07</td><td>4</td><td>2</td><td></td></tr>
<tr><td>7</td><td>00:24:33</td><td>16/09/07</td><td>1</td><td>4</td><td></td></tr>
<tr><td>8</td><td>00:24:34</td><td>16/09/07</td><td>3</td><td>6</td><td></td></tr>
<tr><td>9</td><td>00:24:35</td><td>16/09/07</td><td>6</td><td>6</td><td></td></tr>
<tr><td>10</td><td>00:24:36</td><td>16/09/07</td><td>8</td><td>4</td><td></td></tr>
</table>
</td></tr>
<tr><td>

[Time descending]

“Time descending” means to put the latest data in the top and the earlier data in the bottom.

<table>
<tr><th>No.</th><th>Time</th><th>Date</th><th>Ch.0</th><th>Ch.1</th><th>C</th></tr>
<tr><td>4787</td><td>22:24:15</td><td>16/09/07</td><td>2</td><td>2</td><td></td></tr>
<tr><td>4786</td><td>22:24:00</td><td>16/09/07</td><td>3</td><td>2</td><td></td></tr>
<tr><td>4785</td><td>22:23:59</td><td>16/09/07</td><td>3</td><td>2</td><td></td></tr>
<tr><td>4784</td><td>22:23:58</td><td>16/09/07</td><td>3</td><td>2</td><td></td></tr>
<tr><td>4783</td><td>22:23:57</td><td>16/09/07</td><td>3</td><td>2</td><td></td></tr>
<tr><td>4782</td><td>22:23:56</td><td>16/09/07</td><td>3</td><td>2</td><td></td></tr>
<tr><td>4781</td><td>22:23:55</td><td>16/09/07</td><td>3</td><td>2</td><td></td></tr>
<tr><td>4780</td><td>22:23:54</td><td>16/09/07</td><td>3</td><td>2</td><td></td></tr>
<tr><td>4779</td><td>22:23:53</td><td>16/09/07</td><td>3</td><td>2</td><td></td></tr>
<tr><td>4778</td><td>22:23:52</td><td>16/09/07</td><td>3</td><td>2</td><td></td></tr>
</table>

</td></tr>
<tr><td>**History Control**</td><td>The history files are named with date code. The history control is used to select the designated history data files for display. In case the value of history control is 0, the latest file is selected. If it is 1, the second latest file is selected, and so on.</td></tr>
</table>



Each history data display object can display up to 20 channels. You can select the channels which you want to watch on the screen.

In the example below, there are four channels in the data sampling object, ch 0 and ch. 3 are selected for display only. The data format of each channel is decided by the related data sampling objects.

No.	Time	Date	Ch.0	Ch.3
5272	22:43:09	16/09/07	4	1
5271	22:43:08	16/09/07	2	0
5270	22:33:42	16/09/07	0	0
5269	22:33:41	16/09/07	0	0
5268	22:33:40	16/09/07	0	0
5267	22:33:39	16/09/07	0	0
5266	22:33:38	16/09/07	0	0
5265	22:33:37	16/09/07	0	0
5264	22:33:36	16/09/07	0	0
5263	22:33:35	16/09/07	0	0

New History Data Display Object

General | Data Format | Title | Shape

☑ Use title

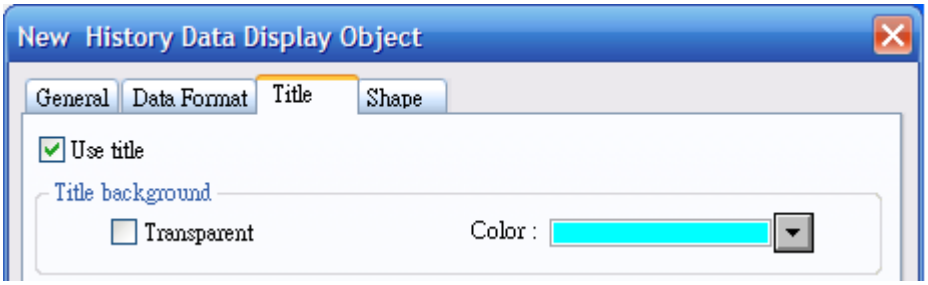
Title background

☑ Transparent

Title name	Title	Label library	Label tag
Sequence no.	No.	None	
Time	Time	None	
Date	Date	None	
Channel 0	ch.0	None	
Channel 1	ch.1	None	
Channel 2	ch.2	None	
Channel 3	ch.3	None	
Channel 4	ch.4	None	
Channel 5	ch.5	None	
Channel 6	ch.6	None	
Channel 7	ch.7	None	
Channel 8	ch.8	None	
Channel 9	ch.9	None	
Channel 10	ch.10	None	
Channel 11	ch.11	None	
Channel 12	ch.12	None	
Channel 13	ch.13	None	
Channel 14	ch.14	None	

Setting ...

OK | Cancel | Help

Title	**[Use title]** To enable or disable title. 
Title background	**[Transparent]** To enable or disable transparent.
	[Background color] Set the background color of title.
Setting	This dialogue window defines the title.  You can use label tag library for title with multi-language. Go to [setting] and select one from label library. 

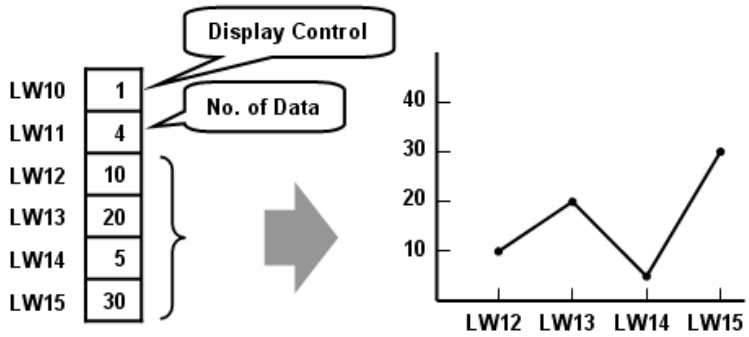
13.18.3 Note

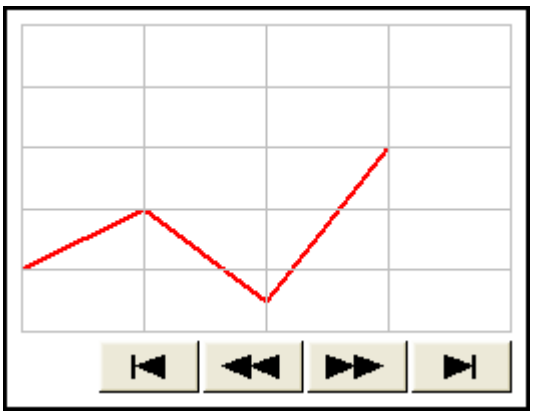
If you have run the off-line simulation and the sampling data is saved in the record, then you want to change the format of sampling data, be sure to delete previous data record in C:\EB8000\datalog to avoid the system misinterpret the old data record.

13.19 Data Block Display

13.19.1 Overview

Data Block is a combination of several word devices with continuous address, for example LW12, LW13, LW14, LW15 and so on. Use Data Block Display object to display multiple data blocks in trend curve, for example, it can display two data blocks LW12~LW15 and RW12~RW15 in trend curve simultaneously. It is very useful to observe and compare the difference of trend curves.



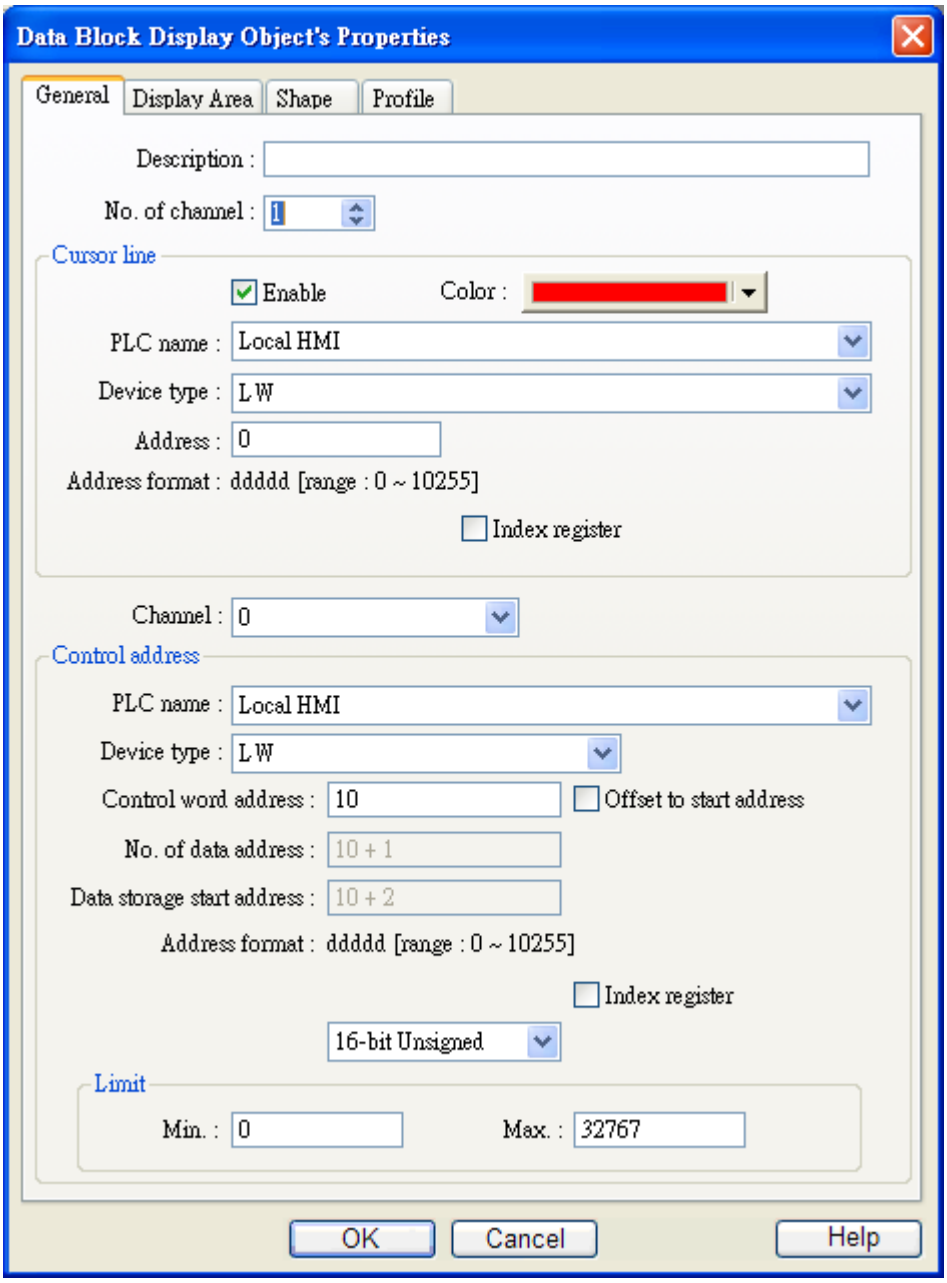


Snapshot of Data Block Display

13.19.2 Configuration

[New object]

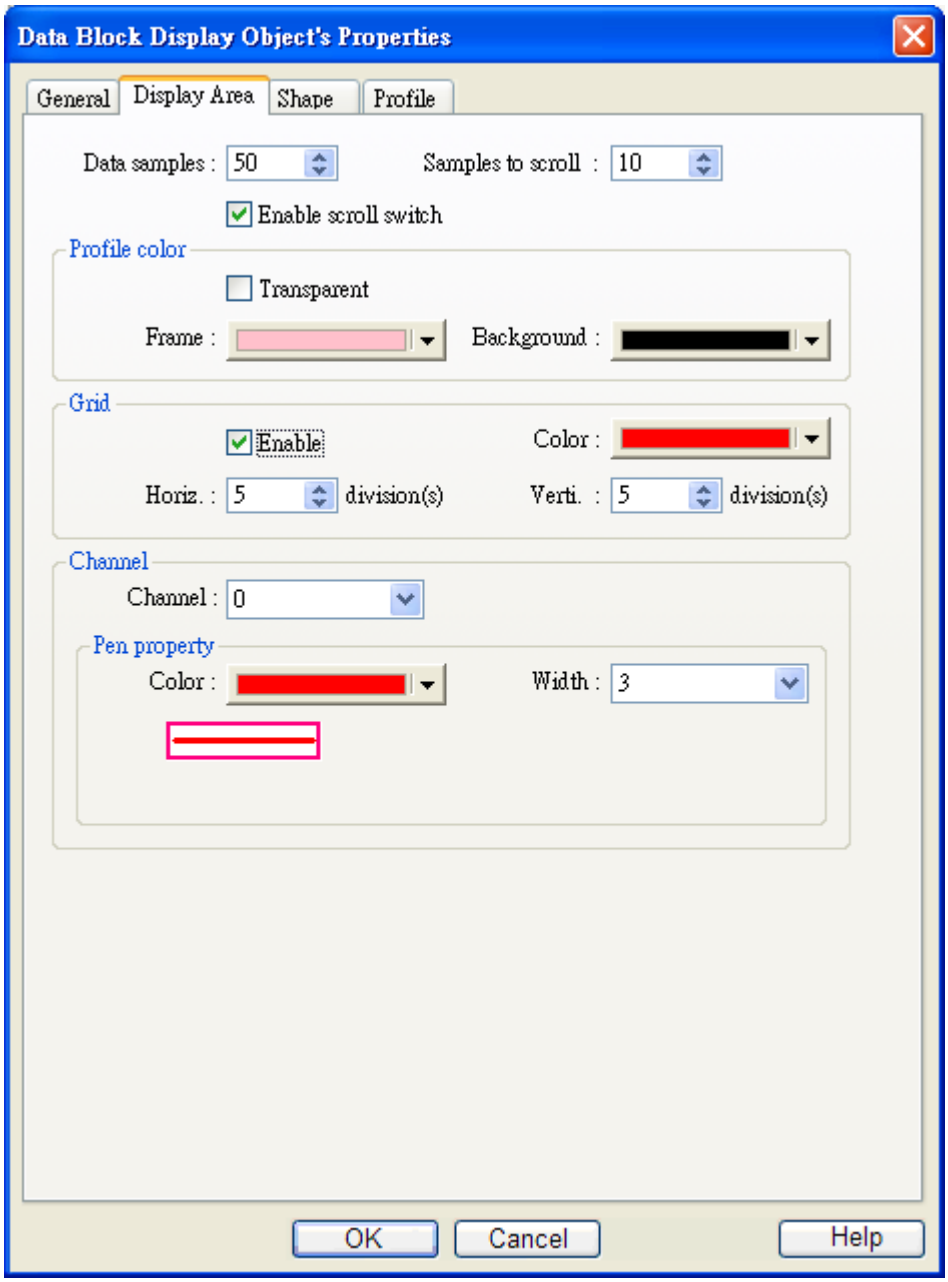
Click the "Data Block Display" icon , "Data Block Display's properties" dialogue box appears as follows:



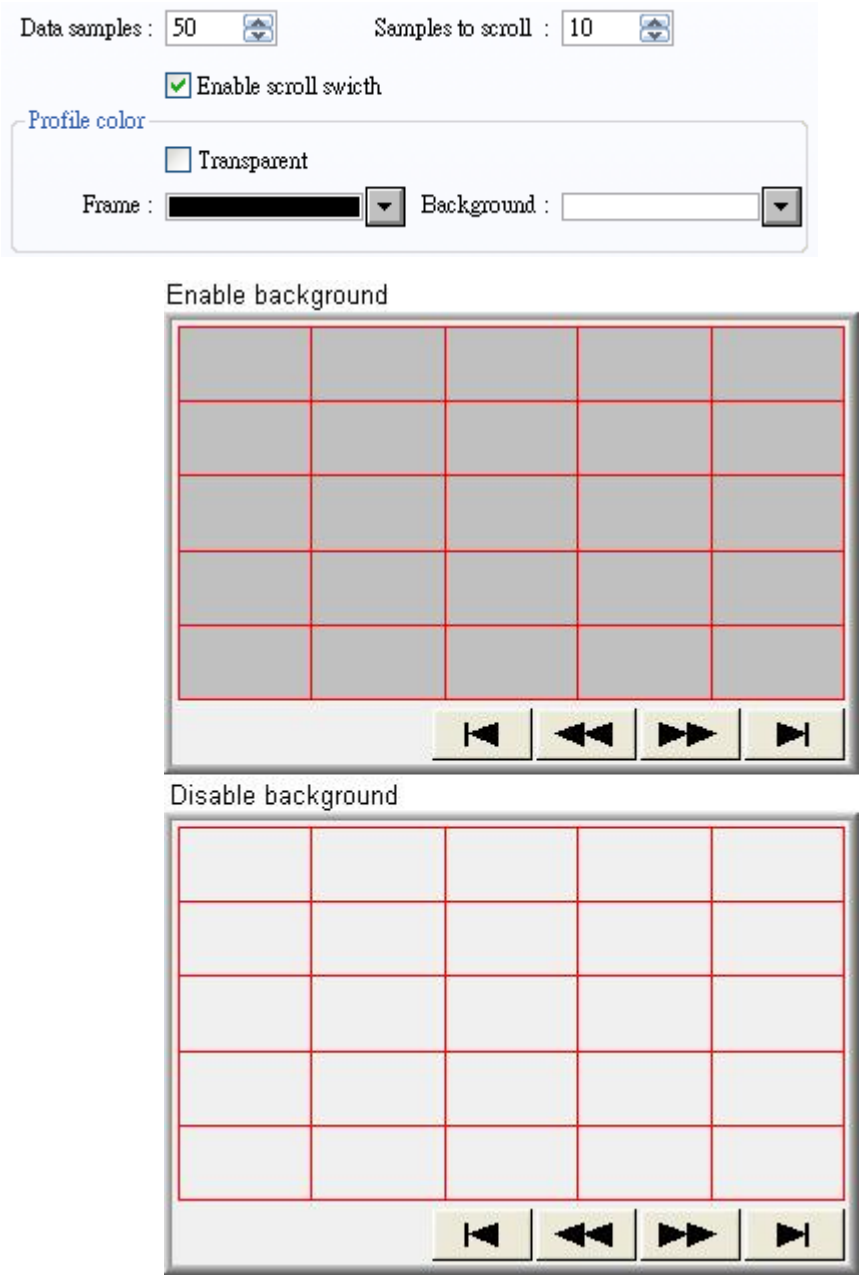
[General]	**No. of channel** Set the no of channel for this object. Each channel represents one data block. The max. no. of channel is 12.

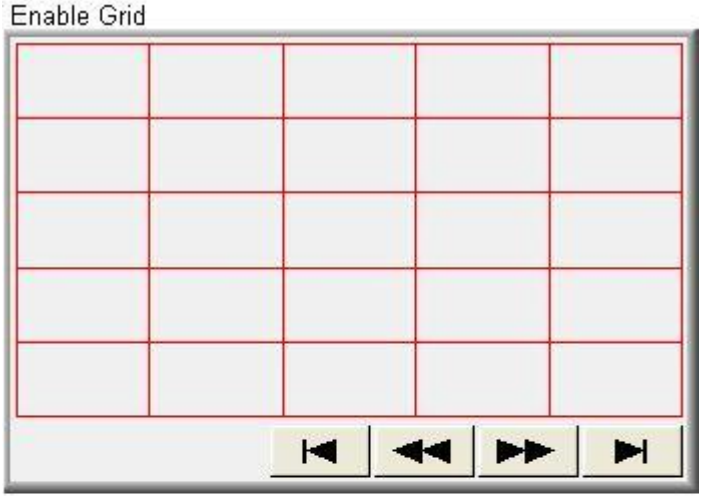
	No. of channel : 2
Cursor Line	Using the "Cursor line" function, when user touches the Data Block display object, it will display a cursor line on the data block display object, and transfer the position of cursor and the data at the cursor position to the designated registers. Please refer 19.3 On line operation for further information.
Channel	Select each channel and set the attributes.
Control address	**[PLC name]** Select the PLC where the target data block located. **[Device type]** Select the device type where the target data block located **[Control word address]** "Control word" is used to control and clear trend curve display. 0=No action (default) 1= Plot trend curve 2=Clear trend curve 3=Redraw trend curve After executing the operation above, the system will reset the control word to zero. **[No. of data address]** "No. of data address" is default as "Control word address +1". "No. of data" is to store the number of word device in each data block, i.e. the number of data to plot in trend curve. The maximum value is 1024. **[Data storage start address]** If "offset to start address" is disabled, the "Data storage start address" is default as "Control word address + 2". **[Offset value storage address]** If "offset to start address" is enabled, the "Data storage start address" is "[Offset value storage] + Control word address", the "Offset value storage address" is default as "Control word address" + 2. **[Format]** If you select 16-bit data format, the address of each data will be start address,

	start address + 1, start address + 2 and so on. If you select 32-bit data format, the address of each data will be start address, start address + 2, start address + 4 and so on.
Limit	Set the minimum and maximum limit of trend curve, the trend curve is limited by the minimum and maximum limit.



Data Sample	Set the data samples, samples to scroll, frame and color of background.

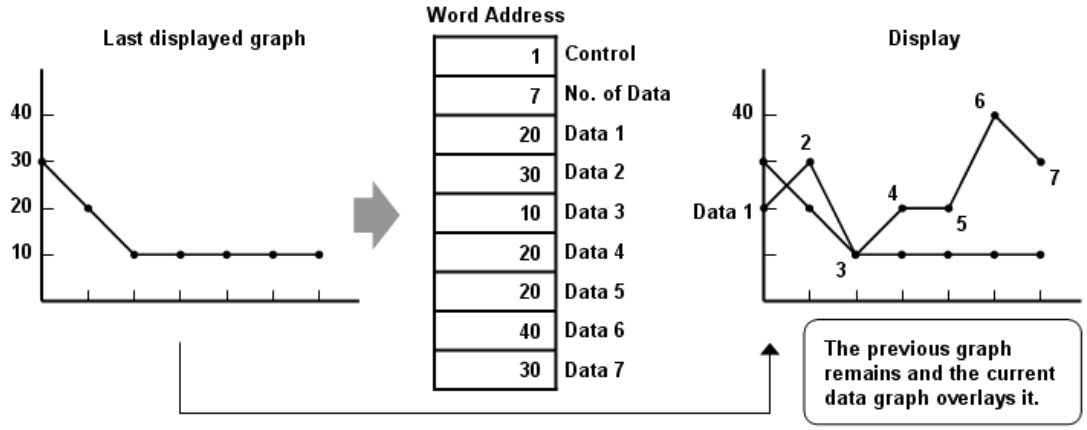

Data samples :
50
Samples to scroll :
10
Enable scroll swicth
Profile color
Transparent
Frame :
Background :
Enable background
Disable background

Grid	Enable Grid  Disable Grid 
Channel	Set the color and width of each trend curve. 

13.19.3 On line operation

13.19.3.1 How to shows a trend curve

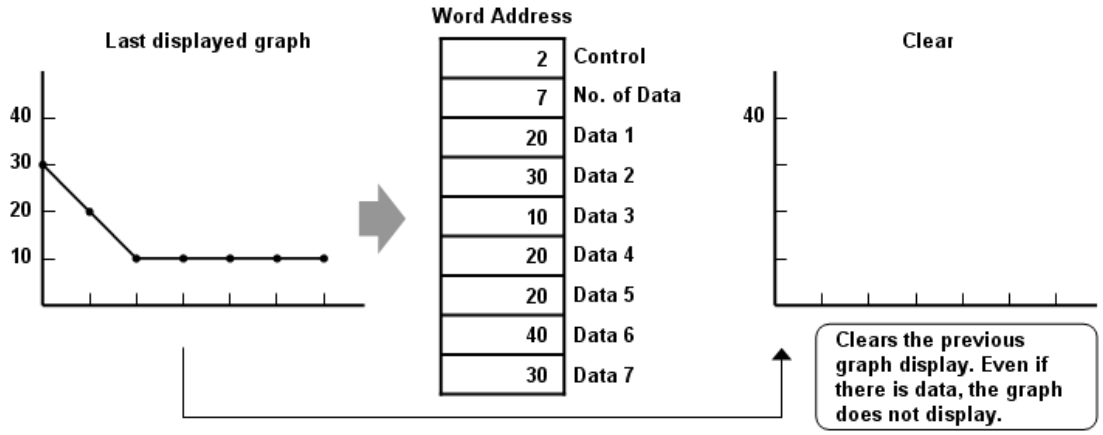
a. Write the number of data to [No. of data address], i.e. “word control address+1”
b. Have the content of data block ready for display.
   NOTE: data block start from “word control address + 2”.
c. Write “1” to [Control word address], the previous trend curve remains and the new content in data block will be plot on the screen.
d. The system will write “0” to [Control word address] after the trend curve displayed.



NOTE : During the period between c and d, do not change the content of [Control], [No. of Data] and [Data], it might cause error for trend curve plot.

13.19.3.2 How to clear a trend curve

a. Write “2” to [Control word address], all the trend curves will be cleared.
b. The system will write “0” to [Control word address] after the trend curve is cleared.

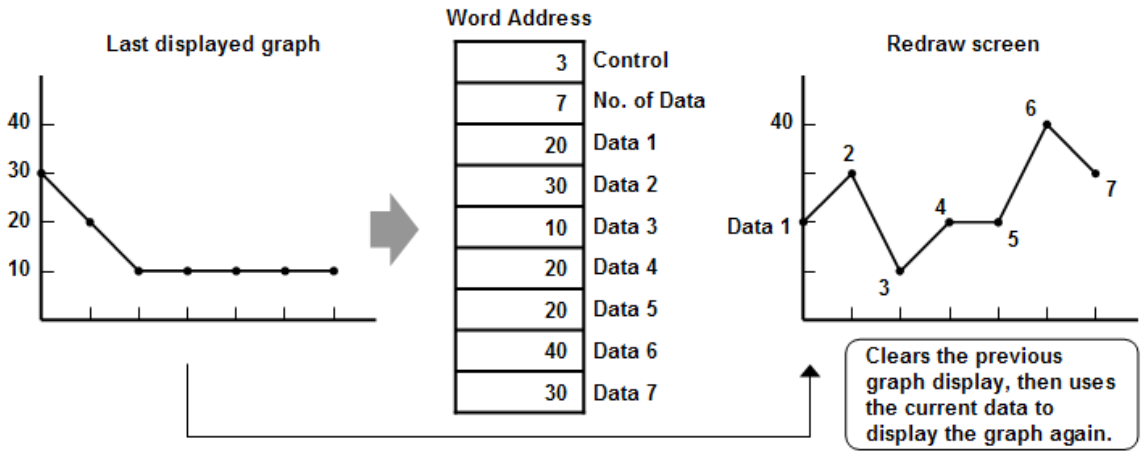


13.19.3.3 How to clear the previous trend curve and display new one

a. Write the number of data to [No. of data address], i.e. “word control address+1”
b. Have the content of data block ready for display.

Note: data block start from “word control address + 2”.

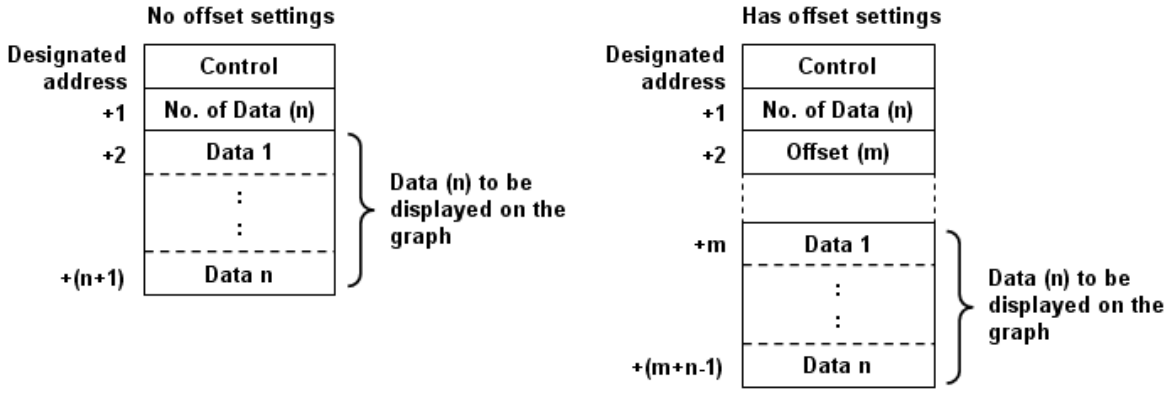
c. Write “3” to [Control word address], the previous trend curves will be cleared and the new content in data block will be plot on the screen.
d. The system will write “0” to [Control word address] after the trend curve displayed.



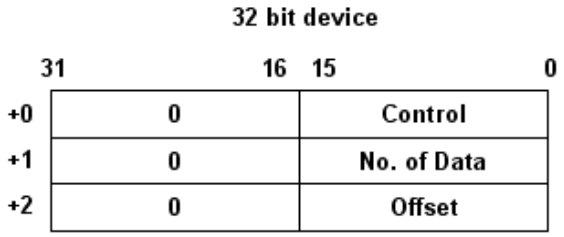
13.19.3.4 How to use offset mode

If “offset to start address” is selected, the “Data storage start address” will be calculated from “control word address + [Offset value storage address]”. “Offset value storage address” is “control word address +2”.

In the following example, the content of “Offset value storage address” is “m”, therefore the data block is started from the address “control word address + m”.



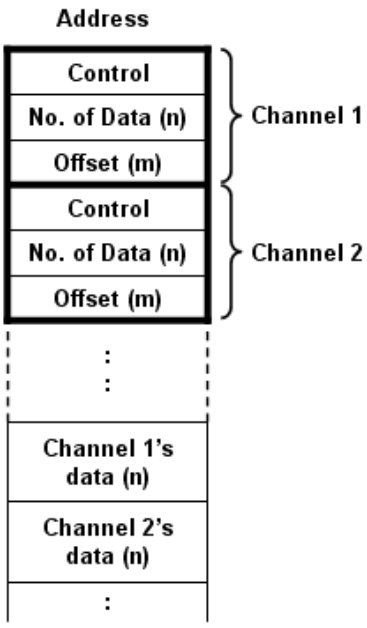
NOTE If the control register is 32 bits device, only bit 0-15 will be used as control purpose, bit 16-31 will be ignored. (as illustration below)



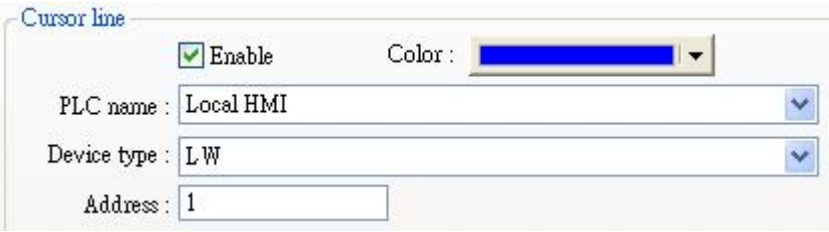
If you do not use “offset to start address”, the system will continuously read [Control] and [No. of Data]. At the time [Control] is changed to non-zero, the system will then read the data block. If you use “offset to start address”, the system will continuously read [Control], [No. of Data] and [Offset].

It is recommended to use “offset to start address” for data block display with multiple channels and the same device type. You can register [Control], [No. of Data] and [Offset] in continuous address for each channel. The system will read the control words of all the channels in one read command and it shall speed up the response time.

Please refer to the following picture. The control words of channel 1 is located from address 0, the control words of channel 2 is located from address 3, there are continuous address and the system will read all the control words in one read command.

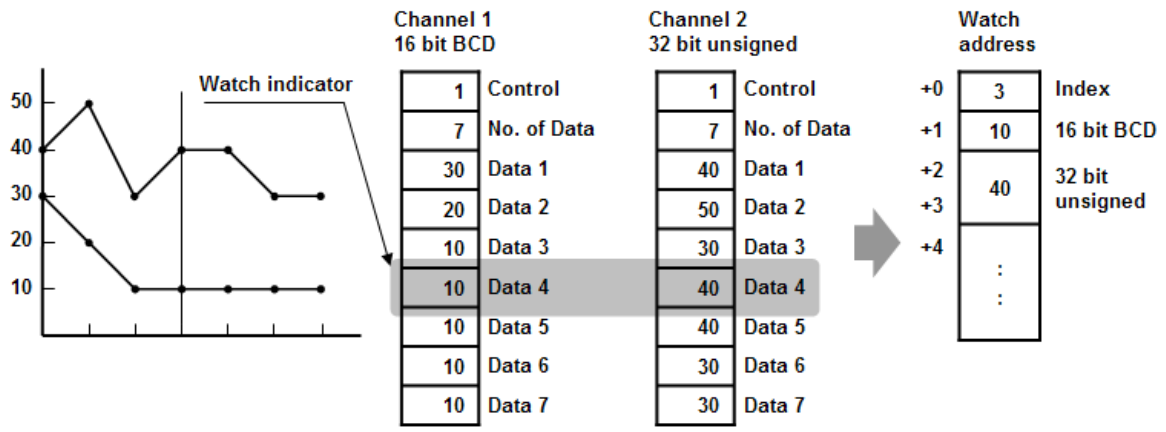


13.19.3.5 How to use watch (Cursor Line) feature



You may use the "Watch" function to check the value of any point in trend curve. When operator touches the data block object, it will display a "Cursor line", the system will write the index and value of that data in cursor line to the designated address. The user shall register NI objects with the designated address. The operator shall be able to observe the numeric value in across with the cursor line.

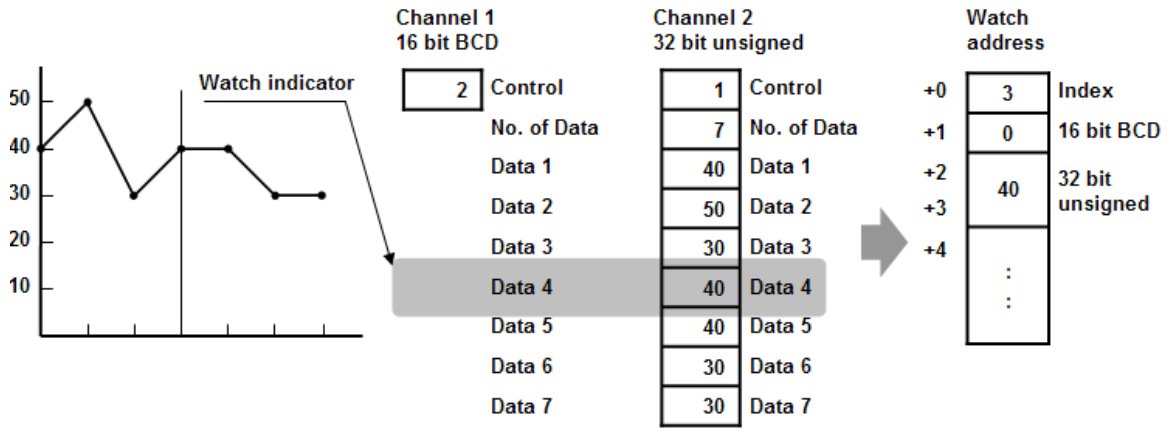
In the following example, the data block display contains two data blocks. The data format of channel 1 is 16 bit BCD and that of channel 2 is 32 bit unsigned. The cursor is positioned in data index 3 which is corresponding to the fourth data in data block. The system writes "data index" and the content of watched data to the watch address as shown in the following picture.



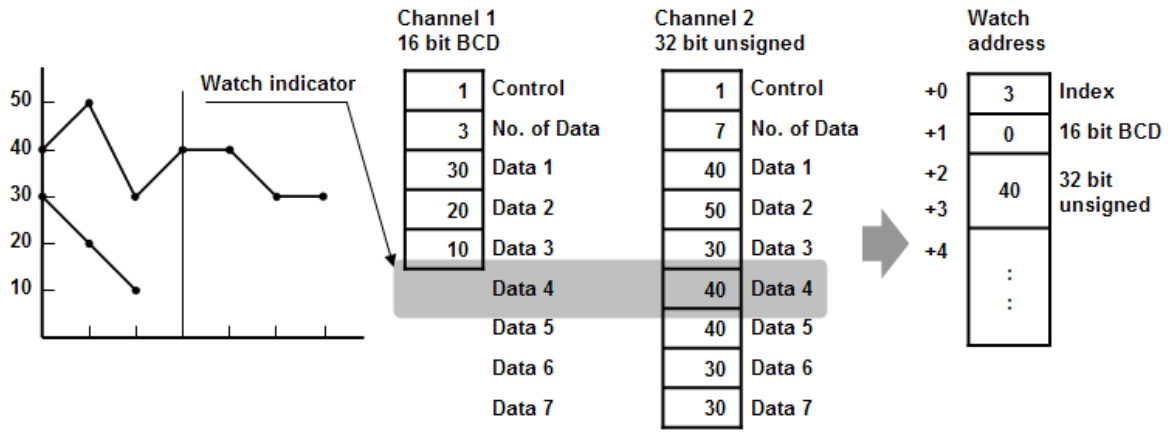
NOTE 1. [Data Index] is a 16 bit unsigned integer; when the designated register of cursor line is 32 bit device, it will be stored in the bit 0-15.

2. The watch function can only inspect current value in the data block. If there are multiple trend curves of the same channel on the screen, the data of previous trend curves is not exist, only the latest value is available for watch.

3. If the trend curve is cleared, when position the cursor line, the "0" will be displayed as shown below.



4. If there are only three data in Channel 1, when position the cursor in Data 4, the "0" will be displayed as shown below.



13.19.3.6 Limitation

The maximum number of channels is 12.

1. The system can draw up to 32 trend curves.
2. The system can draw up to 1024 points for each channel.

13.20 XY Plot

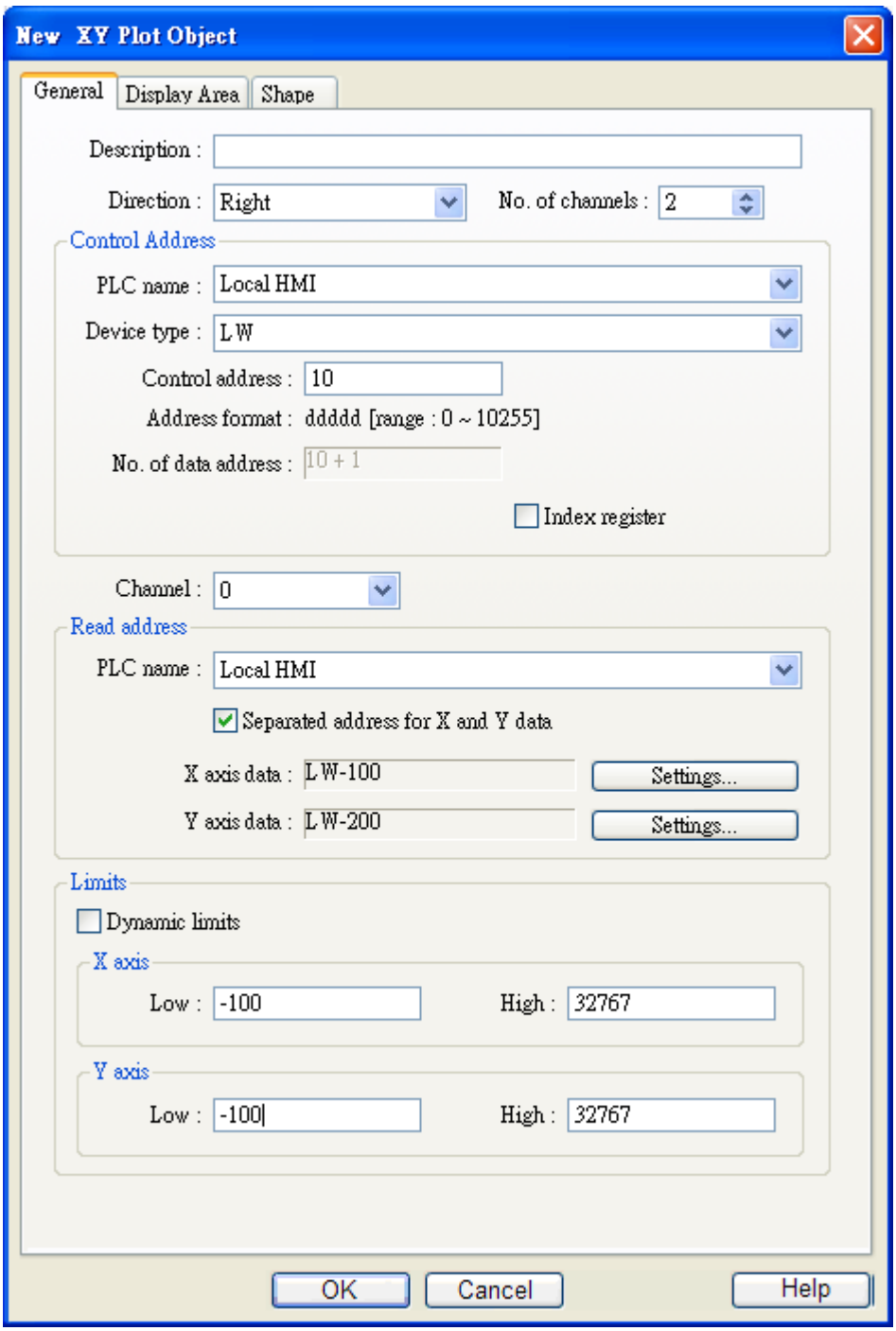
13.20.1 Overview

XY Plot object displays two dimension data. Each data contains X and Y values and each curve is composed of a stream of XY data. The maximum number of trend curves in a XY plot is 16 channels.

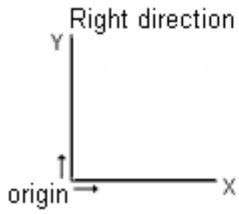
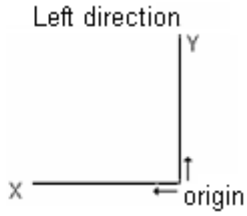
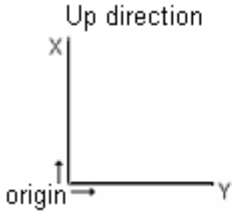
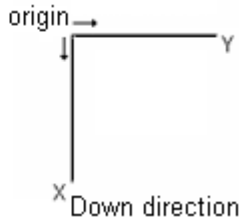
13.20.2 Configuration

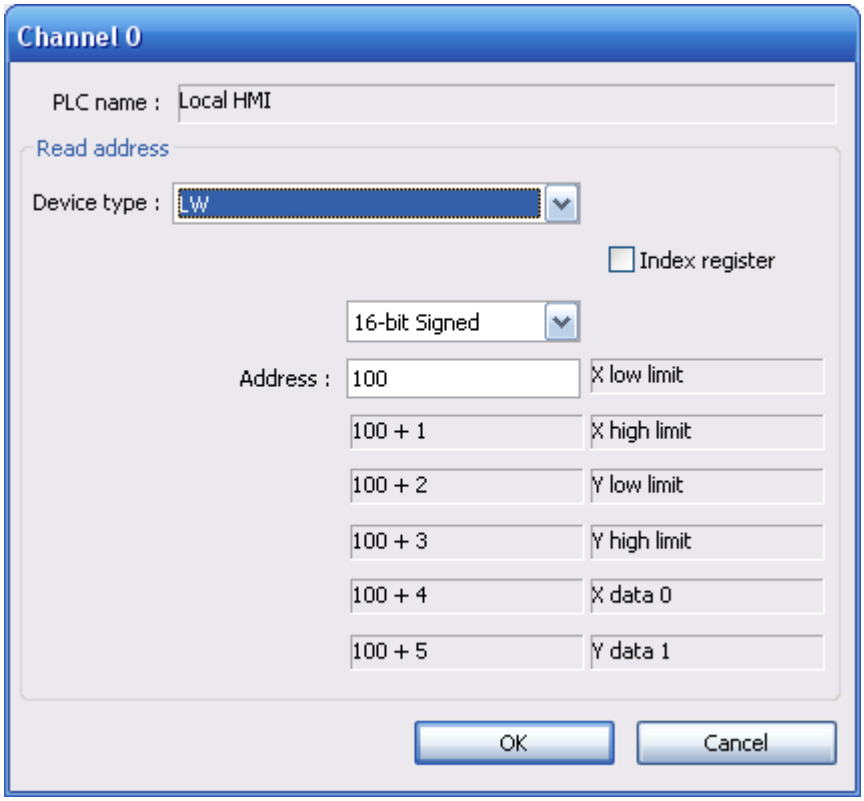
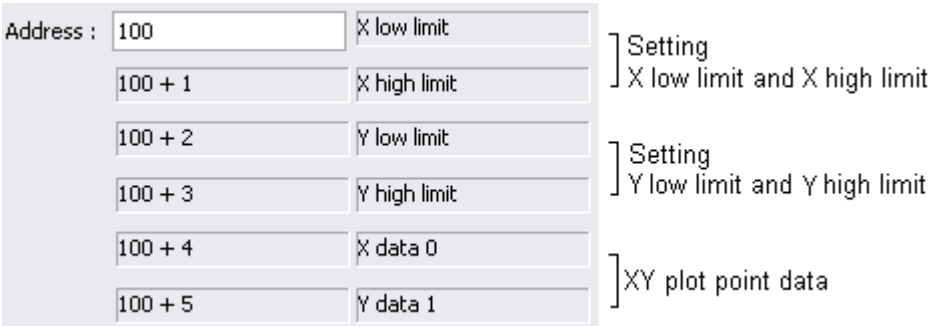
[New object]

Click the “XY plot” icon, and “XY Plot Object” dialog box appears.

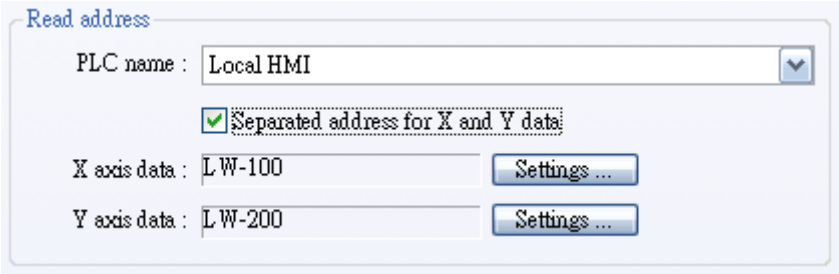


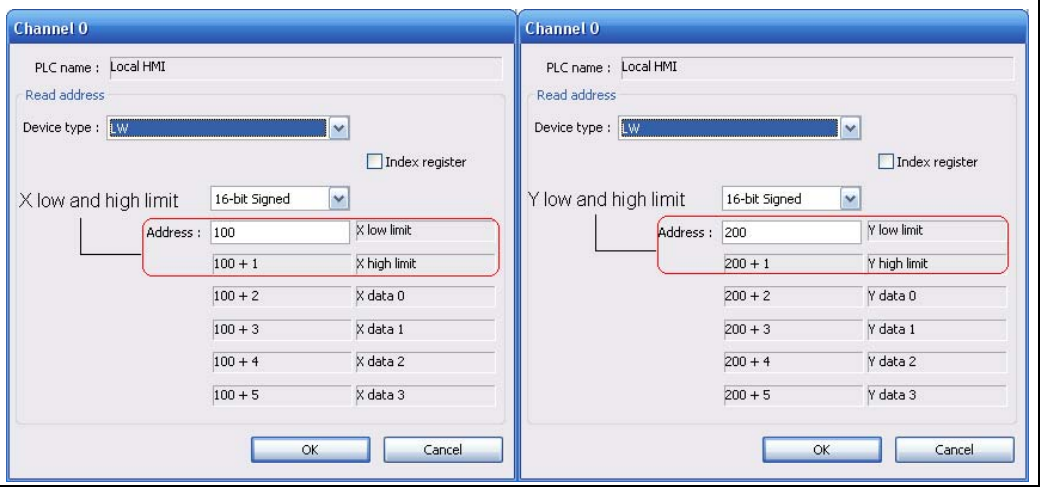
General	a. Direction: There are four selections, right, left, up or down. Right: Left:

	  Up: Down:   b. No. of channel. Set the no. of channels of the XY plot. Each channel may conduct the draw operation alone.
Control address	**[PLC name]** Select the PLC where the control address coming from **[Device type]** Select the device type where the control address coming from. **[Control address]** “Control address” is used to control the display of XY curve for each channel. 1= Plot XY curve Write ”1” to control address, the system will plot the XY curve, the previous XY curve if exists would not be clear. The system will reset the control address after operation complete. 2= Clear XY trend curve Write ”2” to control address, the system will clear all the previous XY curves and reset the control address after operation complete. 3= Refresh XY trend curve Write ”3” to control address, the system will clear the previous XY curve and plot the new XY curve and reset the control address after operation complete.

	[No. of data address] This address store the number of XY data. Each channel can have up to 1023 XY data.
Channel	Setting the channels detail for graph display.
Read Address	**[PLC name]** Select the PLC where the control address coming from. **[PLC address]**  Click settings button, a pop-up window appears as above, you can set the device type, data format and address, the usage of each address is listed on the right side.  If you check “Separated address for X and Y data”, the pop-up window

appears as below. It allows you to set different address for X and Y axis respectively.

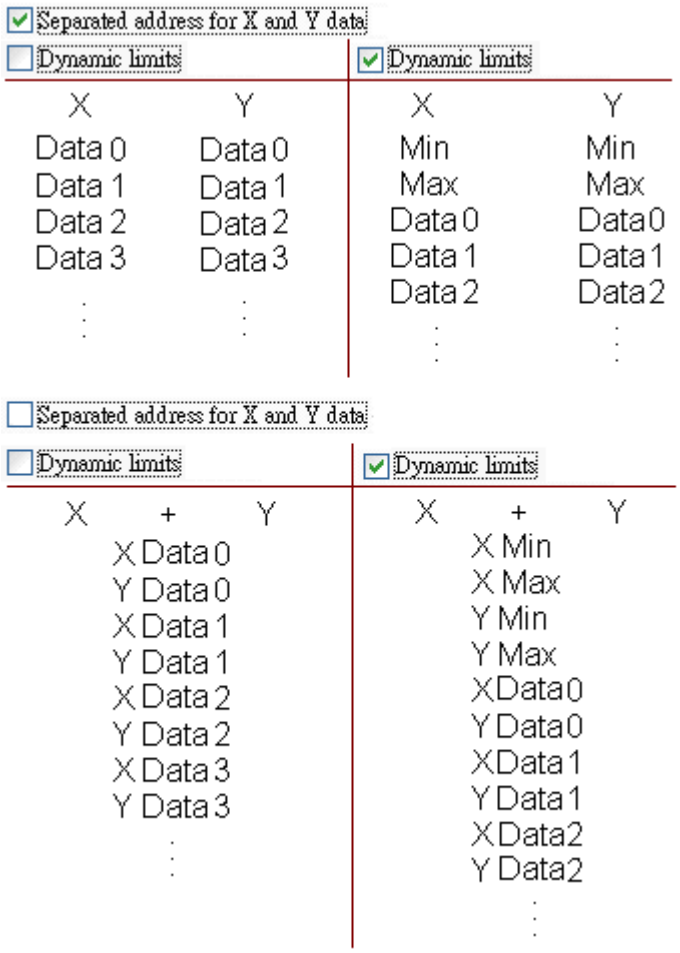




Limits	The above settings are based on dynamic limits, you can also have dynamic limits disable and set the fix high and low limits. Limits ☐ Dynamic limits X axis Low : 0 High : 32767 Y axis Low : 0 High : 32767 The high and low limits is used as scale to calculate the percentage of X and Y axis. i.e. X or Y % = (X or Y reading value – low limit) / (high limit – low limit) Based on your settings, the memory allocation for limit and XY data will be listed on the pop-up window. The following setting is for 16-bit signed data format and dynamic limits. 16-bit Signed Address : 100 X low limit n+0 100 + 1 X high limit n+1 100 + 2 Y low limit n+2 100 + 3 Y high limit n+3 100 + 4 X data 0 n+4 100 + 5 Y data 1 n+5 The following setting is for 32-bit float data format and dynamic limits. 32-bit Float Address : 100 X low limit n+0,n+1 100 + 2 X high limit n+2,n+3 100 + 4 Y low limit n+4,n+5 100 + 6 Y high limit n+6,n+7 100 + 8 X data 0 n+8,n+9 100 + 10 Y data 1 n+10,n+11

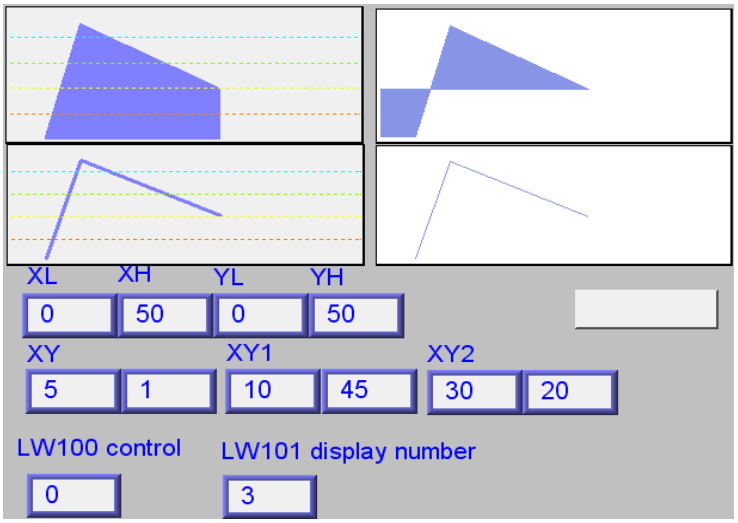
NOTE

There are four different type of selection to designate memory location for high/low limits and XY data. Please refer to the following settings.

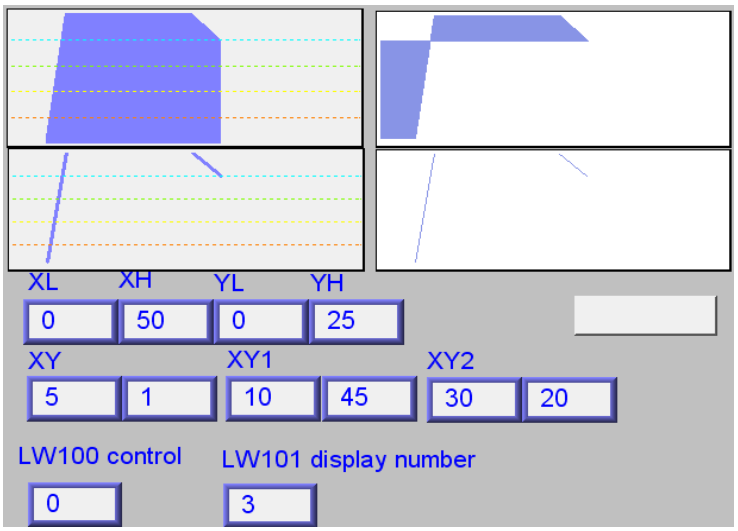


If dynamic limit is checked, you may change the high and low limits to realize zoom in and zoom out function. (Please refer trend display object's dynamic limit.)

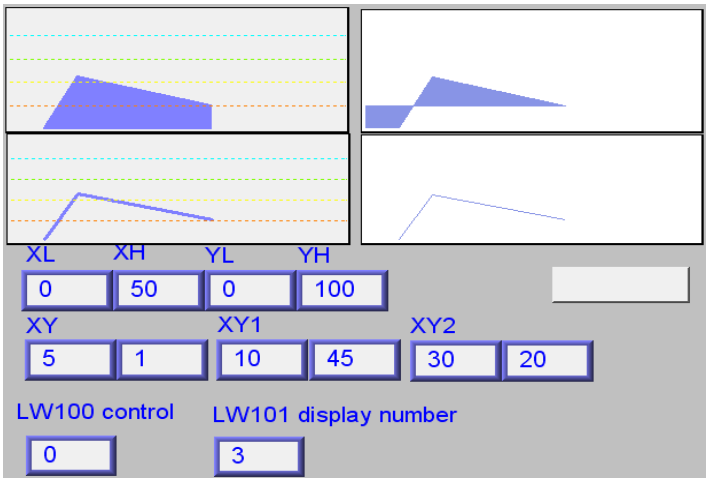
In the following example, the dynamic limit is selected, where XL=X low limit, XH=X high limit, YL=Y low limit, YH=Y high limit, and XY, XY1, XY2 are three XY data. Now we change the high limit of X and Y respectively and you may observe the effect of zoom in and zoom out.



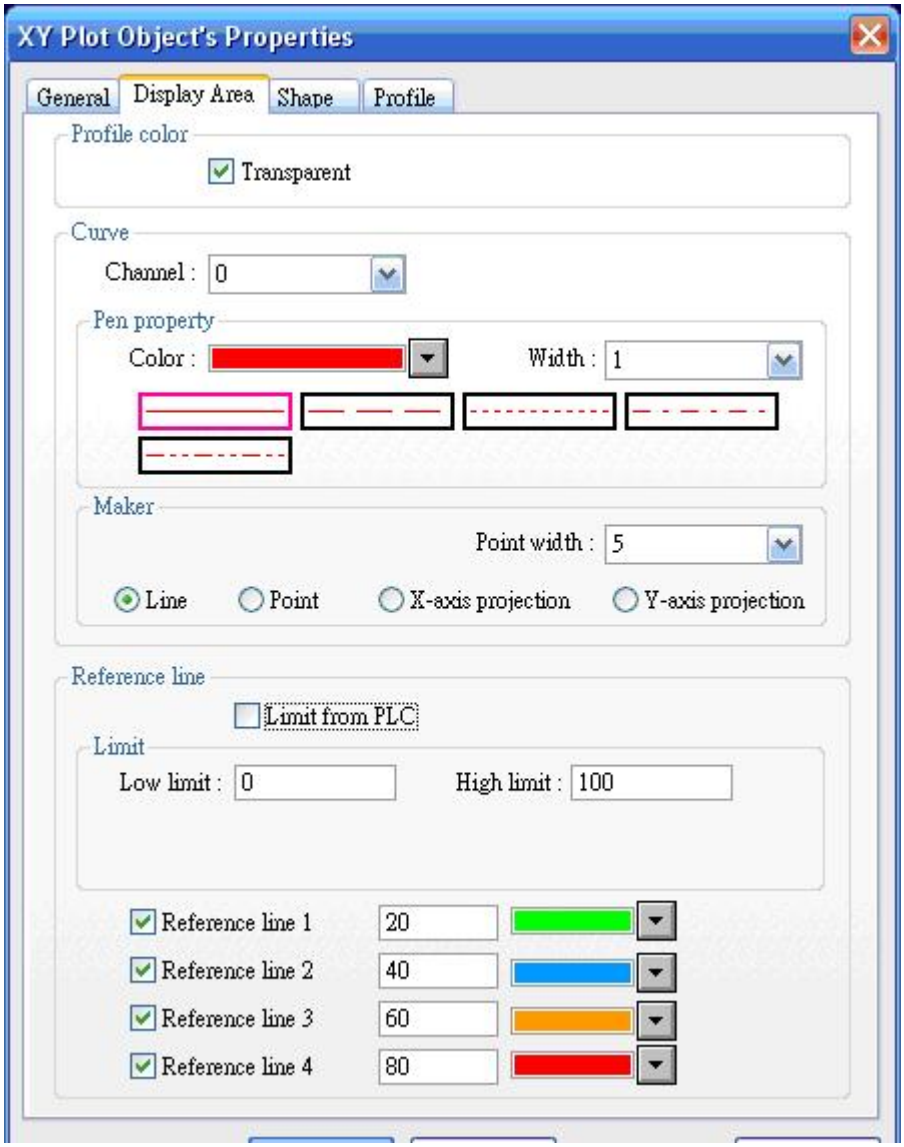
1. Change Y high limit to 25 for zoom in effect.



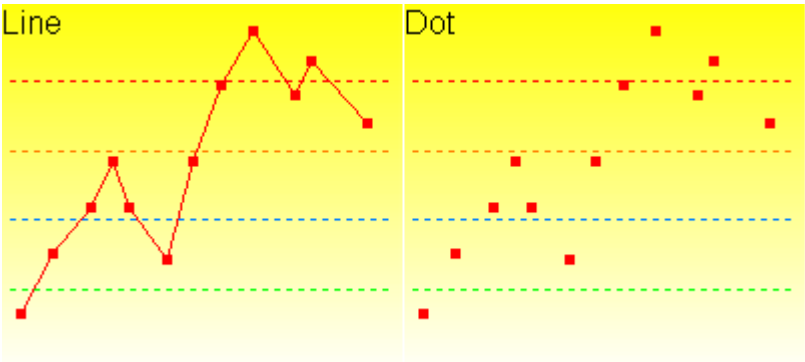
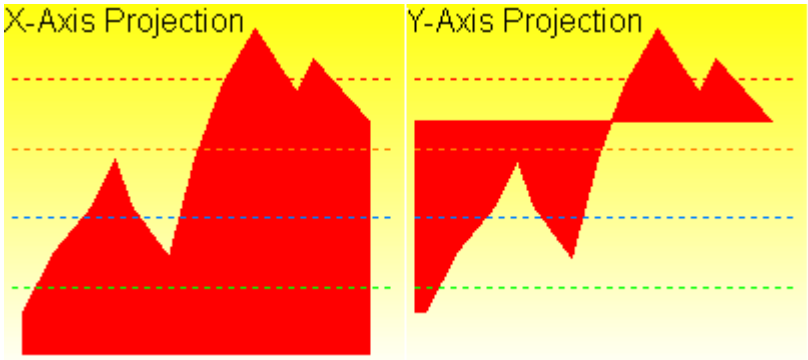
2. Change Y high limit to 100 for zoom out effect.



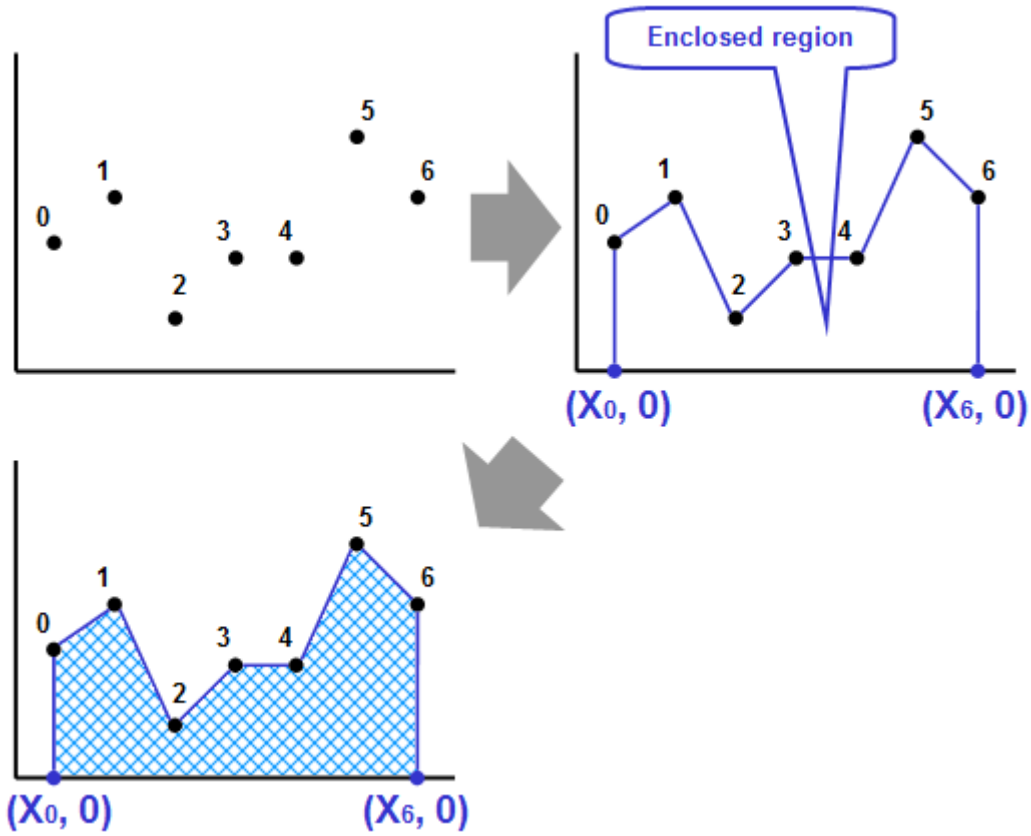
[Display Area]



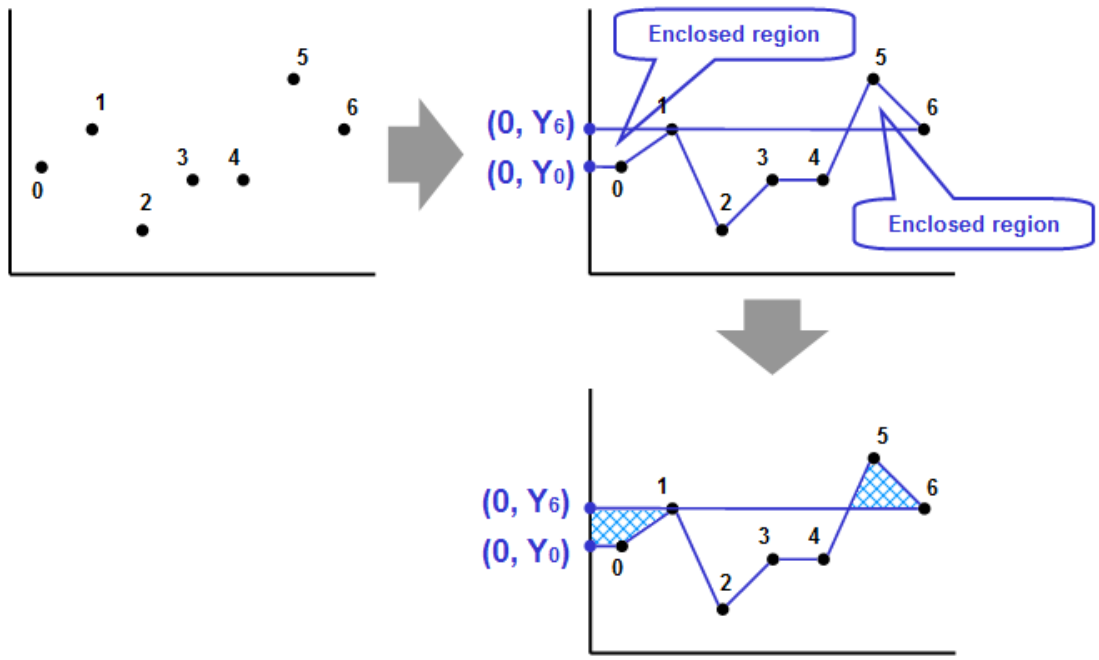
Profile color	**Enable Transparent:** It will not display the background color. **Disable Transparent:** It will display the background color
Curve	Set the attribute of XY curve (color and width) for each channel. 

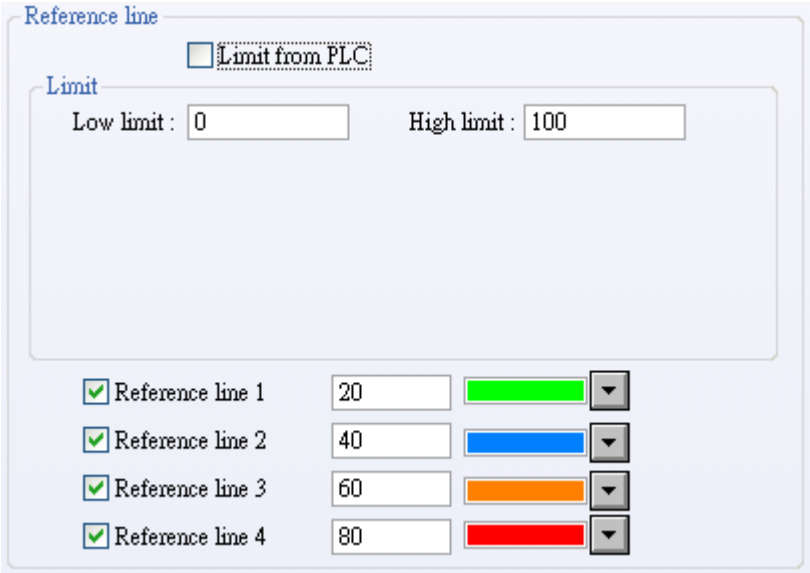
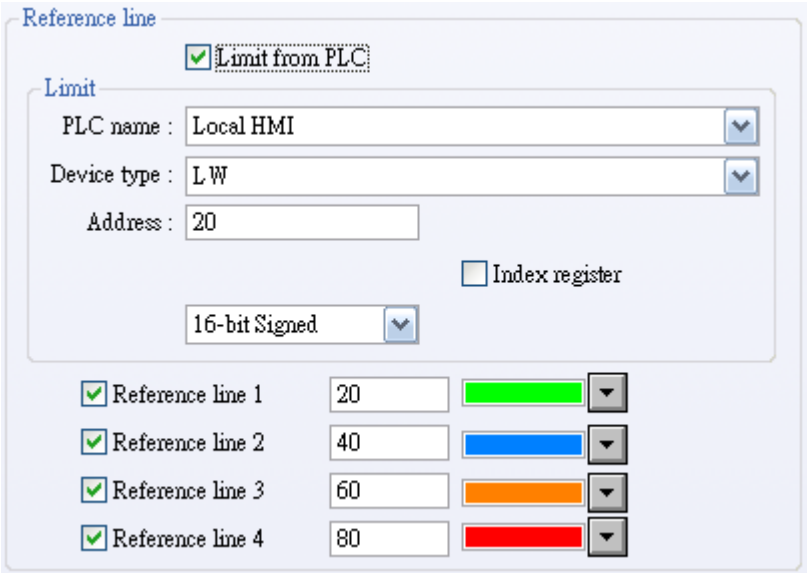
Maker	There are four different type of XY plot, i.e. Line, Point, X-axis projection and Y-axis projection, check one of them. For Line and Point selection, set appropriate point width (unit in pixels).  Line & Point:  X-axis projection is shown as the following:  **Remarks:** Please refer to the figure below, there is a curve containing 7 points from P0 to P6. The system carries out X-axis projection with following steps: a. Automatically calculate two projected points in X-axis – (X_0, 0) and (X_6, 0). b. Link all these points in the order of (X_0, 0), P0, P1… P6, (X_6, 0) and returns to (X_0, 0) at last. c. Fill out all enclosed areas formed.

X-axis projection :



Similarly for Y-axis projection:



Reference line	In order to make the XY plot more readable, you can configure up to 4 horizontal reference lines on the graph. Fill in high, low limit and Y axis coordinate for each reference line.  You may also use PLC address to define high and low limit. 

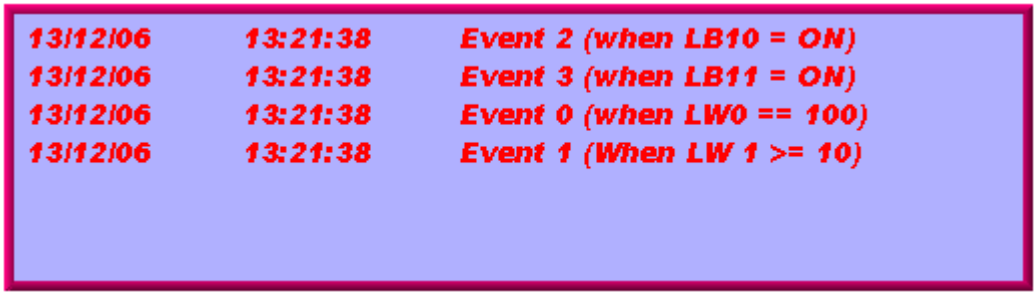
13.21 Alarm Bar and Alarm Display Objects

13.21.1 Overview

Alarm bar and alarm display object are used to display alarm messages. Alarm messages are those events registered in the “event log” and meet trigger conditions. Alarm bar and alarm display objects display these alarms in order of priority and triggering time.

Alarm bar object scroll all alarm messages in one line, alarm display object displays alarm messages in multi-line and each line represents one alarm message. The following pictures show that the alarm message are displayed in alarm display and alarm bar objects. Refer to the “Event Log” chapter for related information.

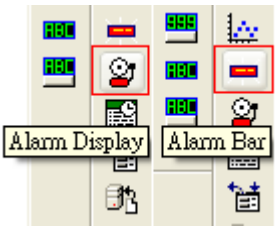
Alarm bar object

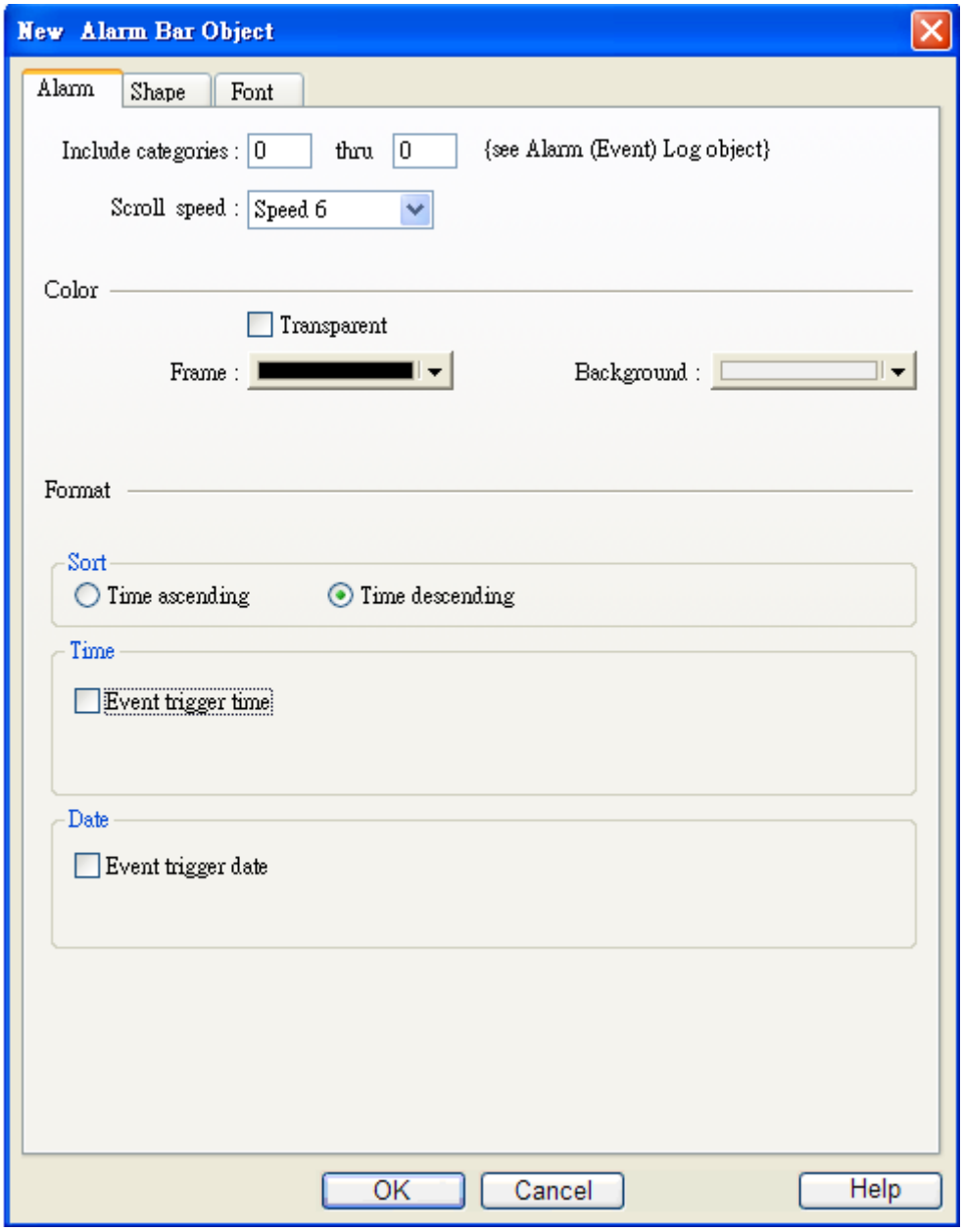


Alarm display object

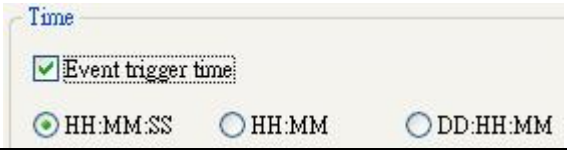
13.21.2 Configuration

Click the “Alarm bar” icon on the toolbar, the “Alarm bar” dialogue box appear; similiarly, click the “Alarm display” icon on the toolbar, the “Alarm display” dialogue box appear, fill in the setting in the “General tab” and press the OK button, a new object will be created. See the pictures below.

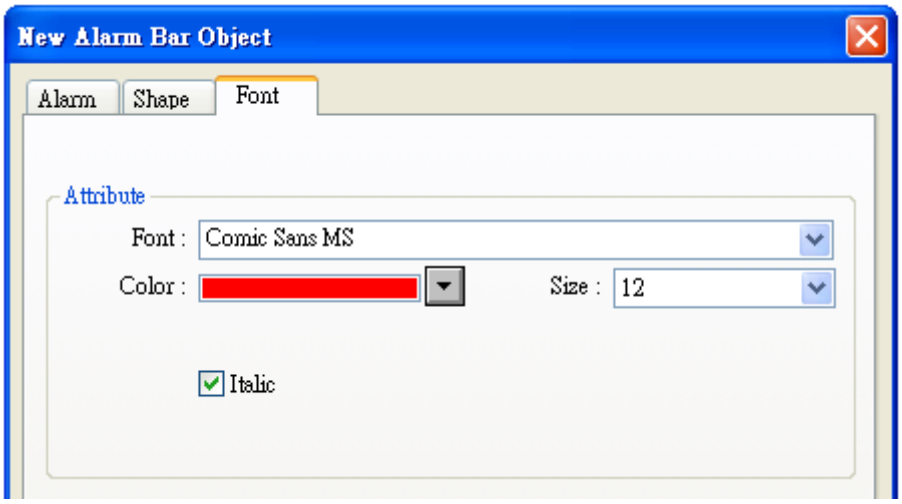




Include categories	Select category of events that belongs to the alarm display or alarm bar object. (category of an event is set in event log) For example, if the category of an alarm bar is set to 2~4, it will display all the alarm messages with “category” equal to 2, 3, or 4.

	Please refer to “Category” statement in “Event Log” chapter.
Scroll Speed	Set the scroll speed of alarm bar.
Color	Set frame and background color of alarm bar.
Format	**a. Sort** Set the order to display alarm message. **Time ascending** Put Latest trigger alarm message in the bottom. **Time descending** Put Latest trigger alarm message in the top.
	b. Time **Event trigger time** Display the time tag with alarm message. There are three formats of time tag. 1. HH:MM:SS / 2. HH:MM / 3. DD:HH:MM 
	c. Date **Event trigger date** Display the date tag with alarm message. There are four formats of date tag. 1. MM/DD/YY / 2. DD/MM/YY / 3. DD.MM.YY / 4. YY/MM/DD 

Set font and color of alarm message in the “Font” tab. See the picture below.


New Alarm Bar Object
Alarm
Shape
Font
Attribute
Font :
Comic Sans MS
Color :
Size :
12
Italic

13.22 Event Display Object

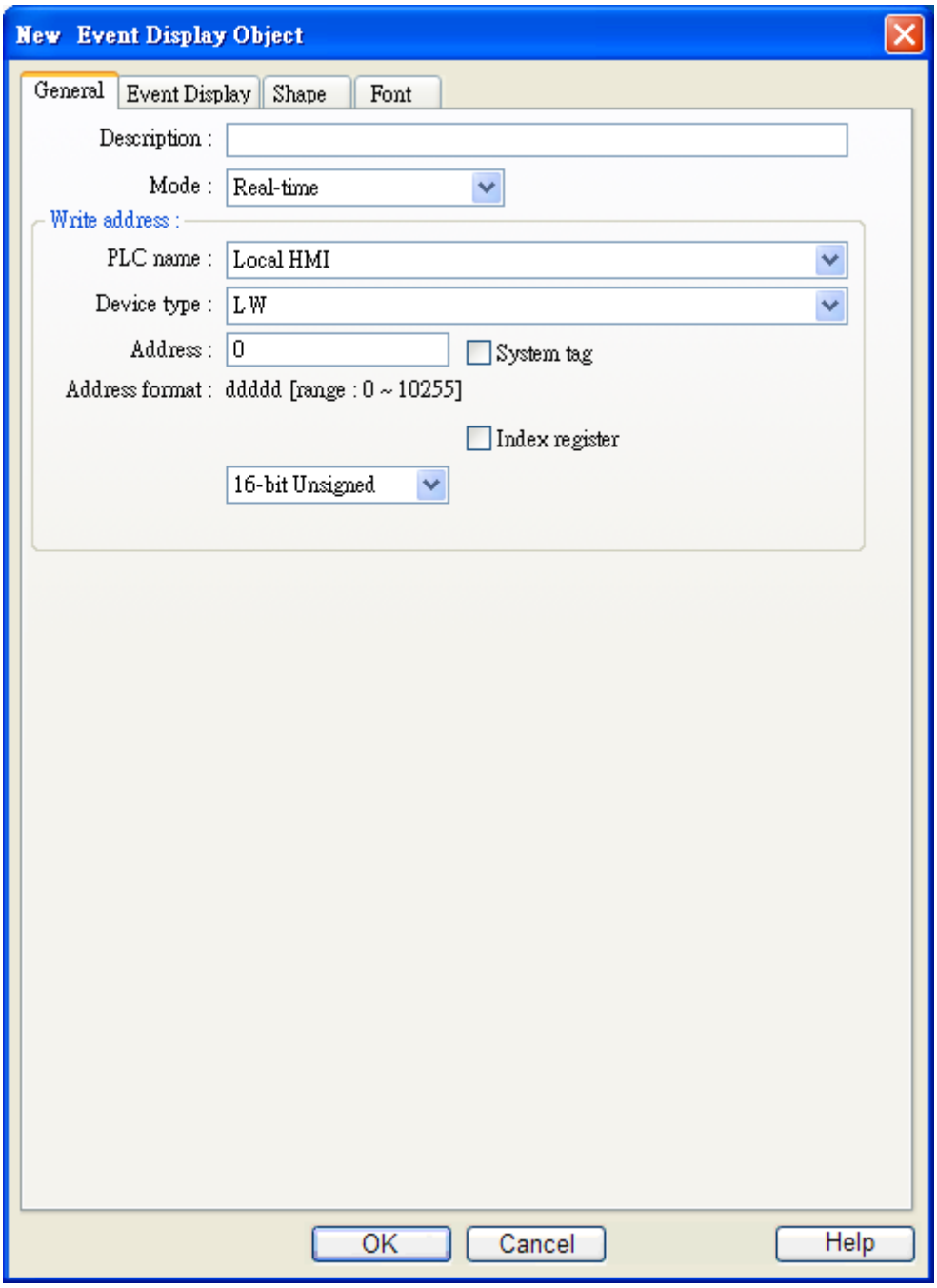
13.22.1 Overview

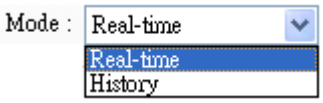
Event display object displays active and finished events. The events are registered in “event log” object. The active events are the events which are in trigger condition, or have been triggered and unacknowledged.

The event display object displays those active events in the order of trigger time. See the picture below. Event display object can also display the time of the events been triggered, acknowledged and recovered.

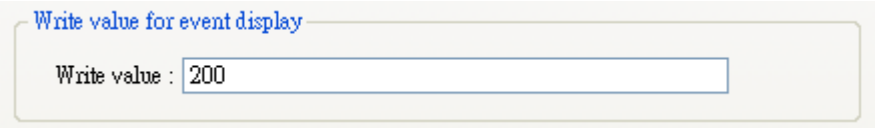
13.22.2 Configuration

Click the “Event Display” icon on the toolbar, the “Event Display” dialogue box appear, set each items in the “General” tab, press OK button and a new “Event Display Object” will be created. See the picture below.

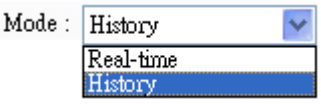


Mode	Select the event source format, there are "Real-time" and "History" for selection.
	a. Real-time  **Write address** When an event is acknowledged (refer to the following illustrations for detail

information), the data in “write value” will be exported to the designated register. The “write value” is set in “event log” object, as shown in the picture below. Refer to the “Event Log” chapter for related information.

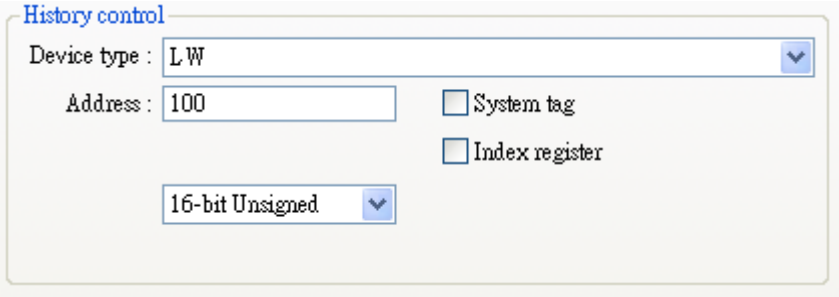


b. History



In this mode, it can display event log from history record. The system save the event history in daily basis, the event history of each date is saved in a separate file with date tag. The “History control” is used to select one history record file.

The picture below shows the “History control” setting, which designates a word device for “History control”.



The system selects history record by an index. The index 0 refer to the latest history record (normally it is history record today), the index 1 refer to the second latest history record, and so on.

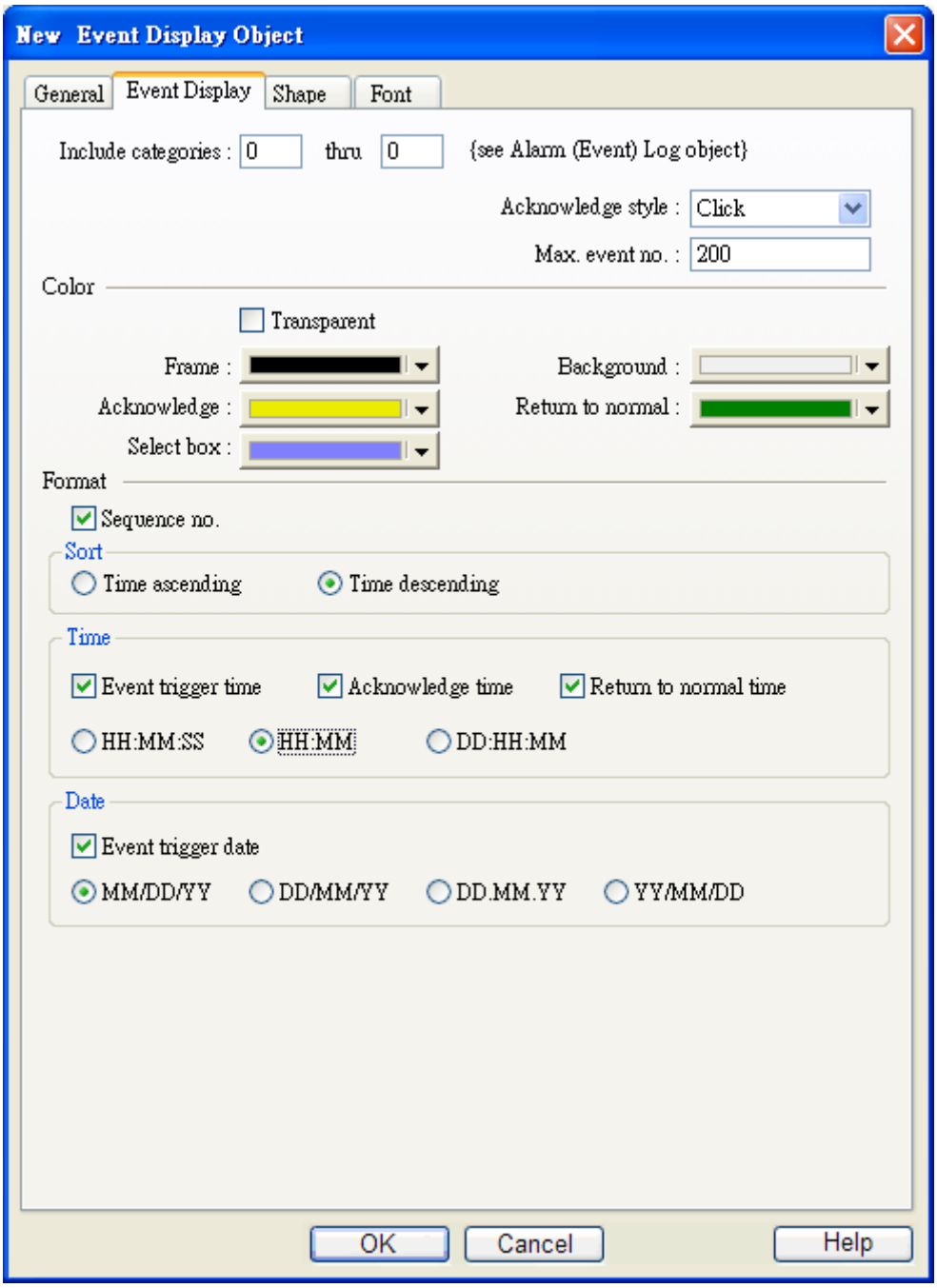
The current value in “History control” register is used as the index to select corresponding history record.

Here is an example to explain how to use the “History control”. The “history control” register is [LW100], supposed that the history records saved in system are

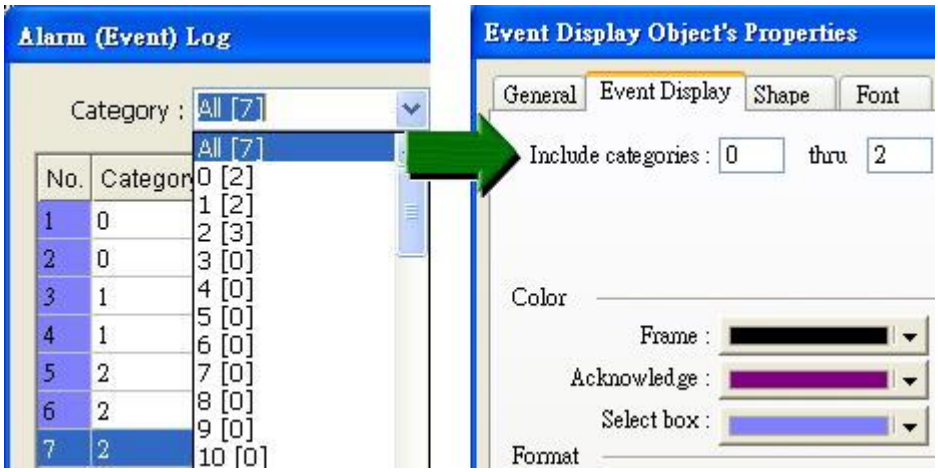
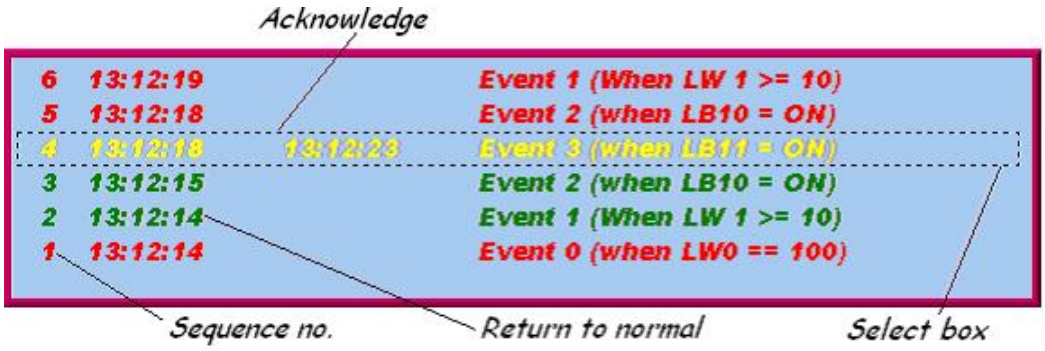
EL_20061120.evt,
EL_20061123.evt,
EL_20061127.evt
EL_20061203.evt,

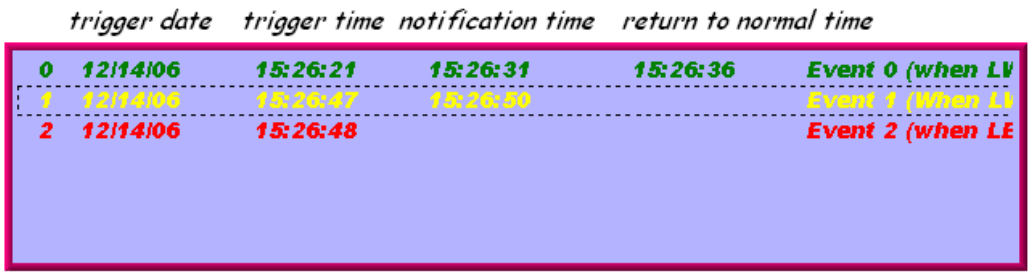
Where the 2006xxxx is the date that system saved history record. The following table shows the event display object displays the corresponding historical record in according to the value of [LW100].

Value of [LW100]	Corresponding Historical Record
0	EL_20061203.evt
1	EL_20061127. evt
2	EL_20061123. evt
3	EL_20061120. evt



Include categories	Select category of events that belongs to the event display object. (category of an event is set in event log) For example, if the category of an event log display is set to 2~4, it will display all the active event messages with “category” equal to 2, 3, or 4. Please refer to “Category” statement in “Event Log” chapter.

	
Acknowledge style	 You may select “Click” or “Double click” to acknowledge a new event. When a new event comes up, the operator can “Click” or “Double click” to acknowledge the new event, the system will change the text color of that event and export the “write value” registered with the event to the designated register. Take use of this feature, the user can register a popup window and put the warning message in the window, then configure an indirect window object, when the event is acknowledged, the “write value” is written into the read address of the indirect window and call up the popup window.
Max. event no.	The maximum number of events to be displayed in the event display object. When the number of events is larger than the maximum, the oldest event will be removed from the event display object.
Color	To set the color of events in different states **a. Acknowledge** **b. Return to normal** **c. Select box –** The system draw a highlight box around the latest acknowledged event.
Format	**Sequence no.** Check to add sequence no with event message.

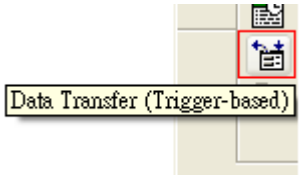
Sort	Set the order to display alarm message. **Time ascending** Put Latest trigger alarm message in the bottom. **Time descending** Put Latest trigger alarm message in the top..
Time	**Event trigger time** Display the trigger time with event message. **Acknowledge time** Display the “acknowledge” time with event message. **Return to normal time** Display the “return to normal” time with event message.
Date	**Event trigger date** Display the event trigger date with event message.. 

The font tab sets the font size and italic attribute. The font of event message is set with the event log object.

13.23 Data Transfer (Trigger-based) Object

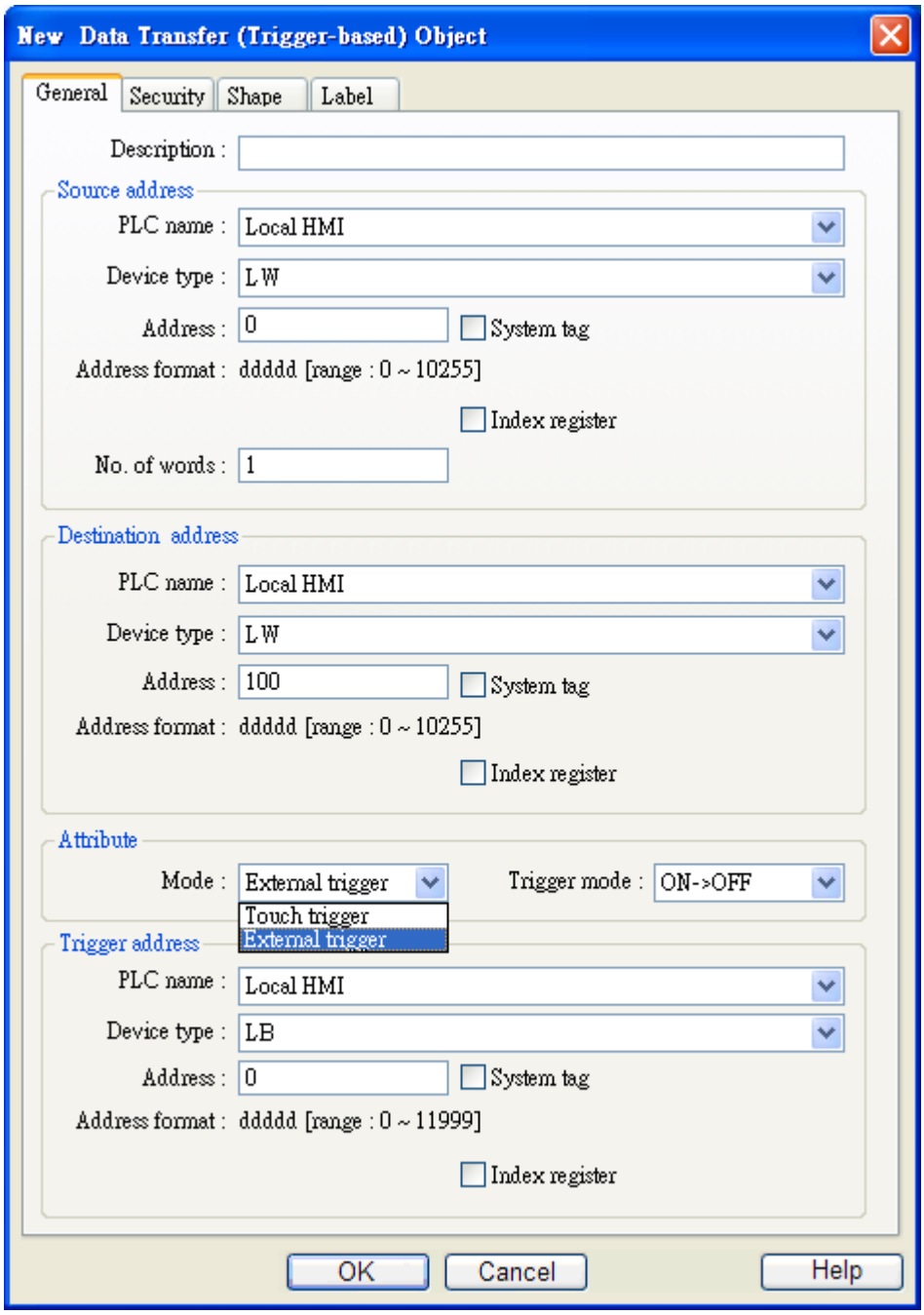
13.23.1 Overview

Data Transfer (Trigger-based) object can transfer the value from the source register to the destination register. The data transfer operation can be activated by pressing the object or setting a trigger bit.

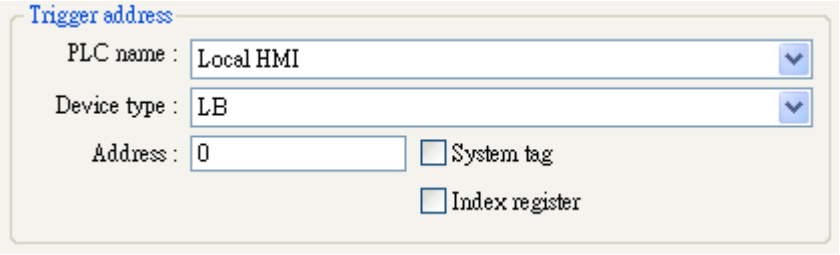


13.23.2 Configuration

Click “Data Transfer (Trigger-based) object” icon on the toolbar, “Data Transfer (Trigger-based) object” dialogue box show up, set each item in the “General” tab, press OK button, a new Trigger Data Transfer object will be created. See the picture below.



Source address	Set source address of data transfer.
	No. of words The number of words to be transferred from source to destination.
Destination address	Destination address for data transfer.
Attribute	Set the trig mode of data transfer.

	[Mode] **a. Touch trigger mode** Press the object to activate data transfer operation. **b. External trigger** Register a bit device to trigger the data transfer operation. **[ON → OFF]** Bit device change from ON to OFF to activate data transfer operation. **[OFF → ON]** Bit device change from OFF to ON to activate data transfer operation. **[ON ←→ OFF]** Bit device change states to activate data transfer operation. 

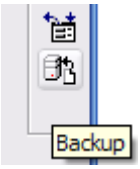
13.24 Backup

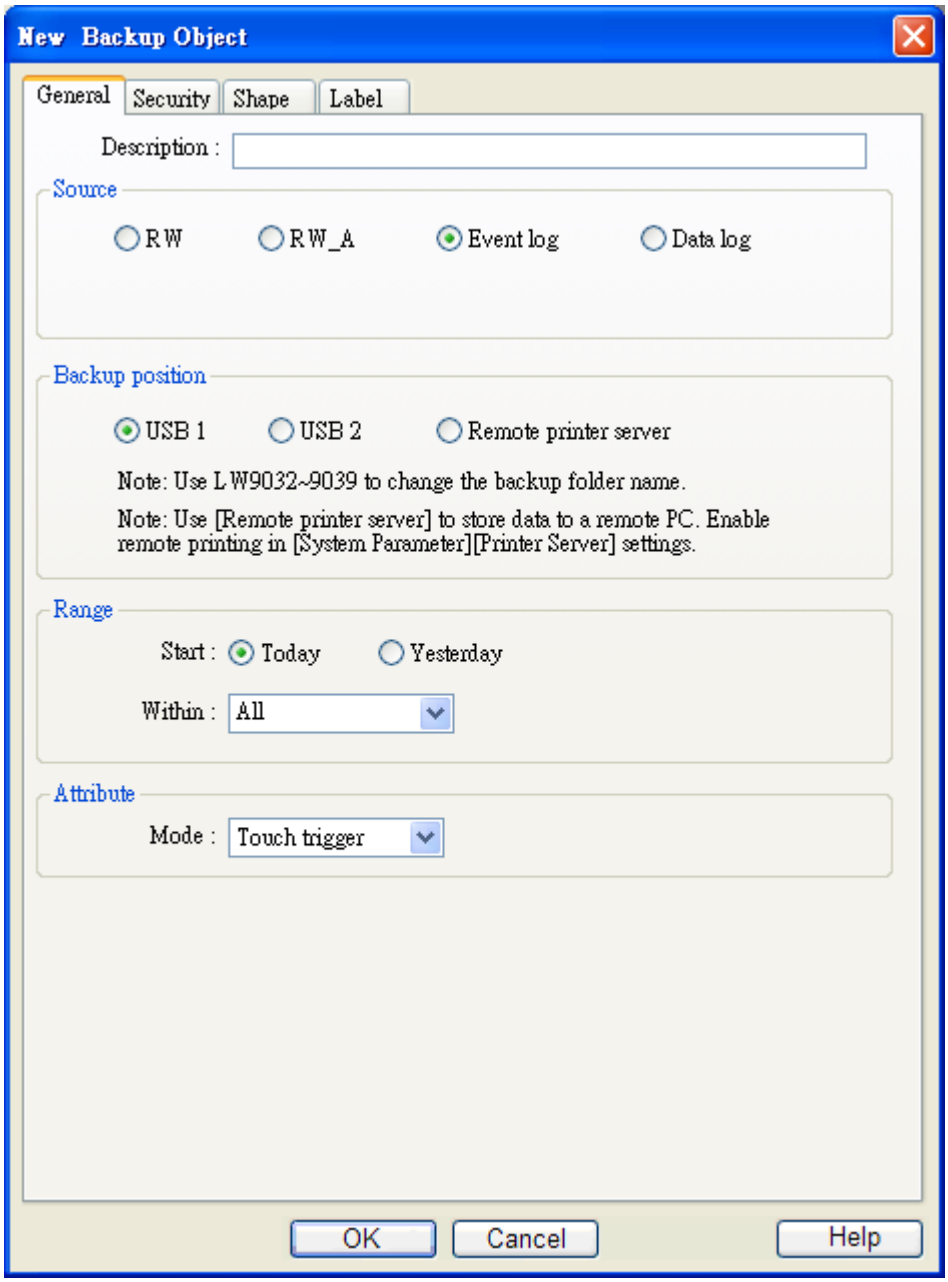
13.24.1 Overview

The backup function can store the recipe data (RW, RW_A), event log and sampling data to USB device. The [LB-9039] represents the backup status, when backup operation is in progress, the status of [LB-9039] is ON.

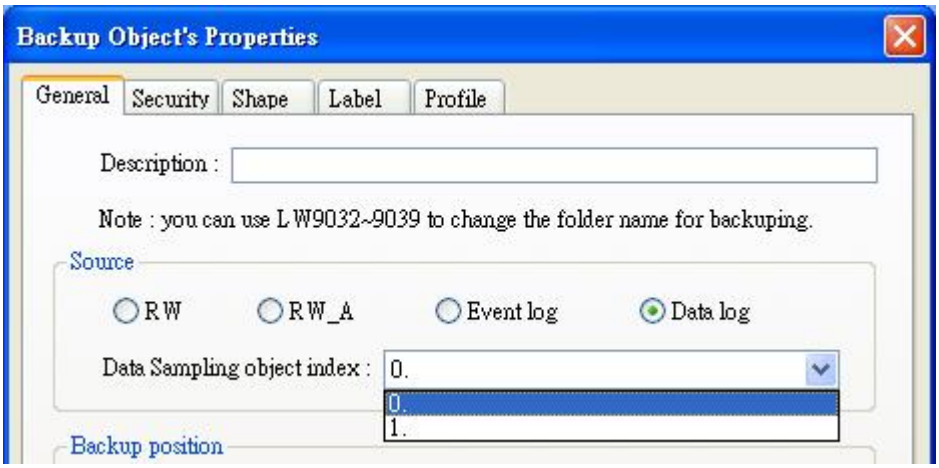
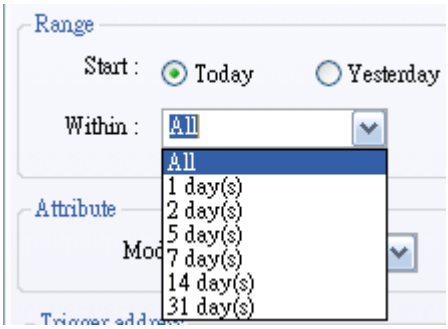
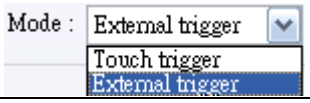
13.24.2 Configuration

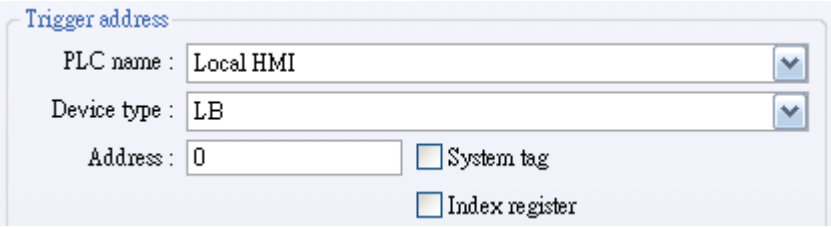
Click “Backup Object” icon on the toolbar, the “Backup Object” dialogue box show up. See the pictures below.





Source	**[RW] [RW_A] [Event log] [Data log]** Select one from the above for the source. There may be several data sampling objects registered in the project. If you select [Data log], use "**Data Sampling object index**:" to select the right one as shown below.

	
Backup Position	Select the destination where the source files will be copied to. a. USB1 or USB2 The USB disk connected to MT8000. b. MT remote printer server To select this, users have to enable ***MT remote printer server*** from: Menu ⇨ Edit ⇨ System Parameters ⇨ Printer Server
Range	**[Start]** from **[Today]** or **[Yesterday]**
	Within Select the range of time period, for example, Select [Yesterday] in [Start], and select "2 day(s)". It means to save the files yesterday and the day before yesterday. Select "All" to save all the files available in the system. 
Attribute	There are two ways to activate Backup function. 
	Touch trigger Touch the object to activate backup operation.

	External trigger Use a bit device to activate backup operation. [ON → OFF] when bit device change from ON to OFF [OFF → ON] when bit device change from OFF to ON [ON ←→ OFF] when bit device change state. **Trigger address** When use "external trigger", assign an appropriate bit device as shown below. 

13.25 Media Player Object

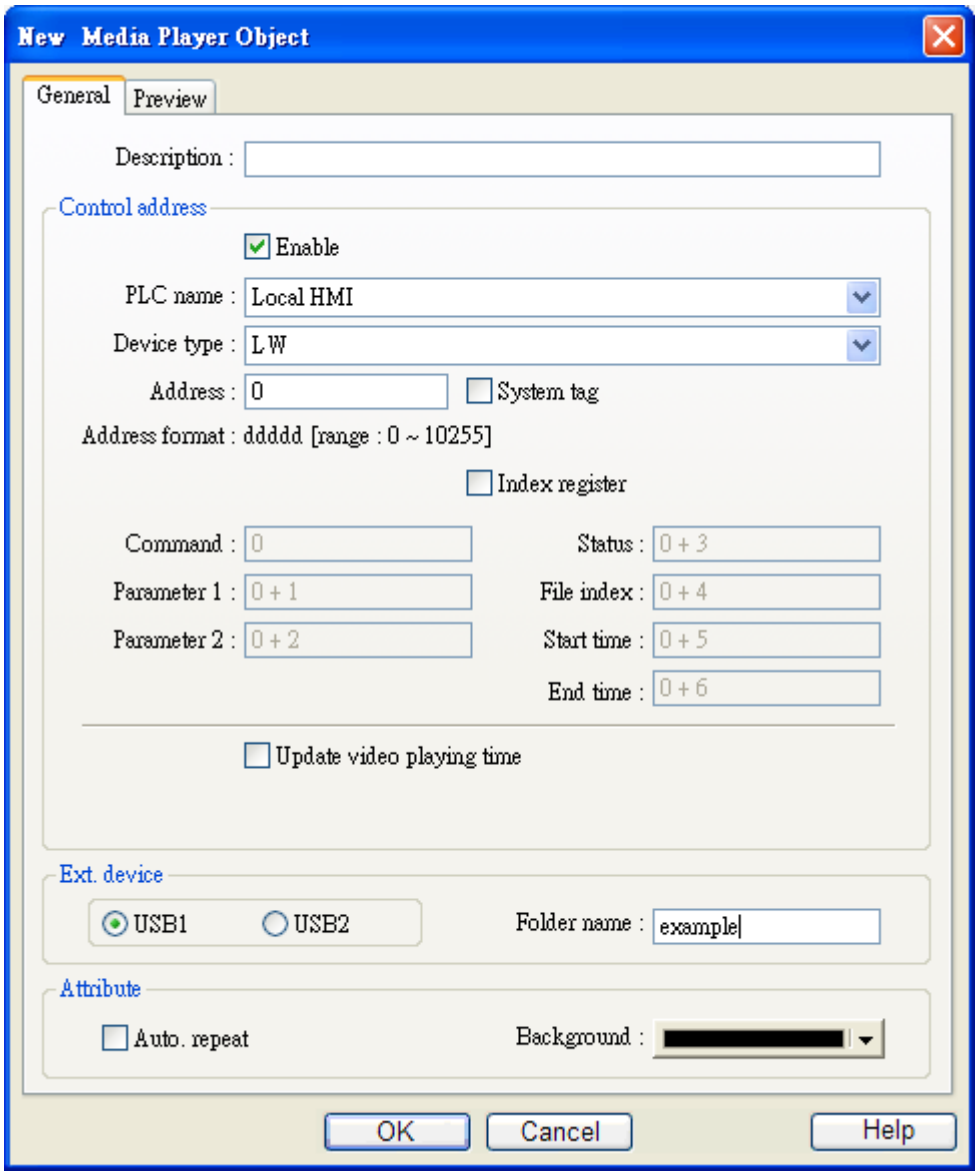
For the first timers using Media Player objects, it's necessary to download the project to the HMI ***via Ethernet***. EasyBuilder8000 will install Media Player drivers during the download.

13.25.1 Overview

The Media Player function is not only used to play video files but also to provide uses of additional controls such as seeking, zooming, volume adjusting and so on. With the Media Player, users can provide operation and maintenance instructions or standard procedures on video, which can help to create an environment that enables any on-site operators to perform tasks efficiently from clear, comprehensible instructions. (Note: The Media Player function is only available on the MT8000X Series models.)

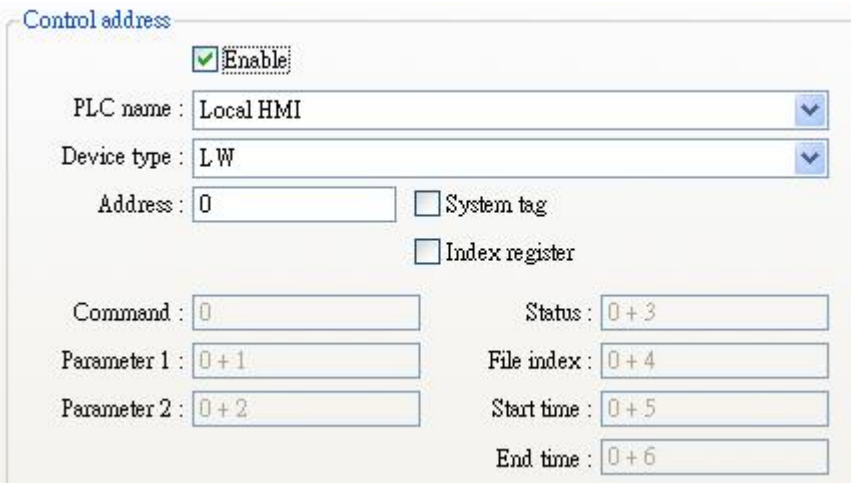
13.25.2 Configuration

Click "Media Player object" icon on the toolbar, "Media Player object" dialogue box show up, set each item in the "General" tab, press OK button, a new Media Player object will be created. See the picture below. (Note: The instruction of this section is an example to play a video file located in the "/example" directory.)

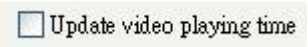


General：

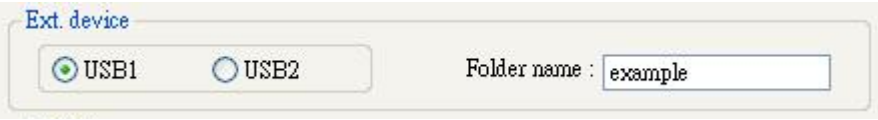
a. In [Control address], select [Enable] and register a word device to control the operation of media player object (example：LW0)



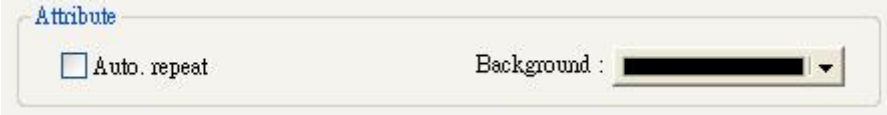
b. In [Control address], unselect the [Update video playing time]



c. In [Ext. device], select [USB1] and input "***example***" as [Folder name].

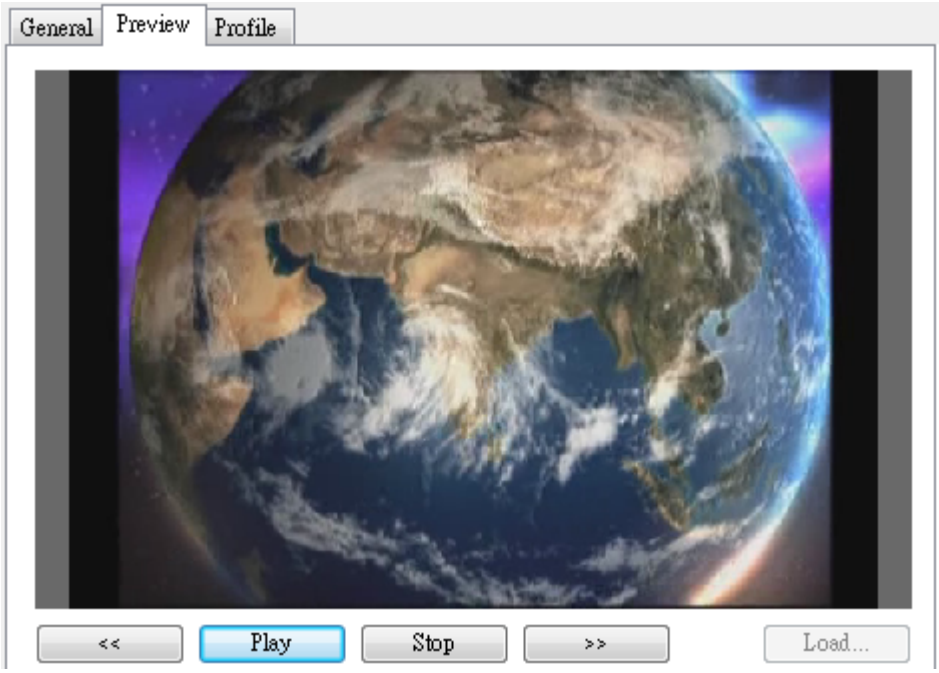


d. In [Attribute], unselect [Auto. repeat] and choose black as the background color.



Preview：

Users can examine whether the MT8000 supports the video format via preview function.



a. Click [Load…] and select the file to be examined. (Users should put the file in the ***/example*** directory of an USB disk)

If the media player starts playing the video, it means the MT8000 supports this video format. Use [<<] and [>>] to navigate video by 1 minute each time.

To play another video, click [Stop] to close the video file and repeat from step a.

Prepare the video file:

Remove all external devices (SD/USB disk) connected to the MT8000.

Plug the USB disk, which has the video file in it, into the MT8000.

Note

The first step is there for ensuring the USB disk (in step b) will be recognized as USB1.

13.25.3 Start / Stop playing video

1. Start playing video

a. Set [Parameter 1] to 0.

b. Set [Command] to 1, the system will open the video file and start playing.

c. After the system start operation, it will reset the [Command] to ”0”.

Note

During the period between step b and c, don’t change the content of [Command], [Parameter 1], and [Parameter 2], it may cause unpredictable result.

---

2. Stop playing video

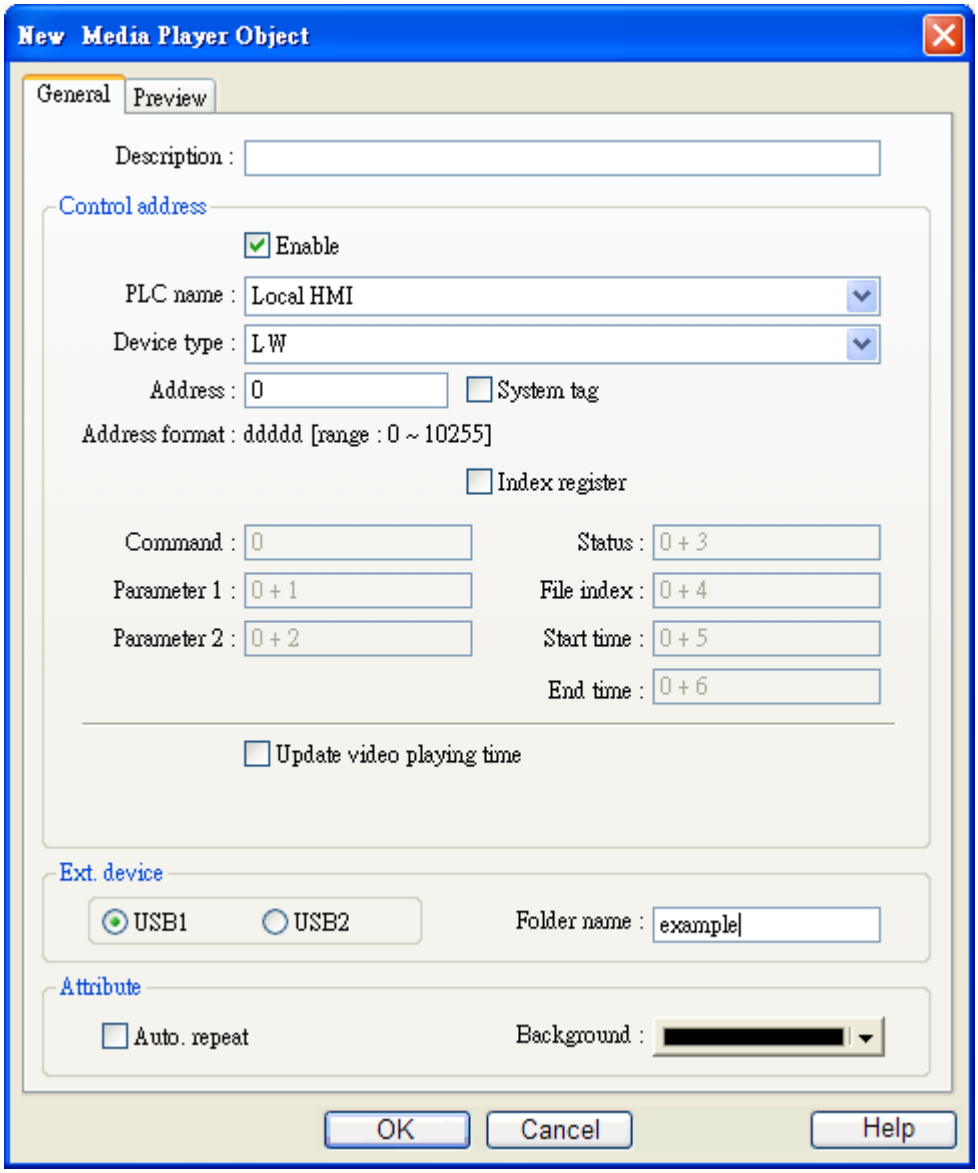
a. Set [Command] to 5, the system will stop playing and close the video file.
b. After the system complete a, it will reset the [Command] to ”0”.

Note

During the period between step a and b, don’t change the content of [Command], [Parameter 1], and [Parameter 2], it may cause unpredictable result.

13.25.4 Media player setting guide

General：



Setting		Description
Control address	Enable control address	● Enable a. You can use “Control address” to control the operation of media player b. Register a device address for “Control address”. ● Disable There is no manual control of video play operation. The system will start to play the first video at designated folder

			when the window is popup.
	Command		Users set this address to control the operation of media player. ➢ Command (control address + 0)
	Parameter 1		Parameter 1 for control operation. ➢ Parameter 1 (control address + 1)
	Parameter 2		Parameter 2 for control operation ➢ Parameter 2 (control address + 2)
	Status		The system will turn bits ON when state changes or malfunctions. ➢ Status (control address + 3)
	File index		The system will write file index when starting to play a video. ➢ File index (control address + 4)
	Start time		The system will write video start time when starting to play a video. (unit = sec) (Always 0) ➢ Start time (control address + 5)
	End time		The system will write video end time when starting to play a video. (unit = sec) ➢ End time (control address + 6)
	Video playing time	Update video playing time	● Enable The system will write video elapsed time into [playing time] register in every [update period] seconds.
		Update period	Update period of [playing time], range between 1 to 60 sec.
		Playing time	Update the video elapsed time periodically. (unit = sec) ➢ Playing time (control address + 7)
Video file store location	USB1		Play video files in USB1.
	USB2		Play video files in USB2.
	Folder name		The name of the folder storing video files. Users must put video files in a folder (e.g. ***"/example"***) instead of root directory. Note 1. [Folder name] couldn't be empty. 2. [Folder name] couldn't include **/\:*?"<>|**.
Attribute	Auto. repeat		When finish playing a video file, the system will

		automatically play next video. e.g. [video 1] ⇨ [video 2] ⇨ …⇨ [video n] ⇨ [video 1]
	Background	Select the background color of the object.

✶ Normally the format of the above registers is 16-unsigned integer. If a 32-bit word device is chosen as the control address, only 0-15 bits are effective. Users should zero the 16-31 bits.

1. Control command：

a. Play index file

[Command] = 1
[Parameter1] = file index
[Parameter2] = ignore (set 0)

Note
1. The files are sorted with file name in ascending order, the "file index=0" is for to the first file, and son on.
2. If it is unable to scan file, it will set [status] bit 8 to ON.
3. If check [Auto. repeat], it will automatically play the next file after finish.

---

b. Play previous file

[Command] = 2
[Parameter1] = ignore (set 0)
[Parameter2] = ignore (set 0)

Note
1. If the [file index] is previously 0, it will re-play the same video from the start.
2. If it is unable to search the right file, it will set [status] bit 8 to ON.
3. If check [Auto. repeat], it will automatically play the next file after finish.

---

c. Play next file

[Command] = 3
[Parameter1] = ignore (set 0)
[parameter2] = ignore (set 0)

Note
1. If there is no next video file, it will play the first (index 0) file.
2. If it is unable to search the right file, it will set [status] bit 8 to ON.
3. If check [Auto. repeat], it will automatically play the next file after finish.

---

d. Pause / Play Switch

[Command] = 4
[Parameter 1] = ignore (set 0)
[Parameter 2] = ignore (set 0)

e. Stop playing and close file

[Command] = 5
[Parameter 1] = ignore (set 0)
[Parameter 2] = ignore (set 0)

f. Start playing at designated target location

[Command] = 6
[Parameter 1] = target location (sec)
[Parameter 2] = ignore (set 0)

Note Parameter 1 (target location) should less than end time. If it is over end time, the system play video from last second.

---

g. Forward

[Command] = 7
[Parameter 1] = target location (sec)
[Parameter 2] = ignore (set 0)

Note
1. Increase playing time by [Parameter 1] seconds. If the system is previously playing video, it continues to play after the operation. If previously paused, it keeps paused.
2. If the playing time is over end time, the system play video from last second.

---

h. Backward

[Command] = 8
[Parameter 1] = target location (The unit is sec)
[Parameter 2] = ignore (set 0)

Note
1. Decrease playing time by [Parameter 1] seconds. If the system is previously playing video, it continues to play after the operation. If previously paused, it keeps paused.
2. If the playing time is less than start time, the system play video from the beginning.

i. Adjust volume

[Command] = 9

[Parameter 1] = volume (0 ~ 128)

[Parameter 2] = ignore (set 0)

Note Default volume is 128.

j. Set video display size

[Command] = 10

[Parameter 1] = display size (0 ~ 16)

[Parameter 2] = ignore (set 0)

Note 1. [0]：Fit video image to object size.

2. [1 ~ 16]：Magnification from 25% ~ 400%. Set 1 for 25%, 2 for 50%, 3 for 75% and so on.

k. Status (control address + 3)

15	09	08		02	01	00	bit
Reserved (all 0)	0	0			0	0	

Bit 00: open file bit (0: file closed；1: file opened)

Bit 01: play file bit (0: not playing video；1: playing video)

Bit 08: command error bit (0: command accepted；
1: incorrect command or parameters)

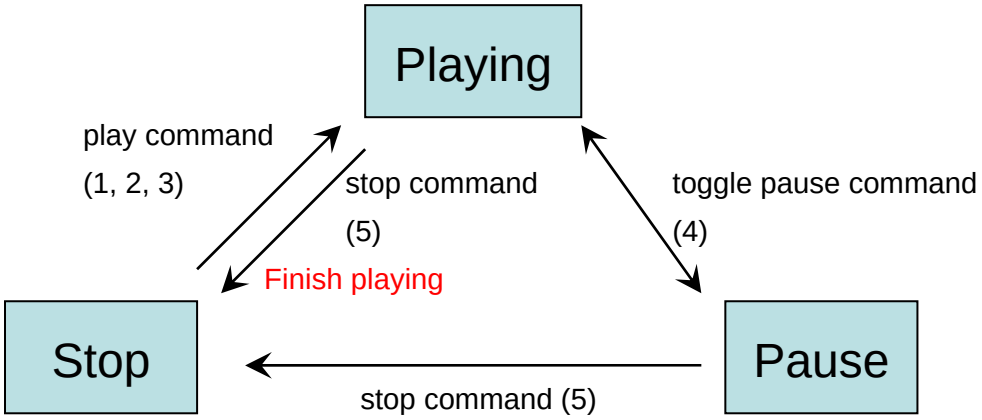
Bit 09: file error bit (0: file format accepted；
1: unknown file format or reading file error)

When playing a video, the system will turn ON [open file bit] and [play file bit]. If the file is unable to be scanned or the command is incorrect, the [command error bit] will be set ON (0→1).

Note

1. If file format is unsupported or disk I/O error happens during playing (e.g. user unplugs the USB disk), the [file error bit] will be set ON (0→1).
2. Refer to the following figure, the value of [status] at each state would be:

"Stop"	[status] = 0
"Pause"	[status] = 1 ([open file bit])
"Playing"	[status] = 3 ([open file bit] + [play file bit])



✶ Users should only set values to [Command], [Parameter 1] and [Parameter 2], and regard the other registers as read-only.

13.25.5 Restrictions

- The system can only play one video file each time.
- If [Auto. repeat] is unselected, the system will stop playing video and close the file after complete a video play operation.
- If [control address] is unselected, the system will find the first file in the designated directory and start playing it.

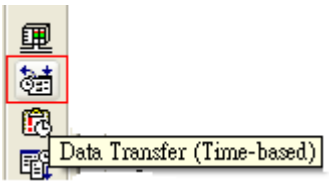
13.26 Data Transfer (Time-based) Object

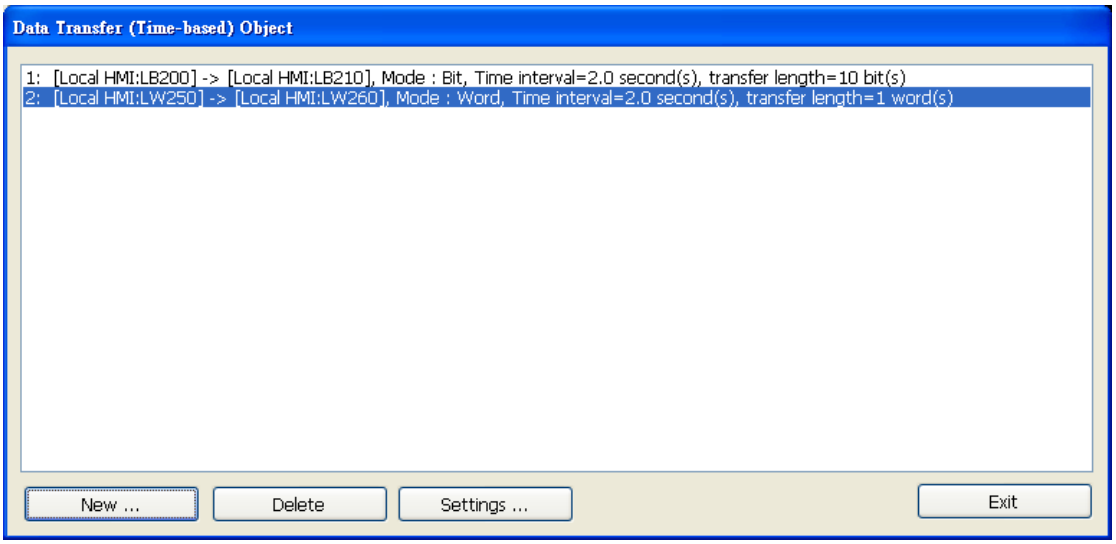
13.26.1 Overview

Data transfer (time-based) object is the same as data transfer (trigger-based) object, it also transfers the data from source to destination register. The difference is the way to activate data transfer operation. The Data transfer (time-based) object conducts data transfer operation based on time schedule, it can also transfer data in the unit of bits.

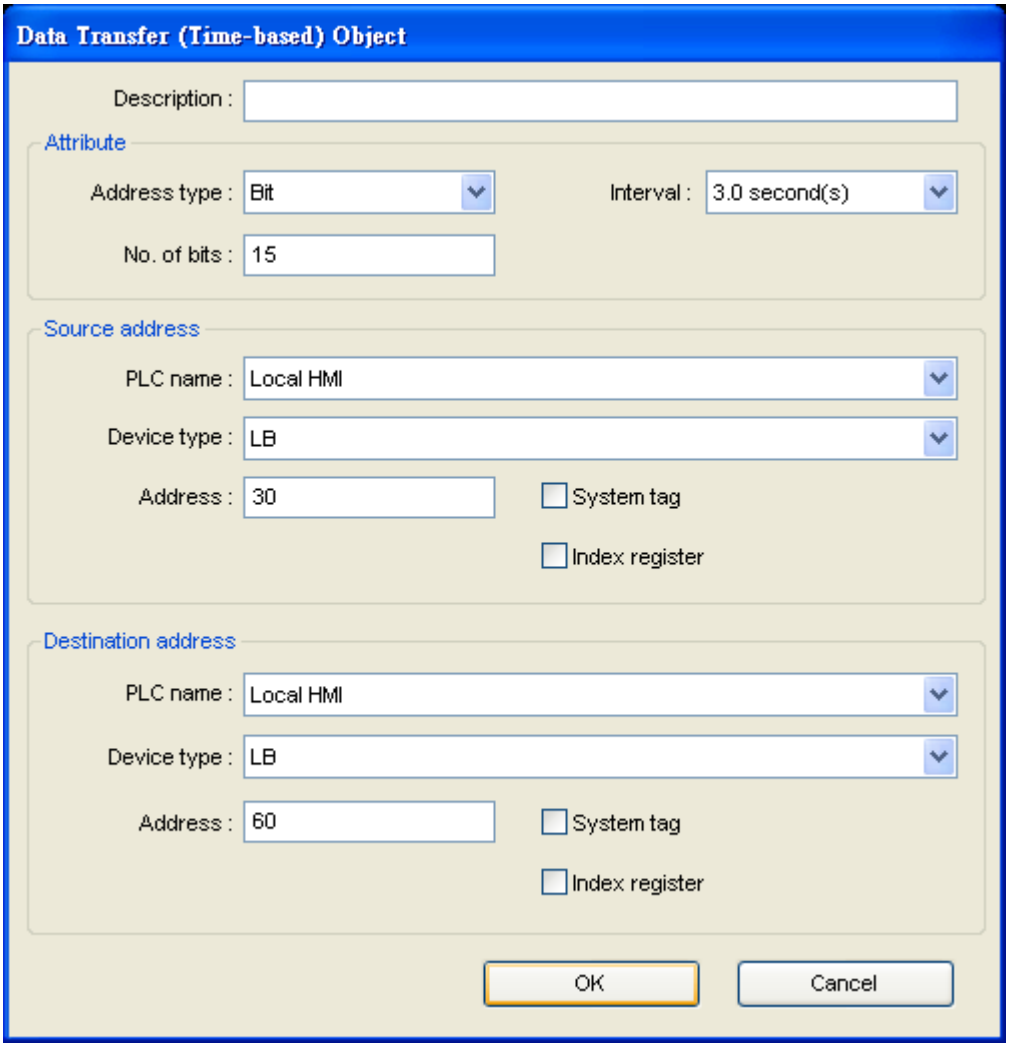
13.26.2 Configuration

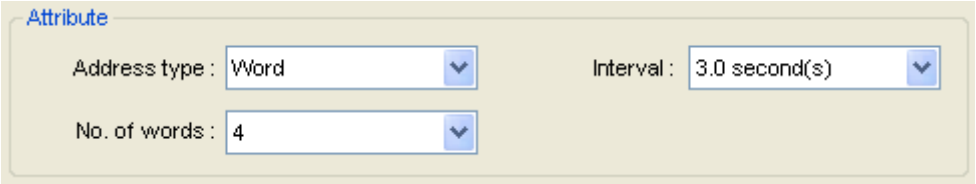
Click “Data Transfer (Time-based) Object” icon on the toolbar, the summary of data transfer objects is shown as follows:.





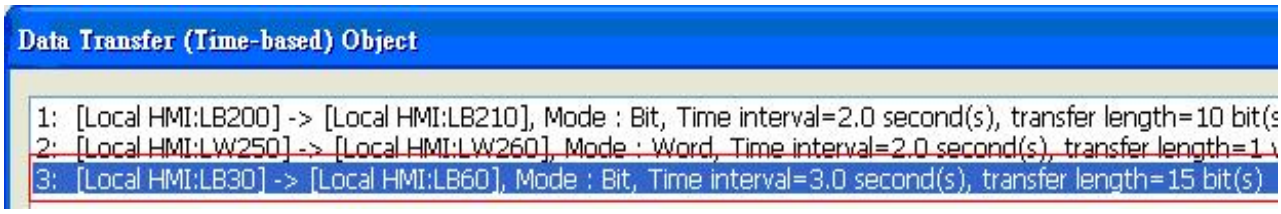
Press the “New…” button in the above dialogue box, the Data Transfer (Time-based) Object dialogue box appear as shown in the picture below, set item and press OK button, the object will be created.



Attribute	**Address type** Select the bit or word device.
	[No. of words] or [No. of bits] When select "Word type", the unit of data transfer is word, set the number of data to transfer. See the picture below.  When select "Bit type", the unit of data transfer is bit, set the number of bits to transfer.

	 **Interval** Select the wait interval for each data transfer, for example, select 3 seconds, the system will conduct data transfer operation every 3 seconds. Note 1. Specifying a small interval or a big number of data to transfer may cause an overall performance decrease due to the time consuming in transferring data. Therefore, users should always try to choose a longer interval and a smaller amount of data to transfer. 2. When a short interval is inevitable, be aware of the interval must be longer than the data transfer operation. For example, if the data transfer operation take 2 seconds, you must set the interval longer than 2 seconds.
Source address	Set source address.
Destination address	Set destination address

After completing all settings and pressing the "OK" button, a new Data Transfer (Time-based) Object is created. The summary displays all the registered data transfer objects with brief information as shown below.



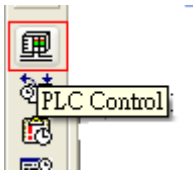
13.27 PLC Control Object

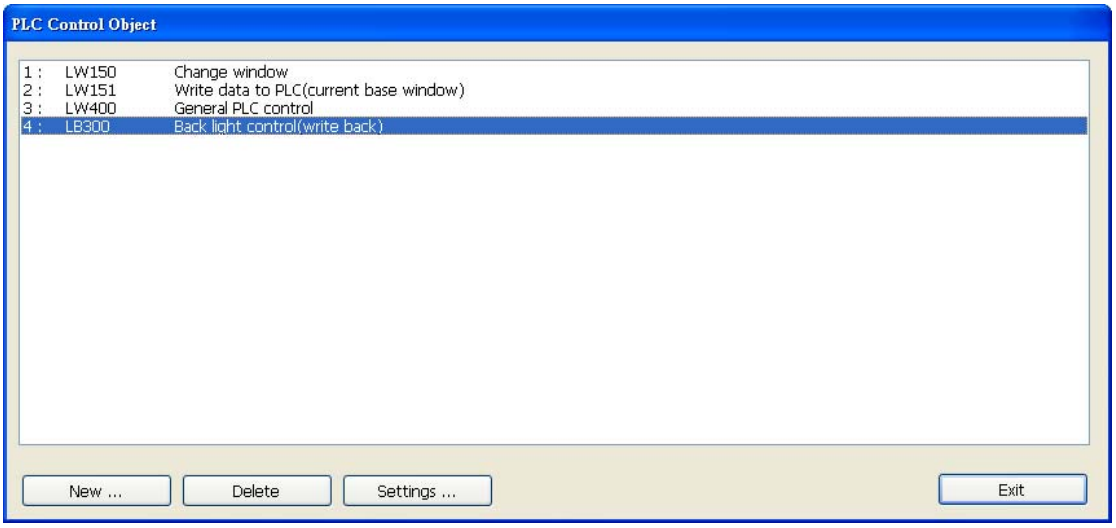
13.27.1 Overview

The PLC control object activates a specific operation when the corresponding control device is triggered.

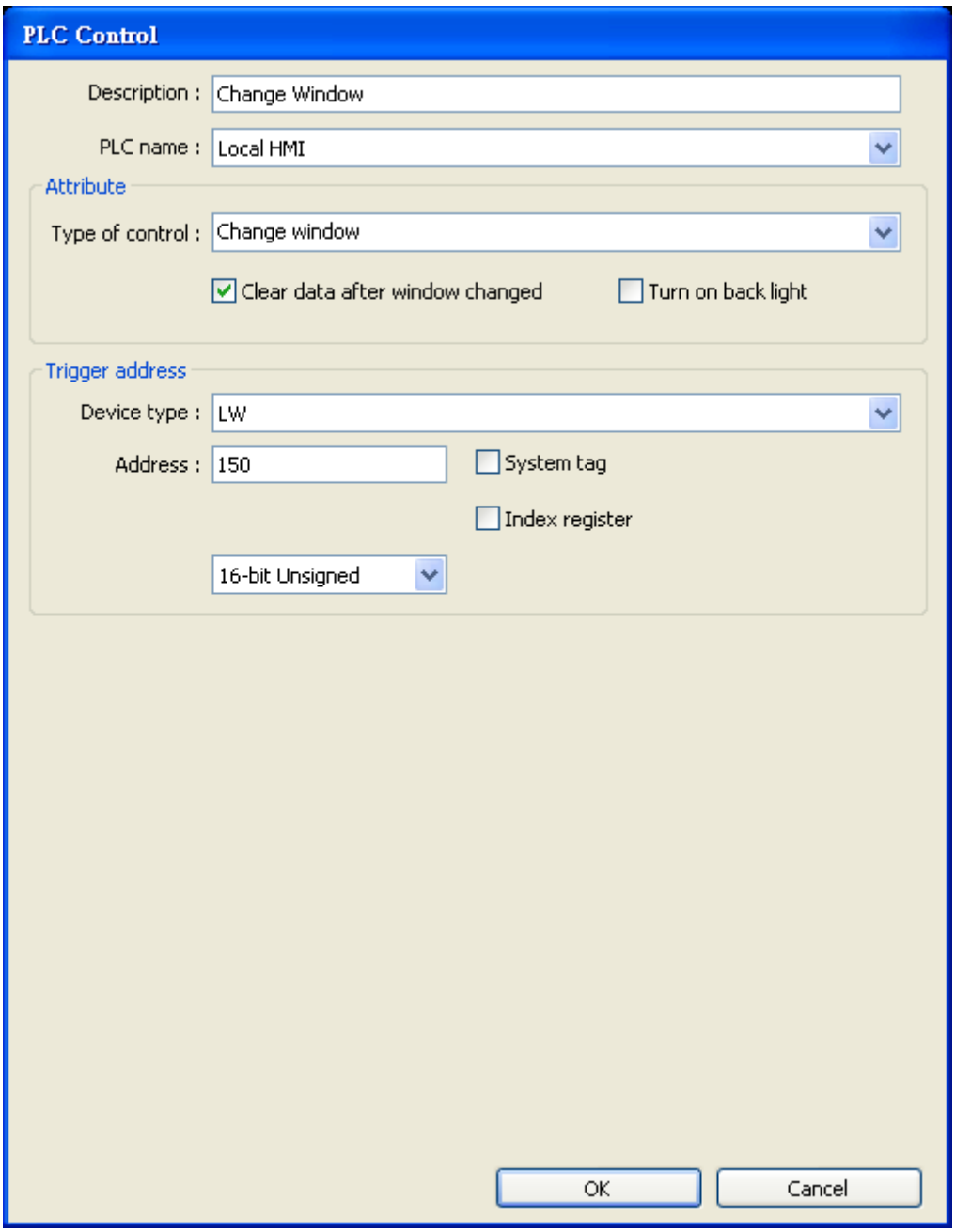
13.27.2 Configuration

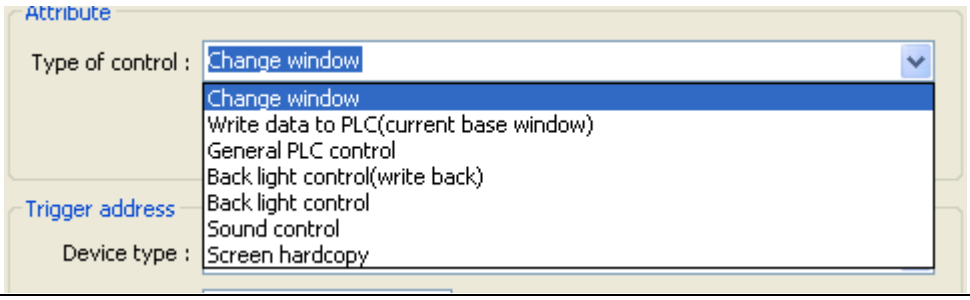
Click the “PLC Control” icon and the “PLC Control Object” summary appear as shown below.





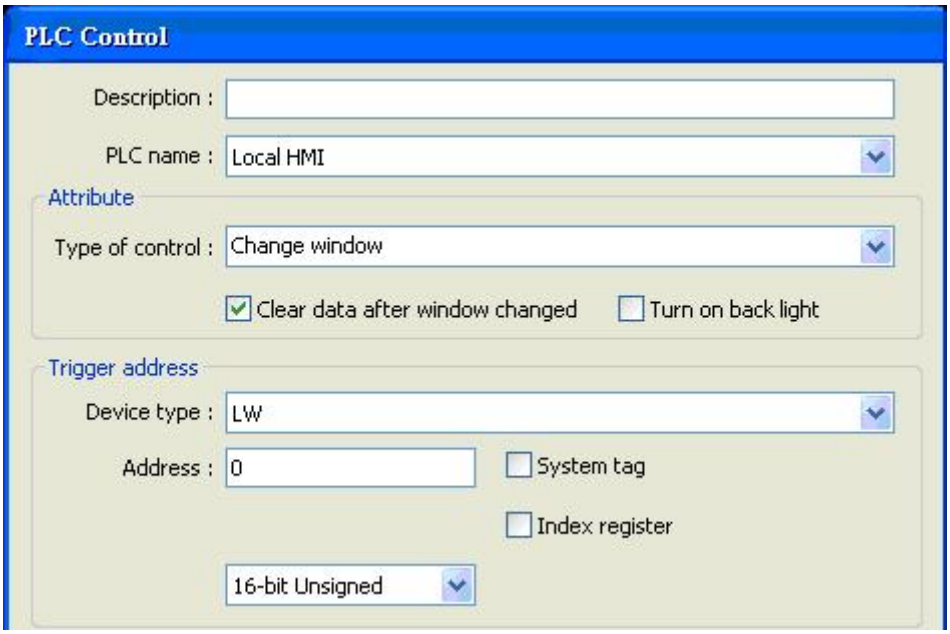
Press the “New…” button and the “PLC Control” dialogue box appear. Set all the attributes of PLC control and press OK button, a new PLC control object will be created.



Attribute & Trigger address	**[Type of control]** To set the type of control. Click the select button and you can drag down a list of all available PLC control functions 

a. "Change window"

This is used to change base window. When the value of [trigger address] is written in a valid window number, the system will close the current window and open the window designated by the [trigger address]. The new window number will be written to the [trigger address + 1].



As an example of the above configuration. When writing a valid window number – 11 into LW0, the system will close the current window and open window 11, then write 11 into LW1 (LW0+1)

If you use 32 bit device as trigger address, and the device type of the trigger address is in word basis, then the system will write the window number into [trigger address +2]

Below is the list of write address for each different type of data format.

Data Format	Trigger address	Write address
16-bit BCD	Address	Address + 1
32-bit BCD	Address	Address + 2
16-bit Unsigned	Address	Address + 1
16-bit Signed	Address	Address + 1
32-bit Unsigned	Address	Address + 2
32-bit Signed	Address	Address + 2

Note: If [LB9017] = ON, the write back operation will not be executed.

If "clear data after window change" is selected, the [trigger address] will be reset to 0 after new window is open.

b. "Write data to PLC (current base window)"

When the system change the base window, the new window number will be written into the [Trigger address]

c."General PLC Control"

This function performs data transfer between PLC and MT8000 when users set appropriate value in [trigger address].

Control code [trigger address]	Operation for data transfer
1	PLC register →MT8000 RW
2	PLC register → MT8000 LW
3	MT8000 RW → PLC register
4	MT8000 LW → PLC register

With this function the system uses four continuous word devices, please refer to the following explanation.

Address	Purpose	Description
[Trigger address]	Control code	The valid control code is listed in the above table. When a new control code is written into the register, the system will conduct the data transfer function.
[Trigger address+1]	Number of words to transfer	
[Trigger address+2]	Offset to the start address of PLC register	If the value is "n", the start address of PLC register is "Trigger address + 4 + n".
[Trigger address+3]	The start address of LW or RW	

As an example, to transfer PLC registers [DM100, 101 … 105] to MT8000 [RW10, 11 … 15], follow the steps below:

1. Set Trigger address to DM10..
2. Set [DM11] = 6 (no. of words to transfer)

3. Set [DM12] = 86 (DM10+4+86= DM100)
4. Set [DM13] = 10 (RW10)
5. Set [DM10] = 1, The system will execute the data transfer operation.

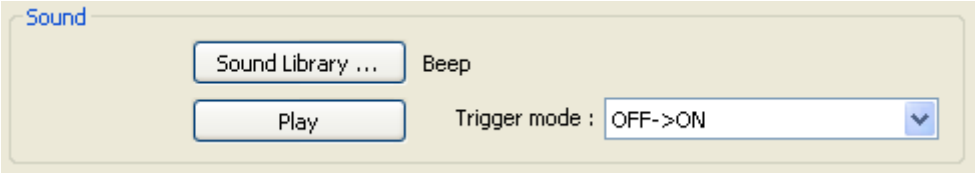
d. "Back light control (write back)"

Set [Trigger address] to "1", the system will turn off the backlight and reset the [Trigger address]. Any touch on the screen will turn the backlight on.

e. "Back light control"

This operation is the same as "Back light control (write back)" except the system would not reset the [Trigger address].

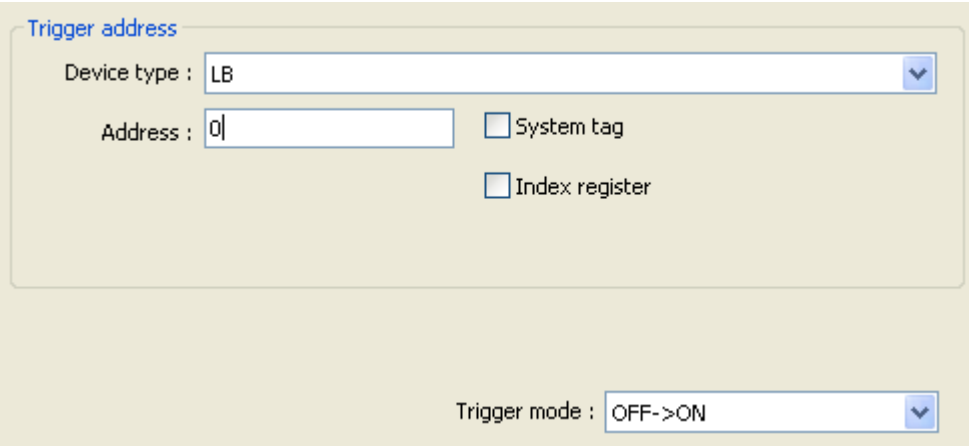
e. "Sound control"



Activate the [Trigger address], the system will play the sound.
You may configure three different way to activate the [Trigger address]:

(1) OFF to ON (OFF→ON)
(2) ON to OFF (ON→OFF)
(3) State change (either from ON→OFF or OFF→ON)

f. "Execute macro program"



Activate the [Trigger address], the system will execute the Macro.
You may configure three different way to activate the [Trigger address]:

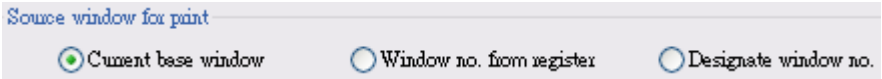
(1) OFF to ON (OFF→ON)
(2) ON to OFF (ON→OFF)
(3) State change (either from ON→OFF or OFF→ON)

h. "Screen hardcopy"

Activate the [Trigger address], the system will have designated window printed out. You may configure three different way to activate the [Trigger address]:

(1) OFF to ON (OFF→ON)
(2) ON to OFF (ON→OFF)
(3) State change (either from ON→OFF or OFF→ON)

The designated window can be one of following three different types:

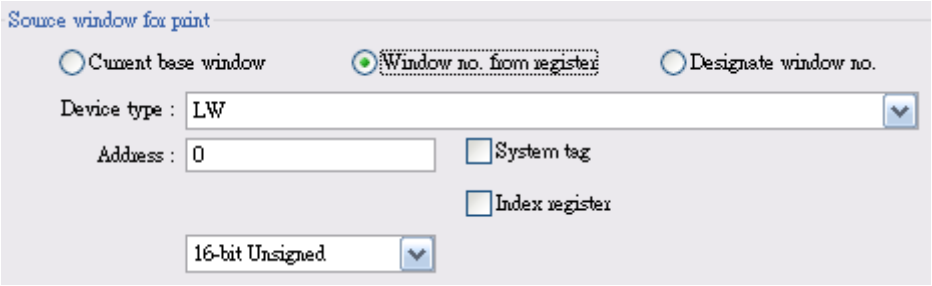


[Current base window]

Print the base window at the time the operation is activated.

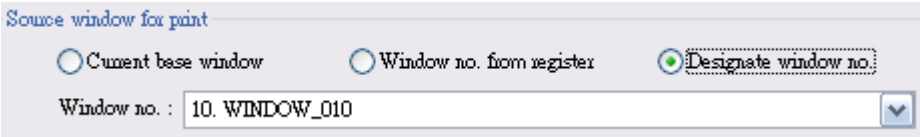
[Window no. from register]

Print the window designated by a PLC device. In the following example, if [LW0] = 14, the window 14 will be printed out.



[Designate window no.]

Select a base window to be printed out.



Note

1. The system performs a ***background printing process*** when the printed

	window is not the current base window. 2. For a window designed to be printed at background, users should put neither direct window nor indirect window in it.

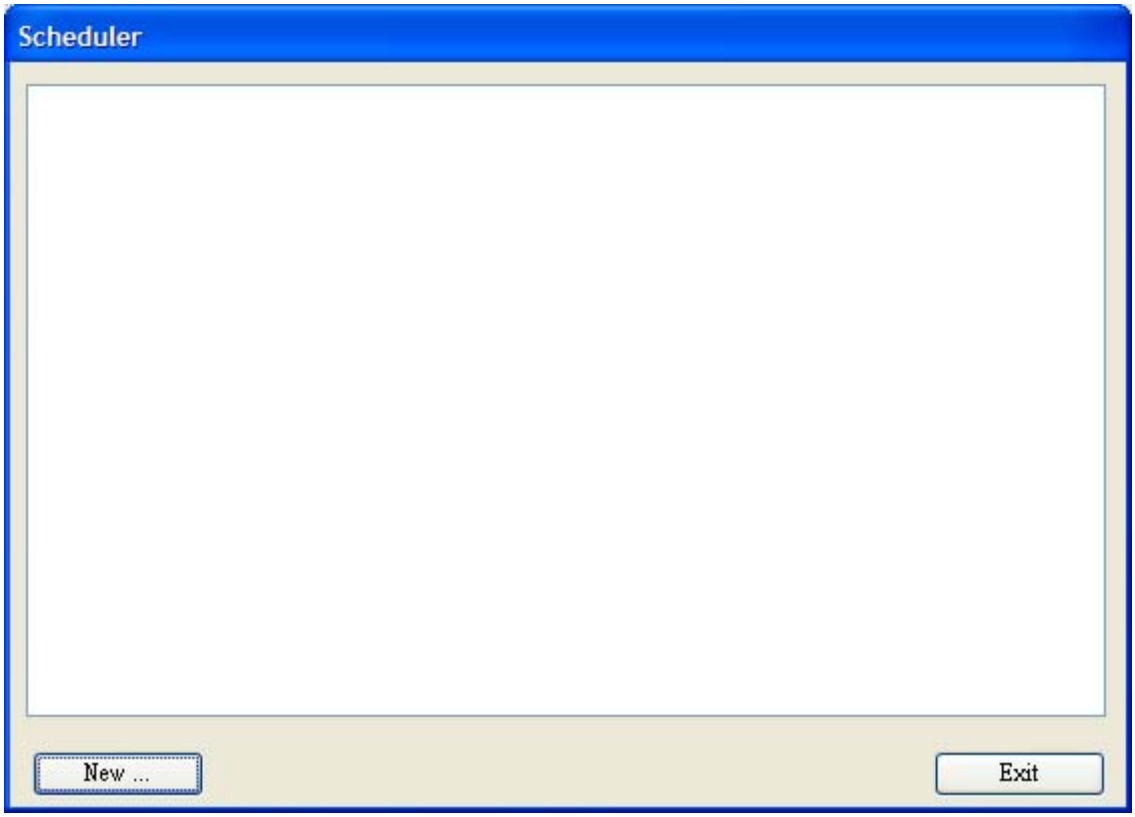
13.28 Schedule Object

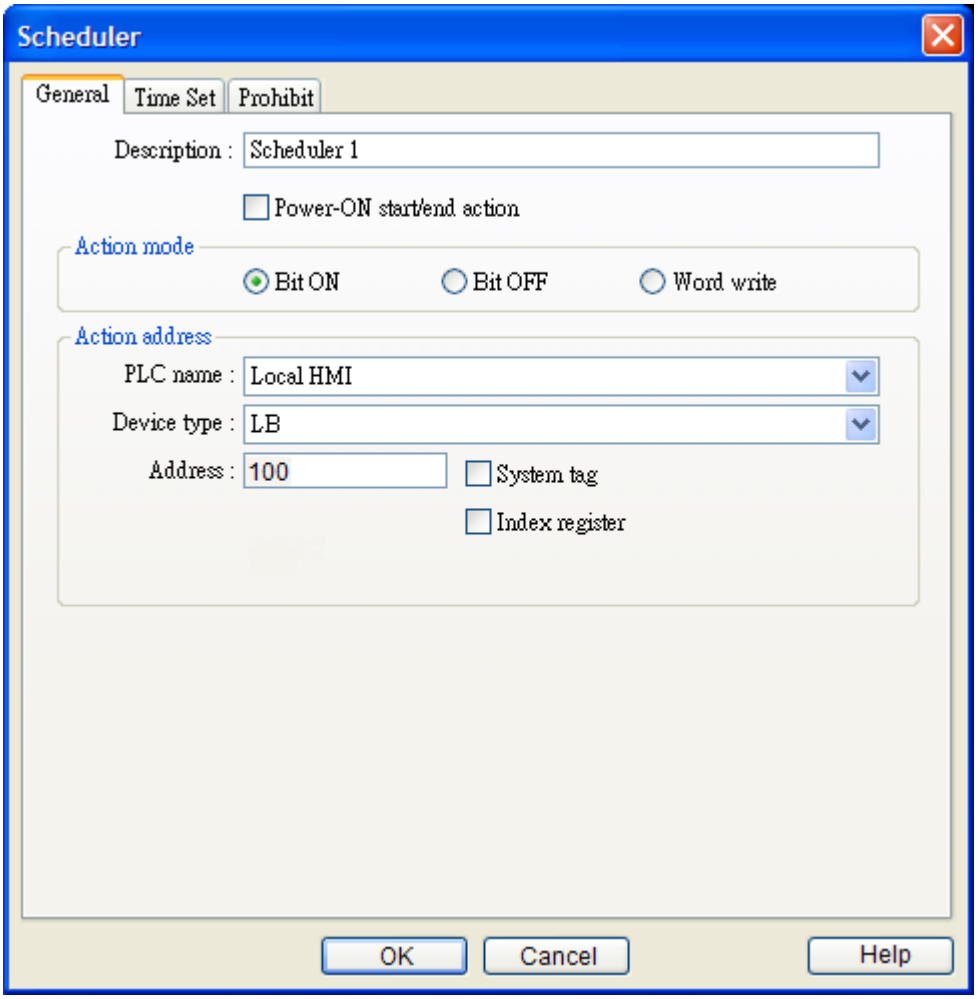
13.28.1 Overview

Schedule object is used to turn on/off a bit or write a value to a word device at designated time. The time schedule setting is very flexible, it can be on daily basis or weekly basis. For more advance application you can use a table (a block of word devices) to set start and terminate time, then update the table at any scheduled time.

13.28.2 Configuration

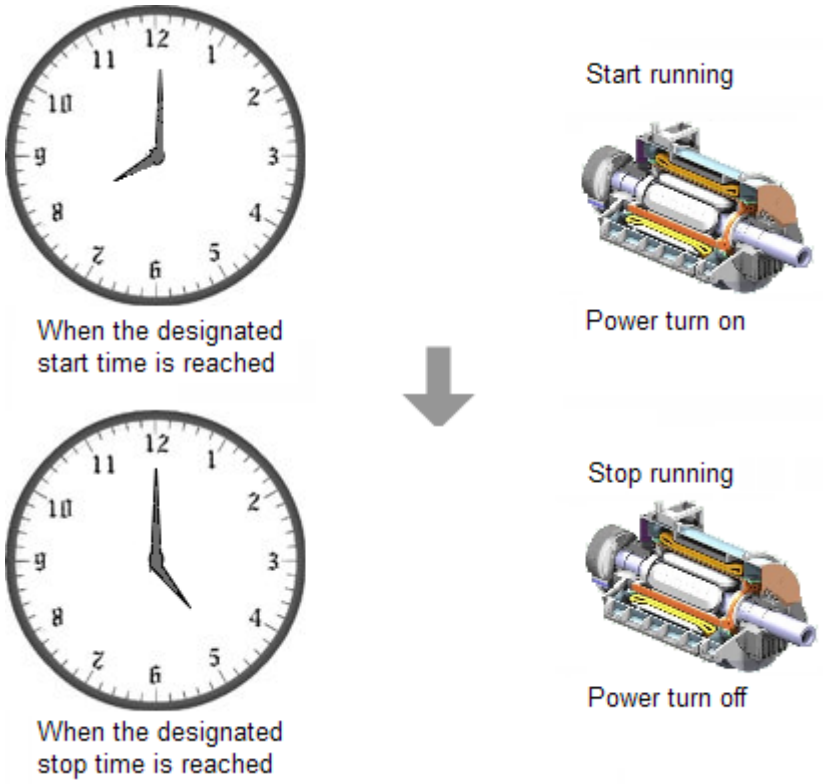
Click the “Schedule” icon on the toolbar and the “Scheduler list” dialogue box will appear, press the “New” , the schedule object dialogue box shall appear as shown below:





Example 1:

The motor is scheduled to be power ON at 8:00 and power off at 17:00, Monday to Friday. Here we use LB100 to control the motor. Follow the steps to set up the schedule object.

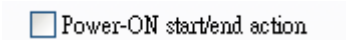


Click [New…], to add a new object.

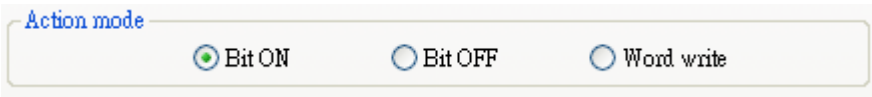
[General]

[Power-ON start/end action]

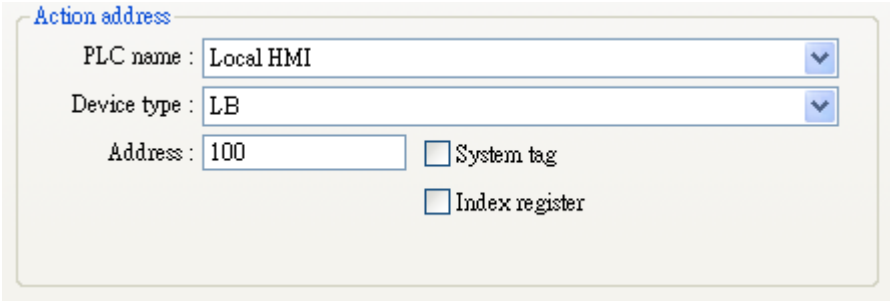
Detail message please refer to below Scheduler settings guide.



1. Check [Bit ON] in [Action mode],

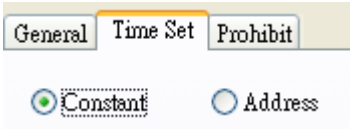


2. Set LB100 in [Action address]

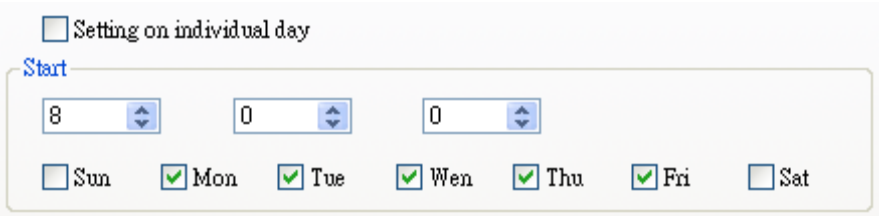


[Time Set tab]

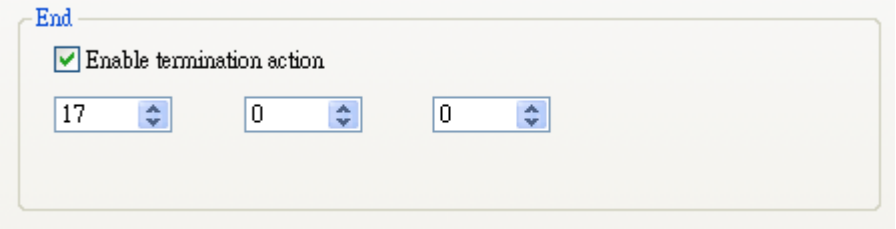
3. Select [Time Set] tab, check [Constant]



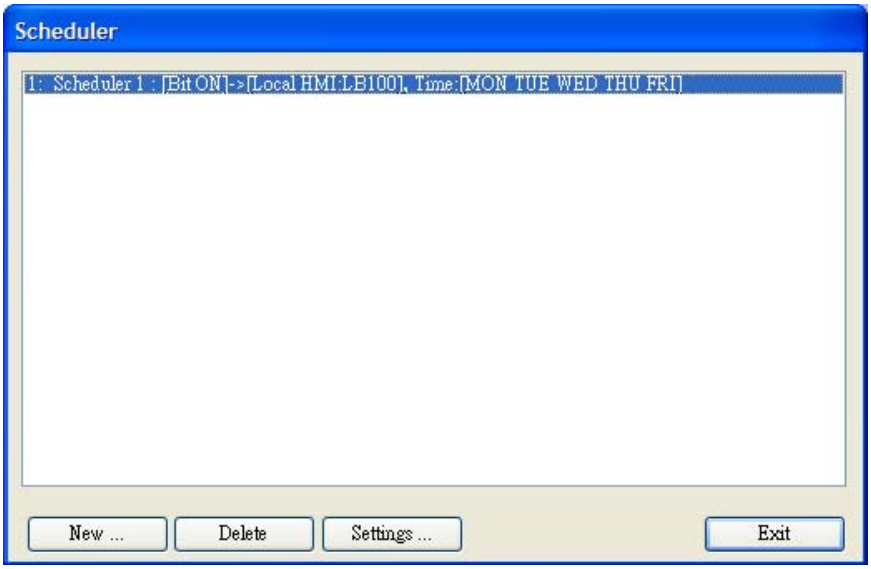
4. Unselect [Setting on individual day]. In [Start], adjust time as 8:00:00 and select Monday to Friday.



5. In [End], select [Enable termination action] and adjust time as 17:00:00.

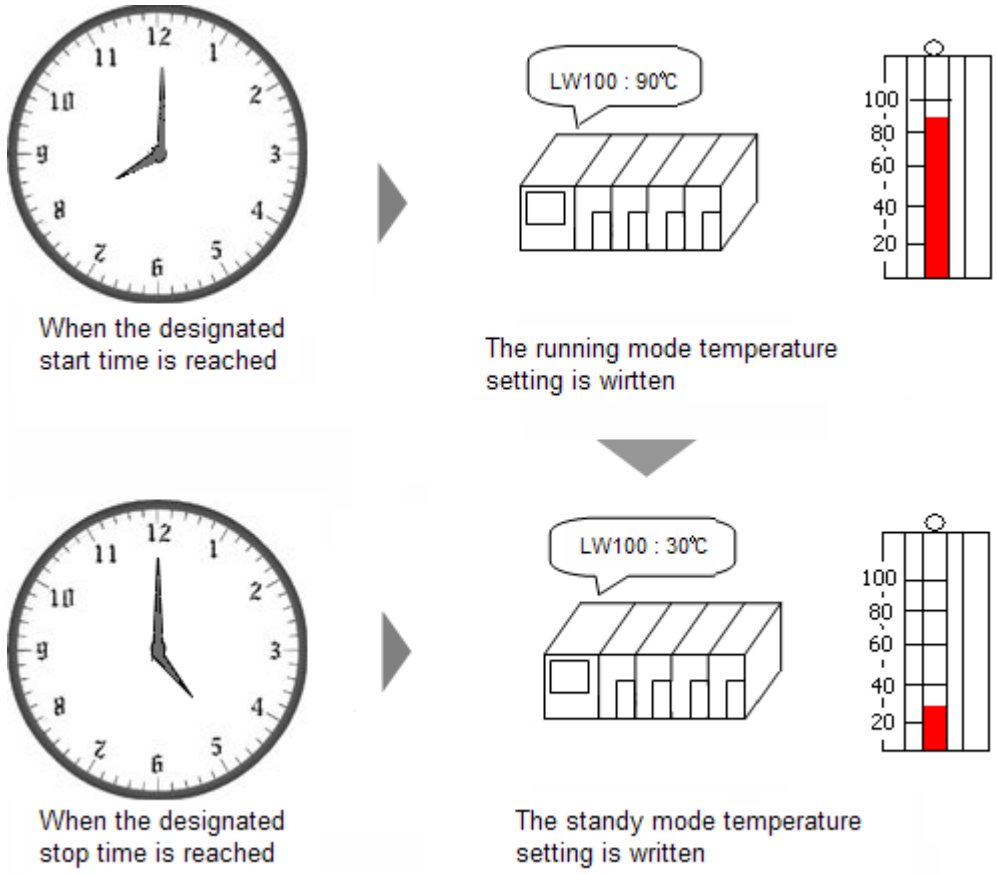


6. Click [OK], a new schedule object is created and display on the schedule list.

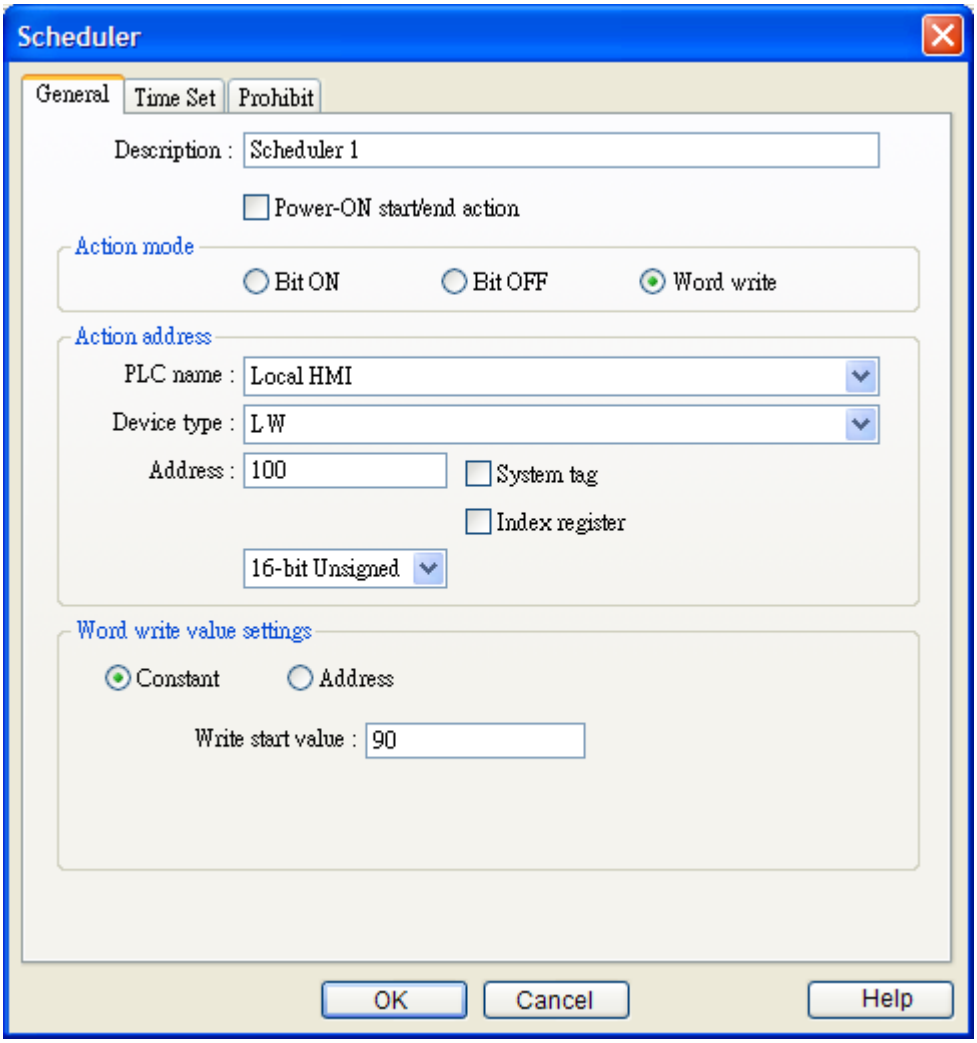


Example 2:

Set temperature at 90F at 8:00 and set it back to 30F (standby mode) at 17:00, Monday to Friday.

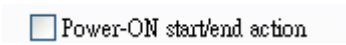


Click [New…], to add a new schedule object. Follow the steps to set up the schedule object. The [LW100] is used to store set value of temperature.

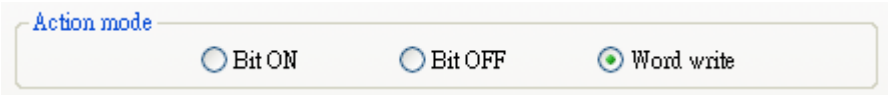


[General]

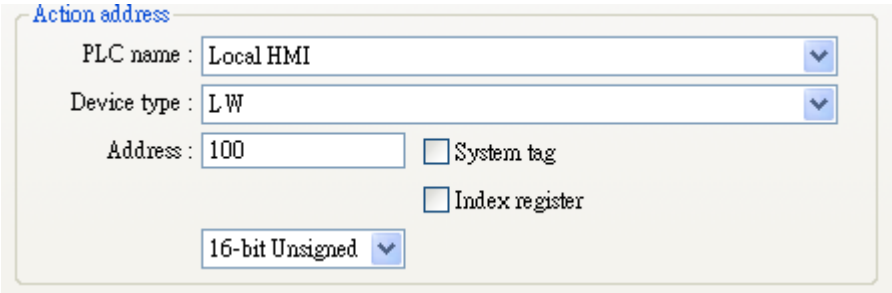
1. [Power-ON start/end action]



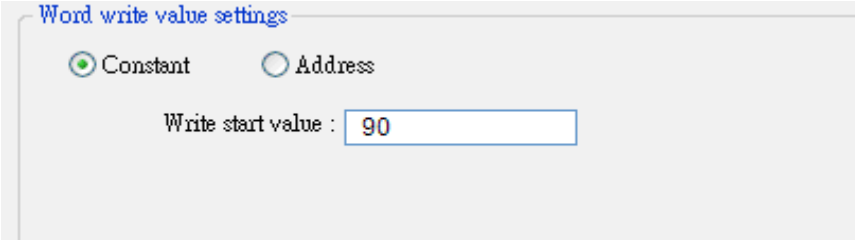
2. Check [Word write] in [Action mode],



3. Set LW100 in [Action address]

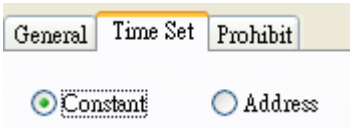


4. Check [Constant] and set [Write start value] to 90 in [Word write value settings],

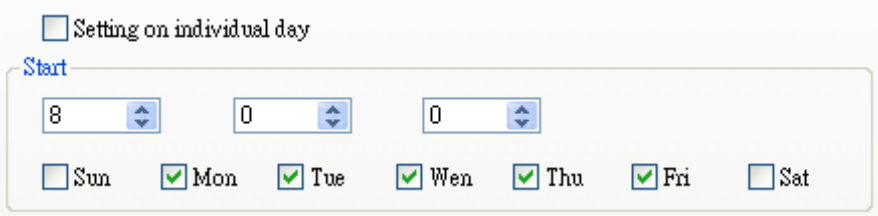


[Time Set tab]

5. Select [Time Set] tab, check [Constant]

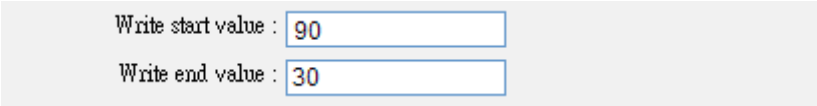


6. Unselect [Setting on individual day]. In [Start], adjust time as 8:00:00 and select Monday to Friday.



7. In [End], select [Enable termination action] and adjust time as 17:00:00.

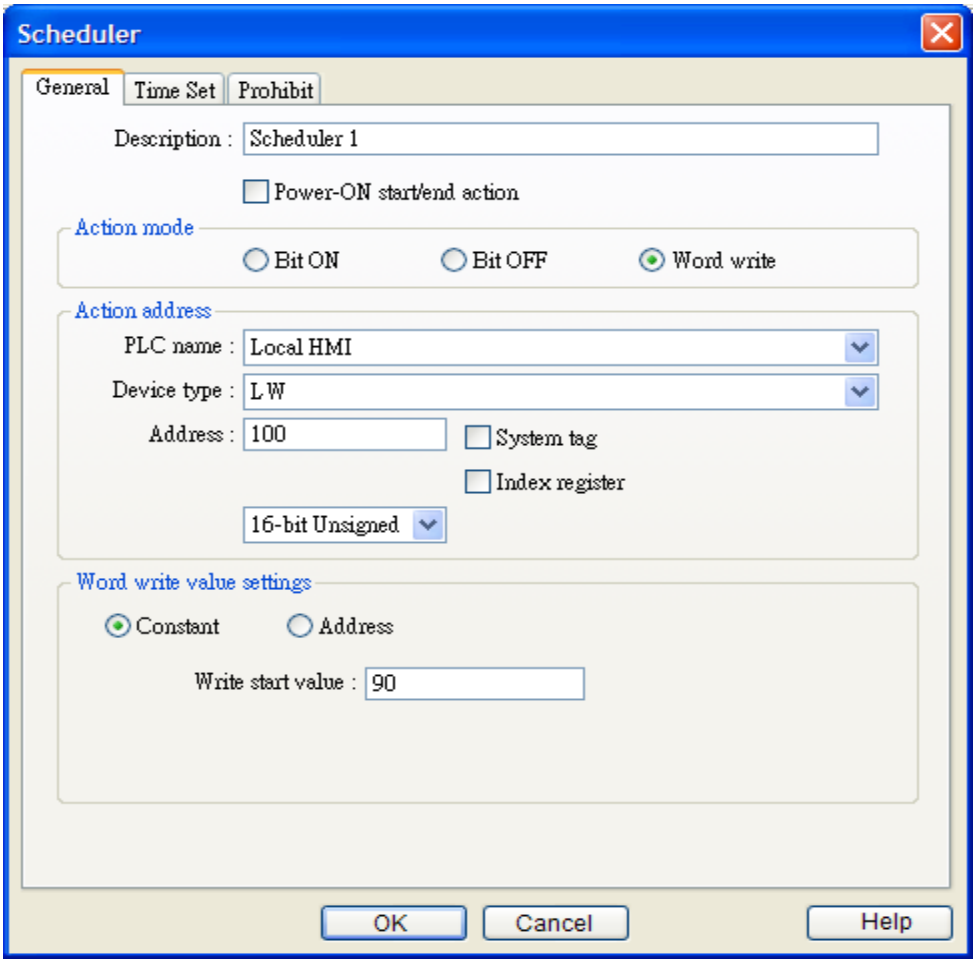
8. Select [General] tab, set [Write start value] to 90 and [Write end value] to 30.



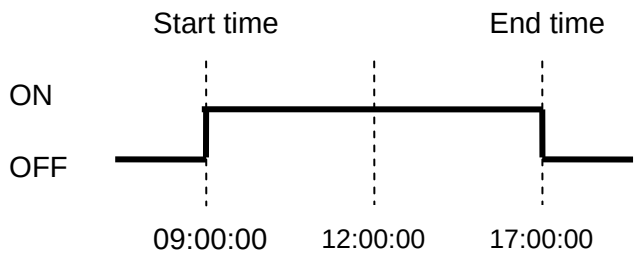
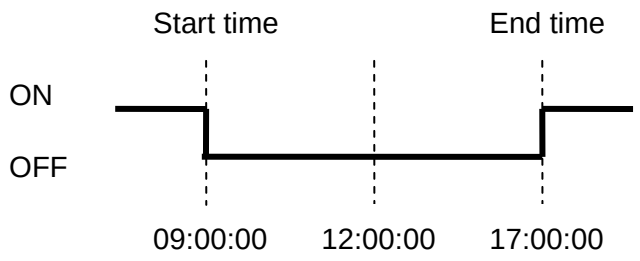
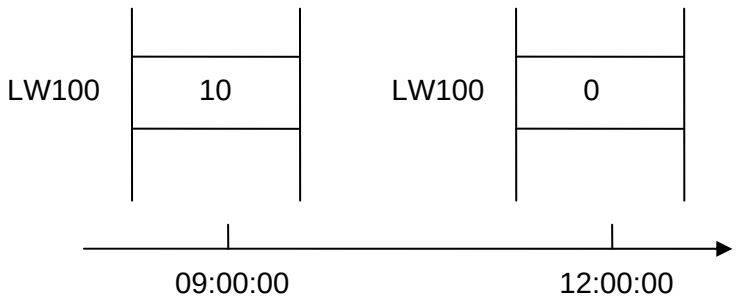
9. Click [OK], the settings appear in the Scheduler list.

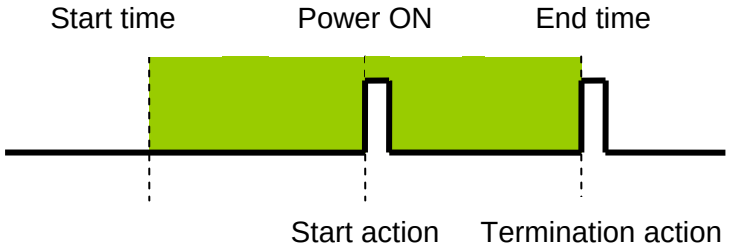
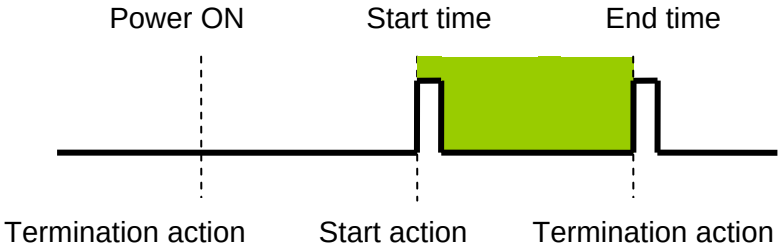
Schedule settings guide:

Action



Settings	Description
Action Mode	Select the type of operation performed at designated time.

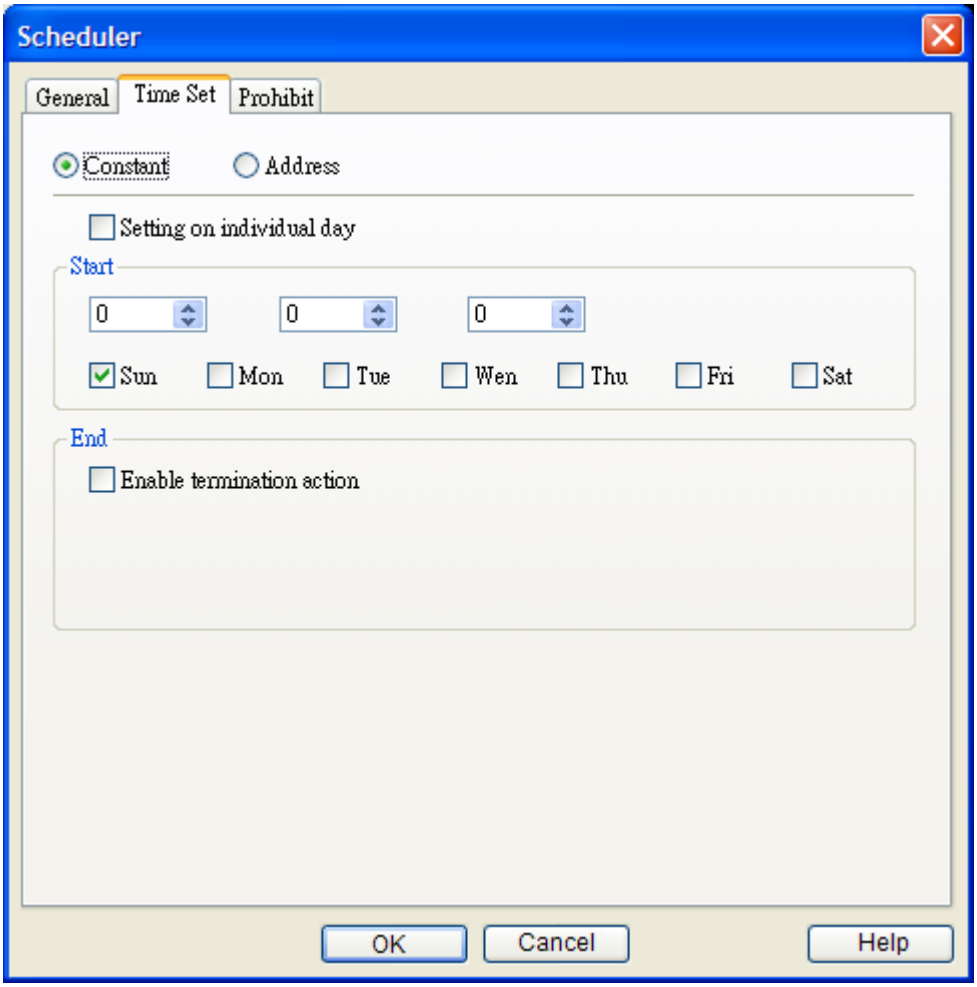
Bit ON	At start time, turn ON the specific bit. At end time, turn OFF the bit. Example: Start time = 09:00:00 End time = 17:00:00 
Bit OFF	At start time, turn OFF the specific bit. At end time, turn ON the bit. Example: Start time = 09:00:00 End time = 17:00:00 
Word write	At start time, the specific [Write start value] is written to the action address. At end time, [Write end value] is written to the action address. Example: Device address = LW100 Start time = 09:00:00 End time = 12:00:00 Write start value = 10 Write end value = 0 
Action address	Specify the address where the scheduler performs actions on.

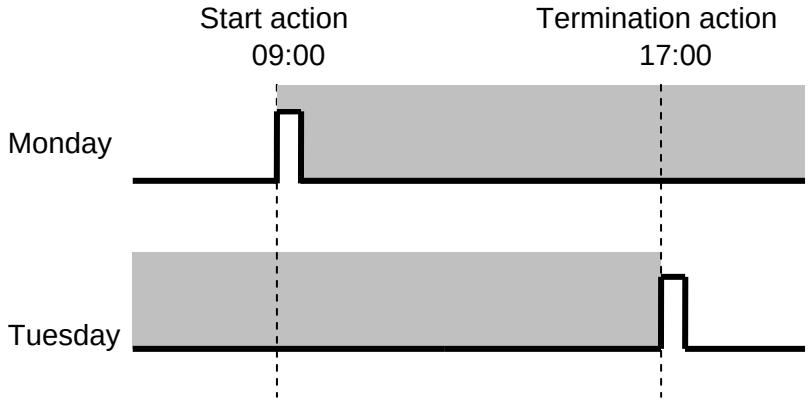
Settings	Description
Power-ON start/end action	Select the action to perform when power is turned on. Enable If the MT8000 power is turned ON within the scheduler range, the start action is performed. If the MT8000 power is turned ON outside of the scheduled range, the termination action is performed. Inside the scheduled range:  Outside the scheduled range:  Disable If power is turned ON but the time is later than the Start Time, the action is not automatically performed. However, the termination action is automatically performed. Also, if the termination action is not set, the schedule range is unable to recognize and the action is not performed.
Word write value Settings	These settings are active only when Action Mode is set to [Word Write].
Write start value	When performing start action, the system will write this value into action address. For [Constant] Designates the value to be written at start time. For [Address] Designates the address used to store the start time value.

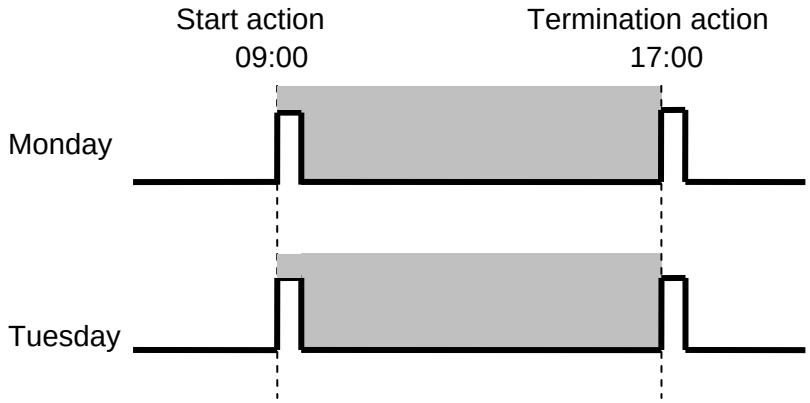
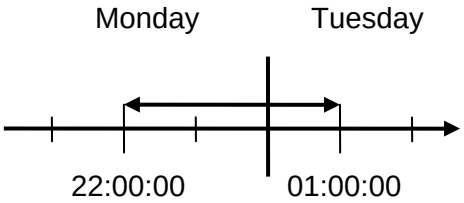
Write end value	When performing end action, the system will write this value into action address. For [Constant] Designates the value to be written at end time. For [Address] Designates the address used to store the end time value. Note You can use this option if the [Enable termination action] in [Time Set] tab is selected.

[Time Set]

Time Set (when [Constant] is selected)

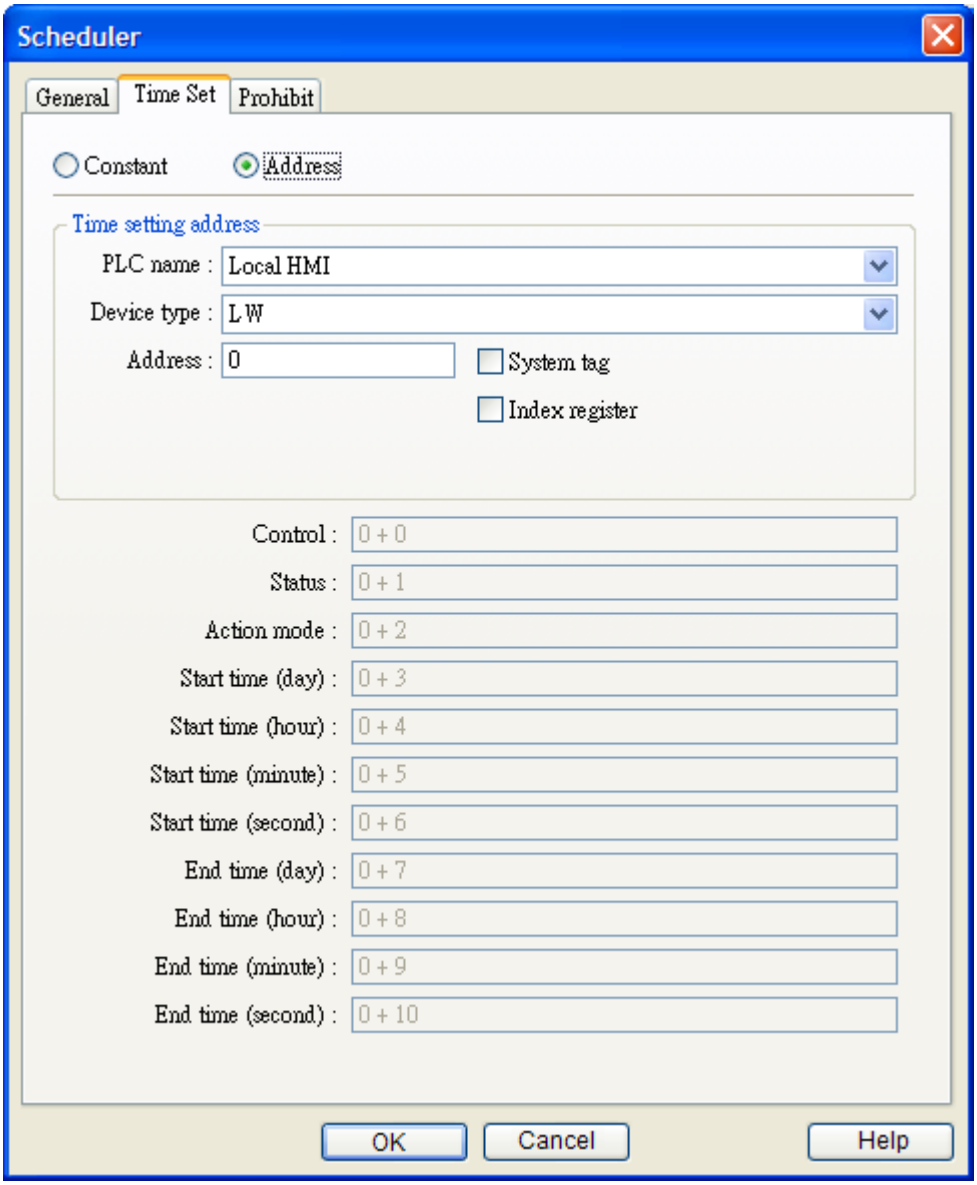


Settings	Description
Constant/Address	Select the method to set the start time and end time. Constant Specifies a fixed time and day. Address The start/end time is retrieved from the device address at on line operation.
Setting on individual day	Enable Start time and end time can be set in different day of week. There is only one start time and one end time during the week. You have to set both start time and end time with this mode.  **NOTE** 1. You must enter settings for the Start Time and End Time. 2. You cannot set the Start Time and End Time to the exact same day and time. Disable A schedule that is 1 day (Start and End times are within 24 hours) can be entered. Multiple Start and End days can be selected. You can perform actions at the same time on multiple days.. To specify an End Time, you must select [Enable termination action]

	 You cannot set the Start Time and End Time to the exact same day and time. The time scheduler is for one day only, so if the End Time is earlier than the Start Time, the operation of End Time will be performed on the next day. (For example) Start day: Monday Start: 22:00:00 End: 01:00:00 
Start	Set the start time and day. When [Setting on individual day] is disabled, user can designate more than one day.
End	Set the end time and day. When [Enable termination action] is selected, the end time can be specified. The day settings can only be set when [Setting on individual day] is enabled.

Time Set (when [Address] is selected)

If "address" mode is selected, the system retrieves the start/end time and day from word devices. Therefore, users can set and change scheduled time in operation.



User designates the [Time setting address] as the top address used to store time settings data. The 11 word devices are automatically allotted.

Normally the format of the above word devices is 16-unsigned integer. If a 32-bit word device is chosen, only 0-15 bits are effective and users should zero the 16-31 bits.

a. **Control** (Time setting address +0)

The layout of the Control word is shown below. Users set the [time acquisition request bit] ON (0→1) to make the system reads the [Action mode], [Start time], and [End time] and uses them as the new scheduled time.

15	0 (Bit)
Reserved (0 fixed)	0

Bit 00: time acquisition request bit (0: no action, 1: perform time read)

NOTE The system would not read start and end time data unless the [time acquisition request bit] is set ON.

---

b. Status (Time setting address +1)

The layout of the Status word is shown below.

When the system competes the read operation, it will turn the [time acquisition complete bit] ON (0→1). Also, if the read time data is incorrect, the [error notification bit] will be turned ON (0→1).

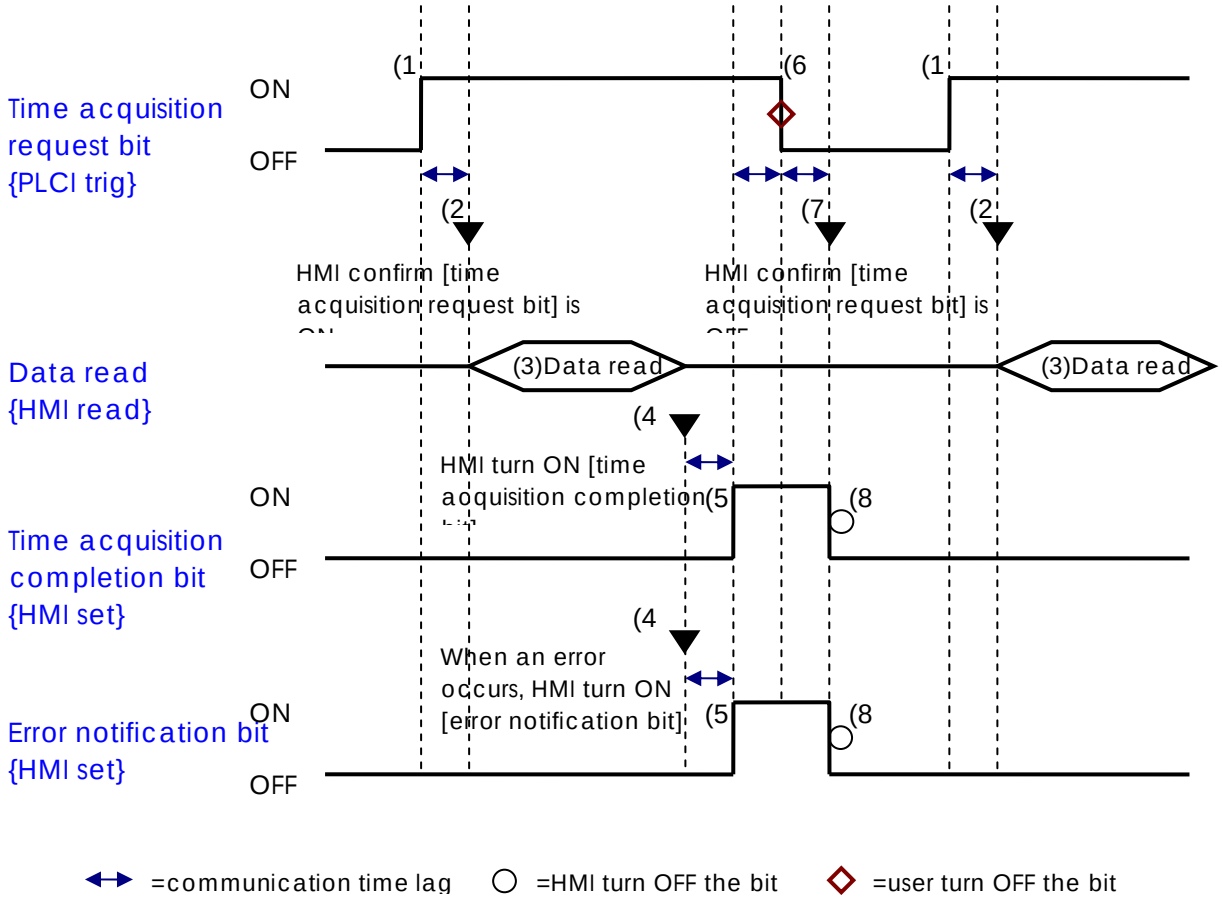
.

15	02	01	00 (Bit)
Reserved (0 fixed)	0	0	

Bit 00: time acquisition complete bit (0: null, 1: read operation complete)

Bit 01: error notification bit (0: no error, 1: start or end time format is incorrect)

NOTE After system reads the time data and turns the [time acquisition complete bit] ON, be sure to turn [Control] [time acquisition request bit] OFF. Once this bit is turned OFF, the system will set both the [Status] [time acquisition complete bit] and [error notification bit] to OFF.



c. **Mode** (Time setting address +2)

Enable and disable the [Termination time action] and [Setting on individual day].

15	02	01	00	Bit
Reserved (0 fixed)		0	0	

Bit 00: Termination time setting (0: disable, 1: enable)

Bit 01: Setting on individual day (0: disable, 1: enable)

NOTE

1. If [setting on individual day] is OFF, the system still reads all 11 word devices but ignores the end time data.

2. If [setting on individual day] is ON, be sure to enter all start and end time information. If 2 or more of the start/end day bits are turned ON simultaneously, an

error occurs.

d. **Start/End Day** (Start Day: Time setting address +3, End Day: Time setting address +7)
Designates the day used as a trigger for the start/termination action.

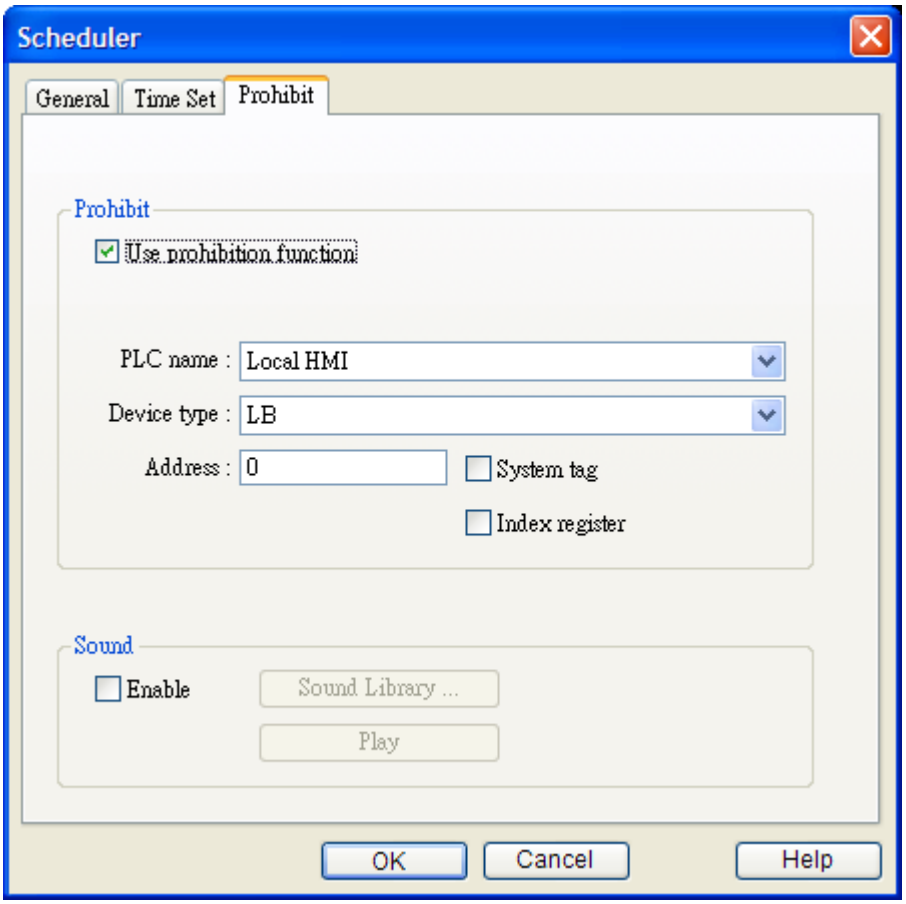
15	07	06	05	04	03	02	01	00	Bit
Reserved (0 fixed)		Sat	Fri	Thu	Wen	Tue	Mon	Sun	

Bit 00: Sunday (0: none, 1: select)
Bit 01: Monday (0: none, 1: select)
Bit 02: Tuesday (0: none, 1: select)
Bit 03: Wednesday (0: none, 1: select)
Bit 04: Thursday (0: none, 1: select)
Bit 05: Friday (0: none, 1: select)
Bit 06: Saturday (0: none, 1: select)

e. **Start/End Time** (Start Time: Time setting address +4 to +6, End Time: Time setting address +8 to +10)
Set the time values used for the start/termination actions in the following ranges.
Hour: 0 - 23
Minute: 0 - 59
Second: 0 - 59
If you specify a value outside the range, an error will occur.

NOTE The time data format shall be ***16-bit unsigned,*** system doesn't accept BCD format.

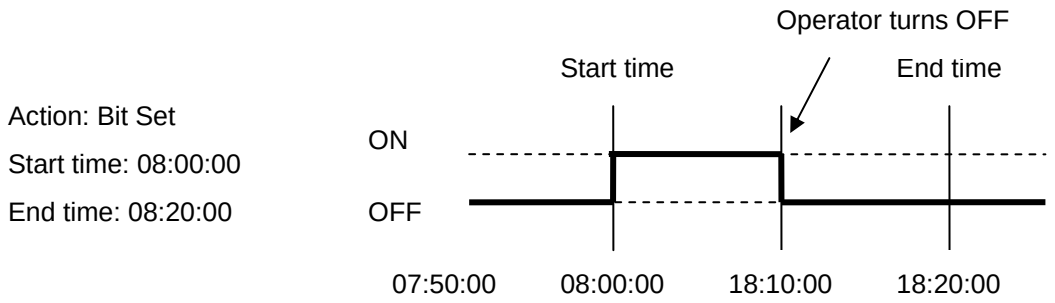
Prohibit



Settings	Description
Prohibit	Enable MT8000 reads the bit status before performing start action. If the bit is ON, the schedule action is not performed.
Sound	Enable When performing start and termination action, the system will simultaneously play the specified sound.

13.28.3 Restrictions

User can register the maximum of 32 entries in Scheduler list.
The time scheduler features are one time actions. When the start time or end time is reached, the system writes the value to device just one time. (not repeated)



- Once the system execute start action, it will read [Write start address] and [Write end address] altogether, after then, even you change the value of [Write end address], the system would not use the new value.
- When the operator changes RTC data, for those schedule object with both start time and end time setting, the system will check if the time update changes the status from out of schedule range to within schedule range, if it is, the start action will be performed.
- If there are several schedule objects registered the same start time or end time, when time up the system will perform the operation from the first to the last in ascending order.
- When [Time Set] are specified as [Address] mode, the system will read [control] word periodically.
- When [Time Set] are specified as [Address] and start time and end time is over valid range, the system may not execute operation properly.
- When [Time Set] are specified as [Address], the action will not start up until time data update is success.

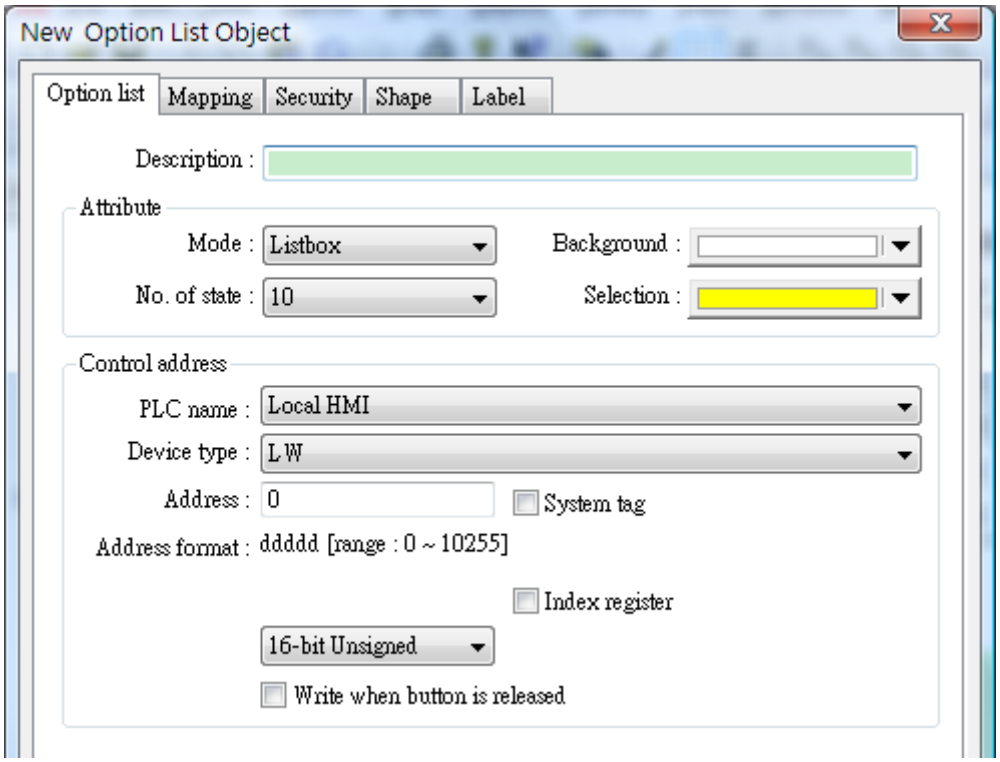
13.29 Option List

13.29.1 Overview

An Option List displays a list of items that the user can view and select. Once the user selects an item, the value corresponding to the item will be written to a word register.There are two forms for this object – Listbox and Drop-down list. The listbox lists all items and highlights the selected one. However, the drop-down list normally displays only the selected item. Once the user touches it, the system will display a listbox (which is similar to the one with Listbox style) beneath the object.

13.29.2 Configuration

Click the “Option List” icon, “Option List object properties” dialogue box appears as follows:

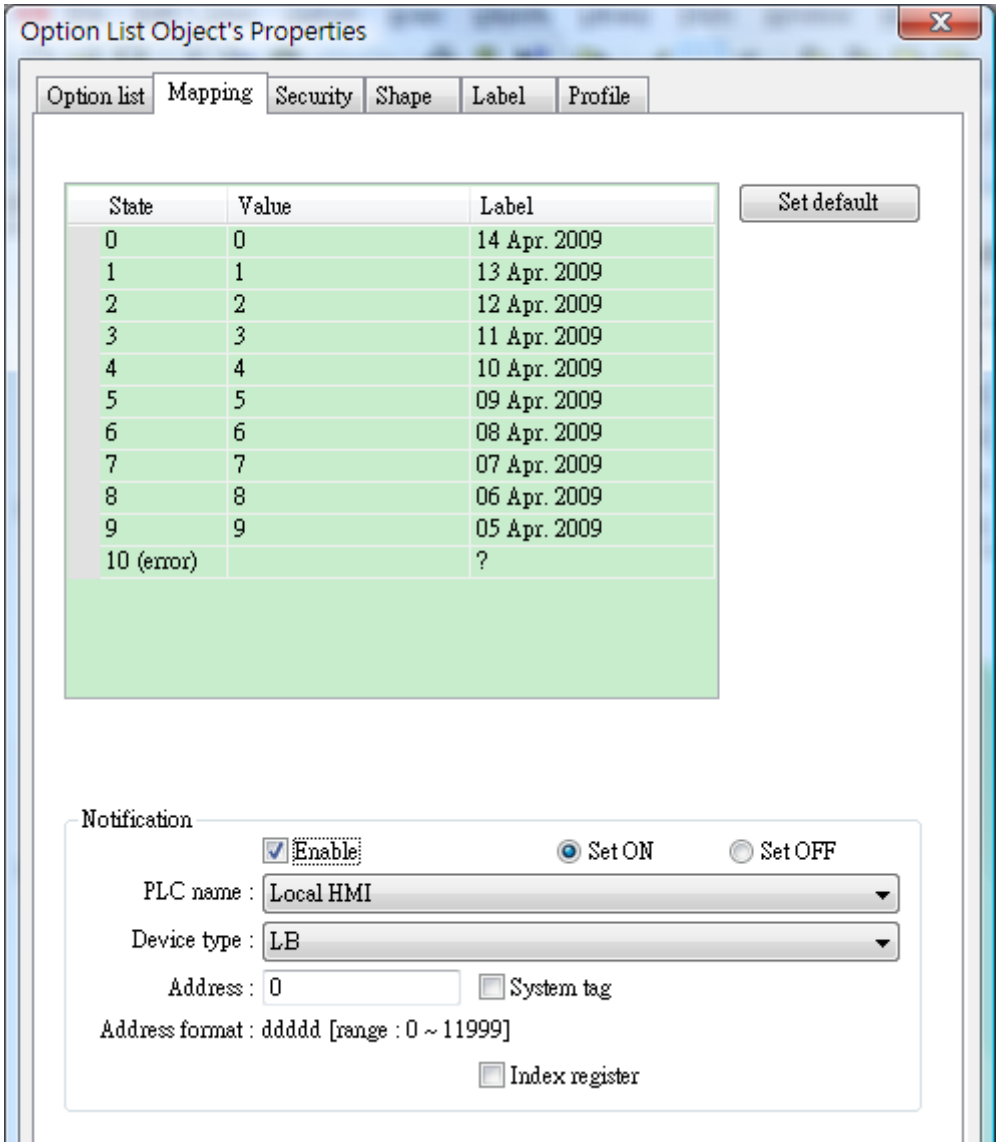


Option list tab

Settings	Description
Attributes	• Mode Select the object style; one of Listbox and Drop-down list. • No. of state Set the number of states for the object. Each state represents an item displayed in the list and a value to be written to the [Control address]. • Background Select background color for the object. • Selection Select background color for the selected/highlighted item.
Control address	Select the [PLC name], [Device type], [Address] of the word register device that controls the display of the object and the system writes the value of the state to the word register.
Write when button is released	• Unselected The system will write value to the [Control address] when the user touches an item. • Selected The system will write value to the [Control address] when the touch action is released.

	NOTE ● This option is only available in listbox style.

Mapping tab



Settings	Description
Mapping table	This table displays all available states/items and their labels and values.. To change the number of available states, please refer to [Option list tab] ➔ [Attributes] ➔ [No. of state].

	● State The system lists all available states. Each state represents an item that will be displayed in the list. This field is read-only. ● Value Here user can assign value for each item, basing on the following two criteria: a. [For reading] If any change of the content from [Control address] is detected, the object compares the content with these values and selects the first matched item. If no item is matched, the status goes to error state and signals the notification bit register (if requested). b. [For writing] The system writes this value to [Control address] when user selects an item. ● Label Users can assign label for each item. The option list object displays the labels of all items in the list for users to review and select. ● Error state a. As the illustration shown above, state 10 is the error state when specifying 10 in [No. of state]. Similarly, if you set [No. of state] to 11 then state 11 would be the error state, and so on. b. On error state, the listbox-style option list removes the highlight to represent no item is selected and the drop-down list displays the label of error state. c. The label of error state is only applied to the option list objects with drop-down list style. The listbox-style list has nothing to do with this label.
Set default	Set default values for all states, i.e. set 0 for state 0, 1 for state 1 and so on.
Notification	● Enable The system will set ON/OFF to the specified bit register when error is detected. The signal of the bit register could be used to trigger a procedure for correcting the error.

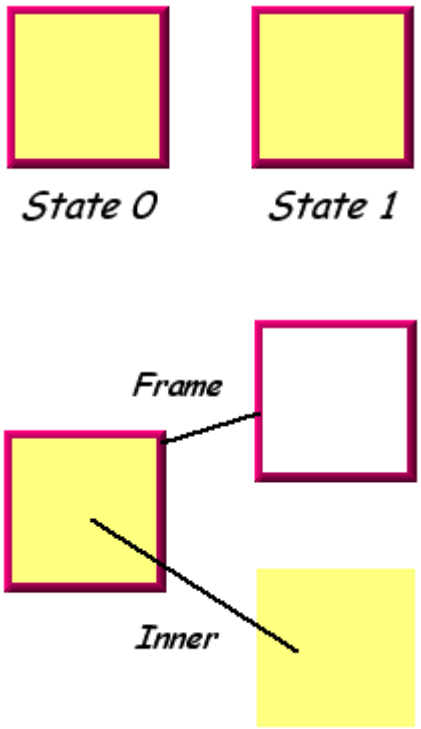
Chapter 14 Shape Library and Picture Library

The EB8000 provides Shape Library and Picture Library features to add the visual effects of objects. Each Shape and Picture includes up to 256 states. This chapter expatiates how to create Shape Library and Picture Library.

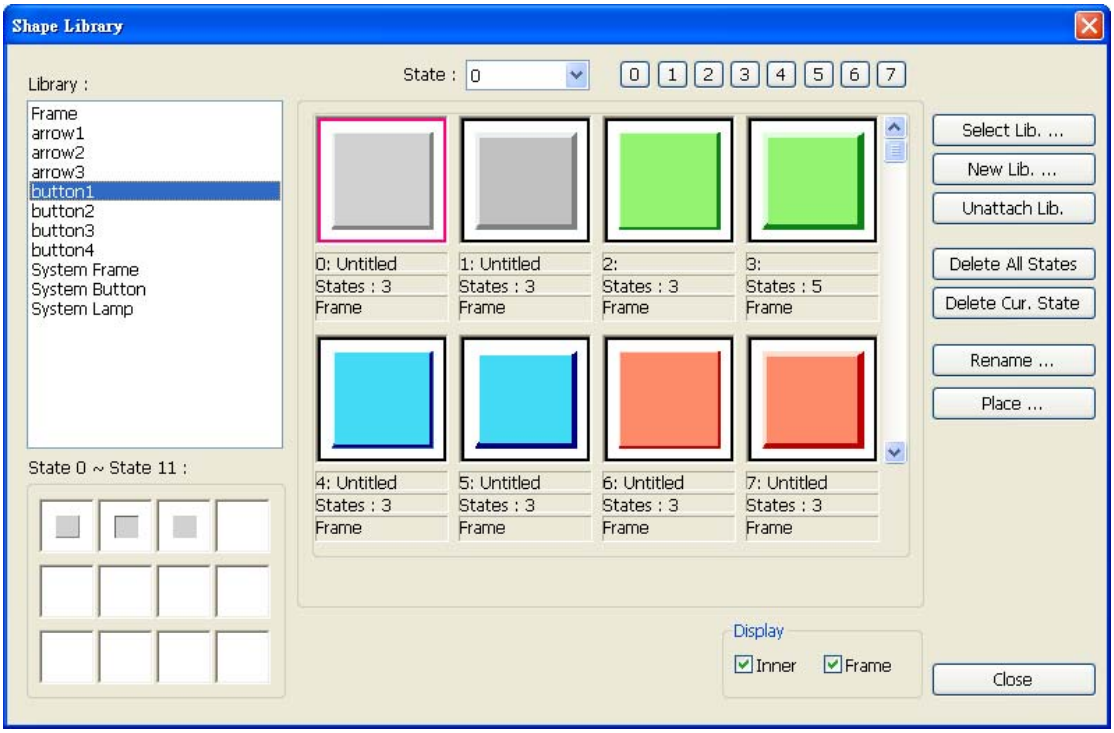
Refer to Chapter 9 - “Object’s General Attribute” for information about how to use Shape Library and Picture Library.

14.1 Creating Shape Library

A shape is a graph composed of lines, rectangles, circles and other drawing objects. A complete Shape can possess more than one state, and each state can include two parts: frame and inner. See the illustration as below:



An object can be set to use the Shape’s frame, inner or both. Click [Shape Library] button on the toolbar, and the [Shape Library] dialogue box appears as below:



[Library]

Selecting the source of a Shape from the Shape Library which has been added into the current project.

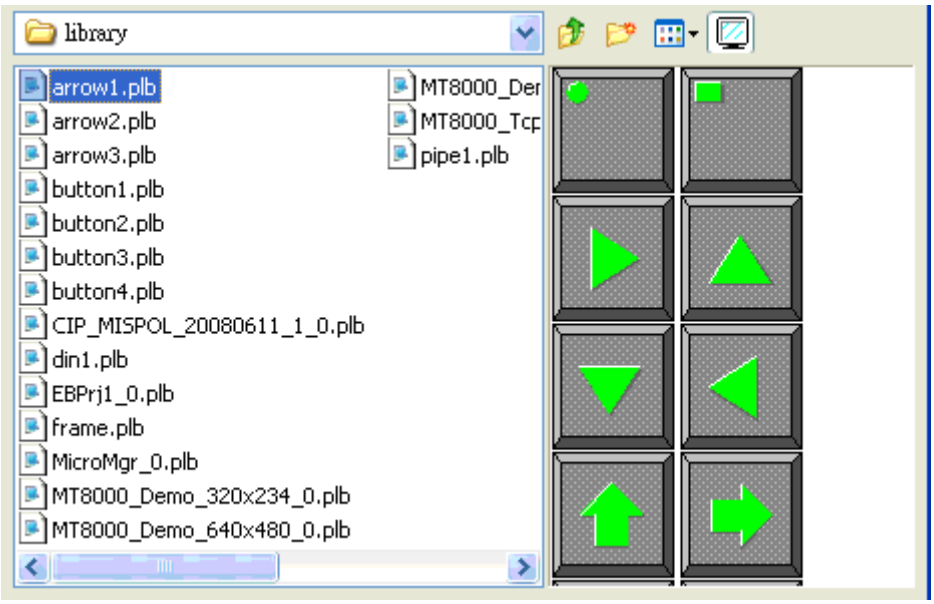
[State]

Selecting the state the current Shape wants to display. If the selected Shape isn't displayed, it means that the Shape does not exist or the state of the Shape isn't defined.

[Select Lib. …]

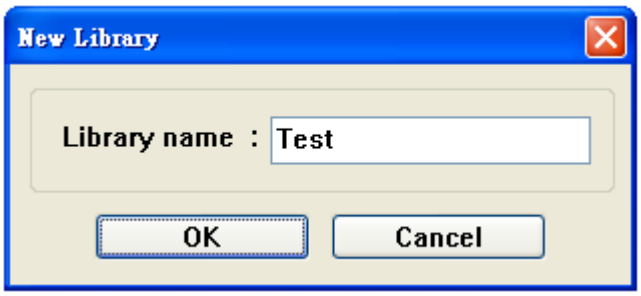
Click the [Select Lib. ...] button, and the following dialog appears for users to select the file path of the Shape Library to be added.

By previewing the content of the library on the right hand side of the window, users can select suitable library.



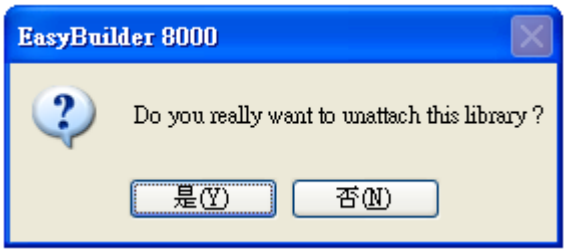
[New Lib. ...]

Click the button to add a new Shape Library.



[Unattach Lib.]

Click the button to delete the Shape Library in [Library] from the current project.



[Delete all States]

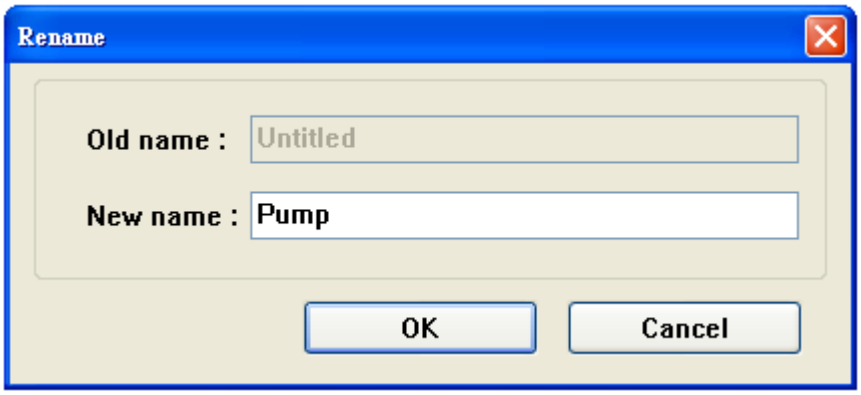
Delete all states of the selected Shape.

[Delete Cur. State]

Delete current state of the selected Shape.

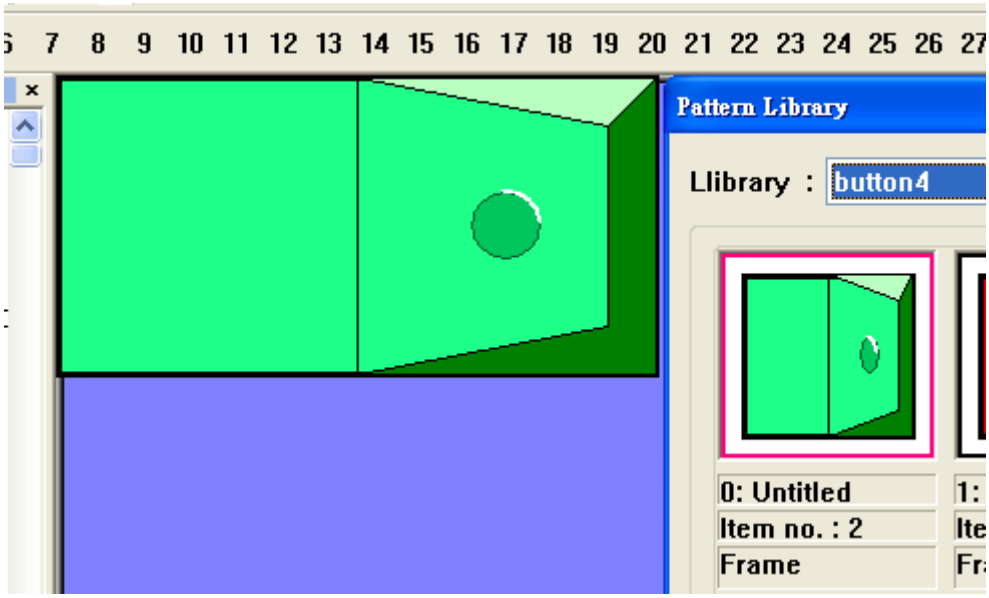
[Rename …]

Rename the selected Shape.



[Place …]

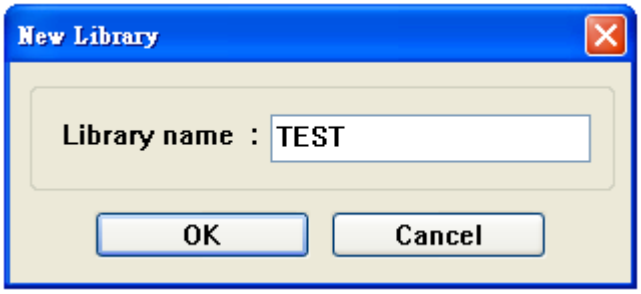
Export the Shape to be placed in the current window.



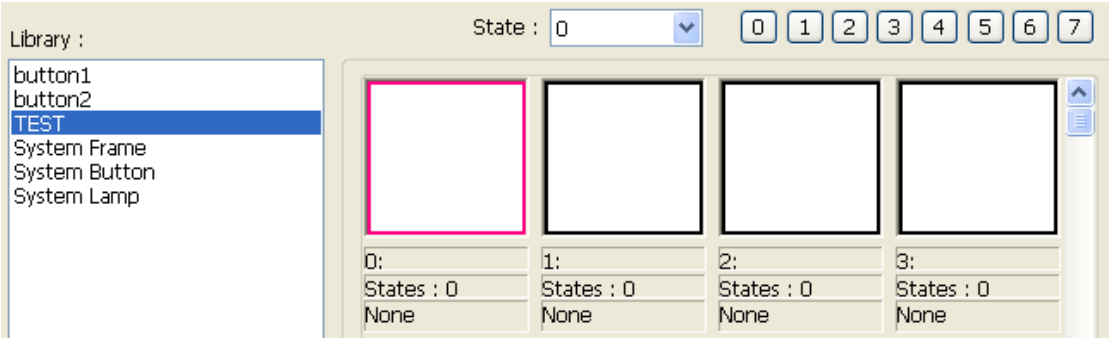
Below is an example of how to create a new Shape Library and add a Shape with two states to it.

Step 1

Click [New Lib. ...] and input the name of the new Shape Library.

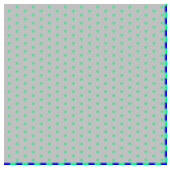


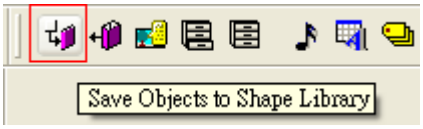
A new Shape Library “TEST” will be added to the Shape Library Manager dialogue box. At this moment, there is no Shape in the library.



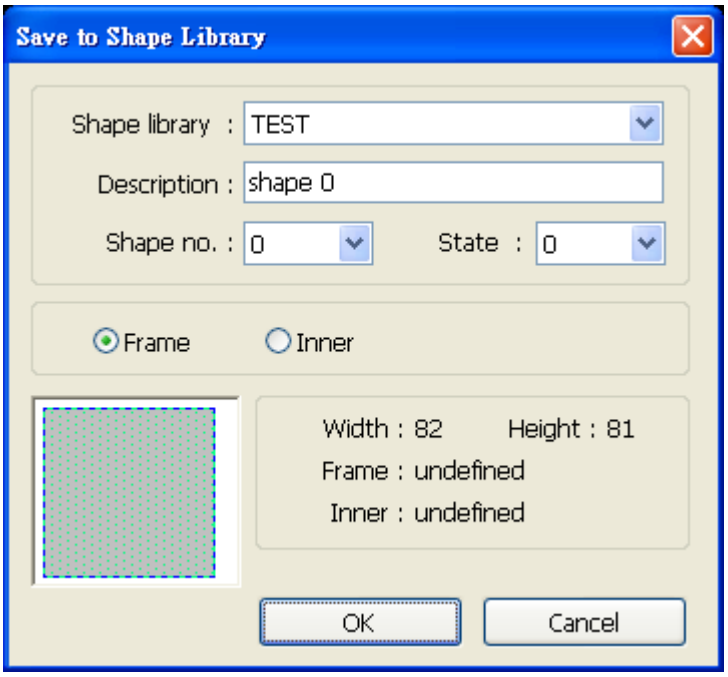
Step 2

Add a state to the selected Shape. First, using the drawing tools to draw a graph in the window and select the graph to be added to the Shape Library.





Click the “Save Objects to Shape Library” button on the toolbar and the following dialogue appears:



[Shape library]
Select the Shape Library for the graph to be added to. In this example, we select “TEST” library.

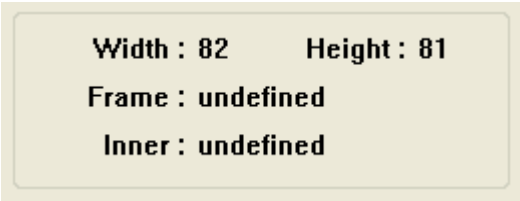
[Description]
The name of the Shape.

[Shape no.]
The number of the Shape Library the shape would like to be added in.

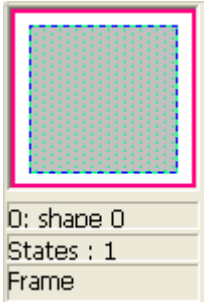
[State]
Select the state of the Shape which the graph wants to be. Here the state is set for 0. The EB8000 provides 256 states for each Shape.

[Frame]
If [Frame] is selected, the graph will become a frame for the Shape.

[Inner]
If [Inner] being selected, the graph will become an inner for the Shape.

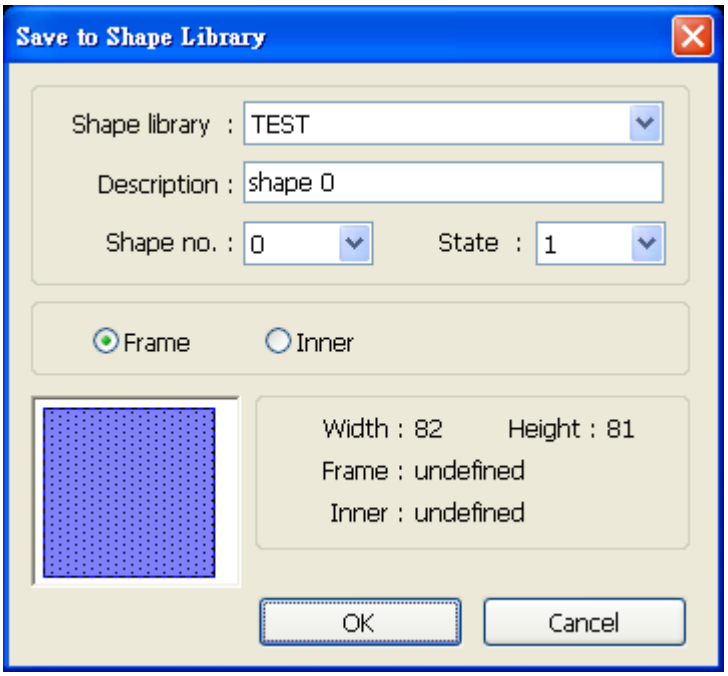


The picture above shows information of the Shape. Neither frame nor inner is defined in the current state (state 0) of the Shape. After clicking the OK button, the graph will be added to the Shape Library; In addition, it also shows that the Shape No.0 has only one state and the frame has also been defined.

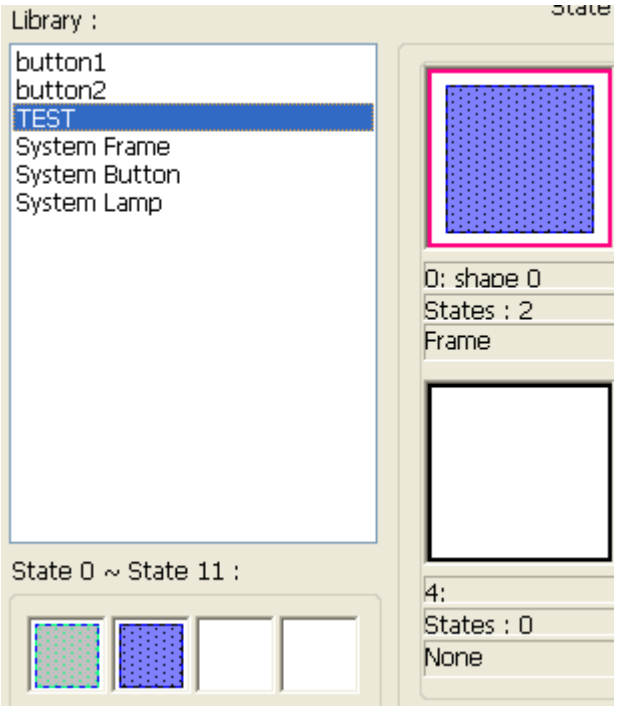


Step 3

Likewise, create another state by the same process as in the Step 2, but the new graph has to be defined as state 1:

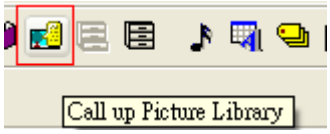


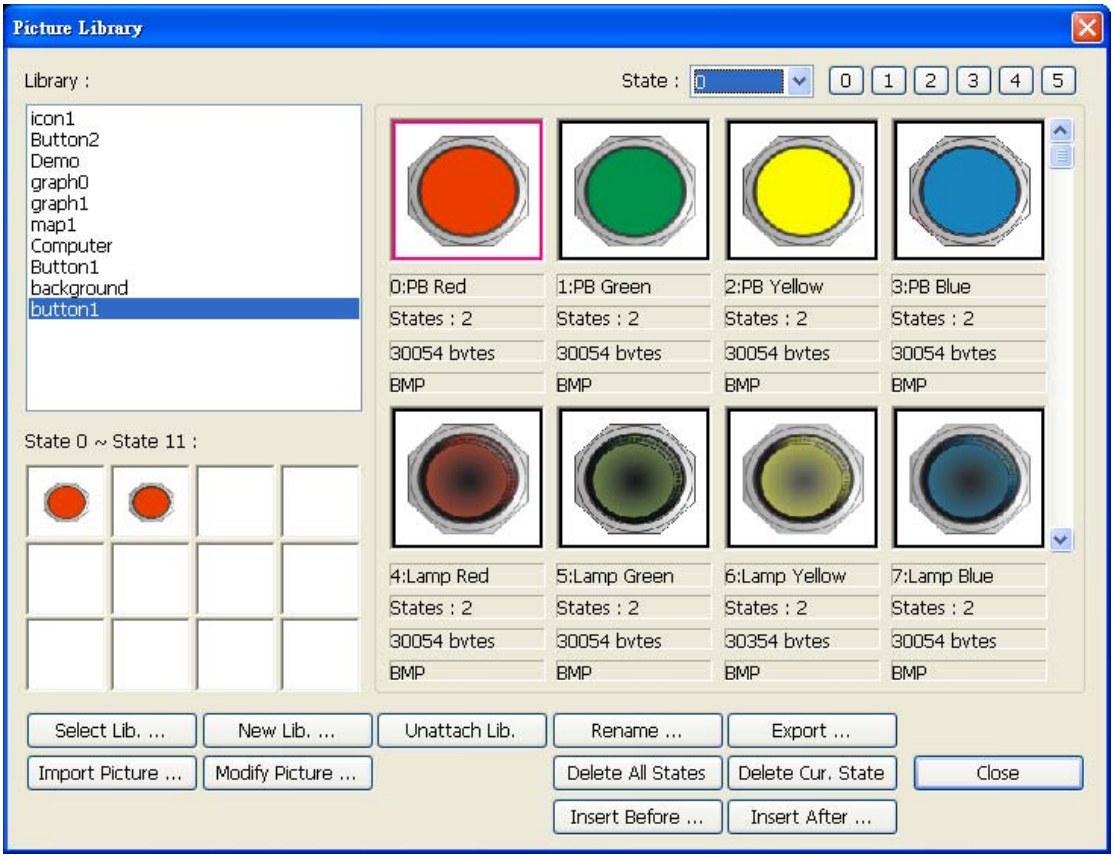
Click OK and a complete Shape with two states is created. See the following picture.



14.2 Creating Picture Library

Click the “Picture Library” button on the toolbar, and the “Picture Library” dialogue appears.





[Library]

Picture Libraries which have been added into the current project. Select the library source of a picture from the list.

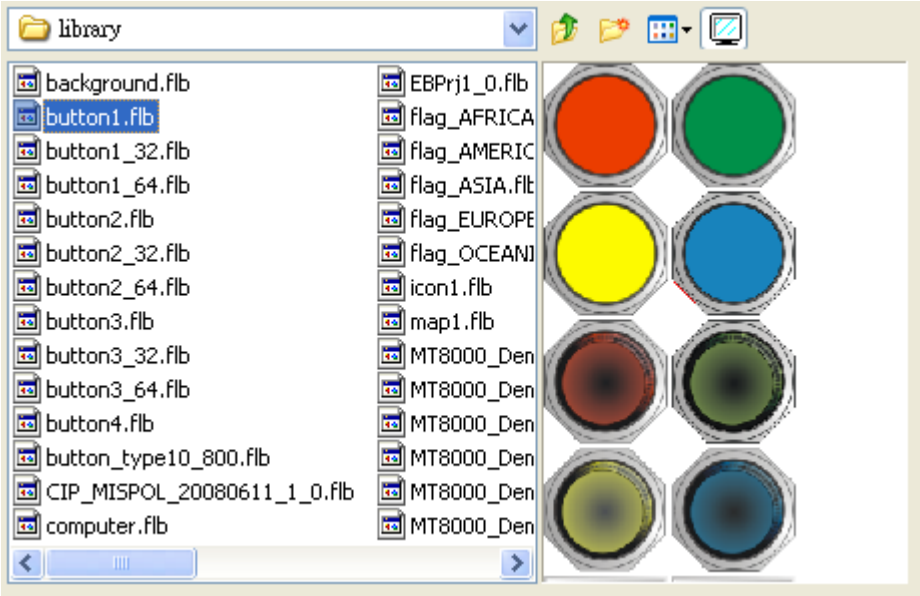
[State]

Select the state that the current graph wants to display. If the selected Picture isn't displayed, it means that the Picture does not exist or the state of the Picture isn't defined.

[Select Lib. …]

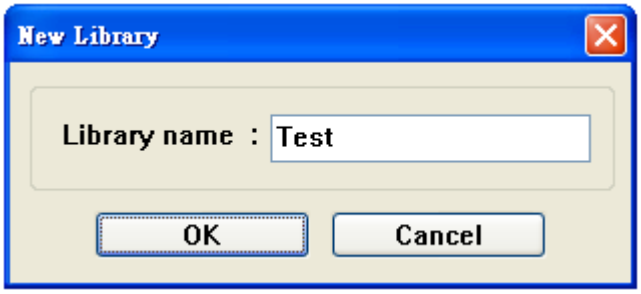
Click the [Select Lib. ...] button, and the following dialog appears for users to select the file path of the Picture Library to be added.

By previewing the content of the library on the right hand side of the window, users can select suitable library.



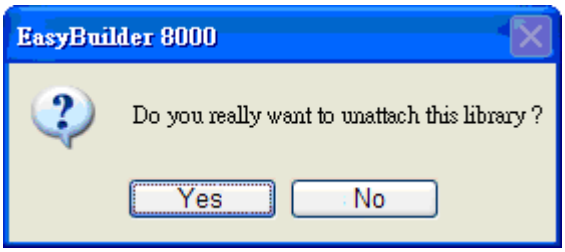
[New Lib. …]

Click the button to add a new Picture Library.



[Unattach Lib.]

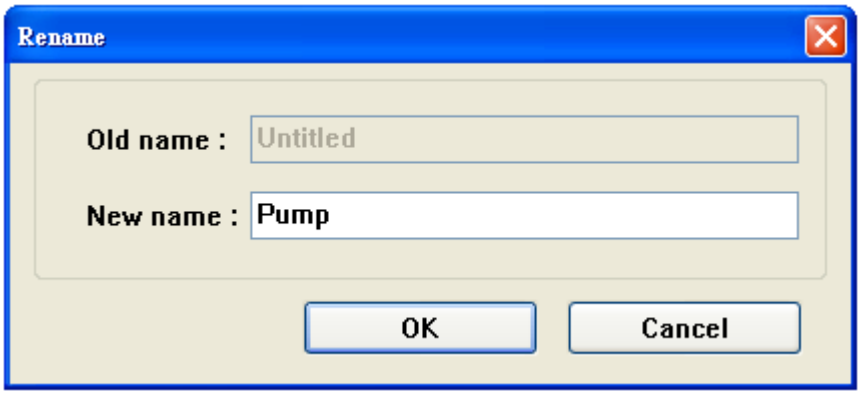
Click the button to delete the Picture Library in [Library] from the current project.



[Delete all States]
Delete all states of the selected Picture.

[Delete Cur. State]
Delete current state of the selected Picture.

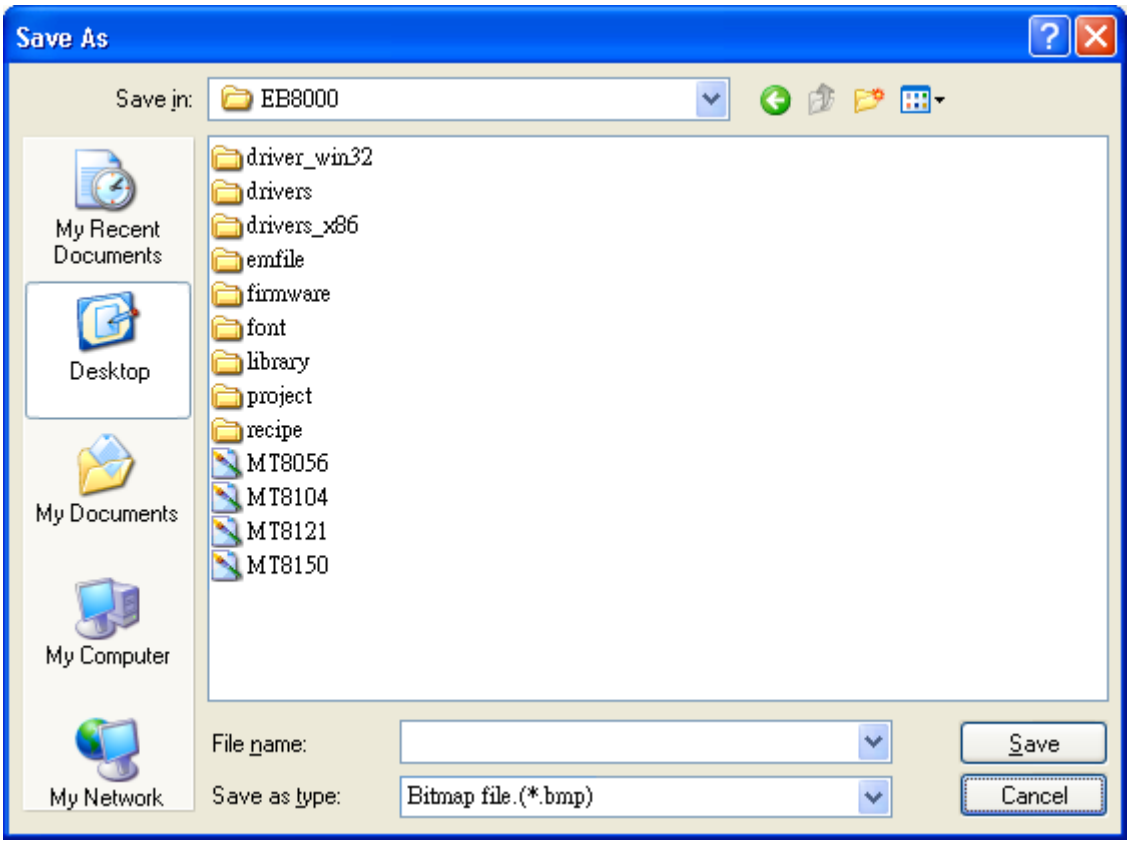
[Rename …]
Rename the selected Picture.



[Insert Before...]
Add a new state before the current state.

[Insert After…]
Add a new state after the current state.

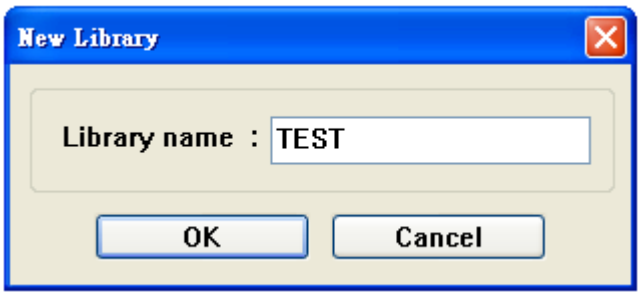
[Export …]
Export the selected picture to the appointed place. As shown below, users can get the original picture.



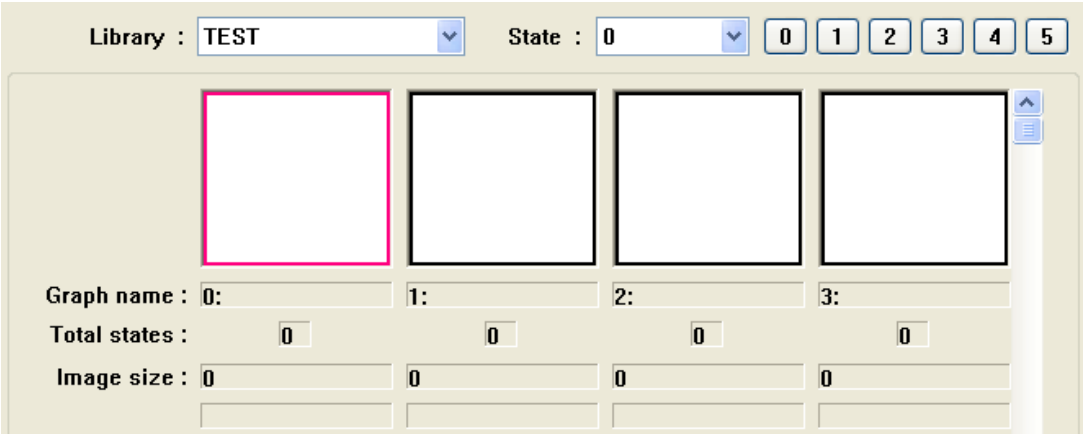
Below is an example of how to create a new Picture Library and add a Picture with two states to it.

Step 1

Click [New Lib. ...] and input the name of the new Picture Library.

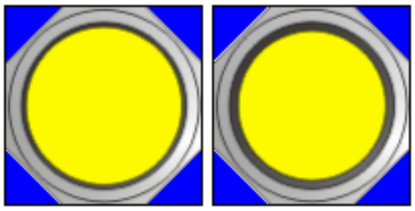


A new Picture Library “TEST” will be added to the Picture Library Manager dialogue box. At this moment, there is no Picture in the library.

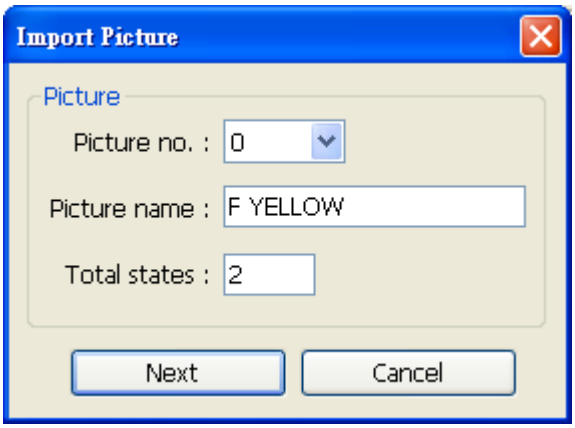


Step 2

Prepare the pictures to be added; suppose the two graphs in the following picture are used to represent the state 0 and the state 1 respectively.

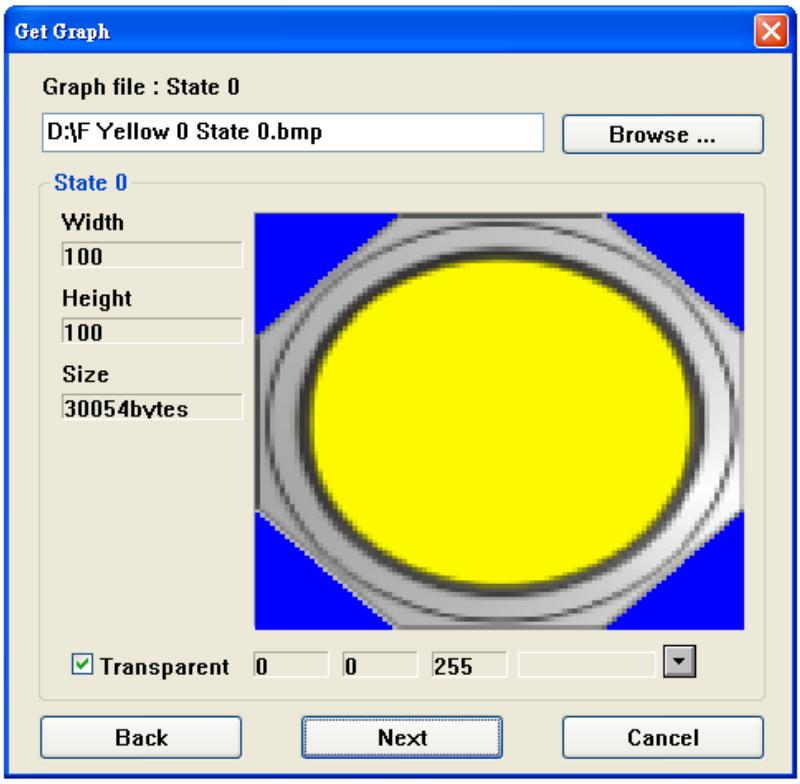


Click the [Import Picture…] button and a dialogue appears as below. Set [Total states] to 2, meaning the picture includes 2 states, and then click [Next].



Step 3

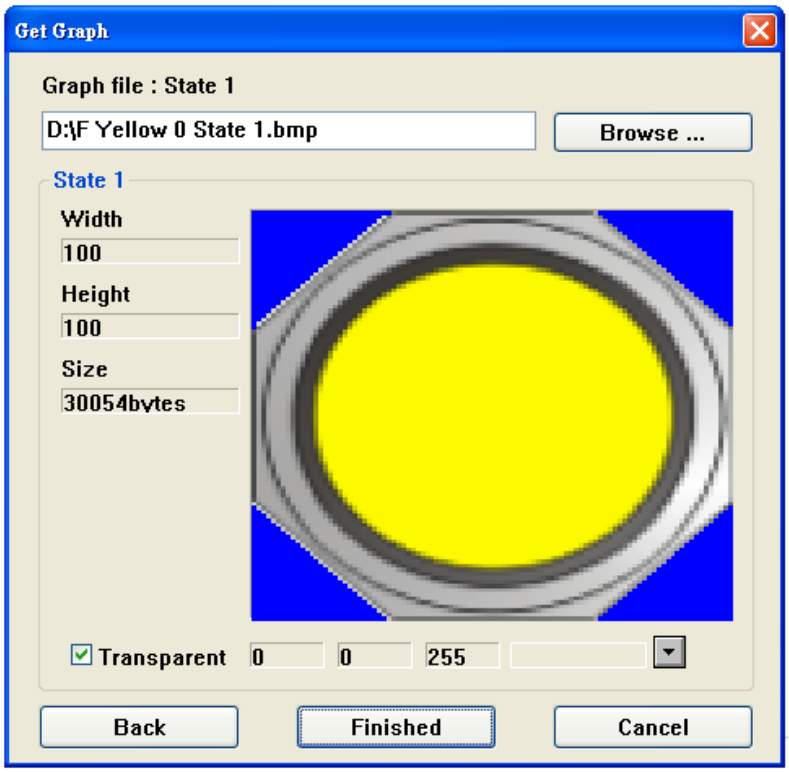
When the dialogue shown in the following picture appears, select the source of a picture, state 0, and select the correct transparent color. In the example below, the blue color RGB (0, 0, 255) is a transparent color. After the setting of the state 0 is completed, click the [next] button to continue the setting of the other state.



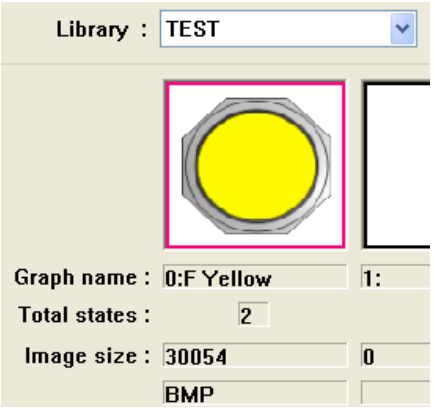
Before choosing transparent color, check [Transparent] box first and then left click on location-to-be of the graph. At this time, EB8000 will automatically display RGB value of the transparent color. Take above as an example, the actual shape shows as below:

Step 4

Likewise, select the source of a picture, state 1 and select the correct transparent color for it. After the completion of the settings, click the [Finished] button.



Below shows the complete picture is created. A new picture “F Yellow” can be found in the Picture Library Manager dialogue box. From the information we know the picture is in the format of bitmap and with two states.

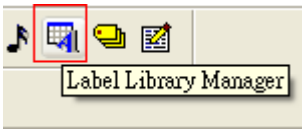


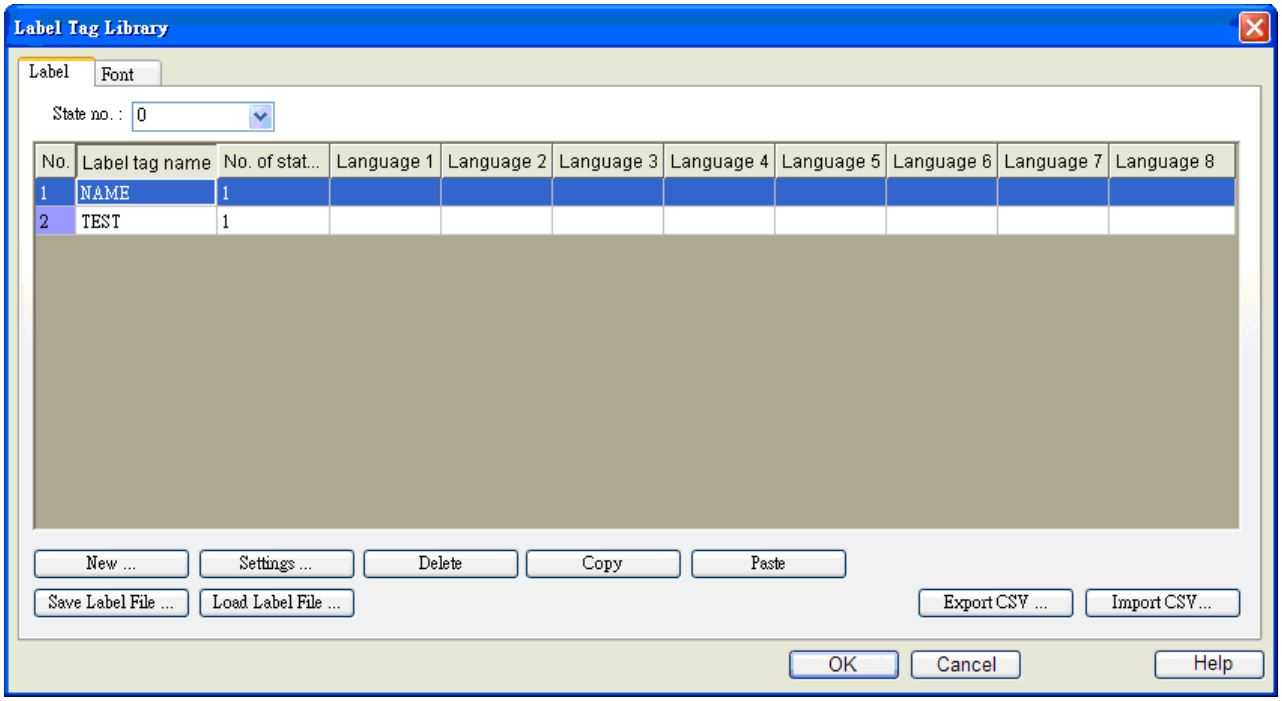
Chapter 15 Label Library and Using Multi-Language

Label Library is used in the Multi-Language environment. Users can design the content of Label Library according to the real demands. Select the suitable label from Label Library when text is needed.

15.1 Introduction

The system in operation will display the corresponding text to the language in use according to the settings. The EB8000 supports 8 different languages simultaneously. Click the "Label Library Manager" button on the toolbar and the dialogue appears as below:





[State no.]

Indicate the current state; each Label has a maximum of 256 states.

[New …]
Create a new Label.

[Settings …]
Modify the content of Label.

[Delete]
Delete the selected Label.

[Copy]
Copy the content of the label.

[Paste]
Paste the content of the label.

[Save Label File]
Save the label file.

[Load Label File]
Download the label file.

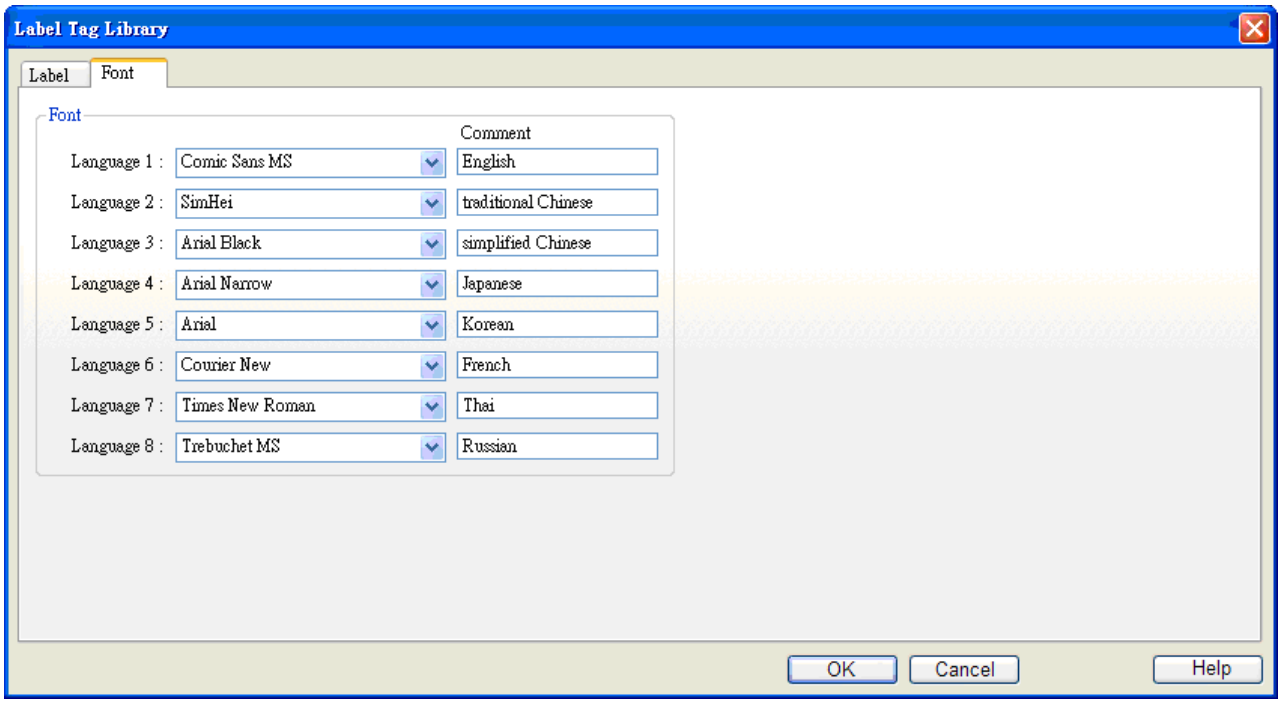
[Export CSV]
Export the whole content of the specified Label Library with CSV format to the appointed storage space.
This function doesn't support Unicode.

[Import CSV]
Import the existing Label Library with CSV format to the current project (MTP).
This function doesn't support Unicode.

The two Labels "Demo" and "Test" can be seen in the "Label Library" dialogue where "Demo" includes 8 languages: English, traditional Chinese, simplified Chinese, Japanese, Korean, French, Thai, and Russian.

15.2 Settings of Label Library's Font

Different fonts can be selected for different languages.

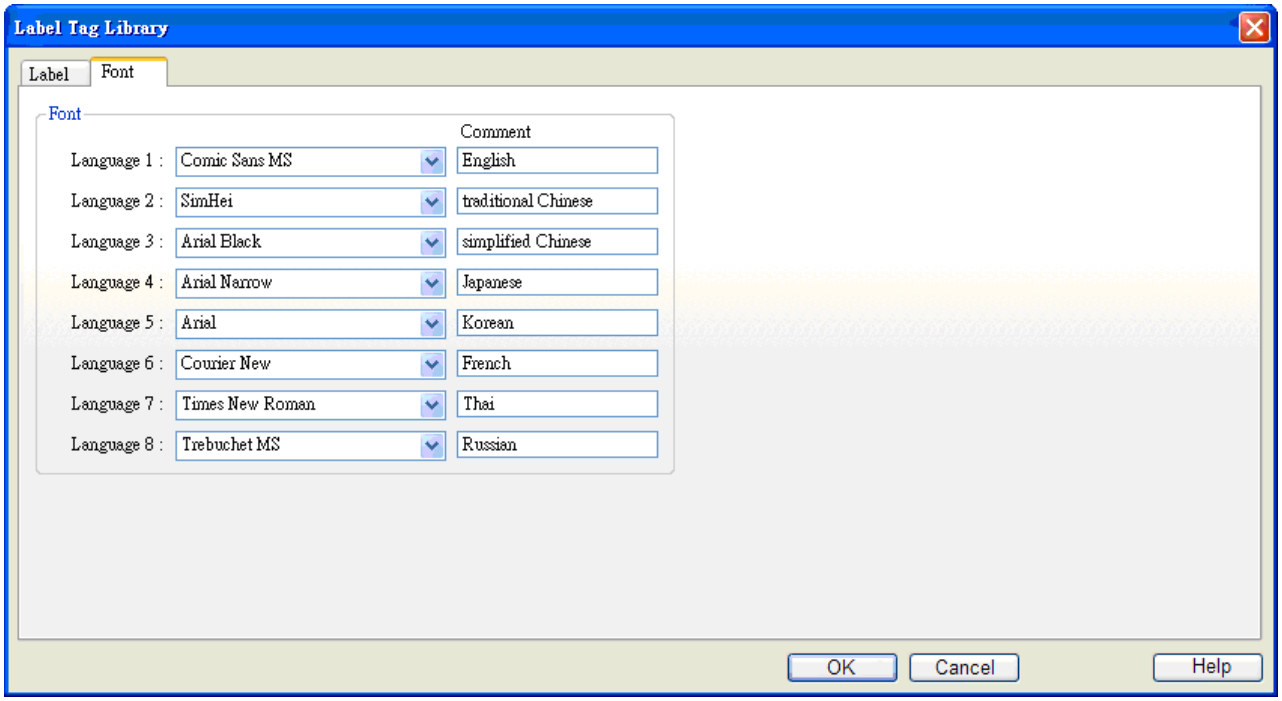


[Font]

Under the Multi-Language configuration, users select fonts for different languages.

[Comment]

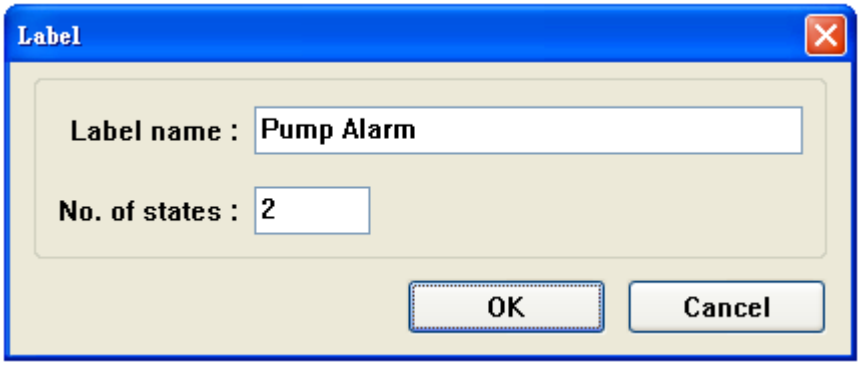
The comment for each font.



15.3 How to Create a Label Library

The following illustrations show how to create a Label Library.

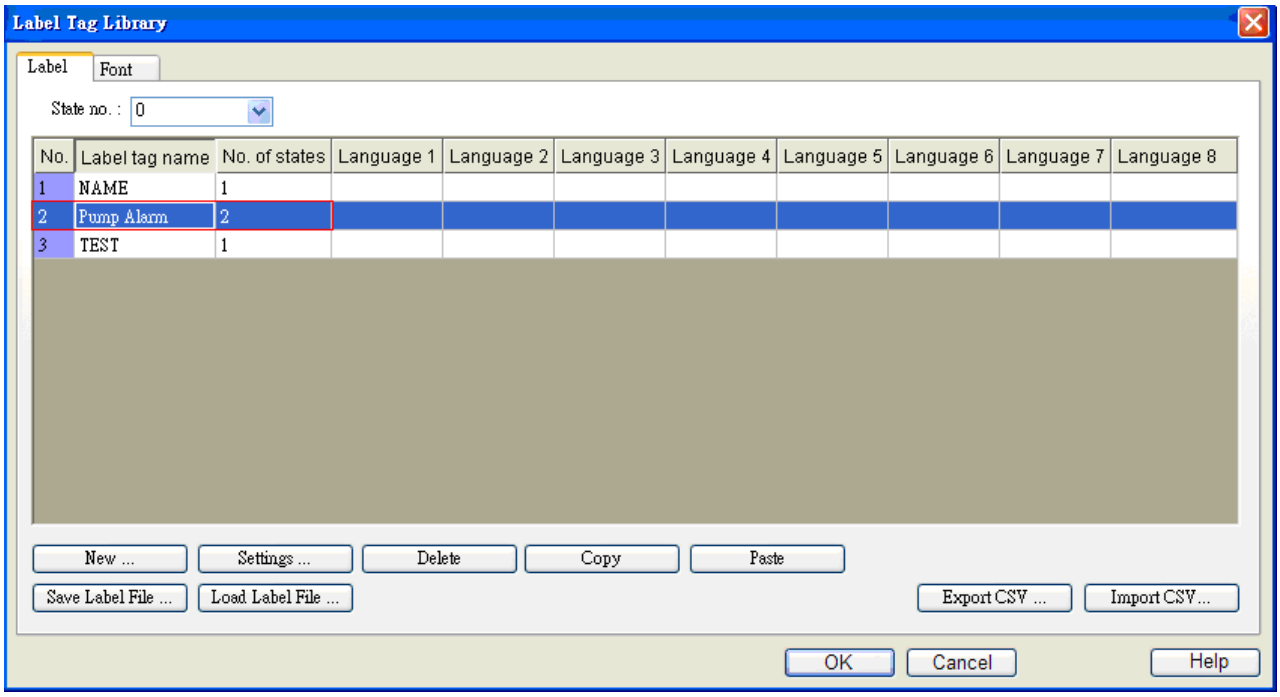
First of all, open the “Label Library” dialogue and click [NEW…]. Correctly set the dialogue as shown below and then click OK.



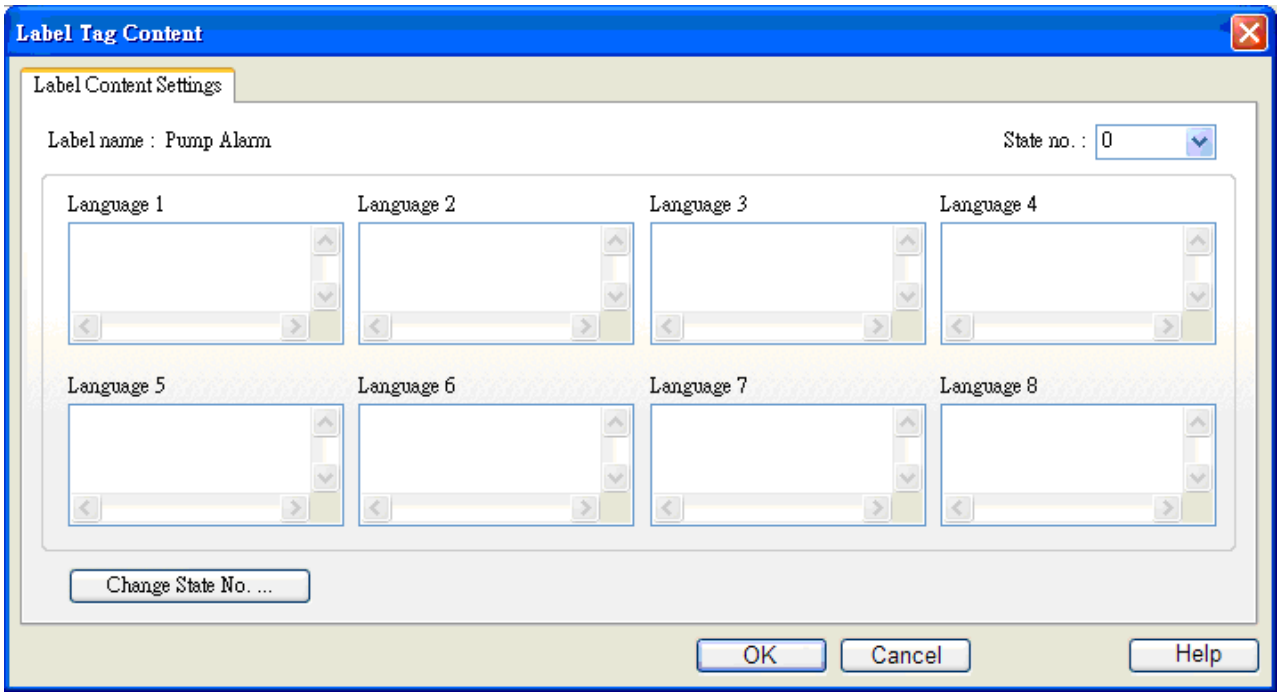
[Label name]
The name of the label. Here it’s named as “Pump Alarm”.

[No. of states]
The number of states possessed by the Label.

When the process is complete, a new Label “Pump Alarm” with 2 states will be added to the Label Library. See the picture below.

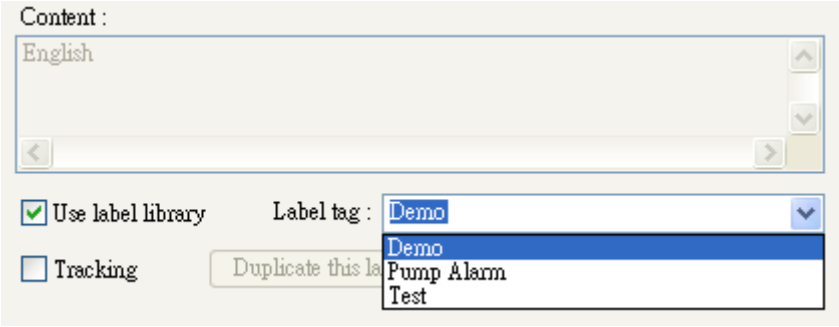


Last, select “Pump Alarm”, click [Settings …] and the Label Tag Content dialog appears for users to set up the corresponding language content.

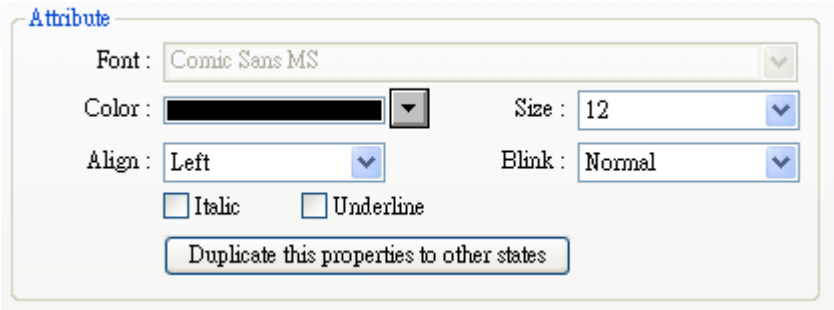


15.4 Using Label Library

When there are already some defined labels in Label Library, users can find out those Labels in [Label tag] by selecting [Use label library] in the object's [Label] tab.



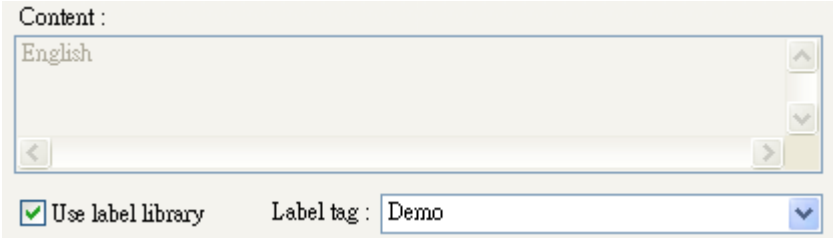
When the Label is selected, [Content] dialog shows the content of selected label, and the settings of the font are also included in the Label Library.



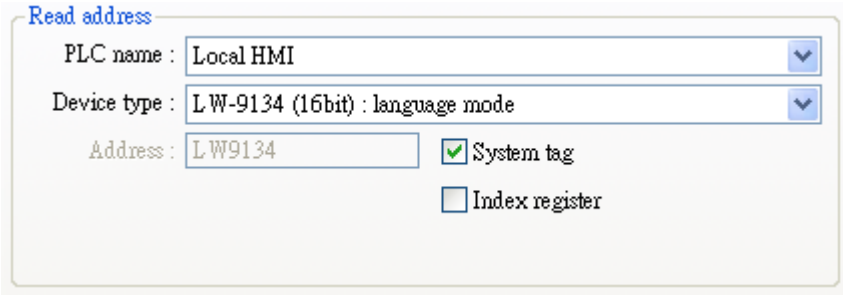
15.5 Use of Multi-Language

When users would like to have the object's text with the multi-language support, except for using the Label Library, it needs to use with the system reserved register [LW9134]. The value range of the [LW9134] can be set from 0 to 7.Different value of [LW9134] corresponds to different Languages. The example below demonstrates how to use the multi-language feature.

First of all, create a Text Object and set the content of it as below:



Next, create a Numeric Input Object. Set it's Read address as below: you will see the Read address in use is the system reserved register [LW9134].



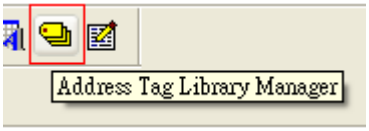
The following illustrations are the results of simulation.

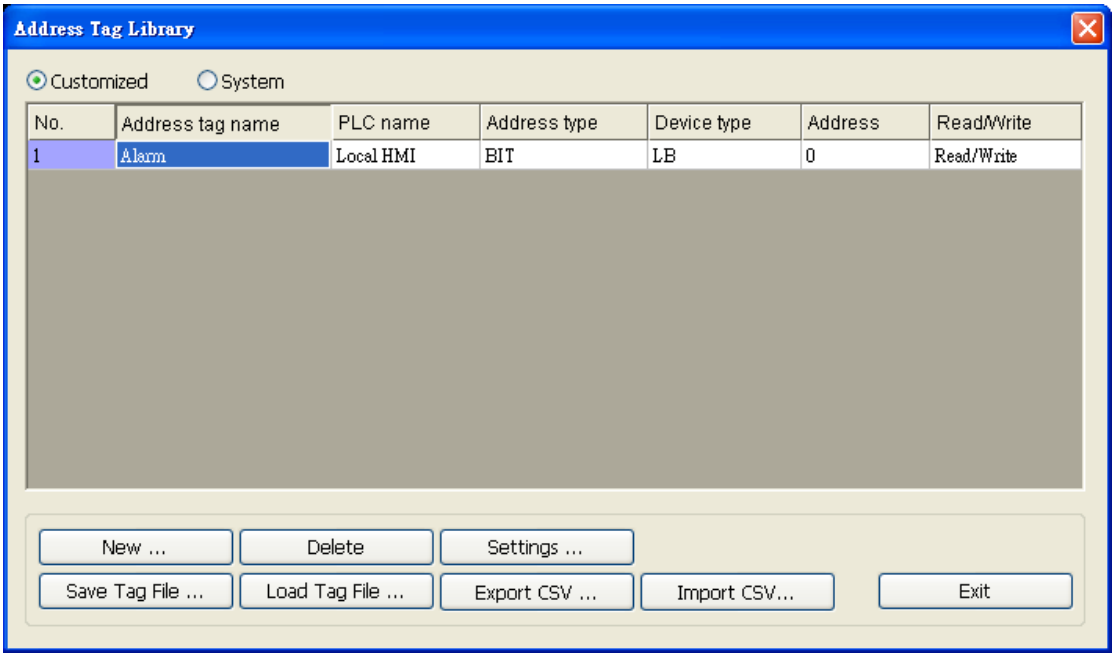
When the value of [LW9134] is changed, the content of the Text Object will also be changed automatically.

Chapter 16 Address Tag Library

16.1 Creating Address Tag Library

At the beginning of designing a project, generally speaking, users are recommended to define commonly-used addresses in the Address Tag Library. It is not only to avoid repeating the address input for an address but also to more clearly convey the function of an address. Click the "Tag" button on the toolbar to call up the "Address Tag Library" dialogue box. See the pictures below.





[Customized]
Display the Address Tags defined by users.

[System]
Display the Address Tags reserved by the system.

[New …]
Add a new Address Tag.

[Delete]
Delete a selected Address Tag.

[Settings …]
Modify the selected Tag.

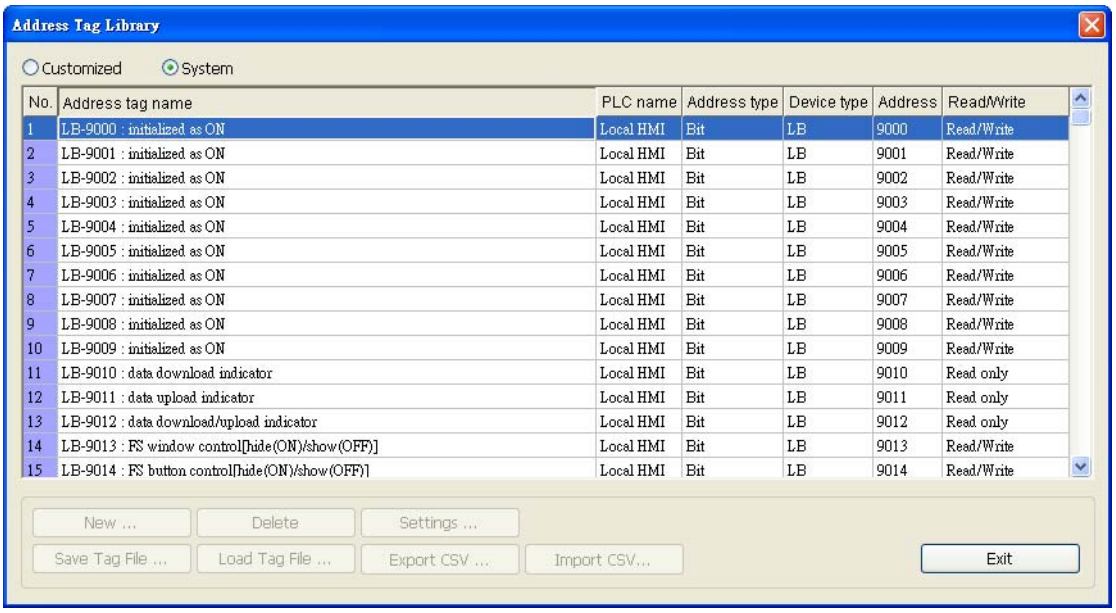
[Export CSV…]
Export the current Address Tag Library to the appointed space in the form of CSV.

[Import CSV…]
Import the Address Tag Library to the current project in the form of CSV.

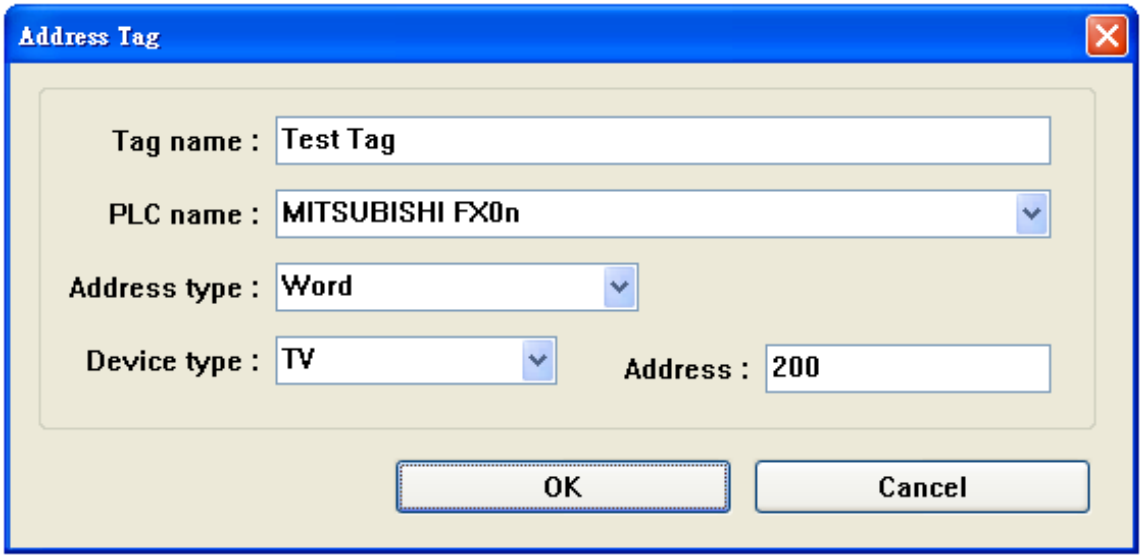
The picture above shows the contents of two existing customized Address Tags in the library. And the following explains the meanings of terms.

1	Temperature	MITSUBISHI FX0n	WORD	TV	100	Read/Write
No.	Tag name	PLC Name	Device Mode	Device Type	Address	Read/Write

The picture below indicates another kind of Address Tag which is the system reserved register.



Before using the Address Tag Library, users need to add the content of the library at first. Click the [New…] button, and the "Address Tag" dialogue appears as below:



[Tag name]
The name of the Address Tag.

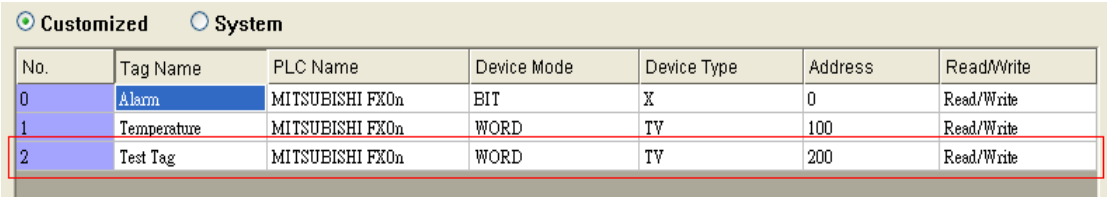
[PLC name]
The name of the PLC which is selected from the device list.

[Address type]
The type of the Address; there are “bit type” and “word type” available.

[Device type]
The type of the device t; the types available are related to [PLC name] and [Address type].

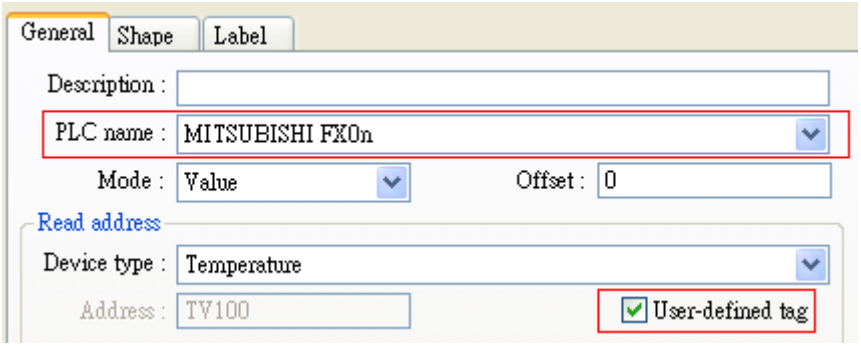
[Address]
The content of the address.

Click the OK when the settings are done, and a new tag will be found in the customized library. See the picture below.



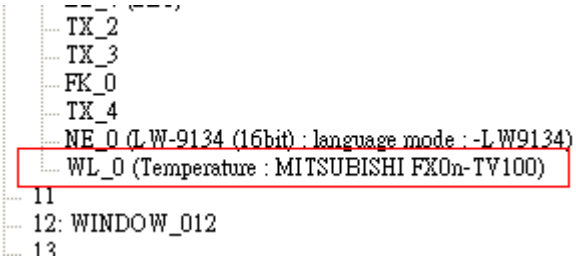
16.2 Using Address Tag Library

After creating the Address Tag Library and setting up the connection PLC devices which are related to the customized Tag in the [General] tab of the "Object Attributes," the [User-defined tag] check box can be found as below.



There are some items in the [Device type] tab for selecting.

When the settings are completed, the object information window will show the name of the Address Tag used for the object. See the picture below.



Chapter 17 Transferring Recipe Data

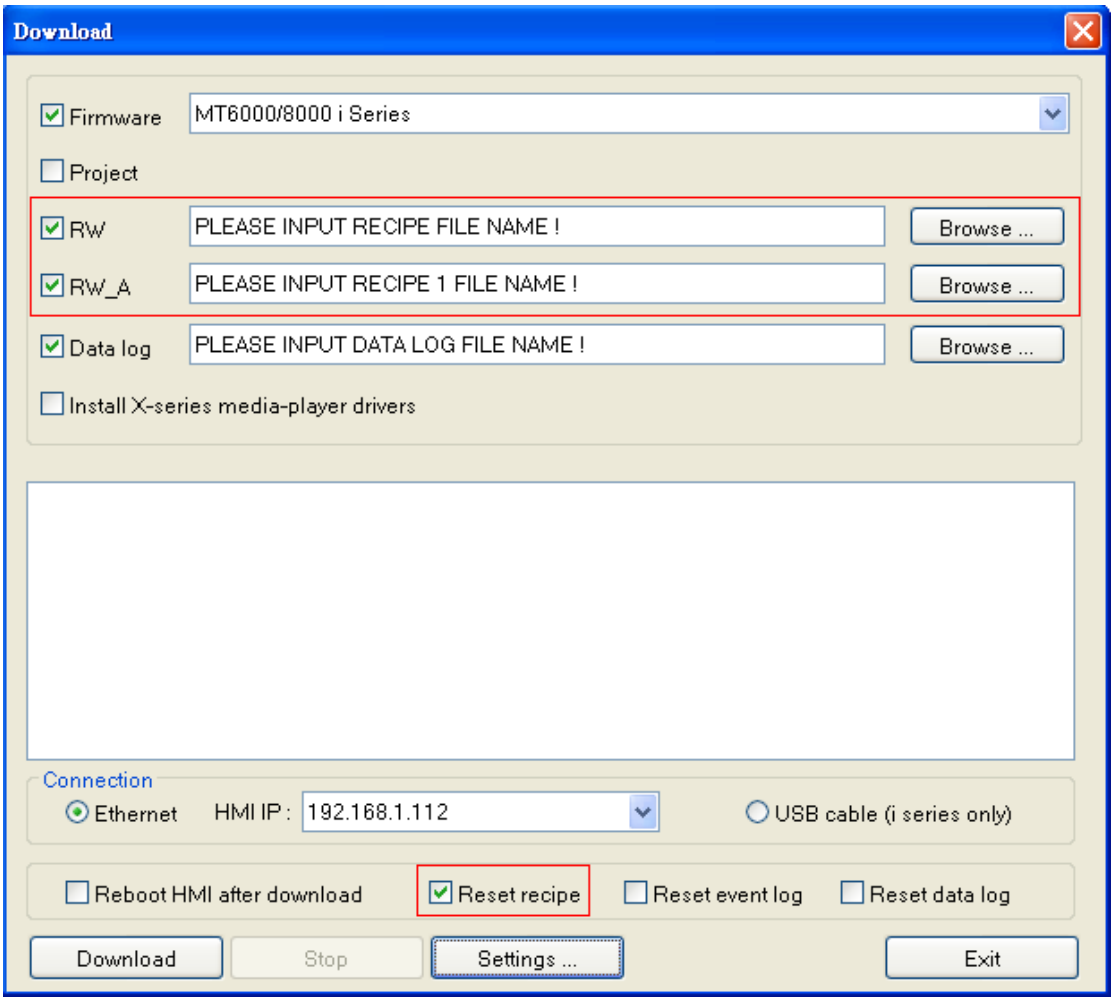
Recipe Data are stored in flash memory. When system startup up, both the RW and RW_A memory will be restored from the recipe data in flash memory, the way of reading and writing Recipe Data is the same as operating the normal Word Register.

The size of Recipe Data in both RW and RW1 are 64k words. User can update Recipe Data by using CF Card, USB cable or Ethernet. It is possible to upload Recipe Data to the designated address of PC; furthermore, it can save the PLC's data in recipe memory. The following explain all of the ways of operating recipe data.

17.1 Updating Recipe Data by Using Ethernet or USB cable

Click [Download] on Project Manager. Select [RW] and [RW_A] and designate the directory of the source files. After the download operation complete, start up the HMI again, and the contents of RW and RW_A will be updated.

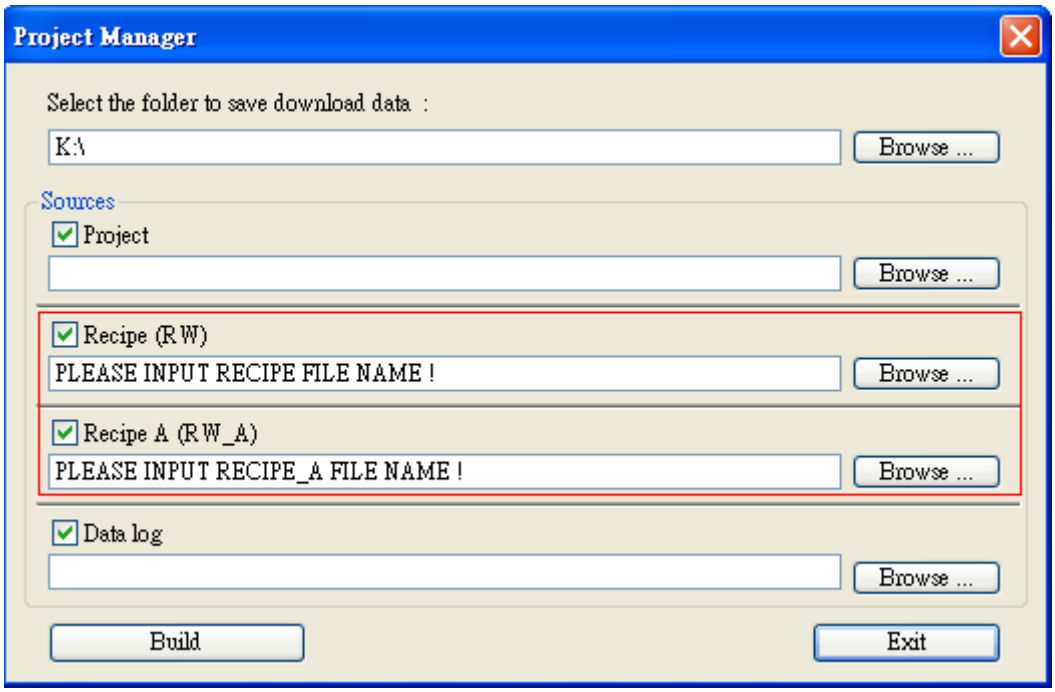
When [Reset recipe] is selected, before start download processing, the EB8000 will set all the data of [RW] and [RW_A] to 0 first.



17.2 Updating Recipe Data by Using CF Card or USB Stick

Click [Building Download Data for CF/USB Disk] on Project Manager.

The function is for building the download data and the settings shows as below.



[Select the folder to save download data]
Insert CF card or USB stick to PC and click **[Browse…]** to assign the file path (or directory name) and then click **[Build]** to set all contexts of the downloaded data.

Note: Save location should be the name of directory and avoid designating only root directory. For example, both "c:\" and "f:\\" are illegal names.

17.3 Transferring Recipe Data

Using the [Data Transfer (Trigger-based) object] to transfer Recipe Data to the appointed address, or saving the data of the designated address in [RW] and [RW_A] as well. Please refer to the [Data Transfer (Trigger-based) object] section for related information.

17.4 Saving Recipe Data Automatically

In order to prolong the life of HMI's flash memory, the EB8000 will save Recipe Data automatically **every minute** to avoid losing the data when the HMI shuts down. The EB8000 provides user with [LB9029: save all recipe data to machine (set ON)] system register bit function

to save Recipe Data manually. The EB8000 will save Recipe Data when user set ON to [LB9029]. But when user set ON to [LB9028: reset all recipe data (set ON)], the EB8000 will clear all Recipe Date as 0.

Chapter 18 Macro Reference

Macros provide the additional functionality your application may need. Macros are automated sequences of commands that are executed at run-time. Macros allow you to perform tasks such as complex scaling operations, string handling, and user interactions with your projects. This chapter describes syntax, usage, and programming methods of macro commands.

18.1 Macro Construction

A Macro is made up of statements. The statements contain constants, variables and operations. The statements are put in a specific order to create the desired output.

A Macro is constructed in the following fashion:

```
Global Variable Declaration          ----------------------------------Optional

Sub Function Block Declarations      ----------------------------------Optional
    Local Variable Declarations
End Sub

macro_command main()                 -----------------------------------Required
    Local Variable Declarations
    [Statements]
end macro_command                    -----------------------------------Required
```

Macro must have one and only one main function which is the execution start point of macro. The format is:

macro_command Function_Name()

end macro_command

Variable declarations must at the beginning of a statement within a function. Other statements before variable declarations will cause compiler error.

Local variables are used within the main macro function or in a defined function block. Its value remains valid only within the specific block.

Global variables are declared before any function blocks and is valid for all functions in the macro. When local variables and global variables have the same name declaration name, only the local variables are valid.

Below is a simple Macro which includes a variable declaration and a function call.

```
macro_command main()
    short pressure = 10                                  //  local variable declaration
    SetData(pressure, "Allen-Bradley DF1", N7, 0, 1)     //  function calling
end macro_command
```

18.2 Syntax

18.2.1 Constants and Variables

18.2.1.1Constants

Constants are fixed values and can be entered directly into statements as:

Constant Type	Note	Example
Decimal integer		345, -234, 0, 23456
Hexadecimal	Must begin with 0x	0x3b, 0xffff, 0x237
ASCII	String must be enclosed in single quotes	‘a’, ‘data’, ‘name’
Boolen		true, false

Example statement using a constant:

```
macro_command main()
short A, B      //  A and B are variables
A = 1234
B = 0x12        //  1234 and 0x12 are constants
end macro_command
```

18.2.1.2 Variables

Variables are names that represent information. The information can change as the variable is modified by statements.

Naming Rules for Variables

1. A variable must start with an alphabet.
2. Variable names longer than 32 characters are not allowed.
3. Reserved words cannot be used as Variable names.

There are 5 different Variable types:

Variable Type	Description	Range
bool	1 bit (discrete)	0, 1
Char	8 bits (byte)	±127
short	16 bits (word)	±32767
Int	32 bits (double word)	±2147418112
float	32 bits (double word)	

Declaring Variables

Variables must be declared before being used. All variable declarations must be made before any other statements in the macro. To declare a variable, specify the type then the variable name.

Example:

```
int     a
short   b, switch
float   pressure
```

Declaring Arrays

Macros support one-dimensional arrays (zero-based index). To declare an array of variables, specify the type, the variable name then the number variables in the array enclosed in brackets "[]". Arrays are 1 to 4096 variables in length. (Macros only support up to 4096 variables per macro).

Example:

```
int     a[10]
short   b[20], switch[30]
float   pressure[15]
```

Minimum of array index is 0 and maximum of array index is (array size – 1).

Example:

```
char data 100]        //    array size is 100
```

where: minimum of array index is 0 and maximum of array index is 99 (100 – 1)

Variable and Array Initialization

There are two ways variables can be initialized:

1. By statement using the assignment operator (=)

Example:

```
int a
float b[3]
a = 10
b[0] = 1
```

2. During declaration

```
char a = '5', b = 9
```

The declaration of arrays is a special case. An entire array can be initialized during declaration by enclosing comma separated values inside curly brackets "{}".

Example:

```
float data[4] = {11, 22, 33, 44}    //now data[0] is 11, data[1] is 22….
```

18.2.2 Operators

Operations are used to designate how data is to be manipulated. In each statement, the operator on the left is set to the conditions on the right.

Operator	Description	Example
=	Assignment operator	pressure = 10

Arithmetic Operators	Description	Example

+	Addition	A = B + C
-	Subtraction	A = B – C
*	Multiplication	A = B * C
/	Division	A = B / C
%	Modulo division (return remainder)	A = B % 5

Comparison Operators	Description	Example
<	Less than	if A < 10 then B = 5
>=	Less than or equal	if A >= 10 then B = 5
>	Greater than	if A < 10 then B = 5
>=	Greater than or equal	if A <= 10 then B = 5
==	Equal	if A == 10 then B = 5
<>	Not equal	if A <> 10 then B = 5

Logic Operators	Description	Example
And	Condition AND	if A < 10 and B > 5 then C = 10
Or	Condition OR	if A >= 10 or B > 5 then C = 10
Xor	Condition Exclusive OR	if A xor 256 then B = 5
Not	Condition NOT	if not A then B = 5

Shift and bitwise operators are used to manipulate bits within char, short, and int variable types. The priority of these operators is from left to right within the statement.

Shift Operators	Description	Example
<<	Shift left specified number of bits	A = B << 8
>>	Shift right specified number of bits	A = B >> 8

Bitwise Operators	Description	Example
&	ANDs two values together	A = B & 0xf
|	ORs two values together	A = B | C
^	XORs two values together	A = B ^ C
~	Compliments a value	A = ~B

Priority of All Operators

The overall priority of all operations from highest to lowest is as follows:

Operations within parenthesis are carried out first
Arithmetic operations
Shift and Bitwise operations
Comparison operations
Logic operations
Assignment

Reserved Keywords

The following keywords are reserved for Macro use. They cannot be used for variable, array, or function names.

+, -, *, /, %, >=, >, <=, <, <>, ==, and, or, xor, not, <<, >>,=, &, |, ^, ~
exit, macro_command, for, to, down, step, next, return, bool, short, int, char, float, void, if, then, else, break, continue, set, sub, end, while, wend, true, false
SQRT, CUBERT, LOG, LOG10, SIN, COS, TAN, COT, SEC, CSC, ASIN, ACOS, ATAN, BIN2BCD, BCD2BIN, DEC2ASCII, FLOAT2ASCII, HEX2ASCII, ASCII2DEC, ASCII2FLOAT, ASCII2HEX, FILL, RAND, DELAY, SWAPB, SWAPW, LOBYTE, HIBYTE, LOWORD, HIWORD, GETBIT, SETBITON, SETBITOFF, INVBIT, ADDSUM, XORSUM, CRC, INPORT, OUTPORT, POW, GetError, GetData, GetDataEx, SetData, SetDataEx

18.3 Statement

18.3.1 Definition Statement

This covers the declaration of variables and arrays. The formal construction is as follows:

```
type      name          where define the type of name

Example:
    int A          //define a variable A as an integer


type name[constant]     where define the type of array name
```

Example:

int B[10] where define a variable B as a one-dimensional array of size 10

18.3.2 Assignment Statement

Assignment statements use the assignment operator to move data from the expression on the right side pf the operator to the variable on the left side. An expression is the combination of variables, constants and operators to yield a value.

Variable = Expression

Example

A = 2 where a variable A is assigned to 2

18.3.3 Logical Statements

Logical statements perform actions depending on the condition of a Boolean expression.
The syntax is as follows:

Single-Line Format

```
if <Condition> then
    [Statements]
else
    [Statements]
end if
```

Example:

```
if a == 2 then
    b = 1
else
    b = 2
end if
```

Block Format

```
If <Condition> then
    [Statements]
else if <Condition – n> then
    [Statements]
else
    [Statements]
end if
```

Example:

```
if a == 2 then
    b = 1
else if a == 3
    b = 2
else
    b = 3
end if
```

Syntax description:

if	Must be used to begin the statement
<Condition>	Required. This is the controlling statement. It is FALSE when the <Condition> evaluates to 0 and TRUE when it evaluates to non- zero.
then	Must precede the statements to execute if the <Condition> evaluates to TRUE.
[Statements]	It is optional in block format but necessary in single-line format without else. The statement will be executed when the <Condition> is TRUE.
else if	Optional. The else if statement will be executed when the relative <Condition-n> is TRUE.
<Condition-n>	Optional. see <Condition>
else	Optional. The else statement will be executed when <Condition> and <Condition-n> are both FALSE.
end if	Must be used to end an if-then statement.

18.3.4 Reiterative Statements

Reiterative statements control loops and repetitive tasks depending on coditiosn. There are tw types of reiterative statements.

18.3.4.1 for-next Statements

The for-next construction is for stepping through a fixed number of iterations. A variable is used as a counter to track progress and test for ending conditions. Use this for fixed execution counts. The syntax is as follows:

```
for [Counter] = <StartValue> to <EndValue> [step <StepValue>]
    [Statements]
next [Counter]
```

or

```
for [Counter] = <StartValue> down <EndValue> [step <StepValue>]
    [Statements]
next [Counter]
```

Example:

```
for a = 0 to 10 step 2
    b = a
next a
```

Syntax description:

for	Must be used to begin the statement
[Counter]	Required. This is the controlling statement. The result of evaluating the variable is used as a test of comparison.
<StartValue>	Required. The initial value of [Counter]
to/down	Required. This determines if the <step> increments or decrements the <Counter>. “to” increments <Counter> by <StepValue>. “down” decrements <Counter> by <StepValue>.
<EndValue>	Required. The test point. If the <Counter> is greater than this value, the macro

	exists the loop.
step	Optional. Specifies that a <StepValue> other than one is to be used.
[StepValue]	Optional. The increment/decrement step of <Counter>. It can be omitted when the value is 1 If [step <StepValue>] are omitted the step value defaults to 1.
[Statements]	Statements to execute when the evaluation is TRUE. “for-next” loops may be nested.
next	Required.
[Counter]	Optional. This is used when nesting for-next loops.

18.3.4.2 while-wend Statements

The while-wend construction is for stepping through an unknown number of iterations. A variable is used to test for ending conditions. When the condition is TRUE, the statements are executed repetitively until the condition becomes FALSE. The syntax is as follows.

```
while <Condition>
    [Statements]
wend
```

Example:

```
while a < 10
    a = a + 10
wend
```

Syntax description:

while	Must be used to begin the statement
continue	Required. This is the controlling statement. When it is TRUE, the loop begins execution. When it is FALSE, the loop terminates.
return [value]	Statements to execute when the evaluation is TRUE.
wend	Indicates the end of the while-end statements

18.3.4.3 Other Control Commands

break	Used in for-next and while-wend. It skips immediately to the end of the

	statement.
continue	Used in for-next and while-wend. It ends the current iteration of a loop and starts the next one.

18.4 Function Blocks

Function blocks are useful for reducing repetitive codes, must be defined before use and can use any variable and statement type. A function block is called by putting its name followed by parameters, in parenthesis, in the Main Macro Function. After the function block is executed, it returns the value to the Main Function where it is used as an assignment or condition. The syntax is as follows:

```
sub type <name> [(parameters)]
    Local variable declarations
    [Statements]
    [return [value]]
end sub
```

Example:

```
sub int Add(int x, int y)
    int result
    result = x +y
    return result
  end sub

macro_command main()
    int    a = 10, b = 20, sum
    sum = Add(a, b)
end macro_command
```

Syntax description:

sub	Must be used to begin the function block
type	Required. This is the data type of value that the function returns.
(parameters)	Optional. The parameters hold values that are passed to the function by the Main Macro. The passed parameters must have their type declared in the parameter field and assigned a variable name. For example: sub int MyFunction(int x, int y). x and y would be integers

	passed to the function by the Main Macro. This function is called by a statement that looks similar to this: ret = MyFunction(456, pressure) Notice that the calling statement can pass hard coded values or variables to the function. After this function is executed, an integer values is return to 'ret'.
Local variable declaration	Variables that are used in the function block must be declared first. This is in addition to passed parameters. In the above example x and y are variables that the function can used. Global variables are also available for use in function block.
[Statements]	Statements to execute
[return [value]]	Used to return a value to the calling statement. The value can be a constant or a variable. Return also ends function block execution.
end sub	Must be used to end a function block.

18.5 Build-In Function Block

EasyBuilder8000 has some build-in functions for retrieving and transferring data to the PLC, data management and mathematical functions.

18.5.1 Mathematical Functions

Name	SQRT
Syntax	SQRT(source, result)
Description	Calculate the square root of source into result. source can be a constant or a variable, but result must be a variable. source must be a nonnegative value.
Example	macro_command main() float source, result SQRT(15, result) source = 9.0 SQRT(source, result)// result is 3.0

	end macro_command

Name	SIN
Syntax	SIN(source, result)
Description	Calculate the sine of source into result. source can be a constant or a variable, but result must be a variable.

Example	macro_command main()
	float source, result
	
	SIN(90, result)// result is 1
	
	source = 30
	SIN(source, result)// result is 0.5
	
	end macro_command

Name	COS
Syntax	COS(source, result)
Description	Calculate the cosine of source into result. source can be a constant or a variable, but result must be a variable.

Example	macro_command main()
	float source, result
	
	COS(90, result)// result is 0
	
	source = 60
	GetData(source, "Local HMI", LW, 0, 1)
	COS(source, result)// result is 0.5
	
	end macro_command

Name	TAN
Syntax	TAN(source, result)
Description	Calculate the tangent of source into result. source can be a constant or a variable, but result must be a variable.

Example	macro_command main()
	float source, result
	
	TAN(45, result)// result is 1
	
	source = 60
	TAN(source, result)// result is 1.732
	
	end macro_command

Name	COT
Syntax	COT(source, result)
Description	Calculate the cotangent of source into result. source can be a constant or a variable, but result must be a variable.

Example	macro_command main()
	float source, result
	
	COT(45, result)// result is 1
	
	source = 60
	COT(source, result)// result is 0.5774
	
	end macro_command

Name	SEC
Syntax	SEC(source, result)
Description	Calculate the secant of source into result. source can be a constant or a variable, but result must be a variable.

Example	macro_command main()
	float source, result
	
	SEC(45, result)// result is 1.414
	
	source = 60
	SEC(source, result)// if source is 60, result is 2

	end macro_command

Name	CSC
Syntax	CSC(source, result)
Description	Calculate the cosecant of source into result. source can be a constant or a variable, but result must be a variable.

Example	macro_command main()
	float source, result
	
	CSC(45, result)// result is 1.414
	
	source = 30
	CSC(source, result)// result is 2
	
	end macro_command

Name	ASIN
Syntax	ASIN(source, result)
Description	Calculate the hyperbolic sine of source into result. source can be a constant or a variable, but result must be a variable.

Example	macro_command main()
	float source, result
	
	ASIN(0.8660, result)// result is 60
	
	source = 0.5
	ASIN(source, result)// result is 30
	
	end macro_command

Name	ACOS
Syntax	ACOS(source, result)
Description	Calculate the hyperbolic cosine of source into result. source can be a constant or a variable, but result must be a variable.
Example	macro_command main()

	float source, result
	
	ACOS(0.8660, result)// result is 30
	
	source = 0.5
	ACOS(source, result)// result is 60
	
	end macro_command

Name	ATAN
Syntax	ATAN(source, result)
Description	Calculate the hyperbolic tangent of source into result. source can be a constant or a variable, but result must be a variable.

Example	macro_command main()
	float source, result
	
	ATAN(1, result)// result is 45
	
	source = 1.732
	ATAN(source, result)// result is 60
	
	end macro_command

Name	RAND
Syntax	RAND(result)
Description	Calculates a random integer saved into result. result must be a variable.
Example	macro_command main() short result RAND (result)// result is not a fixed value when executes macro every time end macro_command

18.5.2 Data Transformation

Name	BIN2BCD
Syntax	BIN2BCD(source, result)
Description	Transforms a binary-type value (source) into a BCD-type value (result). source can be a constant or a variable, but result must be a variable.

Example	macro_command main()
	
	short source, result
	
	BIN2BCD(1234, result)// result is 0x1234
	
	source = 5678
	BIN2BCD(source, result)// result is 0x5678
	
	end macro_command

Name	BCD2BIN
Syntax	BIN2BCD(source, result)
Description	Transforms a BCD-type value (source) into a binary-type value (result). source can be a constant or a variable, but result must be a variable.

Example	macro_command main()
	
	short source, result
	
	BCD2BIN(0x1234, result)// result is 1234
	
	source = 0x5678
	BCD2BIN(source, result)// result is 5678
	
	end macro_command

Name	DEC2ASCII
Syntax	DEC2ASCII(source, result[start], len)
Description	Transforms a decimal value (source) into ASCII string saved to an array (result). len represents the length of the string and the unit of length depends on result's

	type., i.e. if result's type is "char" (the size is byte), the length of the string is (byte * len). If result's type is "short" (the size is word), the length of the string is (word * len), and so on. The first character is put into result[start], the second character is put into result[start + 1], and the last character is put into result[start + (len -1)]. source and len can be a constant or a variable, but result must be a variable. start must be a constant.

Example	macro_command main()
	short source
	char result1[4]
	short result2[4]
	
	source = 5678
	DEC2ASCII(source, result1[0], 4)
	// result1[0] is '5', result1[1] is '6', result1[2] is '7', result1[3] is '8'
	// the length of the string (result1) is 4 bytes(= 1 * 4)
	
	DEC2ASCII(source, result2[0], 4)
	// result2[0] is '5', result2[1] is '6', result2[2] is '7', result2[3] is '8'
	// the length of the string (result2) is 8 bytes(= 2 * 4)
	
	end macro_command

Name	HEX2ASCII
Syntax	HEX2ASCII(source, result[start], len)
Description	Transforms a hexadecimal value (source) into ASCII string saved to an array (result). len represents the length of the string and the unit of length depends on result's type., i.e. if result's type is "char" (the size is byte), the length of the string is (byte * len). If result's type is "short" (the size is word), the length of the string is (word * len), and so on. source and len can be a constant or a variable, but result must be a variable. start must be a constant.
Example	macro_command main() short source char result[4]

	source = 0x5678 DEC2ASCII(source, result[0], 4) // result[0] is '5', result[1] is '6', result[2] is '7', result[3] is '8' end macro_command

Name	ASCII2DEC
Syntax	ASCII2DEC(source[start], result, len)
Description	Transforms a string (source) into a decimal value saved to a variable (result). The length of the string is len. The first character of the string is source[start]. source and len can be a constant or a variable, but result must be a variable. start must be a constant.
Example	macro_command main() char source[4] short result source[0] = '5' source[1] = '6' source[2] = '7' source[3] = '8' ASCII2DEC(source[0], result, 4) // result is 5678 end macro_command

Name	ASCII2HEX
Syntax	ASCII2HEX (source[start], result, len)
Description	Transforms a string (source) into a hexadecimal value saved to a variable (result). The length of the string is len. The first character of the string is source[start]. source and len can be a constant or a variable, but result must be a variable. start must be a constant.
Example	macro_command main() char source[4] short result

	source[0] = '5' source[1] = '6' source[2] = '7' source[3] = '8' ASCII2DEC(source[0], result, 4) // result is 0x5678 end macro_command

18.5.3 Data Manupulation

Name	FILL
Syntax	FILL(source[start], preset, count)
Description	Sets the first count elements of an array (source) to a specified value (preset). source and start must be a variable, and preset can be a constant or variable.
Example	macro_command main() char result[4] char preset FILL(result[0], 0x30, 4) // result[0] is 0x30, result[1] is 0x30, , result[2] is 0x30, , result[3] is 0x30 preset = 0x31 FILL(result[0], preset, 2) // result[0] is 0x31, result[1] is 0x31 end macro_command

Name	SWAPB
Syntax	SWAPB(source, result)
Description	Exchanges the high-byte and low-byte data of a 16-bit source into result. source can be a constant or a variable, but result must be a variable.
Example	macro_command main() short source, result SWAPB(0x5678, result)// result is 0x7856

	source = 0x123 SWAPB(source, result)// result is 0x2301 end macro_command

Name	SWAPW
Syntax	SWAPW(source, result)
Description	Exchanges the high-word and low-word data of a 32-bit source into result. source can be a constant or a variable, but result must be a variable.

Example	macro_command main()
	int source, result
	
	SWAPB(0x12345678, result)// result is 0x78561234
	
	source = 0x12345
	SWAPB(source, result)// result is 0x23450001
	
	end macro_command

Name	LOBYTE
Syntax	LOBYTE(source, result)
Description	Retrieves the low byte of a 16-bit source into result. source can be a constant or a variable, but result must be a variable.

Example	macro_command main()
	short source, result
	
	LOBYTE(0x1234, result)// result is 0x34
	
	source = 0x123
	LOBYTE(source, result)// result is 0x23
	
	end macro_command

Name	HIBYTE
Syntax	HIBYTE(source, result)
Description	Retrieves the high byte of a 16-bit source into result.

	source can be a constant or a variable, but result must be a variable.

Example	macro_command main()
	short source, result
	
	HIBYTE(0x1234, result)// result is 0x12
	
	source = 0x123
	HIBYTE(source, result)// result is 0x01
	
	end macro_command

Name	LOWORD
Syntax	LOWORD(source, result)
Description	Retrieves the low word of a 32-bit source into result. source can be a constant or a variable, but result must be a variable.

Example	macro_command main()
	int source, result
	
	LOWORD(0x12345678, result)// result is 0x5678
	
	source = 0x12345
	LOWORD(source, result)// result is 0x2345
	
	end macro_command

Name	HIWORD
Syntax	HIWORD(source, result)
Description	Retrieves the high word of a 32-bit source into result. source can be a constant or a variable, but result must be a variable.

Example	macro_command main()
	int source, result
	
	HIWORD(0x12345678, result)// result is 0x1234
	
	source = 0x12345
	HIWORD(source, result)// result is 0x0001

	end macro_command

18.5.4 Bit Transformation

Name	GETBIT
Syntax	GETBIT(source, result, bit_pos)
Description	Gets the state of designated bit position of a data (source) into result. result's value will be 0 or 1. source and bit_pos can be a constant or a variable, but result must be a variable.

Example	macro_command main()
	int source, result
	short bit_pos
	
	GETBIT(9, result, 3)// result is 1
	
	source = 4
	bit_pos = 2
	GETBIT(source, result, bit_pos)// result is 1
	
	end macro_command

Name	SETBITON
Syntax	SETBITON(source, result, bit_pos)
Description	Changes the state of designated bit position of a data (source) to 1, and pus in changed data into result. source and bit_pos can be a constant or a variable, but result must be a variable.
Example	macro_command main() int source, result short bit_pos SETBITON(1, result, 3)// result is 9 source = 0 bit_pos = 2

	SETBITON (source, result, bit_pos)// result is 4 end macro_command

Name	SETBITOFF
Syntax	SETBITOFF(source, result, bit_pos)
Description	Changes the state of designated bit position of a data (source) to 0, and put in changed data into result. source and bit_pos can be a constant or a variable, but result must be a variable.

Example	macro_command main()
	int source, result
	short bit_pos
	
	SETBITOFF(9, result, 3)// result is 1
	
	source = 4
	bit_pos = 2
	SETBITFF(source, result, bit_pos)// result is 0
	
	end macro_command

Name	INVBIT
Syntax	INVBIT(source, result, bit_pos)
Description	Inverts the state of designated bit position of a data (source), and put in changed data into result. source and bit_pos can be a constant or a variable, but result must be a variable.

Example	macro_command main()
	int source, result
	short bit_pos
	
	INVBIT(4, result, 1)// result = 6
	
	source = 6
	bit_pos = 1
	INVBIT(source, result, bit_pos)// result = 4

	end macro_command

18.5.5 Communication

Name	DELAY
Syntax	DELAY(time)
Description	Suspends the execution of the current macro for at least the specified interval (time). The unit of time is millisecond). time can be a constant or a variable.

Example	macro_command main()
	int time == 500
	
	DELAY(100)// delay 100 ms
	DELAY(time)// delay 500 ms
	
	end macro_command

Name	DELAY
Syntax	DELAY(time)
Description	Suspends the execution of the current macro for at least the specified interval (time). The unit of time is millisecond). time can be a constant or a variable.

Example	macro_command main()
	int time == 500
	
	DELAY(100)// delay 100 ms
	DELAY(time)// delay 500 ms
	
	end macro_command

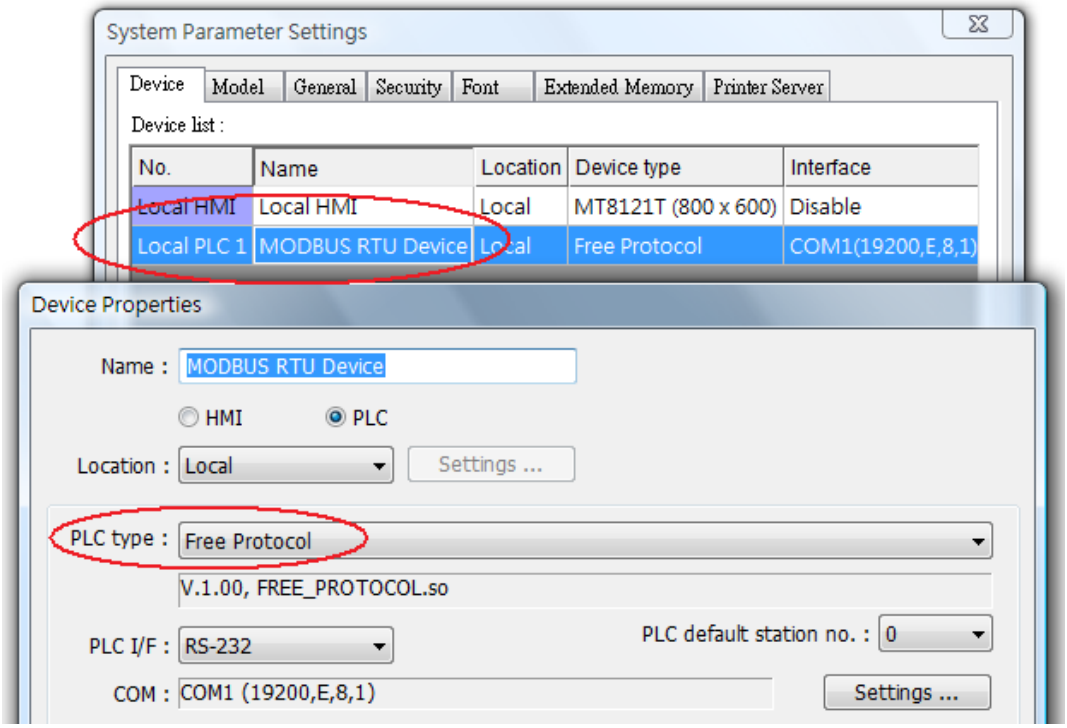
Name	ADDSUM
Syntax	ADDSUM(source[start], result, data_count)
Description	Adds up the elements of an array (source) from source[start] to source[start + data_count - 1] to generate a checksum.

	Puts in the checksum into result. result must be a variable. data_count is the amount of the accumulated elements and can be a constant or a variable.
Example	macro_command main() char data[5] short checksum data[0] = 0x1 data[1] = 0x2 data[2] = 0x3 data[3] = 0x4 data[4] = 0x5 ADDSUM(data[0], checksum, 5)// checksum is 0xf end macro_command

Name	XORSUM
Syntax	XORSUM(source[start], result, data_count)
Description	Uses an exclusion method to calculate the checksum from source[start] to source[start + data_count - 1]. Puts in the checksum into result. result must be a variable. data_count is the amount of the calculated elements of the array and can be a constant or a variable.
Example	macro_command main() char data[5] = {0x1, 0x2, 0x3, 0x4, 0x5} short checksum XORSUM(data[0], checksum, 5)// checksum is 0x1 end macro_command

Name	CRC
Syntax	CRC(source[start], result, data_count)
Description	Calculates 16-bit CRC of the variables from source[start] to source[start + count - 1].

	Puts in the 16-bit CRC into result. result must be a variable. data_count is the amount of the calculated elements of the array and can be a constant or a variable.
Example	macro_command main() char data[5] = {0x1, 0x2, 0x3, 0x4, 0x5} short 16bit_CRC CRC(data[0], 16bit_CRC, 5)// 16bit_CRC is 0xbb2a end macro_command

Name	OUTPORT
Syntax	OUTPORT(source[start], device_name, data_count)
Description	Sends out the specified data from source[start] to source[start + count -1] to PLC via a COM port or the ethernet. device_name is the name of a device defined in the device table and the device must be a "Free Protocol"-type device. data_count is the amount of sent data and can be a constant or a variable.
Example	To use an OUTPORT function, a "Free Protocol" device must be created first as follows: 

	The device is named ”MODBUS RTU Device”. The port attribute depends on the setting of this device. (the current setting is “19200,E, 8, 1”) Below is an example of executing an action of writing single coil (SET ON) to a MODBUS device. macro_command main() char command[32] short address, checksum FILL(command[0], 0, 32)// command initialization command[0] = 0x1// station no command[1] = 0x5// function code : Write Single Coil address = 0 HIBYTE(address, command[2]) LOBYTE(address, command[3]) command[4] = 0xff// force bit on command[5] = 0 CRC(command[0], checksum, 6) LOBYTE(checksum, command[6]) HIBYTE(checksum, command[7]) // send out a “Write Single Coil” command OUTPORT(command[0], **"MODBUS RTU Device"**, 8) end macro_command

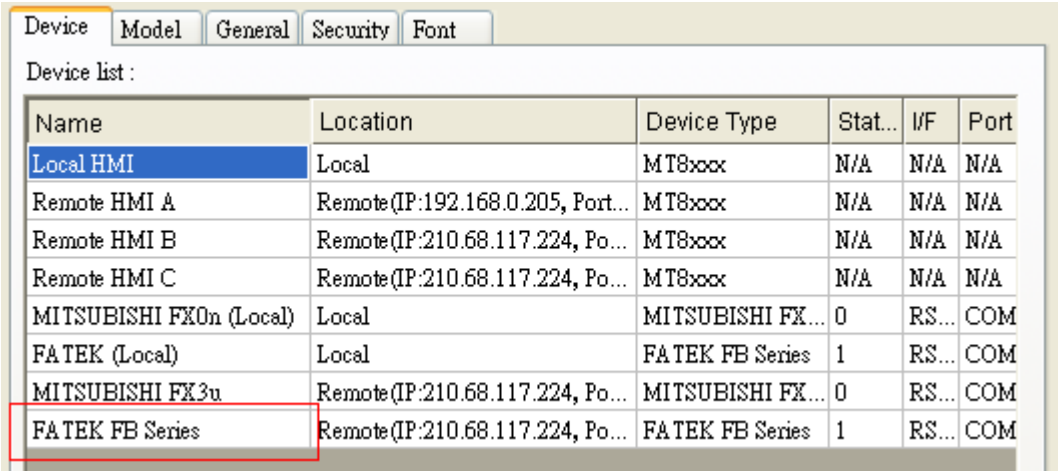
Name	INTPORT
Syntax	INPORT(read_data[start], device_name, read_count, return_value)
Description	Reads data from a COM port or the ethernet. These data is stored to read_data[start]~ read_data[start + read_count - 1].

	device_name is the name of a device defined in the device table and the device must be a “Free Protocol”-type device. read_count is the required amount of reading and can be a constant or a variable. If the function is used successfully to get sufficient data, return_value is 1, otherwise is 0.

Example	Below is an example of executing an action of reading holding registers of a MODBUS device.
	
	// Read Holding Registers
	macro_command main()
	char command[32], response[32]
	short address, checksum
	short read_no, return_value, read_data[2]
	
	FILL(command[0], 0, 32)// command initialization
	FILL(response[0], 0, 32)
	
	command[0] = 0x1// station no
	command[1] = 0x3// function code : Read Holding Registers
	
	address = 0
	HIBYTE(address, command[2])
	LOBYTE(address, command[3])
	
	read_no = 2// read 2 words (4x_1 and 4x_2)
	HIBYTE(read_no, command[4])
	LOBYTE(read_no, command[5])
	
	CRC(command[0], checksum, 6)
	
	LOBYTE(checksum, command[6])
	HIBYTE(checksum, command[7])
	
	// send out a ‘Read Holding Registers” command
	OUTPORT(command[0], "MODBUS RTU Device", 8)
	
	// read responses for a ‘Read Holding Registers” command
	INPORT(response[0], "MODBUS RTU Device", 9, return_value)

	if return_value > 0 then
	read_data[0] = response[4] + (response[3] << 8)// data in 4x_1
	read_data[1] = response[6] + (response[5] << 8)// data in 4x_2
	
	SetData(read_data[0], "Local HMI", LW, 100, 2)
	end if
	
	end macro_command

Name	GetData
Syntax	GetData(read_data[start], device_name, device_type, address_offset, data_count) or GetData(read_data, device_name, device_type, address_offset, 1)
Description	Receives data from the PLC. Data is stored into read_data[start]~ read_data[start + data_count - 1]. data_count is the amount of received data. In general, read_data is an array, but if data_count is 1, read_data can be an array or an ordinary variable. Below are two methods to read one word data. macro_command main() short read_data_1[2], read_data_2 GetData(read_data_1[0], “FATEK KB Series”, RT, 5, 1) GetData(read_data_2, “FATEK KB Series”, RT, 5, 1) end macro_command device_name is the PLC name enclosed in the double quotation marks (“) and this name has been defined in the device list of system parameters as follows (see FATEK KB Series):



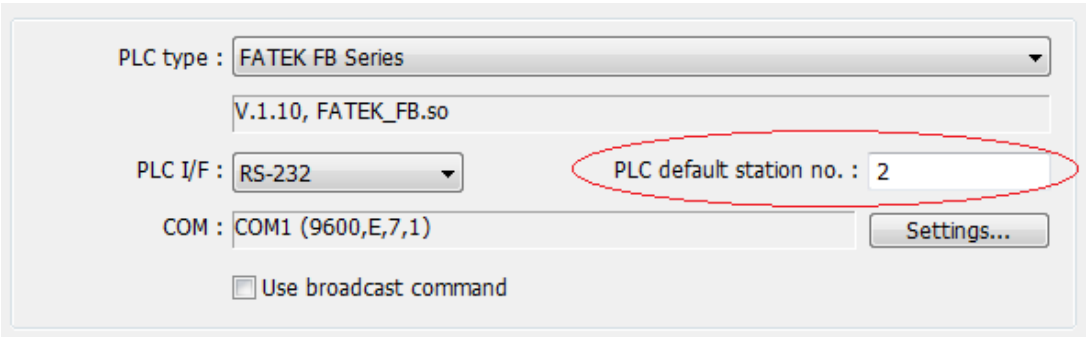
Name	Location	Device Type	Stat...	I/F	Port
Local HMI	Local	MT8xxx	N/A	N/A	N/A
Remote HMI A	Remote(IP:192.168.0.205, Port...	MT8xxx	N/A	N/A	N/A
Remote HMI B	Remote(IP:210.68.117.224, Po...	MT8xxx	N/A	N/A	N/A
Remote HMI C	Remote(IP:210.68.117.224, Po...	MT8xxx	N/A	N/A	N/A
MITSUBISHI FX0n (Local)	Local	MITSUBISHI FX...	0	RS...	COM
FATEK (Local)	Local	FATEK FB Series	1	RS...	COM
MITSUBISHI FX3u	Remote(IP:210.68.117.224, Po...	MITSUBISHI FX...	0	RS...	COM
FATEK FB Series	Remote(IP:210.68.117.224, Po...	FATEK FB Series	1	RS...	COM

device_type is he device type and encoding method (binary or BCD) of the PLC data. For example, if device_type is LW_BIN, it means the register is LW and the encoding method is binary. If use BIN encoding method, "_BIN" can be ignored.

If device_type is LW_BCD, it means the register is LW and the encoding method is BCD.

address_offset is the address offset in the PLC.
For example, GetData(read_data_1[0], "FATEK KB Series", RT, 5, 1) represents that the address is 5.

If address_offset uses the format – "N#AAAAA", N indicates that PLC's station number is N. For example, GetData(read_data_1[0], "FATEK KB Series", RT, 2#5, 1) represents that the PLC's station number is 2. If GetData() uses the default station number defined in the device list as follows, it is not necessary to define station number in address_offset.



The number of registers actually read from depends on both the type of the read_data variable and the value of the number of data_count.

type of read_data	data_count	actual number of 16-bit register read
char (8-bit)	1	1
char (8-bit)	2	1
bool (8-bit)	1	1
bool (8-bit)	2	1
short (16-bit)	1	1
short (16-bit)	2	2
int (32-bit)	1	2
int (32-bit)	2	4
float (32-bit)	1	2
float (32-bit)	2	4

When a GetData()is executed using a 32-bit data type (int or float), the function will automatically convert the data. For example,

```
macro_command main()
float f
GetData(f, "MODBUS", 6x, 2, 1)    // f will contain a floating point value
end macro_command
```

Example

```
macro_command main()
bool a
bool b[30]
short c
short d[50]
int e
int f[10]
double g[10]

//    get the state of LB2 to the variable
GetData(a, “Local HMI”, LB, 2, 1)

//    get 30 states of LB0 ~ LB29 to the variables b[0] ~ b[29]
GetData(b[0], “Local HMI”, LB, 0, 30)
```

	// get one word from LW2 to the variable c
	GetData(c, “Local HMI”, LW, 2, 1)
	
	// get 50 words from LW0 ~ LW49 to the variables d[0] ~ d[49]
	GetData(d[0], “Local HMI”, LW, 0, 50)
	
	// get 2 words from LW6 ~ LW7 to the variable e
	// note that he type of e is int
	GetData(e, “Local HMI”, LW, 6, 1)
	
	// get 20 words (10 integer values) from LW0 ~ LW19 to f[0] ~ f[9]
	// since each integer value occupies 2 words
	GetData(f[0], “Local HMI”, LW, 0, 10)
	
	// get 2 words from LW2 ~ LW3 to the variable f
	GetData(f, “Local HMI”, LW, 2, 1)
	
	end macro_command

Name	SetData
Syntax	SetData(send_data[start], device_name, device_type, address_offset, data_count) or SetData(send_data, device_name, device_type, address_offset, 1)
Description	Send data to the PLC. Data is defined in send_data[start]~ send_data[start + data_count - 1]. data_count is the amount of sent data. In general, send_data is an array, but if data_count is 1, send_data can be an array or an ordinary variable. Below are two methods to send one word data. macro_command main() short send_data_1[2] = { 5, 6}, send_data_2 = 5 SetData(send_data_1[0], “FATEK KB Series”, RT, 5, 1) SetData(send_data_2, “FATEK KB Series”, RT, 5, 1) end macro_command device_name is the PLC name enclosed in the double quotation marks (“) and this

name has been defined in the device list of system parameters.
device_type is he device type and encoding method (binary or BCD) of the PLC data. For example, if device_type is LW_BIN, it means the register is LW and the encoding method is binary. If use BIN encoding method, "_BIN" can be ignored.

If device_type is LW_BCD, it means the register is LW and the encoding method is BCD.

address_offset is the address offset in the PLC.
For example, SetData(read_data_1[0], "FATEK KB Series", RT, 5, 1) represents that the address is 5.

If address_offset uses the format – "N#AAAAA", N indicates that PLC's station number is N. For example, SetData(read_data_1[0], "FATEK KB Series", RT, 2#5, 1) represents that the PLC's station number is 2. If GetData() uses the default station number defined in the device list, it is not necessary to define station number in address_offset.

The number of registers actually sends to depends on both the type of the send_data variable and the value of the number of data_count.

type of read_data	**data_count**	**actual number of 16-bit register send**
char (8-bit)	1	1
char (8-bit)	2	1
bool (8-bit)	1	1
bool (8-bit)	2	1
short (16-bit)	1	1
short (16-bit)	2	2
int (32-bit)	1	2
int (32-bit)	2	4
float (32-bit)	1	2
float (32-bit)	2	4

When a SetData() is executed using a 32-bit data type (int or float), the function will automatically send int-format or float-format data to the device. For example,

	macro_command main()
	float f = 2.6
	SetData(f, "MODBUS", 6x, 2, 1) // will send a floating point value to the device
	end macro_command

Example	macro_command main()
	int i
	bool a = true
	bool b[30]
	short c = false
	short d[50]
	int e = 5
	int f[10]
	
	for i = 0 to 29
	  b[i] = true
	next i
	
	for i = 0 to 49
	  d[i] = i * 2
	next i
	
	for i = 0 to 9
	  f [i] = i * 3
	next i
	
	// set the state of LB2
	SetData(a, “Local HMI”, LB, 2, 1)
	
	// set the states of LB0 ~ LB29
	SetData(b[0], “Local HMI”, LB, 0, 30)
	
	// set the value of LW2
	SetData(c, “Local HMI”, LW, 2, 1)
	
	// set the values of LW0 ~ LW49
	SetData(d[0], “Local HMI”, LW, 0, 50)

	// set the values of LW6 ~ LW7, note that the type of e is int
	SetData(e, “Local HMI”, LW, 6, 1)
	
	// set the values of LW0 ~ LW19
	// 10 integers are equal to 20 words, since each integer value occupies 2 words.
	SetData(f[0], “Local HMI”, LW, 0, 10)
	
	end macro_command

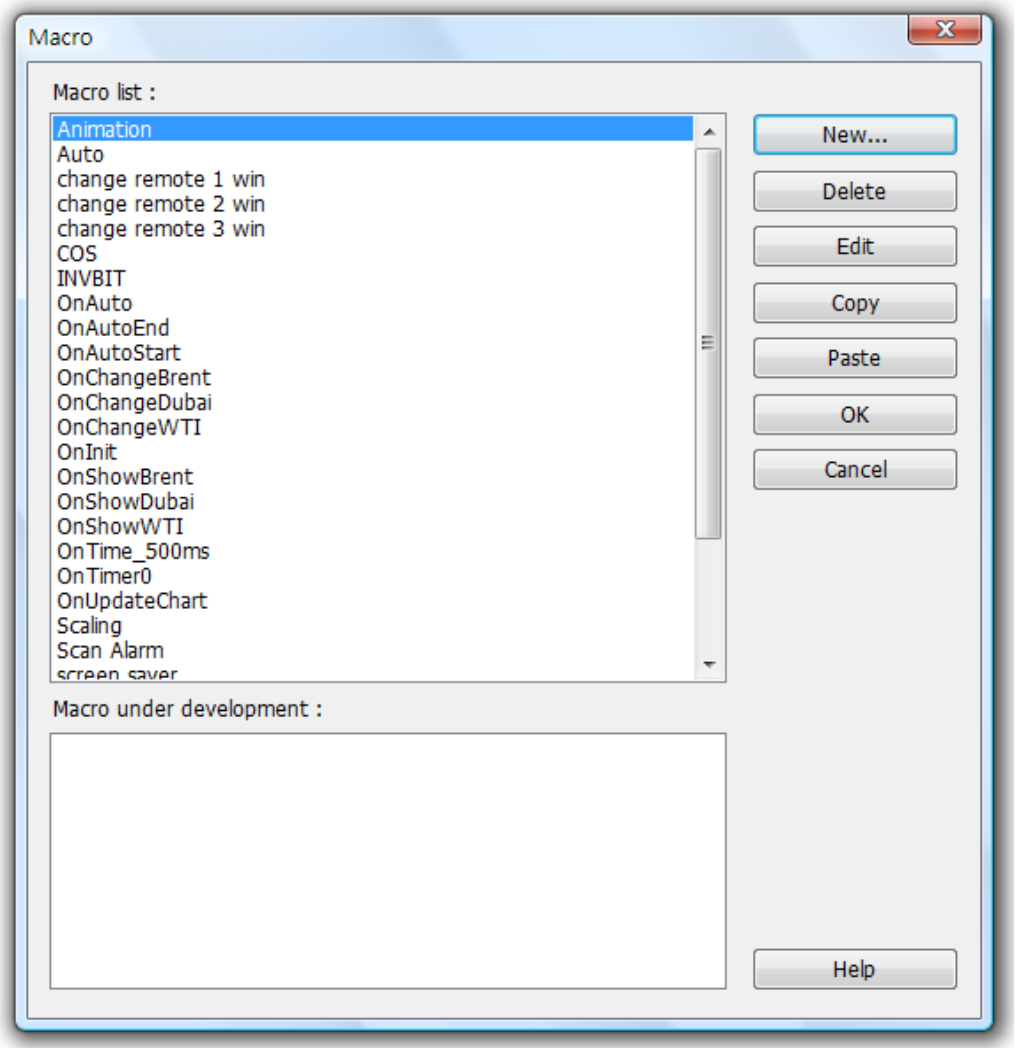
18.6 How to Create and Execute a Macro

18.6.1 How to Create a Macro

Macro programming can be divided into some steps as follows,

Step 1:

Click the “Macro Manager” icon on the tool bar of EasyBuilder 8000 to open Macro Manager as follows.



On Macro Manager, all macros compiled successfully are displayed in “Macro list”, and all macros in developing are display in ‘Macro under development”. The following is a description of the various buttons.

[New]

Opens a blank “WorkSpace” editor for creating a new macro.

[Delete]

Deletes the selected macro.

[Edit]

Opens the “WorkSpace” editor, and loads the selected macro.

[Copy]

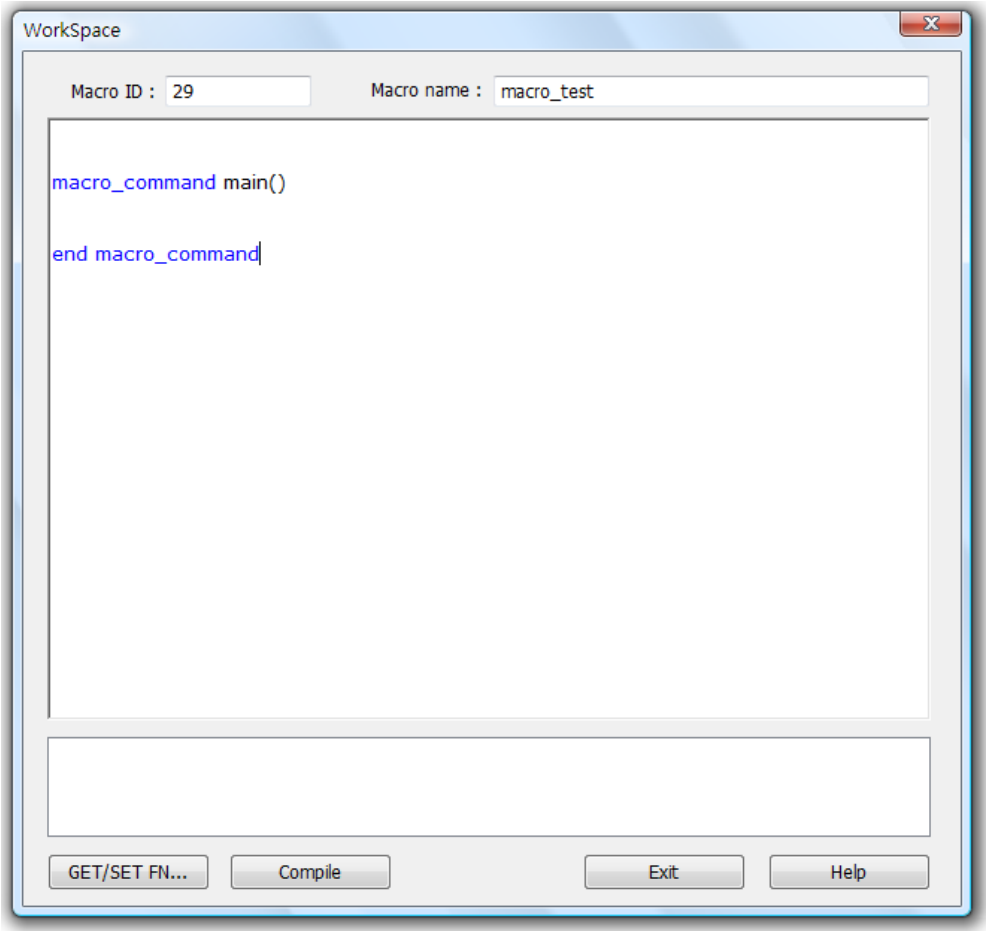
Copies the selected macro into the clipboard.

[Paste]

Pastes the macro in the clipboard into the list, and creates a new name for the macro.

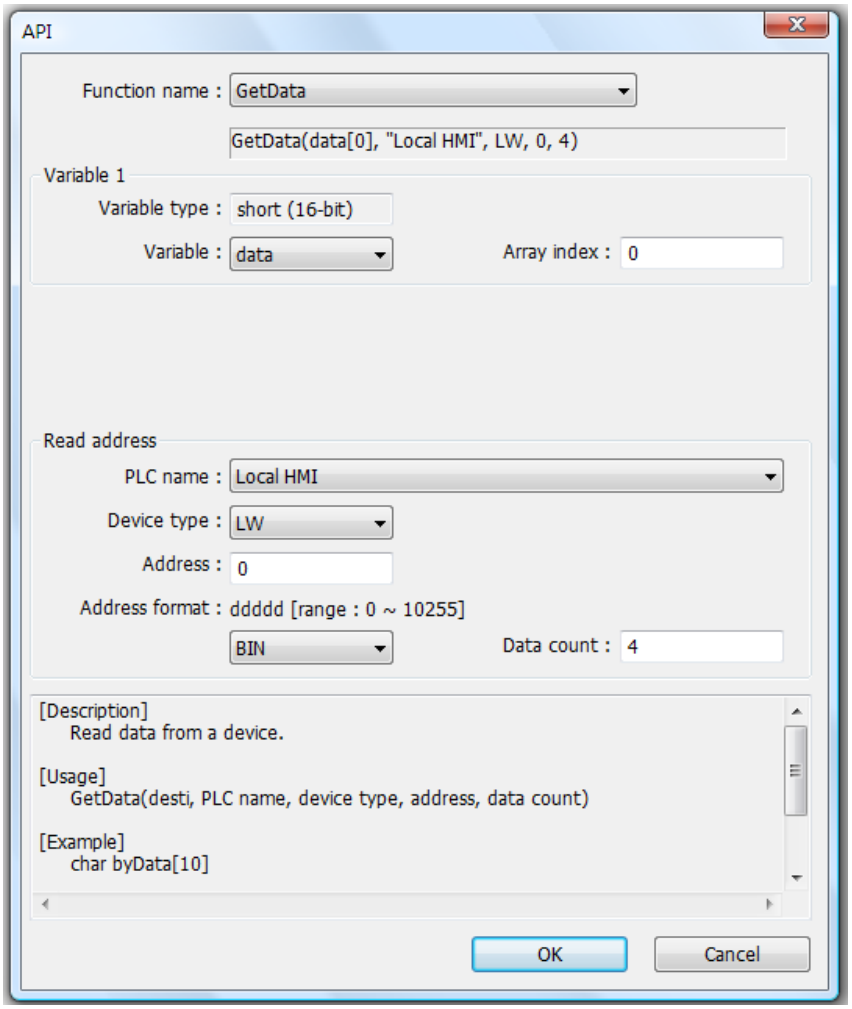
Step 2:

Press the “New” button to open a blank “WorkSpace” editor. Every macro has a unique number defined in “Macro ID” edit box, and macro name must exist, otherwise an error will appear while compiling.



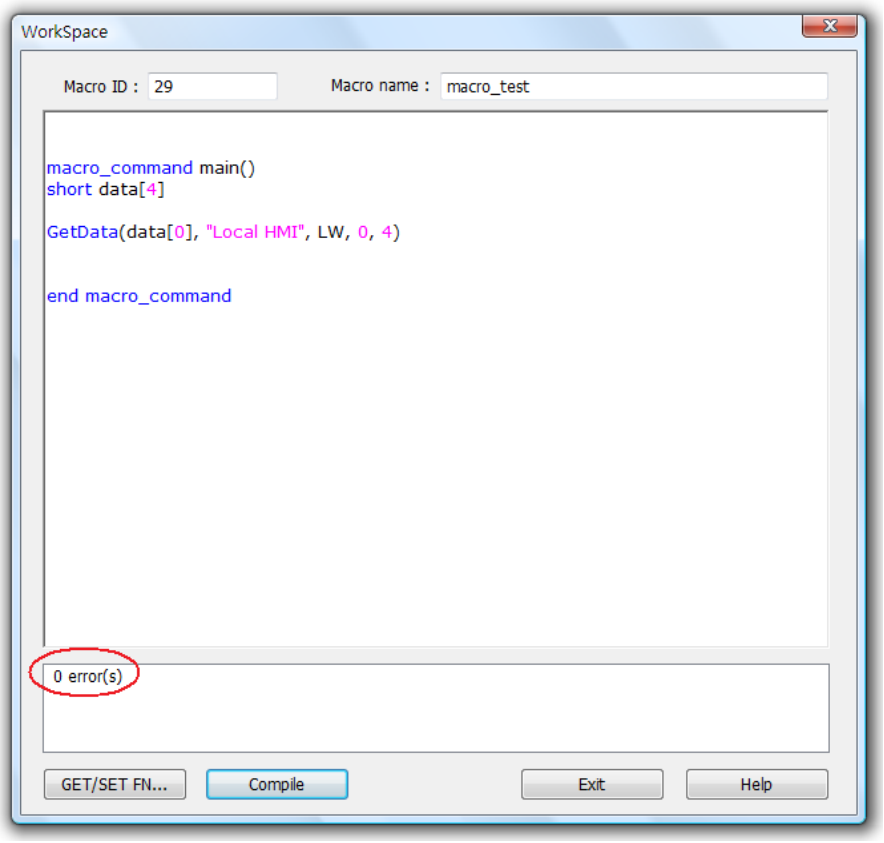
Step 3:

Design your macro. If it is necessary to use build-in functions (like SetData() or Getdata()), press ‘Get/Set FN…” button to open API dialog and select the function and set essential parameters.

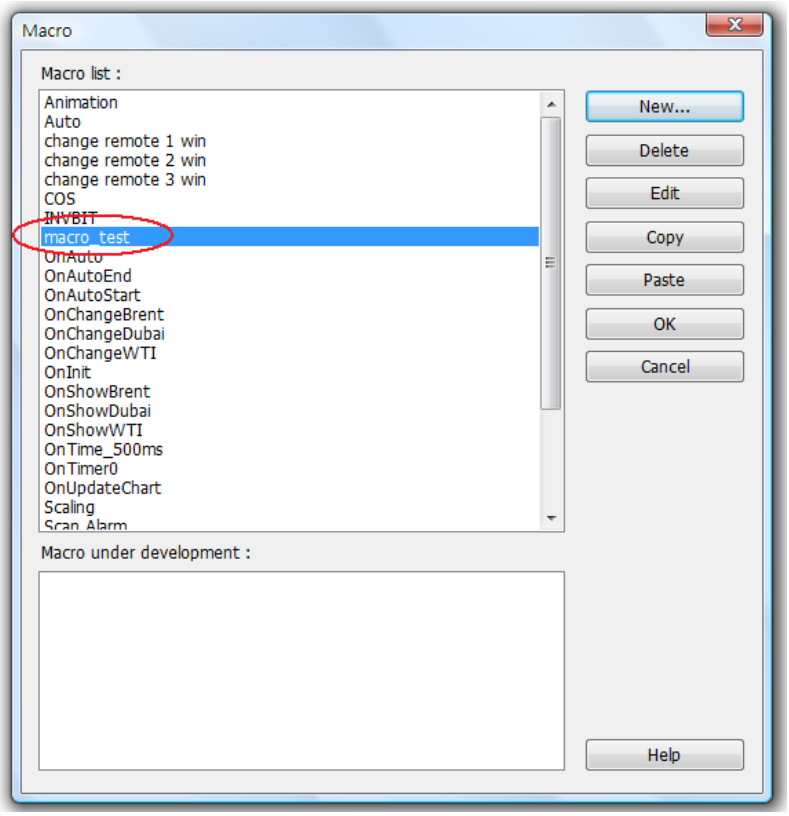


Step 4:

After the completion of a new macro, press ‘Compile” button to compile the macro.



If there is no error, press “Exit” button and find that a new macro “macro_test” exists in “Macro list”.



18.6.2 Execute a Macro

There are several ways to execute a macro.

a. With a PLC Control object
   1. Open the PLC Control object and set the attribute to "Execute macro program".
   2. Select the macro by name. Choose a bit and select a trigger condition to trigger the macro. The macro will continue to be re-triggered as long as the condition is met. In order to guarantee that the macro will run only once, consider latching the trigger bit, and then resetting the trigger condition within the macro.
   3. Use a Set Bit or Toggle Switch object to activate the bit.

b. With a Set Bit or Toggle Switch object
   1. On the General tab of the Set Bit or Toggle Switch dialog, select the Execute Macro option.
   2. Select the macro to execute. The macro will execute one time when the button is activated.

c. With a Function Key object
   1. On the General tab of the Set Bit or Toggle Switch dialog, select the Execute Macro option.
   2. Select the macro to execute. The macro will execute one time when the button is activated.

18.7 Some Notes about Using the Macro

1. The maximum storage space of local variables in a macro is 4K bytes. So the maximum array size of different variable types are as follows:

```
char a[4096]
bool b[4096]
short c[2048]
int   d[1024]
float e[1024]
```

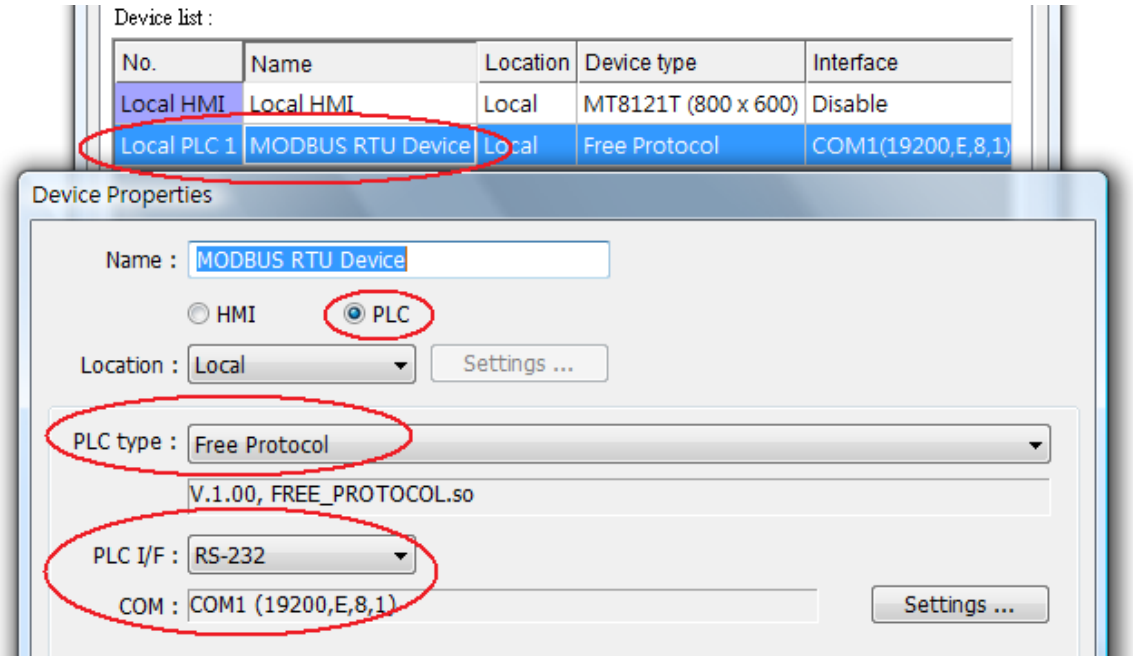
2. A maximum of 256 macros are allowed in an EasyBuilder 8000 project.

3. A macro may cause the HMI to lock up. Possible causes are:
   - A macro contains an infinite loop with no PLC communication.
   - The size of an array exceeds the storage space in a macro.
4. PLC communication time may cause the macro to execute slower than expected.

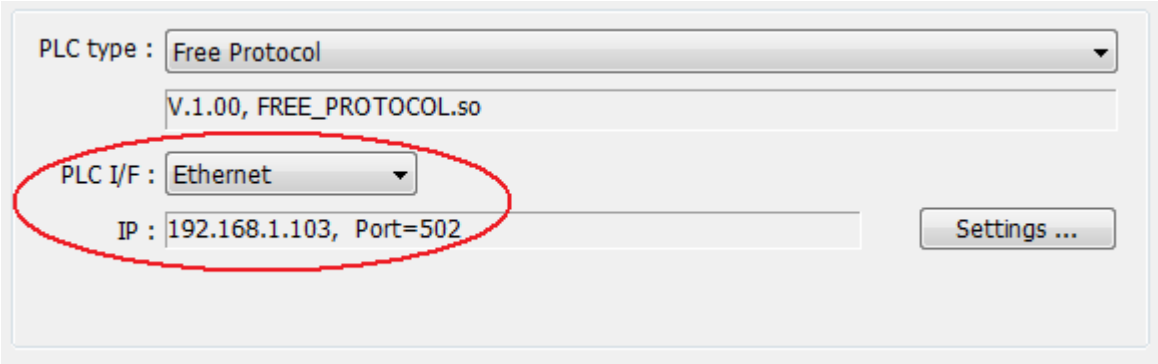
18.8 Use the Free Protocol to Control a Device

When EasyBuilder 8000 does not provide an essential driver to communication with a device, Users also can make use of OUTPORT and INPORT to control the device. The data sent with OUTPORT and INPORT must follow the device's communication protocol. The following example explains how to use these two functions to control a MODBUS RTU device.

First, create a new device in the device table. The device type of the new device is set to "Free Protocol" and named with "MODBUS RTU device" as follows:



The interface of the device (PLC I/F) uses "RS-232" now. If connecting a MODBUS TCP/IP device, the interface must select 'Ethernet". In addition, it is necessary to set correct IP and port number as follows:



Suppose that HMI will read the data of 4x_1 and 4x_2 on the device. First, utilize OUTPORT to send out a read request to the device. The prototype of OUTPORT is:

OUTPORT(command[start], device_name, cmd_count)

Because "MODBUS RTU device" is a MODBUS RTU device, the read request must follow MODBUS RTU protocol. The request uses "Reading Holding Registers (0x03)" command to read data. The following picture displays the content of the command. (The items of the station number (byte 0) and the last two bytes (CRC) are ignored).

Request

Function code	1 Byte	**0x03**
Starting Address	2 Bytes	0x0000 to 0xFFFF
Quantity of Registers	2 Bytes	1 to 125 (0x7D)

Response

Function code	1 Byte	**0x03**
Byte count	1 Byte	2 x N*
Register value	N* x 2 Bytes	

*N = Quantity of Registers

Error

Error code	1 Byte	**0x83**
Exception code	1 Byte	01 or 02 or 03 or 04

Depending on the protocol, the content of a read command as follows (The total bytes are 8):

command[0] : station number (BYTE 0)
command[1] : function code (BYTE 1)
command[2] : high byte of starting address (BYTE 2)
command[3] : low byte of starting address (BYTE 3)
command[4] : high byte of quantity of registers (BYTE 4)
command[5] : low byte of quantity of registers (BYTE 5)
command[6] : low byte of 16-bit CRC (BYTE 6)

command[7] : high byte of 16-bit CRC (BYTE 7)

So a read request is designed as follows :

```
char command[32]
short address, checksum

FILL(command[0], 0, 32)    //    initialize command[0]~command[31] to 0

command[0] = 0x1    //    station number
command[1] = 0x3    //    read holding registers (function code is 0x3)

address = 0//    starting address (4x_1) is 0
HIBYTE(address, command[2])
LOBYTE(address, command[3])

read_no = 2//    the total words of reading is 2 words
HIBYTE(read_no, command[4])
LOBYTE(read_no, command[5])

CRC(command[0], checksum, 6)//    calculate 16-bit CRC

LOBYTE(checksum, command[6])
HIBYTE(checksum, command[7])
```

Finally, use OUPORT to send out this read request to PLC

```
OUTPORT(command[0], "MODBUS RTU Device", 8)//    send request
```

After sending out the request, use INPORT to get the response from PLC. Depending on the protocol, the content of the response is as follows (the total byte is 9):

command[0] : station number (BYTE 0)
command[1] : function code (BYTE 1)
command[2] : byte count (BYTE 2)
command[3] : high byte of 4x_1 (BYTE 3)
command[4] : low byte of 4x_1 (BYTE 4)
command[5] : high byte of 4x_2 (BYTE 5)

command[6] : high byte of 4x_2 (BYTE 6)
command[7] : low byte of 16-bit CRC (BYTE 7)
command[8] : high byte of 16-bit CRC (BYTE 8)

The usage of INPORT is described below:

INPORT(response[0], "MODBUS RTU Device", 9, return_value)// read response

Where the real read count is restored to the variable return_value (unit is byte). If return_value is 0, it means reading fails in executing INPORT.
Depending on the protocol, response[1] must be equal to 0x3, if the response is correct. After getting correct response, calculate the data of 4x_1 and 4x_2 and put in the data into LW100 and LW101.

```
if (return_value >0 and response[1] == 0x3) then
   read_data[0] = response[4] + (response[3] << 8)//   4x_1
   read_data[1] = response[6] + (response[5] << 8)//   4x_2

   SetData(read_data[0], "Local HMI", LW, 100, 2)
end if
```

The complete macro is as follows:

```
//   Read Holding Registers
macro_command main()

char command[32], response[32]
short address, checksum
short read_no, return_value, read_data[2], i

FILL(command[0], 0, 32)//   initialize command[0]~command[31] to 0
FILL(response[0], 0, 32)

command[0] = 0x1//   station number
command[1] = 0x3//   read holding registers (function code is 0x3)

address = 0
address =   0//   starting address (4x_1) is 0
```

```
HIBYTE(address, command[2])
LOBYTE(address, command[3])

read_no = 2/    the total words of reading is 2 words
HIBYTE(read_no, command[4])
LOBYTE(read_no, command[5])

CRC(command[0], checksum, 6)//    calculate 16-bit CRC

LOBYTE(checksum, command[6])
HIBYTE(checksum, command[7])

OUTPORT(command[0], "MODBUS RTU Device", 8 )//    send request
INPORT(response[0], "MODBUS RTU Device", 9, return_value)//    read response

if (return_value > 0 and response[1] == 0x3) then
   read_data[0] = response[4] + (response[3] << 8)//    4x_1
   read_data[1] = response[6] + (response[5] << 8)//    4x_2

   SetData(read_data[0], "Local HMI", LW, 100, 2)
end if

end macro_command
```

The following example explains how to design a request to set the status of 0x_1. The request uses ”Write Single Coil(0x5)” command.

Request

Function code	1 Byte	**0x05**
Output Address	2 Bytes	0x0000 to 0xFFFF
Output Value	2 Bytes	0x0000 or 0xFF00

Response

Function code	1 Byte	**0x05**
Output Address	2 Bytes	0x0000 to 0xFFFF
Output Value	2 Bytes	0x0000 or 0xFF00

Error

Error code	1 Byte	**0x85**
Exception code	1 Byte	01 or 02 or 03 or 04

The complete macro is as follows:

```
//    Write Single Coil (ON)
macro_command main()

char command[32], response[32]
short address, checksum
short i, return_value

FILL(command[0], 0, 32)//    initialize command[0]~ command[31] to 0
FILL(response[0], 0, 32)

command[0] = 0x1//    station number
command[1] = 0x5//    function code : write single coil

address = 0
HIBYTE(address, command[2])
LOBYTE(address, command[3])

command[4] = 0xff//    force 0x_1 on
command[5] = 0

CRC(command[0], checksum, 6)

LOBYTE(checksum, command[6])
HIBYTE(checksum, command[7])

OUTPORT(command[0], "MODBUS RTU Device", 8)//    send request
INPORT(response[0], "MODBUS RTU Device", 8, return_value)//    read response

end macro_command
```

18.9 Compiler Error Message

1. **Error Message Format**:

error c# : error description

(# is the error message number)

Example: error C37 : undeclared identifier : i

When there are compile errors, the error description can be referenced by the compiler error message number.

2. Error Description

(C1) syntax error：'identifier'

There are many possibilities to cause compiler error.

For example:

```
macro_command main()
char i, 123xyz    //    this is an unsupported variable name
end macro_command
```

(C2) 'identifier' used without having been initialized

Macro must define the size of an array during declaration.

For example:

```
macro_command main()
char i
int g[i]    //    i must be a numeric constant
end macro_command
```

(C3) redefinition error : 'identifier'

The name of variable and function within its scope must be unique.

For example:

```
macro_command main()
int g[10]，g    //    error
end macro_command
```

(C4) function name error : 'identifier'

Reserved keywords and constant can not be the name of a function

For example：

```
sub int if()    // error
```

(C5) parentheses have not come in pairs

Statement missing “(“ or “)”

For example：

```
macro_command main    )    //    missing “(“
```

(C6) illegal expression without matching ‘if’

Missing expression in “if” statement

(C7) illegal expression (no ‘then’) without matching ‘if’

Missing “then” in “if” statement

(C8) illegal expression (no ‘end if’)

Missing “end if”

(C9) illegal ‘end if’ without matching ‘if’

Unfinished “If’ statement before “End If”

(C10) illegal ‘else’

The format of “if” statement is :

```
if [logic expression] then
[ else [if [logic expression] then ] ]

end if
```

Any format other than this format will cause a compile error.

(C17) illegal expression (no 'for') without matching ‘next’

“for” statement error : missing “for” before “next”

(C18) illegal variable type (not integer or char)

Should be integer of char variable

(C19) variable type error

Missing assign statement

(C20) must be keyword ‘to’ or ‘down’

Missing keyword “to” or “down”

(C21) illegal expression (no 'next')

The format of “for” statement is:

for [variable] = [initial value] to [end value] [step]

next [variable]

Any format other than this format will cause a compile error.

(C22) ‘wend’ statement contains no ‘while’

“While” statement error : missing “while” before “Wwnd”

(C23) illegal expression without matching ‘wend’

The format of “While” statement is :

while [logic expression]

wend

Any format other than this format will cause a compile error.

(C24) syntax error : ‘break’

“break” statement can only be used in “for”, “while” statement

(C25) syntax error : ‘continue’

“continue” statement can only be used in “for” statement, or “while” statement.

(C26) syntax error

expression is error.

(C27) syntax error

The mismatch of an operation object in expression causes a compile error.

For example :

macro_command main( )

```
int a, b
for a = 0 to 2
    b = 4 + xyz //    illegal : xyz is undefined
next a
end macro_command
```

(C28) must be 'macro_command'

There must be 'macro_command'

(C29) must be key word 'sub'

The format of function declaration is:

```
sub [data type] function_name(…)
……..
end sub
```

For example::

```
sub int pow(int exp)
…….
end sub
```

Any format other than this format will cause a compile error.

(C30) number of parameters is incorrect

Mismatch of the number of parameters

(C31) parameter type is incorrect

Mismatch of data type of parameter

(C32) variable is incorrect

The parameters of a function must be equivalent to the arguments passing to a function to avoid compile error.

(C33) function name : undeclared function

(C34) expected constant expression

(C35) invalid array declaration

(C36) array index error

(C37) undeclared identifier : i 'identifier'

Any variable or function should be declared before use.

(C38) un-supported PLC data address

The parameter of GetData(…) , SetData(…) should be legal PLC address.

(C39) 'idenifier' must be integer, char or constant

The format of array is:

Declaration: array_name[constant] (constant is the size of the array)

Usage: array_name[integer, character or constant]

Any format other than this format will cause a compile error.

(C40) execution syntax should not exist before variable declaration or constant definition

For example :

```
macro_command main(    )
int a, b
for a = 0 To 2
  b = 4 + a
int h , k//    illegal – definitions must occur before any statements or expressions
next a
end macro_command
```

(C41) float variables cannot be contained in shift calculation

(C42) function must return a value

(C43) function should not return a value

(C44) float variables cannot be contained in calculation

(C45) PLC address error

(C46) array size overflow (max. 4k)

(C47) macro command entry function is not only one

(C48) macro command entry function must be only one

The only one main entrance of macro is :

```
macro_command function_name( )
end macro_command
```

(C49) an extended addressee's station number must be between 0 and 255

For example :

```
SetData(bits[0] , "PLC 1", LB , 300#123, 100)
//    illegal : 300#123 means the station number is 300, but the maximum is 255
```

(C50) an invalid PLC name

PLC name is not defined in the device list of system parameters.

(C51) macro command do not control a remote device

A macro just can control a local machine.

For example :

```
SetData(bits[0] , "PLC 1", LB , 300#123, 100)
```

"PLC 1" is connected with the remote HMI ,so it is can not work.

18.10 Sample Macro Code

1. ”for” statement and other expressions (arithmetic, bitwise shift, logic and comparison)

```
macro_command main()
int a[10], b[10], i

b[0]= (400 + 400 << 2) / 401
b[1]= 22 *2 - 30 % 7
b[2]= 111 >> 2
b[3]= 403 > 9 + 3 >= 9 + 3 < 4 + 3 <= 8 + 8 == 8
b[4]= not 8 + 1 and 2 + 1 or 0 + 1 xor 2
b[5]= 405 and 3 and not 0
b[6]= 8 & 4 + 4 & 4 + 8 | 4 + 8 ^ 4
b[7]= 6 – (~4)
b[8]= 0x11
b[9]= 409

for i = 0 to 4 step 1
    if (a[0] == 400) then
        GetData(a[0],”Device 1”, 4x, 0,9)
        GetData(b[0],”Device 1”, 4x, 11,10)
end If
next i
end macro_command
```

2. “while”, “if” and “break” statements

```
macro_command main()
int b[10], i
i = 5
while i == 5 - 20 % 3
    GetData(b[1], ”Device 1”, 4x, 11, 1)

    if b[1] == 100 then
        break
    end if
wend
```

```
end macro_command
```

3. Global variables and function call

```
char g
sub int fun(int j, int k)
int y

SetData(j, “Local HMI”, LB, 14, 1)
GetData(y, “Local HMI”, LB, 15, 1)
g = y

return y
end Sub

macro_command main()
int a, b, i

a = 2
b = 3
i = fun(a, b)
SetData(i, “Local HMI”, LB, 16, 1)
end macro_command
```

4. ”if” statement

```
macro_command main()
int k[10], j

for j = 0 to 10
    k[j] = j
next j

if k[0] == 0 then
    SetData(k[1], “Device 1”, 4x, 0, 1)
end if

if k[0] == 0 then
```

```
        SetData(k[1], “Device 1”, 4x, 0, 1)
else
        SetData(k[2], “Device 1”, 4x, 0, 1)
end if

if k[0] == 0 then
        SetData(k[1], “Device 1”, 4x, 1, 1)
else if k[2] == 1 then
        SetData(k[3], “Device 1”, 4x, 2, 1)
end If

if k[0] == 0 then
        SetData(k[1], “Device 1”, 4x, 3, 1)
else if k[2] == 2 then
        SetData(k[3], “Device 1”, 4x, 4, 1)
else
        SetData(k[4], “Device 1”, 4x, 5, 1)
end If
end macro_command
```

5. “while” and wend” statements

```
macro_command main()
char i = 0
int a[13], b[14], c = 4848

b[0] = 13

while b[0]
        a[i] = 20 + i * 10

        if a[i] == 120 then
                c =200
                break
        end if

        i = i + 1
wend
```

```
SetData(c, “Device 1”, 4x, 2, 1)
end macro_command
```

6. “break” and “continue” statements

```
macro_command main()
char i = 0
int a[13], b[14], c = 4848

b[0] = 13

while b[0]
    a[i] = 20 + i * 10

    if a[i] == 120 then
        c =200
        i = i + 1
        continue
    end if

    i = i + 1

    if c == 200 then
        SetData(c, “Device 1”, 4x, 2, 1)
    break
    end if
wend
end macro_command
```

7. Array

```
macro_command main()
int a[25], b[25], i

b[0] = 13

for i = 0 to b[0] step 1
```

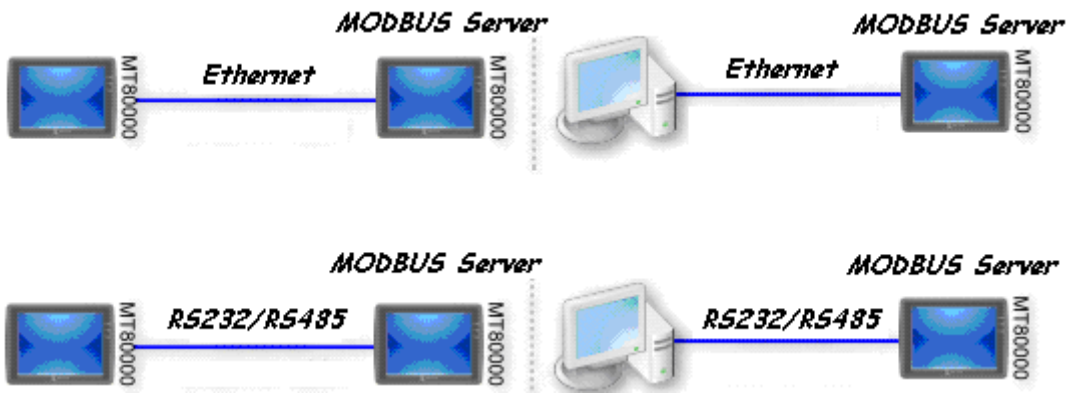
```
    a[i] = 20 + i * 10
next i

SetData(a[0], “Device 1”, 4x, 0, 13)
end macro_command
```

Chapter 19 How to Set HMI as a MODBUS Server

19.1 How to Set HMI as MODBUS Device

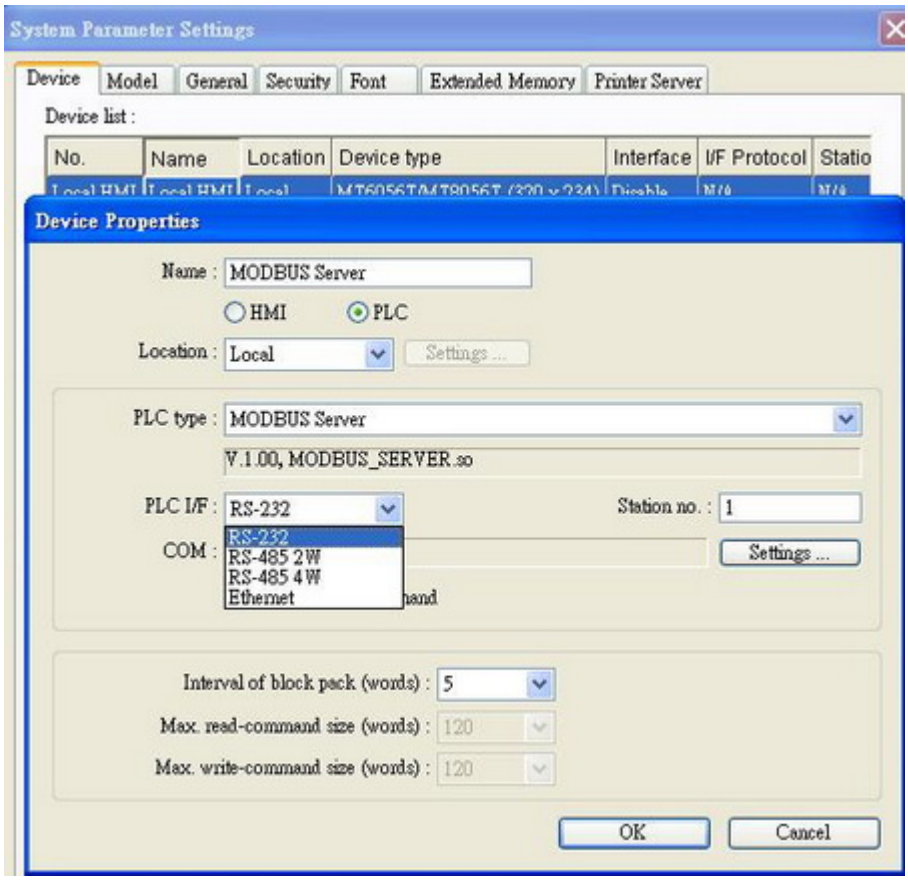
After setting as MODBUS Server, the data of MT8000 can be read or written via MODBUS protocol.



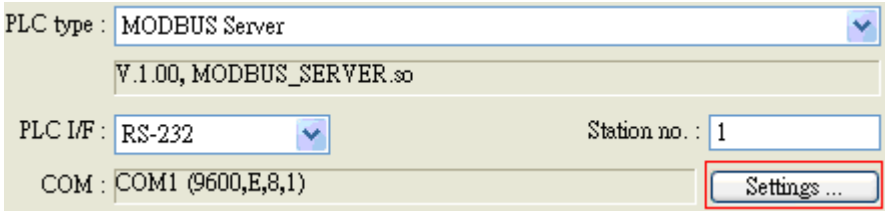
Refer to the above illustration, it shows MT8000 is set as MODBUS Server. The HMI, PC or other devices can use MODBUS protocol to read or write the data from MT8000 via Ethernet or RS232/485 interface. Please follow the steps as below.

19.1.1 Creating a MODBUS Server

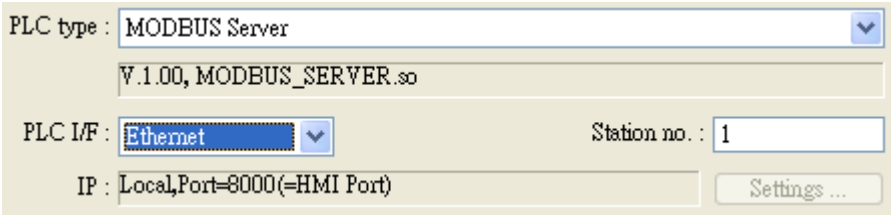
First of all, creating a new device “MODBUS Server” in the Device table of System Parameter Settings, the PLC I/F can be set to anyone of RS232, RS485 2W, RS485 4W ,Ethernet.



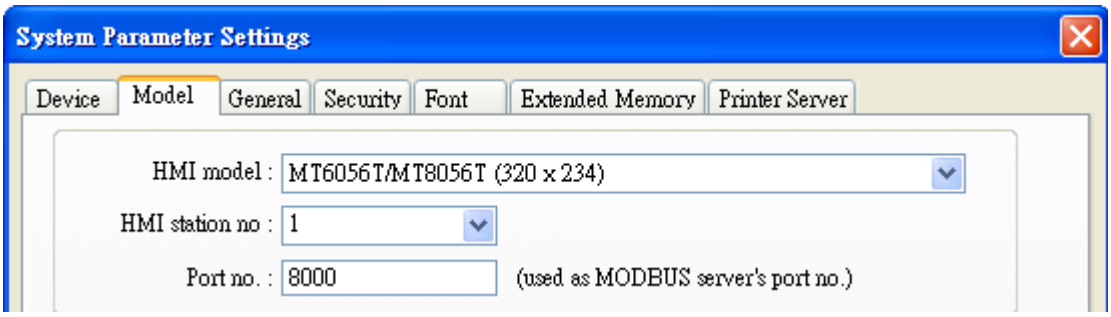
If PLC I/F is set as RS232 or RS485, please fill in COM Port Settings also.



If PLC I/F is set as Ethernet, the IP is the same as HMI.

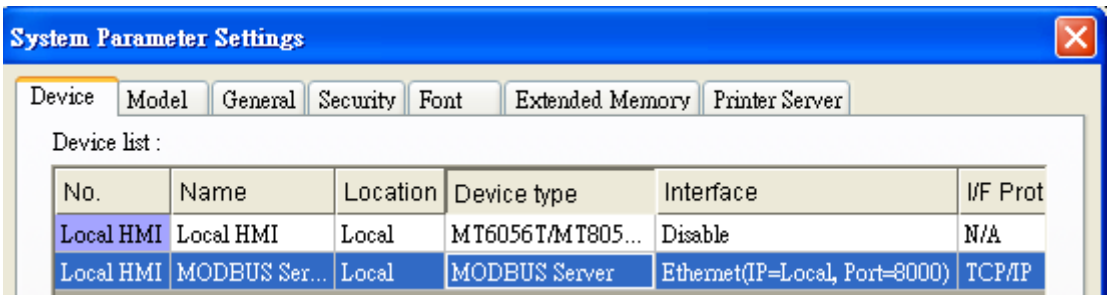


For MODBUS Server and HMI use the same port no., please change the MODBUS Server port no. on Model tab of System Parameter Settings.



After finishing the setting, MODBUS Server will be list on Device tab.

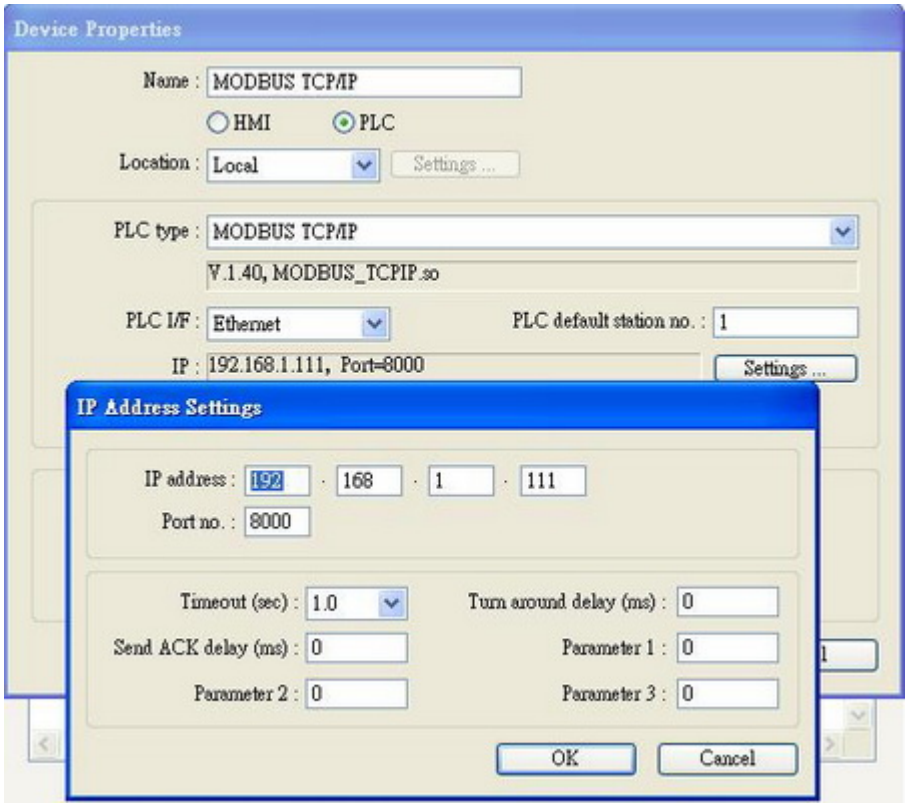
You can send MODBUS command to read or write the data from MODBUS Server after downloading the file of XOB to HMI.



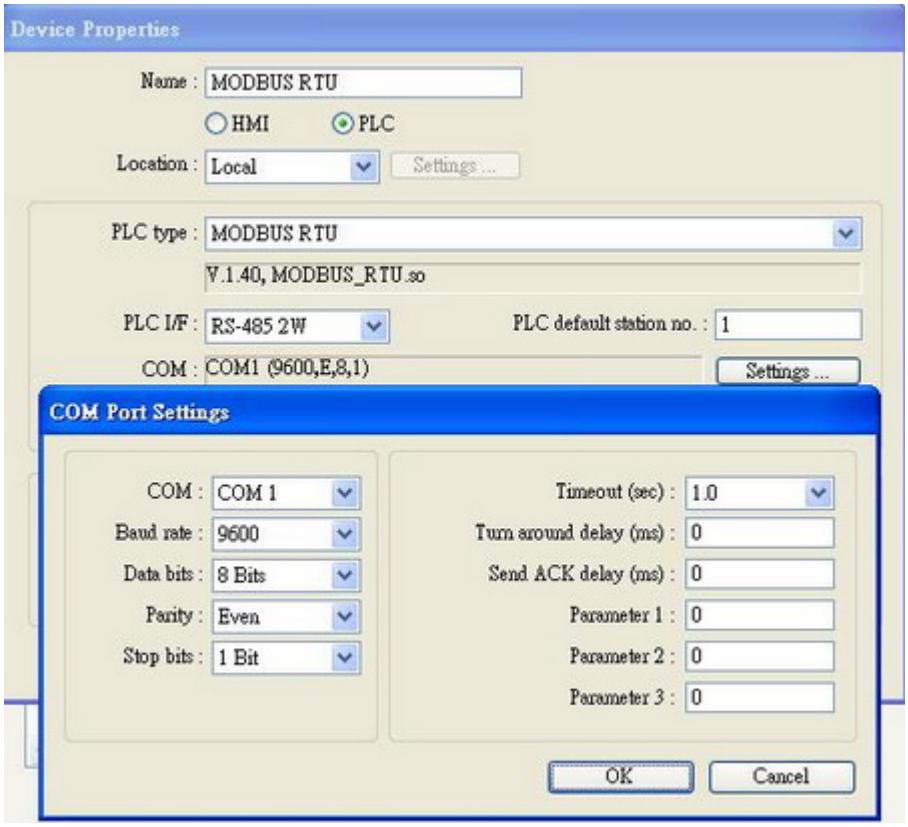
19.1.2 How to Read From / Write to MODBUS Server

MT8000 (the client) can read from / write to another MT8000 (the server) via MODBUS protocol.

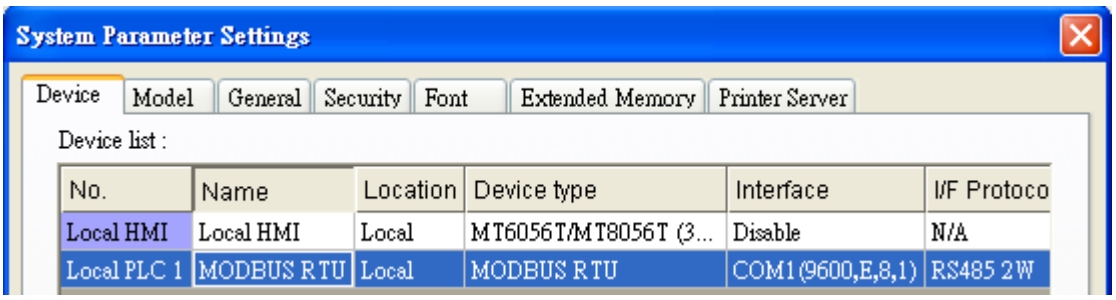
Adding a new device in the client. If client's PLC I/F is set as Ethernet, please select "MODBUS RTU TCP/IP" as PLC type and fill in the correct IP and Port no..



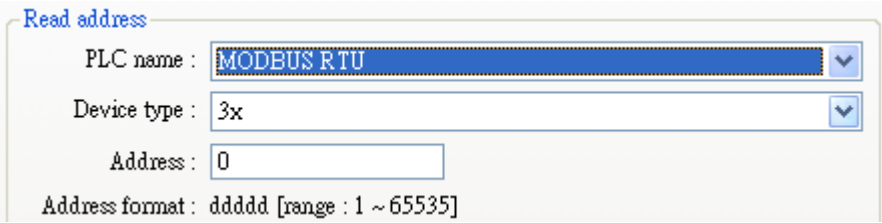
If the client use RS232/485 interface, the PLC type must be set as ”MODBUS RTU”, please make sure the communication parameter setting is correct.



Set and click OK, a new device ”MODBUS RTU” shall be listed in the Device tab.



In the setting page of each object, there is an “MODBUS RTU” in the PLC name selection list, you can then select appropriate device type and address.



The internal memory of MT8000 is mapping to the Modbus address as below：

reading / writing	0x/1x(1~9999)	to	reading / writing LB(0~9998)
reading / writing	3x/4x/5x(1~9999)	to	reading / writing LW(0~9998)
reading / writing	3x/4x/5x(10000~75533)	to	reading / writing RW(0~65533)

19.2 How to Change the Station Number of a MODBUS Server in Runtime

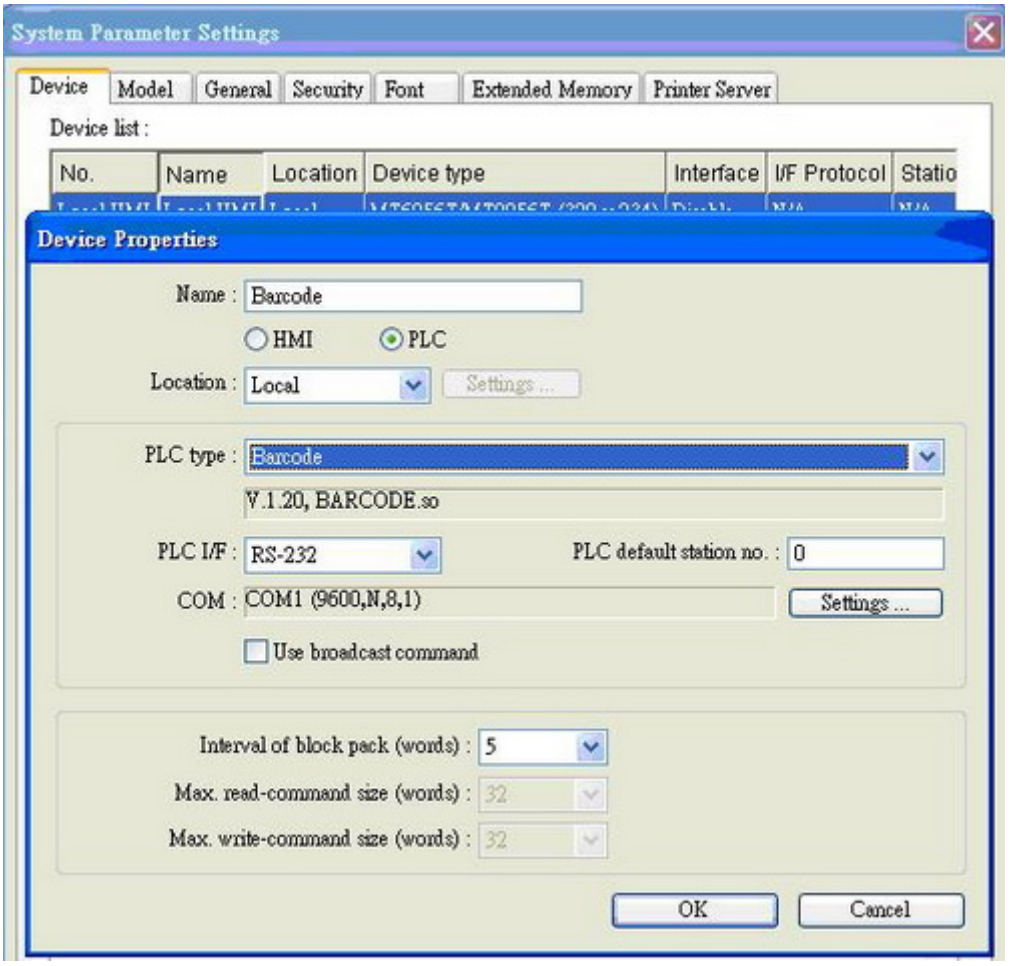
Change the content of relative reserved registers to modify the station number of a MODBUS server (HMI).

[LW9541] The station number of a MODBUS server (COM 1)
[LW9542] The station number of a MODBUS server (COM 1)
[LW9543] The station number of a MODBUS server (COM 1)
[LW-9544] The station number of a MODBUS server (Ethernet)

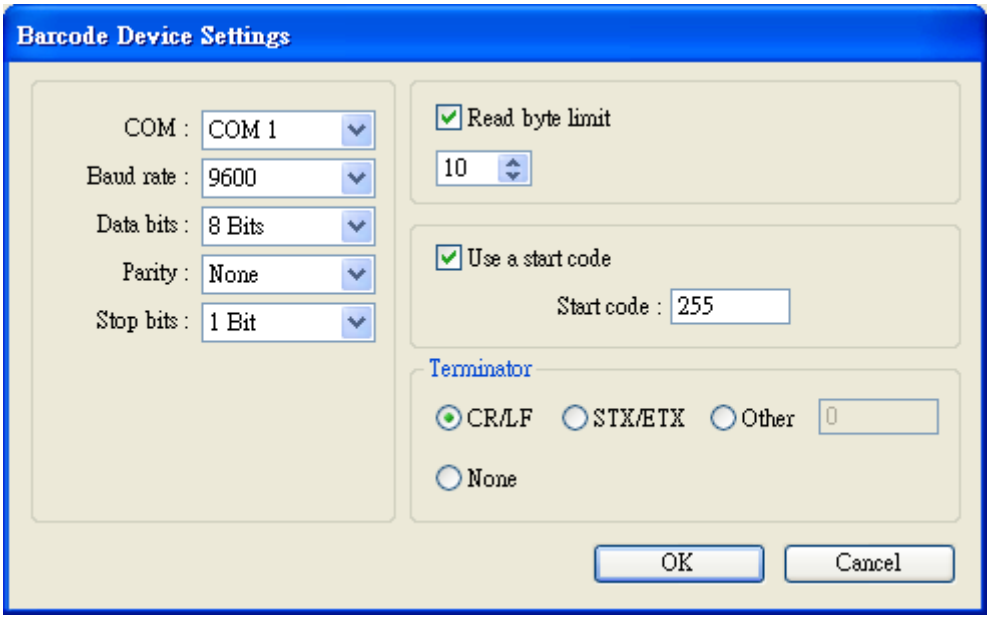
Chapter 20 How to Connect a Barcode Device

20.1 How to Connect a Barcode Device

The following explains how to create a project for connecting and controlling a barcode device. First, please add a new Barcode device into the device list as follows.



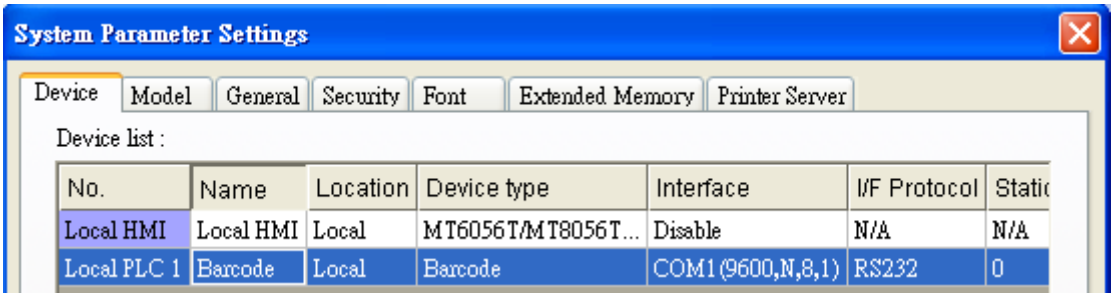
Click the [Settings…], barcode device settings display as below.



COM	Barcode device can be connect to any of COM 1~ COM 3
Baud rate	Set communication parameters accordingly
Data bits	
Parity	
Stop bits	
Read byte limit	This function will restrict the number of byte to read. The range is 10~512 For example: If Read byte limit is set as 10, the barcode device generate data "0x34 0x39 0x31 0x32 0x30 0x30 0x34 0x37 0x30 0x38 0x33 0x38". Only the first 10 bytes is read "0x34 0x39 0x31 0x32 0x30 0x30 0x34 0x37 0x30 0x38"
Use a start code	With this function, the MT8000 will identify the start code in reading the input data from bar code reader. All the data include and before start code will be ignored. All the data after start code will be saved in designated address. For example: if the start code is 255(0xff), and original data are "0xff 0x34 0x39 0x31 0x32 0x30 0x30 0x34 0x37", the data saved in designated device address are "0x34 0x39 0x31 0x32 0x30 0x30 0x34 0x37"
Terminator	Terminator means the end of data, when terminator is detected, it's mean the end of data stream. **[CR/LF]** 0x0a or 0x0d means end of data. **[STX/ETX]** 0x02 or 0x03 means end of data.

	[Other] User can set the terminator manually. **[None]** MT8000 will save all data to designated address of barcode device.

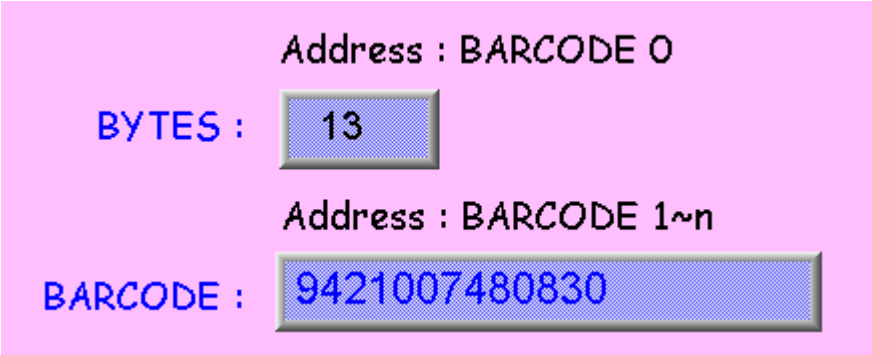
After setting completely, a new barcode device will be list in the device tab.



The Barcode device has two device types (Flag and Barcode).

Device type	Address type	Description
FLAG	bit	FLAG 0 indicates the status of data reading. When reading data is complete, the FLAG 0's states will be changed from OFF to ON.
BARCODE	word	BARCODE 0 Number of bytes of reading data. BARCODE 1~n designate bard code data save address.

The following display shows the configuration of barcode reader data. The data from barcode reader is "9421007480830".The BARCODE 0 and BARCODE 1~n represents number of bytes read from barcode and the data.



At present, the data of barcode device corresponding address as below:

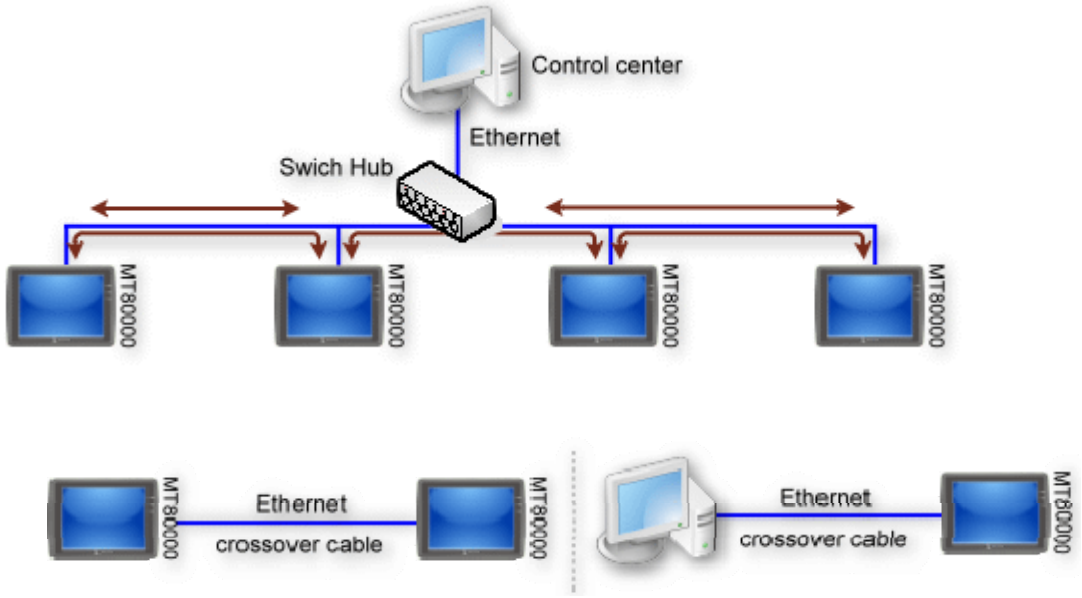
Barcode corresponding address	**Data**
BARCODE 0	13 bytes(decimal) The real data in the address is 14 bytes = 7 words. If the data is odd, will add a byte (0x00) to make it even.
BARCODE 1	3439HEX
BARCODE 2	3132HEX
BARCODE 3	3030HEX
BARCODE 4	3437HEX
BARCODE 5	3038HEX
BARCODE 6	3338HEX
BARCODE 7	0030HEX
BARCODE 8	empty

Chapter 21 Ethernet Communication and Multi-HMIs Connection

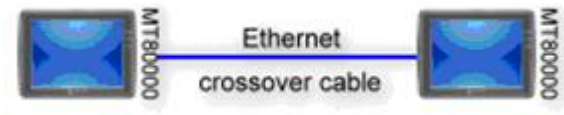
By using the Ethernet network, the EB8000 provides following methods for data transmission:

1. HMI to HMI communication.
2. PC to HMI communication.
3. Operating the PLC connected to other HMIs

There are two ways of the Ethernet communication; one way is to use RJ45 straight through cable with the use of a hub (hubs), and the other way is to use RJ45 crossover cable. In the second way there is no need to use hub(s), and it is limited to the condition of point to point connection (HMI to HMI, or PC to HMI). The following descriptions will show how to set up and perform the Ethernet connection in each way.



21.1 HMI to HMI Communication



Different HMIs can monitor and control each other's data through the Ethernet network. By using the system reserved register (LB and LW), one HMI can master performance of other HMI(s). One HMI can handle requests from a maximum of 32 other HMIs simultaneously.

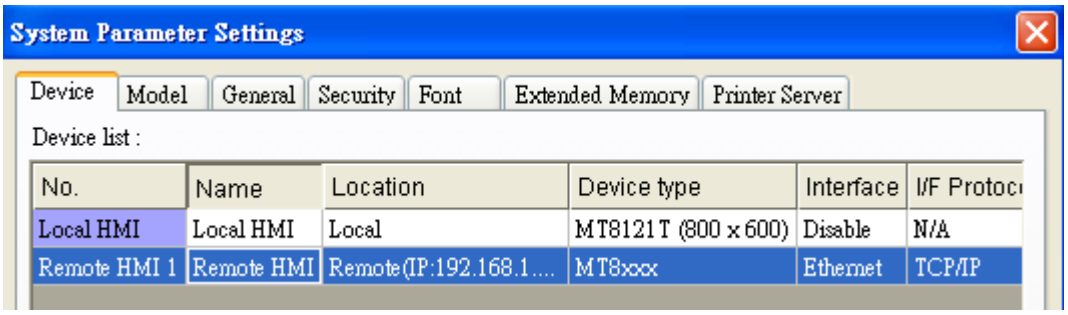
Here is an example of communicating two HMIs (HMI A and HMI B). When HMI A wants to use the set bit object to control the [LB123] node of HMI B, the procedure for setting the Project files (MTP) on HMI A is as follows:

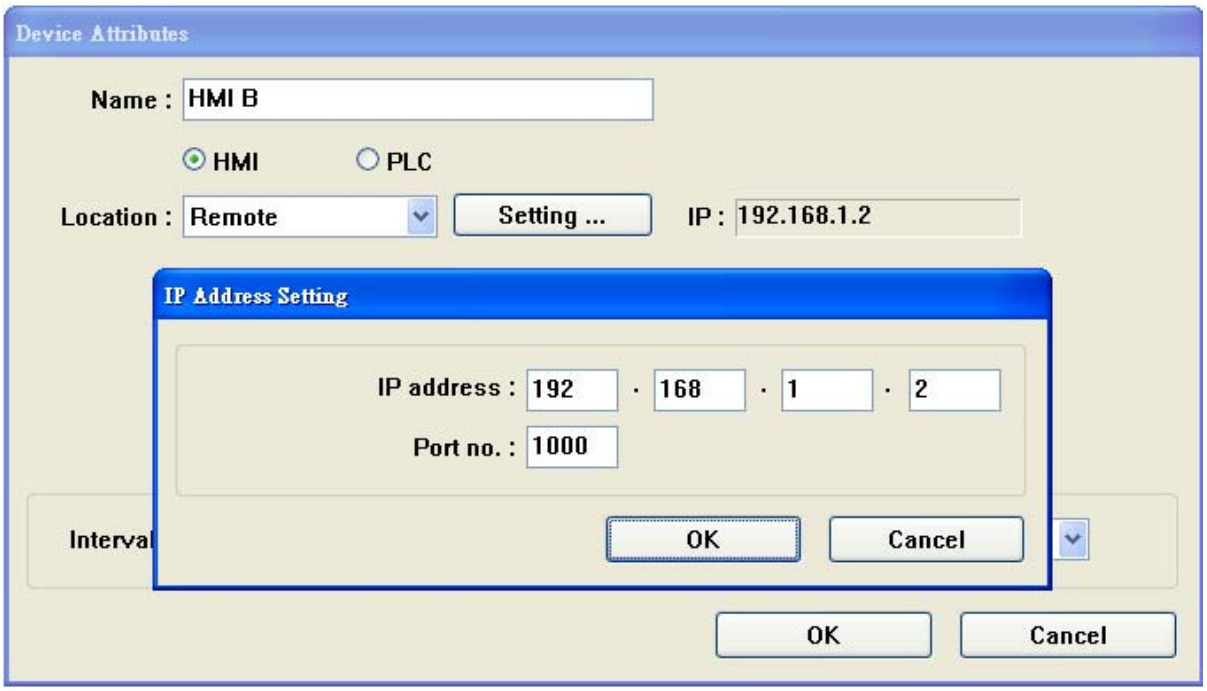
Step 1

Set the IP address of the two HMIs (Refer to the related chapter for the details). Suppose that the IP address of HMI A and HMI B are set for "192.168.1.1" and "192.168.1.2" respectively.

Step 2

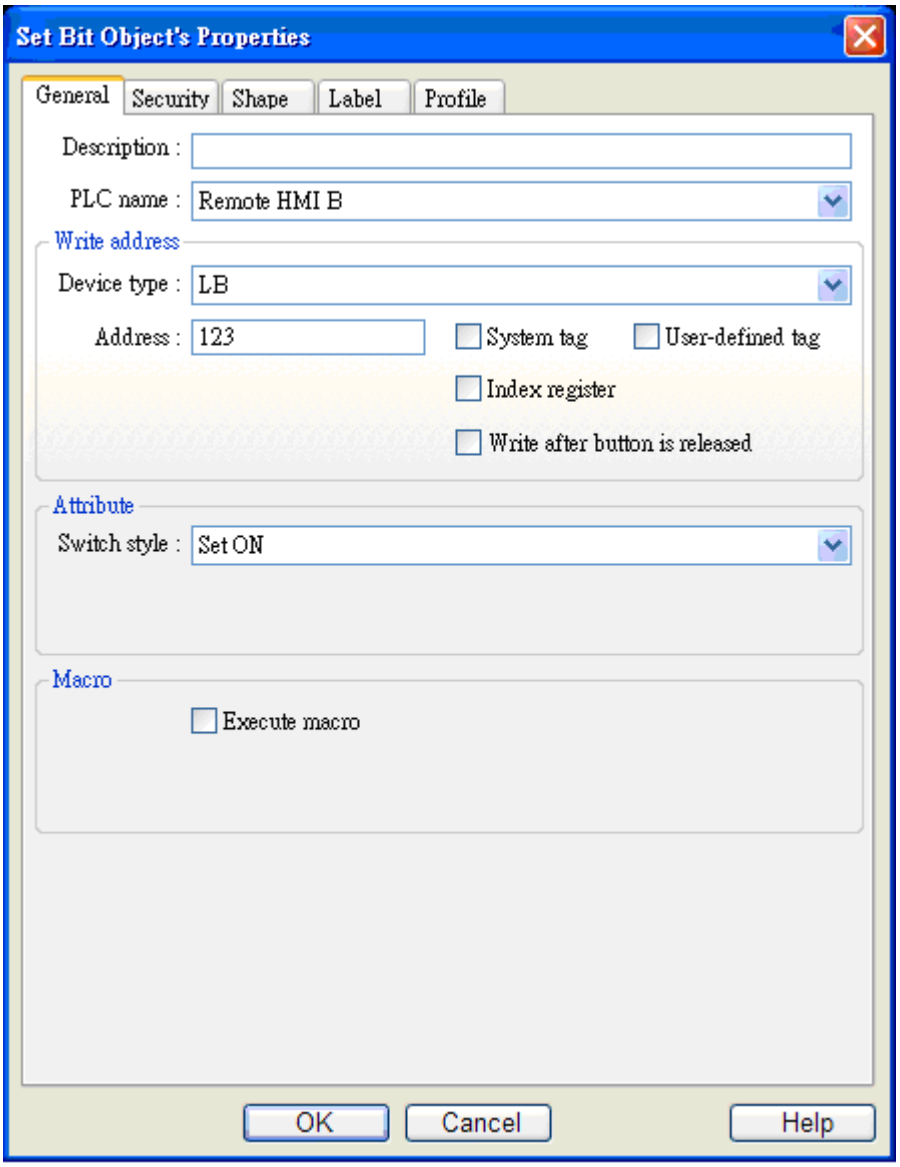
Running the EB8000, and select the [Device Table] tab on the [System Parameter Setting] menu, then add the IP address and Port number of HMI B. (The picture below shows the content of HMI A's MTP projects.)



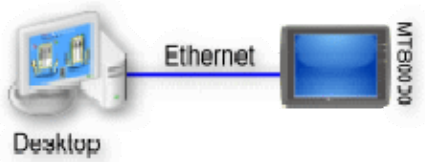


Step 3

Select “HMI B” for [PLC name] on the “Set Bit Object’s Attributes” menu, and now HMI A can operate the content of the LB of HMI B.



21.2 PC to HMI Communication



By using the simulator Function of the EB8000, PC can catch HMI's data through the Ethernet network and save the data as files on computer.

PC can master HMI by operating the system reserved register (LB and LW) of HMI. On the contrary, HMI can also directly control PC's operation, for example, asking PC save data from HMI or PLC.

The number of HMIs mastered by PC is unlimited.

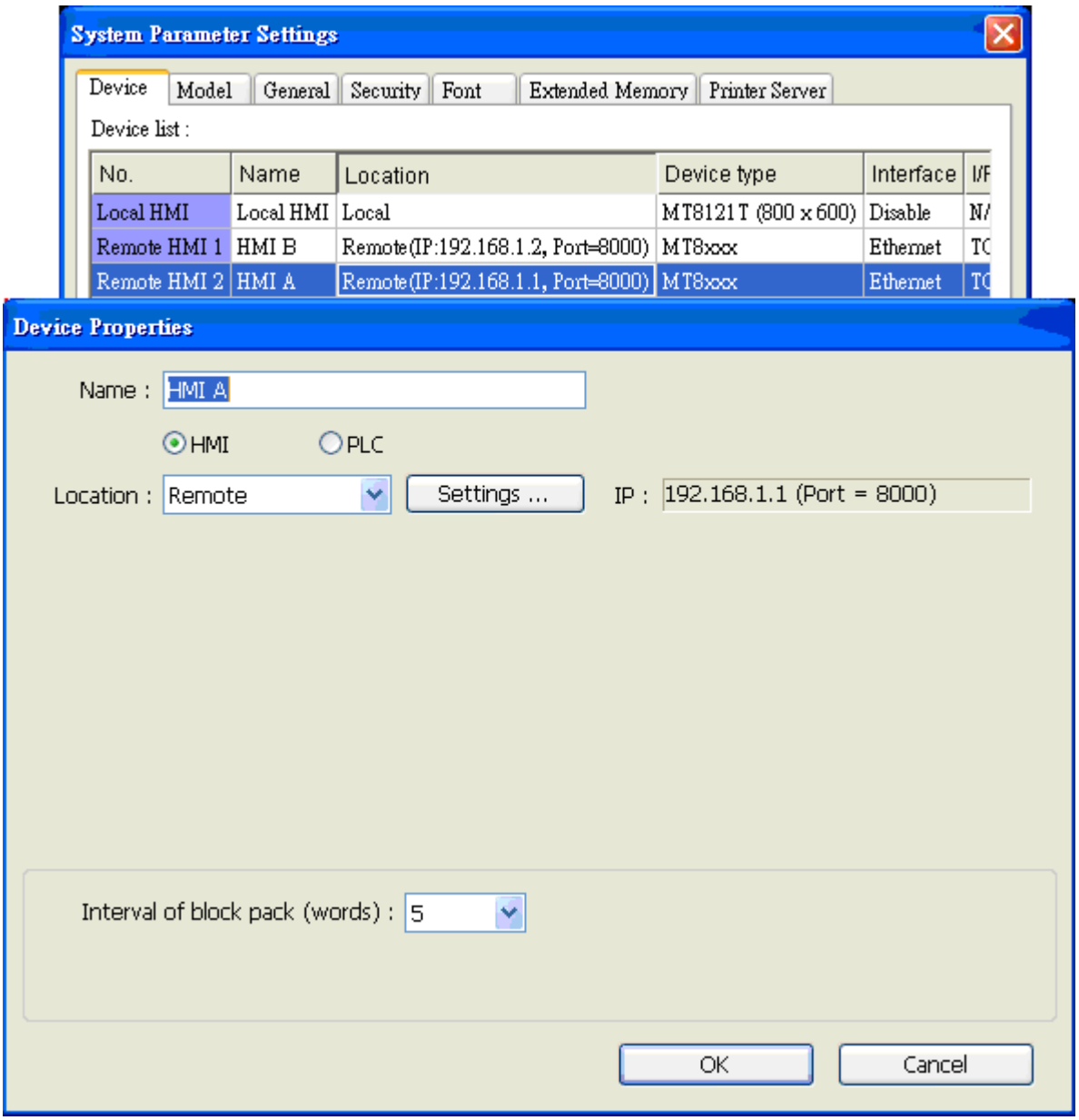
Suppose that PC is going to communicate with two HMIs (HMI A and HMI B)，the procedure for setting PC's MTP projects is as follows:

Step 1

Set the IP address of the two HMIs (Refer to the related chapter for the details). Suppose that the IP address of HMI A and HMI B are set for "192.168.1.1" and "192.168.1.2" respectively.

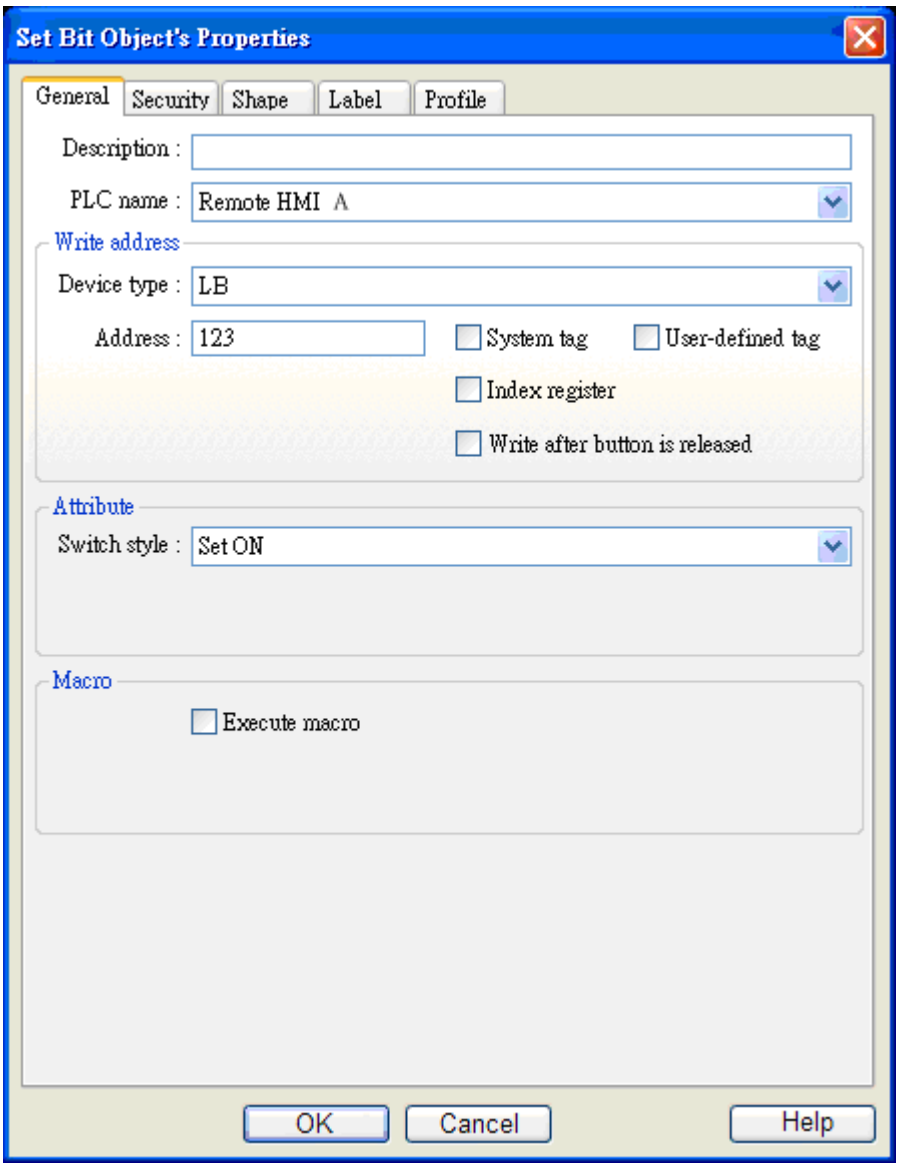
Step 2

Running the EB8000, and select the [Device Table] tab on the [System Parameter Setting] menu, then add the IP addresses and Port numbers of HMI A and HMI B.



Step 3

Select correct PLC for [PLC name]. In the [General] tab on the [Set Bit Object's Attributes] menu, if you intend to control the LB of HMI A, you have to select "HMI A" for [PLC name]. See the picture below.

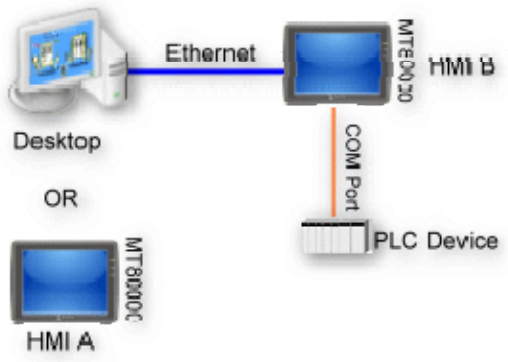


Step 4

Making use of HMI's MTP projects on PC and performing the simulator function (either online mode or offline mode), and then all HMI's data can be controlled by PC.

It is also available for HMI to control PC's data. Just considering the PC another HMI to add it as a new HMI device to the MTP projects of HMI A or HMI B and set the IP address pointing to the PC.

21.3 Operate the PLC Connected with other HMIs.



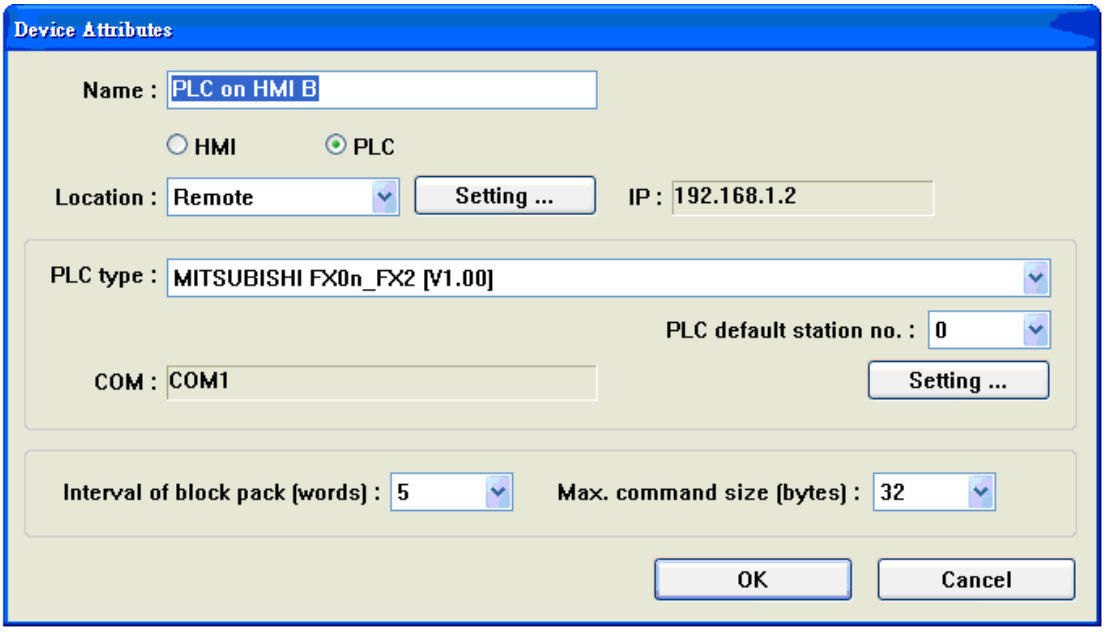
Through the Ethernet network, PC and HMI can also operate PLC that is connected to other HMI; for example, suppose that there is a Mitsubishi PLC connected to HMI B's COM 1, when PC or HMI A wants to read data of the PLC, the procedure for setting PC or HMI A's MTP projects is as follows:

Step 1

Set the IP address of HMI B; suppose the IP address of HMI B is set for "192.168.1.2".

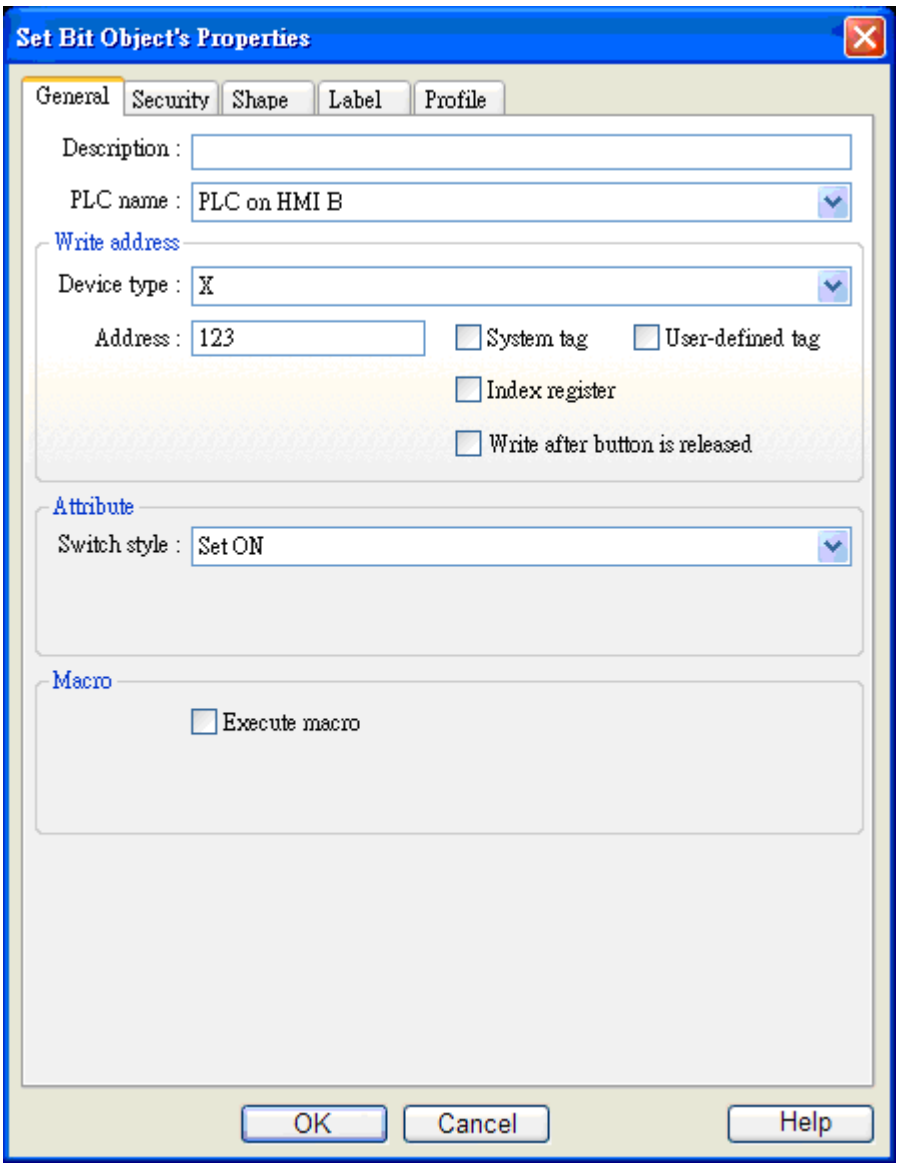
Step 2

Running the EB8000, and select the [Device Table] tab on the [System Parameter Setting] menu, then add a PLC device (defined as Mitsubishi FX0n_FX2 in the example below) and set the correct communication parameters.



Step 3

In the case of using the set bit object to operate the Mitsubishi PLC connected to HMI B, just need to select "PLC on HMI B" for [PLC name] on the [General] tab on the [Set Bit Object's Attributes] menu, then it is able to operate the PLC connected to the remote HMI B on PC through the simulator function .


Set Bit Object's Properties
General
Security
Shape
Label
Profile
Description :
PLC name :
PLC on HMI B
Write address
Device type :
X
Address :
123
System tag
User-defined tag
Index register
Write after button is released
Attribute
Switch style :
Set ON
Macro
Execute macro
OK
Cancel
Help

Chapter 22 System Reserved Words / Bits

Some Local Words and Local Bits are reserved for system usage. Users should not use there reserved words/bits except for the designated purposes. The range of reserved word/bits is listed as follows:

- Local Bits: 9000~9999 are reserved
- Local Words: 9000~9999 are reserved

22.1 System Status and Control

Address	Description	Read & Write	Macro	Remote HMI Control
LB-900n (n = 0~9)	When the HMI starts up, the initial states of these bits will be set as ON.	R / W	R / W	R / W
LB-9017	When the state is ON, the return function of [PLC Control] [Change Base Window] will be disable.	R / W	R / W	R / W
LB-9018	Set ON to make mouse cursor invisible	R / W	R / W	R / W
LW-9025	CPU loading (0-100%) indicator	R	R	R
LW-9050	Window number that are currently displayed as base windows on the MT8000.	R	R	R
LW-9100~ LW-9115	File names of the MTP projects used by the MT8000.	R	R	R
LW-9116~ LW-9117	Sizes of MTP projects (unit: byte).	R	R	R
LW-9118~ LW-9119	Sizes of MTP projects (unit: K byte).	R	R	R
LW-9120~ LW-9121	Version of complier that is used for MTP projects.	R	R	R
LW-9122	Time (year) of MTP project being complied.	R	R	R
LW-9123	Time (month) of MTP project being complied.	R	R	R
LW-9124	Time (day) of MTP project being complied.	R	R	R
LW-9125	IP0 (The IP address format is IP0. IP1. IP2.	R	R	R

	IP3.)			
LW-9126	IP1	R	R	R
LW-9127	IP2	R	R	R
LW-9128	IP3.	R	R	R
LW-9129	gw0. (The IP address of gateway : gw 0. gw 1. gw 2. gw 3.)	R	R	R
LW-9130	gw1	R	R	R
LW-9131	gw2	R	R	R
LW-9132	gw3	R	R	R
LW-9133	Ethernet port no.	R	R	R
LW-9134	Language mode	R/W	R/W	R/W

22.2 States of Data Input

Address	Description	Read & Write	Macro	Remote HMI Control
LW-9002~ LW-9003	Maximum value that is allowed to input to the current data input object. The data format is 32-bit (float).	R	R	R
LW-9004~ LW-9005	Minimum value that is allowed to input to the current data input object. The data format is 32-bit (float).	R	R	R
LW-9150~ LW-9181	Data stream input from the keypad, saved in the ASCII format and the length of data is 32 words.	R	R	R
LW-9540	Reserved for the use of the Caps Lock key on the keypad.	R	R	R

22.3 Recipe Data

Address	Description	Read & Write	Macro	Remote HMI Control
LB-9010	ON when recipe data is in download operation.	R	R	R
LB-9011	ON when recipe data is in upload operation.	R	R	R
LB-9012	ON when recipe data is in either download or upload operation.	R	R	R

LB-9028	If it is set ON, all recipe data will be clear (set to 0).	W	W	W
LB-9029	The MT8000 will save recipe data (RW and RWA) on the flash memory every 5 minutes. If it is set ON, recipe data will be compulsorily saved on the flash memory.	W	W	W

22.4 Task Button and Fast Selection Window

Address	Description	Read & Write	Macro	Remote HMI Control
LB-9013	If it is set ON, the Fast Selection Window is disable.	W	W	W
LB-9014	If it is set ON, the Task Button is disable.	W	W	W
LB-9015	If it is set ON, both the Fast Selection Window and Task Button is disable.	W	W	W

22.5 Event Logging

Address	Description	Read & Write	Macro	Remote HMI Control
LB-9021	Clear all event logs of the day when bit is set ON.	W	W	W
LB-9022	The oldest event log message will be deleted when bit is set ON.	W	W	W
LB-9023	Clear all event logs in the MT8000 when bit is set ON.	W	W	W
LB-9024	The MT8000 will recalculate the file sizes of all the event log message when bit is set ON.	W	W	W
LB-9042	Set ON to acknowledge all unacknowledged events	W	W	W
LB-9043	Status ON indicates there are unacknowledged events	R	N/A	N/A
LW-9060	Number of existing event logs.	R	R	R
LW-9061	The file sizes of all event logs (32-bit Unsigned).	R	R	R

22.6 Data Logging

Address	Description	Read & Write	Macro	Remote HMI Control
LB-9025	Set ON to delete the oldest data sampling log. (The function can only work for data sampling logs on the MT8000.)	W	W	W
LB-9026	Set ON to delete all the data sampling log. (The function can only work for data sampling logs on the MT8000.)	W	W	W
LB-9027	The MT8000 will recalculate the file sizes of all the data sampling log when bit is set ON.	W	W	W
LW-9063	The number of data sampling logs on the MT8000.	W	W	W
LW-9064	The file sizes of all data sampling logs on the MT8000 (32-bit Unsigned).	W	W	W

22.7 Password and Operation Level

Address	Description	Read & Write	Macro	Remote HMI Control
LB-9050	Set ON to logout	W	W	W
LB-9060	ON when a password error occurs.	R	N/A	N/A
LB-9061	When set ON, the MT8000 will copy data stored in [LW9500] to [LW9535] and use it as valid password.	W	N/A	N/A
LW-9219	Show the existing user No. 0 user 1, user 2, or user 3.	R	R	R
LW-9220~ LW-9221	Address for password entering (32-bit).	R / W	R / W	R / W
LW-9222	Level (0~6) of currently entered password.	R	R	R
LW-9500~ LW-9501	A new password for user 1	R / W	R / W	R / W
LW-9502~ LW-9503	A new password for user 2	R / W	R / W	R / W
LW-9504~ LW-9504	A new password for user 3	R / W	R / W	R / W
LW-9506~	A new password for user 4	R / W	R / W	R / W

LW-9505				
LW-9508~ LW-9506	A new password for user 5	R / W	R / W	R / W
LW-9510~ LW-9511	A new password for user 6	R / W	R / W	R / W
LW-9512~ LW-9513	A new password for user 7	R / W	R / W	R / W
LW-9514~ LW-9515	A new password for user 8	R / W	R / W	R / W
LW-9516~ LW-9517	A new password for user 9	R / W	R / W	R / W
LW-9518~ LW-9519	A new password for user 10	R / W	R / W	R / W
LW-9520~ LW-9521	A new password for user 11	R / W	R / W	R / W
LW-9522~ LW-9523	A new password for user 12	R / W	R / W	R / W

22.8 Time of HMI

Address	Description	Read & Write	Macro	Remote HMI Control
LW-9010	Local time (second, BCD)	R / W	R / W	R / W
LW-9011	Local time (minute, BCD)	R / W	R / W	R / W
LW-9012	Local time (hour, BCD)	R / W	R / W	R / W
LW-9013	Local time (day, BCD)	R / W	R / W	R / W
LW-9014	Local time (month, BCD)	R / W	R / W	R / W
LW-9015	Local time(year, BCD)	R / W	R / W	R / W
LW-9016	Local time (week, BCD)	R	R	R
LW-9017	Local time (second, BIN)	R / W	R / W	R / W
LW-9018	Local time (minute, BIN)	R / W	R / W	R / W
LW-9019	Local time (hour, BIN)	R / W	R / W	R / W
LW-9020	Local time (day, BIN)	R / W	R / W	R / W
LW-9021	Local time (month, BIN)	R / W	R / W	R / W
LW-9022	Local time (year, BIN)	R / W	R / W	R / W
LW-9023	Local time (week, BIN)	R	R	R
LW-9030~ LW-9031	System time (in units of 0.1 second), timing from the machine starts up.	R	R	R

22.9 Hardware of HMI

Address	Description	Read & Write	Macro	Remote HMI Control
LB-9019	Set ON to disable Sound and Buzzer Set OFF to enable Sound and Buzzer	R / W	R / W	R / W
LB-9040	Set OFF to ON increase the brightness of CCFL backlight one step.	W	W	W
LB-9041	Set OFF to ON decrease the brightness of CCFL backlight one step.	W	W	W
LW-9070	free space for event logs (K bytes)	R / W	R / W	R / W
LW-9071	System reserved free space size (K bytes)	R / W	R / W	R / W
LW-9072	MT8000 available free space (K bytes)	R / W	R / W	R / W

22.10 The States of Communicating with Remote HMI(s)

Address	Description	Read & Write	Macro	Remote HMI Control
LB-910n	n = 0~31 The registers can be used to indicate the states of communication with remote HMIn. .ON indicates the communication is normal, while OFF indicates the communication is disconnected from remote HMIn; at this time set the state to ON, the MT8000 will try to connect to remote HMIn again.	R / W	R / W	R / W

22.11 The States of Communicating with PLC

Address	Description	Read & Write	Macro	Remote HMI Control
LB-9150	When the state is ON, the system will automatically resume connection if the PLC device with COM 1 is disconnected. When the state is OFF, the disconnection to the PLC device will not be resumed	R / W	R / W	R / W
LB-9151	When the state is ON, the system will automatically resume connection if the PLC device with COM 2 is disconnected. When the state is OFF, the disconnection to the PLC device will not be resumed.	R / W	R / W	R / W
LB-9152	When the state is ON, the system will automatically resume connection if the PLC device with COM 3 is disconnected. When the state is OFF, the disconnection to the PLC device will not be resumed.	R / W	R / W	R / W
LB-9153~ LB-9184	When the state is ON, the system will automatically resume connection if the PLC	R / W	R / W	R / W

	device with the Ethernet port is disconnected; n = 0~31. When the state is OFF, the disconnection to the PLC device will not be resumed.			
LB-9200~ LB-9455	The registers can be used to indicate the states of communication with the PLC device on COM 1. LB9200 is to indicate the states of communication with the PLC on the station no. 0, LB9201 is to indicate the states of communication with the PLC on the station no. 1, and so on. When the state is ON, it indicates the communication is normal. When the state is OFF, it indicates the disconnection to the PLC device; at this time set the state at ON, and the system will try to connect the PLC device again.	R / W	R / W	R / W

LB-9500~ LB-9755	The registers can be used to indicate the states of communication with the PLC device on COM 2. LB9500 is to indicate the states of communication with the PLC on the station no. 0, LB9501 is to indicate the states of communication with the PLC on the station no. 1, and so on. When the state is ON, it indicates the communication is normal. When the state is OFF, it indicates the disconnection to the PLC device; at this time set the state at ON, and the system will try to connect to the PLC device again.	R / W	R / W	R / W

LB-9800~ LB-10055	The registers can be used to indicate the states of communication with the PLC device on COM 3. LB9800 is to indicate the states of communication with the PLC on the station no. 0, LB9801 is to indicate the states of communication with the PLC on the station no. 1, and so on. When the state is ON, it indicates the communication is normal. When the state is OFF, it indicates the disconnection to the PLC device; at this time set the state at ON, and the system will try to connect to the PLC device again.	R / W	R / W	R / W
LB-10100~ LB-10131	The registers can be used to indicate the states of communication with the PLC device on the Ethernet port. When the state is OFF, it indicates the disconnection to the PLC device; at this time set the state at ON, and the system will try to connect to the PLC device again.	R / W	R / W	R / W
LW-930n	The number of the driver that is used by local PLC device.	R	R	R
LW-935n	The number of unprocessed commands that are gave to the local PLC device.	R	R	R
LW-940n	The content of the latest connection error when connecting to the local PLC device.	R	R	R

22.12 Client Connected to Server

Address	Description	Read & Write	Macro	Remote HMI Control
LB-9016	Set ON when client connects to server.	R / W	R / W	R / W
LW-9006	The number of clients connected to server.	R	R	R

22.13 MODBUS Server Station no.

Address	Description	Read & Write	Macro	Remote HMI Control
LW-9541	device station no.(COM 1) if configured as Modbus server	R / W	R / W	R / W
LW-9542	device station no.(COM 2) if configured as Modbus server	R / W	R / W	R / W
LW-9543	device station no. (COM 3) if configured as Modbus server	R / W	R / W	R / W
LW-9544	device station no. (Ethernet) if configured as Modbus server	R / W	R / W	R / W

22.14 COM Communication

Address	Description	Read & Write	Macro	Remote HMI Control
LB-9030	Set LB9030 from OFF to ON force the system to use LW9550~LW9554 as new communication parameter of COM1	R / W	R / W	R / W
LW-9550	COM 1 mode 0: RS232 1: RS232 2W 2: RS232 4W	R / W	R / W	R / W
LW-9551	COM 1 baud rate 0: 4800 1: 9600 2: 19200 3: 38400 4: 57600 5: 115200	R / W	R / W	R / W
LW-9552	COM 1 data bits 7 : 7 bits 8: 8 bits	R / W	R / W	R / W
LW-9553	COM 1 parity 0: none 1: even 2: odd	R / W	R / W	R / W

LW-9554	COM 1 stop bits 1: 1 bit 2: 2 bits	R / W	R / W	R / W
LB-9031	Set LB9031 from OFF to ON force the system to use LW9556~LW9559 as new communication parameter of COM2	R / W	R / W	R / W
LW-9556	COM 2 baud rate 0: 4800 1: 9600 2: 19200 3: 38400 4: 57600 5: 115200	R / W	R / W	R / W
LW-9557	COM 2 data bits 7 : 7 bits 8: 8 bits	R / W	R / W	R / W
LW-9558	COM 2 parity 0: none 1: even 2: odd	R / W	R / W	R / W
LW-9559	COM 2 stop bits 1: 1 bit 2: 2 bits	R / W	R / W	R / W
LB-9032	Set LB9032 from OFF to ON force the system to use LW9560~LW9564 as new communication parameter of COM3	R / W	R / W	R / W
LW-9560	COM 3 mode 0: RS232 2: RS232 4W	R / W	R / W	R / W
LW-9561	COM 3 baud rate 0: 4800 1: 9600 2: 19200 3: 38400 4: 57600 5: 115200	R / W	R / W	R / W
LW-9562	COM 3 data bits 7 : 7 bits	R / W	R / W	R / W

	8: 8 bits			
LW-9563	COM 3 parity 0: none 1: even 2: odd	R / W	R / W	R / W
LW-9564	COM 3 stop bits 1: 1 bit 2: 2 bits	R / W	R / W	R / W

22.15 File Manager

Address	Description	Read & Write	Macro	Remote HMI Control
LB-9034	Save event/data log to HMI	W	W	W
LB-9035	HMI free space insufficiency alarm	R	N/A	N/A
LB-9036	CF free space insufficiency alarm	R	N/A	N/A
LB-9037	USB1 free space insufficiency alarm	R	N/A	N/A
LB-9038	USB2 free space insufficiency alarm	R	N/A	N/A
LB-9039	Status of file backup activity	R	R	R
LW-9074	CF current free space	R	N/A	N/A
LW-9076	USB1 current free space	R	N/A	N/A
LW-9078	USB2 current free space	R	N/A	N/A

22.16 PLC & Remote HMI IP Address Setting

Address	Description	Read & Write	Macro	Remote HMI Control
LW-9600 ~ LW-9629	PLC 4's IP address setting (IP0:IP1:IP2:IP3)	R/W	R/W	R/W
LW-9800 ~ LW-9839	Remote HMI's IP address setting (IP0:IP1:IP2:IP3)	R/W	R/W	R/W

22.17 Printer Server Setting

Address	Description	Read & Write	Macro	Remote HMI Control

LW-9770~ LW-9773	Remote printer server setting (IP0:IP1:IP2:IP3)	R/W	R/W	R/W
LW-9774	Remote printer server user name	R/W	R/W	R/W
LW-9780	Remote printer server password	R/W	R/W	R/W

22.18 Address Index Function

Address	Description	Read & Write	Macro	Remote HMI Control
LW-9200~ LW-9260	Address index	R/W	R/W	R/W

22.19 The Address Ranges of Local HMI Memory

22.19.1 Bits

Memory	Device type	Address Range	Address Format
Local Memory Bits	LB	0~11999	AAAAA
Local Word Bits	LW_BIT	0~9999	AAAAABB AAAAA: address BB: bit offset (00~15) Example: 56712 address = 567 bit offset = 12
Retentive Memory Bit Index	RBI	0~65535	AAAAAB AAAAA: address B: bit offset (0~f) Example: 567a RW_Bit address = 567 + [LW9000] bit offset = a

Retentive Memory Word Bits	RW_Bit	0~65535	AAAAAB AAAAA: address B: bit offset (0~f) Example: 567a address = 567 bit offset = a
Retentive Memory A Word Bits	RW_A_Bit	0~65535	AAAAAB AAAAA: address B: bit offset (0~f) Example: 567a address = 567 bit offset = a

22.19.2 Words

Memory	Device type	Address Range	Format
Local Memory Words	LW	0~9999	AAAAA AAAAA: address
Retentive Memory Words	RW	0~65535	AAAAA AAAAA: address
Retentive Memory Word Index	RWI	0~65535	AAAAAB AAAAA: address Example: 567 RW address = 567 + [LW9000]
Retentive Memory A Word	RW_A	0~65535	AAAAA AAAAA: address
Extended Memory Words	EM0~EM9	AAAAAAAAAA Limited by device, Maximum 2 GB	

22.20 Touch Screen X and Y Position

Address	Description	Read & Write	Macro	Remote HMI Control
LW-9041	Touch status word (bit 0 ON = user is touching the screen)	R	R/W	R/W
LW-9042	Touch X position	R	R/W	R/W
LW-9043	Touch Y position	R	R/W	R/W
LW-9044	Leave X position	R	R/W	R/W
LW-9045	Leave Y postion	R	R/W	R/W

22.21 Variable Station no.

Address	Description	Read & Write	Macro	Remote HMI Control
LW-10000~ LW-10015	Var0~Var15 station no. variable (Usage: Var0#address)	R/W	R/W	R/W

Chapter 23 PLC Connection Guide

AIBUS

UDIAN Automation AI-501, AI-518, AI-519, AI-701, AI-702M, AI-704M, AI-706M, AI-719
http://www.yudian.us

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	AIBUS		
Com port	RS485 2W	RS232	
Baud rate	9600	9600, 19200	
Parity bit	None		
Data Bits	8		
Stop Bits	2		
HMI Station No.	0		
PLC Station No.	1	0-100	

Online Simulator	YES	
Extend address mode	NO	

PLC Setting:

Communication mode	

Device address:

AI-518

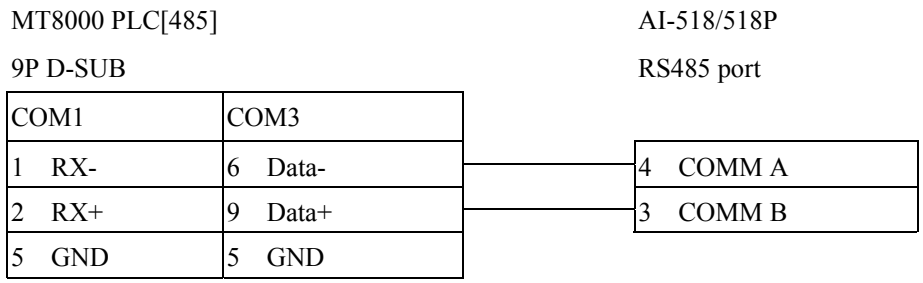
Bit/Word	Device Type		Format	Range	Memo
Word	0	00H	dd		SV/STEP
Word	1	01H	dd	-1999~+9999	HIAL
Word	2	02H	dd	-1999~+9999	LoAL
Word	3	03H	dd	0~9999	dHAL
Word	4	04H	dd	0~9999	dLAL
Word	5	05H	dd	0~2000	dF
Word	6	06H	dd	0~4	CtrL
Word	7	07H	dd	0~9999	M5
Word	8	08H	dd	1~9999	P
Word	9	09H	dd	0~2000	t
Word	10	0AH	dd	0~125	CtI
Word	11	0BH	dd	0~37	Sn (read only)
Word	12	0CH	dd	0~3	dIP (read only)
Word	13	0DH	dd	-1999~+9999	dIL
Word	14	0EH	dd	-1999~+9999	dIH
Word	15	0FH	dd	0~9999	ALP
Word	16	10H	dd	-1999~+4000 0.1℃	Sc
Word	17	11H	dd	0~48	Op1
Word	18	12H	dd	-110~+110%	oPL
Word	19	13H	dd	0~110%	oPH
Word	20	14H	dd	0~127	CF (read only)
Word	21	15H	dd	0~19.2K	Baud rate（bAud） /808Pstatus word: run:0 suspend:4 stop:12 (read only)
Word	22	16H	dd	0~100	ADDR
Word	23	17H	dd	0~20	dL
Word	24	18H	dd	0~127	Run
Word	25	19H	dd	0~9999	Loc

AI-701

Bit/Word	Device Type		Format	Range	Memo
W	1	01H	dd	-9990~+30000	HIAL
W	2	02H	dd	-9990~+30000	LoAL
W	3	03H	dd	-9990~+30000	HdAL
W	4	04H	dd	-9990~+30000	LdAL
W	5	05H	dd	0~2000	AHYS
W	11	0BH	dd	0~37	InP (read only)
W	12	0CH	dd	0~3	dPt
W	13	0DH	dd	-9999~+30000	SCL
W	14	0EH	dd	-9999~+30000	SCH
W	15	0FH	dd	0~4444	AOP
W	16	10H	dd	-1999~+4000 0.1℃	Scb
W	17	11H	dd	0~48	Opt
W	21	15H	dd	0~19.2K	Baud rate（bAud） /808P status word run:0 suspend:4 stop:12 (read only)
W	22	16H	dd	0~80	ADDR
W	23	17H	dd	0~40	FILt
W	25	19H	dd	0~255	Loc

Wiring diagram:

RS-485:



Allen-Bradley CompactLogix / FlexLogix

Allen-Bradley CompactLogix, FlexLogix CH0 DF1

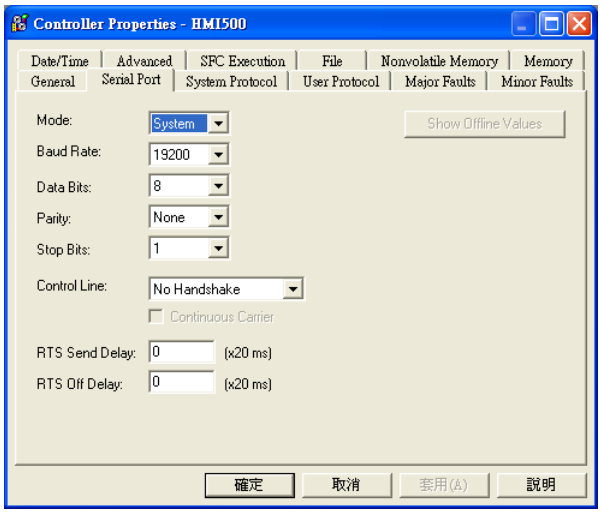
http://www.ab.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Allen-Bradley CompactLogix/FlexLogix		
Com port	RS232		
Baud rate	19200	9600, 19200, 38400	
Parity bit	None	Even, Odd, None	
Data Bits	8	8	
Stop Bits	1	1	
HMI Station No.	0		
PLC Station No.	1	1-31	

PLC Setting:

Communication mode	**DF1 Full Duplex protocol 19200, None, 8, 1 (default)** **Error Check: BCC, Station Address: 1**



Device address:

Bit/Word	Device Type	Format	Range	Memo
B	B_BOOL	fffddd(dd)	File no. ff: 3, 10~255 Element no. ddd: 0~255 Bit no. (dd): 0~15	Bit data file
B	N_BOOL	fffddd(dd)	File no. ff: 7, 10~255 Element no. ddd: 0~255 Bit no. (dd): 0~15	Integer data file bit level (N7, 10~255)
W	Bx_INT	fffddd	File no. fff: 3, 10~255 Element no. ddd: 0~255	Bit data file word level
DW	Tx.PRE	fffddd	File no. fff: 4, 10~255 Element no. ddd: 0~255	Timer Preset Value (T4, T10~255)
DW	Tx.ACC	fffddd	File no. fff: 4, 10~255 Element no. ddd: 0~255	Timer Accumulator Value (T4, T10~255)
DW	Cx.PRE	fffddd	File no. fff: 5, 10~255 Element no. ddd: 0~255	Counter Preset Value (C5, C10~255)
DW	Cx.ACC	fffddd	File no. fff: 5, 10~255 Element no. ddd: 0~255	Counter Accumulator Value (C5, C10~255)
F	F8_REAL	ddd	ddd:0~255	Floating point data file (F8)
DW	Nx_INT	Fffddd	File no. fff:0~255 Element no. ddd:0~255	Integer data file (N7, 10~255)

Wiring diagram:

RS-232: ControlLogix, CompactLogix CPU CH0

MT8000 RS232
9P D-SUB Female

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

AB CPU CH0
RS-232
9P D-SUB Male

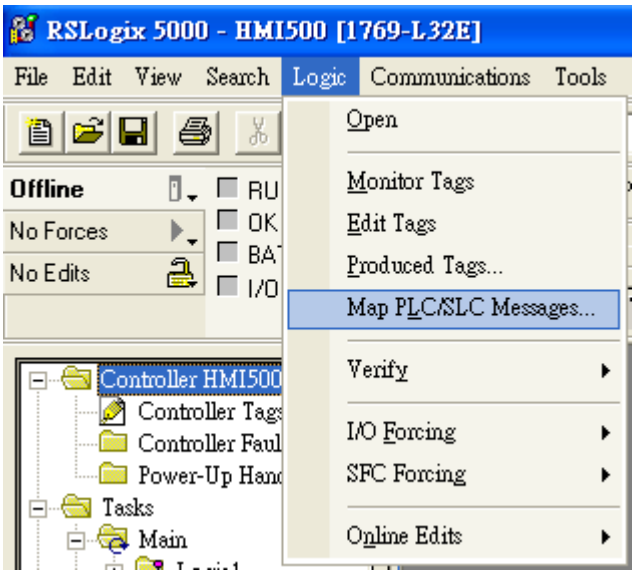
2	RD
3	TD
5	GND

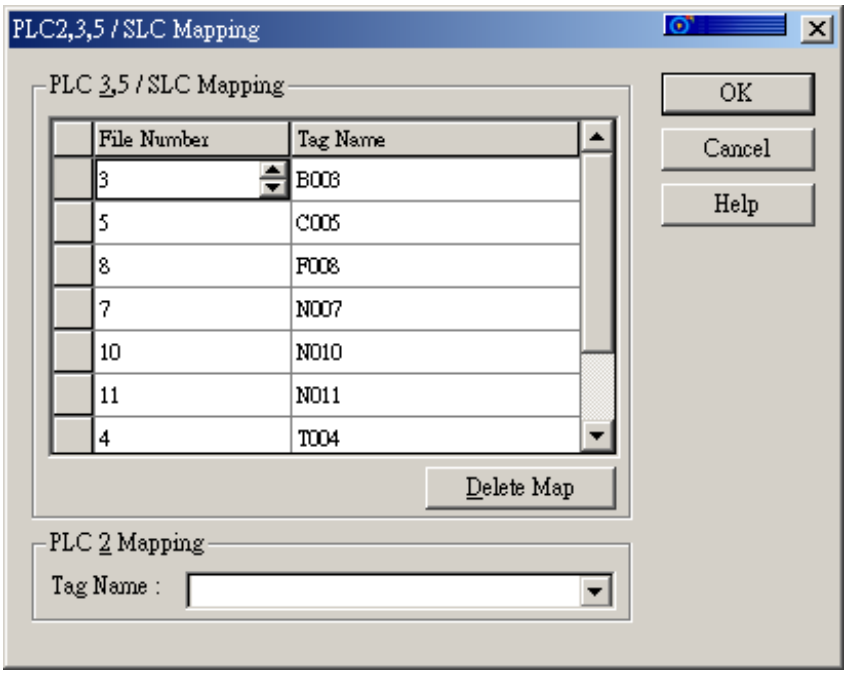
RS Logix 5000 setting

You can configure a mapping table to allow the controller to accept the PLC-2, 3, 5, or SLC/500 messages.

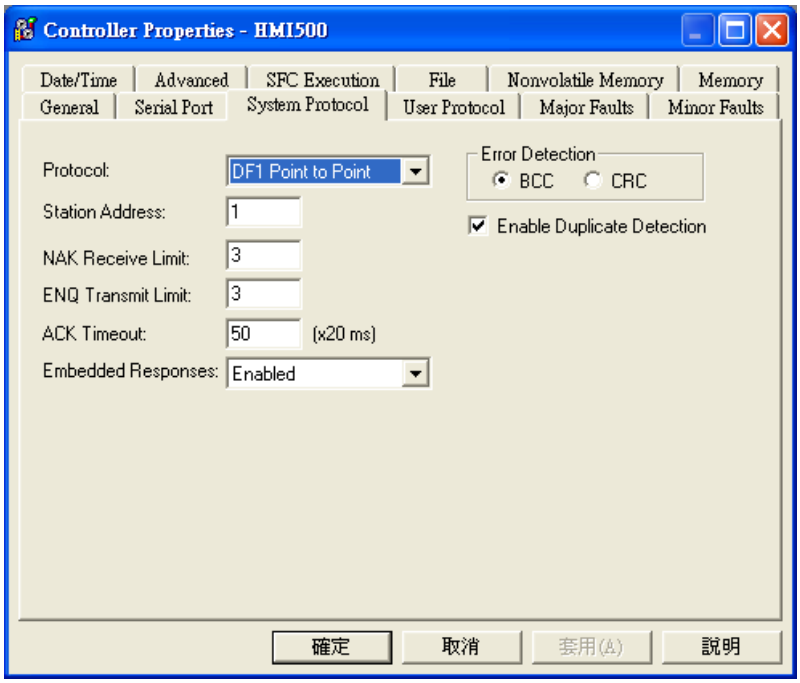
Configure Mapping for a PLC-3, PLC-5, or SLC/500 Processor

1. From the Logic menu, choose Map PLC Messages.
2. In the Mapping frame, enter the File Number and Tag Name to be mapped.
3. Click on OK to configure the mapping.

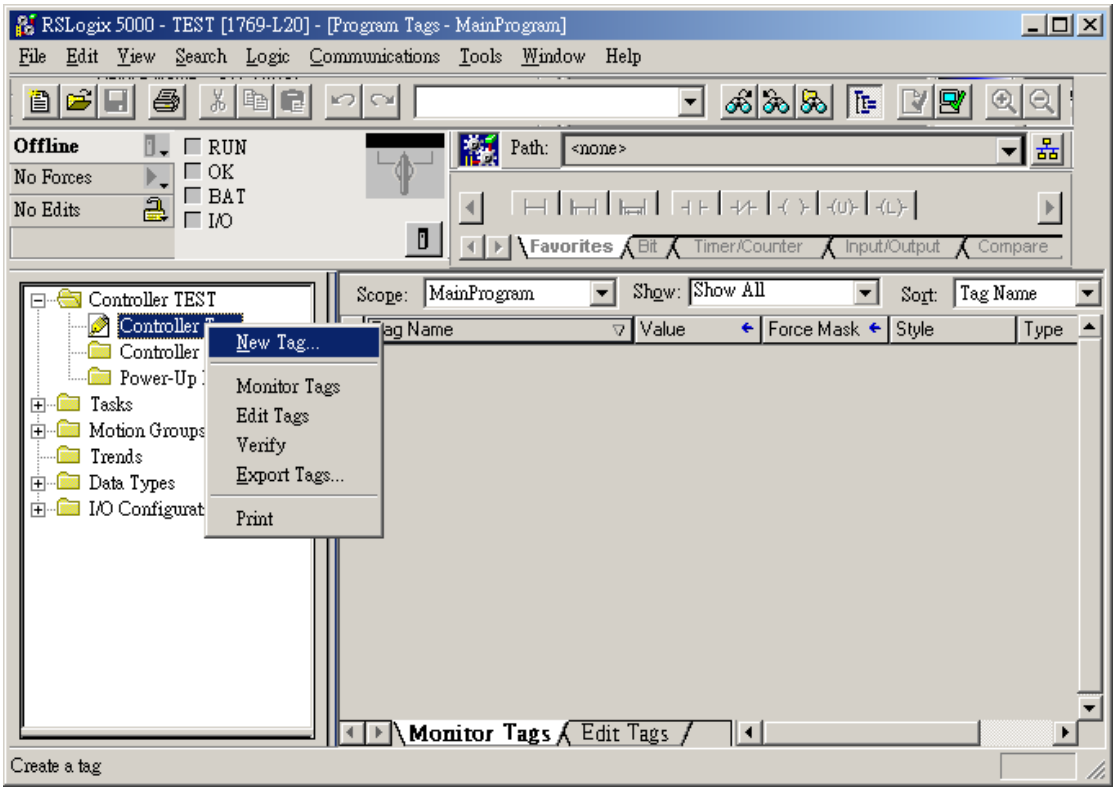


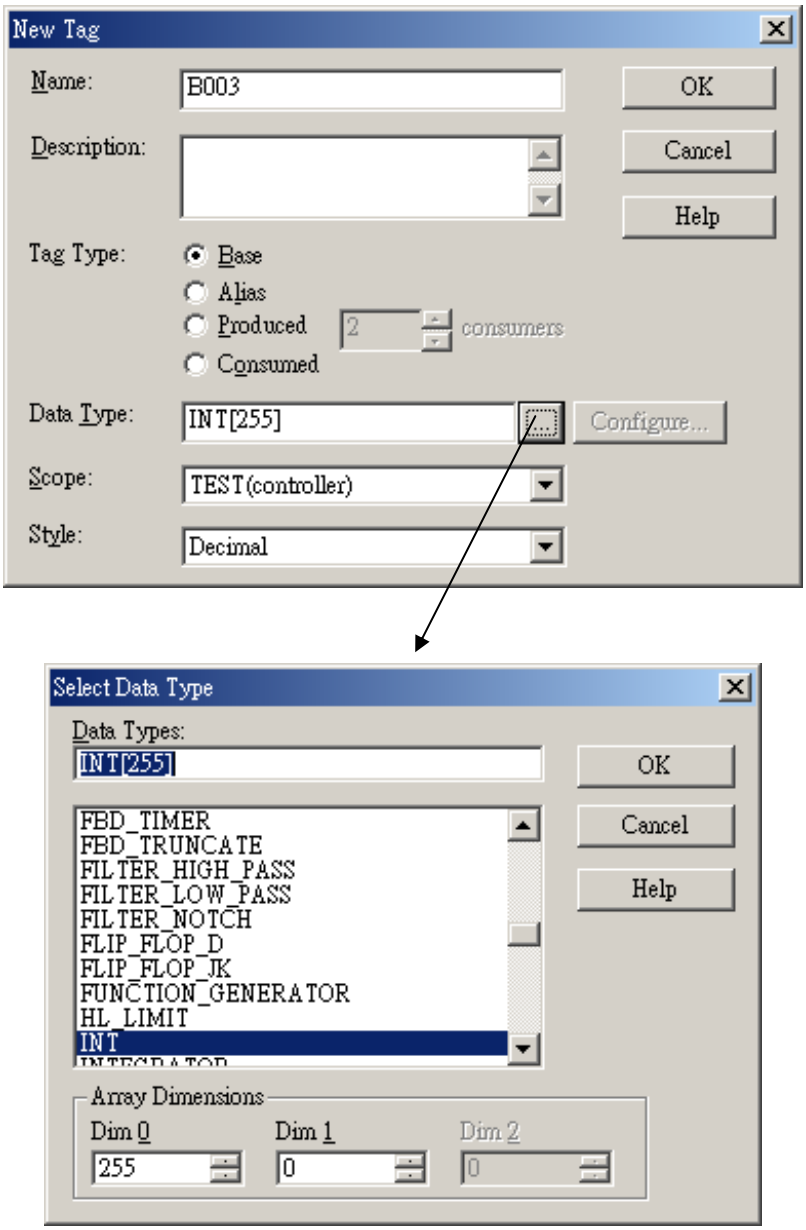


ControlLogix, CompactLogix CPU CH0 setting:



Create the Tag:




New Tag
Name:
B003
OK
Description:
Cancel
Help
Tag Type:
Base
Alias
Produced
2
consumers
Consumed
Data Type:
INT[255]
Configure...
Scope:
TEST(controller)
Style:
Decimal
Select Data Type
Data Types:
INT[255]
OK
Cancel
Help
FBD_TIMER
FBD_TRUNCATE
FILTER_HIGH_PASS
FILTER_LOW_PASS
FILTER_NOTCH
FLIP_FLOP_D
FLIP_FLOP_JK
FUNCTION_GENERATOR
HL_LIMIT
INT
Array Dimensions
Dim 0
Dim 1
Dim 2
255
0
0

Allen-Bradley DF1

Allen-Bradley MicroLogix 1000, 1100, 1200, 1500, SLC 5/03, 5/04, 5/05
http://www.ab.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	AB DF1		
Com port	RS232		
Baud rate	19200	9600, 19200, 38400	
Parity bit	None	Even, Odd, None	
Data Bits	8	8	
Stop Bits	1	1	
HMI Station No.	0		
PLC Station No.	1	1-31	

PLC Setting:

Communication mode	**DF1 Full Duplex protocol 19200, None, 8, 1 (default)** **Error Check: CRC**

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	I1	ddd(dd)	ddd:0~254 (dd): 0~15	Input (I)
B	O0	ddd(dd)	ddd:0~254 (dd): 0~15	Output (O)
B	S_Bit	ddd(dd)	ddd:0~254 (dd): 0~15	Status (S) bit level
B	B3	ddd(dd)	ddd:0~254 (dd): 0~15	Bit data file (B3)
B	B10~13	ddd(dd)	ddd:0~254 (dd): 0~15	Bit data file (B10~13)
B	Bfn	fffddd(dd)	File no. fff: 3, 10~254 Element no. ddd: 0~254 Bit no. (dd): 0~15	Bit data file (B3, 10~254)
B	NfnBit	fffddd(dd)	File no. fff: 7, 10~254 Element no. ddd: 0~254 Bit no. (dd): 0~15	Integer data file bit level (N7, 10~254)
W	S	ddd	ddd:0~254	Status (S)
W	T4SV	ddd	ddd:0~254	Timer Preset Value (T4)
W	TfnSV	fffddd	File no. fff: 4, 10~254 Element no. ddd:0~254	Timer Preset Value
W	T4PV	ddd	ddd:0~254	Timer Accumulator Value (T4)
W	TfnPV	fffddd	File no. fff: 4, 10~254 Element no. ddd:0~254	Timer Accumulator Value
W	C5SV	ddd	ddd:0~254	Counter Preset Value (C5)
W	CfnSV	fffddd	File no. fff: 5, 10~254	Counter Preset Value

Bit/Word	Device Type	Format	Range	Memo
			Element no. ddd:0~254	
W	C5PV	ddd	ddd:0~254	Counter Accumulator Value (C5)
W	CfnPV	fffddd	File no. fff: 5, 10~254 Element no. ddd:0~254	Counter Accumulator Value
W	N7	ddd	ddd:0~254	Integer data file (N7)
W	N10~15	ddd	ddd:0~254	Integer data file (N10~15)
W	F8	ddd	ddd:0~254	Floating point data file (F8)
W	Nfn	fffddd	File no. fff:0~254 Element no. ddd:0~254	Integer data file (N7, 10~254)

Wiring diagram:

RS-232: MicroLogix 1000, 1100, 1200, 1500

MT8000 RS232
9P D-SUB

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

MicroLogix RS232
mini-DIN 8pin

4	RXD
7	TXD
8	GND

RS-232: SLC5/03, 04, 05 CH0

MT8000 RS232
9P D-SUB Female

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

AB CPU CH0
RS-232
9P D-SUB Male

2	RD
3	TD
5	GND

Allen-Bradley DH485

Allen-Bradley MicroLogix 1000, 1100, 1200, 1500, SLC 5/03, 5/04, 5/05
http://www.ab.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Allen-Bradley DH485		
Com port	RS485 2W	RS232	
Baud rate	19200	9600, 19200	
Parity bit	Even		
Data Bits	8		
Stop Bits	1		
HMI Station NO.	0	2	
PLC Station NO.	1	1-31	

Online Simulator	YES		
Extend address mode	NO		

PLC Setting:

Communication mode	**DH485 protocol 19200 (default)** **Set the Max. Node Address as exactly how many PLCs you have.**

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	I1	ddd(dd)	ddd:0~254 (dd): 0~15	Input (I)
B	O0	ddd(dd)	ddd:0~254 (dd): 0~15	Output (O)
B	B3	ddd(dd)	ddd:0~254 (dd): 0~15	Bit data file (B3)
B	B10~13	ddd(dd)	ddd:0~254 (dd): 0~15	Bit data file (B10~13)
B	Bfn	fffddd(dd)	File no. fff: 3, 10~254 Element no. ddd: 0~254 Bit no. (dd): 0~15	Bit data file (B3, 10~254)
B	NfnBit	fffddd(dd)	File no. fff: 7, 10~254 Element no. ddd: 0~254 Bit no. (dd): 0~15	Integer data file bit level (N7, 10~254)
B	S_Bit	ddd(dd)	ddd:0~254 (dd): 0~15	Status file
W	T4SV	ddd	ddd:0~254	Timer Preset Value (T4)
W	T4PV	ddd	ddd:0~254	Timer Accumulator Value (T4)
W	C5SV	ddd	ddd:0~254	Counter Preset Value (C5)
W	C5PV	ddd	ddd:0~254	Counter Accumulator Value (C5)
W	TfnSV	fffddd	File no. fff:0~254 Element no. ddd:0~254	Timer Preset Value
W	TfnPV	fffddd	File no. fff:0~254 Element no. ddd:0~254	Timer Accumulator Value
W	CfnSV	fffddd	File no. fff:0~254 Element no. ddd:0~254	Counter Preset Value
W	CfnPV	fffddd	File no. fff:0~254 Element no. ddd:0~254	Counter Accumulator Value
W	N7	ddd	ddd:0~254	Integer data file (N7)
W	N10~15	ddd	ddd:0~254	Integer data file (N10~15)
W	F8	ddd	ddd:0~254	Floating point data file (F8)
W	Nfn	fffddd	File no. fff:0~254 Element no. ddd:0~254	Integer data file (N7, 10~254)
W	S	ddd	ddd:0~254	Status file

Wiring diagram:

RS-485: SLC500 Fixed type, SLC5/01,02,03 CH1.

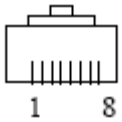
MT8000 can't connect to 1747-AIC PERIPHERAL PORT

MT8000 RS485
9P D-SUB

COM1	COM3
1 RX- 2 RX+ 5 GND	6 Data- 9 Data+ 5 GND

AB SLC500 DH485
RJ8 clip style ports

2	SDB
1	SDA
7	GND



RJ8 connector

RS-232: MicroLogix 1000, 1100, 1200, 1500 must set DH485 protocol.

MT8000 RS232
9P D-SUB

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

MicroLogix RS232
mini-DIN 8pin

4	RXD
7	TXD
8	GND

RS-232: SLC5/03,04,05 CH0 must set DH485 protocol.

MT8000 RS232
9P D-SUB Female

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

AB CPU CH0
RS-232
9P D-SUB Male

2	RD
3	TD
5	GND

<u>Caution: AB DH485 supports MT8000 X series only.</u>

Allen-Bradley EtherNet/IP CompactLogix

Allen-Bradley ControlLogix, CompactLogix, FelxLogix Ethernet

http://www.ab.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Allen-Bradley EtherNet (CompactLogix)		
Com port	Ethernet		
Port no.	44818		
PLC Station No.	1		

PLC Setting:

Communication mode	

Device address:

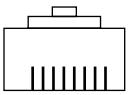
Bit/Word	Device Type	Format	Range	Memo
B	Bx_BOOL	ffddd(dd)	File no. ff: 3, 10~99 Element no. ddd: 0~999 Bit no. (dd): 0~15	Bit data file
B	Nx_BOOL	ffddd(dd)	File no. ff: 7, 10~99 Element no. ddd: 0~999 Bit no. (dd): 0~15	Integer data file bit level (N7, 10~99)
W	Bx_INT	fffddd	File no. fff: 3, 10~255 Element no. ddd: 0~255	Bit data file word level
W	Nx_INT	fffddd	File no. fff:0~255 Element no. ddd:0~255	Integer data file (N7, 10~99)
F	F8_REAL	ddd	ddd:0~255	Floating point data file (F8)
F	Fx_REAL	fffddd	File no. fff:0~255 ddd:0~255	Floating point data file (F8)

DW	Tx.PRE	fffddd	File no. fff: 4, 10~255 Element no. ddd: 0~255	Timer Preset Value (T4, T10~255)
DW	Tx.ACC	fffddd	File no. fff: 4, 10~255 Element no. ddd: 0~255	Timer Accumulator Value (T4, T10~255)
DW	Cx.PRE	fffddd	File no. fff: 5, 10~255 Element no. ddd: 0~255	Counter Preset Value (C5, C10~255)
DW	Cx.ACC	fffddd	File no. fff: 5, 10~255 Element no. ddd: 0~255	Counter Accumulator Value (C5, C10~255)

Wiring diagram:

Ethernet:

MT8000 Ethernet RJ45		**Wire color**	**Ethernet Hub or Switch RJ45**	
1	TX+	White/Orange	1	RX+
2	TX-	Orange	2	RX-
3	RX+	White/Green	3	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	6	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-



1 8

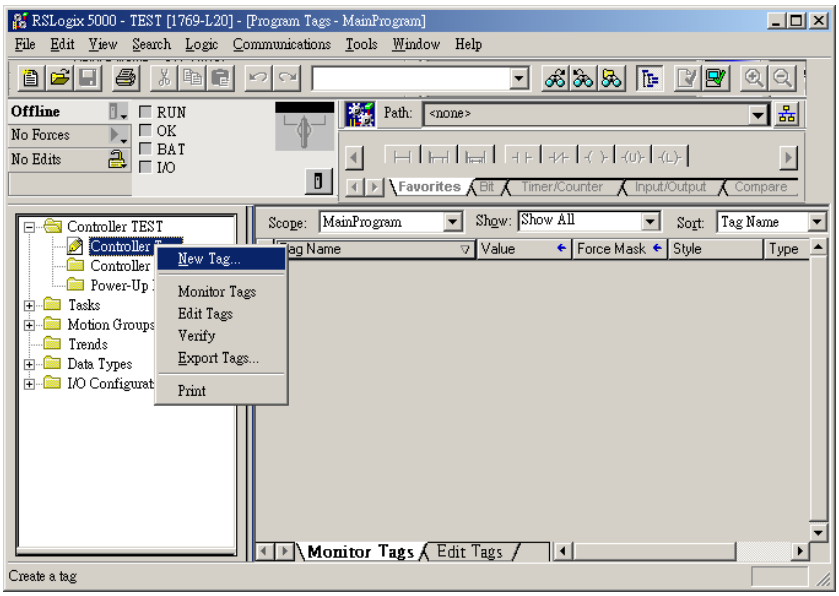
RJ45 connector

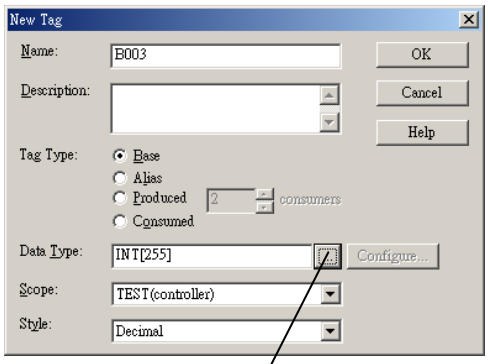
Ethernet: Direct connect (crossover cable)

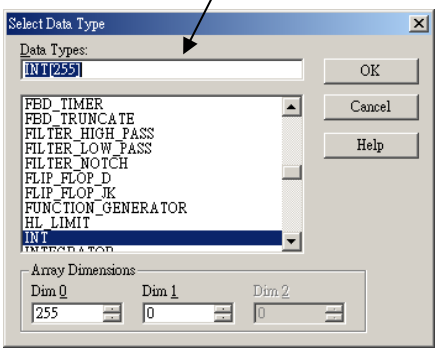
MT8000 Ethernet RJ45		**Wire color**	**CPU Ethernet port RJ45**	
1	TX+	White/Orange	3	RX+
2	TX-	Orange	6	RX-
3	RX+	White/Green	1	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	2	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-

RSLogix 5000 setting

Create the Tag:


RSLogix 5000 - TEST [1769-L20] - [Program Tags - MainProgram]
File Edit View Search Logic Communications Tools Window Help
Offline
No Forces
No Edits
RUN
OK
BAT
I/O
Path: <none>
Favorites Bit Timer/Counter Input/Output Compare
Controller TEST
Controller
Controller
Power-Up
Tasks
Motion Groups
Trends
Data Types
I/O Configurat
New Tag...
Monitor Tags
Edit Tags
Verify
Export Tags...
Print
Scope: MainProgram
Show: Show All
Sort: Tag Name
Tag Name
Value
Force Mask
Style
Type
Monitor Tags
Edit Tags
Create a tag


New Tag
Name: B003
Description:
OK
Cancel
Help
Tag Type:
Base
Alias
Produced
2
consumers
Consumed
Data Type: INT[255]
Configure...
Scope: TEST(controller)
Style: Decimal


Select Data Type
Data Types:
INT[255]
OK
Cancel
Help
FBD_TIMER
FBD_TRUNCATE
FILTER_HIGH_PASS
FILTER_LOW_PASS
FILTER_NOTCH
FLIP_FLOP_D
FLIP_FLOP_JK
FUNCTION_GENERATOR
HL_LIMIT
INT
Array Dimensions
Dim 0
Dim 1
Dim 2
255
0
0

Allen-Bradley EtherNet/IP (DF1)

Allen-Bradley MicroLogix 1100, SLC5/05 Ethernet port.
MicroLogix1000, 1200, 1500, SLC 5/03, 5/04 with 1761-NET-ENI

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Allen-Bradley EtherNet/IP (DF1)		
Com port	Ethernet		
TCP Port no.	44818		
HMI Station No.	0		
PLC Station No.	1		

PLC Setting:

Communication mode	**Port Setting: 10/100 Mbps Full Duplex/Half Duplex**

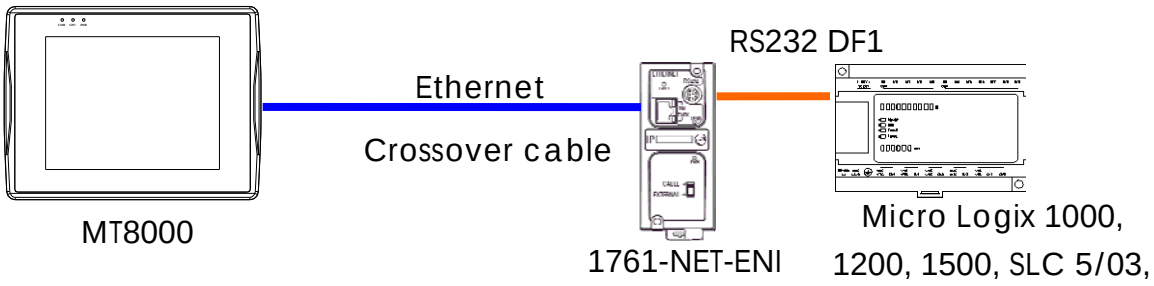
Device address:

Bit/Word	Device Type	Format	Range	Memo
B	I1	ddd(dd)	ddd:0~254 (dd): 0~15	Input (I)
B	O0	ddd(dd)	ddd:0~254 (dd): 0~15	Output (O)
B	B3	ddd(dd)	ddd:0~254 (dd): 0~15	Bit data file (B3)
B	Bfn	fffddd(dd)	File no. fff: 3, 10~254 Element no. ddd: 0~254 Bit no. (dd): 0~15	Bit data file (B3, 10~254)
B	NfnBit	fffddd(dd)	File no. fff: 7, 10~254 Element no. ddd: 0~254 Bit no. (dd): 0~15	Integer data file bit level (N7, 10~254)
W	T4SV	ddd	ddd:0~254	Timer Preset Value (T4)
W	T4PV	ddd	ddd:0~254	Timer Accumulator Value (T4)
W	C5SV	ddd	ddd:0~254	Counter Preset Value (C5)
W	C5PV	ddd	ddd:0~254	Counter Accumulator Value (C5)
W	N7	ddd	ddd:0~254	Integer data file (N7)
W	Nfn	fffddd	File no. fff:0~254	Integer data file (N7, 10~254)

			Element no. ddd:0~254	
32bit Float	F8	ddd	ddd:0~254	Floating point data file (F8)
32bit Float	Ffn	fffddd	File no. fff:0~254 Element no. ddd:0~254	Floating point data file (F8, 10~254)

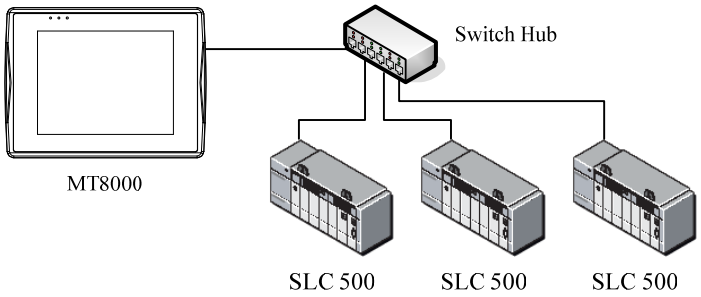
Wiring diagram:

Ethernet: Direct connect (crossover cable)

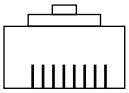


MT8000 Ethernet RJ45		Wire color	PLC RJ45	
1	TX+	White/Orange	3	RX+
2	TX-	Orange	6	RX-
3	RX+	White/Green	1	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	2	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-

Ethernet:



MT8000 Ethernet RJ45		Wire color	Ethernet Hub or Switch RJ45	
1	TX+	White/Orange	1	RX+
2	TX-	Orange	2	RX-



1 8

RJ45 connector

3	RX+	White/Green		3	TX+
4	BD4+	Blue		4	BD4+
5	BD4-	White/Blue		5	BD4-
6	RX-	Green		6	TX-
7	BD3+	White/Brown		7	BD3+
8	BD3-	Brown		8	BD3-

Allen Bradley PLC5

http://www.ab.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	AB PLC5		
Com port	RS232		
Baud rate	19200	9600, 19200	
Parity bit	None	Even, Odd, None	
Data Bits	8	8	
Stop Bits	1	1	
HMI Station No.	0		
PLC Station No.	1	1-31	

PLC Setting:

Communication mode	**DF1 Full Duplex protocol 19200, None, 8, 1 (default)**

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	I1	ddd(dd)	ddd:0~254 (dd): 0~15	Input (I)
B	O0	ddd(dd)	ddd:0~254 (dd): 0~15	Output (O)
B	B3	ddd(dd)	ddd:0~254 (dd): 0~15	Bit data file (B3)
B	B10~13	ddd(dd)	ddd:0~254 (dd): 0~15	Bit data file (B10~13)
W	T4SV	ddd	ddd:0~254	Timer Preset Value (T4)
W	T4PV	ddd	ddd:0~254	Timer Accumulator Value (T4)
W	C5SV	ddd	ddd:0~254	Counter Preset Value (C5)
W	C5PV	ddd	ddd:0~254	Counter Accumulator Value (C5)
W	N7	ddd	ddd:0~254	Integer data file (N7)
W	N10~15	ddd	ddd:0~254	Integer data file (N10~15)
W	F8	ddd	ddd:0~254	Floating point data file (F8)
W	Nfn	fffddd	File no. fff:7,9~254 Element no. ddd:0~254	Integer data file (V2.5.0 or newer)
W	Ffn	fffddd	File no. fff:8,9~254	Floating point data file (V2.5.0 or

Bit/Word	Device Type	Format	Range	Memo
			Element no. ddd:0~254	newer)

Allen-Bradley PLC-5 Family PLCs using the DF1 Full Duplex protocol.
For the PLC-5/10, PLC-5/15 and PLC-5/25 the MT8000 should be connected to:

- the DF1 port on the 1785-KE module;

for the PLC-5/11, PLC-5/20, PLC-5/30 and PLC-5/40 the MT8000 should be connected to:

- the Channel 0 Port on the PLC.

Wiring diagram:

RS-232: PLC5 CPU CH0

EasyView MT8000

9P D-SUB

COM1 [RS232]	COM2 [RS232]	COM3 [RS232]
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

AB CPU CH0 RS-232

25P D-SUB

3 RXD
2 TXD
7 GND

Baumuller Servo

http://www.baumuller.com/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Baumuller		
Com port	RS485 4W COM1		
Baud rate	19200	9600, 19200	
Parity bit	Even	Even, Odd, None	
Data Bits	8	7 or 8	
Stop Bits	1	1 or 2	
HMI Station No.	0		
PLC Station No.	0	Defaults	

Baumuller Servo Setting:

Communication mode	**RK 512 Protocol，19200，8，1，EVEN**

Device address:

Bit/Word	Device Type	Format	Range	Device Range
B	DB0_bit	ddd(h)	ddd:0~255 (h): 0~f	DB0_bit~DB29_bit
W	DB0	ddd	ddd:0~255	DB0~DB29

Wiring diagram:

RS-485 4W:

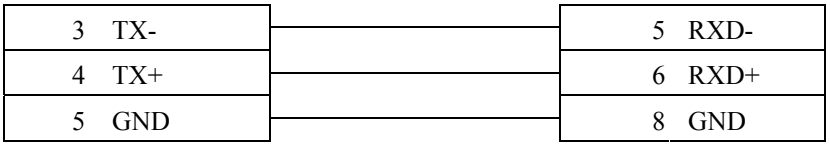
MT8000 HMI COM1

RS485 4W 9P D-SUB

Female

Baumuller servo
RS-422 9P D-SUB
Female

1	RX-	1	TXD-
2	RX+	9	TXD+


3 TX-
4 TX+
5 GND
5 RXD-
6 RXD+
8 GND

Copley Controls

Digital Servo Driver & Controllers, Xenus, Xenus Micro, Accelnet, Accelnet Micro, Stepnet series
http://www.copleycontrols.com/motion/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Copley Controls		
Com port	RS232		
Baud rate	9600	9600~115200	
Parity bit	None	Even, Odd, None	
Data Bits	8	8	
Stop Bits	1	1	
HMI Station No.	0		
PLC Station No.	0	0-127	

PLC Setting:

Communication mode	**ASCII format**

Device address:

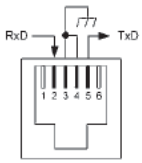
Bit/Word	Device Type	Format	Range	Memo
W	Flash INT 16	hhh	0~FFF	For Register is INT16 or U16
W	RAM INT 16	hhh	0~FFF	For Register is INT16 or U16
W	Flash INT 32	hhh	0~FFF	For Register is INT32 or U32
W	RAM INT 32	hhh	0~FFF	For Register is INT32 or U32

Wiring diagram:

Xenus, Xenus Micro, Accelnet

MT8000 RS232
9P D-SUB

Xenus Micro Panel
RS-232 RJ11
J7 cable connector

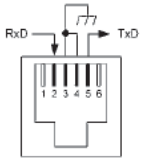


COM1	COM2	COM3		
3 TX	4 TX	7 TX	2	RXD
2 RX	6 RX	8 RX	5	TXD
5 GND	5 GND	5 GND	3, 4	GND

Stepnet

MT8000 RS232
9P D-SUB

Stepnet
RS232 RJ11
J8 cable connector



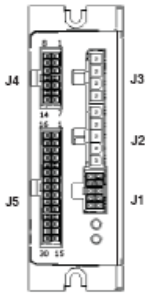
COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

2	RXD
5	TXD
3, 4	GND

Accelnet Micro

MT8000 RS232
9P D-SUB

Accelnet Micro Panel
RS-232
J5 cable connector



COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

14	RXD
29	TXD
15	GND

DELTA DVP

DELTA DVP series

http://www.deltadriver.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	DELTA DVP		
Com port	RS232	RS232, RS485	
Baud rate	9600	9600, 19200	
Parity bit	Even	Even, Odd, None	
Data Bits	7	7, 8	
Stop Bits	1	1	
HMI Station No.	0		
PLC Station No.	1	0-255	

PLC Setting:

Communication mode	

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	X	ooo	0 ~ 23417 (Octal)	Input
B	Y	ooo	0 ~ 23417 (Octal)	Output
B	M	dddd	0 ~ 9999	Auxiliary Relay
B	S	dddd	0 ~ 9999	Step Relay
B	T	dddd	0 ~ 9999	Timer
B	C	dddd	0 ~ 9999	Counter
B	TV	dddd	0 ~ 9999	Timer
W	CV	ddd	0 ~ 127	Counter
W	CV2	ddd	232 ~ 255	Double word counter
W	D	dddd	0 ~ 9999	Data Register

Wiring diagram:

1. RS232: CPU port

MT8000 RS232
9P D-SUB

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

DELTA DVP CPU port
8p mini DIN

4	RXD
5	TXD
3/8	GND

8Pin Mini-Din Female

2. RS485: CPU port

MT8000 RS232

COM1	COM3
1 RX-	6 Data-
2 RX+	9 Data+

DELTA DVP
RS-485 port

-
+

FATEK FB series

FATEK FBs series, FB MC series, FB MA series need FB-DTBR converter.
http://www.fatek.com/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	FATEK FB Series		
Com port	RS232	RS232/RS485/Ethernet	Must match the PLC's port setting.
Baud rate	9600		Must match the PLC's port setting.
Parity bit	Even		Must match the PLC's port setting.
Data Bits	7		
Stop Bits	1		
HMI Station No.	0		Does not apply to this protocol.
PLC Station No.	1	0-255	Must match the PLC's port setting.

PLC Setting:

Communication mode	

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	X	ddd	ddd : 0~9999	Input
B	Y	ddd	ddd : 0~9999	Output
B	M	ddd	ddd : 0~9999	Internal Relay
B	S	ddd	ddd : 0~9999	Step Relay
B	T	ddd	ddd : 0~9999	Timer
B	C	ddd	ddd : 0~9999	Counter
W	R	ddd	ddd : 0~9999	Data Register
W	D	ddd	ddd : 0~9999	Data Register
W	RT	ddd	ddd : 0~9999	Timer Register
W	RC	ddd	ddd : 0~9999	Counter Register
DW	DRT	ddd	ddd : 0~9999	Double word Timer Register

DW	DRC	ddd	ddd : 0~9999	Double word Counter Register

Wiring diagram:

1. RS232: CPU port

MT8000 RS232

9P D-SUB Male

FB CPU port

15P D-SUB Male

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

1	RX
2	TX
6	GND
3	RTS
4	CTS

2. RS485: CPU port

MT8000

COM[RS-485] 2w

9P D-SUB Female

FB CPU port

15P D-SUB Male

COM1	COM3
1 RX-	6 Data-
2 RX+	9 Data+

7	D-
5	D+

3. RS232: FB-DTBR/DTBR-E

MT8000 RS232

9P D-SUB Male

FB-DTBR/DTBR-E

15P D-SUB Male

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

1	RX
2	TX
6	GND
3	RTS
4	CTS

4. RS485: FB-DTBR/DTBR-E

MT8000 RS232

9P D-SUB Male

FB-DTBR/DTBR-E

9P D-SUB Male

COM1	**COM2**	COM3		
3 TX	4 TX	7 TX	3	RX
2 RX	6 RX	8 RX	4	TX
5 GND	5 GND	5 GND	1	GND

5. RS485: FB-DTBR/DTBR-E

MT8000

COM[RS-485] 2w

9P D-SUB Female

FB-DTBR/DTBR-E

3P Terminal Block

COM1	COM3	
1 RX-	6 Data-	D-
2 RX+	9 Data+	D+

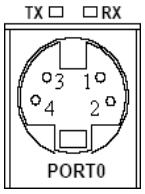
6. RS232: FBs Port0

MT8000 RS232

9P D-SUB Male

FB-DTBR/DTBR-E

4P Mini-Din Male



COM1	**COM2**	COM3		
3 TX	4 TX	7 TX	4	RX
2 RX	6 RX	8 RX	3	TX
5 GND	5 GND	5 GND	2	GND

4P Mini-Din Female

GE Fanuc SNP-X

GE Fanuc 90 & VersaMax series PLC

http://www.ge.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	GE Fanuc SNP-X		
Com port	RS485 4w	RS232/RS485	
Baud rate	19200	9600,19200,38400,57600,115200	Must same as the PLC setting
Parity bit	Odd	Even, Odd, None	Must same as the PLC setting
Data Bits	8	7,8	Must set as 8 to this protocol
Stop Bits	1	1, 2	Must same as the PLC setting
HMI Station No.	0	0-255	Does not apply to this protocol
PLC Station No.	0	0-255	Does not apply to this protocol

PLC Setting:

Refer to related PLC manual

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	I	ddd	1-10000	Input relay
B	Q	ddd	1-10000	Output relay
B	M	ddd	1-10000	Auxiliary relay
B	G	ddd	1-7680	
B	T	ddd	1-256	
W	AI	ddd	1-10000	Analog input register
W	AQ	ddd	1-10000	Analog output register
W	R	ddd	1-32640	Data register
B	SA	ddd	1-128	
B	SB	ddd	1-128	
B	SC	ddd	1-128	
B	S	ddd	1-128	

Wiring diagram:

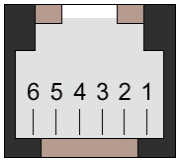
Memo：90 VersaMax series PLC of GE FANUC includes such series as 90-30, 90-70, VersaMax Micro, VersaMax Nano and VersaMax,etc., CPU of 90-30series can pass RS485 serial com port on module, utilize SNP serial communication protocol of GE to connect with EasyView MT8000HMI, In addition, CPU331/340/341/350/351/352/360/363/364 can also connect through CMM311 Communication Module, CPU351/352/363/364 also can connect through serial com port on CPU Unit；90-70 series CPU can also connect through CMM711 Communication Module or connect through serial com port on CPU Unit；Relevant software and hardware are set up concretely please consult the technical manual that GE GE Fanuc offered.

CPU port(90-30/VersaMax)

MT8000 COM1[485] 9P D-SUB	**90-30/VersaMax** **RS485 port** 15P SUB-D Female
1 RX-	12 SDA
2 RX+	13 SDB
5 GND	7 GND
3 TX-	10 RDA
4 TX+	11 RDB
	9 RT
	6 RTSA
	15 CTSA
	8 RTSB
	14 CTSB

CPU port(90-30 series CPU351/352/363/364)

MT8000 PLC[232] 9P D-SUB Female	**90-30/90-70 series** **RS232 port** 6P RJ-11 Female
3 TX	5 RX
2 RX	2 TX
5 GND	3 GND



6P RJ-11 Female

MT8000 RS232

9P D-SUB

VersaMax series
RS232 port
9P SUB-D Female

COM1	COM2	COM3		
3 TX	4 TX	7 TX	3	RX
2 RX	6 RX	8 RX	2	TX
5 GND	5 GND	5 GND	5	GND

CPU port(VersaMax series CPU001/002/005/E05)

MT8000 RS232

9P D-SUB

VersaMax series
RS232 port
9P SUB-D Female

COM1	COM2	COM3		
3 TX	4 TX	7 TX	3	RX
2 RX	6 RX	8 RX	2	TX
5 GND	5 GND	5 GND	5	GND

GE Fanuc Series 90-30 (Ethernet)

GE 90-30 series, CPU model 374plus

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	GE fanuc series 90-30 (Ethernet)		
Com port	Ethernet		
PLC station No.	1	1~99	
Port No.	18245		

Device address:

Bit/Word	Device type	Format	Range	Memo
B	I_bit	dddd	1 ~ 2048	
B	Q_bit	dddd	1 ~ 2048	
B	M_bit	dddd	1 ~ 4096	
B	G_bit	dddd	1 ~ 1280	
B	T_bit	ddd	1 ~ 256	
B	SA_bit	dd	1 ~ 32	Read Only
B	SB_bit	dd	1 ~ 32	Read Only
B	SC_bit	dd	1 ~ 32	Read Only
B	S_bit	dd	1 ~ 32	Read Only
W	I	dddd	1 ~ 2033	Address increases 8 words, ex: I1, I9, I17, I25…..
W	Q	dddd	1 ~ 2033	the rule is same as above, ex:Q1, Q9, Q17…
W	M	dddd	1 ~ 4081	the rule is same as above, ex:M1, M9, M17..
W	G	dddd	1 ~ 1256	the rule is same as above, ex:G1, G9, G17…
W	T	ddd	1 ~ 241	the rule is same as above, ex:T1, T9, T17….
W	SA	dd	1 ~ 17	Read Only, the rule is same as above

W	SB	dd	1 ~ 17	Read Only, the rule is same as above
W	SC	dd	1 ~ 17	Read Only, the rule is same as above
W	S	dd	1 ~ 17	Read Only, the rule is same as above
W	R	dddd	1 ~ 9999	
W	AI	dddd	1 ~ 2048	
W	AQ	ddd	1 ~ 512	

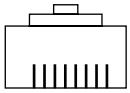
Wiring diagram:

Ethernet:

MT8000 Ethernet Wire color RJ45

Ethernet Hub or Switch RJ45

1	TX+	White/Orange	1	RX+
2	TX-	Orange	2	RX-
3	RX+	White/Green	3	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	6	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-



RJ45 connector

Ethernet: Direct connect (crossover cable)

MT8000 Ethernet Wire color RJ45			Modbus TCP Device RJ45	
1	TX+	White/Orange	3	RX+
2	TX-	Orange	6	RX-
3	RX+	White/Green	1	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	2	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-

HAN YOUNG

Temperature Controller

http://hynux.com/kor/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Heng Young Seires		
Com port	RS485 4W		Must match the PLC's port setting.
Baud rate	9600		Must match the PLC's port setting.
Parity bit	None	Even, Odd, None	Must match the PLC's port setting.
Data Bits	8	7 or 8	Must match the PLC's port setting.
Stop Bits	1	1 or 2	Must match the PLC's port setting.
PLC Station No.	1	0-255	Must match the PLC's port setting.

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	I	ddd	1-699	
W	D	ddd	1-699	

Wiring diagram:

MT8000 PLC[485] RS485 4w 9Pin D-Sub		Han Young RS485	
1	RX-	32	TX-
2	RX+	31	TX+
3	TX-	34	RX-
4	TX+	33	RX+

Heng Yuan Sensor

EU sereis, EU5 series, EU10 series.

http://www.hysensor.com.cn

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Heng Yuan Sensor		
Com port	RS485 2W		
Baud rate	9600		
Parity bit	Even		
Data Bits	8		
Stop Bits	1		
HMI Station No.	0		
PLC Station No.	2	1-31	

Online Simulator	YES	
Extend address mode	YES	

PLC Setting:

Communication mode	

Device address:

Bit/Word	Device Type	Format	Range	Memo
W	Parameter	ddd	ddd:0~1000	

Wiring diagram:

EU05 series

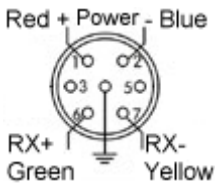
MT8000 PLC[485]

9P D-SUB

COM1	COM3
1 RX-	6 Data-
2 RX+	9 Data+
5 GND	5 GND

RS485 port

7 RX- (Yellow)
5 RX+ (Green)
4 GND (Black)



HITACHI H series (CPU port)

Compatible PLCs	
Family	Model
HITACHI H series	EH-150, Micro-EH, H20, H40, H64, H200, H250, H252, H300, H302, H700, H702, H1000, H1002, H2000, H4010

HITACHI Web site: http://www.hitachi-ies.co.jp/english/products/plc/index.htm

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	HITACHI H-Series		
Com port	RS232	RS232, RS485	Must match the PLC's port setting.
Baud rate	19200	9600, 19200, 38400	Must match the PLC's port setting.
Parity bit	Even	Even	Must match the PLC's port setting.
Data Bits	7	7	Must match the PLC's port setting.
Stop Bits	1	1	Must match the PLC's port setting.
HMI Station No.	0	0-255	Does not apply to this protocol.
PLC Station No.	0	0-255	Does not apply to this protocol.

Online Simulator	YES	Broadcast command	NO
Extend address mode	NO		

PLC Setting:

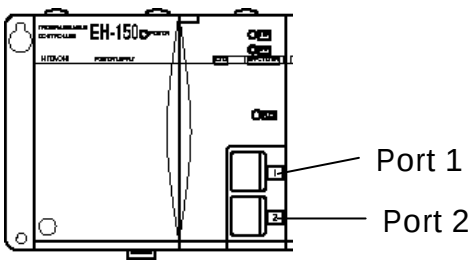
Communication mode	**19200,E,7,1(default)**
Select	

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	X	hhh(h)	hhh: 0~FFFF (h):0~F	External Input-bit(X)
B	Y	hhh(h)	hhh: 0~FFFF (h):0~F	External Output-bit(Y)
B	M	hhh(h)	hhh: 0~FFFF (h):0~F	Data area-bit(M)
B	T	hhh(h)	hhh: 0~FFFF (h):0~F	Timer(T)
B	R	hhh(h)	hhh: 0~FFFF (h):0~F	Internal Output(R)
B	L	hhh(h)	hhh: 0~FFFF (h):0~F	Link area-bit(L)
W	TC	hhh	hhh: 0~FF	Timer/Counter current value
W	WX	hhh	hhh: 0~270F	External Input-word(X)
W	WY	hhh	hhh: 0~270F	External Output-word(Y)
W	WR	hhh	hhh: 0~270F	Internal Output-word(R)
W	WL	hhh	hhh: 0~270F	Link area-word(L)
W	WM	hhh	hhh: 0~270F	Data area-word(M)

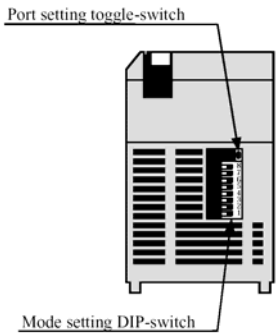
Wiring diagram:

WARNING: If your communications cable is not wired exactly as shown in our cable assembly instructions, damage to the MT8000 or loss of communications can result.



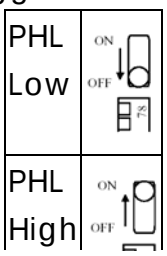
CPU TYPE	Port 1	Port 2
EH-150/CPU 104A	RS-232	RS-232
EH-150/CPU 208A	RS-232	RS-232
EH-150/CPU 308A	RS-232/RS-485	RS-232
EH-150/CPU 316A	RS-232/RS-485	RS-232
EH-150/CPU 448A	RS-232/RS-485	RS-232

Switch Number				
1	OFF	Normal mode		
2	OFF	TRNS0 operation		
3, 4	3	4	Port1 transmission speed	
	ON	ON	4,800 bps	Doesn't support
	OFF	ON	9,600 bps	
	ON	OFF	19,200 bps	Default
	OFF	OFF	38,400 bps	
5	ON	Dedicated port		



6	6	PHL	Port2 transmission speed	
	ON	Low	9,600 bps	
	ON	High	38,400 bps	
	OFF	Low	4,800 bps	Doesn't support
	OFF	High	19,200 bps	Default
7	OFF	(System mode)		Do not turn on.
8	OFF	(System mode)		Do not turn on.

Toggle-Switch

PHL Low	
PHL High	

EH-150 port1 RS232

MT8000 RS-232

9P D-SUB

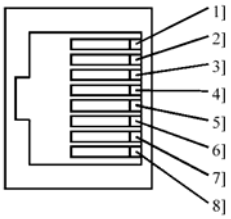
COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

HITACHI EH-150

port1

8pin RJ45 Male

6 RD
5 SD
1 SG
4 PHL
7 DR



Port 1

8pin RJ45

Female

EH150port1 RS485 4wire（RS422）：

EasyView MT8000 HMI

PLC RS485port

9PinD-SUB FEMALE

Hitachi EH-150

port1

8PinRJ45port

1 RX-	5 TX-
2 RX+	4 TX+
3 TX-	6 RX-
4 TX+	7 RX+
5 GND	1 SG

EH150port1 RS485 2wire：

EasyView MT8000 HMI

PLC RS485 port

9PinD-SUB FEMALE

Hitachi EH-150 port1

8PinRJ45 port

1 RX-	5 TX-
2 RX+	4 TX+
3 TX-	6 RX-
4 TX+	7 RX+
5 GND	1 SG

EH-150 port2 RS232

MT8000 PLC[232]

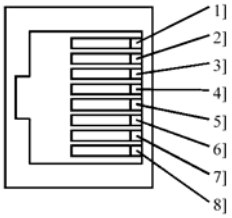
9P D-SUB Male

COM1	COM2	COM3
2 RX	6 RX	8 RX
3 TX	4 TX	7 TX
5 GND	5 GND	5 GND
7 RTS		
8 CTS		

HITACHI EH-150 port2

8pin RJ45 Male

5 SD
6 RD
1 SG
7 DR
8 RS



Port 2

8pin RJ45

Female

MT8000 PLC[232]

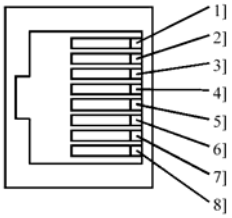
9P D-SUB Male

COM2	COM3
6 RX	8 RX
4 TX	7 TX
5 GND	5 GND

HITACHI EH-150 port2

8pin RJ45 Male

5 SD
6 RD
1 SG
4 PHL
7 DR



Port 2

8pin RJ45

Female

H series CPU RS232 port

MT8000 PLC[232]

HITACHI H series CPU RS232

15p D-SUB Male

9P D-SUB Male

COM1
3 TX
2 RX
5 GND
8 CTS

3 RXD
2 TXD
9 SG
4 RTS
10 SG
5 CTS
7 DSR
8 PHL
14 PV12

MICRO-EH port1 RS232

MT8000 RS-232

9P D-SUB

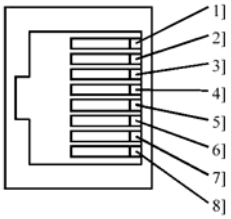
COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

HITACHI EH-150

port1

8pin RJ45 Male

6 RD
5 SD
1 SG
4 PHL
7 DR



Port 1

8pin RJ45

IDEC

IDEC Micro3, Micro3C, MicroSmart, OpenNet Controller series
http://www.idec.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	IDEC Micro		Support Extend address mode
Com port	RS232	RS232, RS485	
Baud rate	9600	9600, 19200	
Parity bit	Even	Even, Odd, None	
Data Bits	7	7, 8	
Stop Bits	1	1	
HMI Station No.	0		Does not apply to this protocol
PLC Station No.	255 (for 1:1 connect)	0-255	255 or same as the PLC setting

Online Simulator	YES	
Extend address mode	YES	Don't set the PLC Station No.= 255

PLC Setting:

Communication mode	**9600,E,7,1(default), Use Computer Link Protocol**

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	X	ddd(o)	ddd=0~2047, (o)=0~7	Input(I)
B	Y	ddd(o)	ddd=0~2047, (o)=0~7	Output(Q)
B	M	ddd(o)	ddd=0~2047, (o)=0~7	Internal Relay(M)
W	RT	ddd	ddd=0~9999	Timer(T)
W	RC	ddd	ddd=0~9999	Counter(C)
W	D	ddd	ddd=0~9999	Data Register(D)

Wiring diagram:

RS232: Micro3C, MicroSmart, OpenNet Controller CPU Ladder Port

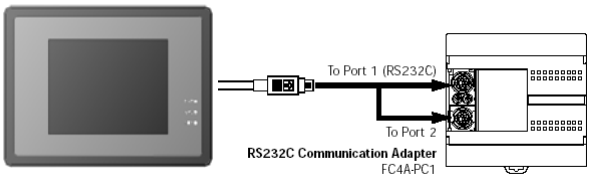
MT8000 RS232

CPU port 1 or port2 RS-232

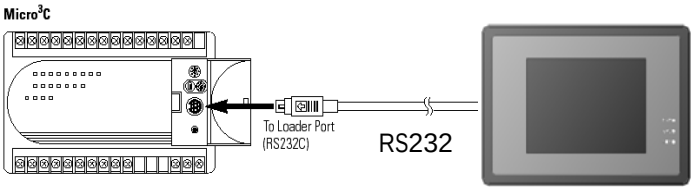
8P mini DIN Male

COM1	COM2	COM3		
3 TX	4 TX	7 TX		4 RXD
2 RX	6 RX	8 RX		3 TXD
5 GND	5 GND	5 GND		7 GND

8Pin mini DIN
Female Pin



MT8000 MicroSmart



MT8000

RS485: Micro3 CPU Port, MicroSmart with FC4A-PC2 RS485 Communication Adapter

MT8000 RS-485

CPU Port RS-485

8P mini DIN Male

COM1	COM3		
1 RX-	6 Data-		2 RXD-
2 RX+	9 Data+		1 RXD+
5 GND	5 GND		7 GND

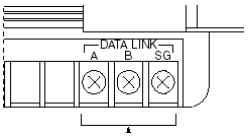
8Pin mini DIN
Female Pin

RS485: Micro3C, OpenNet Controller Data Link Terminals,
MicroSmart with FC4A-PC3 RS485 Communication Adapter

MT8000 RS-485

9P D-SUB Female

Data Link Terminals



COM1	COM3		
1 RX-	6 Data-		A RXD-
2 RX+	9 Data+		B RXD+
5 GND	5 GND		SG GND

KEYENCE KV series

KEYENCE KV series, KV10~80

http://www.keyence.com/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	KEYENCE KV-16		
Com port	RS232	RS232	Must match the PLC's port setting.
Baud rate	9600		Must match the PLC's port setting.
Parity bit	Even		Must match the PLC's port setting.
Data Bits	8		
Stop Bits	1		
PLC Station No.	1		Must match the PLC's port setting.

PLC Setting:

Communication mode	None

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	RLY	ddd(h)0	0~19999	
B	MR	ddd(h)	0~19999	
B	LR	ddd(h)	0~19999	
B	CR	ddd(h)	0~19999	
B	DM_Bit	ddd(h)	0~19999	
W	DM	ddd	0-1999	
W	TM	ddd	0-99	
W	CM	ddd	0~65535	
W	EM	ddd	0~65535	
W	T	ddd	0-999	
W	Timer_Curr	ddd	0-999	Timer_Current
W	Timer_Preset	ddd	0-999	
W	C	ddd	0-999	
W	Counter_Curr	ddd	0-999	Counter_Current

W	Counter_Preset	ddd	0-999	

Precaution:

If you use the Relay(bit) register, Please place zero behind address.For example, If you want to read Relay(bit)100, you just set the address as “1000”.

Wiring diagram:

RS232: CPU port

MT8000 RS-232 9P D-SUB

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

KEYENCE PLC

OP-26486

2 RXD
3 TXD
5 GND

KEYENCE KV-1000

http://www.keyence.com/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	KEYENCE KV-1000		
Com port	RS232	RS232	Must match the PLC's port setting.
Baud rate	9600		Must match the PLC's port setting.
Parity bit	Even		Must match the PLC's port setting.
Data Bits	8		
Stop Bits	1		
PLC Station No.	0		Must match the PLC's port setting.

PLC Setting:

Communication mode	None

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	RLY	ddd(h)0	0~19999	
B	MR	ddd(h)	0~19999	
B	LR	ddd(h)	0~19999	
B	CR	ddd(h)	0~19999	
B	DM_Bit	ddd(h)	0~19999	
W	DM	ddd	0-1999	
W	TM	ddd	0-99	
W	CM	ddd	0~65535	
W	EM	ddd	0~65535	
W	T	ddd	0-999	
W	Timer_Curr	ddd	0-999	Timer_Current
W	Timer_Preset	ddd	0-999	
W	C	ddd	0-999	

W	Counter_Curr	ddd	0-999	Counter_Current
W	Counter_Preset	ddd	0-999	

Precaution:

If you use the Relay(bit) register, Please place zero behind address.For example, If you want to read Relay(bit)100, you just set the address as “1000”.

Wiring diagram:

RS232: CPU port

MT8000 RS-232 9P D-SUB

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

KEYENCE PLC

OP-26486

2 RXD
3 TXD
5 GND

Korenix 6550 / 6520

http://www.korenix.com/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Korenix 6550/ 6520		Modbus protocol
COM port	Ethernet		
PLC station No.		0	
Port No.	502		

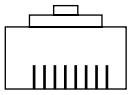
Device address:

Bit/Word	Device type	Format	Range	Memo
W	3X	ddddd	1~65535	
W	4X	ddddd	1~65535	
W	5X	ddddd	1~65535	
W	6X	ddddd	1~65535	
B	0X	ddddd	1~65535	
B	1X	ddddd	1~65535	
B	3x_Bit	ddddd	1~65535	
B	4x_Bit	ddddd	1~65535	
B	6x_Bit	ddddd	1~65535	

Wiring diagram:

Ethernet:

MT8000 Ethernet RJ45		Wire color	Ethernet Hub or Switch RJ45	
1	TX+	White/Orange	1	RX+
2	TX-	Orange	2	RX-
3	RX+	White/Green	3	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	6	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-



1 8

RJ45

Ethernet: Direct connect (crossover cable)

MT8000 Ethernet Wire color RJ45			Modbus TCP Device RJ45	
1	TX+	White/Orange	3	RX+
2	TX-	Orange	6	RX-
3	RX+	White/Green	1	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	2	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-

KOYO DirectLogic

KOYO DirectLogic series PLC DL05, DL06，DL105, DL205, DL305 and DL405 series
http://www.automationdirect.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	KOYO DIRECT		
Com port	RS232	RS232, RS485	
Baud rate	9600	9600, 19200, 38400	
Parity bit	Odd	Even, Odd, None	
Data Bits	8	7, 8	
Stop Bits	1	1	
HMI Station No.	0		Does not apply to this protocol.
PLC Station No.	1	1-90	

PLC Setting:

	1. The PLC must not have a password. 2. PLC must be set for Full Duplex operation. 3. PLC must be set for No Hardware Handshaking. 4. The PLC must be set to use the 'K' Sequence Protocol. 5. Set the mode switch to the TERM mode 6. When using the D4-440 CPU, you must set the station number to 1.

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	X	oooo	0 ~ 4000	Input Bits
B	Y	oooo	0 ~ 4000	Output Bits
B	C	ooooo	0 ~ 10000	Control Relays
B	T	oooo	0 ~ 1000	Timer Status Bits
B	CT	oooo	0 ~ 1000	Counter Status Bits
B	S	oooo	0 ~ 2000	
B	SP	oooo	0 ~ 2000	
B	GX	ooooo	0 ~ 10000	

B	GY	ooooo	0 ~ 10000	
W	Timer	oooo	0 ~ 1000	
W	Counter	oooo	0 ~ 1000	
W	V	oooo	0 ~ 77777	V Memory

Wiring diagram:

1. CPU unit: DL05/DL06/DL105/DL230/DL240/DL250/DL350/DL450 RS232 port

MT8000 RS232

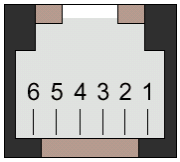
9P D-SUB

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

KOYO DirectLogic PLC
RS232 port

6P RJ12 phone jack

3 RX
4 TX
1 GND



RJ12 6Pin

2. CPU unit: DL06/DL250 CPU Port2 RS232

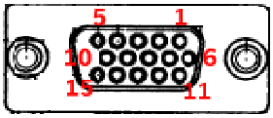
MT8000 RS232

9P D-SUB

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

KOYO DirectLogic PLC
CPU RS232 Port2
15P D-SUB Female

3 RX
2 TX
7 GND
4 RTC
5 CTS



15P D-SUB Female

3. CPU unit: DL06/DL250 CPU Port2 RS422

MT8000

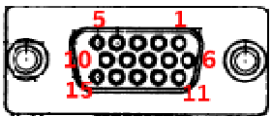
COM1 [RS-485] 4w

9P D-SUB

1	RX-
2	RX+
5	GND
3	TX-
4	TX+

KOYO DirectLogic PLC
CPU RS422 Port2
15P D-SUB Female

10	TX-
9	TX+
7	GND
6	RX-
13	RX+
11	RTS+
14	CTS+



12	RTS-
15	CTS-

Note: DL06/DL250 CPU Port2 include RS232 and RS422

4. CPU unit: DL430/DL440/DL450 CPU unit Port0 RS232

MT8000 RS232

9P D-SUB

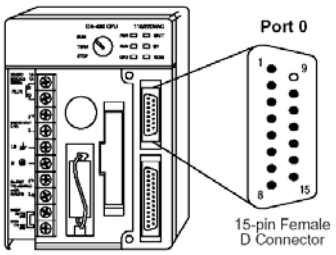
COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

KOYO DirectLogic PLC

DL405 CPU RS232 Port0

15P D-SUB Female

3	RX
2	TX
13	GND
1	YOP
7	CTS
2	YOM
4	ONLINE
14	GND



5. CPU unit: DL430/DL440/DL450 CPU unit Port1 & DL350 CPU unit Port2 RS232

MT8000 RS232

9P D-SUB

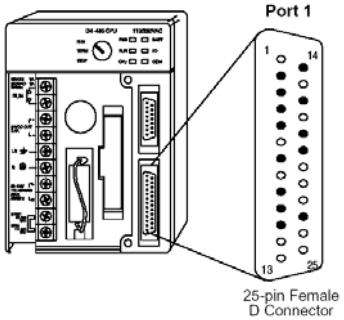
COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

KOYO DirectLogic PLC

DL305/405 CPU RS232 Port

25P D-SUB Female

3	RX
2	TX
7	GND
4	RTC
5	CTS



6. CPU unit: DL430/DL440/DL450 CPU unit Port1 & DL350 CPU unit Port2 RS422

MT8000

COM1[RS-485]4w

9P D-SUB

1	RX-
2	RX+
5	GND
3	TX-
4	TX+

KOYO DirectLogic PLC

DL305/405 CPU RS422 Port

25P D-SUB Female

16	TX-
14	TX+
7	GND
10	RX-
9	RX+
19	RTS+
11	CTS+

18	RTS-
23	CTS-

7. CPU unit: DL450 CPU unit Port3 RS422

MT8000

COM1[RS-485]4w

KOYO DirectLogic PLC

DL405 CPU RS422 Port3

25P D-SUB Female

9P D-SUB

1	RX-	13	TX-
2	RX+	12	TX+
5	GND	7	GND
3	TX-	25	RX-
4	TX+	24	RX+

8. Communication unit: DL205 series D2-DCM and DL405 series D4-DCM RS232

MT8000 RS232

9P D-SUB

KOYO DirectLogic PLC

DL205/405 DCM RS232 Port

25P D-SUB Female

COM1	COM2	COM3		
3 TX	4 TX	7 TX	3	RX
2 RX	6 RX	8 RX	2	TX
5 GND	5 GND	5 GND	7	GND
			4	RTC
			5	CTS

LS MASTER-K Cnet

LS MASTER-K series: K80S, K200S, K300S, K1000S
http://www.lgis.com/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	LS MASTER-K Cnet		
Com port	RS232	RS232/RS485	Must match the PLC's port setting.
Baud rate	38400	9600, 19200, 38400	Must match the PLC's port setting.
Parity bit	None	Even, Odd, None	Must match the PLC's port setting.
Data Bits	8	8	Must match the PLC's port setting.
Stop Bits	1	1	Must match the PLC's port setting.
HMI Station No.	0		Does not apply to this protocol.
PLC Station No.	0	0-31	Must match the PLC's port setting.

Online Simulator	YES	
Extend address mode		

PLC Setting:

Communication mode	**38400, None, 8, 1**

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	P	ddd(h)	0~255F	I/O Relay (P)
B	K	ddd(h)	0~255F	Keep Relay (K)
B	M	ddd(h)	0~255F	Auxiliary Relay (M)
B	L	ddd(h)	0~255F	Link Relay (L)
B	F	ddd(h)	0~255F	Special Relay (F)
W	TV	ddd	0~255	Timer Present Value
W	CV	ddd	0~255	Counter Present Value
W	D	dddd	0~9999	Data Register (D)

d: Decimal h: Hexadecimal

Wiring diagram:

MT8000 RS232 9P D-SUB			CPU port Cnet I/F RS232 9P D-SUB Female
COM1	COM2	COM3	
3 TX	4 TX	7 TX	4 RX
2 RX	6 RX	8 RX	7 TX
5 GND	5 GND	5 GND	5 GND

If connect with Cnet module please refer Cnet module's document.

LS MASTER-K300S CPU

LS MASTER-K series: K80S, K120S, K200S, K300S, K1000S
http://www.lgis.com/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	LG MASTER-K300S		
Com port	RS232	RS232/RS485	Must match the PLC's port setting.
Baud rate	38400	9600, 19200, 38400	Must match the PLC's port setting.
Parity bit	None	Even, Odd, None	Must match the PLC's port setting.
Data Bits	8	8	Must match the PLC's port setting.
Stop Bits	1	1	Must match the PLC's port setting.
HMI Station No.	0		Does not apply to this protocol.
PLC Station No.	0	0-31	Must match the PLC's port setting.

Online Simulator	YES	
Extend address mode		

PLC Setting:

Communication mode	**38400, None, 8, 1**

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	P	ddd(h)	0~255F	I/O Relay (P)
B	K	ddd(h)	0~255F	Keep Relay (K)
B	M	ddd(h)	0~255F	Auxiliary Relay (M)
B	L	ddd(h)	0~255F	Link Relay (L)
B	F	ddd(h)	0~255F	Special Relay (F)
W	TV	ddd	0~255	Timer Present Value
W	CV	ddd	0~255	Counter Present Value

W	D	dddd	0~9999	Data Register (D)

d: Decimal h: Hexadecimal

Wiring diagram:

MT8000 RS232
9P D-SUB

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

CPU port RS232
9P D-SUB Female

2 RX
3 TX
5 GND

LS XGB/XGT

LS XGB/XGT Series

http://www.lgis.com/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	LS XGB/XGT		
Com port	RS232	RS232/RS485	Must match the PLC's port setting.
Baud rate	115200	9600~115200	Must match the PLC's port setting.
Parity bit	None	Even, Odd, None	Must match the PLC's port setting.
Data Bits	8	7, 8	Must match the PLC's port setting.
Stop Bits	1	1	Must match the PLC's port setting.
HMI Station No.	0		
PLC Station No.	1	0-31	Must match the PLC's port setting.

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	P	ddd(h)	0~127F	I/O device_2,048 points
B	M	ddd(h)	0~255F	Internal device_4,096 points
B	L	dddd(h)	0~1279F	Communication device_20,480 points
B	K	dddd(h)	0~2559F	Preservation device_4,096 points
B	F	ddd(h)	0~255F	Special device_4,096 point
B	T	ddd	0~255	Timer device_256 point
B	C	ddd	0~255	Counter device_256 point
B	S	ddd(dd)	0~127(99)	Relay for step control
B	D_Bit	dddd(h)	0~5120F	Data register_Bit expression (D0000.0)
W	D	dddd	0~5119	Data register_5120 words
W	U	d(dd)	0~7(0~31)	Analog data register_256 words
W	N	dddd	0~3935	Communication data register_3,936 words
W	Z	ddd	0~127	Index register_128 words
W	T	ddd	0~255	Timer current value register_256 words
W	C	ddd	0~255	Counter current value register_256 words

d:Decimal h:Hexadecimal

Wiring diagram:

RS-232:

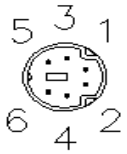
MT8000 RS232
9P D-SUB

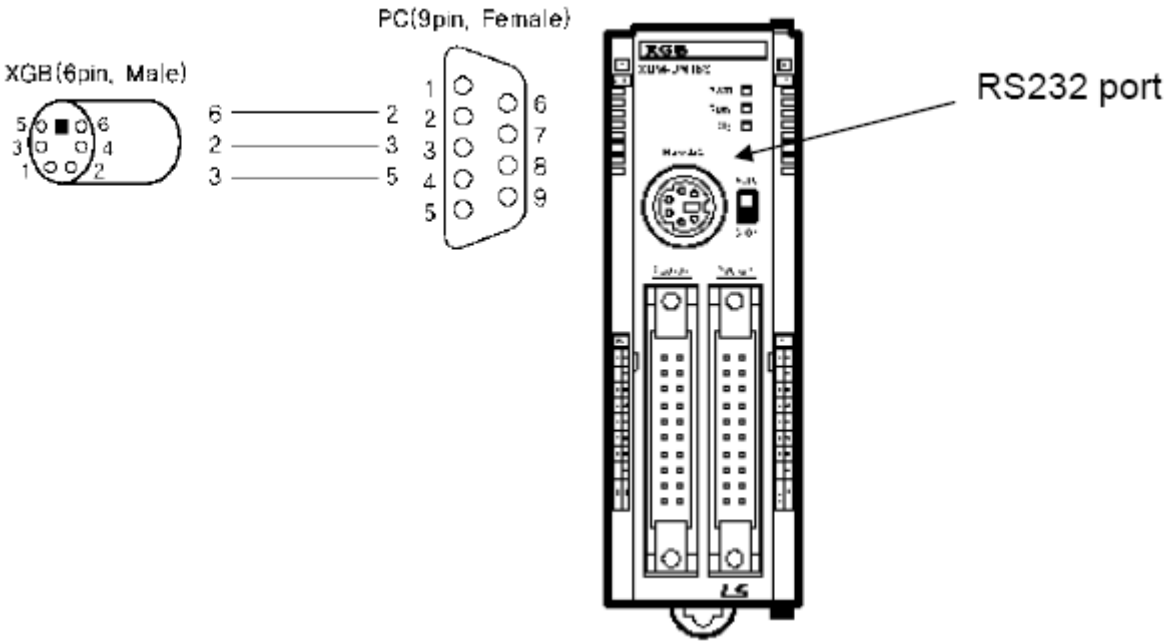
COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

XGB main unit
RS232 6pin

2	RXD
6	TXD
3	GND

6pin female pinout





LS XGB/XGT TCP/IP series

LS XGB/XGT TCP/IP Series

http://www.lgis.com/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	XBL-EMTA		
Com port	Ethernet		
PLC Station no.	0	0~255	
TCP/IP port	2004		

PLC Setting:

Communication mode	Fenet Potocol

Device address:

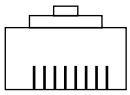
Bit/Word	Device Type	Format	Range	Memo
B	P	ddd(h)	0~127F	I/O device_2,048 points
B	M	ddd(h)	0~255F	Internal device_4,096 points
B	L	dddd(h)	0~1279F	Communication device_20,480 points
B	K	dddd(h)	0~2559F	Preservation device_4,096 points
B	F	ddd(h)	0~255F	Special device_4,096 point
B	T	ddd	0~255	Timer device_256 point
B	C	ddd	0~255	Counter device_256 point
B	S	ddd(dd)	0~127(99)	Relay for step control
B	D_Bit	dddd(h)	0~5120F	Data register_Bit expression (D0000.0)
W	D	dddd	0~5119	Data register_5120 words
W	U	d(dd)	0~7(0~31)	Analog data register_256 words
W	N	dddd	0~3935	Communication data register_3,936 words
W	Z	ddd	0~127	Index register_128 words
W	T	ddd	0~255	Timer current value register_256 words
W	C	ddd	0~255	Counter current value register_256 words

d:(Decimal) h:(Hexadecimal)

Wiring diagram:

Ethernet:

MT8000 Ethernet RJ45		Wire color	Ethernet Hub or Switch RJ45	
1	TX+	White/Orange	1	RX+
2	TX-	Orange	2	RX-
3	RX+	White/Green	3	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	6	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-



1 8

RJ45

Ethernet: Direct connect (crossover cable)

MT8000 Ethernet RJ45		Wire color	TCP Device RJ45	
1	TX+	White/Orange	3	RX+
2	TX-	Orange	6	RX-
3	RX+	White/Green	1	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	2	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-

LIYAN EX series

LIYAN PLC Ex/Ex1s/Ex1n/Ex2n series

http://www.liyanplc.com/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Mitsubishi FX0n/FX2		
Com port	RS232	RS232	Must match the PLC's port setting.
Baud rate	9600	9600~115200	Must match the PLC's port setting.
Parity bit	Even	Even, Odd, None	Must match the PLC's port setting.
Data Bits	7	7,8	Must match the PLC's port setting.
Stop Bits	1	1,2	Must match the PLC's port setting.
HMI Station No.	0	0-255	Does not apply to this protocol.
PLC Station No.	0	0-255	Must match the PLC's port setting.

PLC Setting:

Communication mode	**9600,7,1,Even**

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	X	ooo	0-377	Input relay
B	Y	ooo	0-377	Output relay
B	M	ddd	0-9999	Internal bit memory
B	T	ddd	0-255	Timer bit memory
B	C	ddd	0-255	Counter bit memory
W	TV	ddd	0-255	Timer register
W	CV	ddd	0~199	Counter Register
W	D	ddd	0-9999	data Register
W	CV2	ddd	200-255	Counter Register(Double word)
W	SD	ddd	8000-9999	Special data register

Wiring diagram:

Ex,Ex1s,Ex1n,Ex2n series RS232

MT8000 RS232
9P D-SUB

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

LIYAN Ex series
CPU RS232 Port
8P miniDin Female

4	RXD
7	TXD
8	GND

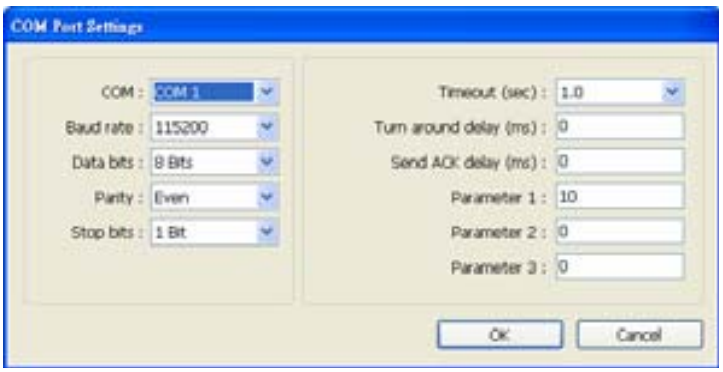
8Pin miniDin
Female

Master (Master-Slave Protocol)

MT500 series

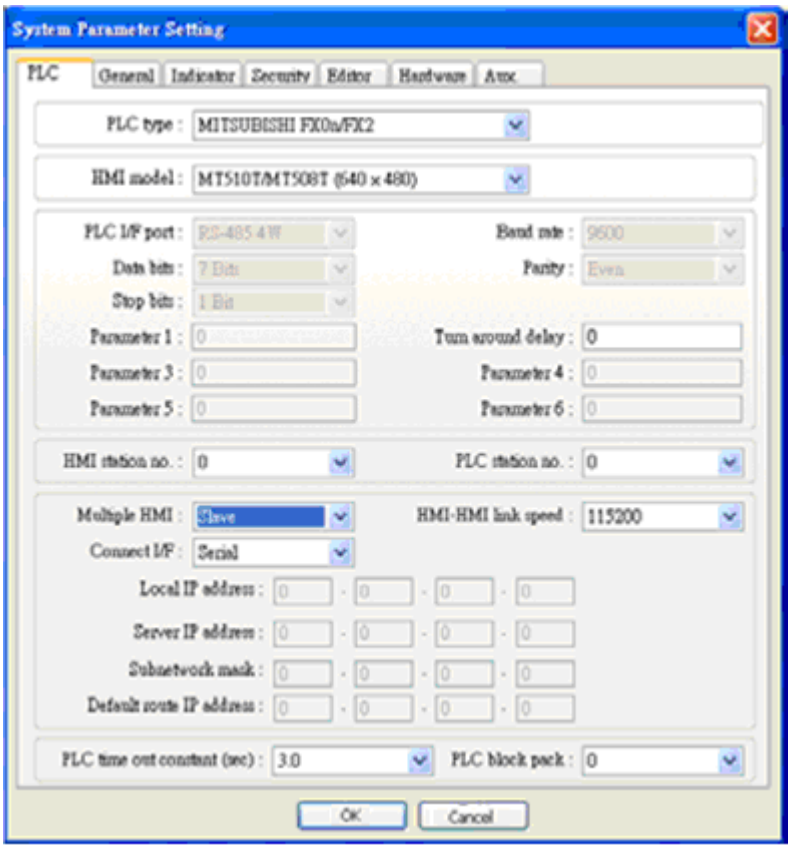
HMI Setting:

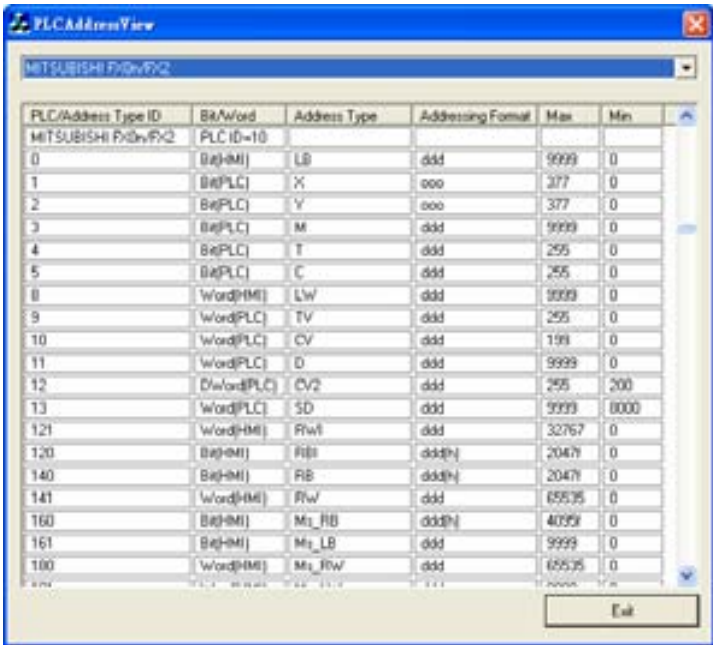
Parameters	Recommend	Option	Notes
PLC type	Master (Master-Slave Protocol)		
Com port	RS232		
Baud rate	115200	38400, 115200	
Parity bit	Even		
Data Bits	8		
Stop Bits	1		
HMI Station No.	0		
PLC Station No. Parameter 1	0 MT500 PLC ID	Use PLCAddressView.exe find PLC ID.	



PLC Setting:

Communication mode	MT500 Multiple HMI set Slave





Device address:

Bit/Word	MT500	MT8000	Range	Memo
B	Ms_RB	RW_Bit	ddd:0~4095 (h): 0~f	
B	Ms_LB	LB	dddd:0~9999	

W	Ms_RW	RW	ddd:0~65535	
W	Ms_LW	LW	ddd:0~9999	

Memobus (YASKAWA MP Series controllers)

YASKAWA MP2200, MP2300, MP9xx communication module

http://www.yaskawa.com/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Memobus		
Com port	RS485	RS232/RS485 2w,4w	Must match the PLC's port setting.
Baud rate	19200	9600~57600	Must match the PLC's port setting.
Parity bit	Even		Must match the PLC's port setting.
Data Bits	8		
Stop Bits	1		
HMI Station No.	0		Dose not apply to this protocol.
PLC Station No.	1	1-31	Must match the PLC's port setting.

PLC Setting:

Communication mode	MEMOBUS, Slave, RTU
Select	

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	MB_1	ddddh	dddd:0~9999, h: 0~f	MB 0~9999
B	MB_2	ddddh	dddd:10000~65535, h: 0~f	MB 10000~65535
B	IB	hhhh	hhhh : 0~A7FF	Read only
W	IW	hhhh	hhhh : 0~A7FF	Read only
DW	IL	hhhh	hhhh : 0~A7FE	Read only
F	IF	hhhh	hhhh : 0~A7FE	Read only
W	MW	ddddd	ddddd:0~65534	Holding Register
DW	ML	ddddd	ddddd:0~65533	Double word
F	MF	ddddd	ddddd:0~65533	Floating point

Wiring diagram:

1. RS-232: 217IF-01, 218IF-01

MT8000 RS232

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

217IF-01 RS232
9P D-SUB Female

3 RX
2 TX
7 GND

2. RS-485 2w: 217IF-01

MT8000 RS-485 2w

COM1	COM3
1 RX-	6 Data-
2 RX+	9 Data+
5 GND	5 GND

217IF-01 RS422/485
14P connector

2, 4 D-
1, 3 D+
14 GND

3. RS485 4w: 217IF-01

MT8000 RS-485 2w

COM1	
1	RX-
2	RX+
3	TX-
4	TX+
5	GND

217IF-01 RS422/485
14P connector

2 TX-
1 TX+
4 RX-
3 RX+
14 GND

MITSUBISHI AJ71

Mitsubishi A series PLC with AJ71C24 communication module using the Computer Link protocol.
http://www.mitsubishi-automation.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	MITSUBISHI AJ71	MITSUBISHI AJ71(AnA/AnU CPU) MITSUBISHI AJ71[format4] pds driver	
Com port	RS485 4W	RS485 4W, RS232	
Baud rate	19200	9600, 19200	
Parity bit	Even	Even, Odd, None	
Data Bits	8	8	
Stop Bits	1	1	
HMI Station No.	0		
PLC Station No.	0		

PLC Setting:

Communication mode	Computer Link protocol 9600, Even, 8, 1 (default)
Mode Setting Switch	**Format 1**
Parity Check	**Enable**
Sum Check	**Enable**

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	X	hhh	hhh: 0~270F (hex-decimal)	Input Bits
B	Y	hhh	hhh: 0~270F (hex-decimal)	Output Bits
B	M	dddd	dddd:0~9999	Internal Relays
W	TV	ddd	ddd:0~255	Timer Preset Value
W	CV	ddd	ddd:0~255	Counter Preset Value
W	D	dddd	ddd:0~9999	Data Registers

Wiring diagram:

RS-485 4W:

MT800 Com1

RS-485]

AJ71C24

RS-422

9P D-SUB

1	RX-		SDB
2	RX+		SDA
3	TX-		RDB
4	TX+		RDA
5	GND		GND

RS-232: A1SJ71UC24-R2

MT8000 RS232

9P D-SUB

RS232 port
9P D-SUB Female

COM1	COM2	COM3		
3 TX	4 TX	7 TX		2 RXD
2 RX	6 RX	8 RX		3 TXD
5 GND	5 GND	5 GND		5 GND
				1 DCD
				4 DTR
				6 DSR
				7 RTS
				8 CTS

MITSUBISHI FX0n/FX2

Mitsubishi FX0s/FX0n/FX1s/FX1n/FX2 PLC
http://www.mitsubishi-automation.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Mitsubishi FX0n/FX2	Mitsubishi FX0n/FX2	
Com port	RS485	RS232/RS485	
Baud rate	9600	9600/19200/38400/57600/115200	must same as the PLC setting
Parity bit	Even	Even, Odd, None	must same as the PLC setting
Data Bits	7	7,8	must same as the PLC setting
Stop Bits	1	1,2	must same as the PLC setting
HMI Station No.	0	0-255	Does not apply to this protocol
PLC Station No.	0	0-255	must same as the PLC setting

PLC Setting:

Communication mode	9600,Even,7,1

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	X	ooo	0-377	Input Relay
B	Y	ooo	0-377	Output Relay
B	M	ddd	0-9999	Auxiliary Relay
B	T	ddd	0-255	Timer Relay
B	C	ddd	0-255	Counter Relay
W	TV	ddd	0-255	Timer Memory
W	CV	ddd	0-199	Counter Memory
W	D	ddd	0-9999	Data Register
DW	CV2	ddd	200-255	Counter Memory(D Word)
W	SD	ddd	8000-9999	Special Data Register

Wiring diagram:

MT8000 COM1 [RS-485] 4w 9P D-SUB	Mitsubishi PLC CPU RS422 Port 8P MiniDin Female
1 RX-	4 TX-
2 RX+	7 TX+
5 GND	3 GND
3 TX-	1 RX-
4 TX+	2 RX+

8Pin miniDin Female

MITSUBISHI FX2n

Mitsubishi FX2n series PLC
http://www.mitsubishi-automation.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Mitsubishi FX2n	Mitsubishi FX2n	
Com port	RS485	RS232/RS485	
Baud rate	9600	9600/19200/38400/57600/115200	
Parity bit	Even		
Data Bits	7		
Stop Bits	1		
HMI Station No.	0		
PLC Station No.	0		

Online Simulator	YES	Extend address mode	NO
Broadcast command	NO		

PLC Setting:

Communication mode	9600,Even,7,1

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	X	ooo	0-377	Input Relay
B	Y	ooo	0-377	Output Relay
B	M	dddd	0-7999	Auxiliary Relay
B	T	ddd	0-255	Timer Relay
B	C	ddd	0-255	Counter Relay
B	SM	dddd	8000-9999	Special Auxiliary Relay
B	D_Bit	dddd(dd)	0~7999(0~15)	Data Register Bit (D)
B	S	dddd	0~4095	State Relay (S)

Bit/Word	Device Type	Format	Range	Memo
W	TV	ddd	0-255	Timer Memory
W	CV	ddd	0-199	Counter Memory
W	D	ddd	0-7999	Data Register
DW	CV2	ddd	200-255	Counter Memory(D Word)
W	SD	ddd	8000-9999	Special Data Register

Wiring diagram:

MT8000 COM1 [RS-485]4w 9P D-SUB		Mitsubishi FX series PLC CPU RS422 Port 8P MiniDin Female
1 RX-		4 TX-
2 RX+		7 TX+
3 TX-		1 RX-
4 TX+		2 RX+
5 GND		3 GND

8Pin miniDin Female

MITSUBISHI FX232/485BD

Mitsubishi FX0n/FX2/FX2n COM For Communication Module BD
FX2N-485-BD, FX2N-232-BD, FX1N-485-BD and FX1N-232-BD
http://www.mitsubishi-automation.com

HMI Setting:

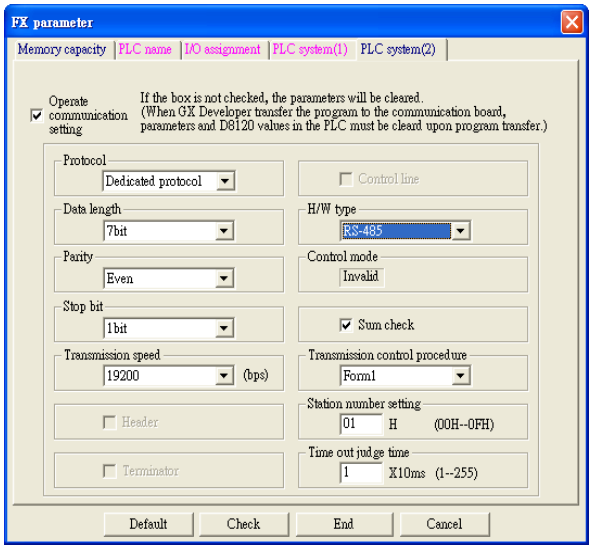
Parameters	Recommend	Option	Notes
PLC type	MITSUBISHI FX232/485BD		
Com port	RS232/RS485	RS232/RS485 2w/4w	in accordance with the BD module
Baud rate	19200	9600/19200	must same as the PLC setting
Parity bit	Even	Even, Odd, None	must same as the PLC setting
Data Bits	7	7,8	must same as the PLC setting
Stop Bits	1	1,2	must same as the PLC setting
HMI Station No.	0		Does not apply to this protocol
PLC Station No.	1	0-15	must same as the PLC setting

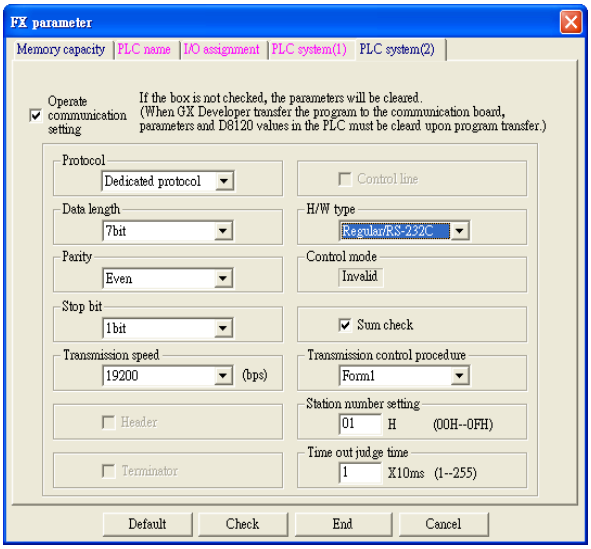
Online Simulator	YES	Extend address mode	YES
Broadcast command			

PLC Setting:

Communication mode	Must set PLC station when use the BD Module

Register D8120 setting: set b9 and b8 of BFM#0 as 0





FX2N-485-BD, FX1N-485-BD FX2N-232-BD, FX1N-232-BD

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	X	ooo	0-377	Input Relay
B	Y	ooo	0-377	Output Relay
B	M	ddd	0-9999	Auxiliary Relay
B	T	ddd	0-255	Timer Relay
B	C	ddd	0-255	Counter Relay
W	TV	ddd	0-255	Timer Memory
W	CV	ddd	0-199	Counter Memory
W	D	ddd	0-9999	Data Register
W	CV2	ddd	200-255	Counter Memory(D Word)

Wiring diagram:

Communication Module RS232BD:

MT8000 RS232

9P D-SUB

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

232BD Module

9P D-SUB Female

2 RXD
3 TXD
5 GND

Communication Module RS485BD:

MT8000 COM1

RS-485 4w

9P D-SUB Male

1 RX-
2 RX+
3 TX-
4 TX+
5 GND

485BD Module

5P terminal

SDB
SDA
RDB
RDA
SG

Communication Module RS485BD:

MT8000 RS-485 2Wire

9P D-SUB

COM1	COM3
1 RX-	6 Data-
2 RX+	9 Data+
3 TX-	
4 TX+	
5 GND	5 GND

RS485BD Module

5P terminal

SDB
SDA
RDB
RDA
SG

MITSUBISHI FX3U

Mitsubishi FX3U/FX3UC
http://www.mitsubishi-automation.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	MITSUBISHI FX3u		
Com port	RS485 4w	RS232/RS485 2w/4w	
Baud rate	9600	9600/19200	must same as the PLC setting
Parity bit	Even		must same as the PLC setting
Data Bits	7		must same as the PLC setting
Stop Bits	1		must same as the PLC setting
HMI Station No.	0		Does not apply to this protocol
PLC Station No.	0		Does not apply to this protocol

Online Simulator	YES	Extend address mode	NO

PLC Setting:

Communication mode	9600,Even,7,1

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	X	ooo	0~377	Input Relay
B	Y	ooo	0~377	Output Relay
B	M	dddd	0~7679	Auxiliary Relay
B	SM	dddd	8000~9999	Special Relay (M)
B	S	dddd	0~4095	State Relay (S)
B	T	ddd	0~511	Timer Relay (T)
B	C	ddd	0~199	Counter Relay (C)

Bit/Word	Device Type	Format	Range	Memo
B	D_Bit	dddd(dd)	dddd=0~7999 (dd)=0~15	Data Register Bit (D)
W	TV	ddd	0~511	Timer Memory (T)
W	CV	ddd	0~199	Counter Memory (C)
DW	CV2	ddd	200~255	Counter Memory(D Word)
W	D	dddd	0~7999	Data Register (D)
W	SD	dddd	8000~9999	Special Data Register (D)
W	R	ddddd	0~32767	Extended Register (R)

Wiring diagram:

MT8000 COM1[RS-485]4w 9P D-SUB		**Mitsubishi FX series PLC** **CPU RS422 Port** 8P MiniDin Female
1 RX-		4 TX-
2 RX+		7 TX+
3 TX-		1 RX-
4 TX+		2 RX+
5 GND		3 GND

8Pin miniDin Female

MITSUBISHI FX3U-ETHERNET

MITSUBISHI FX SERIES, Module: FX3U-ENET
http://www.mitsubishi-automation.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	MITSUBISHI FX3u (Ethernet)		
Com port	Ethernet		
PLC Station No.	0 (default)		Refer Module Setting
TCP/IP port	5001(default)		Refer Module Setting

Device address:

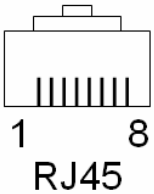
Bit/Word	Device type	Format	Range	Memo
B	X	ooo	0 ~ 377	Input
B	Y	ooo	0 ~ 377	Output Relay
B	M	dddd	0 ~ 7679	Internal Relay
B	S	dddd	0 ~ 4095	Step Relays
B	T	ddd	0 ~ 511	Timer Contacts
B	C	ddd	0 ~ 255	Counter Contacts
B	SM	dddd	8000 ~ 8511	Special Int. Relays
B	D_Bit	dddd(dd)	0-799915	Data Register Bit Access
W	TV	ddd	0 ~ 511	Timer Value
W	R	ddddd	0 ~ 32767	File Register
W	CV	ddd	0 ~ 199	Counter Value
W	D	dddd	0 ~ 7999	Data Registers
W	CV2	ddd	200 ~255	Counter Value
W	SD	dddd	8000 ~ 8511	Special Data Registers

ddd: (Decimal), hhh:(Hexadecimal), ooo:(Octal).

Wiring diagram:

Ethernet:

MT8000 Ethernet RJ45		Wire color	Ethernet Hub or Switch RJ45	
1	TX+	White/Orange	1	RX+
2	TX-	Orange	2	RX-
3	RX+	White/Green	3	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	6	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-



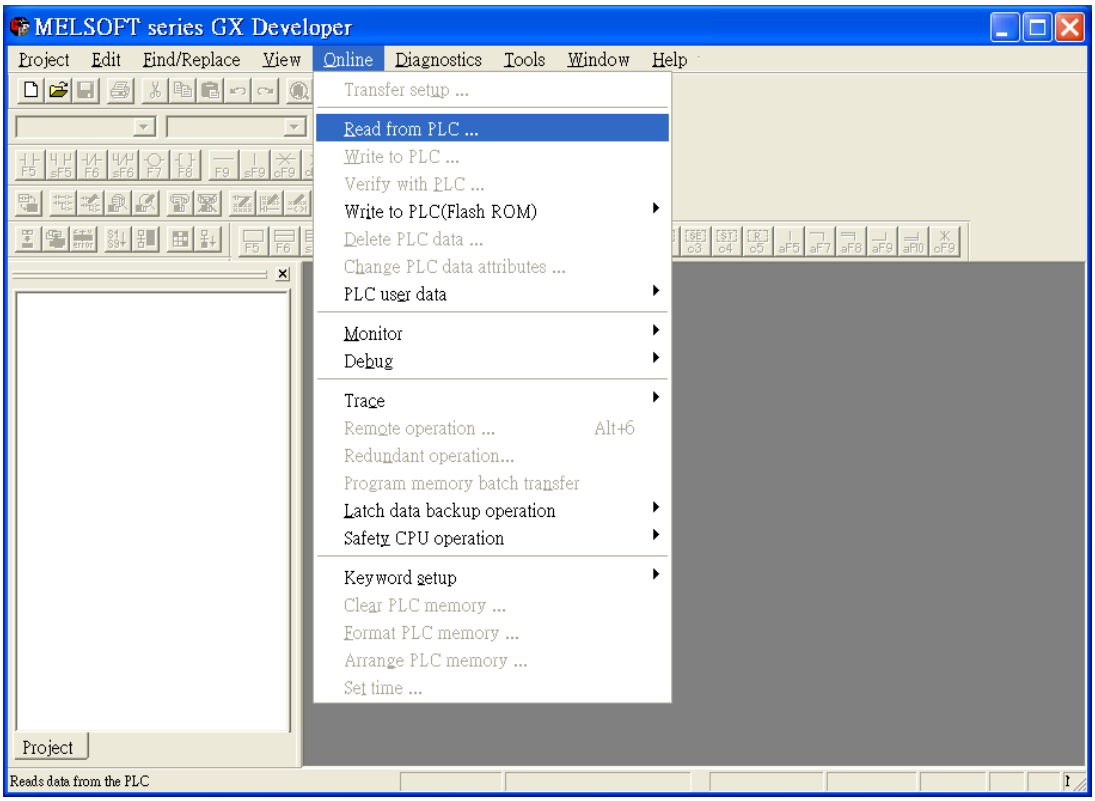
Ethernet: Direct connect (crossover cable)

MT8000 Ethernet RJ45		Wire color	Modbus TCP Device RJ45	
1	TX+	White/Orange	3	RX+
2	TX-	Orange	6	RX-
3	RX+	White/Green	1	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	2	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-

Fx3u-ENET module setting:

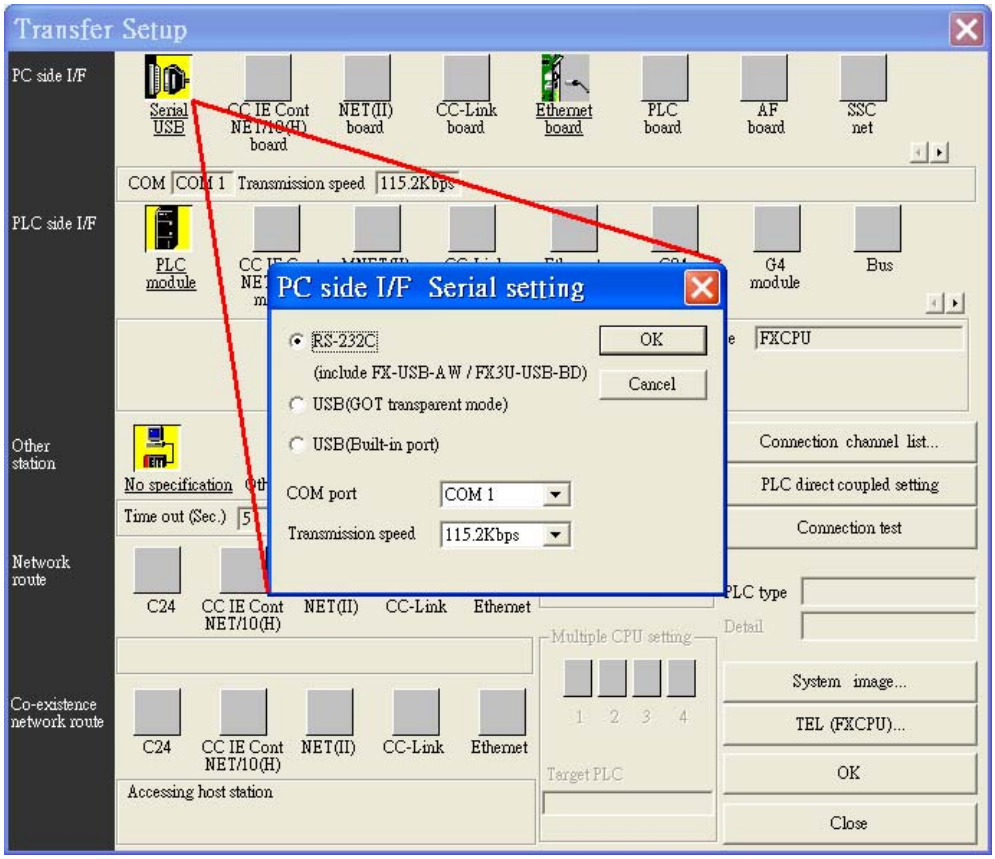
Before using Ethernet module, using GX Developer / FX Configurator-EN to set the Ethernet module, the FX3u-ENET module settings as below steps.

1. Open GX Developer, select “Read from PLC” in Online list.

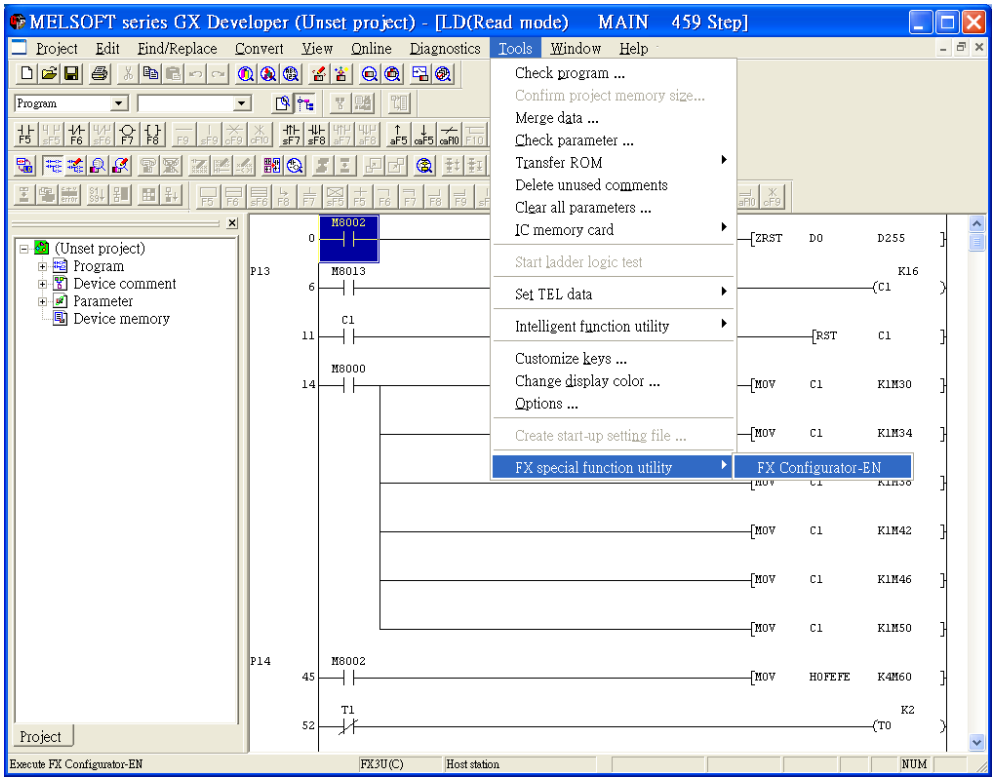


2. Select “FXCPU” in PLC series.

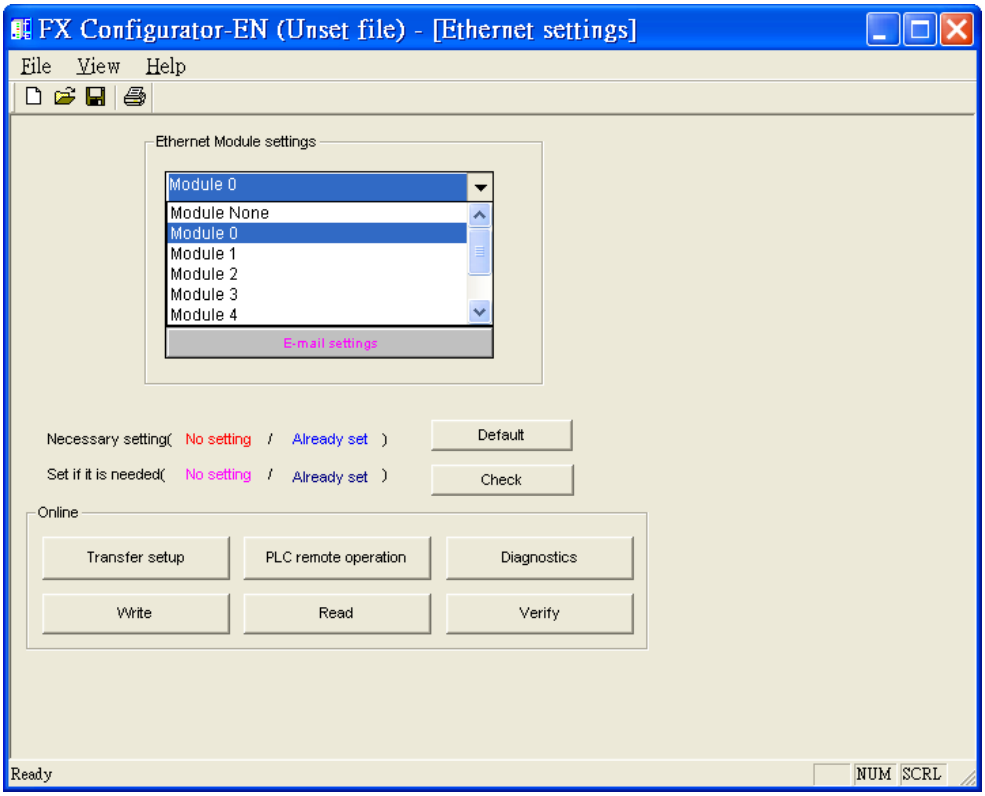
3. Users have to connect PLC via series port for setting IP address at first time.



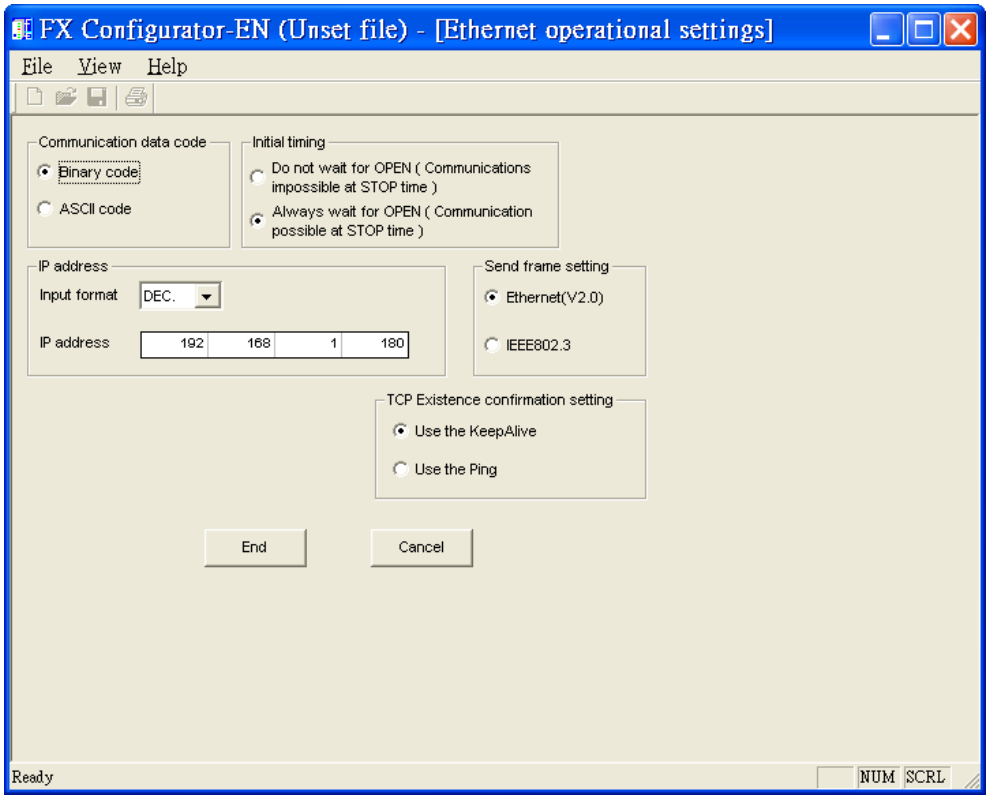
4. After finishing the PLC settings, select Tools/FX special function utility/FX Configurator-EN



5. Select “Module 0” in Ethernet Module settings.
(If more than one module, please setting modules step by step)



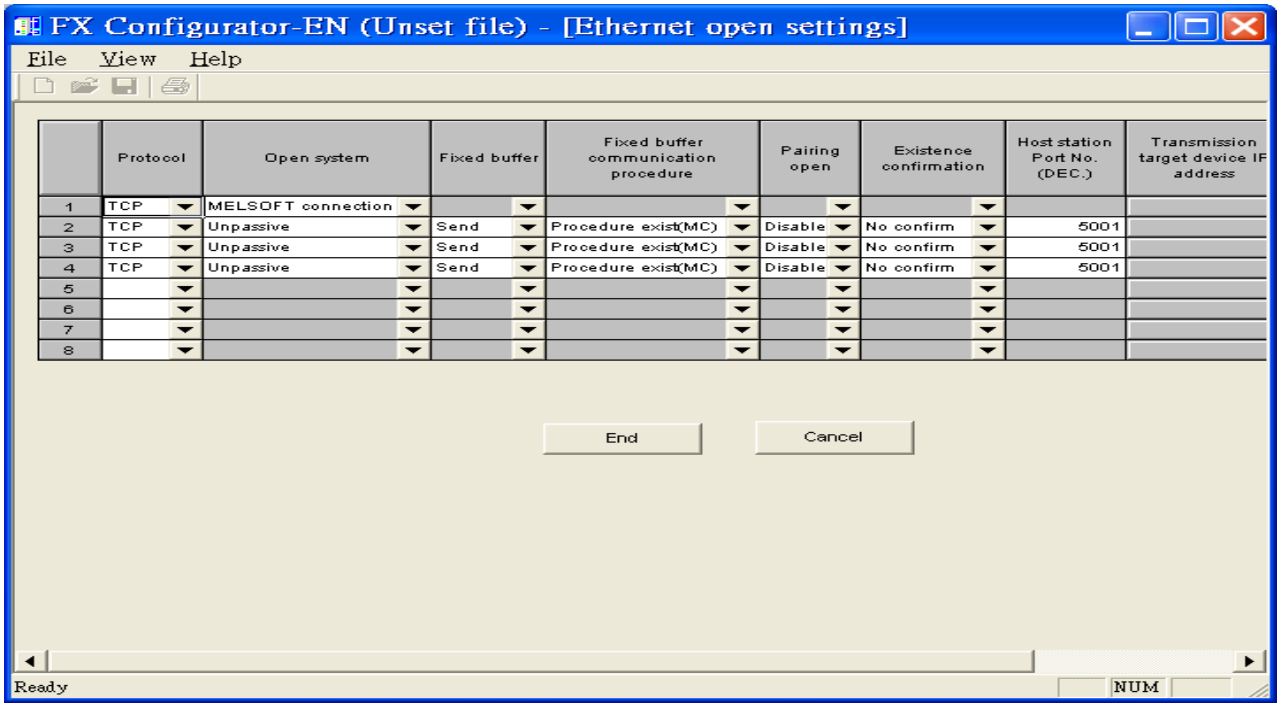
6. In Ethernet operational settings, select the related parameters and IP address and then press ”End” to finish the settings.



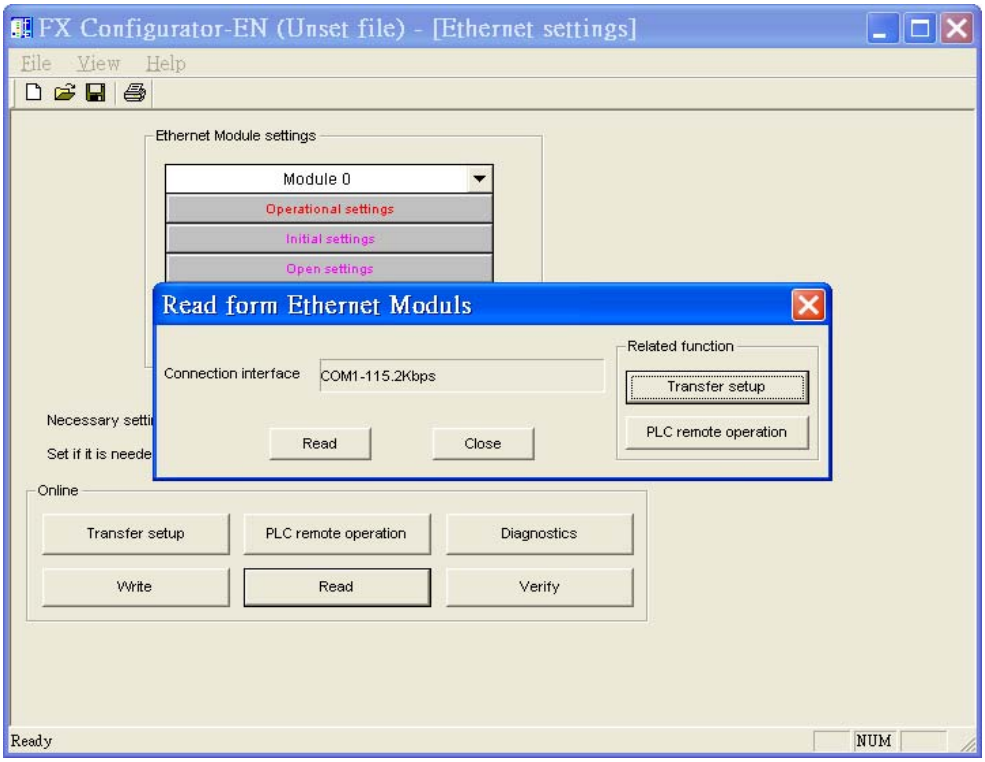
7. In Ethernet open settings, press “End” after setting the below parameters.

1	TCP	MELSOFT connection					
2	TCP	Unpassive	Send	Procedure exist(MC)	Disable	No confirm	5001
3	TCP	Unpassive	Send	Procedure exist(MC)	Disable	No confirm	5001
4	TCP	Unpassive	Send	Procedure exist(MC)	Disable	No confirm	5001

(The first Protocol means using GX Developer to communicate with module, The max. “Fixed buffer communication preocedure” is 4 units.)



8. After setting the parameters to PLC, restart for using Ethernet communication.


FX Configurator-EN (Unset file) - [Ethernet settings]
File View Help
Ethernet Module settings
Module 0
Operational settings
Initial settings
Open settings
Read form Ethernet Moduls
Connection interface
COM1-115.2Kbps
Related function
Transfer setup
PLC remote operation
Read
Close
Online
Transfer setup
PLC remote operation
Diagnostics
Write
Read
Verify
Ready
NUM

MITSUBISHI Q02H

Mitsubishi Q02H CPU port.
http://www.mitsubishi-automation.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	MITSUBISHI Q02H		
Com port	RS232	RS485 4W, RS232	
Baud rate	115200	115200 only	
Parity bit	Odd		
Data Bits	8		
Stop Bits	1		
HMI Station No.	0		
PLC Station No.	0		

Online Simulator	YES	Extend address mode	NO
Broadcast command	NO		

PLC Setting:

Communication mode	

Device address:

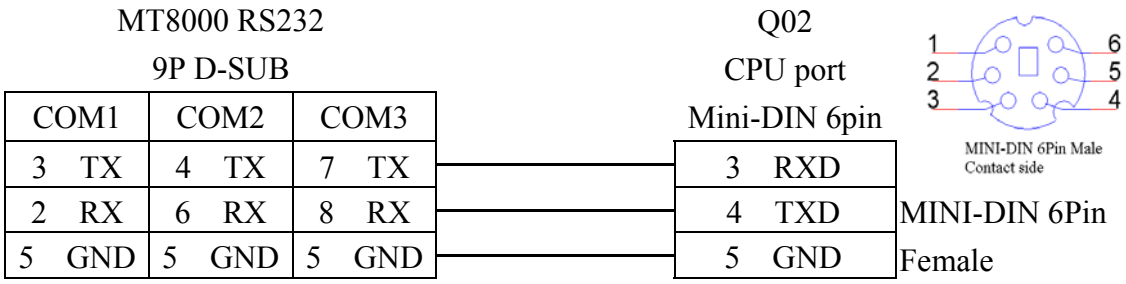
Bit/Word	Device Type	Format	Range	Memo
B	X	hhh	0~1FFF	Input Relay
B	Y	hhh	0~1FFF	Output Relay
B	M	dddd	0~8191	Internal Relay
B	L	dddd	0~8191	Latch Relay
B	F	dddd	0~2047	Annunciator
B	V	dddd	0~2047	Edge Relay
B	B	hhh	0~1FFF	Link Relay
B	TC	ddd	0~2047	Timer Coil
B	SS	ddd	0~2047	Retentive Timer Contact
B	SC	ddd	0~2047	Retentive Timer Coil

Bit/Word	Device Type	Format	Range	Memo
B	CS	ddd	0~1023	Counter Contact
B	CC	ddd	0~1023	Counter Coil
B	SB	hhh	0~7FF	Special Link Relay
B	S	dddd	0~8191	Step Relay
B	DX	hhh	0~1FFF	Direct Input
B	DY	hhh	0~1FFF	Direct Output
B	TS	ddd	0~2047	Timer Contact
W	W	hhh	0~1FFF	Link Register
W	TN	ddd	0~2047	Timer Current Value
W	SN	ddd	0~2047	Retentive Timer Current Value
W	CN	ddd	0~1023	Counter Current Value
W	R	ddddd	0~32767	File Register
W	SW	hhh	0~7FF	Special Link Register
W	Z	d	0~9	Index Register
W	ZR	hhhh	0~FFFF	File Register
W	D	ddddd	0~12287	Data Register

ddd: Decimal, hhh: Hexadecimal, ooo: Octal.

Wiring diagram:

RS-232:



MITSUBISHI Q06H

Mitsubishi Q06H CPU port.
http://www.mitsubishi-automation.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	MITSUBISHI Q06H		
Com port	RS232	RS485 4W, RS232	
Baud rate	115200	115200 only	
Parity bit	Odd		
Data Bits	8		
Stop Bits	1		
HMI Station No.	0		
PLC Station No.	0		

Online Simulator	YES	Extend address mode	NO
Broadcast command	NO		

PLC Setting:

Communication mode	

Device address:

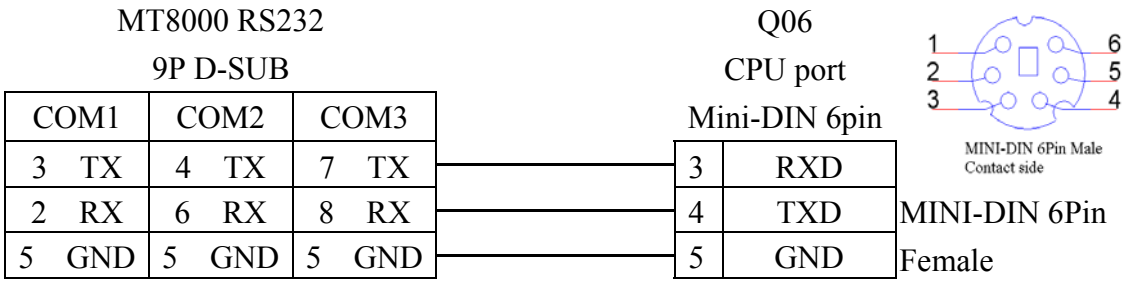
Bit/Word	Device Type	Format	Range	Memo
B	X	hhh	0~1FFF	Input Relay
B	Y	hhh	0~1FFF	Output Relay
B	M	dddd	0~8191	Internal Relay
B	L	dddd	0~8191	Latch Relay
B	F	dddd	0~2047	Annunciator
B	V	dddd	0~2047	Edge Relay
B	B	hhh	0~1FFF	Link Relay
B	TC	ddd	0~2047	Timer Coil
B	SS	ddd	0~2047	Retentive Timer Contact
B	SC	ddd	0~2047	Retentive Timer Coil

Bit/Word	Device Type	Format	Range	Memo
B	CS	ddd	0~1023	Counter Contact
B	CC	ddd	0~1023	Counter Coil
B	SB	hhh	0~7FF	Special Link Relay
B	S	dddd	0~8191	Step Relay
B	DX	hhh	0~1FFF	Direct Input
B	DY	hhh	0~1FFF	Direct Output
B	TS	ddd	0~2047	Timer Contact
W	W	hhh	0~1FFF	Link Register
W	TN	ddd	0~2047	Timer Current Value
W	SN	ddd	0~2047	Retentive Timer Current Value
W	CN	ddd	0~1023	Counter Current Value
W	R	ddddd	0~32767	File Register
W	SW	hhh	0~7FF	Special Link Register
W	Z	d	0~9	Index Register
W	ZR	hhhh	0~FFFF	File Register
W	D	ddddd	0~12287	Data Register

ddd: Decimal, hhh: Hexadecimal, ooo: Octal.

Wiring diagram:

RS-232:



MITSUBISHI QJ71

Mitsubishi Q series PLC with QJ71C24 communication module, Q00, Q01 CPU port.
http://www.mitsubishi-automation.com

HMI Setting:

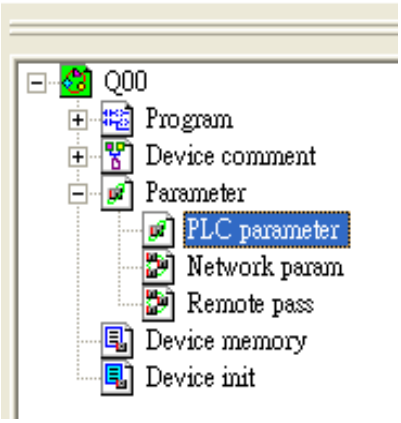
Parameters	Recommend	Option	Notes
PLC type	MITSUBISHI Melsec_QJ71		
Com port	RS232	RS485 4W, RS232	
Baud rate	9600		
Parity bit	Odd		
Data Bits	8		
Stop Bits	1		
HMI Station No.	0		
PLC Station No.	0		

Online Simulator	YES
Extend address mode	NO

PLC Setting:

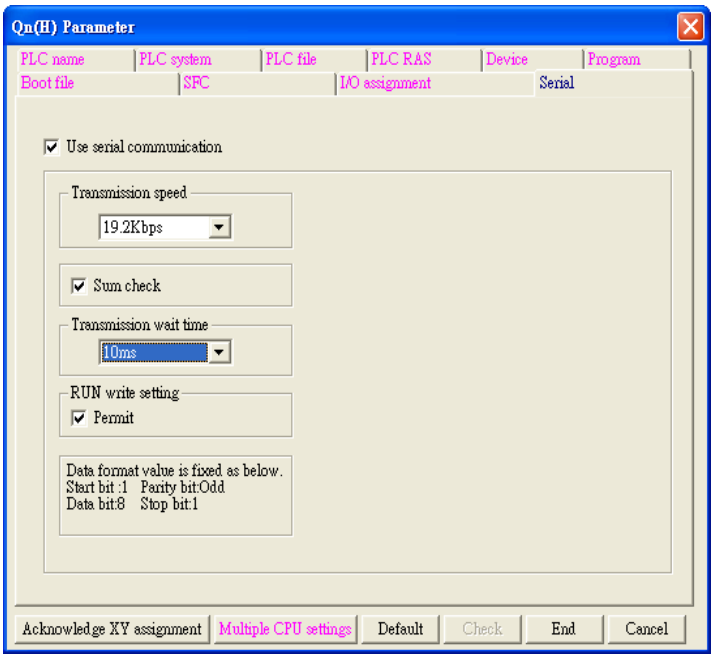
Communication mode	

Q00, Q01 CPU port setting:



1. In the GX Developer “PLC data list” click the “PLC parameter”
2. In the “PLC parameter” select “Serial” page.
3. Select “Use serial communication”
4. Set the “Transmission speed”. 9600~115200.
5. Select “Sum check”
6. Select “Transmission wait time” to 10ms.
7. Select “RUN write setting”
8. Click “End” close the dialog.
9. Write the PLC Parameter to PLC.

10. RESET the PLC, the parameter will active.



Device address:

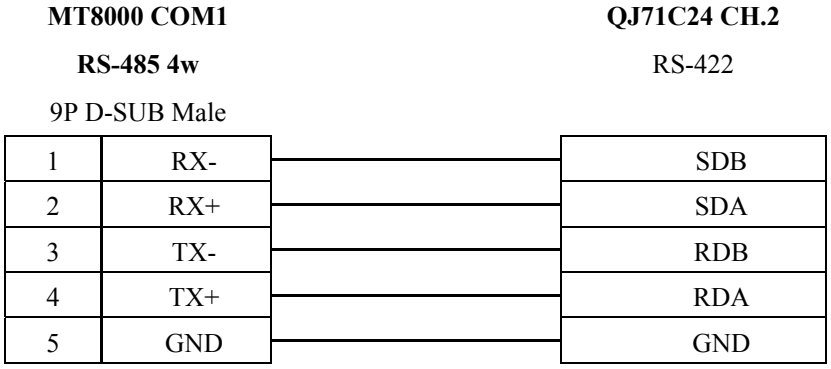
Bit/Word	Device Type	Format	Range	Memo
B	X	hhh	0~1FFF	Input Relay
B	Y	hhh	0~1FFF	Output Relay
B	M	dddd	0~8191	Internal Relay
B	L	dddd	0~8191	Latch Relay
B	F	dddd	0~2047	Annunciator
B	V	dddd	0~2047	Edge Relay
B	B	hhh	0~1FFF	Link Relay
B	TC	ddd	0~2047	Timer Coil
B	SS	ddd	0~2047	Retentive Timer Contact
B	SC	ddd	0~2047	Retentive Timer Coil
B	CS	ddd	0~1023	Counter Contact
B	CC	ddd	0~1023	Counter Coil
B	SB	hhh	0~7FF	Special Link Relay
B	S	dddd	0~8191	Step Relay
B	DX	hhh	0~1FFF	Direct Input
B	DY	hhh	0~1FFF	Direct Output
B	TS	ddd	0~2047	Timer Contact
W	W	hhh	0~1FFF	Link Register
W	TN	ddd	0~2047	Timer Current Value

Bit/Word	Device Type	Format	Range	Memo
W	SN	ddd	0~2047	Retentive Timer Current Value
W	CN	ddd	0~1023	Counter Current Value
W	R	ddddd	0~32767	File Register
W	SW	hhh	0~7FF	Special Link Register
W	Z	d	0~9	Index Register
W	ZR	hhhh	0~FFFF	File Register
W	D	ddddd	0~12287	Data Register

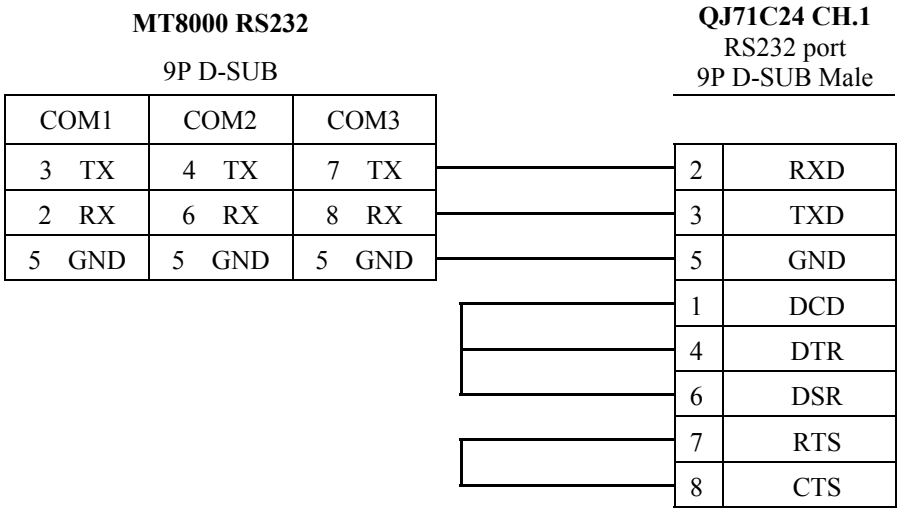
ddd: Decimal, hhh: Hexadecimal, ooo: Octal.

Wiring diagram:

RS-485 4W:



RS-232:



Q00, Q01 CPU port RS-232:

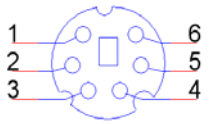
MT8000 RS232

9P D-SUB

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

Q00, Q01
CPU port
Mini-DIN 6pin

3	RXD
4	TXD
5	GND



MINI-DIN 6Pin

Female

MITSUBISHI QJ71E71

Mitsubishi Q type, QJ71E71-100 Ethernet module.
http://www.mitsubishi-automation.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	MITSUBISHI QJ71E71 [V1.00]		
Com port	Ethernet		
PLC Station No.	2	1~99	
TCP/IP port	5002		

Device address:

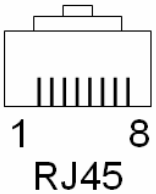
Bit/Word	Device Type	Format	Range	Memo
B	X	hhhh	0~1FFF	Input Relay
B	Y	hhhh	0~1FFF	Output Relay
B	M	dddd	0~8191	Internal Relay
B	L	dddd	0~8191	Latch Relay
B	F	dddd	0~2047	Annunciator
B	V	dddd	0~2047	Edge Relay
B	B	hhhh	0~1FFF	Link Relay
B	SB	hhhh	0~2047	Special Link Relay
B	DX	hhhh	0~1FFF	Direct Input
B	DY	hhhh	0~1FFF	Direct Output
W	W	hhhh	0~2FFF	Link Register
W	R	dddd	0~32767	File Register
W	SW	hhh	0~7FF	Special Link Register
W	Z	dd	0~15	Index Register
W	ZR	hhhh	0~FFFF	File Register
W	D	ddddd	0~12287	Data Register

Ddd: Decimal, hhh: Hexadecimal

Wiring diagram:

Ethernet:

MT8000 Ethernet RJ45		Wire color	Ethernet Hub or Switch RJ45	
1	TX+	White/Orange	1	RX+
2	TX-	Orange	2	RX-
3	RX+	White/Green	3	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	6	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-

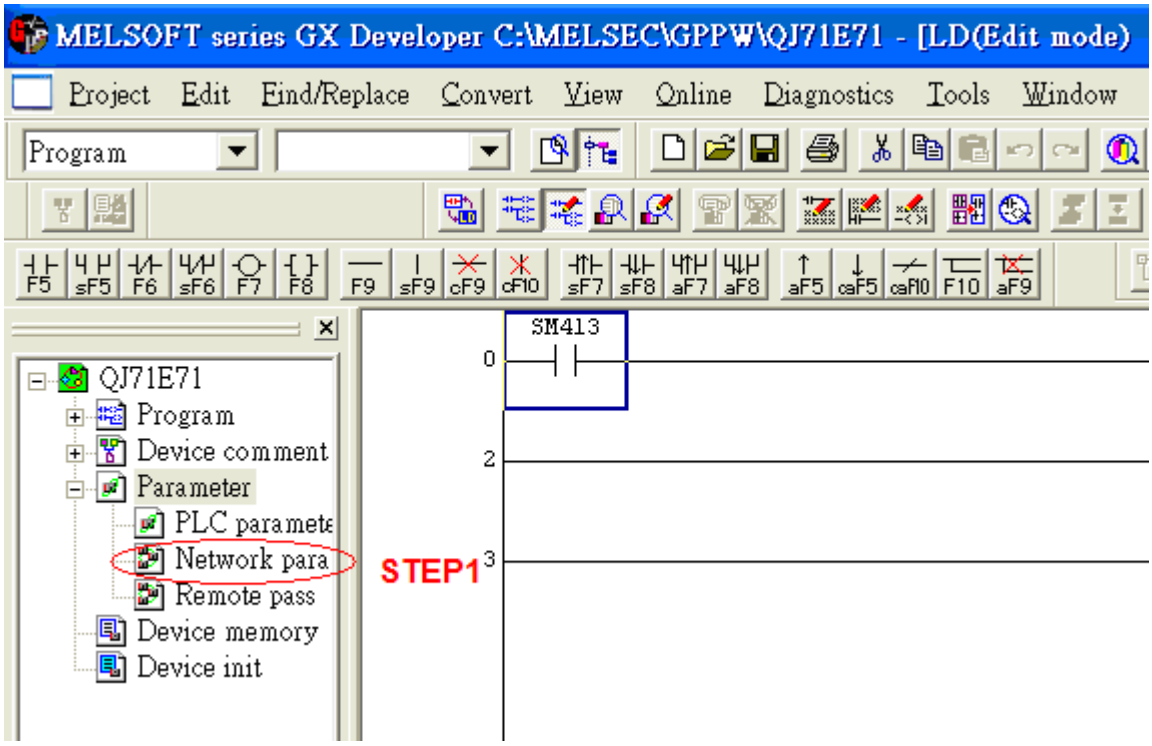


Ethernet: Direct connect (crossover cable)

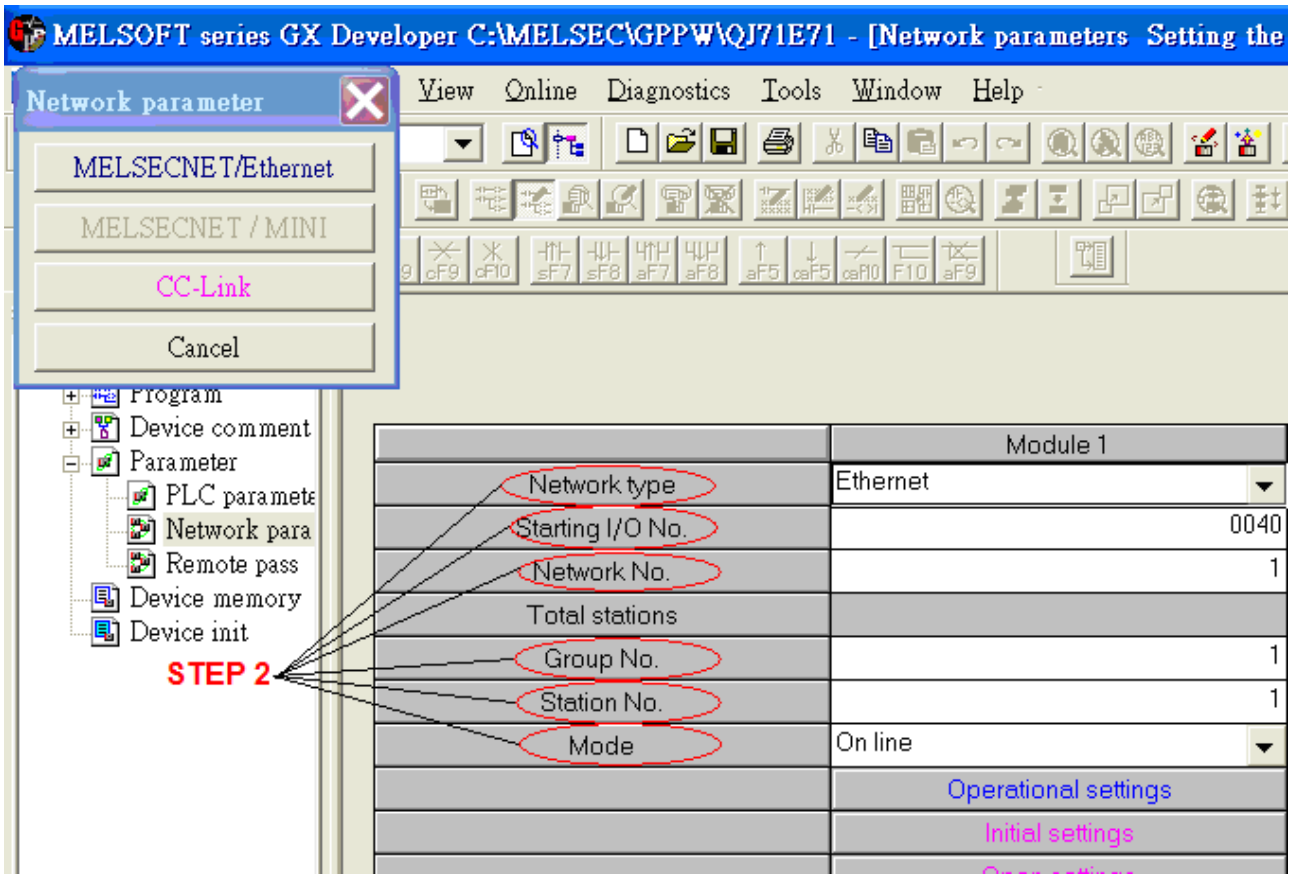
MT8000 Ethernet RJ45		Wire color	Modbus TCP Device RJ45	
1	TX+	White/Orange	3	RX+
2	TX-	Orange	6	RX-
3	RX+	White/Green	1	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	2	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-

QJ71E71-100 Ethernet module settings:

1. Use Q-CPU's USB or RS232 setting PLC parameters.

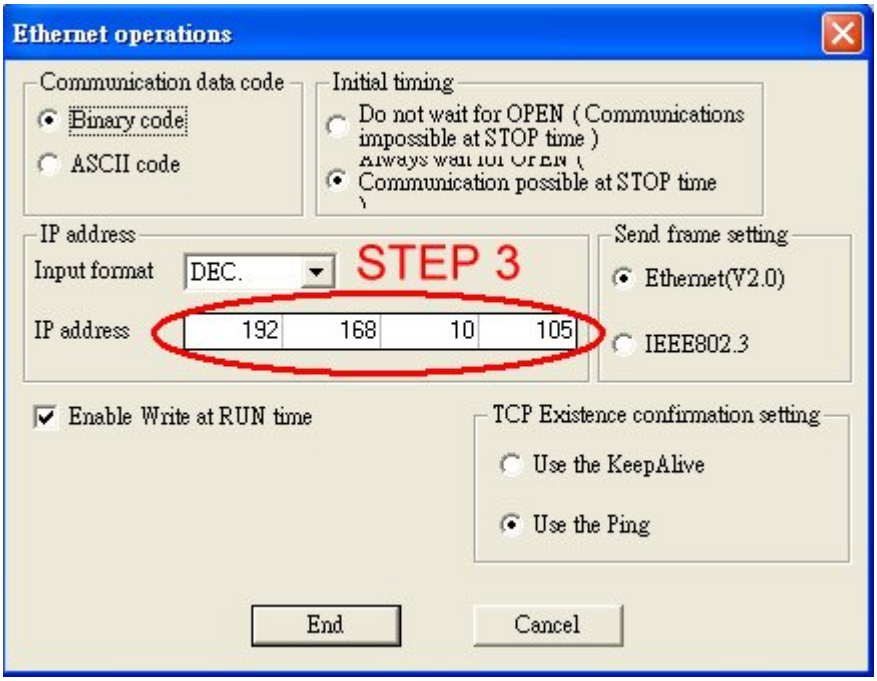


2. Click Operational setting to set IP information.



	Module 1	Module 2
Network type	Ethernet	None
Starting I/O No.	0040	
Network No.	1	
Total stations		
Group No.	1	
Station No.	1	
Mode	On line	
	Operational settings	
	Initial settings	
	Open settings	
	Router relay parameter	
	Station No.<->IP information	
	FTP Parameters	
	E-mail settings	
	Interrupt settings	

3. Select Ethernet (2.0) for communicating with HMI.



4. Click “Open settings” to set the system.

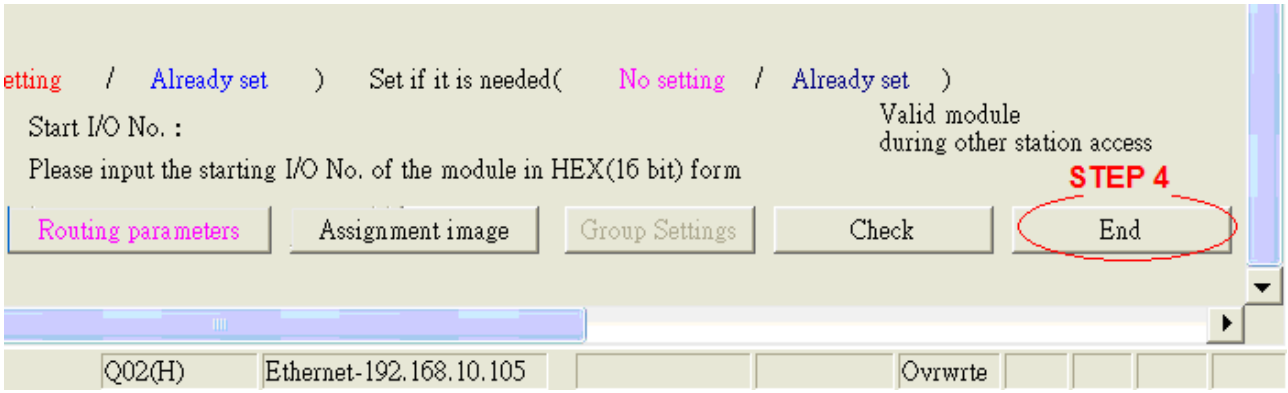
	Module 1	Module 2
Network type	Ethernet	None
Starting I/O No.	0040	
Network No.	1	
Total stations		
Group No.	1	
Station No.	1	
Mode	On line	
	Operational settings	
	Initial settings	
	Open settings	
	Router relay parameter	
	Station No.<->IP information	
	FTP Parameters	
	E-mail settings	
	Interrupt settings	

Network parameter Ethernet open setting. Module No.1

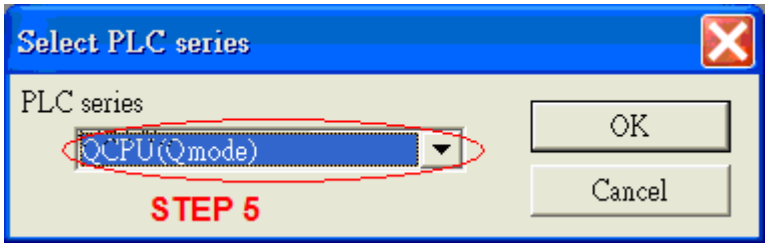
	Protocol	Open system	Fixed buffer	Fixed buffer communication procedure	Pairing open	Existence confirmation	Host station Port No.	Transmission target device IP address	Transmission target device Port No.
1	TCP	MELSOFT connection							
2	TCP	MELSOFT connection							
3	TCP	MELSOFT connection							
4	TCP	MELSOFT connection							
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									

End Cancel

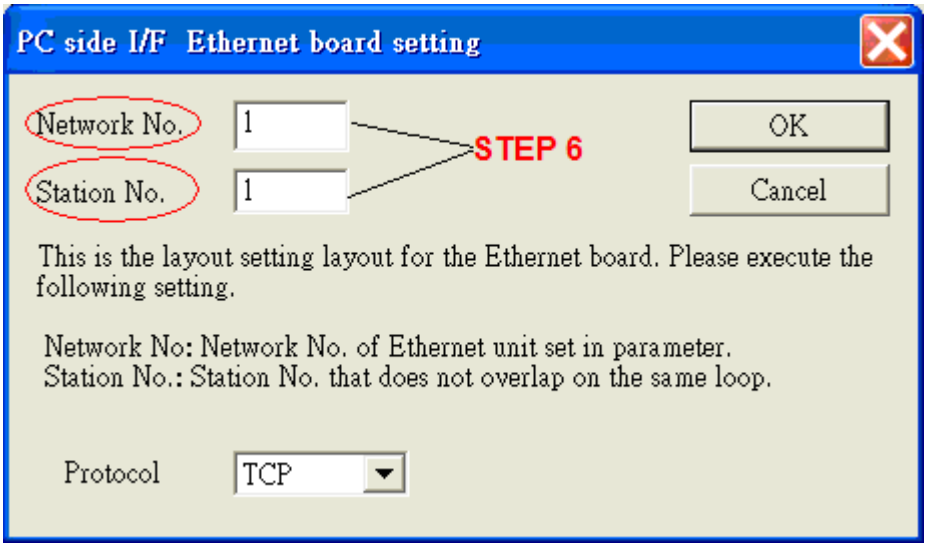
5. Press END to finish settings.



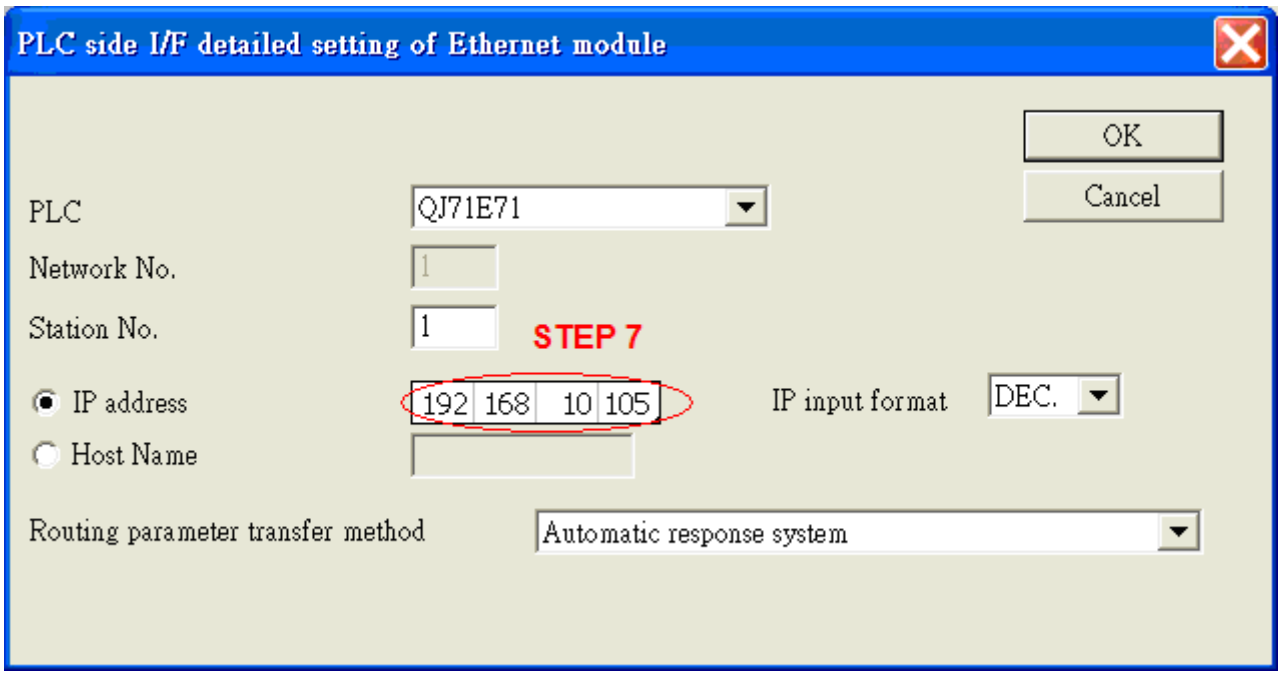
6. Restart PLC software and select [READ FROM PLC], click QCPU (Qmode) and press OK.



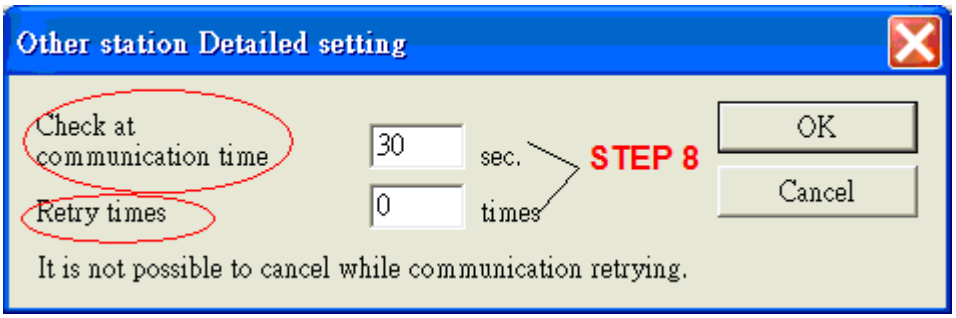
7. Select "Ethernet board" in PC Side I/F to set Network and Station no..(the Station no.1 is PC's station no. not Ethernet module's, range from 2~64, the Network no. can not the same as PC's number)



8. Select "Ethernet module" in PLC Side I/F to set QJ71E71's IP address.(IP address = Network Parameter's IP address)



9. In “Other station”, click “Other station(Single network)” setting “Check at communication time” and “Retry times”.



After finishing settings as above, click “Connection test” for testing the communication and sending the PLC’s program.

MODBUS ASCII

MODBUS ASCII CONTROLLER

http://www.modbus.org

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Modbus ASCII		
Com port	RS485	RS232/RS485	
Baud rate	9600	9600/19200/38400/57600/ 115200	
Parity bit	Even	Even, Odd, None	
Data Bits	8	7,8	
Stop Bits	1	1,2	
HMI Station No.	0		Does not apply to this protocol
PLC Station No.	1	0-255	

Online Simulator	YES	Broadcast command	YES
Extend address mode	YES		

PLC Setting:

Communication mode	Modbus ASCII protocol

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	0x	ddddd	1-65535	Output bit
B	1x	ddddd	1-65535	Input bit (read only)
B	3x_Bit	ddddd(dd)	100-6553515	Input Register bit (read only)
B	4x_Bit	ddddd(dd)	100-6553515	Output Register bit
W	3x	ddddd	1-65535	Input Register (read only)
W	4x	ddddd	1-65535	Output Register

Modbus RTU function code:

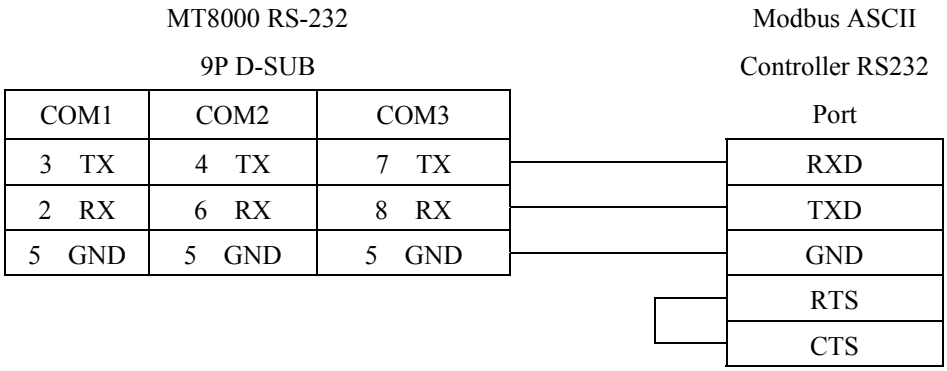
0x	0x01 Read coil	0x05 write single coil
1x	0x02 Read discrete input	N/A for write operation
3x	0x04 Read input register	N/A for write operation
4x	0x03 Read holding register	0x10 write multiple register

3xbit is equivalent to 3x

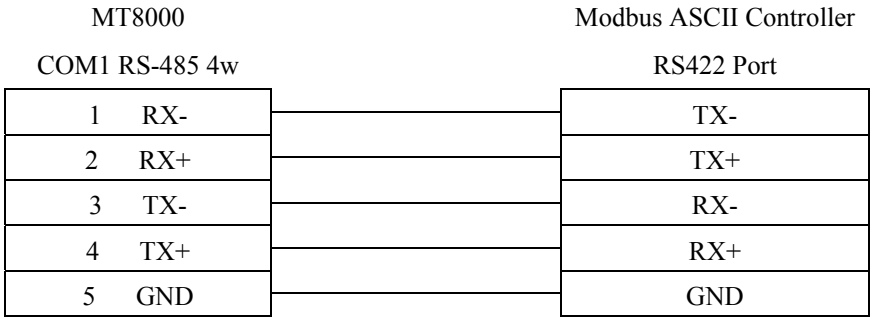
4xbit is equivalent to 4x

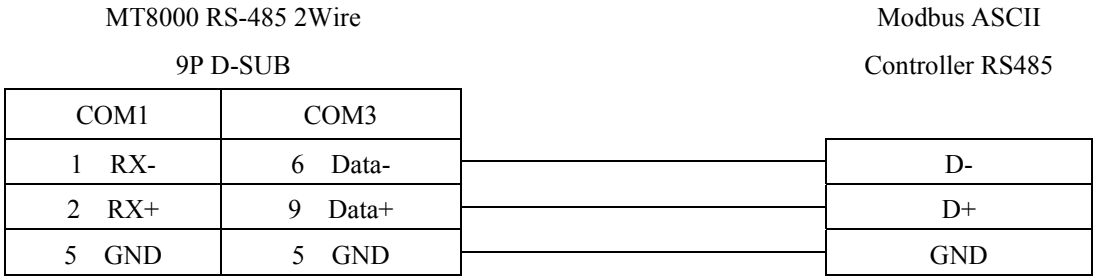
Wiring diagram:

MODBUS RS232 PORT



MODBUS RS422/485 PORT





MODBUS RTU

MODBUS RTU CONTROLLER

http://www.modbus.org

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Modbus RTU		
Com port	RS485	RS232/RS485	
Baud rate	9600	9600~115200	
Parity bit	Even	Even, Odd, None	
Data Bits	8	7,8	
Stop Bits	1	1,2	
HMI Station No.	0		Does not apply to this protocol
PLC Station No.	1	0-255	

Online Simulator	YES	Broadcast command	YES
Extend address mode	YES		

PLC Setting:

Communication mode	Modbus RTU protocol

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	0x	ddddd	1-65535	Output bit
B	1x	ddddd	1-65535	Input bit (read only)
B	3x_Bit	ddddd(dd)	100-6553515	Input Register bit (read only)
B	4x_Bit	ddddd(dd)	100-6553515	Output Register bit
B	6x_Bit	ddddd(dd)	100-6553515	Output Register bit
W	3x	ddddd	1-65535	Input Register (read only)
W	4x	ddddd	1-65535	Output Register
DW	5x	ddddd	1-65535	4x double word swap
W	6x	ddddd	1-65535	4x single word write

NOTE:

Address type “5x” are mapping to Hold Reg. The communication protocol of 5x is almost same as “4x” except “5x”making double word swap.

If 4x has following information

Address	1	2	3	4	5	6	...
Data in word	0x1	0x2	0x3	0x4	0x5	0x6	
Data	0x20001		0x40003		0x60005		

For 5x, it become

Address	1	2	3	4	5	6	...
Data in word	0x2	0x1	0x4	0x3	0x6	0x5	
Data	0x10002		0x30004		0x50006		

Modbus RTU function code:

0x	0x01 Read coil	0x05 write single coil
1x	0x02 Read discrete input	N/A for write operation
3x	0x04 Read input register	N/A for write operation
4x	0x03 Read holding register	0x10 write multiple register
5x	0x03 Read holding register	0x10 write multiple register

(note: reverse word order in double word format)

3xbit is equivalent to 3x

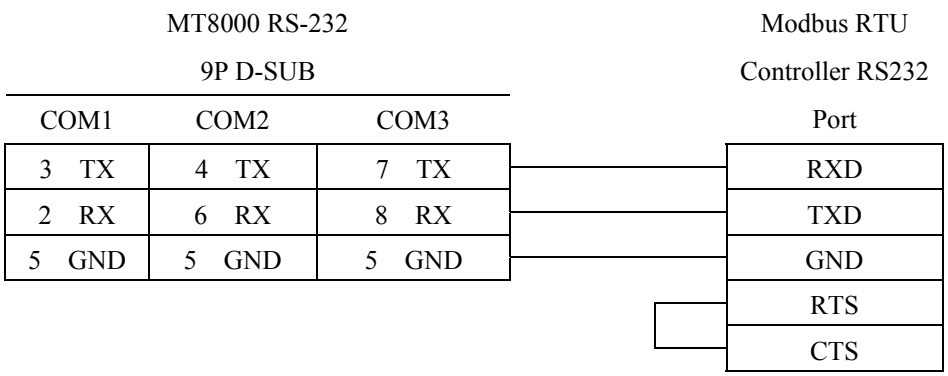
4xbit is equivalent to 4x

6x	0x03 Read holding register	0x06 write single register

(note: use 6x device is limited to device of one word only)

Wiring diagram:

MODBUS RS232 PORT



MODBUS RS422/485 PORT

MT8000 COM1 RS-485 4w		Modbus RTU Controller RS422 Port
1 RX-		TX-
2 RX+		TX+
3 TX-		RX-
4 TX+		RX+
5 GND		GND

MT8000 RS-485 2Wire 9P D-SUB		Modbus RTU Controller RS485
COM1	COM3	
1 RX-	6 Data-	D-
2 RX+	9 Data+	D+
5 GND	5 GND	GND

MODBUS RTU (zero-based addressing)

MODBUS RTU CONTROLLER

http://www.modbus.org

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Modbus RTU		
Com port	RS485	RS232/RS485	
Baud rate	9600	9600~115200	
Parity bit	Even	Even, Odd, None	
Data Bits	8	7,8	
Stop Bits	1	1,2	
HMI Station No.	0		Does not apply to this protocol
PLC Station No.	1	0-255	

Online Simulator	YES	Broadcast command	YES
Extend address mode	YES		

PLC Setting:

Communication mode	Modbus RTU protocol

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	0x	ddddd	0-65535	Output bit
B	1x	ddddd	0-65535	Input bit (read only)
B	3x_Bit	ddddd(dd)	0-6553515	Input Register bit (read only)
B	4x_Bit	ddddd(dd)	0-6553515	Output Register bit
W	3x	ddddd	0-65535	Input Register (read only)
W	4x	ddddd	0-65535	Output Register
DW	5x	ddddd	0-65535	4x double word swap
W	6x	ddddd	0-65535	4x single word write

NOTE:

Address type “5x” are mapping to Hold Reg. The communication protocol of 5x almost same as “4x” except “5x”making double word swap.

If 4x have following information

Address	1	2	3	4	5	6	...
Data in word	0x1	0x2	0x3	0x4	0x5	0x6	
Data	0x20001		0x40003		0x60005		

For 5x, it become

Address	1	2	3	4	5	6	...
Data in word	0x2	0x1	0x4	0x3	0x6	0x5	
Data	0x10002		0x30004		0x50006		

Modbus RTU function code:

0x	0x01 Read coil	0x05 write single coil
1x	0x02 Read discrete input	N/A for write operation
3x	0x04 Read input register	N/A for write operation
4x	0x03 Read holding register	0x10 write multiple register
5x	0x03 Read holding register	0x10 write multiple register

(Note: reverse word order in double word format)

3xbit is equivalent to 3x

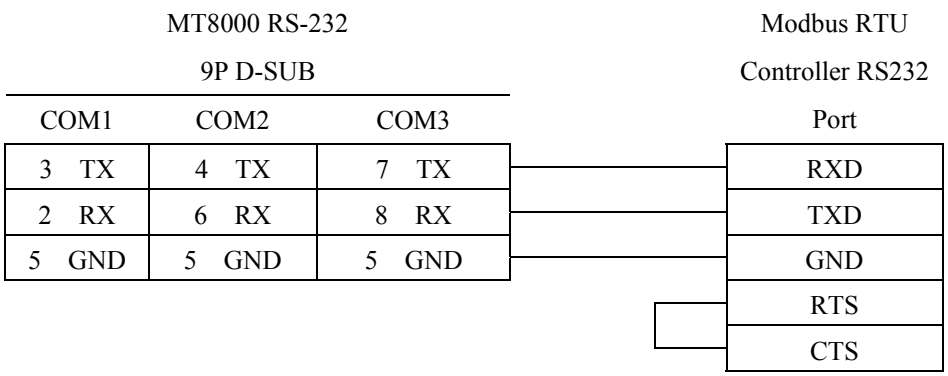
4xbit is equivalent to 4x

6x	0x03 Read holding register	0x06 write single register

(Note: use 6x device is limited to device of one word only)

Wiring diagram:

MODBUS RS232 PORT



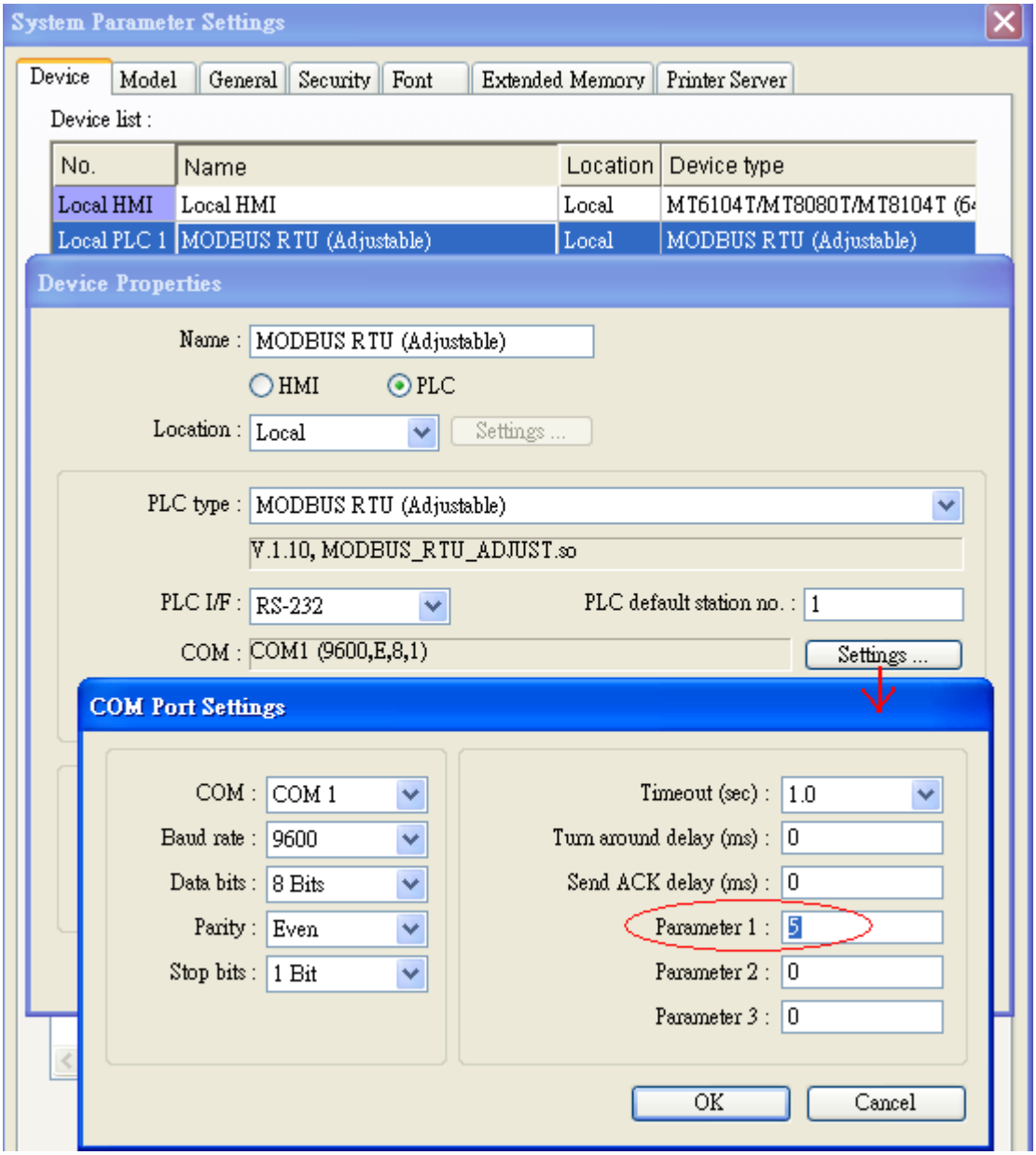
MODBUS RS422/485 PORT

MT8000 COM1 RS-485 4w	Modbus RTU Controller RS422 Port
1 RX-	TX-
2 RX+	TX+
3 TX-	RX-
4 TX+	RX+
5 GND	GND

MT8000 RS-485 2Wire 9P D-SUB		Modbus RTU Controller RS485
COM1	COM3	
1 RX-	6 Data-	D-
2 RX+	9 Data+	D+
5 GND	5 GND	GND

Note: MODBUS RTU (adjustable) usage

Users can decide the address range via setting value on Parameter 1. For example, when users set 5 to Parameter 1, the address range become 5~65535.


System Parameter Settings
Device
Model
General
Security
Font
Extended Memory
Printer Server
Device list :
No.
Name
Location
Device type
Local HMI
Local HMI
Local
MT6104T/MT8080T/MT8104T (6
Local PLC 1
MODBUS RTU (Adjustable)
Local
MODBUS RTU (Adjustable)
Device Properties
Name :
MODBUS RTU (Adjustable)
HMI
PLC
Location :
Local
Settings ...
PLC type :
MODBUS RTU (Adjustable)
V.1.10, MODBUS_RTU_ADJUST.so
PLC I/F :
RS-232
PLC default station no. :
1
COM :
COM1 (9600,E,8,1)
Settings ...
COM Port Settings
COM :
COM 1
Baud rate :
9600
Data bits :
8 Bits
Parity :
Even
Stop bits :
1 Bit
Timeout (sec) :
1.0
Turn around delay (ms) :
0
Send ACK delay (ms) :
0
Parameter 1 :
5
Parameter 2 :
0
Parameter 3 :
0
OK
Cancel

MODBUS SERVER (Modbus RTU Slave)

HMI Setting:

Parameters	Recommend	Option	Option	Notes
PLC type	Modbus Server			
Com port	RS232	RS232, RS485	Ethernet	
Baud rate	9600	9600~115200		
Parity bit	Even	Even, Odd, None		
Data Bits	8	8		
Stop Bits	1	1		
HMI Station No.	0		0	
PLC Station No.	1	1-31	0	**HMI Modbus station No.**
Port no.			502	

Online Simulator	YES	Extend address mode	NO
Broadcast command	NO		

PLC Setting:

Communication mode	**Modbus RTU protocol**

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	LB	dddd	0~9998	Mapping to 0x/1x 1~9999
W	LW	dddd	0~9998	Mapping to 3x/4x 1~9999
W	RW	ddddd	0~55536	Mapping to 3x/4x 10000~65536

LB0 = 0x0001, LB1 = 0x0002, LW0 = 3x0001, LW1 = 3x0002
Modbus RTU Server doesn't support function Code 06(to preset single register), please use function code 16(0x10, preset multiple register).

Wiring diagram:

RS-232:

MT8000 RS232

9P D-SUB

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

Modbus RTU RS232
9P D-SUB

RX
TX
GND

RS-485:

MT8000 RS485 2w

9P D-SUB

COM1	COM3
1 RX-	6 Data-
2 RX+	9 Data+
5 GND	5 GND

Modbus RTU RS-485

9P D-SUB

Data-
Data+
GND

Precaution: Setting more than one Modbus server in HMI device list is useless.

MODBUS TCP/IP

Modbus RTU TCP/IP device.
http://www.modbus.org

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	MODBUS TCP/IP		
Com port	Ethernet		
HMI Station No.	0	Does not apply	
PLC Station No.	0	0~255	
TCP/IP port	502		

PLC Setting:

Communication mode	

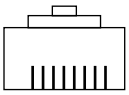
Device address:

Bit/Word	Device Type	Format	Range	Memo
B	0x	ddddd	1-65535	Output bit
B	1x	ddddd dd	1-65535	Input bit (read only)
B	3x_bit	ddddd dd	100-6553515	Input Register bit (read only)
B	4x_bit	ddddd dd	100-6553515	Output Register bit
B	6x_bit	ddddd dd	100-6553515	Output Register bit
W	3x	Ddddd	1-65535	Input Register (read only)
W	4x	Ddddd	1-65535	Output Register
DW	5x	Ddddd	1-65535	4x double word swap
W	6x	Ddddd	1-65535	4x single word write

Wiring diagram:

Ethernet::

MT8000 Ethernet RJ45		Wire color	Ethernet Hub or Switch RJ45	
1	TX+	White/Orange	1	RX+
2	TX-	Orange	2	RX-
3	RX+	White/Green	3	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	6	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-



1 8

RJ45

Ethernet: Direct connect (crossover cable)

MT8000 Ethernet RJ45		Wire color	Modbus TCP Device RJ45	
1	TX+	White/Orange	3	RX+
2	TX-	Orange	6	RX-
3	RX+	White/Green	1	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	2	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-

MODBUS TCP/IP (zero-based)

Modbus RTU TCP/IP device.

http://www.modbus.org

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	MODBUS TCP/IP		
Com port	Ethernet		
HMI Station No.	0	Does not apply	
PLC Station No.	0	0~255	
TCP/IP port	502		

PLC Setting:

Communication mode	

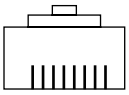
Device address:

Bit/Word	Device Type	Format	Range	Memo
B	0x	ddddd	0-65535	Output bit
B	1x	ddddd dd	0-65535	Input bit (read only)
B	3x_bit	ddddd dd	0-6553515	Input Register bit (read only)
B	4x_bit	ddddd	0-6553515	Output Register bit
W	3x	ddddd	0-65535	Input Register (read only)
W	4x	ddddd	0-65535	Output Register
DW	5x	ddddd	0-65535	4x double word swap

Wiring diagram:

Ethernet::

MT8000 Ethernet RJ45		Wire color	Ethernet Hub or Switch RJ45	
1	TX+	White/Orange	1	RX+
2	TX-	Orange	2	RX-



3	RX+	White/Green		3	TX+
4	BD4+	Blue		4	BD4+
5	BD4-	White/Blue		5	BD4-
6	RX-	Green		6	TX-
7	BD3+	White/Brown		7	BD3+
8	BD3-	Brown		8	BD3-

Ethernet: Direct connect (crossover cable)

MT8000 Ethernet RJ45		**Wire color**		**Modbus TCP Device RJ45**	
1	TX+	White/Orange		3	RX+
2	TX-	Orange		6	RX-
3	RX+	White/Green		1	TX+
4	BD4+	Blue		4	BD4+
5	BD4-	White/Blue		5	BD4-
6	RX-	Green		2	TX-
7	BD3+	White/Brown		7	BD3+
8	BD3-	Brown		8	BD3-

Modicon Twido

http://www.modicon.com/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Modbus RTU		Support Extended Address mode.
Com port	RS485	RS232/RS485	Must match the PLC's port setting.
Baud rate	19200	19200	Must match the PLC's port setting.
Parity bit	None	Even, Odd, None	Must match the PLC's port setting.
Data Bits	8	8	Must set 8 for RTU mode
Stop Bits	1	1	Must set 8 for RTU mode
HMI Station No.	0		Does not apply to this protocol.
PLC Station No.	1	0-247	Must match the PLC's port setting.

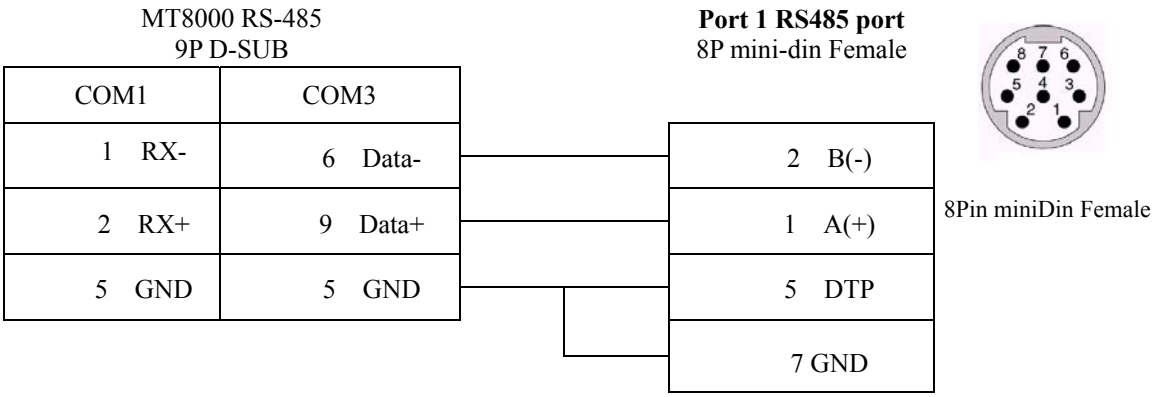
PLC Setting:

Communication mode	**19200, None, 8, 1**
Select	**Modbus RTU Slave**

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	0x or 1x	dddd	0~9999	%Mi
W	3x or 4x	dddd	0~9999	%MWi

Wiring diagram:



MT8000 RS-485
9P D-SUB

Port2 RS485 port
3Pin Terminal

COM1	COM3	
1 RX-	6 Data-	B(-)
2 RX+	9 Data+	A(+)
5 GND	5 GND	GND

MT8000 RS232
9P D-SUB Female

Port2 RS232
9P D-SUB Female

COM1	COM2	COM3		
3 TX	4 TX	7 TX	2	RX
2 RX	6 RX	8 RX	3	TX
5 GND	5 GND	5 GND	5	GND

OMRON C/CQM1 series

OMRON C, CPM, CQM Series (Host Link Protocol),
http://oeiweb.omron.com/oei/Products-PLC.htm

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	OMRON C/CQM1 Series		
Com port	RS232	RS232, RS422, RS485	
Baud rate	9600	9600, 19200	
Parity bit	Even	Even, Odd, None	
Data Bits	7	7 or 8	
Stop Bits	2	1 or 2	
HMI Station No.	0		
PLC Station No.	0	0-31	**Host Link Station No.**

Online Simulator	YES	Broadcast command	YES
Extend address mode	YES		

PLC Setting:

Communication mode	**Host Link protocol**

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	IR	ddd(dd)	0-409515	I/O and internal Relay
B	HR	ddd(dd)	0-409515	Hold Relay
B	AR	ddd(dd)	0-409515	Auxiliary Relay
B	LR	ddd(dd)	0-409515	Link Relay
B	TC	ddd	0-519	Timer/Counter Register
W	DM	dddd	0-6659	Data register

Wiring diagram:

CPU Port(CPM2A,CQM1/1H,C200H/HS/ALPHA series)

Communication Module:

CPM1-CIF01 adapter(for CPM1/CPM1A/CPM2A series,CQM1/CQM1H series)

CPM1H-SCB41 communication module(for CQM1H-CPU51/61)

MT8000 RS232

9P D-SUB Female

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

OMRON
CPU RS-232 9P
D-SUB Female

3	RD
2	SD
9	GND
4	RS
5	CS

C200h-LK201,3G2A6-LK201 communication module

C200HW-COM02/03/04/05/06 communication module

MT8000 RS232

9P D-SUB Female

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

OMRON
CPU RS-232 9P
D-SUB Female

3	RD
2	SD
7	GND
4	RS
5	CS

OMRON CJ1/CS1

OMRON CJ1M, CJ1H, CJ1G, CS1H and CS1G. (Host Link Protocol FINS command),
This driver supports Extend Addressing mode.
http://oeiweb.omron.com/oei/Products-PLC.htm

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	OMRON CJ1/CS1		
Com port	RS232	RS232, RS422, RS485	
Baud rate	9600	9600, 19200	
Parity bit	Even	Even, Odd, None	
Data Bits	7	7 or 8	
Stop Bits	2	1 or 2	
HMI Station No.	0		
PLC Station No.	0	0-31	**Host Link Station No.**

Online Simulator	YES	Extend address mode	YES
Broadcast command	NO		

PLC Setting:

Communication mode	**Host Link protocol**

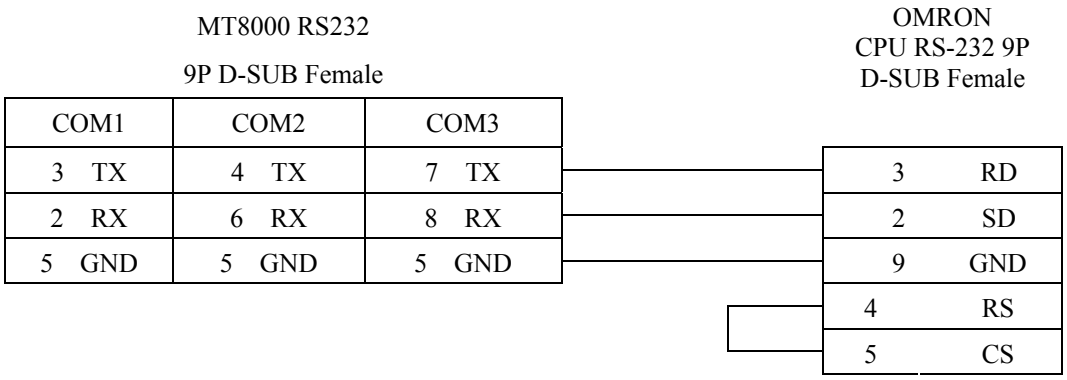
Device address:

Bit/Word	Device Type	Format	Range	Memo
Bit	D_bit	ddd(dd)	ddd:0~32767 (dd): 0~15	Data Memory (DM)
Bit	H_bit	ddd(dd)	ddd:0~511 (dd): 0~15	Holding Area (HR)
Bit	W_bit	ddd(dd)	ddd:0~511 (dd): 0~15	Work Area (WR)
Bit	CIO_bit	ddd(dd)	ddd:0~6143 (dd): 0~15	Channel I/O (CIO)
Bit	A_bit	ddd(dd)	ddd:0~959 (dd): 0~15	Auxiliary Relay (AR)
Bit	T_bit	ddd	ddd:0~4095	Timer (TIM)
Bit	C_bit	ddd	ddd:0~4095	Counter (CNT)
Word	D	ddd	ddd:0~32767	Data Memory (DM)

Bit/Word	Device Type	Format	Range	Memo
Word	H	ddd	ddd:0~511	Holding Area (HR)
Word	W	ddd	ddd:0~511	Work Area (WR)
Word	CIO	ddd	ddd:0~6143	Channel I/O (CIO)
Word	A	ddd	ddd:0~959	Auxiliary Relay (AR)
Word	T	ddd	ddd:0~4095	Timer (TIM)
Word	C	ddd	ddd:0~4095	Counter (CNT)
Word	EM0~EMC	dddd	dddd:0-6149	Extend Memory

Wiring diagram:

RS-232:



OMRON CJ1/CS1 Ethernet

OMRON CJ1M, CJ1H, CJ1G, CS1H and CS1G. (Ethernet FINS),
http://oeiweb.omron.com/oei/Products-PLC.htm

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	OMRON CJ1/CS1 (Ethernet)		
Com port	Ethernet		
TCP port	9600		
HMI Station No.	0		
PLC Station No.	0		

PLC Setting:

Communication mode	**FINS Ethernet protocol**

Device address:

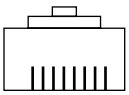
Bit/Word	Device Type	Format	Range	Memo
B	D_bit	ddddd(dd)	ddd:0~32767 (dd): 0~15	Data Memory (DM)
B	H_bit	ddd(dd)	ddd:0~511 (dd): 0~15	Holding Area (HR)
B	W_bit	ddd(dd)	ddd:0~511 (dd): 0~15	Work Area (WR)
B	CIO_bit	dddd(dd)	ddd:0~6143 (dd): 0~15	Channel I/O (CIO)
B	A_bit	ddd(dd)	ddd:0~959 (dd): 0~15	Auxiliary Relay (AR)
B	T_bit	dddd	ddd:0~4095	Timer (TIM)
B	C_bit	dddd	ddd:0~4095	Counter (CNT)
W	D	ddddd	ddd:0~32767	Data Memory (DM)
W	H	ddd	ddd:0~511	Holding Area (HR)
W	W	ddd	ddd:0~511	Work Area (WR)
W	CIO	dddd	ddd:0~6143	Channel I/O (CIO)
W	A	ddd	ddd:0~959	Auxiliary Relay (AR)
W	T	dddd	ddd:0~4095	Timer (TIM)

W	C	dddd	ddd:0~4095	Counter (CNT)

Wiring diagram:

Ethernet:

MT8000 Ethernet RJ45		Wire color	Ethernet Hub or Switch RJ45	
1	TX+	White/Orange	1	RX+
2	TX-	Orange	2	RX-
3	RX+	White/Green	3	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	6	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-



RJ45 connector

Ethernet: Direct connect (crossover cable)

MT8000 Ethernet RJ45		Wire color	OMRON Ethernet RJ45	
1	TX+	White/Orange	3	RX+
2	TX-	Orange	6	RX-
3	RX+	White/Green	1	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-

6	RX-	Green		2	TX-
7	BD3+	White/Brown		7	BD3+
8	BD3-	Brown		8	BD3-

OMRON E5CN

OMRON E5CN series Temperature controller with communication option.
E5EN/CN/GN series
http://oeiweb.omron.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	OMRON E5CN		
Com port	RS485 2W		
Baud rate	9600	9600/19200/38400/57600 /115200	
Parity bit	Even	Even, Odd, None	
Data Bits	7	7,8	
Stop Bits	2	1,2	
HMI Station No.	0		Does not apply to this protocol
PLC Station No.	0	0-99	

Online Simulator	YES	Broadcast command	YES
Extend address mode	YES		

PLC Setting:

Communication mode	9600, Even, 7, 2 (default)

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	Status	dd	0-31	Page40
DW	C0	hhhh	0-5	Read only (Hex) Page34
DW	C1	hhhh	0-1C	Read/Write (Hex) Page35
DW	C3	hhhh	0-1D	Read/Write (Hex) Page36
W	Operation00_00	hh	0	Communications writing OFF (disabled)
W	Operation00_01	hh	0	Communications writing ON(Enabled)
W	Operation01_00	hh	0	Run
W	Operation01_01	hh	0	Stop

Bit/Word	Device Type	Format	Range	Memo
W	Operation02_00	hh	0	Multi-SP Set point 0
W	Operation02_01	hh	0	Multi-SP Set point 1
W	Operation02_02	hh	0	Multi-SP Set point 2
W	Operation02_03	hh	0	Multi-SP Set point 3
W	Operation03_00	hh	0	AT cancel
W	Operation03_01	hh	0	AT execute
W	Operation04_00	hh	0	Write mode (Backup)
W	Operation04_01	hh	0	Write mode (Ram)
W	Operation05_00	hh	0	Save RAM data
W	Operation06_00	hh	0	Software reset
W	Operation07_00	hh	0	Move to setup area 1
W	Operation08_00	hh	0	Move to protect level

Wiring diagram:

MT8000 RS-485 2Wire

9P D-SUB

OMRON E5CN

COM1	COM3		
1 RX-	6 Data-	———	12 B
2 RX+	9 Data+	———	11 A
5 GND	5 GND	———	GND

Panasonic FP

NAIS (Matsushita) FP series include FP-X, FP-Σ, FP0, FP1, FP2, FP2SH, FP10SH and FP3
Ethernet support FP-X with AFPX-COM5.
http://pewa.panasonic.com/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Matsushita FP		
Com port	RS232	RS232/RS485 Ethernet	Must match the PLC's port setting.
Baud rate	9600	9600, 19200, 38400, 57600, 115200	Must match the PLC's port setting.
Parity bit	Odd	Even, Odd, None	Must match the PLC's port setting.
Data Bits	8	7 or 8	Must match the PLC's port setting.
Stop Bits	1	1 or 2	Must match the PLC's port setting.
HMI Station No.	0	0-255	Does not apply to this protocol.
PLC Station No.	1	0-255	Must match the PLC's port setting. **FP3 must set 0.**

PLC Setting:

Communication mode	**9600,O,8,1(default)**

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	X	dddd(h)	0~9999F	Input(X)
B	Y	dddd(h)	0~9999F	Output(Y)
B	R	dddd(h)	0~9999F	Internal Relay(R)
B	L	dddd(h)	0~9999	Link Relay(L)
B	T	ddd	0~9999	Timer(T)
B	C	ddd	0~9999	Counter(C)
W	SV	ddd	0~9999	Timer/Counter set value(SV)

W	EV	ddd	0~9999	Timer/Counter elapse value(EV)
W	DT	ddd	0~32767	Data Register(DT)

Wiring diagram:

MT8000 RS232

9P D-SUB

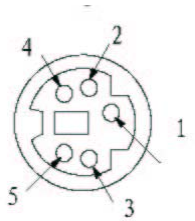
COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

FP0, FP2, FP2SH,FPM

CPU Tool port

5P mini DIN RS-232

3 RXD
2 TXD
1 GND



Mini Din 5 Pin

Female

MT8000 RS232

9P D-SUB

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

FP0 CPU RS232

3P terminal

R
S
G

MT8000 RS232

9P D-SUB

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

FP1, FP2, FP2SH,FP10SH CPU

9p D-SUB Male RS232

3	RXD
2	TXD
7	GND
4	RTS
5	CTS
8	CD
9	ER

MT8000

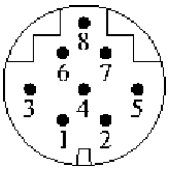
COM1[RS-485]4w

9P D-SUB

FP1 CPU RS422 port

Hirose 8Pin Port

1 RX-		2	TXDA
2 RX+		5	TXDB
3 TX-		3	RXDA
4 TX+		6	RXDB
5 GND		1	GND



Hirose 8Pin Port

MT8000

COM1[RS-485]4w 9P

D-SUB

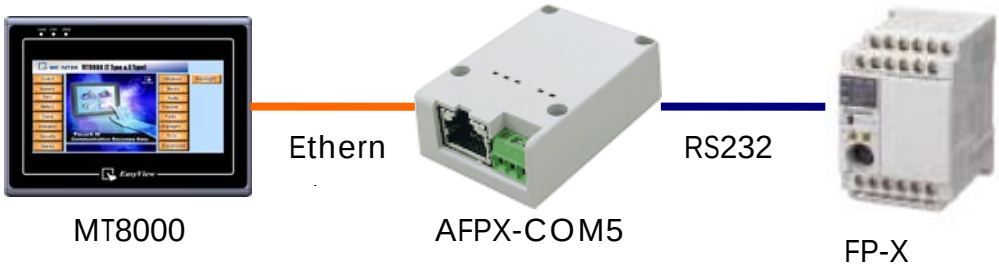
FP3 CPU RS422 port

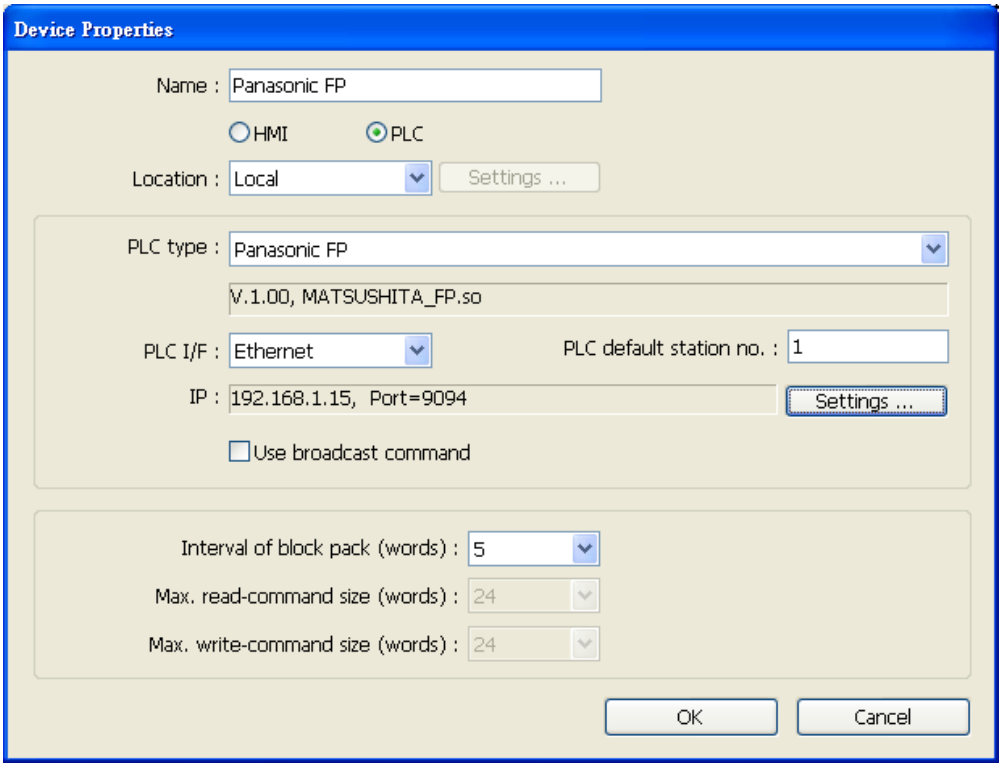
15P D-SUB Female

1 RX-		9	TXDA
2 RX+		2	TXDB
3 TX-		10	RXDA
4 TX+		3	RXDB
5 GND		7	GND
		4	RTS+
		5	CTS+
		11	RTS-
		12	CTS-

Ethernet connect

TCP port: 9094




Device Properties
Name : Panasonic FP
HMI
PLC
Location : Local
Settings ...
PLC type : Panasonic FP
V.1.00, MATSUSHITA_FP.so
PLC I/F : Ethernet
PLC default station no. : 1
IP : 192.168.1.15, Port=9094
Settings ...
Use broadcast command
Interval of block pack (words) : 5
Max. read-command size (words) : 24
Max. write-command size (words) : 24
OK
Cancel

Parker Compax3

Parker Compax3 Servo Drive

http://www.parker.com

HMI Setting:

RS232

Parameters	Recommend	Option	Notes
PLC type	Parker Compax3 [V1.50]		
Com port	RS-232		Must match the PLC's port setting.
Baud rate	115200		Must match the PLC's port setting.
Parity bit	None	Even, Odd, None	Must match the PLC's port setting.
Data Bits	8	7 or 8	Must match the PLC's port setting.
Stop Bits	1	1 or 2	Must match the PLC's port setting.
PLC Station No.	0	0	Must be 0 for RS232

RS485

Parameters	Recommend	Option	Notes
PLC type	Parker Compax3 [V1.50]		
Com port	RS-485 2W		Must match the PLC's port setting.
Baud rate	9600		Must match the PLC's port setting.
Parity bit	None	Even, Odd, None	Must match the PLC's port setting.
Data Bits	8	7 or 8	Must match the PLC's port setting.
Stop Bits	1	1 or 2	Must match the PLC's port setting.
PLC Station No.	1	1-99	Range from 1 to 99 for RS485, according to the PLC's setting.

Device address:

Bit/Word	Device Type	Format	Range	Memo
DW	Register_Int	DDD(dd)	0-9999(99)	Integer register
DW	Register_Float	DDD(dd)	0-9999(99)	Floating point register

Note: D (Decimal).

About device address range details, please refer to the PLC manual.

Example: read/write address:1901.2, please input 190101.

read/write address: 400.1, please input 40001.

When select the Register_Float, be sure set data format to 32 bit float, or it will ignore the read/write of point.

Wiring diagram:

RS232:

EasyView MT8000

RS232 9P D-SUB

COM1 [RS232]	COM2 [RS232]	COM3 [RS232]
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

Parker Compax3 PLC

X10 9P D-SUB

2 RXD
3 TXD
5 GND

RS485:

EasyView MT8000

RS-485 2w D-SUB

COM1[485]	COM3[485]
1 RX-	6 Data-
2 RX+	9 Data+
5 GND	5 GND

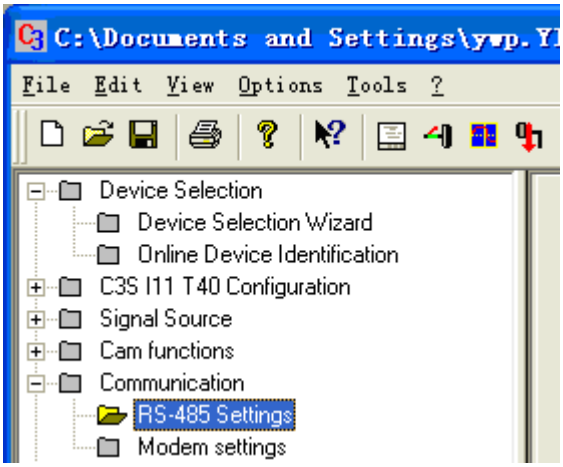
Parkar Compax3 PLC

X10 9P D-SUB

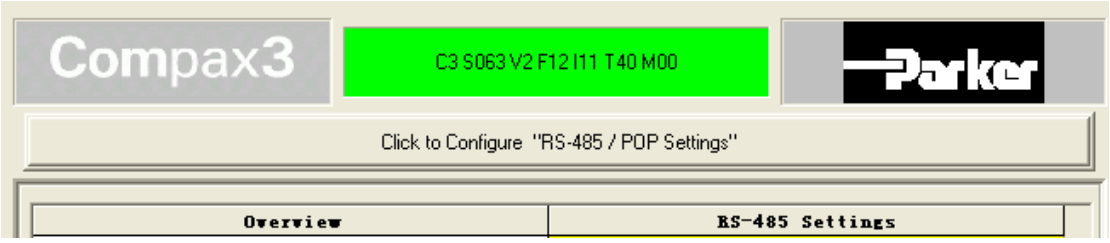
3 RXD
7 TXD
5 GND
1 Enable RS485
9 +5V

How to setting Compax 3 servo to RS485 mode?

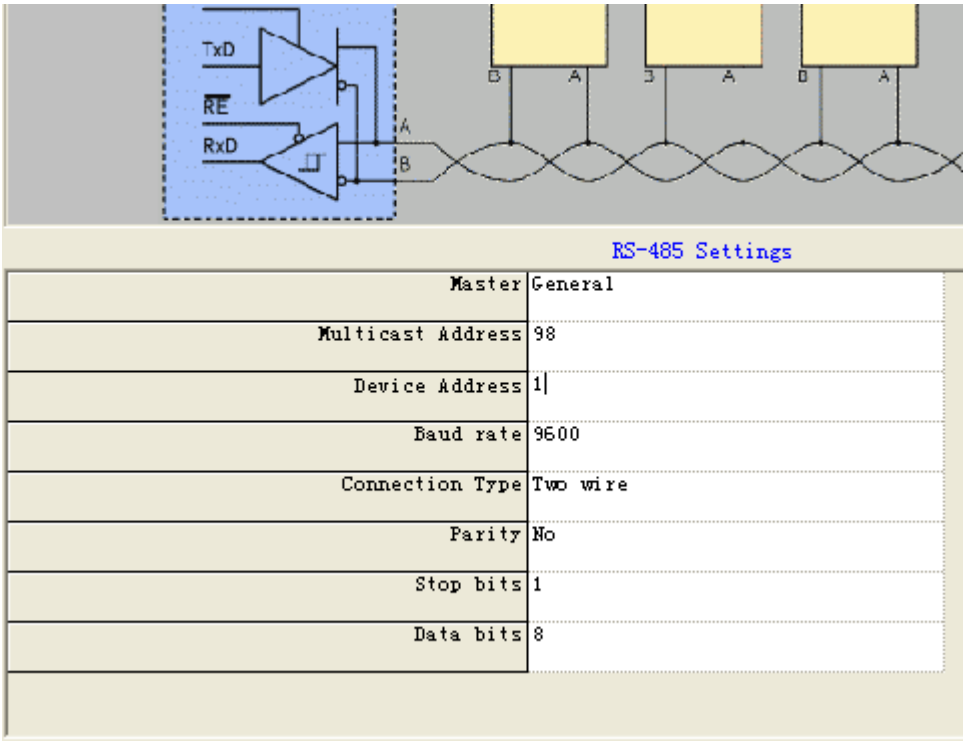
1. Open C3 ServoManager2, select “Communication”=> “RS-485 Settings”.



2. Click to Configure “RS-485/POP Settings”.



3. Setting parameters as below



4. Downloading settings to Compax3 Servo.

5. Setting EB8000 system parameter and connecting with PLC for communication of HMI and Servo.

SAIA PCD PGU mode

SAIA PCD series PGU mode.
http://www.saia-burgess.com/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	SAIA PCD PGU mode	SAIA PCD S-BUS mode	PDS driver
Com port	RS232	RS232, RS485	
Baud rate	9600	9600, 19200	
Parity bit	Even	Even, Odd, None	
Data Bits	7	7,8	
Stop Bits	1	1	
HMI Station No.	0		
PLC Station No.	1	0-255	

PLC Setting:

Communication mode	**9600,E,7,1(default)**

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	Flag	ddd	ddd=0~8191	
B	Input	ddd	ddd=0~511	
B	Output	ddd	ddd=0~511	
D	Register	ddd	ddd=0~4095	
D	Counter	ddd	ddd=0~1599	
D	Timer	ddd	ddd=0~450	
D	Reg_Float	ddd	ddd=0~4095	support single float point

Wiring diagram:

RS232:

MT8000 RS232

9P D-SUB Male

COM1	COM2	COM3
3 TX		
2 RX		
5 GND		
7 RTS		

SAIA PCD PGU port

9P D-SUB Female

2 RXD
3 TXD
5 GND
6 DSR
7 RTS
8 CTS

6 DSR (Of PGU Port):PGU connected

SAIA PCD S-Bus mode

SAIA PCD series S-Bus mode.

http://www.saia-burgess.com/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	SAIA PCD S-BUS mode	SAIA PCD PGU mode	PDS driver
Com port	RS232	RS232, RS485	
Baud rate	9600	9600, 19200, 38400	
Parity bit	None	Even, Odd, None	
Data Bits	8	7,8	
Stop Bits	1	1	
HMI Station No.	0		
PLC Station No.	1	0-255	

PLC Setting:

Communication mode	**9600,N,8,1(default)**
RS232	**Port 0-Type:RS232**
RS485 2W	**S-BUS Mode:Data(S2),Port 1-Type:RS485**

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	Flag	ddd	ddd=0~8191	
B	Input	ddd	ddd=0~511	
B	Output	ddd	ddd=0~511	
D	Register	ddd	ddd=0~4095	
D	Counter	ddd	ddd=0~1599	
D	Timer	ddd	ddd=0~450	
D	Reg_Float	ddd	ddd=0~4095	support single float point

Wiring diagram:

RS232:

MT8000 RS232

9P D-SUB Male

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

SAIA PCD PGU port

9P D-SUB Female

2 RXD
3 TXD
5 GND
7 RTS
8 CTS

RS485:

MT8000 RS-485

9P D-SUB Female

COM1	COM3
1 RX-	6 Data-
2 RX+	9 Data+
5 GND	5 GND

SAIA PCD1

Port# 1

11
12

MT8000 RS-485

9P D-SUB Female

COM1	COM3
1 RX-	6 Data-
2 RX+	9 Data+
5 GND	5 GND

SAIA PCD1

Port# 0

29
28

SEW Eurodrive MOVITRAC

SEW Eurodrive series, model MOVITRAC-07 inverter
http://sg.sew-eurodrive.com/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	SEW Eurodrive MOVITRAC		
Com port	RS-485		
PLC Station No.	0	0~255	
Baud rate	9600		
Data bit	8		
Parity bit	Even		
Stop bit	1		

Device address:

Bit/Word	Device Type	Format	Range	Memo
W	INDEX	SSSAAAAA	S(000~255) A(08000~25000)	S: Sub index A: Index

- The MOVITRAC-07 doesn't support Sub index（other series maybe support）, please fixed to input 000.
- When input S and A, the correct format example as follow：Sub index 15, Index 8359, Format is 01508359

Wiring diagram:

EasyView MT8000
RS-485 2W (COM 1)

MOVITRAC-07
RS-485

Pin 1 (D－) ——→ Green
Pin 2 (D＋) ——→ Red

SIEMENS S7/200

Siemens S7/200 series PLC (CPU212/214/215/216/221/222/224/226/226XM)
http://www.ad.siemens.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	SIEMENS S7/200		
Com port	RS485	RS485	
Baud rate	9600	9600, 19200	Must same as the PLC setting
Parity bit	Even	Even, Odd, None	Must same as the PLC setting
Data Bits	8	7,8	Must same as the PLC setting
Stop Bits	1	1, 2	Must same as the PLC setting
HMI Station No.	0	0-255	
PLC Station No.	2	0-255	Must same as the PLC setting
Turn around delay (ms)	5		
Reserved 1	30		ACK delay time

Online Simulator	YES	Extend address mode	NO
Broadcast command	NO		

PLC Setting:

Communication mode	**Set station number as 2**

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	I	dddd(o)	0-40957	Input (I)
B	Q	dddd(o)	0-40957	Output (O)

B	M	dddd(o)	0-40957	Bit Memory
B	VW.Bit	ddddd(o)	0-102397	V Memory bit address
W	VW	ddddd	0-10238	V memory
DW	VD	ddddd	0-10236	V memory double word

* Double word and Floating point value must use VD device type.

Wiring diagram:

MT8000 RS-485

9P D-SUB Female

COM1	COM3
1 RX-	6 Data-
2 RX+	9 Data+
5 GND	5 GND

SIEMENS S7/200

CPU Port

9P D-SUB Female

8 D-
3 D+
5 GND

SIEMENS S7/200 Ethernet

Siemens S7/200 Ethernet Series PLC (CPU212/214/215/216/221/222/224/226/226XM)
http://www.ad.siemens.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Siemens S7/200 (Ethernet)		Must match the PLC's port setting.
Com port	Ethernet		Must match the PLC's port setting.
Port no.	102		Must match the PLC's port setting.
PLC station no.	1	0-31	Must match the PLC's port setting.

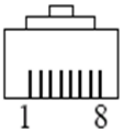
Device address:

Bit/Word	Device Type	Format	Range	Memo
B	I	dddd(o)	0-40957	Input (I)
B	Q	dddd(o)	0-40957	Output (O)
B	M	dddd(o)	0-40957	Bit Memory
B	VW.Bit	ddddd(o)	0-102397	V Memory bit address
W	VW	ddddd	0-10238	V memory
DW	VD	ddddd	0-10236	V memory double word

- Double word and Floating point value must use VD device type.

Wiring diagram:

MT8000 Ethernet RJ45	Wire color	**Ethernet Hub or Switch RJ45**
1 TX+	White/Orang	1 RX+
2 TX-	Orange	2 RX-
3 RX+	White/Green	3 TX+
4 BD4+	Blue	4 BD4+
5 BD4-	White/Blue	5 BD4-
6 RX-	Green	6 TX-
7 BD3+	White/Brow	7 BD3+
8 BD3-	Brown	8 BD3-



RJ45 connector

Ethernet: Direct connect (crossover cable)

MT8000 Ethernet RJ45		Wire color	Ethernet Device RJ45	
1	TX+	White/Orange	3	RX+
2	TX-	Orange	6	RX-
3	RX+	White/Green	1	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	2	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-

SIEMENS S7/300

Siemens S7/300 series PLC

http://www.ad.siemens.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	SIEMENS S7/300		
Com port	RS232		
Baud rate	19200, 38400	9600~115200	Must same as the PLC setting
Parity bit	Odd		
Data Bits	8		
Stop Bits	1		
HMI Station No.	0		Does not apply to this protocol
PLC Station No.	2		Must same as the PLC setting

PLC Setting:

Communication mode	

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	I	dddd(o)	0-40957	Input (I)
B	Q	dddd(o)	0-40957	Output (O)
B	M	dddd(o)	0-40957	Bit Memory
B	DB0Bit-DB99Bit	dddd(o)	0-81927	Data register bit
W	DB0-DB99	dddd	0-8192	Data register(must be even)
W	IW	dddd	0-4095	Input (I)
W	QW	dddd	0-4095	Output (O)
W	MW	dddd	0-4095	Bit Memory
W	DBn	dddddd	000000-998192	Data register(must be even)
DW	DBDn	ffdddd	ff:0-99, dddd:0-8192	Data register double word (must be multiple of 4)

* Double word and Floating point value must use DBDn device type.

Wiring diagram:

MT8000 RS232

9P D-SUB Male

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

SIEMENS S7/300 PC adapter RS232 Port

9P D-SUB Male

2 RXD
3 TXD
5 GND
7 RTS
8 CTS

MT8000 RS232

9P D-SUB Male

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

Systeme Helmholz SSW7-TS

9P D-SUB Male

2 RXD
3 TXD
5 GND
7 RTS
8 CTS
4 DTR
6 DSR

SIEMENS S7/300 Ethernet

Siemens S7/300 Ethernet Series PLC

http://www.ad.siemens.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Siemens S7/300 (Ethernet)		Must match the PLC's port setting.
Com port	Ethernet		Must match the PLC's port setting.
Port no.	102		Must match the PLC's port setting.
PLC station no.	1	0-31	Must match the PLC's port setting.

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	I	dddd(o)	0-40957	Input (I)
B	Q	dddd(o)	0-40957	Output (O)
B	M	dddd(o)	0-40957	Bit Memory
B	DB0Bit-DB99Bit	dddd(o)	0-81927	Data register bit
W	DB0-DB99	dddd	0-8192	Data register(must be even)
W	IW	dddd	0-4095	Input (I)
W	QW	dddd	0-4095	Output (O)
W	MW	dddd	0-4095	Bit Memory
W	DBn	dddddd	000000-998192	Data register(must be even)
DW	DBDn	ffdddd	ff:0-99, dddd:0-8192	Data register double word (must be multiple of 4)

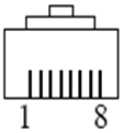
* Double word and Floating point value must use DBDn device type.

Wiring diagram:

MT8000 Ethernet RJ45 Wire color **Ethernet Hub or Switch RJ45**

1 TX+	White/Orang	1	RX+
2 TX-	Orange	2	RX-
3 RX+	White/Green	3	TX+
4 BD4+	Blue	4	BD4+

5	BD4-	White/Blue		5	BD4-
6	RX-	Green		6	TX-
7	BD3+	White/Brow		7	BD3+
8	BD3-	Brown		8	BD3-



RJ45 connector

Ethernet: Direct connect (crossover cable)

MT8000 Ethernet RJ45		Wire color		Ethernet Device RJ45	
1	TX+	White/Orange		3	RX+
2	TX-	Orange		6	RX-
3	RX+	White/Green		1	TX+
4	BD4+	Blue		4	BD4+
5	BD4-	White/Blue		5	BD4-
6	RX-	Green		2	TX-
7	BD3+	White/Brown		7	BD3+
8	BD3-	Brown		8	BD3-

SIMATIC TI505

SIMATIC TI505 Series PLCs: TI520, TI525, TI530, TI535, TI545, TI555, TI560, TI565, TI575
Using the NITP protocol in a point-to-point single master, single slave format.
http://www.ad.siemens.de/simatic/controller/index_76.htm

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	SIMATIC TI505		
Com port	RS232	RS232, RS485(4W)	
Baud rate	19200	19200	
Parity bit	Odd	Odd	
Data Bits	7	7	
Stop Bits	1	1	
PLC Station No.	0	Does not apply	

PLC Setting:

Communication mode	NITP protocol

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	CR	ddddd	ddddd:1~65535	Internal Relay
B	X	ddddd	ddddd:1~65535	Discrete input coils
B	Y	ddddd	ddddd:1~65535	Discrete output coils
W	V	ddddd	ddddd:1~65535	User data registers
W	STW	ddddd	ddddd:1~65535	Status word registers
W	TCP	ddddd	ddddd:1~65535	Timer/counter preset values
W	TCC	ddddd	ddddd:1~65535	Timer/counter current values
W	WX	ddddd	ddddd:1~65535	Word discrete inputs
W	WY	ddddd	ddddd:1~65535	Word discrete outputs

Wiring diagram:

RS-232:

MT8000 HMI

9P D-SUB

SIMATIC TI505
25Pin D-SUB

COM1 [RS232]	COM2 [RS232]	COM3 [RS232]
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

3 RXD
2 TXD
7 GND
4 RTS
5 CTS
6 DSR
8 DCD
20 DTR

RS-232:

MT8000 HMI

9P D-SUB

SIMATIC TI505
9Pin D-SUB

COM1 [RS232]	COM2 [RS232]	COM3 [RS232]
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

2 RXD
3 TXD
5 GND
7 RTS
8 CTS
1 DCD
4 DTR
6 DSR

RS485 4W:

MT8000HMI

COM1 RS-485/4w

9P D-SUB

SIMATIC TI505
9Pin D-SUB

1 RX-	7 DO(-)
2 RX+	1 DO(+)
3 TX-	8 DI(-)
4 TX+	5 DI(+)
5 GND	6 GND

Telemecanique UniTelWay

Modicon TSX Micro&Nano&Neza series PLC

http://www.modicon.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Telemecanique UniTelWay		
Com port	RS485	RS232/RS485	
Baud rate	9600	9600~115200	Must same as the PLC setting
Parity bit	Odd	Even, Odd, None	Must same as the PLC setting
Data Bits	8	7,8	Must set as 8 to this protocol
Stop Bits	1	1, 2	Must same as the PLC setting
HMI Station No.	5	4-7	Must set by manual
PLC Station No.	0	0-3	

Online Simulator	YES	Extend address mode	YES
Broadcast command	NO		

PLC Setting:

Communication mode	**UniTelWay protocol, set PLC as master**

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	S	ddd	0-32767	Internal relay
B	M	ddd	0-32767	Auxiliary relay
B	MW.B	ddd(dd)	0-999915	Data register bit
W	MW	ddd	0-9999	Data register

Wiring diagram:

TSX37-XX/TSX07-XX CPU

MT8000 RS-485 9P D-SUB			**TSX series CPU port** 8P mini-din Female
COM1	COM3		
1 RX-	6 Data-		2 D-
2 RX+	9 Data+		1 D+
5 GND	5 GND		7 GND

8Pin miniDin Female

TOSHIBA T series

Toshiba T series, S2E
http://www.tic.toshiba.com

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Toshiba T Serial		
Com port	RS232	RS232/RS485	In accordance with plc port
Baud rate	9600	9600, 19200,38400,57600,115200	Must same as the PLC setting
Parity bit	Odd	Even, Odd, None	Must same as the PLC setting
Data Bits	8	7,8	Must same as the PLC setting
Stop Bits	1	1, 2	Must same as the PLC setting
HMI Station No.	0	0-255	Does not apply to this protocol
PLC Station No.	0	0-255	In accordance with PLC setting

Online Simulator	YES	Extend address mode	YES
Broadcast command			

PLC Setting:

Communication mode	**Must set PLC node ID**

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	X	ddd(h)	0-9999f	Input Bit
B	Y	ddd(h)	0-9999f	Output Bit
B	R	ddd(h)	0-9999f	Auxiliary Bit
B	S	ddd(h)	0-9999f	Special Bit
W	T	ddd	0-9999	Timer Register
W	C	ddd	0-9999	Counter Register
W	D	ddd	0-9999	Data Memory
W	SW	ddd	0-9999	Special Register

Bit/Word	Device Type	Format	Range	Memo
W	XW	ddd	0-9999	Input Register
W	YW	ddd	0-9999	Output Register
W	RW	ddd	0-9999	Auxiliary Register

Wiring diagram:

RS232

MT8000 RS232

9P D-SUB

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

Toshiba T1 PRG port

8P mini-D

8 RXD
6 TXD
3 GND
4 RTS
7 CTS

MT8000 RS232

9P D-SUB

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

Toshiba T2 PRG port

9P D-SUB Female

2 RXD
3 TXD
5 GND
7 RTS
8 CTS

RS485

MT8000 COM1

RS485

9P D-SUB

1 RX-
2 RX+
3 TX-
4 TX+
5 GND

Toshiba T2 LINK port

15P D-SUB Female

11 TXB
3 TXA
10 RXB
2 RXA
7 SG
5 RTSA
4 CTSA
13 RTSB
12 CTSB

TOSHIBA TC mini series

TOSHIBA MACHINE CO., JAPAN

Web Site: http://www.toshiba-machine.co.jp

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Provisor TC200	Provisor TC200	
Com port	RS232	RS232	In accordance with plc port
Baud rate	9600	9600, 19200	Must same as the PLC setting
Parity bit	None	Even, Odd, None	Must same as the PLC setting
Data Bits	8	7,8	Must same as the PLC setting
Stop Bits	1	1, 2	Must same as the PLC setting
HMI Station No.	0		Does not apply to this protocol
PLC Station No.	0		Does not apply to this protocol

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	X_Bit	hhh(h)	0-fff(f)	(h) : Bit no.(0~f)
B	Y_Bit	hhh(h)	0-fff(f)	(h) : Bit no.(0~f)
B	R_Bit	hhh(h)	0-fff(f)	(h) : Bit no.(0~f)
B	L_Bit	hhh(h)	0-fff(f)	(h) : Bit no.(0~f)
W	V	hhh	0-fff	
W	P	hhh	0-fff	
W	D	hhh	0-fff	
W	R	hhh	0-fff	
W	L	hhh	0-fff	

Wiring diagram:

RS232

MT8000 HMI

RS232 9P D-SUB

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

TC mini series

9P D-SUB

3 RXD
2 TXD
5 GND
7 RTS
9 CTS

TOSHIBA VF-S11

Toshiba Invertor Protocol(ASCII code)

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Toshiba VF-S11		
Com port	RS485(2 wire)	RS422, RS485	
Baud rate	9600	9600, 19200	
Parity bit	Even	Even, Odd, None	
Data Bits	8	7 or 8	
Stop Bits	1	1 or 2	
HMI Station No.	0		
PLC Station No.	0	0-99	

Online Simulator	YES	Extend address mode	YES
Broadcast command	YES		

PLC Setting:

Communication mode	**9600 E,8,1, Station No=0**

Device address:

Bit/Word	Device Type	Format	Range	Memo
Word	Communication No.	HHH	HHH:0~ 0FFF	Parameters and data memory
Bit	Comm.No.Bit	HHH(DD)	HHH(DD):0-FFF(15)	

Wiring diagram:

Pay Attention:

Before you connect the VF-A11, Make sure you have put two switch on of sw1.(SW1: Wiring method selector switch)

RS-485

MT8000 PLC[RS485] 9P D-SUB male		Toshiba VF-S11 communication port
1 RX-		RXB
2 RX+		RXA
5 GND		SG

VIGOR

VIGOR M Series

http://www.vigorplc.com.tw/

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	VIGOR		
Com port	RS232	RS232, RS485 4wires,	
Baud rate	19200		
Parity bit	Even		
Data Bits	7		
Stop Bits	1		
HMI Station No.	0		
PLC Station No.	1		

PLC Setting:

Communication mode	None

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	X	ooo	0~177	
B	Y	ooo	0~177	
B	M	dddd	0~4095	
B	S	ddd	0~999	
B	T	ddd	0~255	
B	C	ddd	0~255	
W	TV	ddd	0~255	
W	CV	ddd	0~255	
W	D	dddd	0~4095	
W	DL	dddd	0~4095	Double word

Wiring diagram:

RS-485 4wire:

MT8000 **COM1 RS485 4w** 9P D-SUB Male		VIGOR M series 6pin terminal
1 RX-		TX-
2 RX+		TX+
3 TX-		RX-
4 TX+		RX+
5 GND		SG
		24V

RS-232:

MT8000 RS232 9P D-SUB				VIGOR M series COM Port
COM1	COM2	COM3		
3 TX	4 TX	7 TX		2 RXD
2 RX	6 RX	8 RX		3 TXD
5 GND	5 GND	5 GND		5 GND

Yokogawa FA-M3

FA-M3 CPU SP35-5N, SP55-5N CPU port, F3LC11 Computer Link module.
http://www.yokogawa.com/itc/itc-index-en.htm

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Yokogawa FA-M3		
Com port	RS232		
Baud rate	19200	9600, 19200	
Parity Bit	Even	Even, Odd, None	
Data Bits	8	8	
Stop Bits	1	1	
HMI Station No.	0		
PLC Station No.	1	1-31	

PLC Setting:

Communication mode	**Use Personal Communication Link** **Use checksum** **Use End Character**

Device address:

Bit/Word	Device Type	Format	Range	Memo
B	X	ddd	201-71664(discontinuous)	
B	Y	ddd	201-71664(discontinuous)	
B	I	ddd	1-16384	
B	L	ddd	1-71024(discontinuous)	
B	M	ddd	1-9984	
W	D	ddd	1-8192	
W	B	ddd	1-32768	
W	V	ddd	1-64	
W	W	ddd	1-71024(discontinuous)	

W	Z	ddd	1-512	

Wiring diagram:

RS-232: CPU port

MT8000 RS232 CPU port cable

9P D-SUB KM11 RS-232

MT8000 RS232

9P D-SUB

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

3	RXD
2	TXD
5	GND

RS-232: LC11

MT8000 RS232 LC11 Computer

9P D-SUB Female Link module RS232

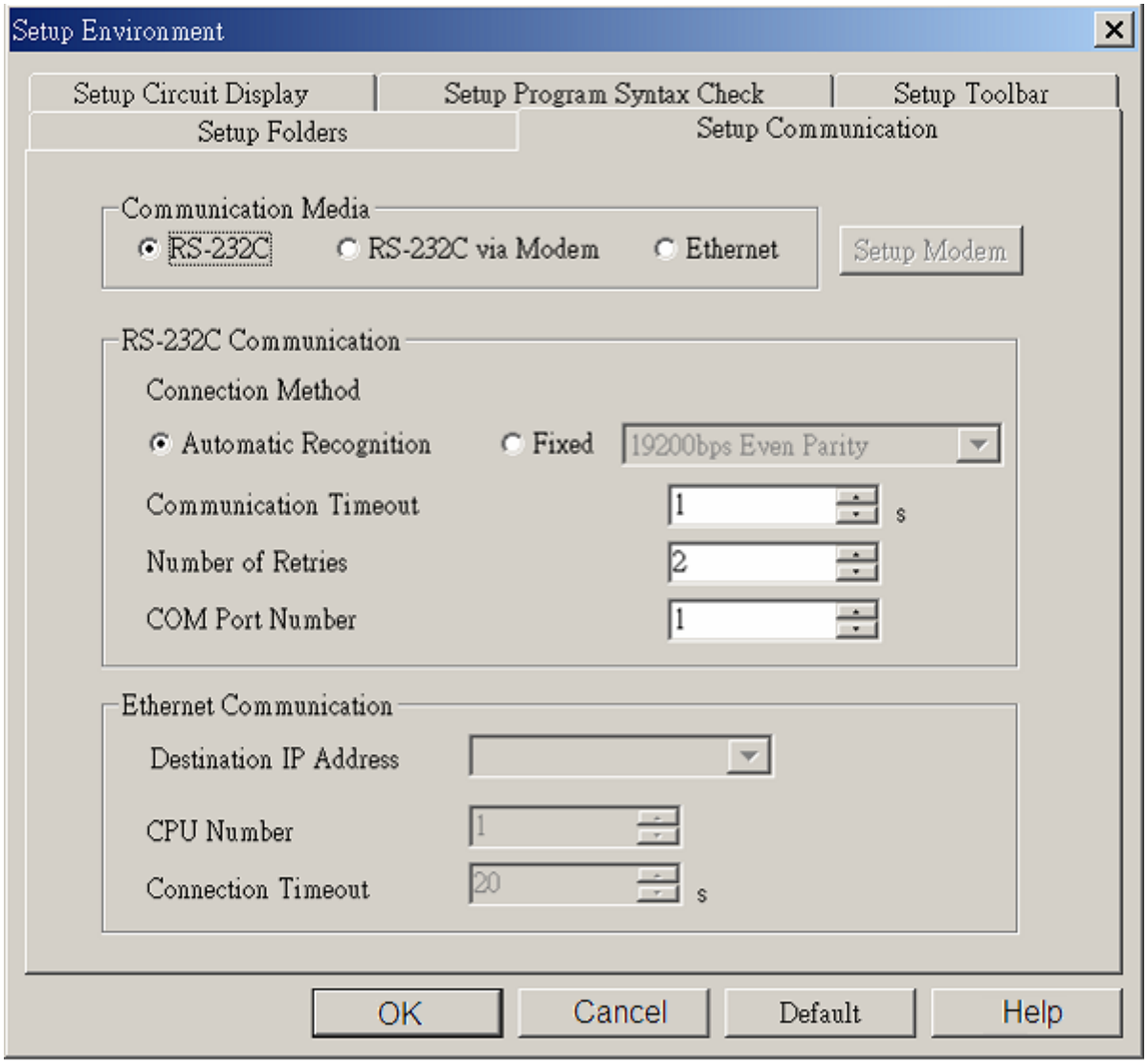
Port

COM1	COM2	COM3
3 TX	4 TX	7 TX
2 RX	6 RX	8 RX
5 GND	5 GND	5 GND

2	RXD
3	TXD
5	GND
7	RTS
8	CTS

How to get the WideField communication setting

If you want get the WideField communication setting, select [Tool]->[Set Environment] default is Automatic. Using the Automatic Recognition, Wide Field software will connect the Current PLC and get the PLC communication setting. If you have know the PLC communication configuration, you alse can select the Fixed mode ,It will connect the PLC quickly.



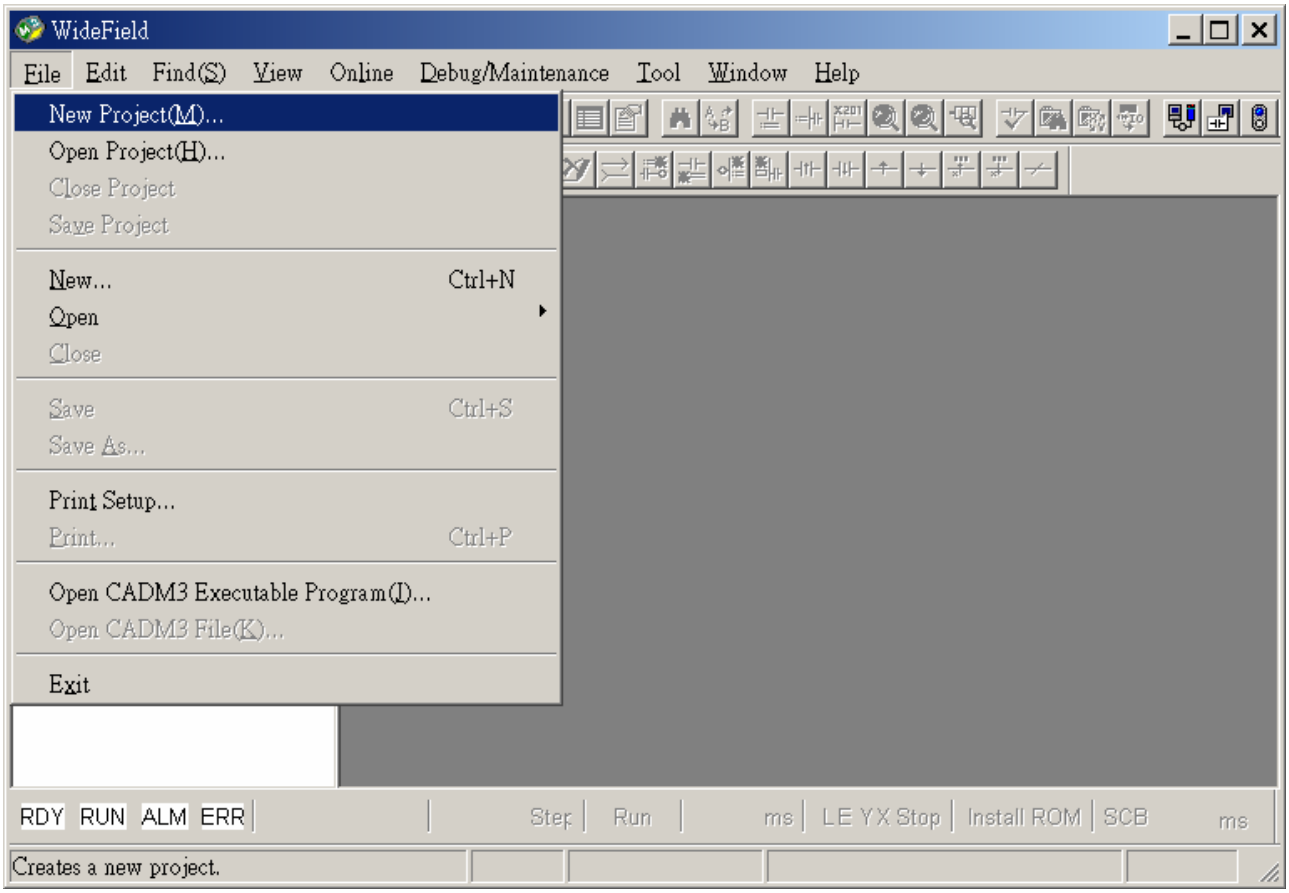
P.S Because use Personal computer link, when you connecting to PLC it will delay about 20sec for test communication.

How to Setting YOKOGAWA PLC Communcation configuration.

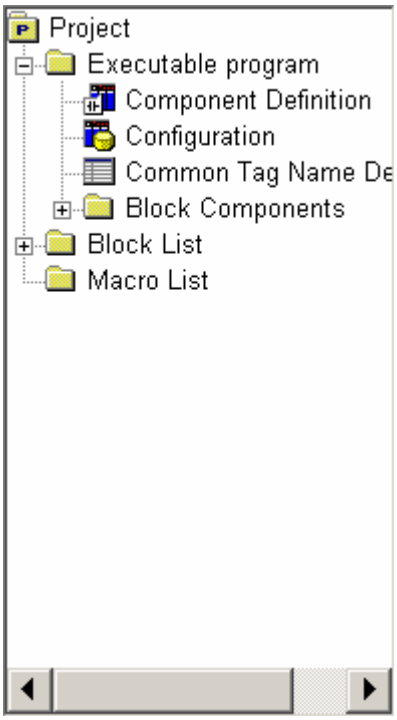
YOKOGAWA FA-M3

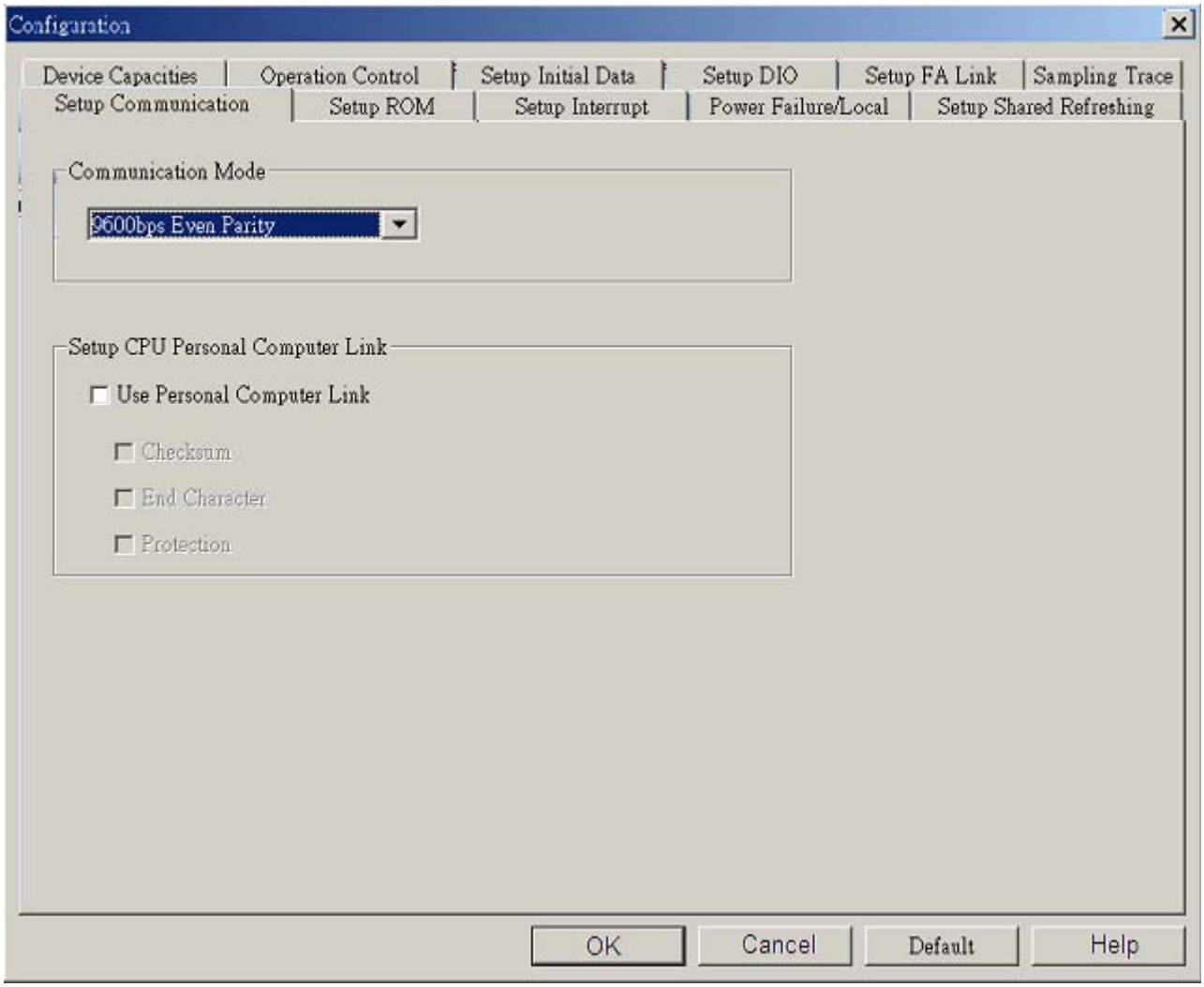
CPU SP55-5N (same SP35-5N)

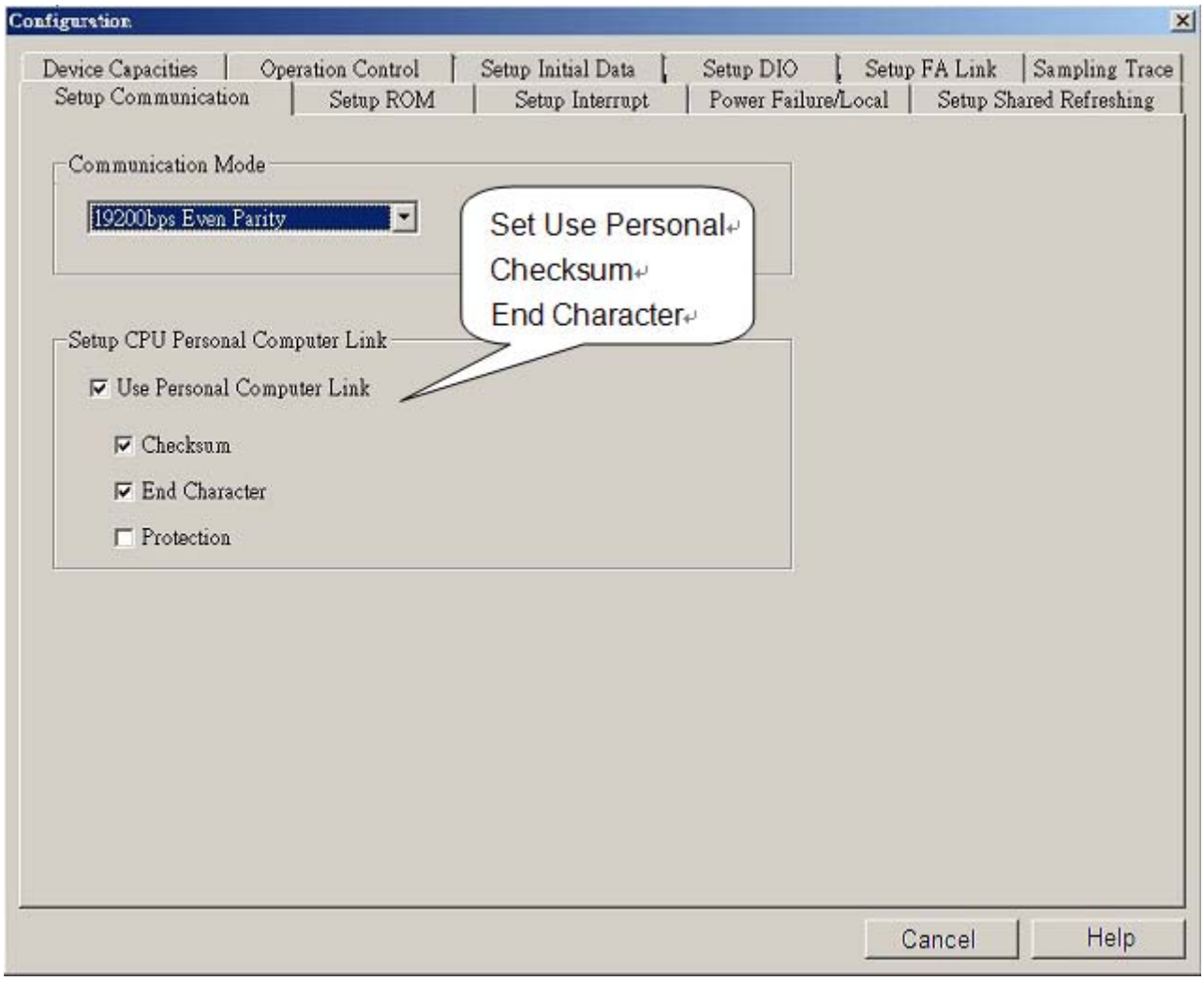
[File]->[New Project] to create a new project



click “Configuration” for setup communication.




Configuration
Device Capacities
Operation Control
Setup Initial Data
Setup DIO
Setup FA Link
Sampling Trace
Setup Communication
Setup ROM
Setup Interrupt
Power Failure/Local
Setup Shared Refreshing
Communication Mode
9600bps Even Parity
Setup CPU Personal Computer Link
Use Personal Computer Link
Checksum
End Character
Protection
OK
Cancel
Default
Help


Configuration
Device Capacities
Operation Control
Setup Initial Data
Setup DIO
Setup FA Link
Sampling Trace
Setup Communication
Setup ROM
Setup Interrupt
Power Failure/Local
Setup Shared Refreshing
Communication Mode
19200bps Even Parity
Set Use Personal
Checksum
End Character
Setup CPU Personal Computer Link
Use Personal Computer Link
Checksum
End Character
Protection
Cancel
Help

Yokogawa FA-M3 (Ethernet)

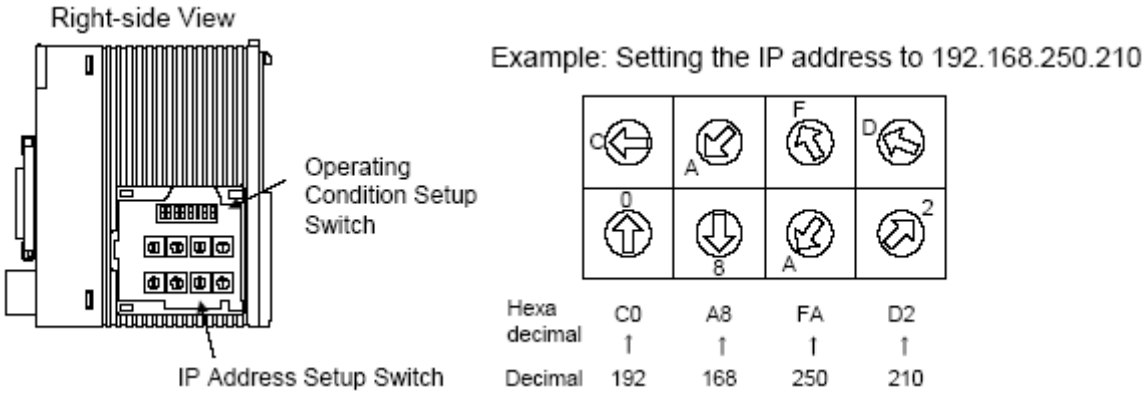
FA-M3 CPU SP35-5N, SP55-5N with F3LE01-5T/F3LE11-0T Ethernet module.
http://www.yokogawa.com/itc/itc-index-en.htm

HMI Setting:

Parameters	Recommend	Option	Notes
PLC type	Yokogawa FA-M3 (Ethernet)		
Com port	Ethernet		
TCP port no.	12289		
HMI Station No.	0		
PLC Station No.	1		

PLC Setting:

Communication mode	**Set IP Address** **Set all condition setup switch OFF.**



Device address:

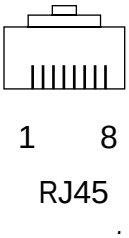
Bit/Word	Device Type	Format	Range	Memo
B	X	ddd	201-71664(discontinuous)	
B	Y	ddd	201-71664(discontinuous)	
B	I	ddd	1-16384	
B	L	ddd	1-71024(discontinuous)	
B	M	ddd	1-9984	
W	D	ddd	1-8192	
W	B	ddd	1-32768	
W	V	ddd	1-64	

W	W	ddd	1-71024(discontinuous)	
W	Z	ddd	1-512	

Wiring diagram:

Ethernet:

MT8000 Ethernet RJ45		Wire color	Ethernet Hub or Switch RJ45	
1	TX+	White/Orange	1	RX+
2	TX-	Orange	2	RX-
3	RX+	White/Green	3	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	6	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-



Ethernet: Direct connect (crossover cable)

MT8000 Ethernet RJ45		Wire color	FA-M3 Ethernet module RJ45	
1	TX+	White/Orange	3	RX+
2	TX-	Orange	6	RX-
3	RX+	White/Green	1	TX+
4	BD4+	Blue	4	BD4+
5	BD4-	White/Blue	5	BD4-
6	RX-	Green	2	TX-
7	BD3+	White/Brown	7	BD3+
8	BD3-	Brown	8	BD3-

Chapter 24 MT8000 Supports Printers

MT8000 print function supports EPSON ESC/P2, HP PCL and SP Printer.

1. EPSON ESC/P2

Impact Printers:
LQ-300, LQ-300+, LQ-300K+ (RS232)
LQ-300+II (RS232, USB)

Inkjet Printer:
Stylus Photo 750 (USB)

Laser Printer: (USB)
EPL-5800

2. HP PCL Series

USB port, conform to HP PCL level 3 protocol.

Laser Printer
HP LaserJet P1505n: HP PCL 5e

- PCL 5 was released on the HP LaserJet III in March 1990, adding Intellifont font scaling (developed by Compugraphic, now part of Agfa), outline fonts and HP-GL/2 (vector) graphics.

- PCL 5e (PCL 5 enhanced) was released on the HP LaserJet 4 in October 1992 and added bi-directional communication between the printer and the PC and Windows fonts.

Caution: For HP printer, we do not support

1. HP LaserJet P1005 which is not PCL 5.
2. HP LaserJet P1006
3. HP LaserJet 1000 which is support HostBase Printing language
4. HP LaserJet 1010 which is support HostBase Printing language
5. HP Color LaserJet 1500 which is support HostBase Printing language
6. HP Color LaserJet 3500 which is support HostBase Printing language

Please ensure the HP printer has supported PCL5 before connect with MT8000 series.

Inkjet Printer:

HP DeskJet 920C, 930C, D2360

3. SP-M, D, E, F

EPSON ESC protocol 9-pin printer.

RS232 port

SIUPO

http://www.siupo.com

SP-M, D, E, F series

SP-E1610SK (paper width: 45mm)

SP-E400-4S (paper width: 57.5mm)

SP-MDEF

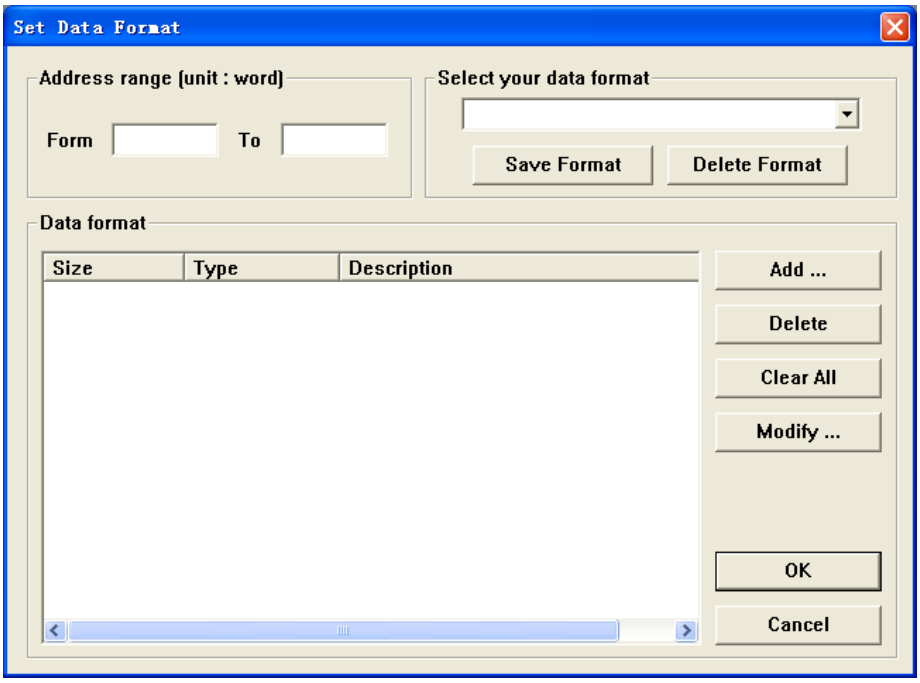
Recommended SP printer type for customers outside China

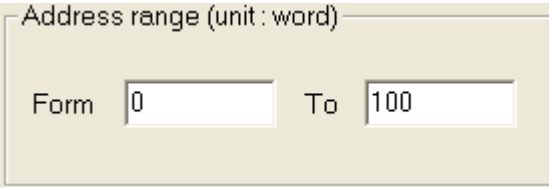
Appendix A. Recipe Editor

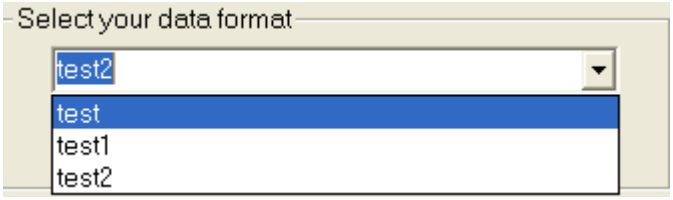
RecipeEditor is a Win32 application and only can run on MS Windows 2000, XP and Vista. It allows users to create, view and modify recipe (*.rcp) and EMI (*.emi) files. Additionally, it can convert recipe and EMI files to CSV format and vice versa.

A.1 Introduction

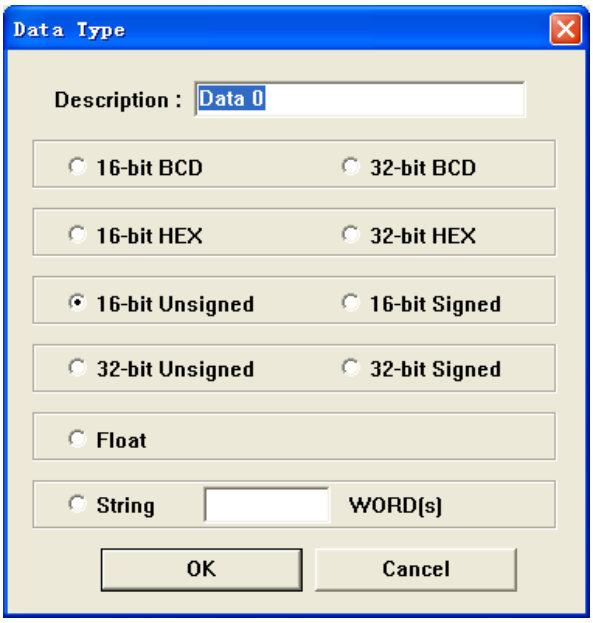
In [Menu] → [File], select [Open…] and choose a recipe or EMI file, you will see the following dialogue appears:



[Address range]	To fill the range of the address users want to examine. 
[Add...]	Add a column to the current data format template.
[Delete]	Delete the selected column.

[Clear All]	Delete all columns.
[Modify…]	Modify the description and data type for the selected column.
[Save Format]	Save the settings of the current data format template so that users can load it every time when needed without recreating it repeatedly. The template data will be stored in "data.fmt" file in the EasyBuilder8000 installation directory.
[Delete Format]	Delete an existed data format template.
[Select your data format]	Select an existed data format template for examining the recipe or EMI data. 

After clicking [Add…], [Data Type] dialogue will appear as follow:

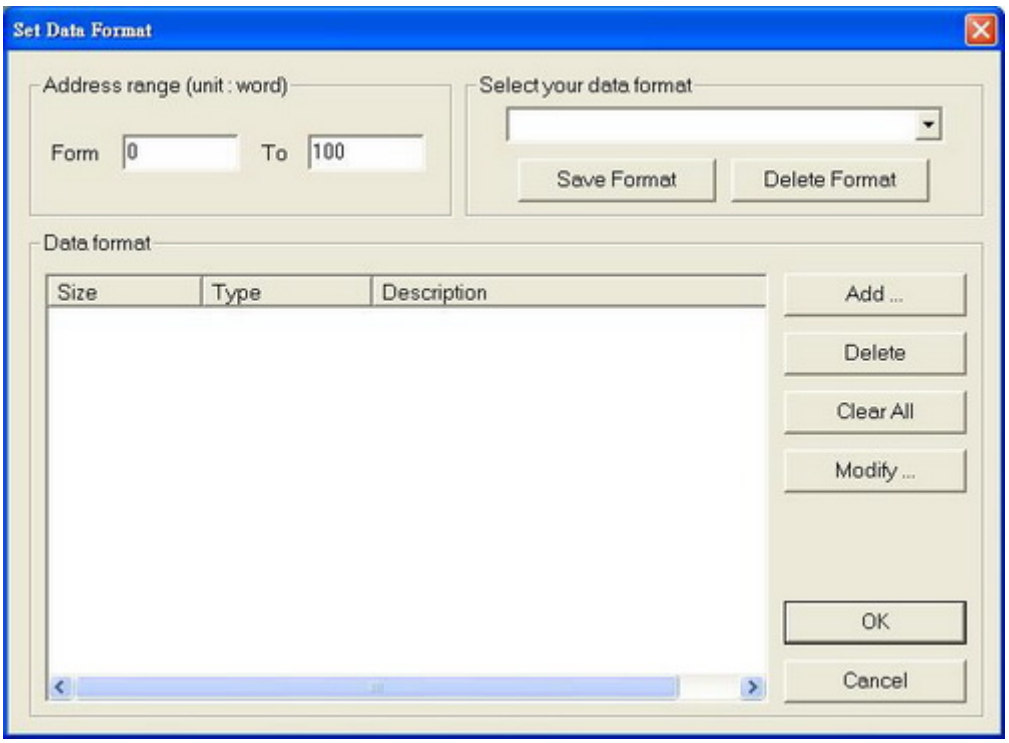


First, you can assign a readable name as [Description] for the column. And select the correct data type for the column. If [String] is selected as data type, you must specify the length of the string in addition.

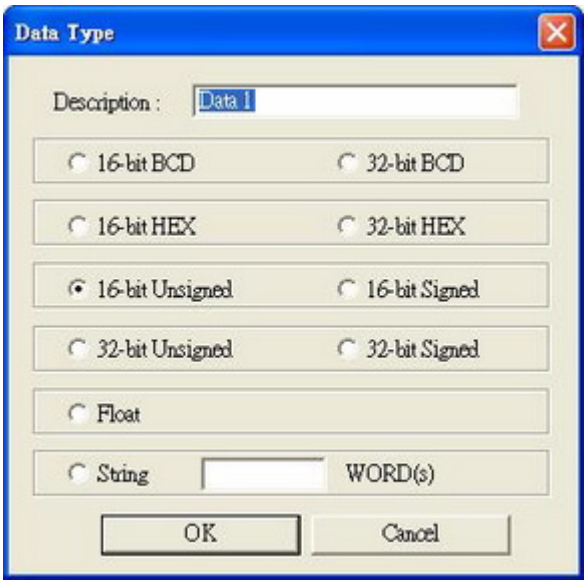
A.2 Setting of Recipe Editor

How to Add a Recipe / EMI File

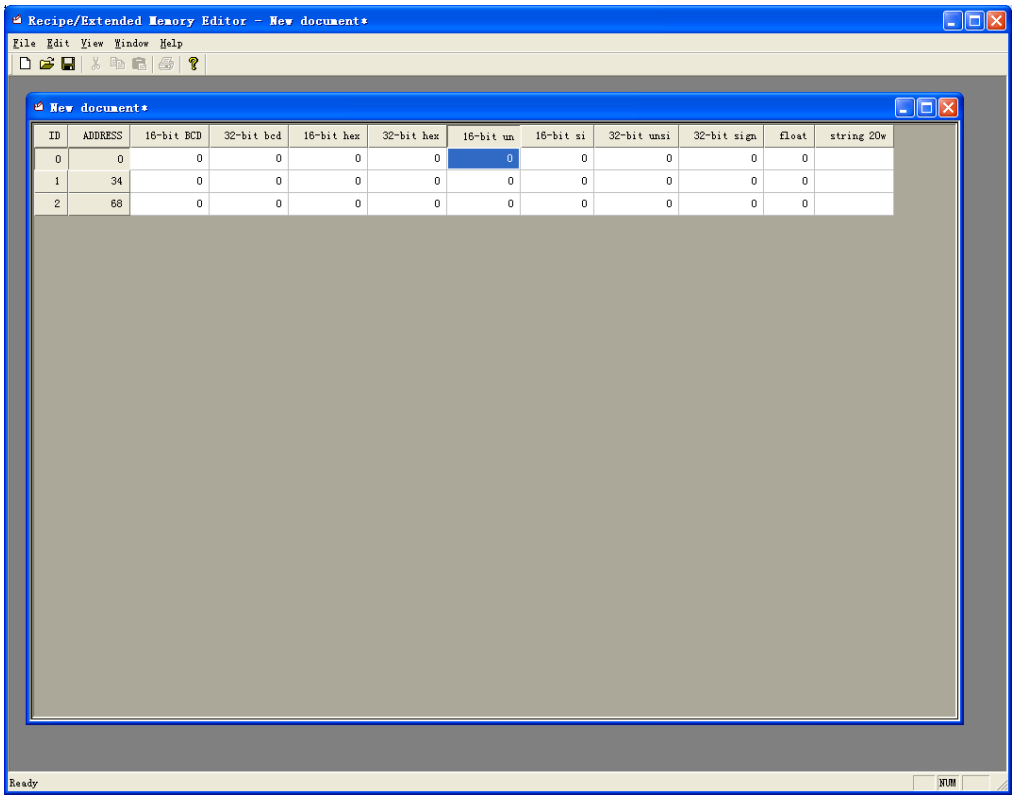
(1) In [Menu] → [File], select [New] and the following dialogue will appear:



(2) Click [Add…] and select [16-bit Unsigned] as data format type.



(3) After all the settings finish, a new document appears as follow



ID	ADDRESS	16-bit BCD	32-bit bcd	16-bit hex	32-bit hex	16-bit un	16-bit si	32-bit unsi	32-bit sign	float	string 20w
0	0	0	0	0	0	0	0	0	0	0	
1	34	0	0	0	0	0	0	0	0	0	
2	68	0	0	0	0	0	0	0	0	0	

(4) Users can view and modify the data in the sheet.

(5) In [Menu] → [File] → [Save As], select the correct format and file name to create a recipe or EMI file.

Export to CSV File

After opening a recipe or EMI file, select [Menu] → [File] → [Save As] and choose file format as CSV.

Import CSV File

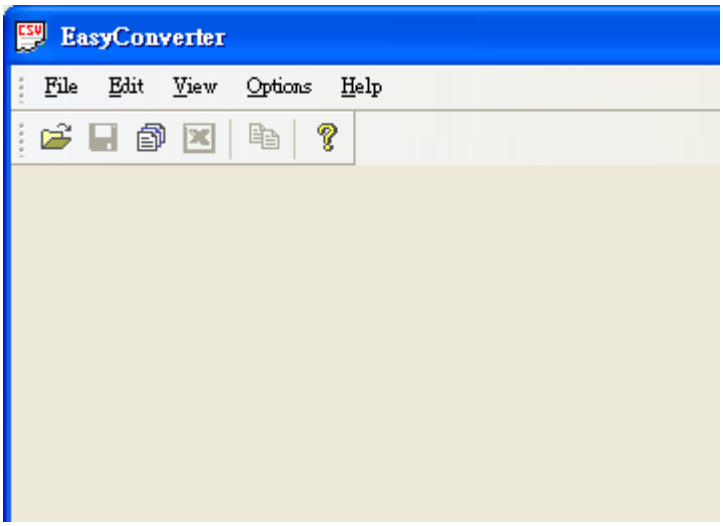
In [Menu] → [File], select [Import CSV File] and choose a CSV file to open. After editing, users can save it as a recipe or EMI file so that it can be downloaded to MT8000 series.

Appendix B. EasyConverter

This application program is utilized when the history record of data sampling (dtl) or event log (evt) is uploaded to PC, which can be transferred to Excel (csv).

B.1 Introduction

In Project Manager, clicking the “EasyConverter” will pop up the application program.



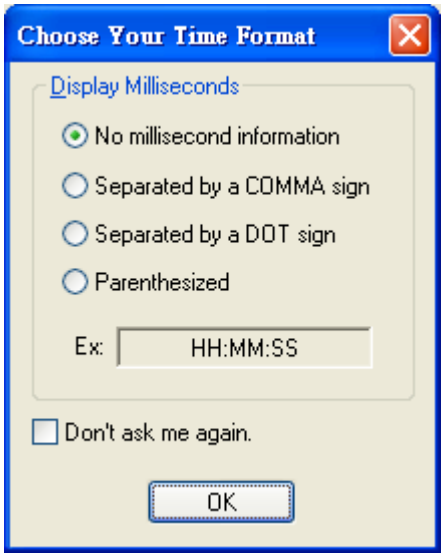
There are four function introductions as follows:

Export to Excel
Scaling function
Multi-File Conversion
Command line

B.2 Setting of EasyConverter

B.2.1 How to Export to Excel

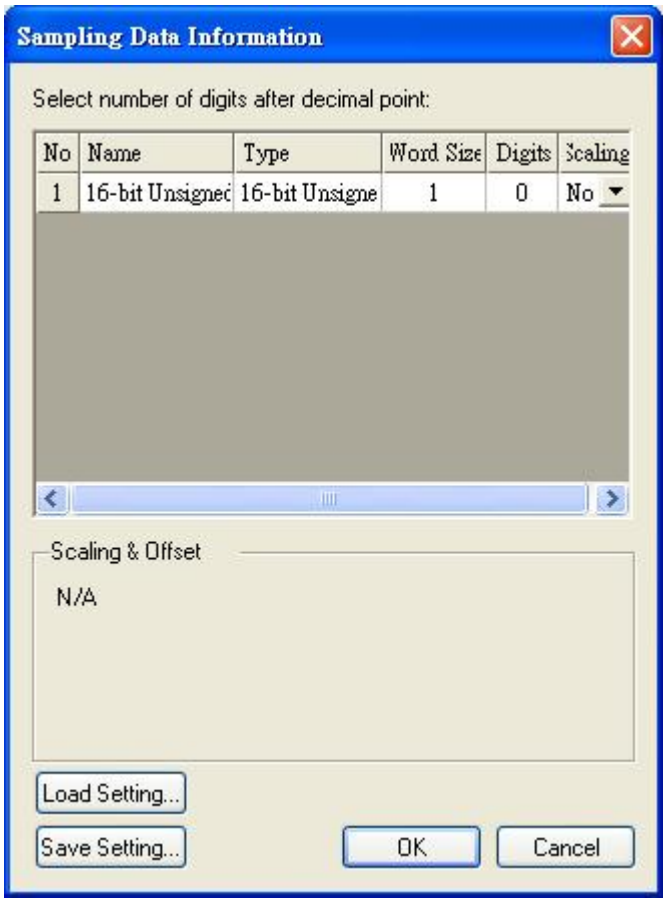
When open the file, it will pop up setting dialog as follow:



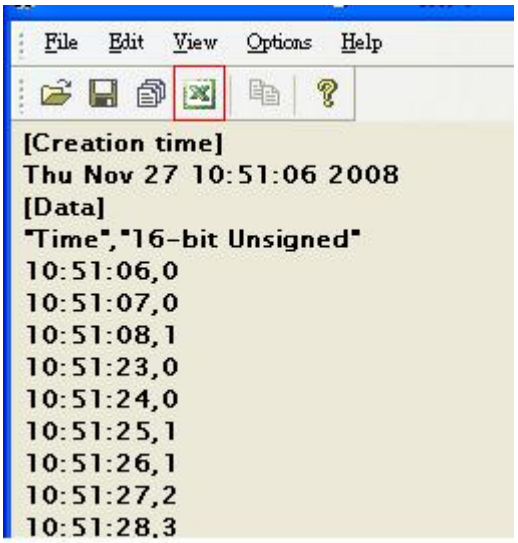
There are four options of time format which can be selected.

No millisecond information	Ex: HH:MM:SS
Separated by a COMMA sign	Ex: HH:MM:SS,###
Separated by a DOT sign	Ex: HH:MM:SS.###
Parenthesized	Ex: HH:MM:SS(###)

If checking “Don’t ask me again”, the pop-up window will not appear next time.
If you need to modify the time format, please go to Options / Time Format to call up the setting dialog.
After setting, click OK. And next setting dialog pops up, as follow:



Click OK.

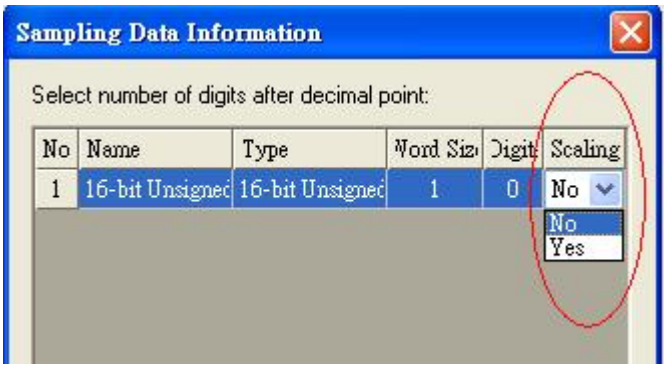


Export to Microsoft Excel.

	A	B	C
1	[Creation time]		
2	Thu Nov 27 10:51:06 2008		
3	[Data]		
4	"Time"	"16-bit Unsigned"	
5	10:51:06	0	
6	10:51:07	0	
7	10:51:08	1	
8	10:51:23	0	
9	10:51:24	0	
10	10:51:25	1	
11	10:51:26	1	
12	10:51:27	2	
13	10:51:28	3	
14	10:51:29	3	

B 2.2 How to Use Scaling Function

The **scaling** is utilized to offset data.

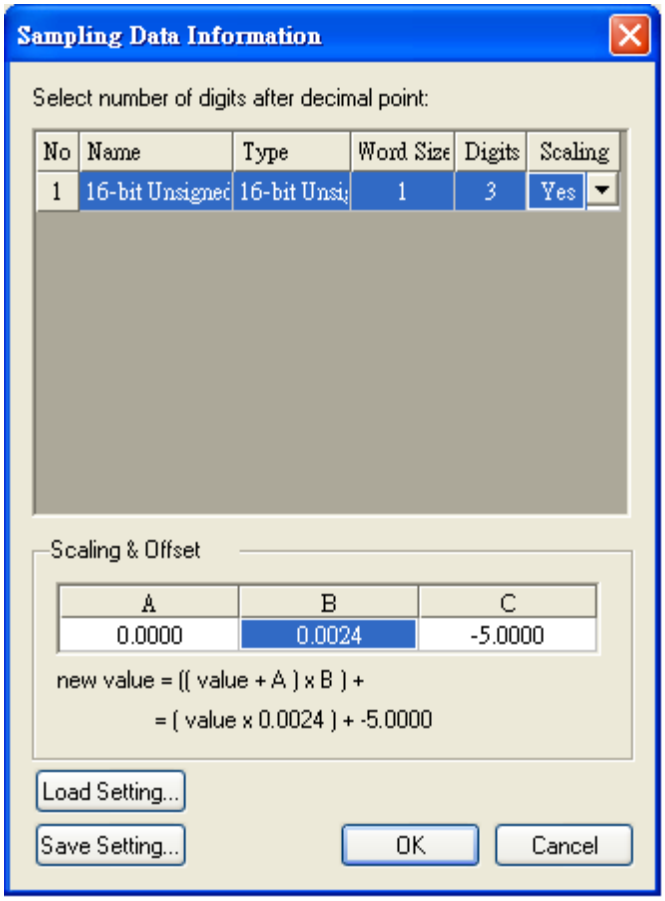


new value ={{value+A}xB}+C, users can set a value on A, B, and C.

Why do we need the Scaling function?

For example, here is a data of voltage and data format is 16-bit unsigned (rang: 0~4096). Users want to map those data to volt whose range is from -5 to +5.

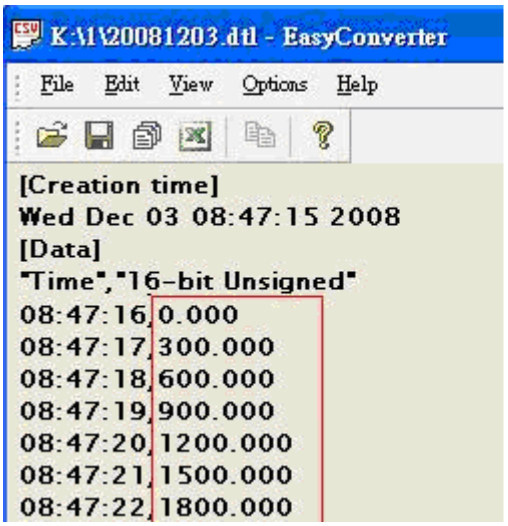
new value = {{value+0}x0.0024}+(-5), as follow:



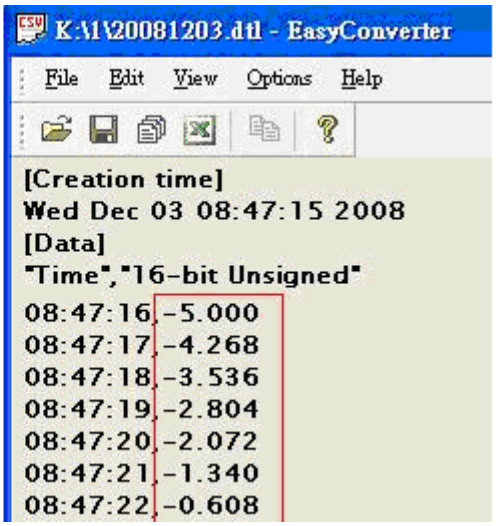
Above sampling data of setting can be saved and loaded next time.

After the scaling

Original file



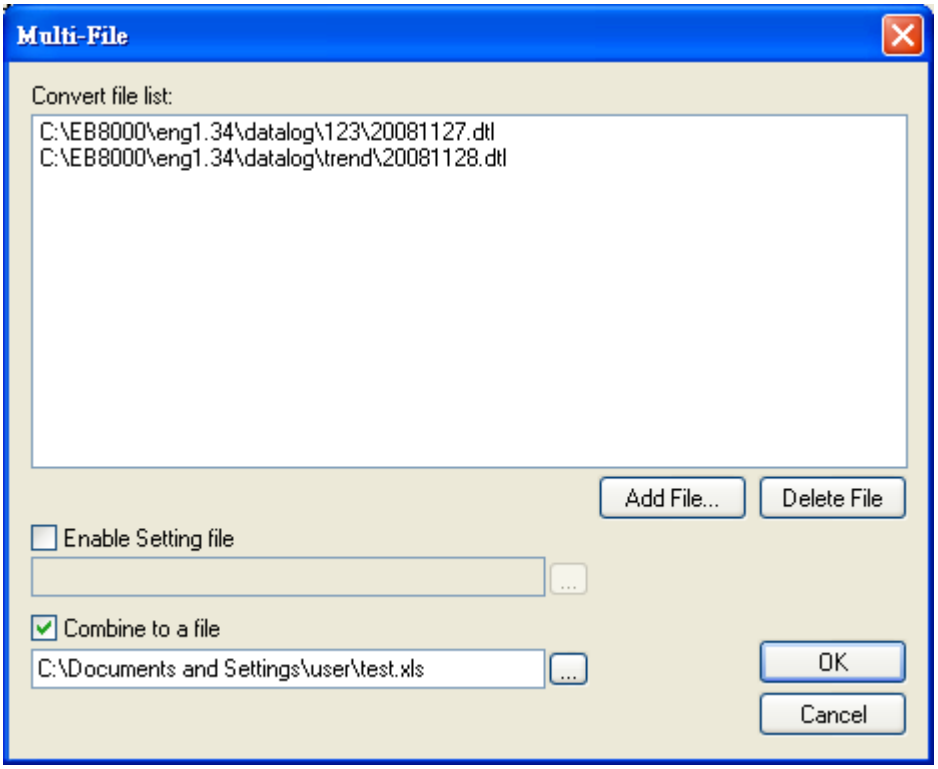
After utilizing scaling function file



B.2.3 How to Use Multi-File Conversion

Step1: Clicking the File / Multi-File will pop up the setting dialog.

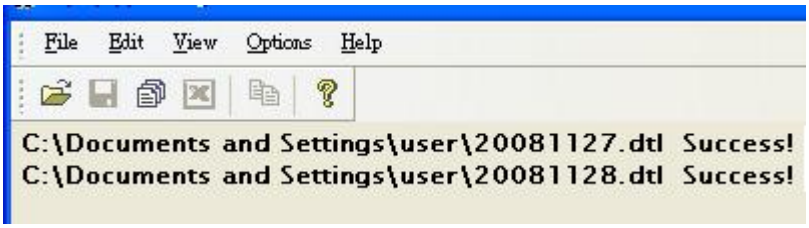
Step2: Click "Add File…" to add files into "List".



Step3: After adding files, check the "**Combine to a file**" to export those files to a single Excel file (xls).

	A	B	C
1	[Creation time]		
2	Thu Nov 27 10:51:06 2008		
3	[Data]		
4	"Time"	"16-bit Unsigned"	
5	10:51:06	0	
6	10:51:07	0	
7	10:51:08	1	
8	10:51:23	0	
9	10:51:24	0	
10	10:51:25	1	
11	[Creation time]		
12	Fri Nov 28 17:05:09 2008		
13	[Data]		
14	"Time"	"16-bit Unsigned"	
15	17:05:09	0	
16	17:05:10	0	
17	17:05:11	0	
18	17:05:12	0	
19	17:05:13	0	

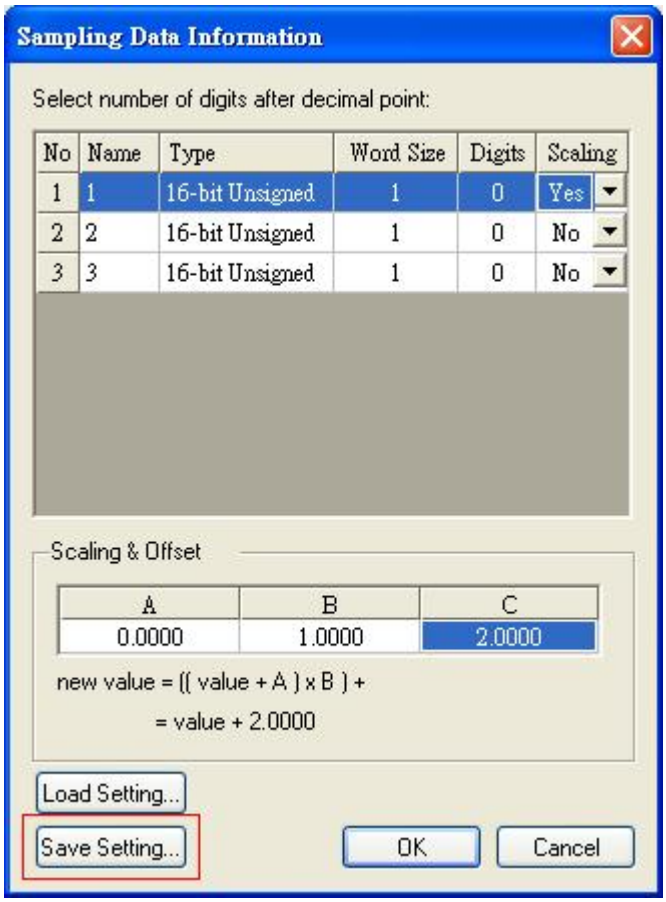
Note: If you don't check the box, the files will be exported to Excel individually.



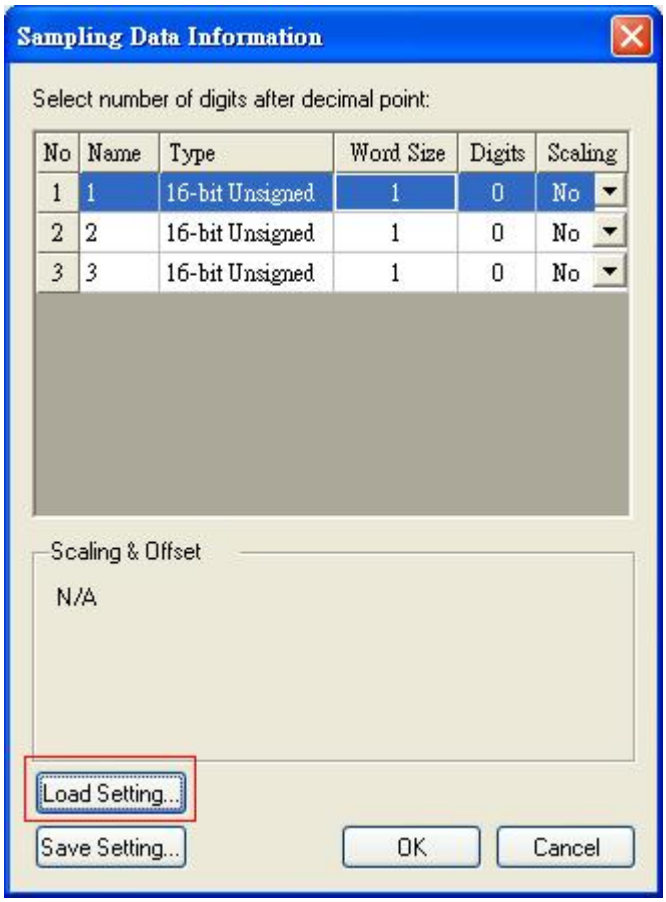
B.3 Enable Setting File

A user can load an existent Setting file to apply to a data log file(s).

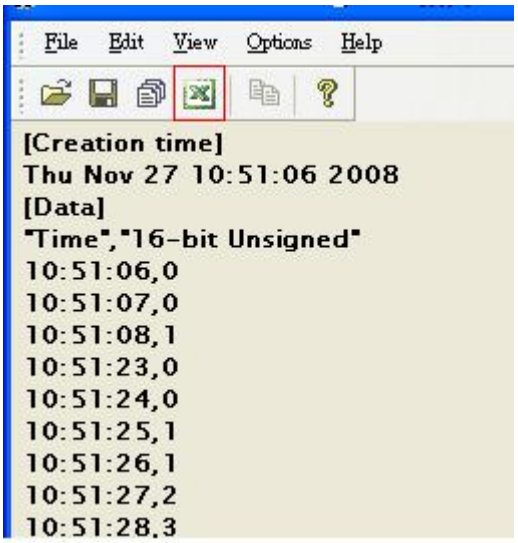
Step1: Save the setting to test.lgs after filling out "scaling & offset"



Step2: In a new data sampling, click “Load Setting” to load test.lgs.

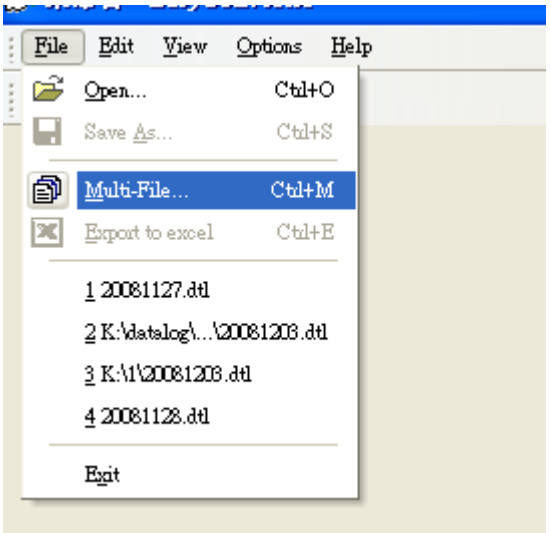


Step3: Press “Export to Microsoft Excel” button to examine the data.

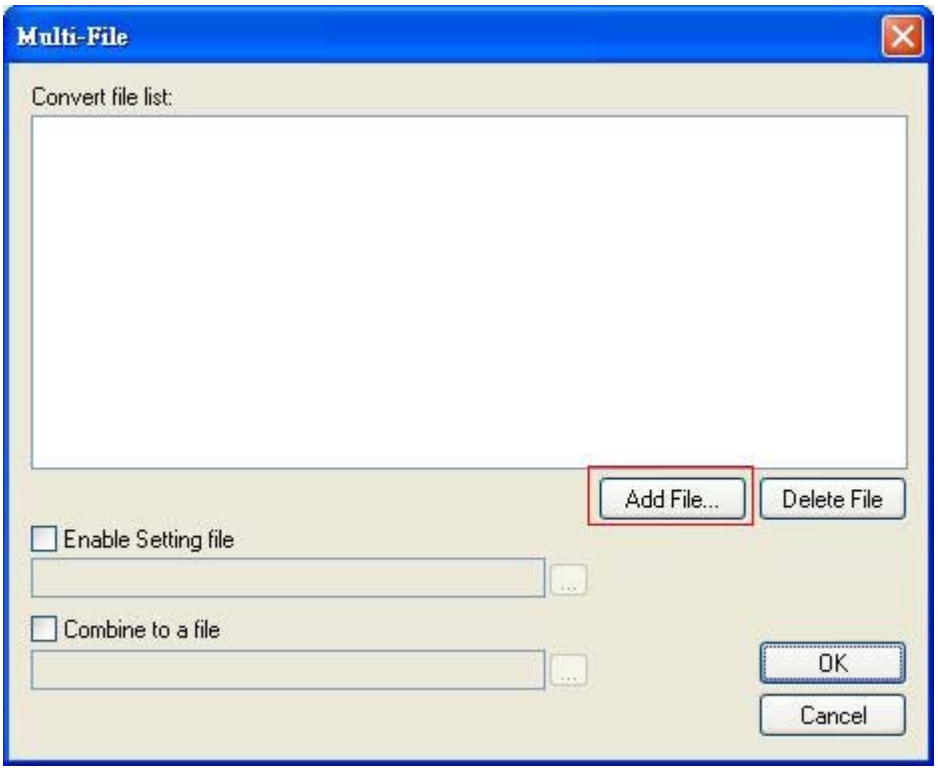


B.3.1 For “Combination” and “Enable Setting File”

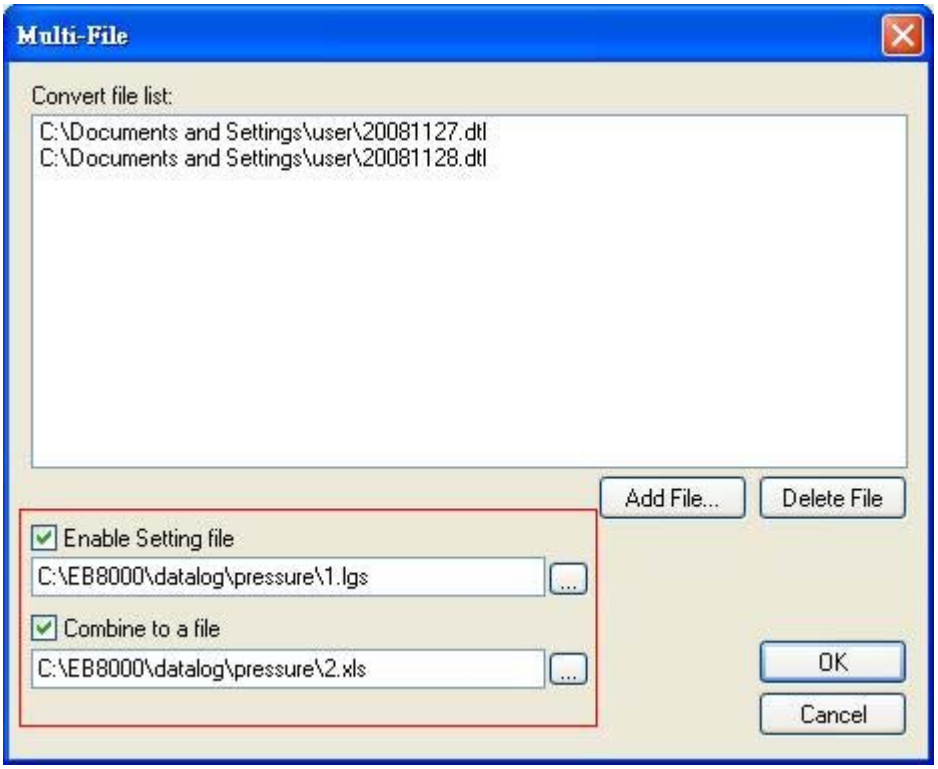
Step1: Click Multi-File



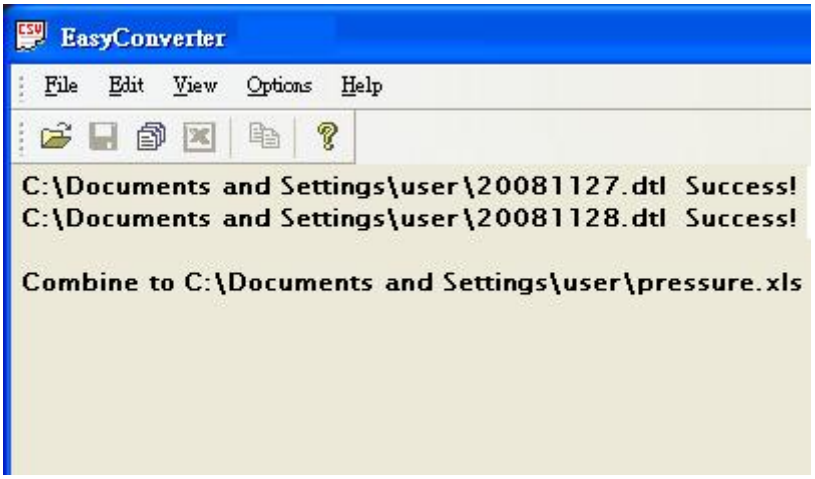
Step2: Select “Add File…”



Step3: Select the files that you would like to combine and check both of “Enable Setting file” and “Combine to a file” boxes. With “Combine to a file” edit, please indicate a file name for the new outcome.



Step4: After pressing OK, the data will display on the dialog.



Step5: Open the new combined file to examine the data in Microsoft Excel.

B.4 Command Line

For EasyConverter, users can run in a command mode.

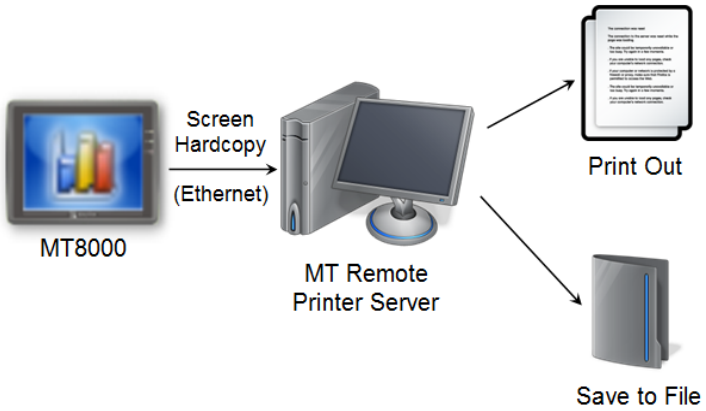
EasyConverter[/c][/s][/t[num]] setting source destination

setting	Indicate the setting file.(*.lgs)
source	Indicate the source file.(*.dtl or *.evt)
destination	Indicate the destination file.(*.csv or *.xls)
/c	Output file type. If set the flag, output a CSV file, or the output file will be an Excel file.
/s	Weather involving a setting file or not. If set the flag, it indicates that users utilize a setting file.
/t[num]	Time format. For example: t2 indicates “Separated by a DOT sign”.

For example: EasyConverter.exe /c /s /t3 “E:\Work\20080625.lgs” "E:\Work\ 20080625.dtl" "E:\Work\"

Appendix C. EasyPrinter

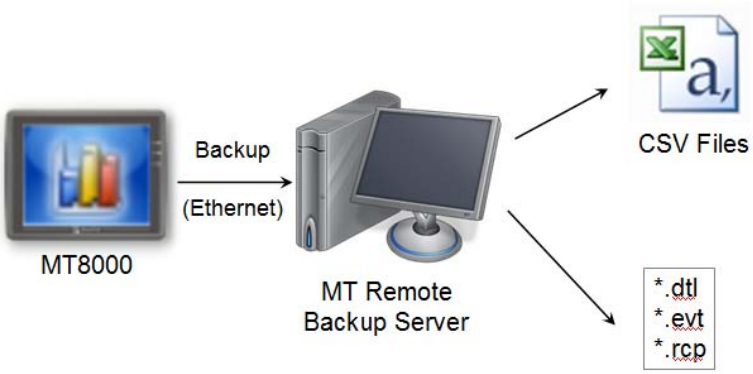
EasyPrinter is a Win32 application and only can run on MS Windows 2000, XP and Vista. It enables MT8000 Series to output screen hardcopies on a remote PC via Ethernet. Please see the following illustration:



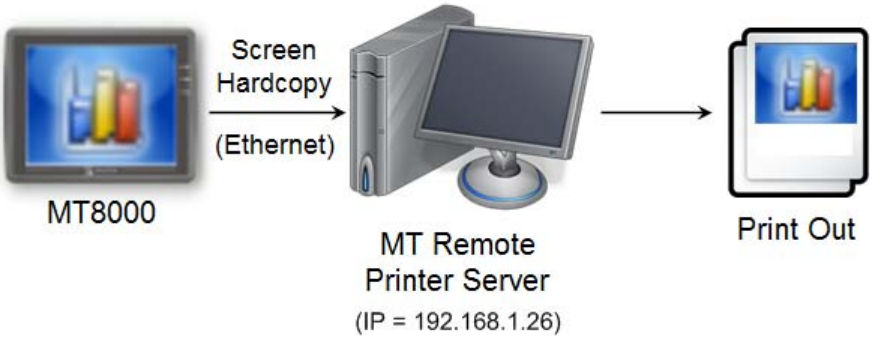
Here are some advantages of using EasyPrinter:

- EasyPrinter provides two modes of hardcopy output: Print-Out and Save-to-File. Users can use either way or both ways.
- Since EasyPrinter is running on the MS Windows system, it supports most of the available printers on the market.
- Multiple MT8000 HMIs can share one physical printer via EasyPrinter. Users do not have to prepare printers for each MT8000 HMI.

Additionally, EasyPrinter can also be a backup server. Users can use backup objects on MT8000 HMIs to copy history files such as Data-Sampling's and Event-Log's histories onto a remote PC via Ethernet. Please see the following illustration:



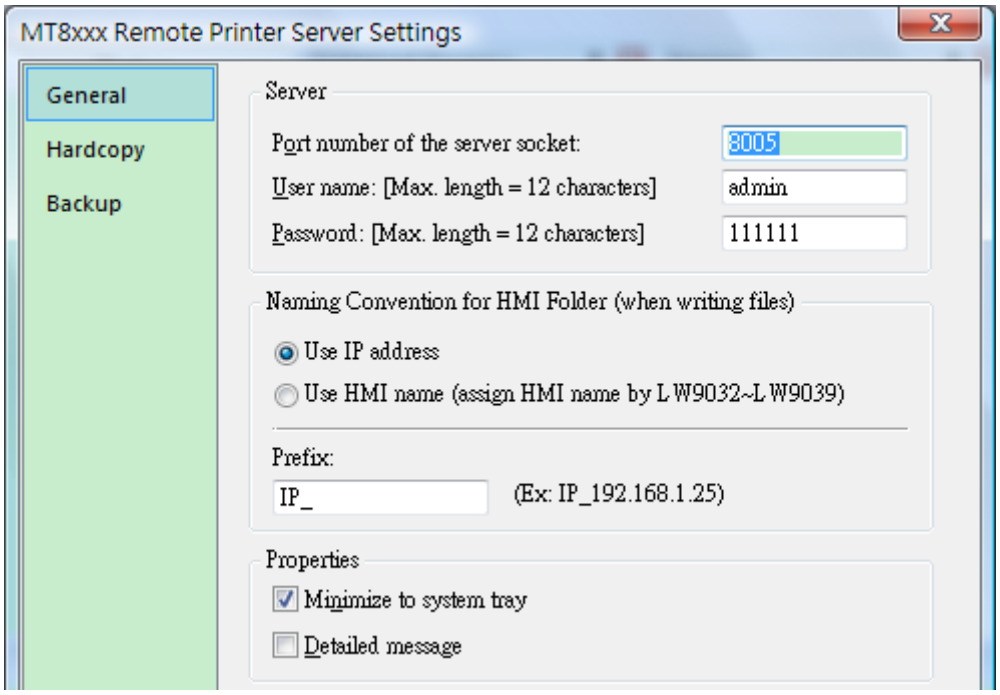
C.1 Using EasyPrinter as a Printer Server



Users can make screen hardcopies with a Function-Key object. The hardcopies will be transferred to the MT Remote Printer Server via Ethernet and then printed out.

C.1.1 Setup Procedure in EasyPrinter

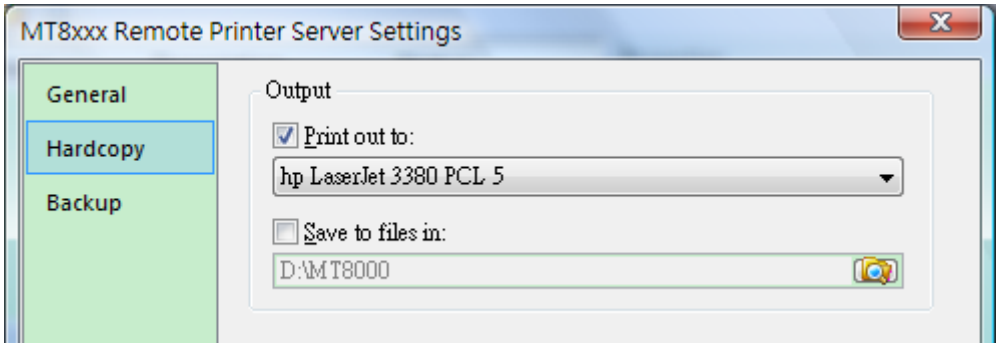
In [Menu] ➔ [Options], select [Settings…] and the following dialogue box will appear:



1. In [Server], assign [Port number of the server socket] to “8005”, [User name] to “admin” and [Password] to “111111”. (Note: These are default values.)

2. In [Naming Convention for HMI Folder], select [Use IP address] and assign “IP_” as the [Prefix].
3. In [Properties], select [Minimize to system tray].

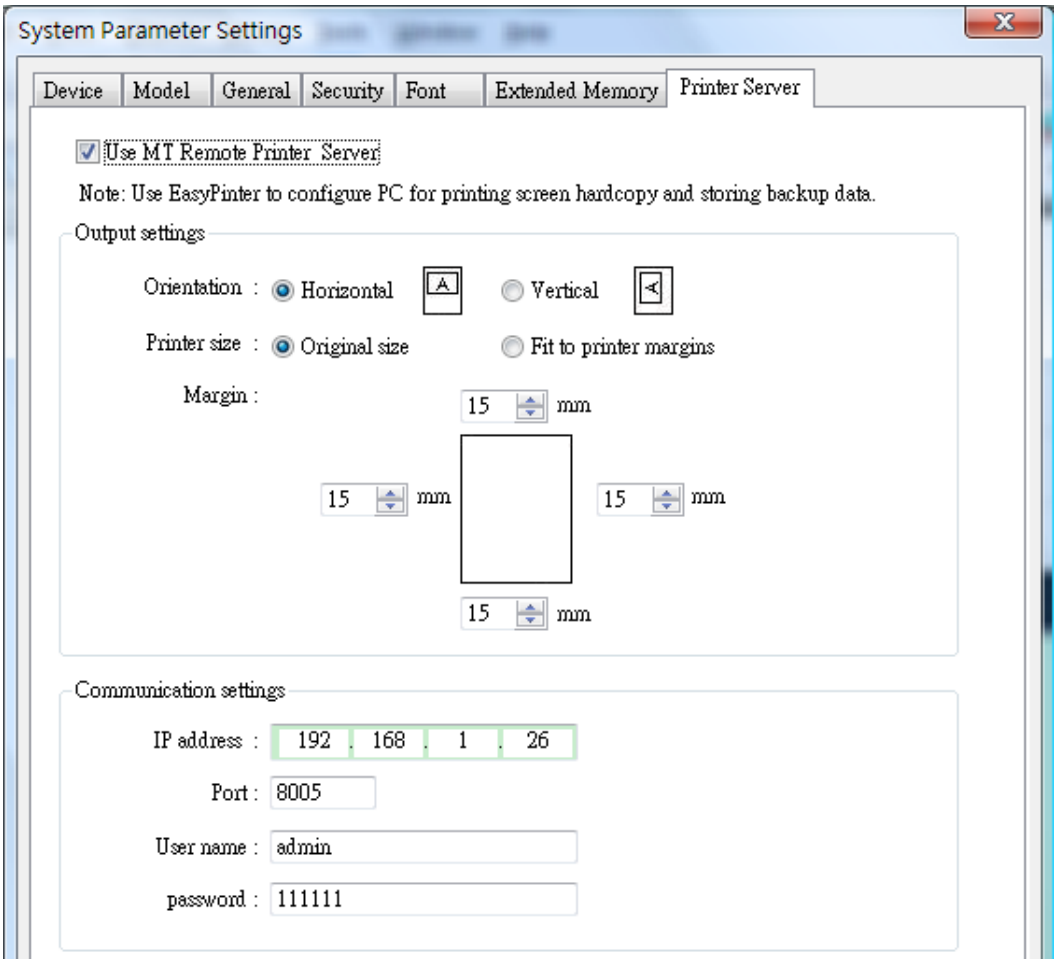
Click [Hardcopy] tab at the left side in the dialogue box as follows:



4. In [Output], select [Print out to] and choose a printer as the output device for screen hardcopies. (Note: You can only choose from the printers available in your system, so it is normal if you do not see “hp LaserJet 3380 PCL 5” on your list as the example.)
5. Click [OK] to apply the settings.
6. In [Menu] ➔ [File], select [Enable Output] to allow EasyPrinter to output any incoming print request, i.e. screen hardcopy.

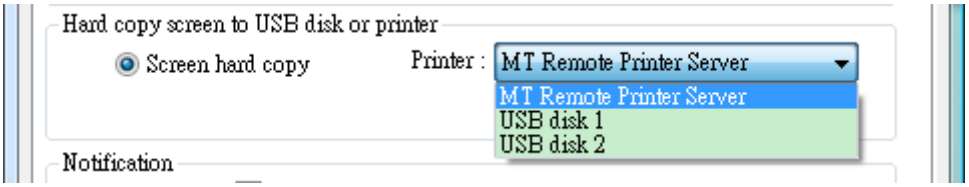
C.1.2 Setup Procedure in EasyBuilder8000

In [Menu] ➔ [Edit] ➔ [System Parameters], click [Printer Server] tab and select [Use MT Remote Printer Server], the following dialogue box will appear:



7. In [Output settings], assign appropriate values for left/top/right/bottom margins. (Note: The margins are all assigned to 15mm in the example.)
8. In [Communication settings], fill in the IP address of the printer server and same as step 1, assign the port number to “8005”, [User name] to “admin” and [Password] to “111111”.

In [Menu] ➔ [Objects] ➔ [Buttons], select [Function Key] and assign [Screen hardcopy] to [MT Remote Printer Server].



9. Place the Function-Key object in the common window (window no. 4), and you will be able to make screen hardcopies anytime when needed.
10. Compile and download your project to the MT8000 HMI. Press the Function-Key

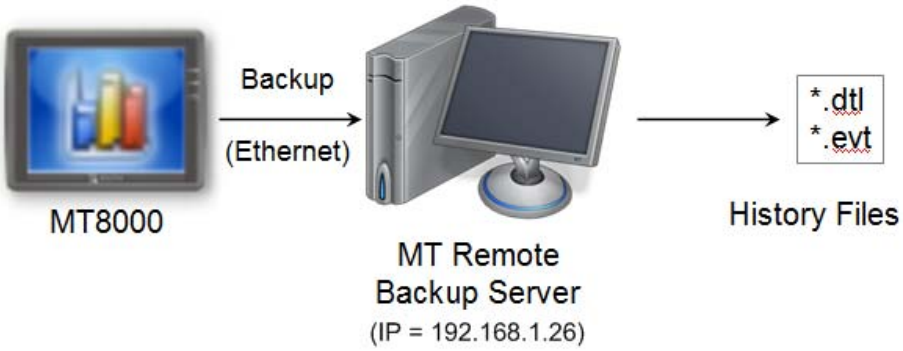
object set in step 9 to make a screen hardcopy.

NOTE

- You can also use a PLC-Control object to make screen hardcopies.
- You cannot print alarm information via EasyPrinter.

- EasyPrinter can only communicate with HMI via Ethernet, so this feature is unavailable in MT6000 Series.

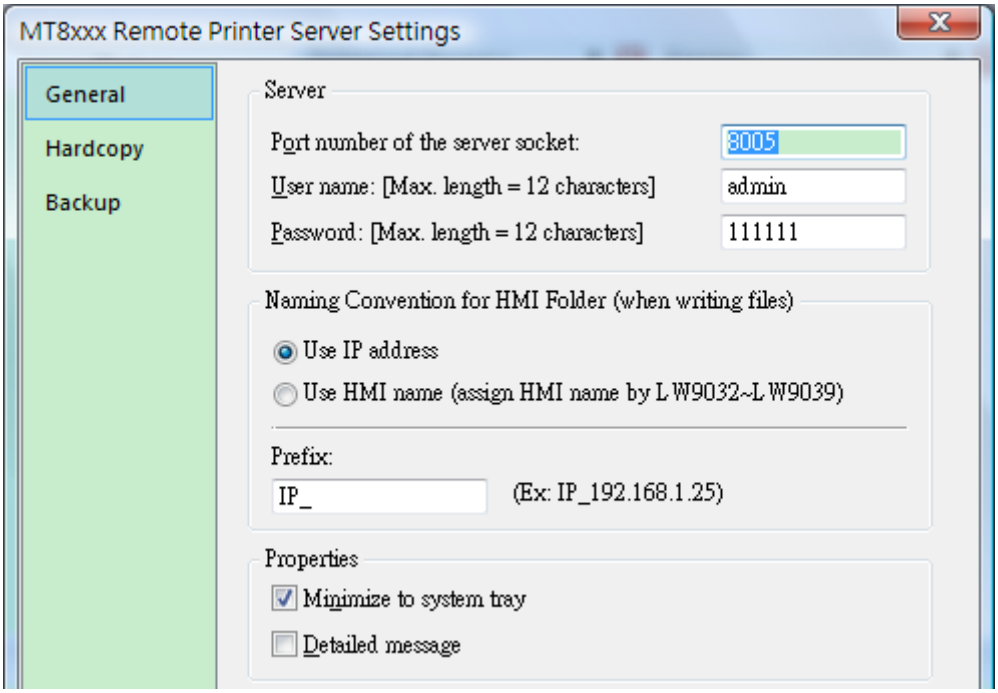
C.2 Using EasyPrinter as a Backup Server



Users can upload historical data such as Data-Sampling and Event-Log history files onto the MT remote backup server with Backup objects.

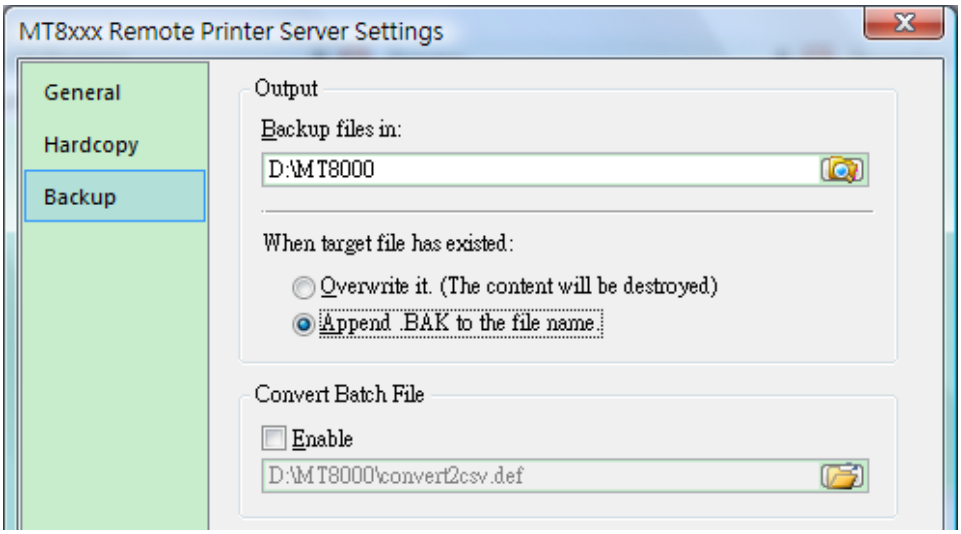
C.2.1 Setup Procedure in EasyPrinter

In [Menu] ➔ [Options], select [Settings…] and the following dialogue box will appear:



1. In [Server], assign [Port number of the server socket] to “8005”, [User name] to “admin” and [Password] to “111111”. (Note: These are default values.)
2. In [Naming Convention for HMI Folder], select [Use IP address] and assign “IP_” as the [Prefix].
3. In [Properties], select [Minimize to system tray].

Click [Backup] tab at the left side in the dialogue box as follows:

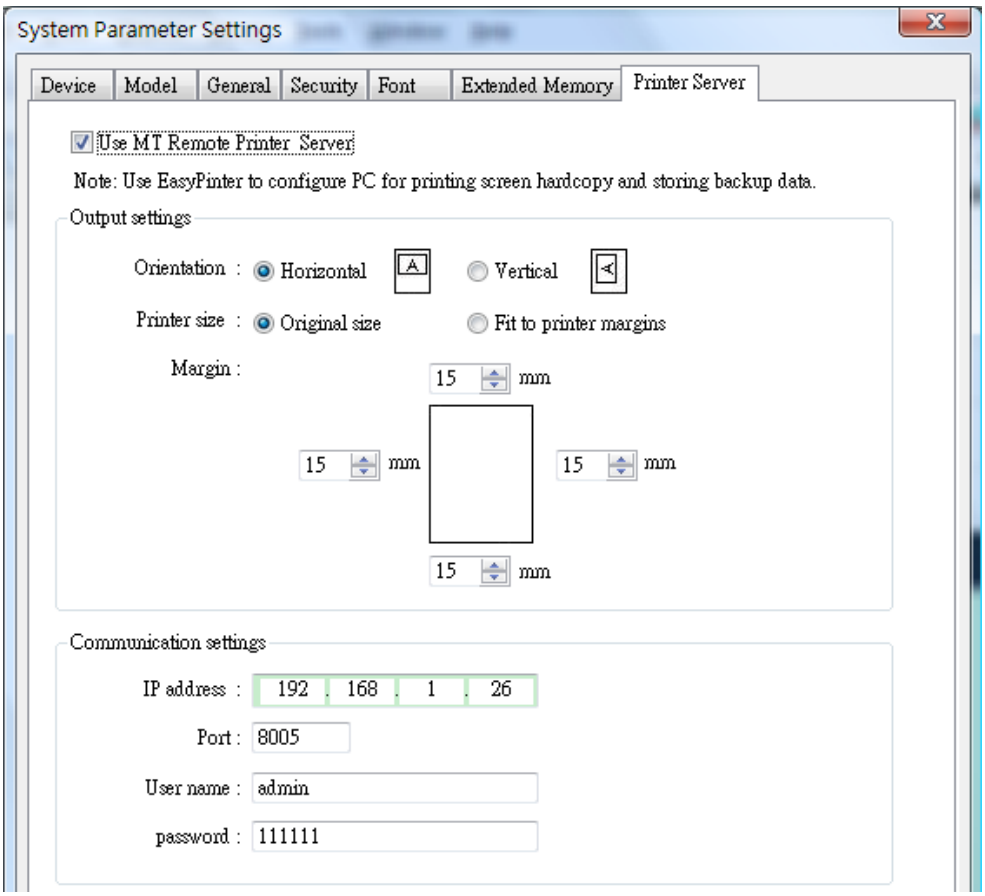


4. In [Output], click the button to browse and select a path for storage of the incoming history files.
5. Click [OK] to apply the settings.

6. In [Menu] ➔ [File], select [Enable Output] to allow EasyPrinter to store any incoming backup request in the location specified in step 4.

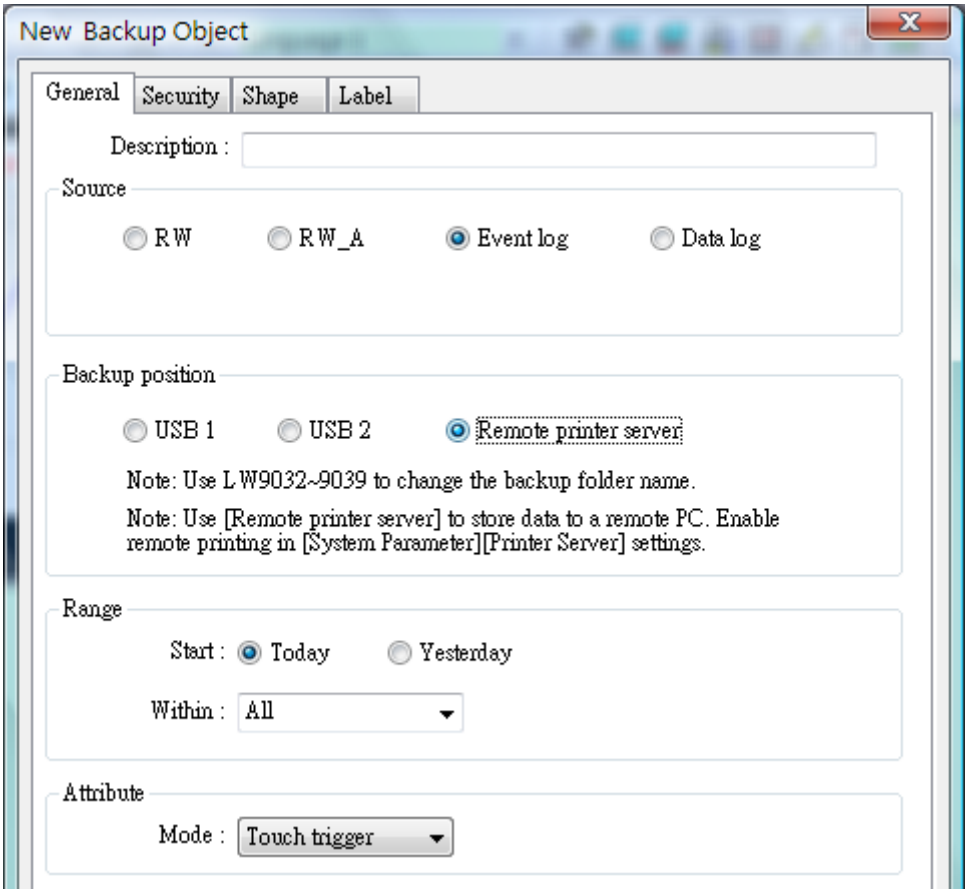
C.2.2 Setup Procedure in EasyBuilder8000

In [Menu] ➔ [Edit] ➔ [System Parameters], click [Printer Server] tab and select [Use MT Remote Printer Server], the following dialogue box will appear:



7. In [Communication settings], fill the IP address of the printer server and same as step 1, assign port number to “8005”, [User name] to “admin” and [Password] to “111111”.

In [Menu] ➔ [Objects], select [Backup] and the following dialogue box will appear:



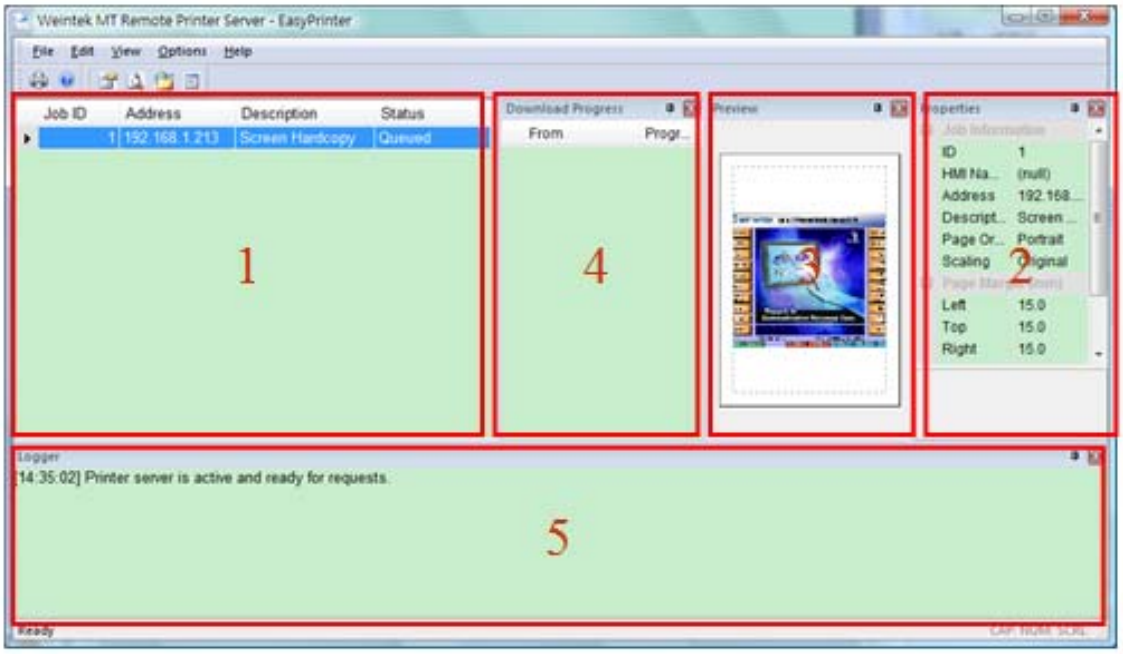
8. In [Source], select [Event log].
9. In [Backup position], select [Remote printer server].
10. In [Range], select [Today] and [All].
11. In [Attribute], select [Touch trigger].
12. Place the Backup object in the common window (window no. 4), and you will be able to make backups anytime when needed.
13. Compile and download your project to the MT8000 HMI. Press the Backup object set in step 12 to make a backup of the Event-Log history data.

NOTE

- The Backup object can be triggered via a bit signal.
- Users can arrange a Scheduler object, which turns a bit ON at the end of week, to trigger a Backup object to automatically back up all history data.

C.3 EasyPrinter Operation Guide

C.3.1 Appearance



Area	Name	Description
1	Job List	This window lists all incoming tasks, i.e. screen hardcopy and backup requests.
2	Property Window	This window shows the information about the task selected from “Job List.”
3	Preview Window	This window shows the preview image of the screen hardcopy task selected from “Job List.”
4	Download Progress Window	This window shows the download progress of incoming requests.
5	Message Window	This window shows the time and message of events such as incoming request, incorrect password, etc.

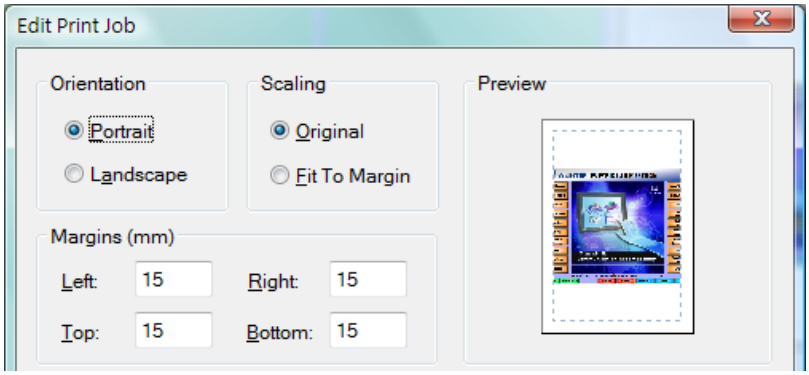
C.3.2 Operation Guide

The following tables describe the meaning and explain how to use all EasyPrinter menu items.

Menu → File	Description
Enable Output	• **Select** EasyPrinter processes the tasks one by one. • **Unselect** EasyPrinter arranges the incoming tasks in memory.

NOTE

- EasyPrinter can only reserve up to 128 MB of task data in memory. If the memory is full, any request coming in afterwards will be rejected and users must either operate [Enable Output] or delete some tasks to make room for new tasks.

Menu → Edit	Description
Edit	To edit a screen hardcopy task.  Users can freely change the properties of [Orientation], [Scaling] and [Margins] here.
Delete	To delete the selected tasks permanently.
Select All	To select all tasks from “Job List.”

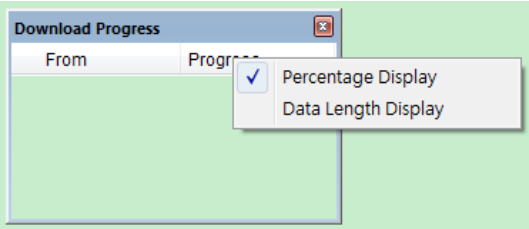
NOTE

- The backup task is not editable.
- [Edit] is available only when a task is selected.
- [Delete] is available when at least one task is selected.

Menu → View	Description
Properties Bar	To show or hide the Property Window.
Preview Bar	To show or hide the Preview Window.
Download Bar	To show or hide the Download Progress Window.
Logger Bar	To show or hide the Message Window.

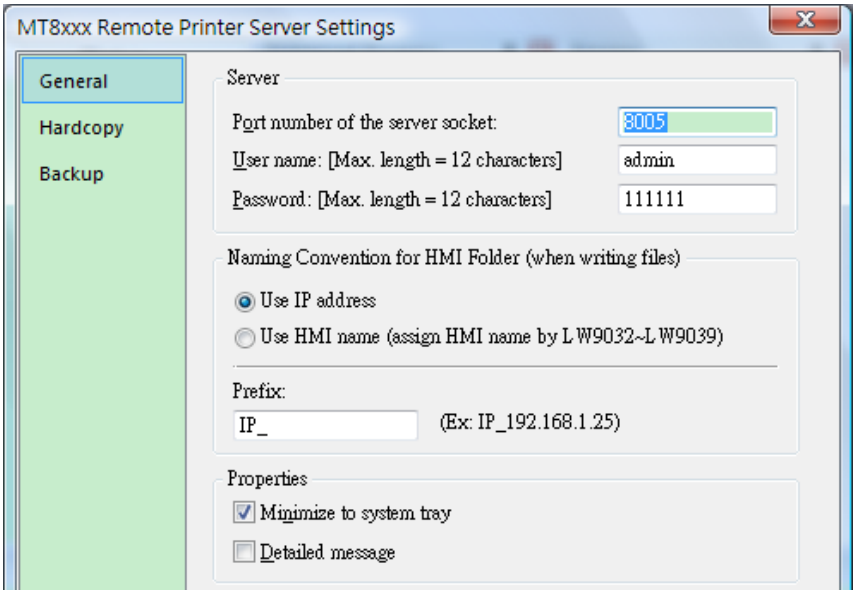
NOTE

- In Download Progress Window, users can select the mode to show download progress by clicking the header of the progress column. Please see the following illustration:



- EasyPrinter can reserve up to 10,000 messages in Message Window. If a new message comes in, the oldest message will be deleted.

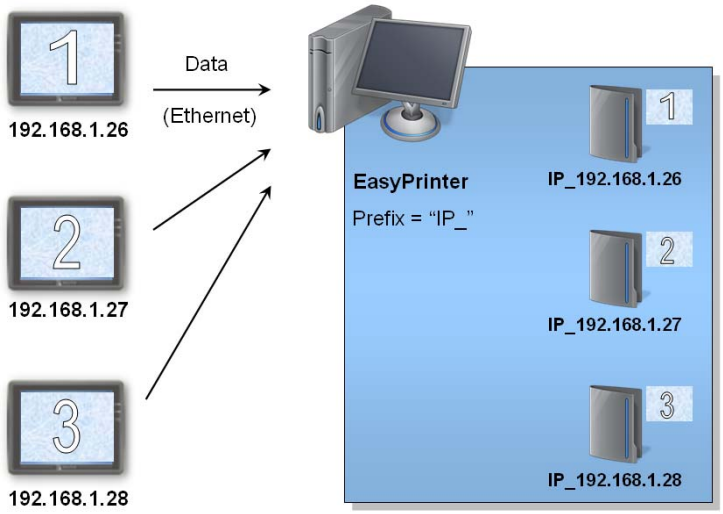
Menu→Options	Description
Toolbars	To show or hide toolbars.
Status Bar	To show or hide the status bar.
Settings	Configuration for EasyPrinter. Please refer to the following illustrations: **[General]**



- **[Server] → [Port number of the server socket]**
  Set the Ethernet socket number for HMIs to connect to. The range goes from 1 to 65535 and 8005 is the default value.

- **[Server] → [User name] & [Password]**
  Set the user name and password to restrict that only the authorized HMIs can send requests to EasyPrinter.

- **[Naming Convention for HMI Folder]**
  EasyPrinter creates different folders to store files (e.g. hardcopy bitmap files, backup files) from different HMIs. There are two ways to name the folders:
  a. Use IP address
  EasyPrinter names the folder after the IP address of the HMI sending the request. (i.e. [Prefix] + [IP address]) Please see the following illustration:



b. Use HMI name

EasyPrinter names the folder after the name of the HMI sending the request. (i.e. [Prefix] + [HMI name])

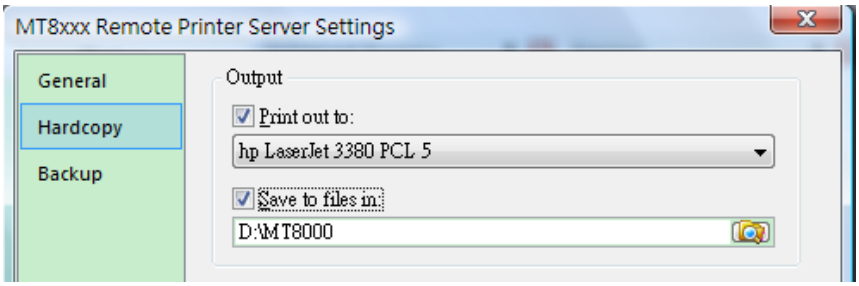
- **[Properties] → [Minimize to system tray]**

  Select this option to minimize EasyPrinter to system tray instead of task bar. Users can double-click the icon in system tray to restore the EasyPrinter window.

- **[Properties] → [Detailed message]**

  Select this option to display more detailed messages about events in the message window.

[Hardcopy]



- **[Output]**

  EasyPrinter provides two modes to output hardcopy results: Print-Out and Save-to-File.

  a. Print-Out

  Select this option to inform EasyPrinter to print out the hardcopy result on specified printers.

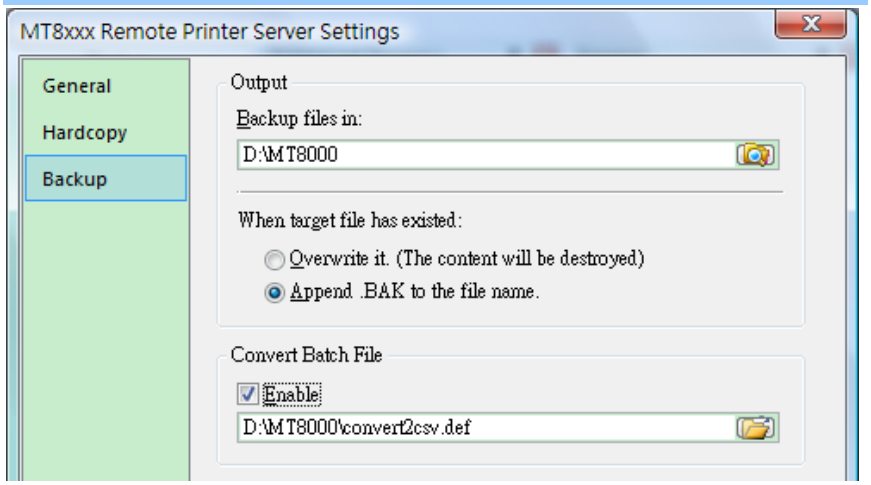
  b. Save-to-File

Select this option to inform EasyPrinter to convert the hardcopy result into a bitmap file and save it in the specified directory. Users can find the bitmap files at:

[Specified Path] →
[HMI Folder] →
yymmdd_hhmm.bmp

For example, when a hardcopy request is given at 17:35:00 12/Jan/2009, the bitmap file will be named "090112_1735.bmp". And if there is another bitmap file generated in the same minute, it will be named "090112_1735_01.bmp" and so on.

[Backup]



- **[Output]**

  EasyPrinter stores the backup files to the specified path.

  For Event-Log historical data files:
  [Specified Path] →
  [HMI Folder] →
  [eventlog] →
  EL_yyyymmdd.evt

  For Data-Sampling historical data file:
  [Specified Path] →
  [HMI Folder] →

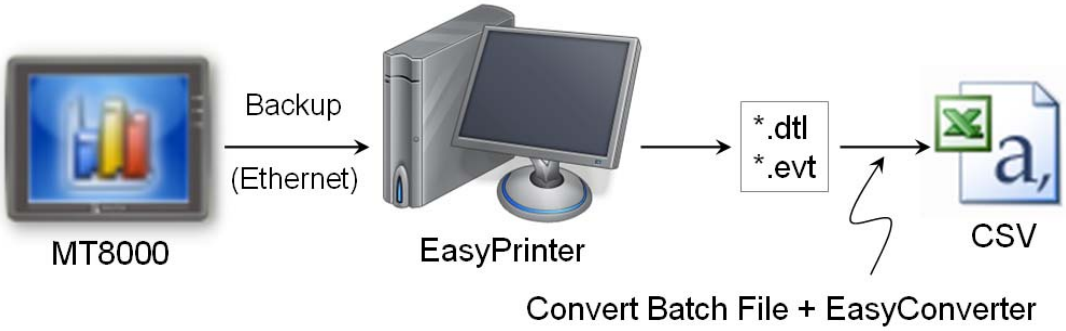
	[datalog] → [Folder name of the Data-Sampling object] → yyyymmdd.dtl **For Recipe:** [Specified Path] → [HMI Folder] → [recipe] → recipe.rcp or recipe_a.rcp ● **[Convert Batch File]** Select [Enable] and assign a Convert Batch File for automatically converting uploaded history files to CSV or MS Excel format. Please refer to the next section for the details of Convert Batch File.

NOTE

- Users can assign HMI names from LW9032 to LW9039.
- EasyPrinter names the folder after IP address if HMI name is not set.

C.4 Convert Batch File

EasyPrinter provides a mechanism for converting the uploaded Data-Sampling and Event-Log history files stored in binary mode to CSV files automatically. Users requesting this function have to prepare a **Convert Batch File** to provide EasyPrinter with the information of how to convert the history files.



As shown in the above illustration, the conversion is actually carried out by **EasyConverter**. EasyPrinter simply follows the criteria in Convert Batch File and activates EasyConverter with proper arguments to achieve the conversion.

NOTE

- EasyConverter is another Win32 application converting history data into CSV or MS Excel (*.xls) files. Users can find it in the EasyBuilder 8000 installation directory.
- Users requesting this function must ensure EasyPrinter and EasyConverter are placed in the same directory.

C.4.1 The Default Convert Batch File

The following is the default Convert Batch File included in the EasyBuilder 8000 software package:

The default Convert Batch File (convert2csv.def)

```
1:    "dtl", "EasyConverter /c $(PathName)"
2:    "evt", "EasyConverter /c $(PathName)"
```

There are two lines of text in the file. Each line has two arguments separated by a comma and forms a criterion of how to deal with a specific type of files, e.g. Data-Sampling and Event-Log history files. The first argument specifies the extension name for the type of the files to be

processed and the second one specifies the exact command to execute in console mode. Please note "**$(PathName)**" is a key word to tell EasyPrinter to replace it with the real name of the backup file in conversion. For example, if a Data-Sampling history file named **20090112.dtl** is uploaded and stored, EasyPrinter will send out the following command to a console window:

EasyConverter /c 20090112.dtl

And then the CSV file named **20090112.csv** is created.

Therefore, the criteria of the default Convert Batch File are:
1. Convert all Data-Sampling history files (*.dtl) into CSV files.
2. Convert all Event-Log history files (*.evt) into CSV files.

NOTE

- Actually, the "**$(PathName)**" in the second argument stands for the full path name of the file. In the previous case, EasyPrinter replaces it with:
  [Specified Path] \ [HMI Folder] \ [datalog] \
  [Folder name of the Data-Sampling object] \ 20090112.dtl
- EasyPrinter interprets the Convert Batch File on a line basis, i.e. each line forms a criterion.
- Any two arguments should be separated by a comma.
- Every argument should be put in double quotes.
- Do not put any comma inside an argument.
- For further information about how to use EasyConverter, please refer to the manual -- **Appendix EasyConverter.**

C.4.2 Specialized Criteria

Sometimes users may need a special handling for the files uploaded from a specific HMI. Here is an example:

Specialized Criterion for the HMI with IP = 192.168.1.26

3: "dtl", "EasyConverter /c $(PathName)", "192.168.1.26"

Or users can also specify the HMI with its name.

Specialized Criterion for the HMI with name = Weintek_01

4: "dtl", "EasyConverter /c $(PathName)", "Weintek_01"

Or in the case of needing special handling for different Data-Sampling history files.

Specialized Criterion for the Data-Sampling object's folder name = Voltage

5: "dtl", "EasyConverter /s Voltage.lgs $(PathName)", "*", "Voltage"

The 5th criterion can be only performed on the history files uploaded from the Data-Sampling objects with the folder name of "Voltage". The 3rd argument ("*") indicates this criterion accepts the qualified Data-Sampling files from any HMI. Users can also change the 3rd argument to "192.168.1.26", "192.168.1.*", HMI name, etc. for narrowing the target HMIs.

C.4.3 The Format of a Convert Batch File

The following table explains all arguments in a criterion.

No	Argument	Description
1	File Type	This argument specifies the extension name of the uploaded files this criterion targets. (e.g. "dtl" for Data-Sampling history files, "evt" for Event-Log history files)
2	Command Line	The exact command EasyPrinter sends to a console window if the uploaded file is qualified.
3	a. HMI IP address b. HMI name	This argument specifies the HMI this criterion targets.
4	Condition 1	• **If the file type is "dtl"** This argument specifies the folder name of the Data-Sampling objects this criterion targets. • **Others** No use.
5	Condition 2	No use. (reserved for further use)

C.4.4 The Order of Examining Criteria

EasyPrinter examines criteria in ascending order every time a file is uploaded. Once the file is qualified for a criterion, it stops the examination and starts over for next file. Therefore, **users should place the criteria with more specification upward in the Convert Batch File and place the less-specific criteria downward**. Take the 5 criteria mentioned in the previous sections for example, the correct order is:

Correct order for the previous criteria

"dtl", "EasyConverter /s Voltage.lgs $(PathName)", "*", “Voltage"

"dtl", "EasyConverter /c $(PathName)", "EasyView"

"dtl", "EasyConverter /c $(PathName)", "192.168.1.26"

"dtl", "EasyConverter /c $(PathName)"

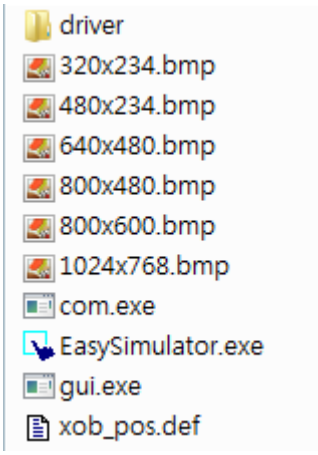
"evt", "EasyConverter /c $(PathName)"

Appendix D. EasySimulator

EasySimulator enables users to perform Online/Offline simulation without installing EayBuilder8000 software. To achieve that, users have to prepare the following files in one folder.

D.1 Prepare Files

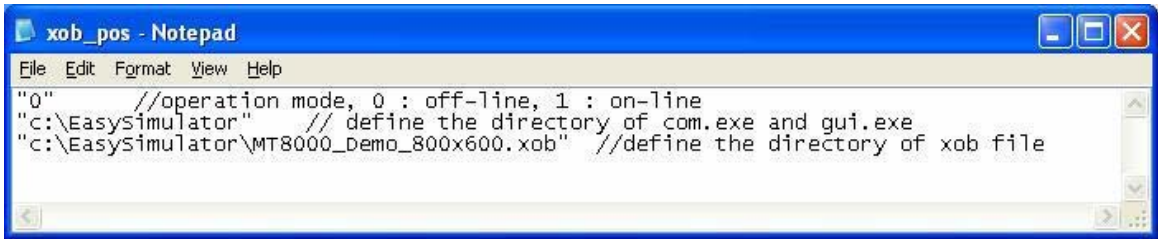
1. [driver] → [win32]
2. 320x234.bmp
3. 480x234.bmp
4. 640x480.bmp
5. 800x480.bmp
6. 800x600.bmp
7. 1024x768.bmp
8. com.exe
9. gui.exe
10. xob_pos.def
11. EasySimulator.exe



Users can find all the above files in EasyBuilder8000 installation directory, which means users have to install EasyBuilder8000 software package on a PC and copy the files to the target PC.

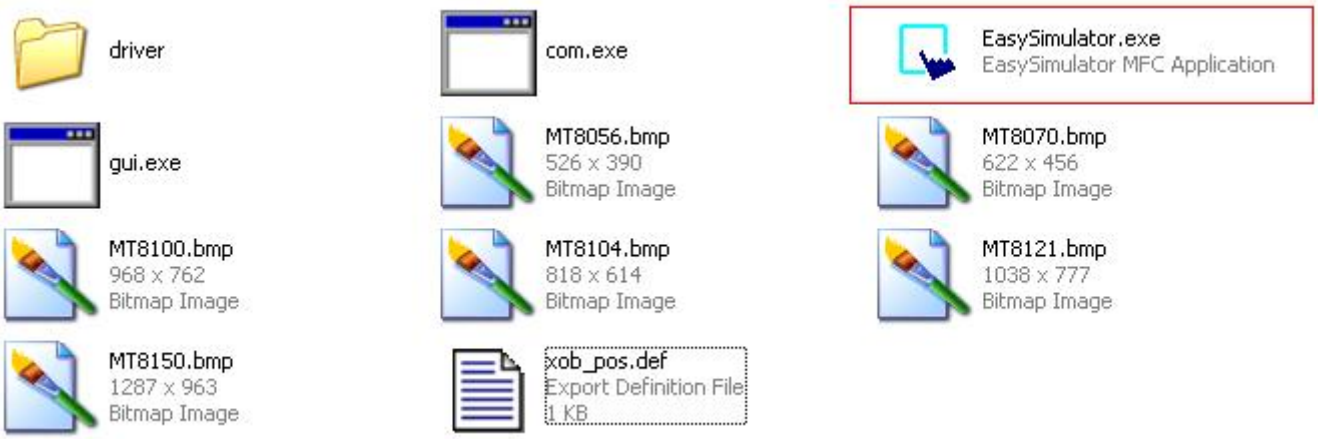
D.2 Modify the Content of xob_pos.def

Step1. Open xob_pos.def using a text editing tool (e.g. Notepad).

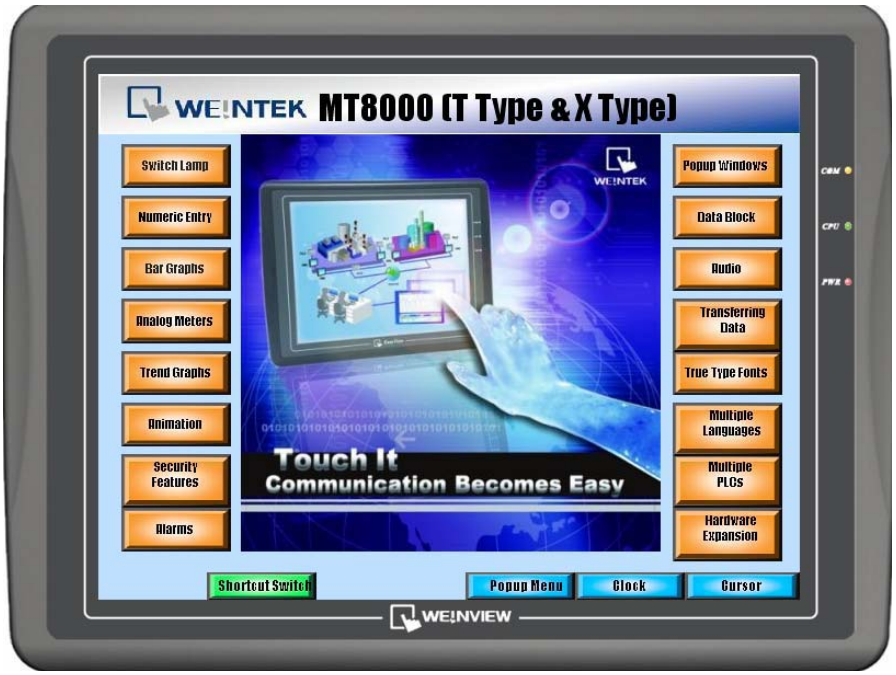


Line No.	Description
1	**[“0”]** Perform Offline simulation **[“1”]** Perform Online simulation
2	Specify the full path where the files (e.g. com.exe, gui.exe, EasySimulator.exe, etc.) locate.
3	Specify the full path of the project file (*.xob)

Step2. Double click EasySimulator.exe to start the simulation



Step3. ON-Line/OFF-Line simulation is display on the screen.



Appendix E. Multi-HMIs Intercommunication (Master-Slave Mode)

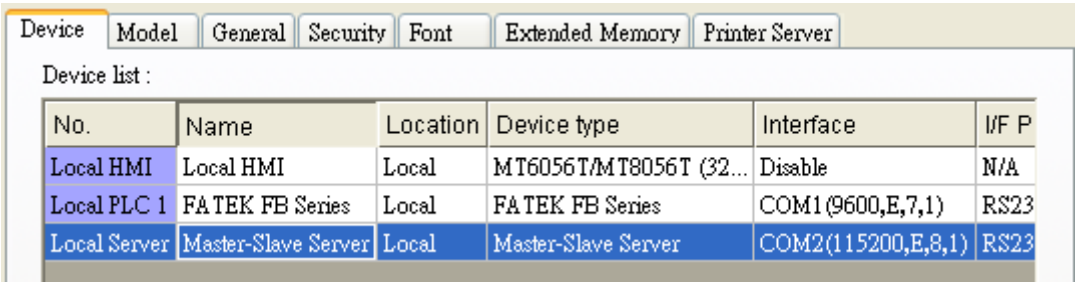
Multi-HMIs intercommunication means that HMI uses COM port to connect a remote HMI, and read/write data from/to a remote PLC as below:

Above shows the PLC connects HMI 1, and HMI 1 connects HMI 2 via COM port, so that the HMI 2 can control the PLC by way of HMI 1.

An example describes how to use EB8000 to create projects used on HMI 1 and HMI 2.

E.1 How to Create a Project of Master HMI

Below show the content of HMI 1's [System Parameter Settings] / [Device list]



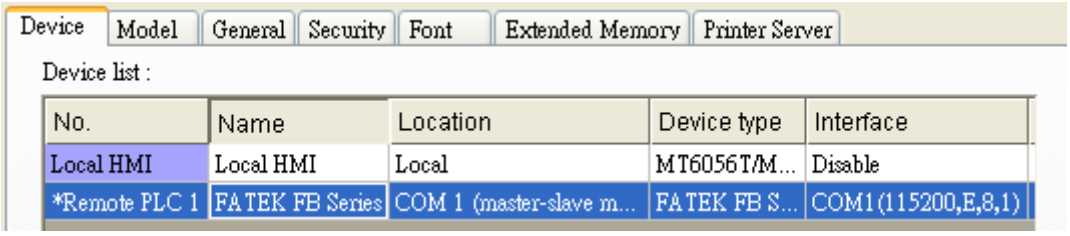
No.	Name	Location	Device type	Interface	I/F P
Local HMI	Local HMI	Local	MT6056T/MT8056T (32...	Disable	N/A
Local PLC 1	FATEK FB Series	Local	FATEK FB Series	COM1(9600,E,7,1)	RS23
Local Server	Master-Slave Server	Local	Master-Slave Server	COM2(115200,E,8,1)	RS23

1. Due to HMI 1's COM 1 connects PLC, the device list must include [Local PLC 1]. This example's [Local PLC 1] is "FATEK FB Series" and PLC's communication parameter is "9600, E, 7, 1".

2. Users must add a new device - "Master-Slaver Server" for setting COM 2's communication properties. Because HMI 1's COM 2 is used to receive commands from HMI 2. Above picture shows the COM 2's parameters are "115200, E, 8, 1", and uses RS232. These parameters have

not been restricted to be the same as COM 1, but the “data” bits must set to 8. In general, COM 2 is set to use a higher baud rate for more efficient communication.

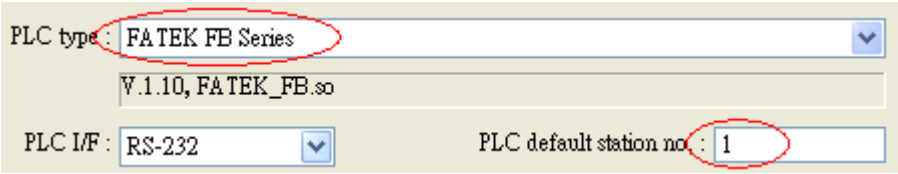
E.2 How to Create a Project of Slave HMI



Above picture shows HMI 2’s content of [Device list]. HMI 2 wants to control PLC via HMI 1, thus HMI 2 recognizes this PLC as a remote PLC. So it is necessary that add a [*Remote PLC 1] into the device list. This example shows the remote PLC is “FATEK FB Series”. How to create [*Remote PLC 1] is described below:

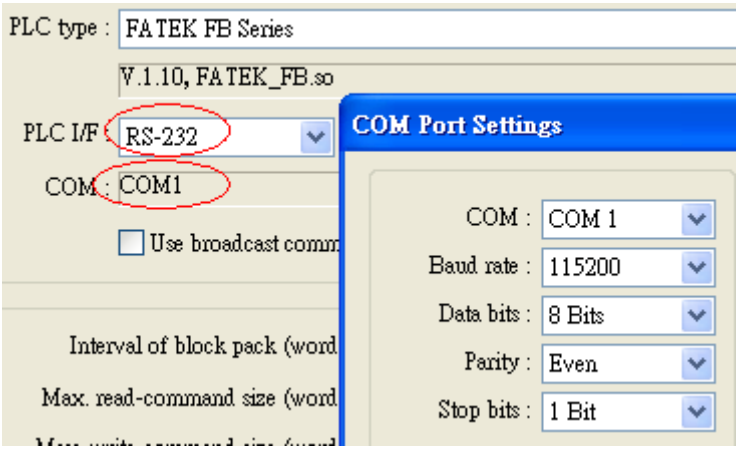
Step 1

Create a new device and select ”FATEK FB Series” for [PLC type]. [PLC default station no.] must be set correctly.



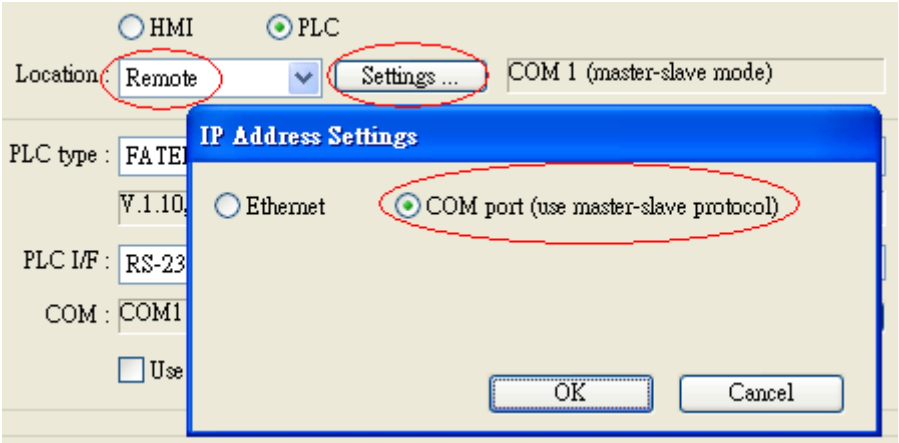
Step 2

Correctly set the parameters. HMI 2’s COM 1 connects HMI 1’s COM 2, so they both must have the same communication parameters and interfaces, ignoring the PLC parameters. As below, HMI 1’s COM 2 and HMI 2’s COM 1 use RS232 and the parameters are [115200, E, 8, 1].



Step 3

Change [Location] to [Remote], and select [COM port] to connect remote HMI 1.



Device list :

No.	Name	Location	Device type	Interface
Local HMI	Local HMI	Local	MT6056T/MT8056T...	Disable
*Remote PLC 1	FATEK FB Series	COM 1 (master-slave mode)	FATEK FB Series	COM1 (11520

After completing all settings described above, users can find a new device named [*Remote PLC 1] on the device table. This device has the "*" symbol to mean that HMI uses a COM port (not ethernet) to control a remote PLC via other HMI.

Users can check HMI's local registers to view the communication status.

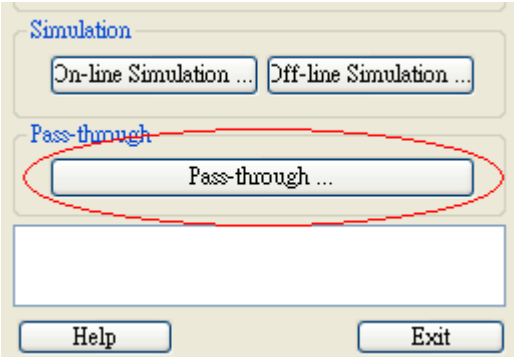
LB-9150	When ON, auto. connection for PLC1 (COM 1)
LB-9151	When ON, auto. connection for PLC2 (COM 2)
LB-9152	When ON, auto. connection for PLC3 (COM 3)

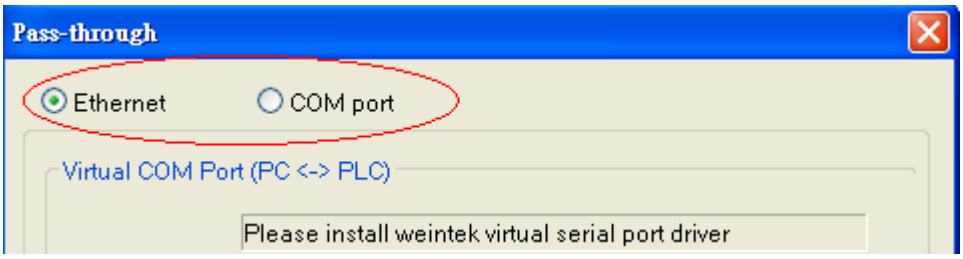
LB-9200~ LB-9455	This local registers indicate the connection states between COM 1 and PLC LB9200 indicates the state between COM 1 and PLC SN0 (station no. 0), and LB9201 indicates the state between COM 1 and PLC SN1…… When ON, it means that connection is normal. When OFF, it means that disconnect with PLC, and set on to retry connecting activity once.
LB-9500~ LB-9755	This local registers indicate the connection states between COM 1 and PLC LB9500 indicates the state between COM 1 and PLC SN0 (station no. 0), and LB9501 indicates the state between COM 1 and PLC SN1…… When ON, it means that connection is normal. When OFF, it means that disconnect with PLC, and set on to retry connecting activity once.
LB-9800~ LB-10055	This local registers indicate the connection states between COM 1 and PLC LB9800 indicates the state between COM 1 and PLC SN0 (station no. 0), and LB9801 indicates the state between COM 1 and PLC SN1…… When ON, it means that connection is normal. When OFF, it means that disconnect with PLC, and set on to retry connecting activity once.

Appendix F. Pass-Through Function

The pass-through function allows the PC application to connect PLC via HMI, and the HMI acts as a converter at this moment.

The pass-through function provides two modes: Ethernet and COM port. To click [Pass-through] on Project Manager will display the application.



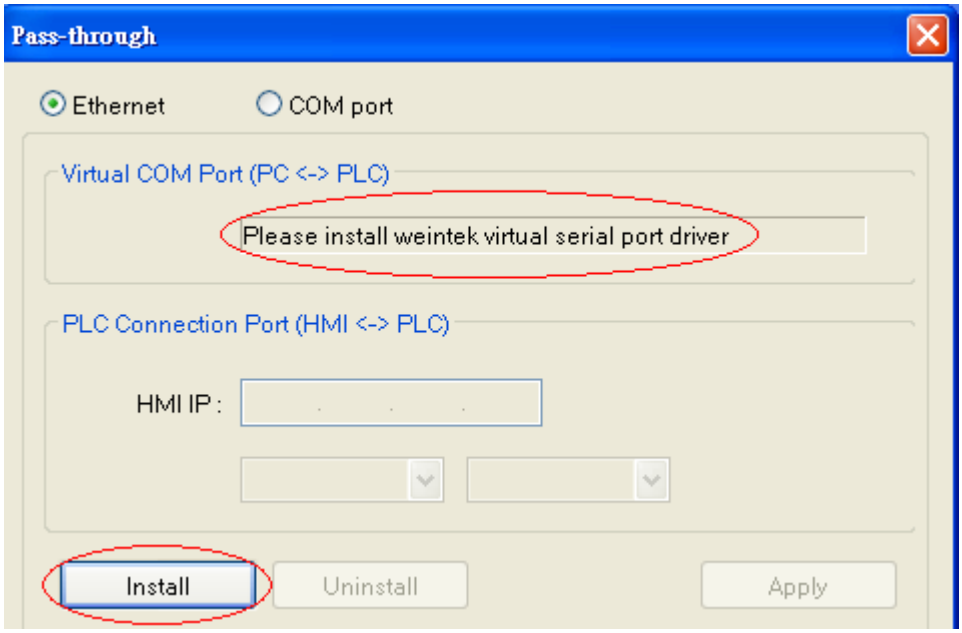


F.1 Ethernet Mode

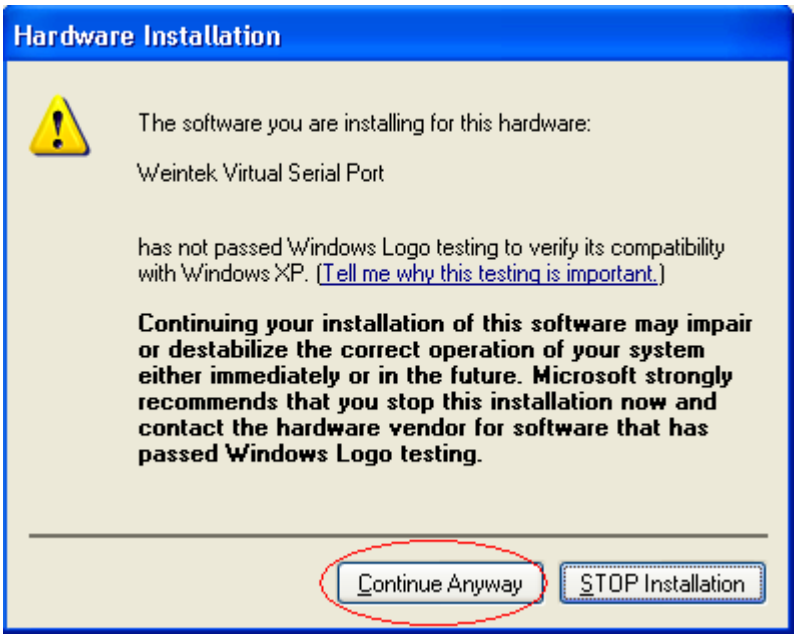
[How to install virtual serial port driver]

Before using ethernet mode, please check whether virtual serial port driver is installed as described below:

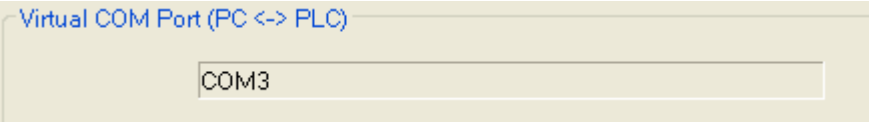
If [Virtual COM port (PC<->PLC)] displays **[Please install weintek virtual serial port driver]**, please click [Install].



If install processing pops up a dialog as follows, please click **[Continue Anyway]**.

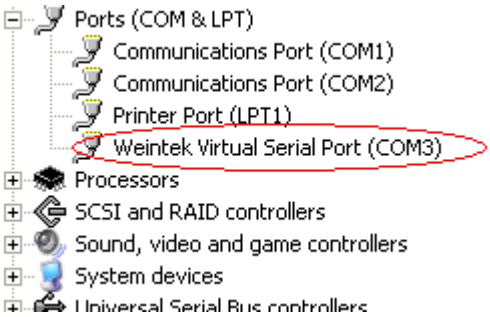


After processing is completed, the virtual COM port is displayed as follows.

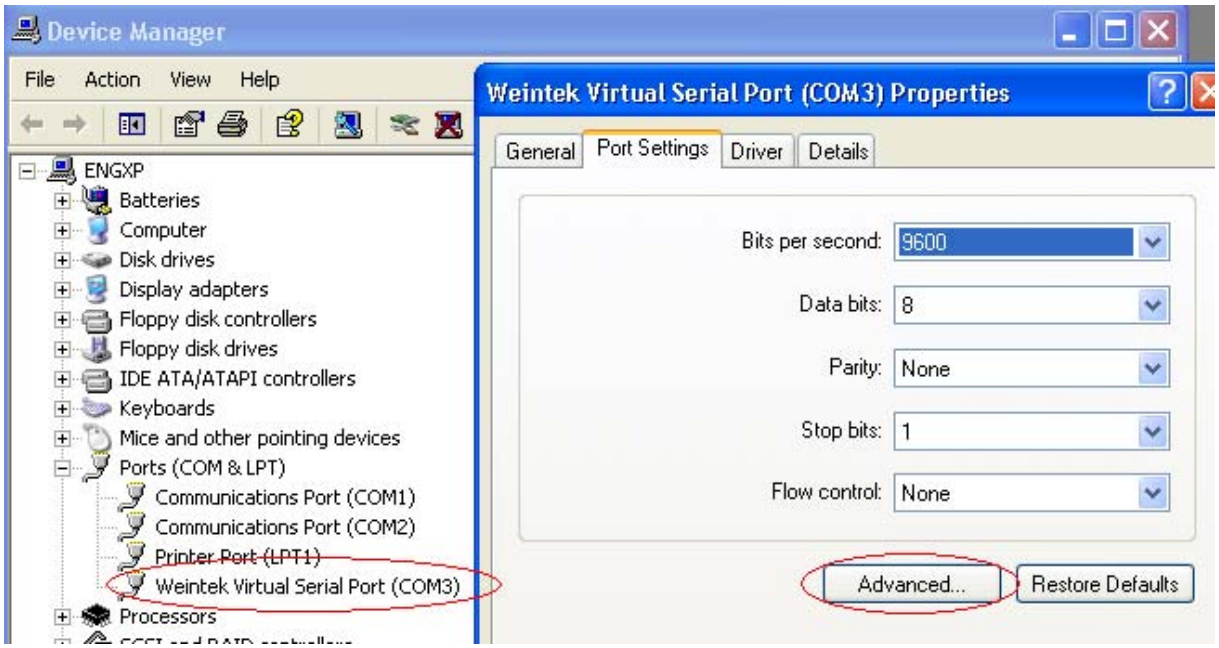


F.1.1 How to Change the Virtual Serial Port

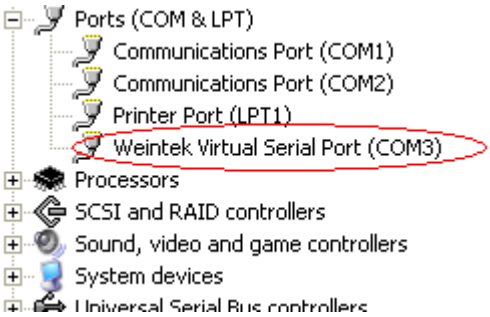
Open [System Properties]->[Device Manager] to check if the virtual serial port is installed successfully.

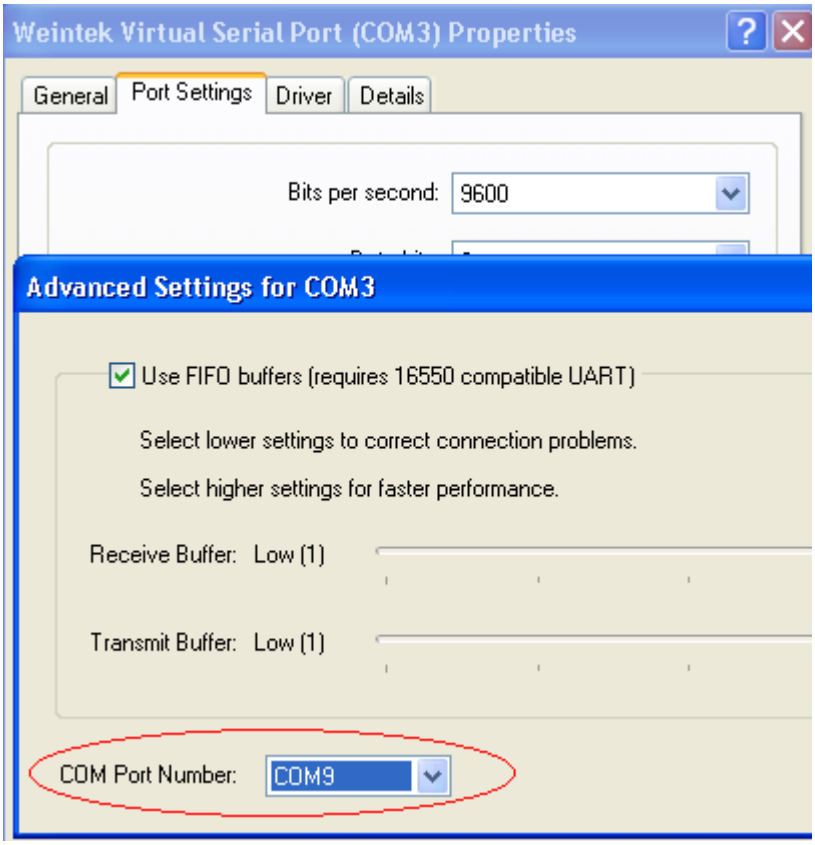


If users want to change the number of virtual serial port, please click [Weintek Virtual Serial Port] to open [Port Settings] / [Advanced…], as follows:

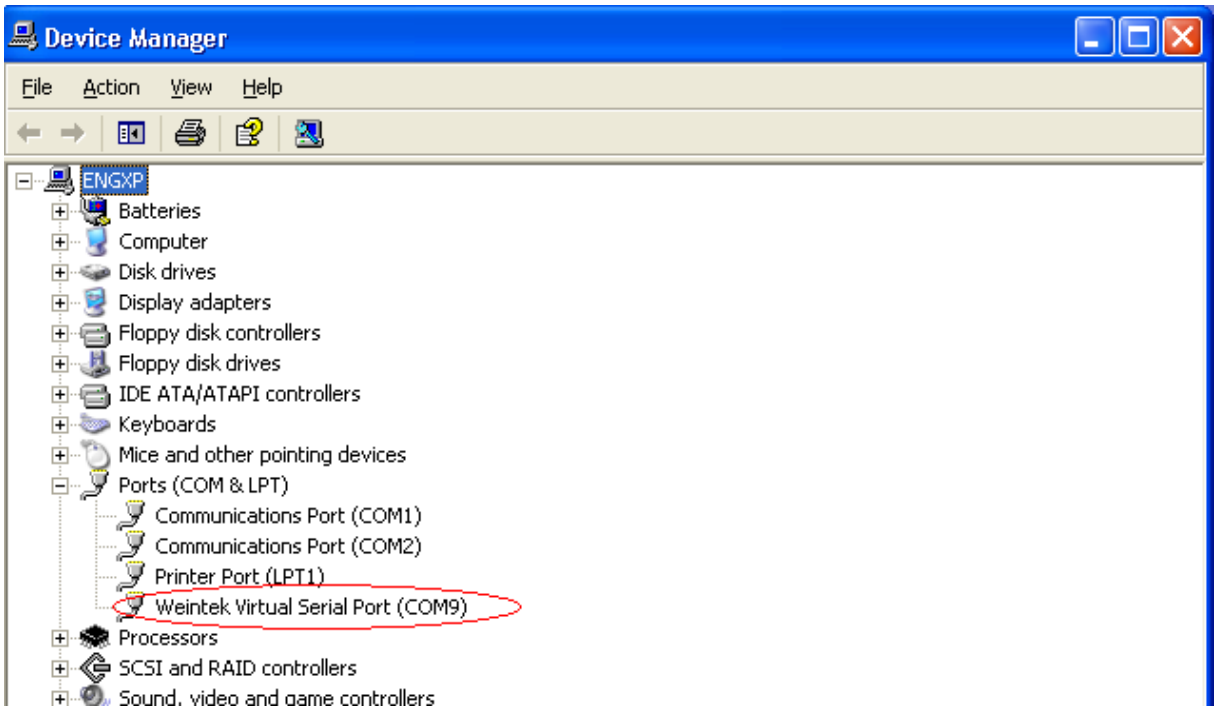


For example, users change virtual serial port from COM 3 to COM 9.

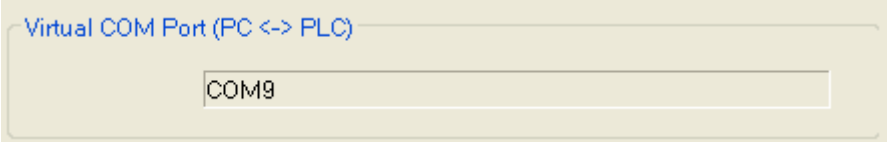




Select COM 9 and click [OK], the virtual serial port will be changed to COM 9.



It can be found that the virtual COM port be changed to COM 9 on Project Manager.



F.1.2 How to Use Ethernet Mode

After installing virtual serial port driver, users should follow four steps to use ethernet mode of pass-through.

Step 1

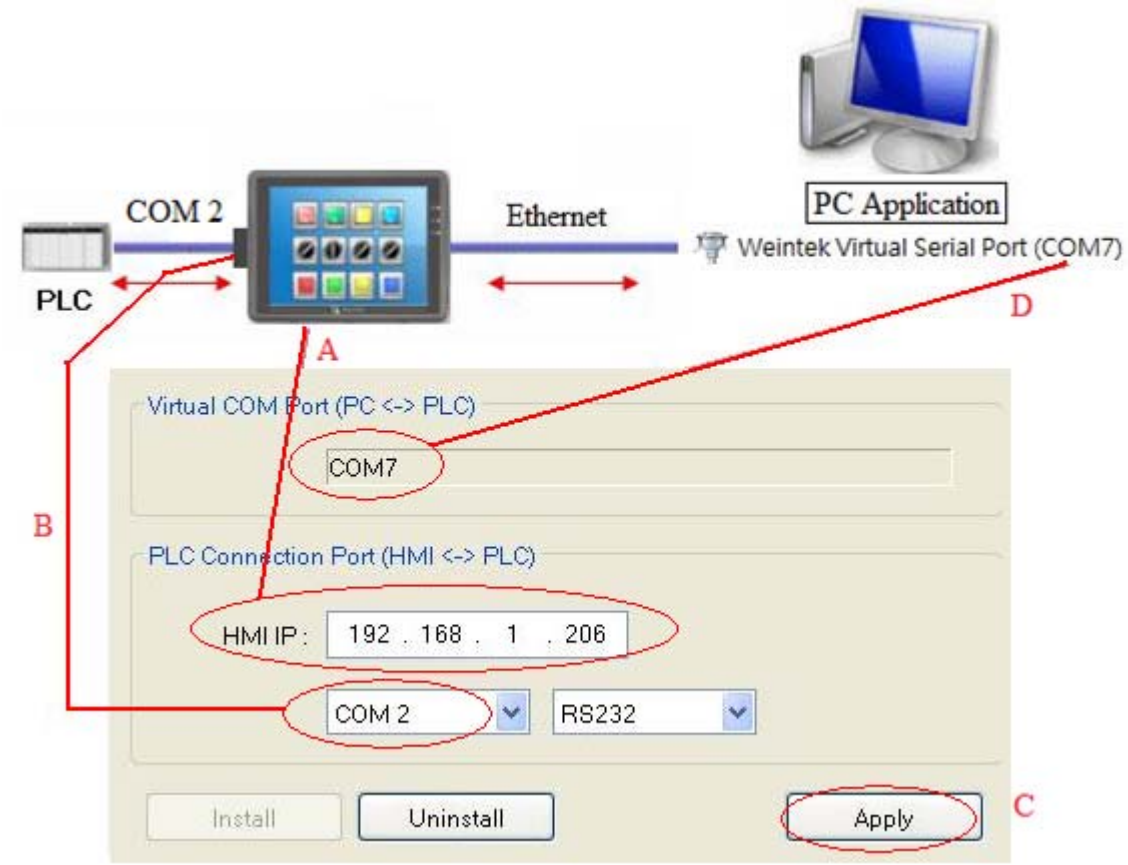
Set HMI IP connecting PLC. For example, HMI IP is 192.168.1.206

Step 2

Assign HMI's serial port properties and this port is used to connect PLC. For example, COM2 RS232 is used to connect PLC.

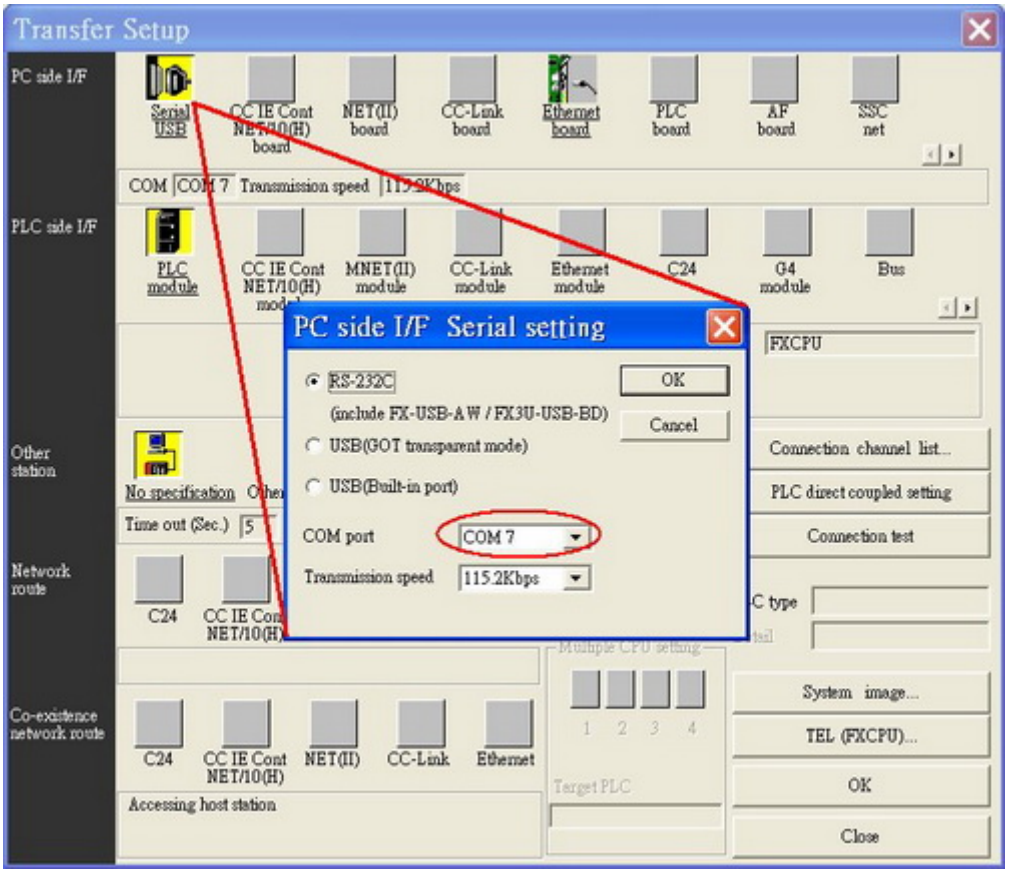
Step 3

Click [Apply], and these settings will be update.

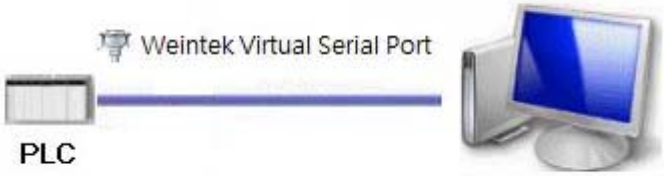


Step 4

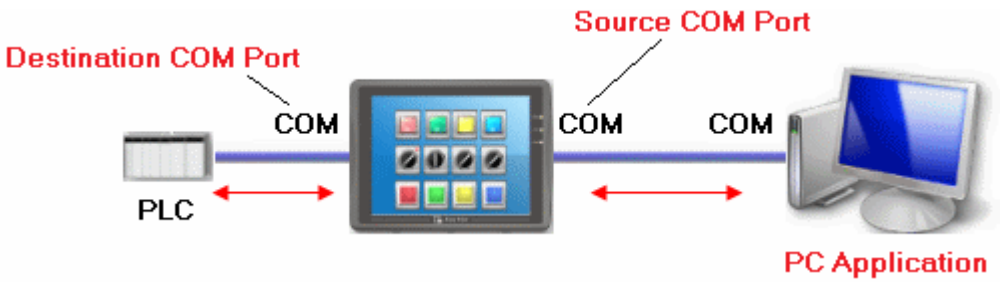
On the PC application, the serial port's number must be same as virtual serial port. For example, using a Mitsubishi application, if the virtual serial port is COM 7, please open [PC side I/F Serial setting] / [COM port] to select COM 7, as follows:



After completing all settings, when users execute PC's PLC application, the HMI will be switched automatically to pass-through mode (the communication between HMI and PLC will be suspended just now and it will be resumed if the application closes), as follows:



F.2 COM Port Mode



Source COM Port

The port is used between HMI and PC.

Destination COM Port

The port is used between HMI and PLC.

When using COM port mode of pass-through, users should select the source and destination com port first.

F.2.1 Settings of COM Port Mode

There are two ways to enable COM port mode of pass-through function.

(1) Use Project Manager

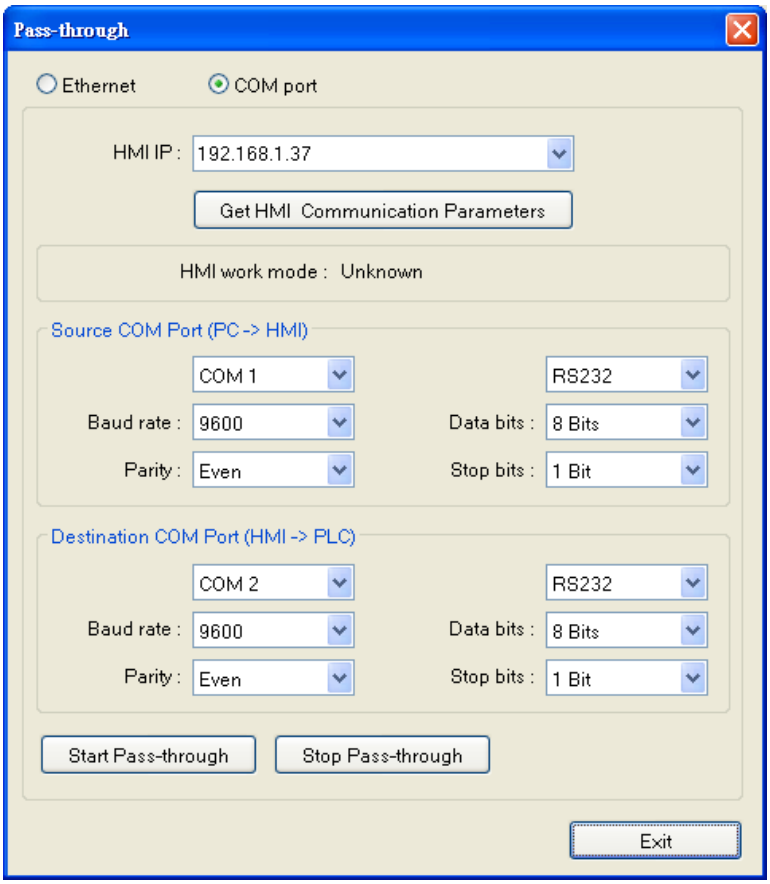
(2) Use LW-9901 and LW9902

LW-9901: source COM port (1~3: COM1~COM3)

LW-9902: destination COM port (1~3: COM1~COM3)

Start pass-through on project manager.

Click [Pass-through] button on the Project Manager to set the communication parameters.



[HMI IP]

Assign HMI's IP address.

[Get HMI Communication Parameters]

To get the settings of source and destination COM port, that parameters come from reserved addresses, the details of addresses as follow.

Source COM port and Destination COM port

LW9901 (Source COM port)	1 : COM 1 2 : COM 2 3 : COM 3
LW9902 (Destination COM port)	1 : COM 1 2 : COM 2 3 : COM 3

COM 1 mode settings

LW9550 (PLC I/F)	0 : RS232 1 : RS485/2W 2 : RS485/4W
LW9551 (baud rate)	0 : 4800 1 : 9600 2 : 19200 3 : 38400 4 : 57600 5 : 115200
LW9552 (data bits)	7 : 7 bits 8 : 8 bits
LW9553 (parity)	0 : none 1 : even 2 : odd
LW9554 (stop bits)	1 : 1 bit 2 : 2 bits

COM 2 mode settings

LW9556 (baud rate)	0 : 4800 4 : 57600	1 : 9600 5 : 115200	2 : 19200	3 : 38400
LW9557 (data bits)	7 : 7 bits	8 : 8 bits		
LW9558 (parity)	0 : none	1 : even	2 : odd	
LW9559 (stop bits)	1 : 1 bit	2 : 2 bits		

COM 3 mode setting

LW9560 (PLC I/F)	0 : RS232	1 : RS485/2W		
LW9561 (baud rate)	0 : 4800 4 : 57600	1 : 9600 5 : 115200	2 : 19200	3 : 38400
LW9562 (data bits)	7 : 7 bits	8 : 8 bits		
LW9563 (parity)	0 : none	1 : even	2 : odd	
LW9564 (stop bits)	1 : 1 bit	2 : 2 bits		

Click [Get HMI Communication Parameters] to update HMI current states and communication parameters.

F.2.2 HMI Work Mode

There are three work modes in the pass-through function,

Unknown	Before getting the settings of HMI, the work mode is displayed "Unknown".
Normal	The work mode "Normal" means that PC can't control PLC via HMI.
Pass-through	HMI is working on pass-through state; at this time, the PC application can control PLC via source com port.

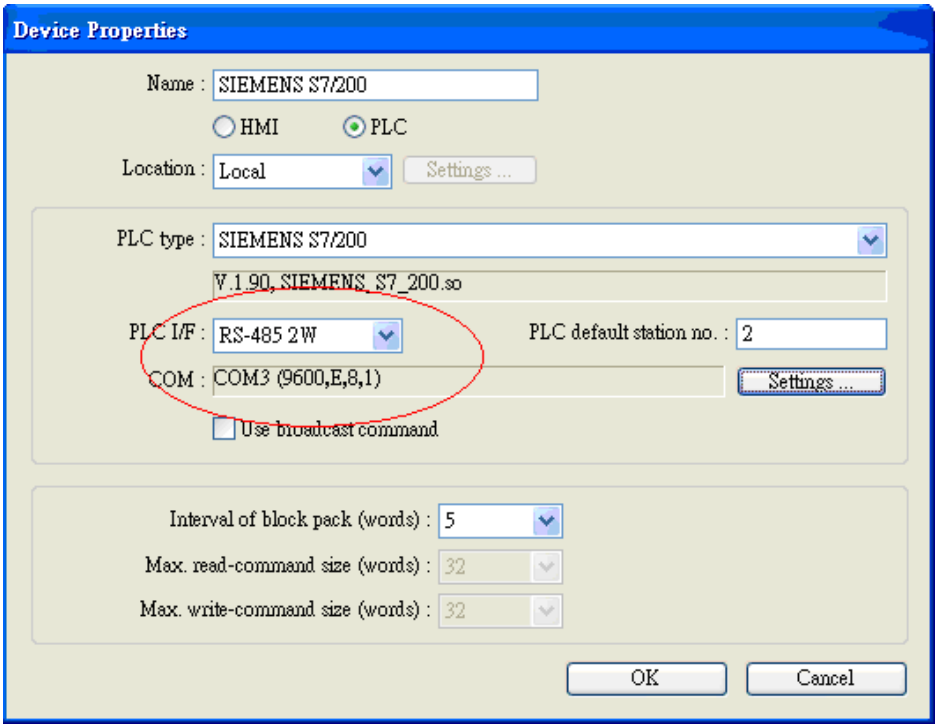
[Source COM Port]、[Destination COM Port]

The communication parameters of source and destination COM port are displayed on these two areas. **The settings will be used when pass-through is enabled. The "Baud rate", "Data bits", "Parity", and "Stop bits" of [Source COM Port] and [Destination COM Port] have to be the same**.

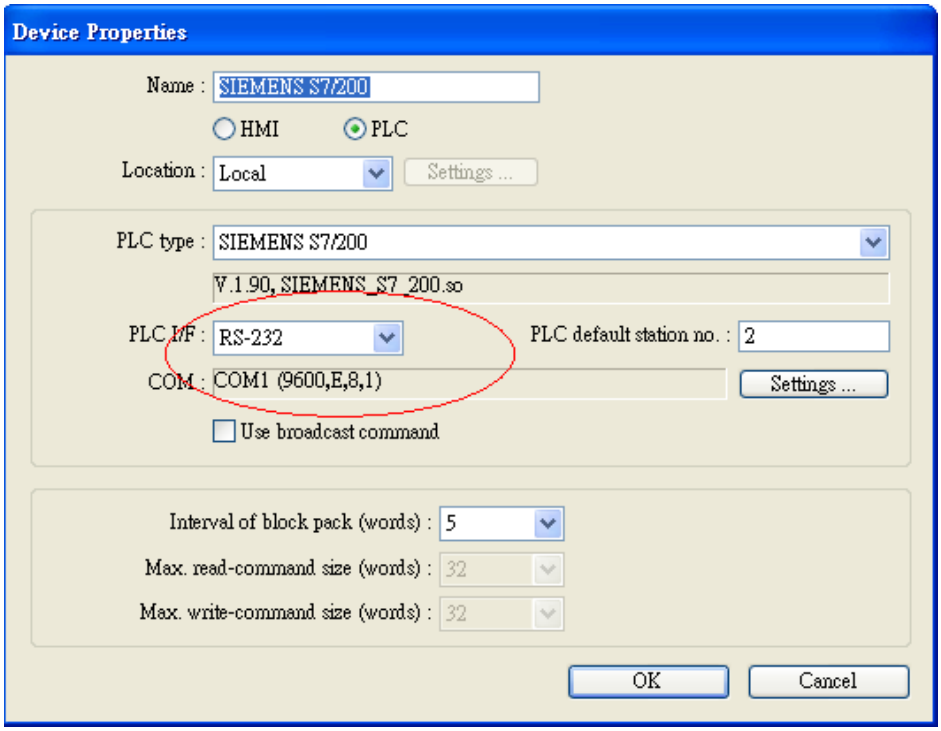
[Source COM Port] connects PC, so select RS232 mode; [Destination COM Port] connects PLC, so settings of the COM port depend on the PLC's requirement.

For an example, the illustration below shows the setting when HMI connects SIEMENS S7/200.

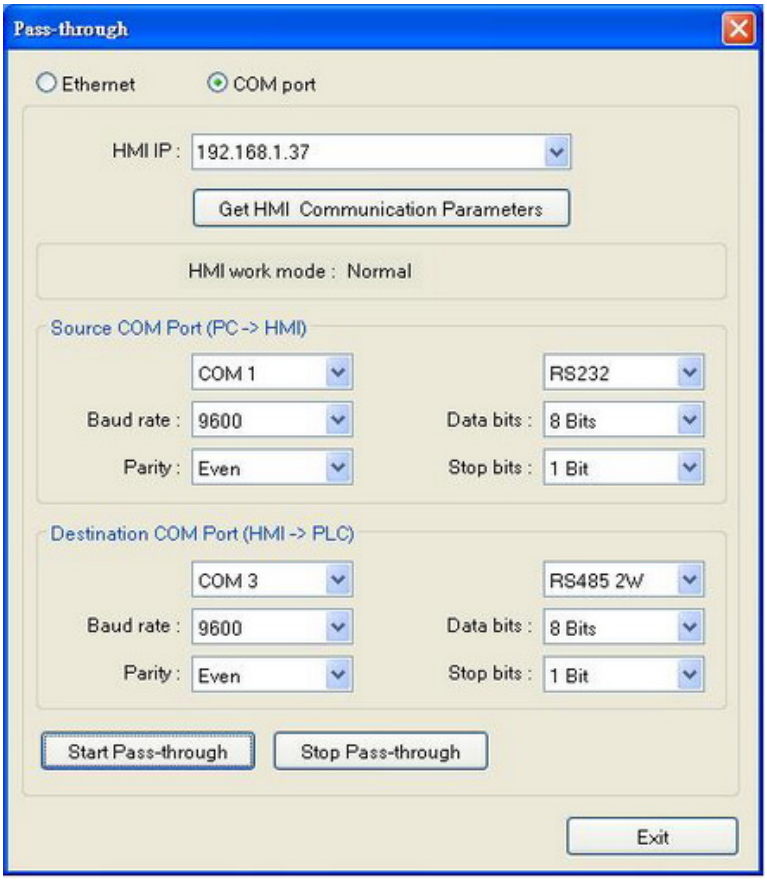
The HMI COM 1 (RS232) connects PC;COM 3 (RS485 2W) connects PLC. The communication parameter of PLC is ”9600, E, 8, 1”. Before starting pass-through, users must use the parameters in MTP project and download the project to HMI.



After the project is downloaded to HMI, open the same project and change the PLC I/F and COM port to COM 1 RS232 (PC uses COM 1 to connect HMI) as follows:



After that, press [Pass-through] to assign HMI IP address; for a example, 192.168.1.37. Finally, press [Get HMI Communication Parameters], as follows:



Press **[Start Pass-through]** and HMI's work mode is switched into "Pass-through". Users can execute on-line Simulation. Now PC application can control PLC via HMI, and HMI is acting as a converter at this moment.

Note: The communication between HMI and PLC will be paused when pass-through is active.. If users want to resume communication between HMI and PLC, please press [Stop Pass-through] to disable this function.

F.3 Using System Reserved Addresses to Enable Pass-Through Function

Other way to enable pass-through is to use LW9901/LW9902 to set source COM port and destination COM port directly. When the values of LW9901 and LW9902 match conditions as below, HMI will start pass-through automatically:

a. The values of LW9901 and LW9902 has to be 1 or 2 or 3
   (1: COM 1 2: COM 2 3: COM 3).
b. The values of LW9901 and LW9902 should be not the same.

Note: If users want to stop pass-through, just change the values of LW9901 and LW9902 to 0.

If users need to change the communication parameters, just change the relative reserved addresses (Please refer to the section above or the relevant chapters to understand how to use these addresses) and set ON to LB9030, LB9031 and LB9032, the HMI will be forced to accept new settings.

LB9030	Update COM1 communication parameters (set ON)
LB9031	Update COM2 communication parameters (set ON)
LB9032	Update COM3 communication parameters (set ON)