1. Installation

The followings are the basic requirements to install the ADP:

1. PC - CPU 80586 or higher;
2. Memory – 64 Meg RAM or more;
3. Hardware - 60 Meg or more free space;
4. Display - VGA or SVGA. Windows with 256 color or higher,
   and resolution with 800×600 or higher.

Since all the programs in the ADP have been compressed, one needs to install the software before using it.

The software is available from the following websites or your local dealers.

- http://www.hitechsite.com
- http://www.hitechsite.com.tw

1.1.

Installation Procedures

Users can run the ADP software in the following Windows operating systems:

- Windows 95
- Windows 98
- Windows ME
- Windows 2000
- Windows XP

Installation Procedure:

1. Start your computer in the Windows environment.
2. Click [Start] and select [Run]. The [Run] dialog box should be appeared on the screen and select [Browse] to locate the install program “Setup.exe”. See Figure 1.

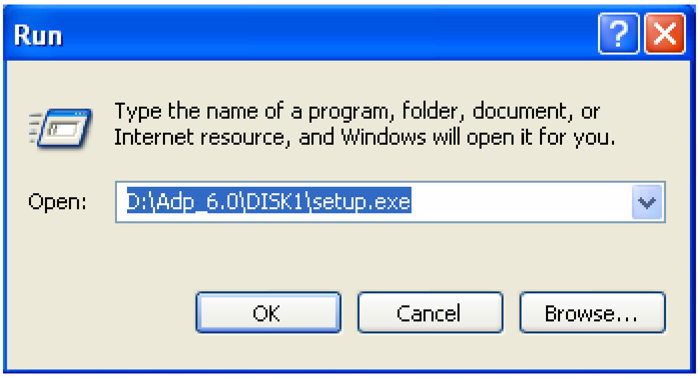


Figure 1. Run the ADP installation program “Setup.exe” in Window

3. Click [OK] to start to install, See Figure 2.

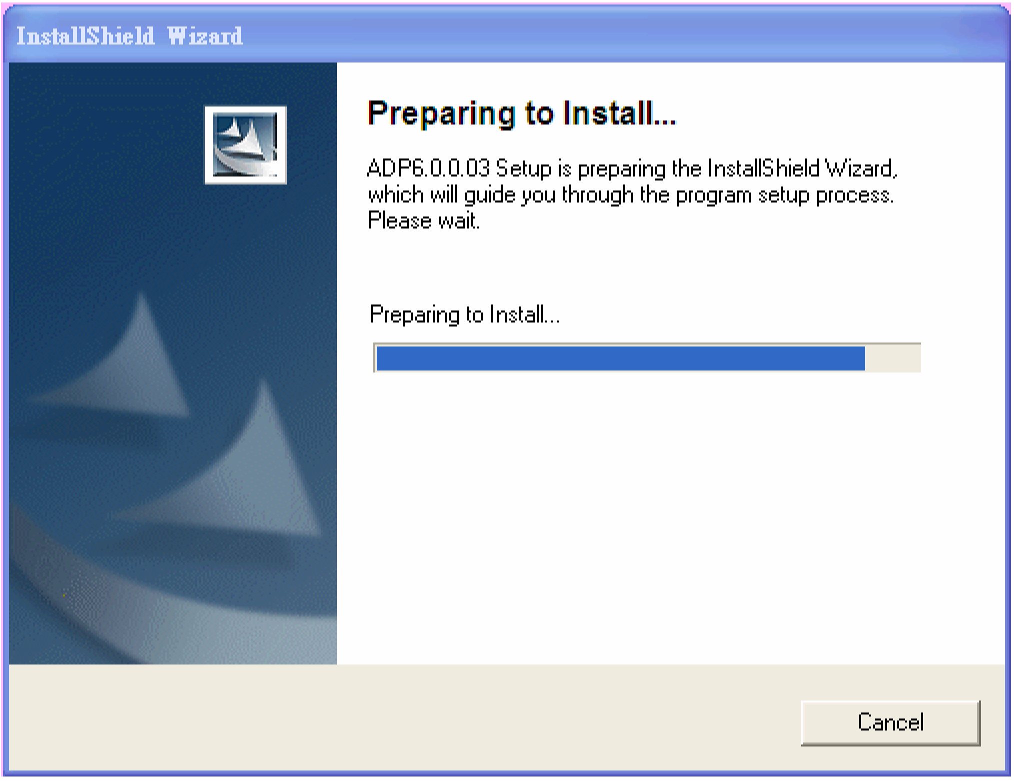


Figure 2. The ADP is preparing to install

4. Follow the instructions and specify the hard drive and the directory which the ADP will be installed to. See Figure 3.

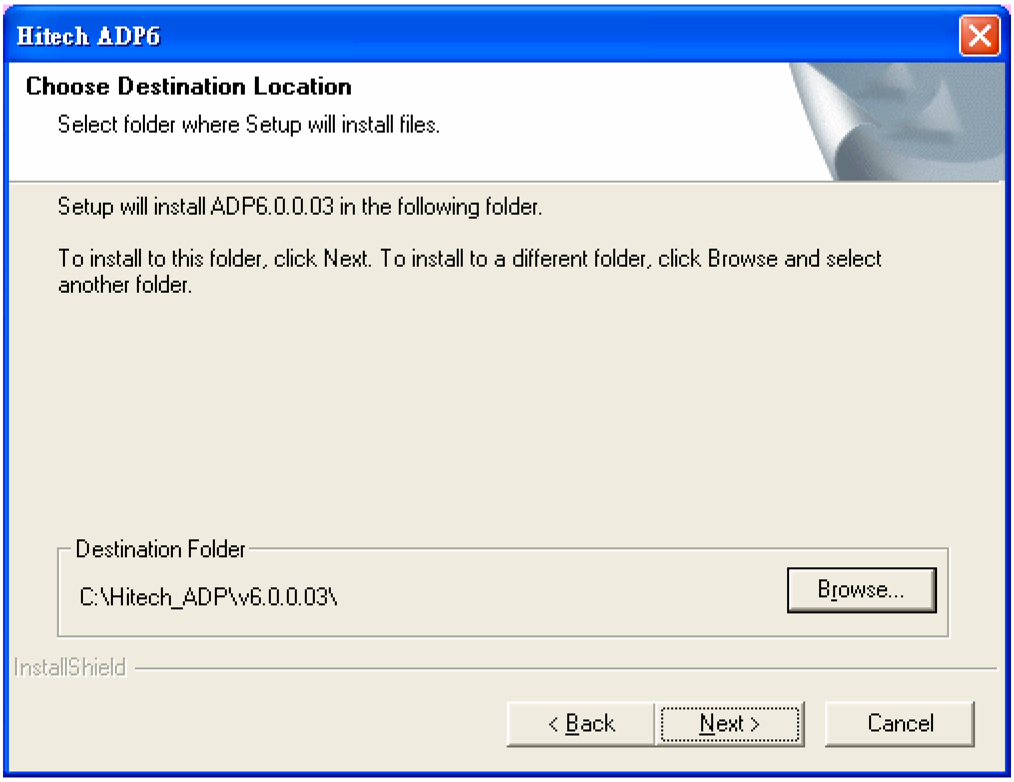


Figure 3. The destination hard drive and the directory

5. Click [Next] to select the type of setup. See Figure 4. “Typical” is recommended for the most users. “Compact” is the program with basic options. “Custom” is the program which users can individually select the options to install and this is recommended for advanced users.

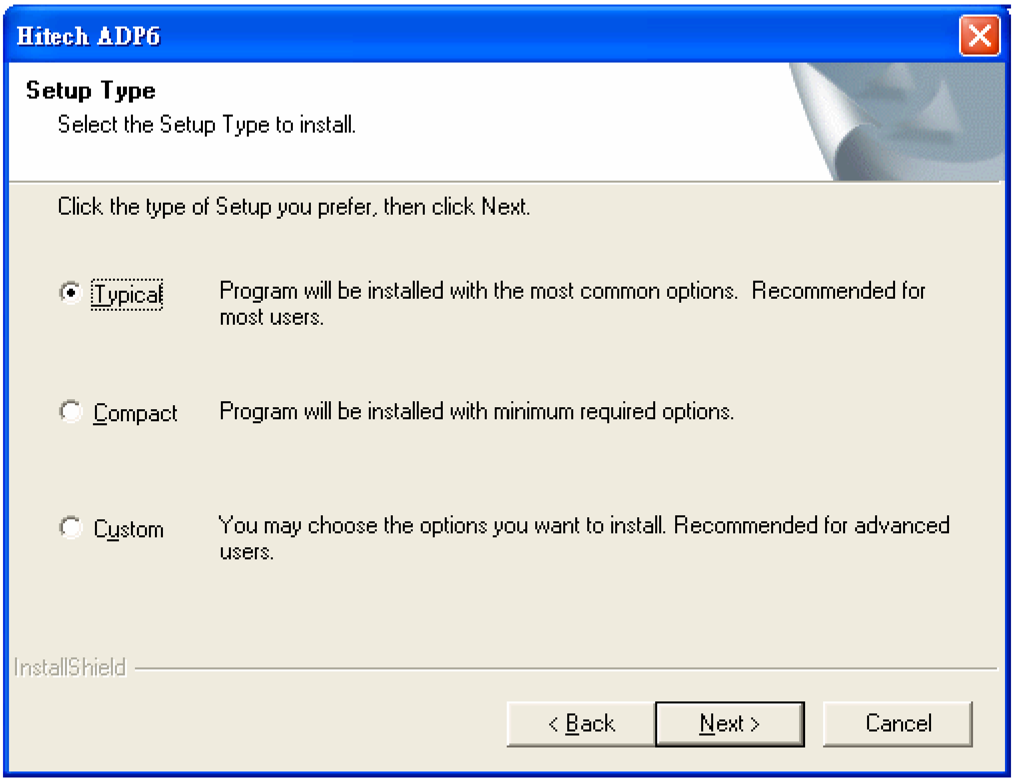


Figure 4. Select the type of setup

6. Click [Next] to begin to install. If the “Typical” option is selected, then the following dialog box will appear on the screen. See Figure 5.

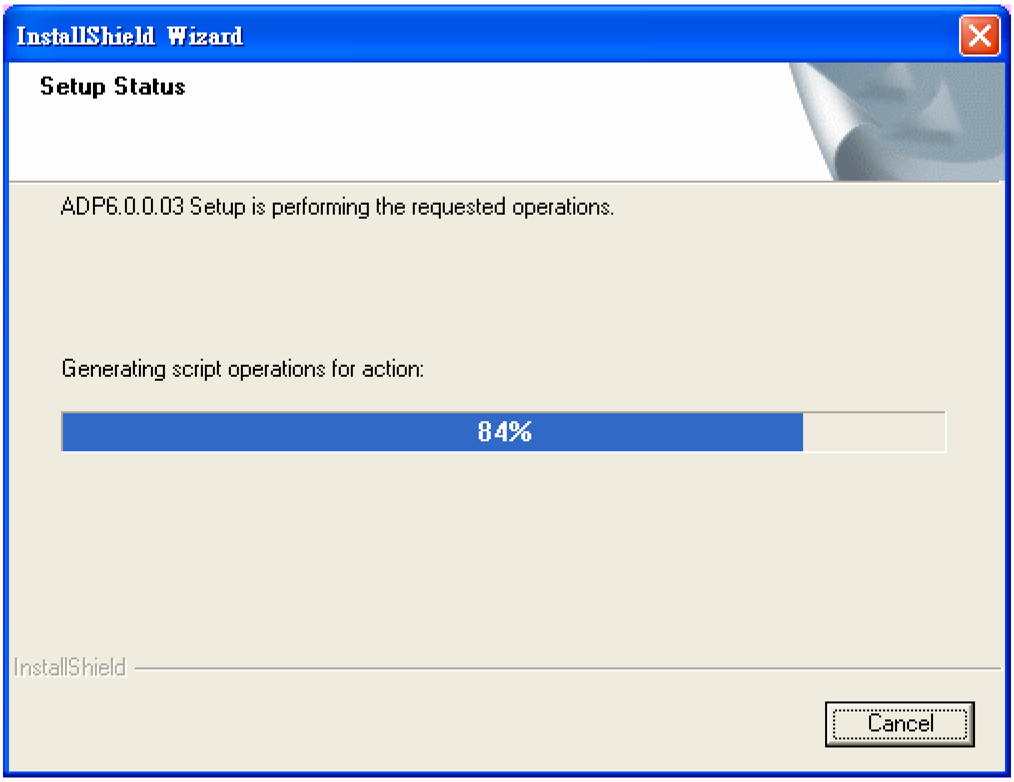
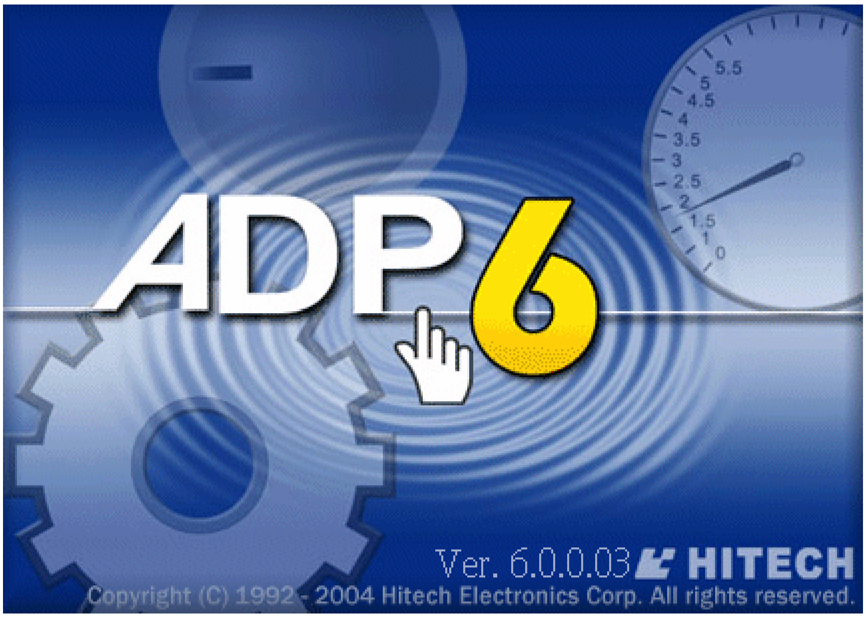


Figure 5. The ADP Installation

7. After the installation, the system will create the ADP icon automatically.

8. Once the installation is completed, the ADP software is in the specified directory. To launch the ADP program, simply use the mouse to click on the ADP icon.



1.2. File Upgrades

There are several things about file conversions and upgrades to be noted:

ADP 6.0 can open an *.V3F file designed by ADP 3.x. To open an *.P3F file designed by ADP 2.x, one needs to open the file in ADP 3.x first and save it as an *.V3F file. Then open the file in ADP 6.0.

Finally, one cannot open the files designed by ADP 6.0 in ADP 3.x.

1.3. HMI Models Upgrades

There are several upgrades regarding the applicable models of HMI in ADP 6.0:

The followings are the applicable HMI models in ADP 6.0: PWS3261,PWS3261N,PWS6300,PWS6500,PWS6600,PWS6600 Color,PWS6600N,PWS6600N-Color,AP1600,AP1600-Color,AP1600N,AP1600N-Color and SoftPanel.

The following HMI models are not applicable in ADP 6.0: PWS500S,PWS500S-PLC,PWS700T,PWS700X,PWS1711,PWS1711-Color,PWS1760,PWS3160/3260,PWS2100,PWS3700,and PWS3760.

If a file is designed for an HMI model which is not applicable in ADP 6.0, then ADP 6.0 will automatically upgrade the older version of model to an updated version of model once the file is opened. The conversions of these HMI models are shown below:

Models are applicable in ADP 6.0.	**Models are *NOT* applicable in ADP 6.0**
PWS6600S-S	PWS1700-Mono
PWS6600S-S	PWS1700-B/W
PWS6600C-S	PWS1700-Color
PWS6600C-S-Ladder	PWS1711-Color-Ladder
PWS6600S-S	PWS1711-Mono

PWS6600S-S-Ladder	PWS1711-Mono-Ladder
PWS6600C-P	PWS1760
PWS6600C-P-Ladder	PWS1760-Ladder
PWS3261	PWS2100
PWS3261	PWS3000/3100
PWS3261	PWS3160/3260
PWS3261-Ladder	PWS3160/3260-Ladder
PWS3261	PWS3700
PWS3261	PWS3760
PWS3261-Ladder	PWS3760-Ladder
PWS6300	PWS500S
PWS6300-Ladder	PWS500S-PLC
PWS6500	PWS700T
PWS6600S-P	PWS700X

Note also that not all features provided by the ADP are applicable on every HMI model. For the complete details on those ADP features and the applicable models, please refer to **Appendix A.**

2. Instructions

Microsoft Windows TM is undoubtedly the main PC operating environment nowadays. ADP is also designed to make full use of the Windows environment and adopts the concept of "What You See is What You Get." Users can immediately see their designed objects on a PC screen with their specified attributes such as font size, color, location of objects, picture, scale, frame, and so on. What a user sees on a PC screen will be the same as those displayed on a Workstation. Furthermore, ADP utilizes the principles of **object-oriented** design to implement the **drag-and-drop editing.** Users can conveniently drag objects into another location or change shapes and sizes with a mouse as they wish.

2.1. Introduction

Figure 6 illustrates the major bars and tool boxes in the ADP program environment.

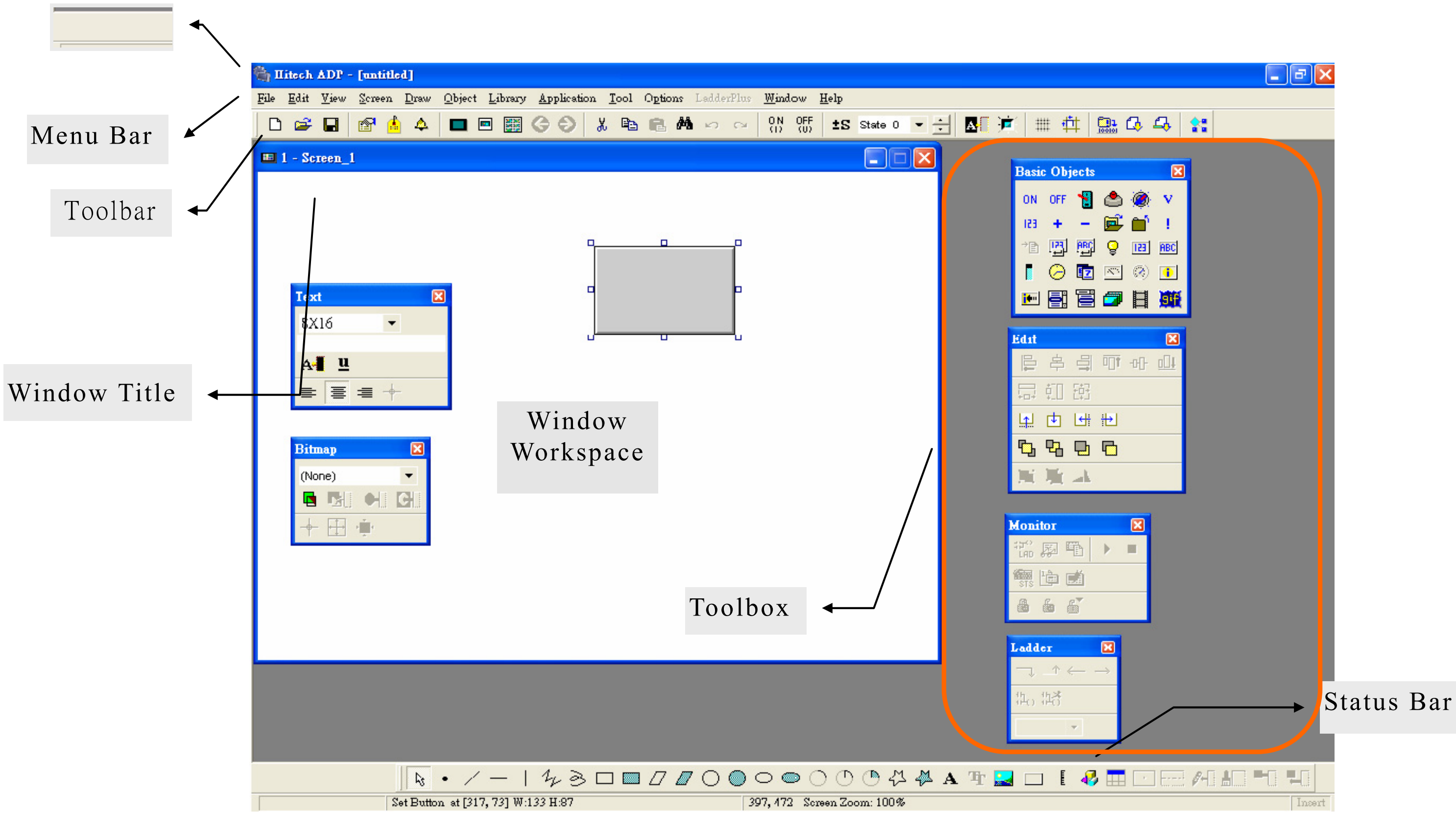


Figure 6. ADP Program Environment Overview

Title Bar:

The Title Bar shows the windows name and the directory of the current application. Example: C:\MyAPP\V6.0 \TEST1.V6F.

If an application file has not been saved, “untitled” will be displayed in the Title Bar.

Menu Bar:

There are 13 menus in the Menu Bar; they are [File], [Edit], [View], [Screen], [Draw], [Object], [Library], [Application], [Tool], [Options], [LadderPlus], [Window] and [Help].

Tool Bar:

Users can create an ADP program simply by clicking the icons on the Tool Bar. This feature also helps new users to learn the software quickly and easily.

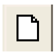
Window Workspace

This is the area to design a Screen. The objects or data created in this area will actually be displayed on an HMI.

In the following sections, we will talk about the function, application, and usage for each of the commands and menus in much more details.

2.2. File Menu

The main purpose of the [File] menu is to manage the files designed by ADP.

2.2.1. [New] 

This command allows users to create a new application and specify its properties such as [Application Name], [Panel/Workstation], [Controller/PLC], [Printer], [Multi-lingual Support], [Control Block], [Status Block] and so on.

To create a new application, select [File]/[New]. The [New Application's Properties] dialog box should be appeared on the screen. See Figure 7.

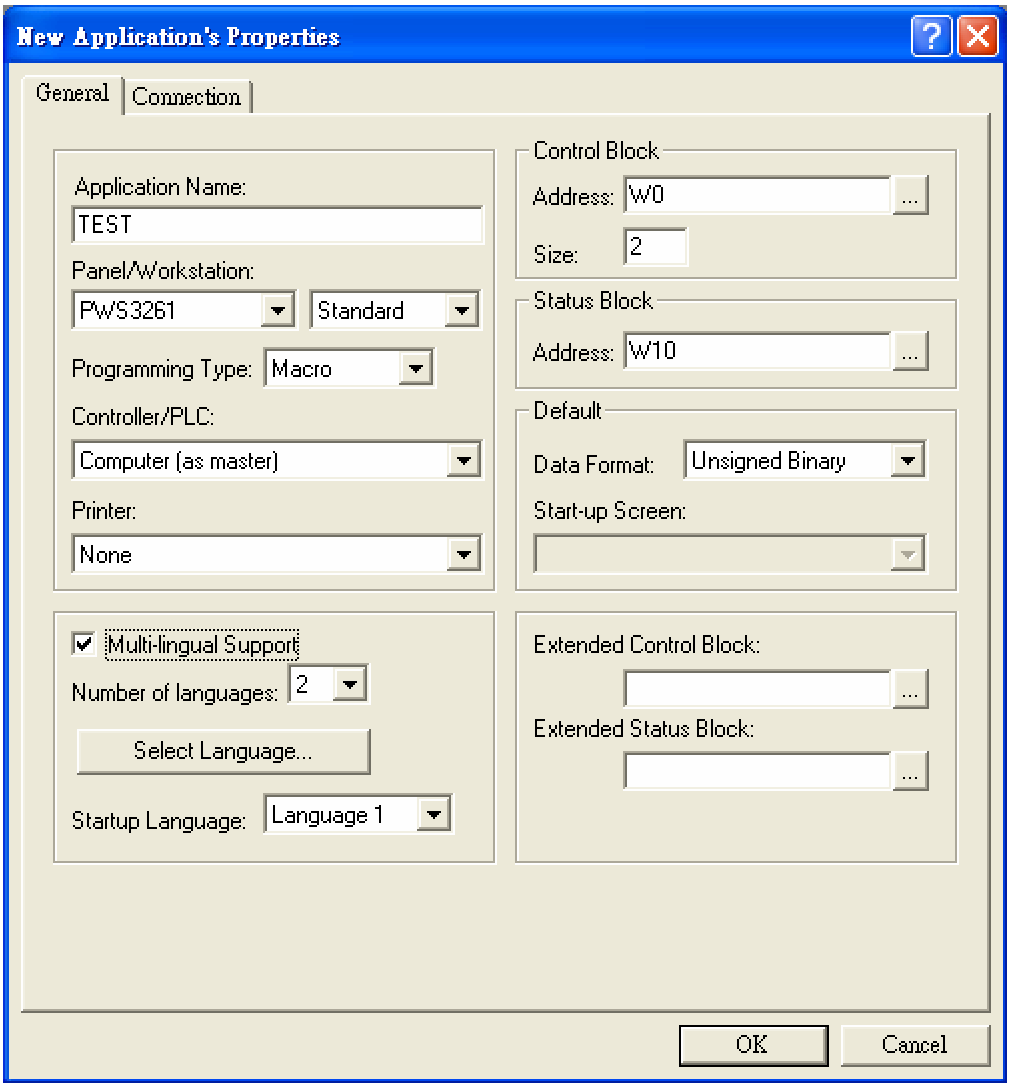


Figure 7. The [New Application's Properties] Dialog Box

The followings are the basic properties a user needs to set up for a new application:

- In the [Application Name] box, enter the name of an application.
- In the [Panel/Workstation] list, select the model of a Workstation.
- In the [Controller/PLC] list, select the type of PLC which a Workstation will communicate with.

Please refer to Section 2.9 [Application] and Section 2.9.1.2 [Connection] for more details.

2.2.2. [Open] and [Close]

[Open] allows users to open an existing application. The compatible format of a file includes *.V6F, *.V4F and *.V3F. See Figure 8.

[Close] allows users to close an application.

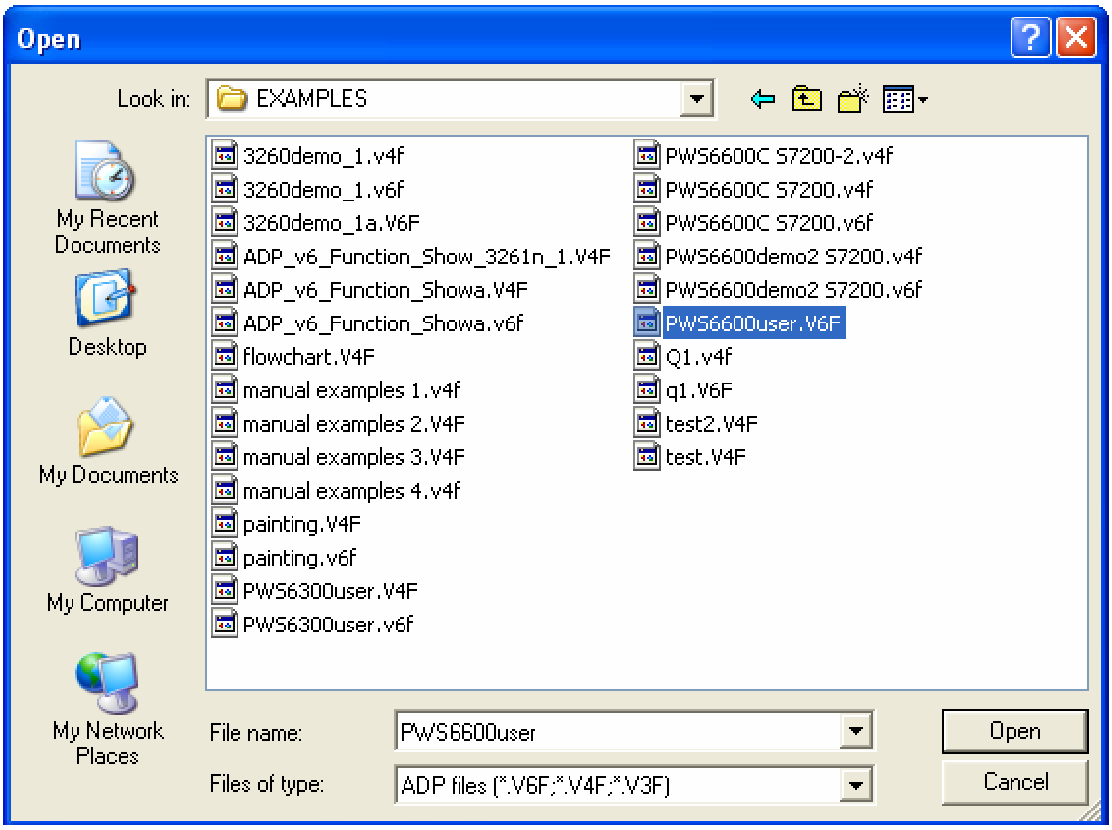


Figure 8. The [Open] dialog box

ADP 6.0 can open an *.V3F file designed by ADP 3.x. To open an *.P3F file designed by ADP 2.x, one needs to open the file in ADP 3.x first and save it as an *.V3F file. Then open the file in ADP 6.0.

2.2.3. [Save] and [Save as]

[Save]: Saves an existing application to replace the previous copy with the new copy.

[Save As]: Saves a new or existing application with a new name. See Figure 9.

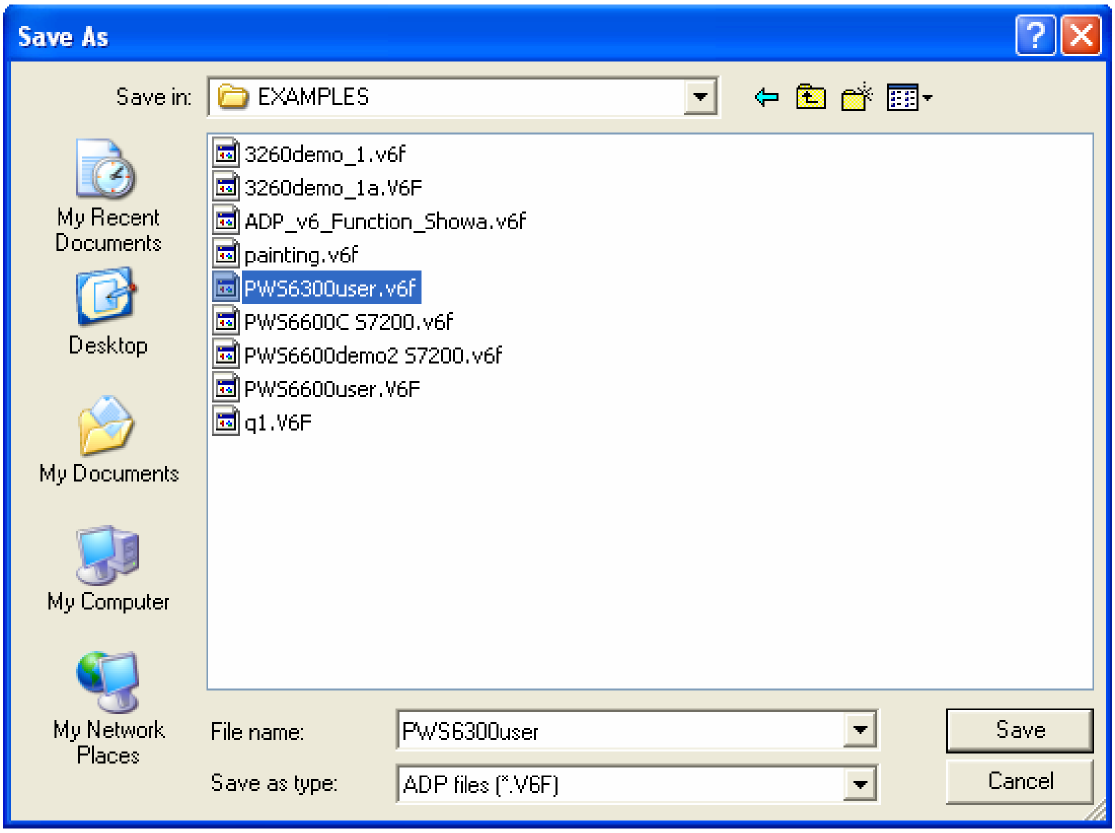


Figure 9. The [Save as] Dialog Box

2.2.4. [Print]

An application file can be printed for the purposes of planning, management or storage.

Select [File]/[Print] and the [Print Options] dialog box should be appeared on the screen. See Figure 10. There are three options available: “Workstation Setup”, “Screen Overview” and “Screen Image.”

The function is not applicable on every HMI model; please refer to Appendix A. - Table of the ADP 6.0 Features and the HMI Models for the complete details.

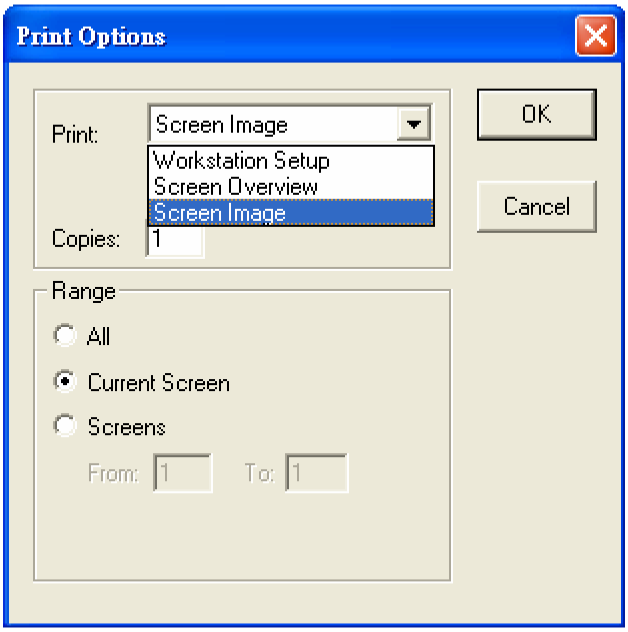


Figure 10. The [Print Option] Dialog Box

The [Print] options:

- "Workstation Setup": Prints the data of Workstation such as the PLC type, configuration setup and the details of logging buffer. See Figure 11.

- "Screen Overview": Prints the image of a screen with the PLC location of each object. See Figure 12.

- "Screen Image": Prints the image of a screen without the PLC locations. See Figure 13.

Other options：

- [Copies]: Specify the number of copies to print.

- [Range]: Only available for the "Screen Overview" and "Screen Image" options.

```
Application name: Myapp001     page  1    12/22/1998 17:31
____________________________________________________________
Workstation Type : PWS3160/3260
PLC Type : Modicon 984 (RTU)
Printer Type : EPSON Stylus Color II
Default Startup Screen : 1
Default Data Format : BCD
Control Block Address : 40100  Size : 2
Status Block Address : 40200
Logging Buffers
```

		Record		Stamp		Auto	Triggered	Time
#	Source Address	Size	Total	Time	Date		Stop By	Interval
1	40500	4	3000	Yes	No	No	Timer	5
2		0	0	No	No	No	PLC	0
3		0	0	No	No	No	PLC	0
4		0	0	No	No	No	PLC	0
5		0	0	No	No	No	PLC	0
6		0	0	No	No	No	PLC	0
7		0	0	No	No	No	PLC	0
8		0	0	No	No	No	PLC	0
9		0	0	No	No	No	PLC	0
10		0	0	No	No	No	PLC	0
11		0	0	No	No	No	PLC	0
12		0	0	No	No	No	PLC	0

Figure 11.   An Example of the “Workstation Setup” Print Option

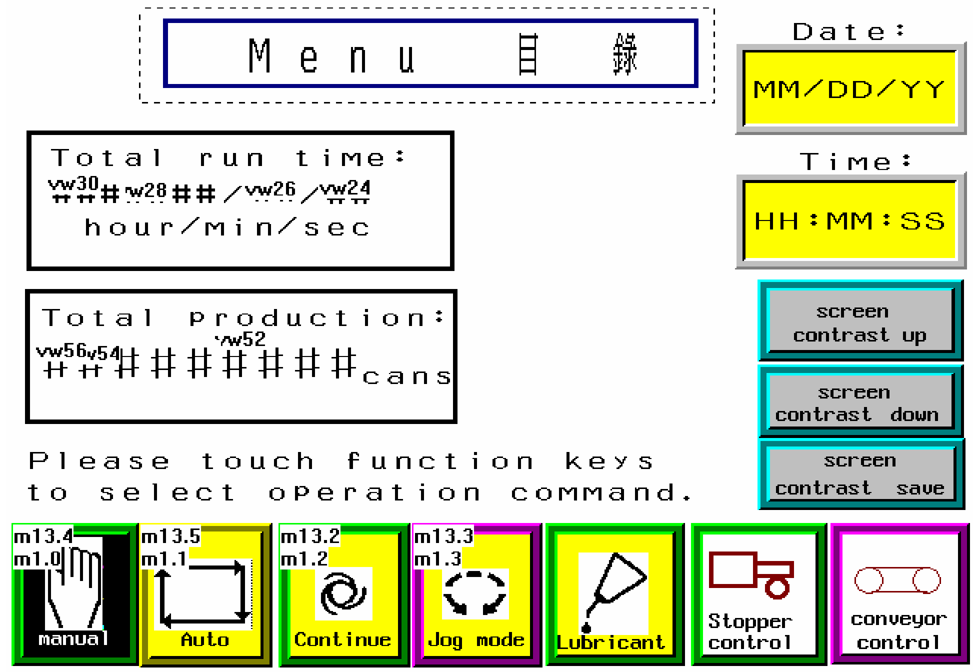


Figure 12.   An Example of the “Screen Overview” Print Option

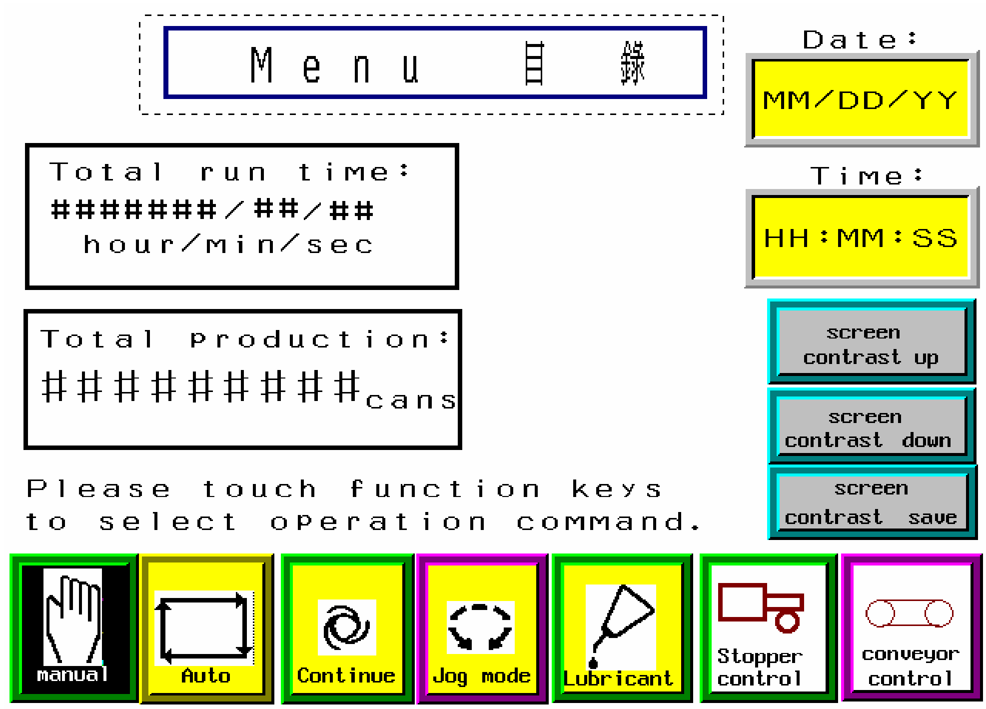


Figure 13. An Example of the "Screen Image" Print Option

2.2.5. [Upload Application] and [Download Application From]

[Upload Application] is to upload an application from a Workstation to a PC and the file will be saved as *.AF6. See Figure 14.

[Download Application From] is to download a program from a PC to a Workstation and the format of the file is *.AF6.

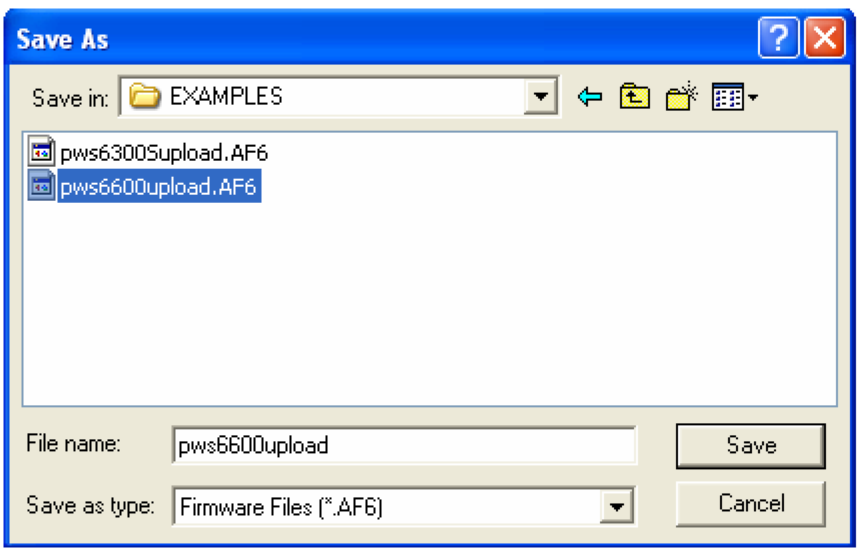


Figure 14. The [Upload Application] Dialog Box

2.2.6. [Upload Recipes] and [Download Recipes]

[Upload Recipes] is to upload recipes from the Workstation to a PC and the file will be saved as *.RCP. See Figure 15.

[Download Recipes] is to download recipes from a PC to a Workstation and the format of the file is *.RCP.

These functions are not applicable on every HMI model; please refer to Appendix A. - Table of the ADP 6.0 Features and the HMI Models for the complete details.

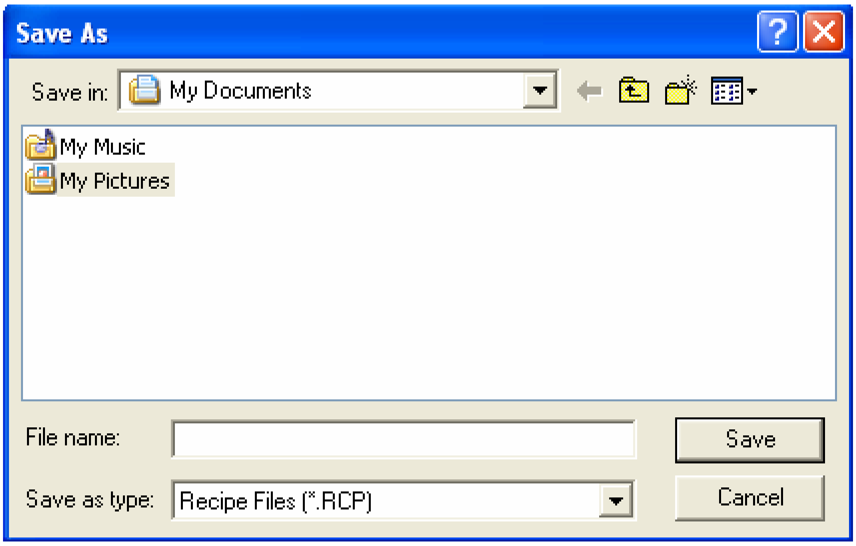


Figure 15. The [Upload Recipes] Dialog Box

2.2.7. [Reconstruct Source]

This function allows users to directly reconstruct a source file of an application via uploading the application file from an HMI to a PC.

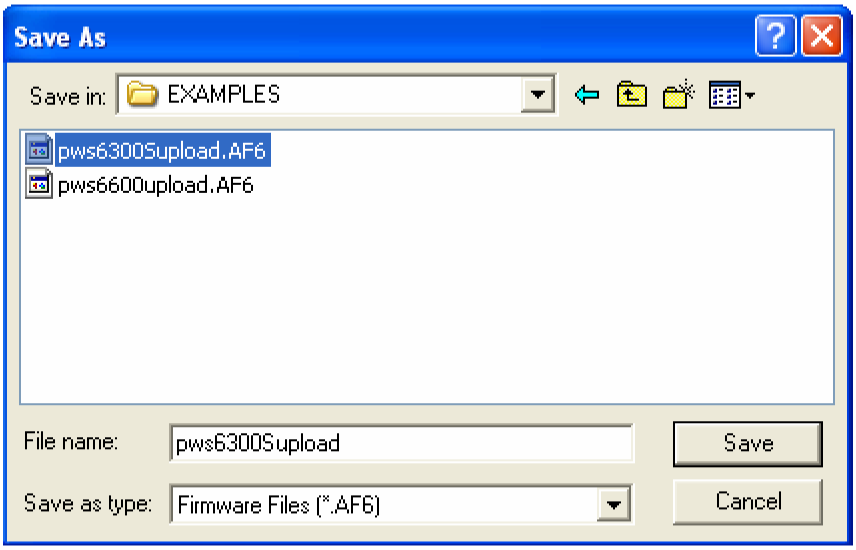
[Reconstruct Source] is to reconstruct an uploaded application file from *.AA6 to *.V6F. The application will be displayed on a PC and the source file (*.V6F) can be saved for the purposes of future editing and application.

In ADP 6.0 or later, an application downloaded to an HMI is "rebuilt-able"; [Reconstruct Source] enables a user to directly reconstruct a source file of an uploaded application on an HMI from *.AA6 to *.V6F.

The function is not applicable on every HMI model; please refer to Appendix A. - Table of the ADP 6.0 Features and the HMI Models for the complete details.

Steps to reconstruct a source file from *.AA6 to *V6F:
(Suppose that an application has been uploaded on the HMI.)

1. On the HMI, select [Upload Application]. In ADP, select [File]/[Upload Application]. The HMI will upload the application to the PC and the file is saved as *.AF6. See below.



2. Next, select [File]/[Reconstruct Source] and open the application file (*.C64 or *.AA6). Thus the application should be appeared on the PC and a user can save the source file as *.V6F for future use. See Figure 16.

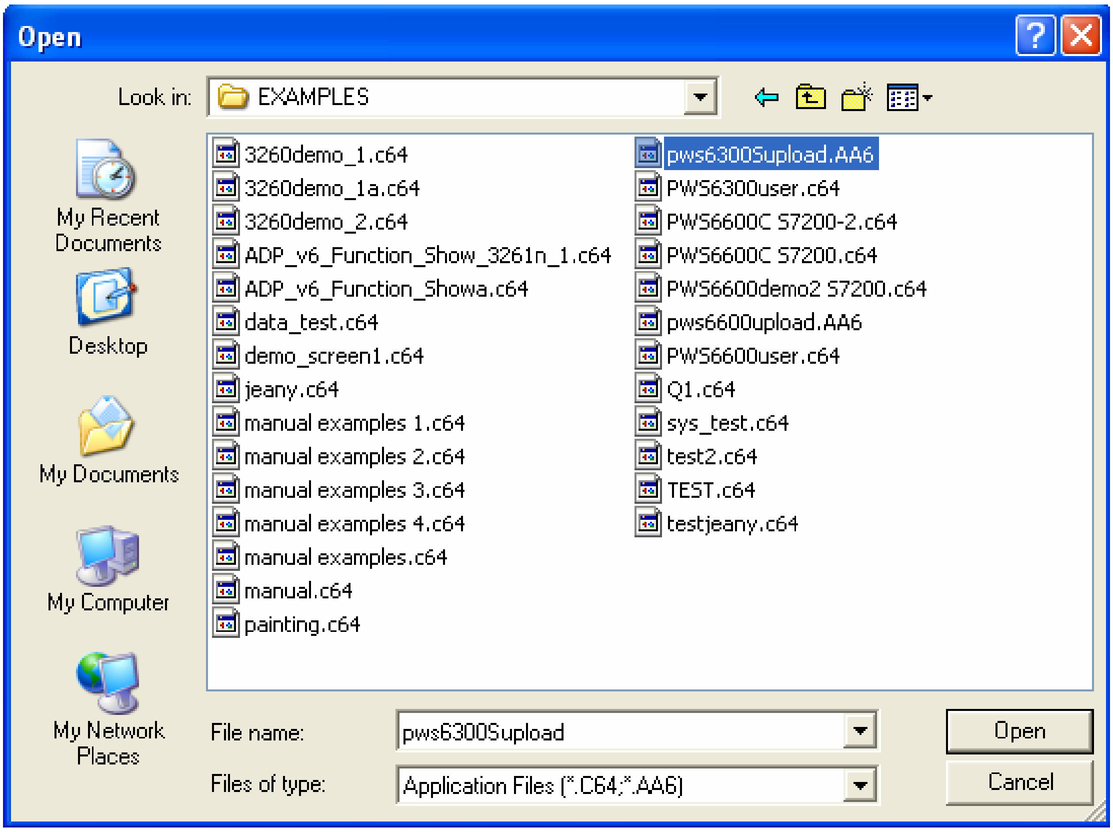


Figure 16. The [Reconstruct Source] Dialog Box

2.2.8. [Exit]

[Exit] is to close and leave ADP.

If any changes have been made, the following dialog box will appear on the screen to ask a user to save the changes or leave. See Figure 17.

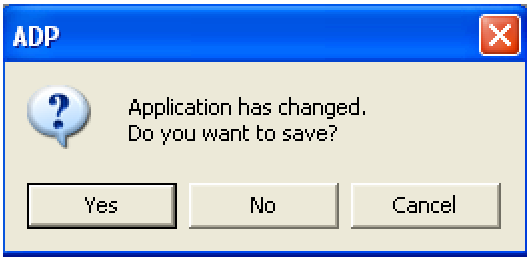


Figure 17. The [Exit] Dialog Box

2.3. Edit

The main purposes of the [Edit] menu include the common editing functions of ADP screen and objects. If a user does not open any image, all of light-colored items in the [Edit] are unavailable.

User can click the icons on the tool bar to speed edit or operate the elements on the list quickly by right-click the mouse.

The following sections will explain the functions more specific to the ADP software.

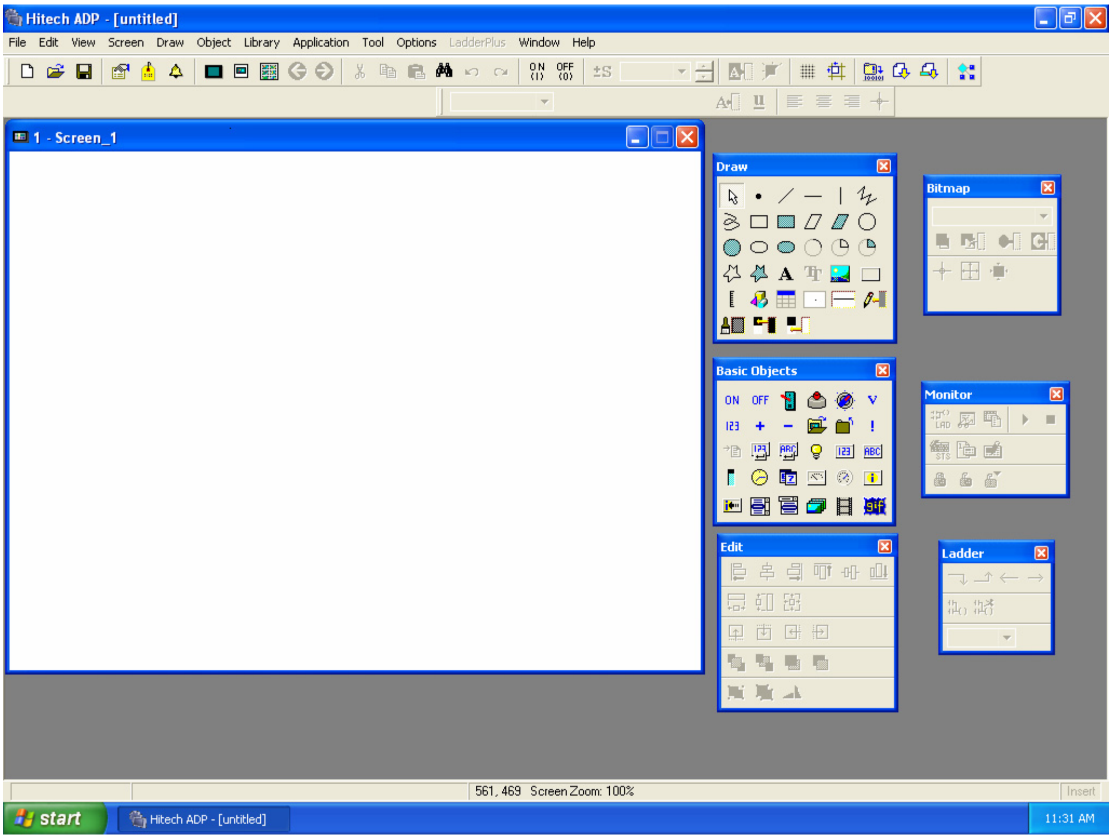


Figure 18. [Edit] Menu

2.3.1. [Duplicate]

Allows a user to make multiple copies of an object and simultaneously increment the corresponding addresses. See Figure 19.

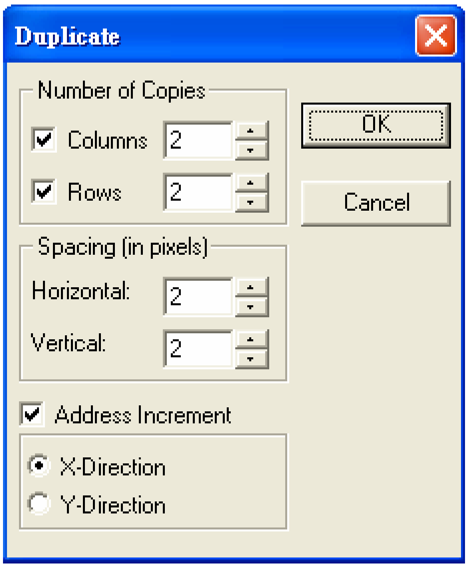


Figure 19. The [Duplicate] Dialog Box

- [Number of Copies]
- [Columns]：Specify number of columns to duplicate.
- [Rows]：Specify number of rows to duplicate.
- [Spacing]
- [Horizontal]：Specify how many pixels to space duplicate objects horizontally.
- [Vertical]：Specify how many pixels to space duplicate objects vertically.
- [Address Incremen]
- [X-Direction]：The address of the same dynamic objects increase from left to right.
- [Y-Direction]：The address of the same dynamic objects increase from up to down.

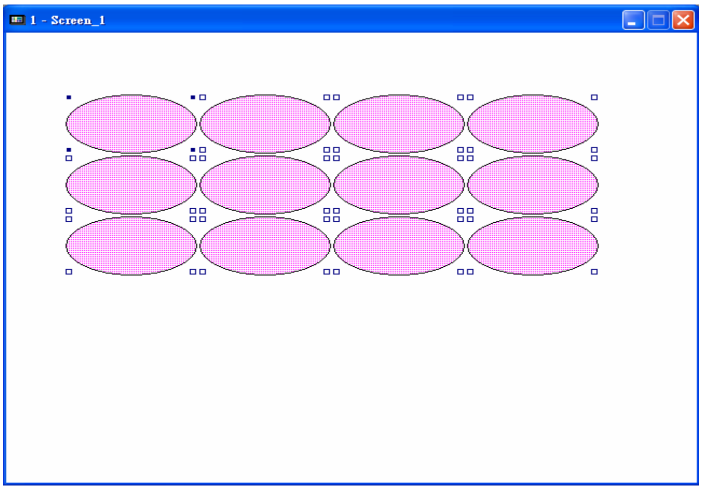


Figure 20. [Duplicate]

2.3.2. [Find/Replace Address] 

The main function is to find or edit the address in designed program; and replace the found address. While select [Edit]/[Find/Replace Address], the dialog box will display on the screen as Figure 21.

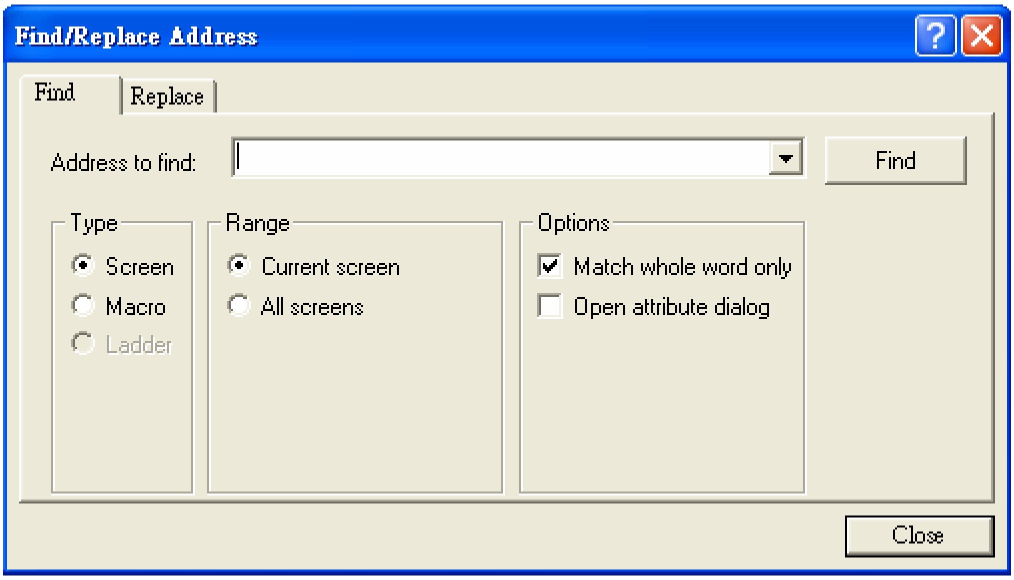


Figure 21. The [Find/Replace Address] Dialog Box

Enter the address in the blank space or select from drop-down list directly (Ex：D100); then press the [Find] button for search. The [Result] index tab displays a detailed list in accordance with the designated range and address. See Figure 22.

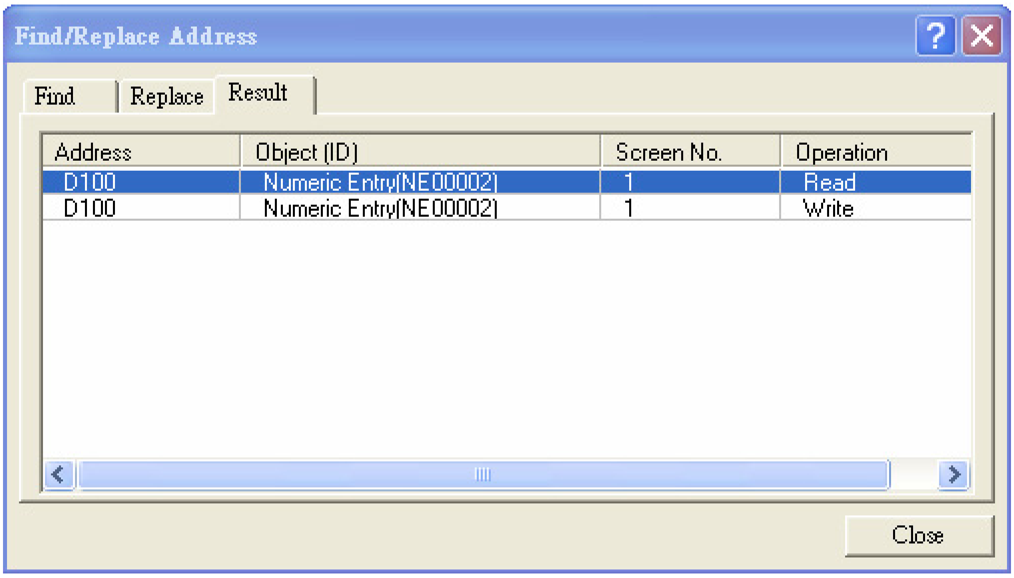


Figure 22. [Result] Index Tab

Select [Replace] button to replace the address to a new one. The function of [Replace] button is to replace the objects address one by one; select [Replace All] to replace all of the objects address at a time. See Figure 23.

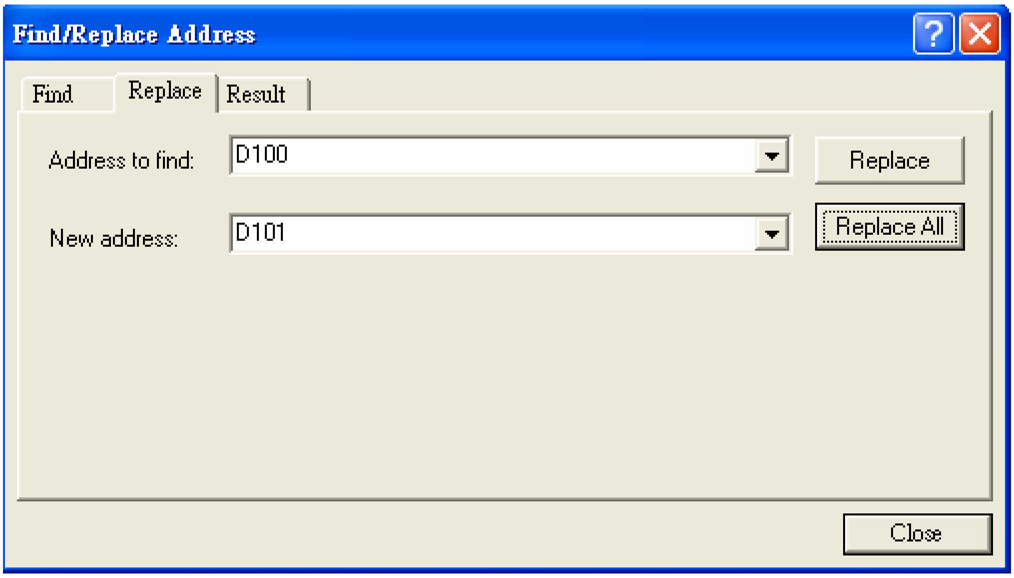


Figure 23. [Replace] Index Tab

I. Find Screen Address

Select [Type]/[Screen] to find the screen address. See Figure 24.

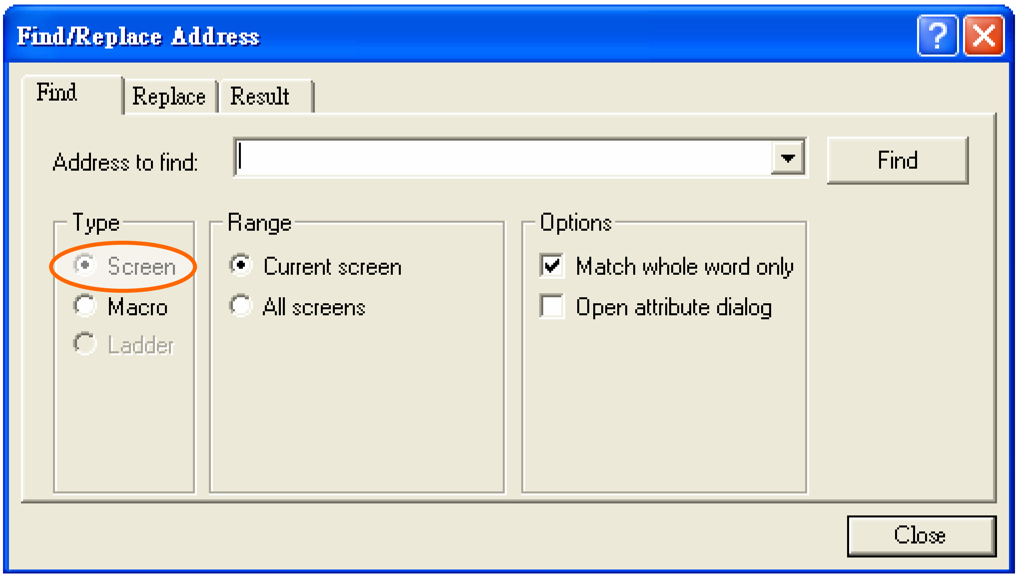


Figure 24. Find [Screen] Address

- [Range]：
  - ♦ [Current screen]：Only find the current open screen.
  - ♦ [All screen]：Finds the entire screens in application program.
- [Option]：
  - ♦ [Match whole word only]：The findings match the entry address entrirely. If this option is not selected, the initial findings match the entry address including the partial and entire match.
  - ♦ [Open attribute dailog]：To display the attribute of object by double-clicks on the list of [Result] index tab. If this option is not selected, the attribute of the object dialog box is unavailable.

II. Find Macro Address

Select [Type]/[Marcro] to find the macro address. See Figure 25.

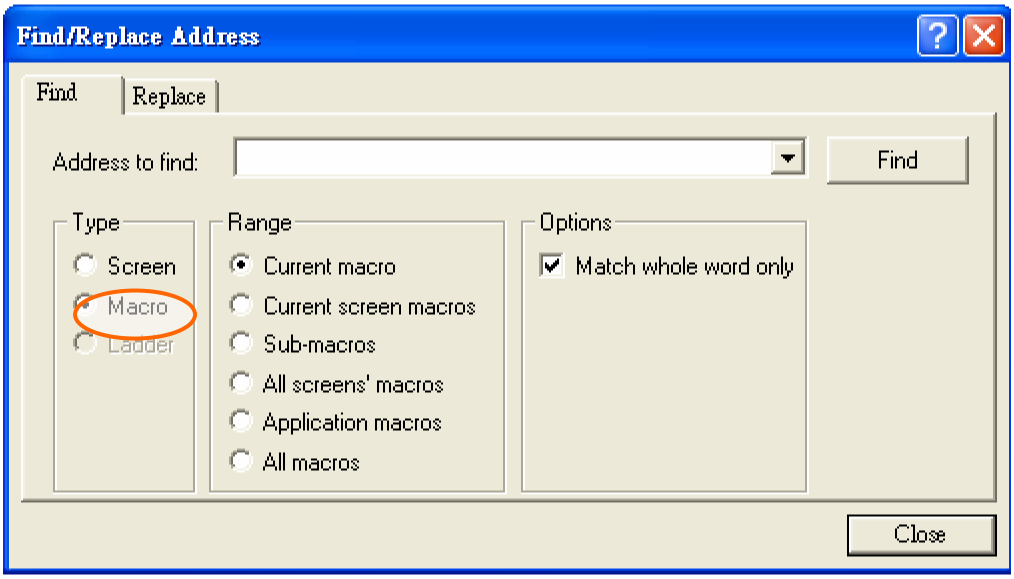


Figure 25. Find [Macro] Address

- [Range]：
  - [Current macro]：Finds current macro.
  - [Current screen macros]：Finds the current image/screen macros.
  - [Sub-macros]：Finds entire sub-macros.
  - [All screens' macros]：Finds entire image/screen macros.
  - [Application macros]：Finds three types of macros in [Application] menu.
  - [All macros]：Finds entire macros.
- [Option]：
  - [Match whole word only]：The fidings match the entry address entirely. If this option is not selected, the initial findings match the entry address including the partial and entire match.

2.3.3. [Decompose Shape] 

This function is mainly to decompose the graph created by [Shape] in the [Draw] command and each decomposed graph can be modified and edited. See Figure 26 and Figure 27.

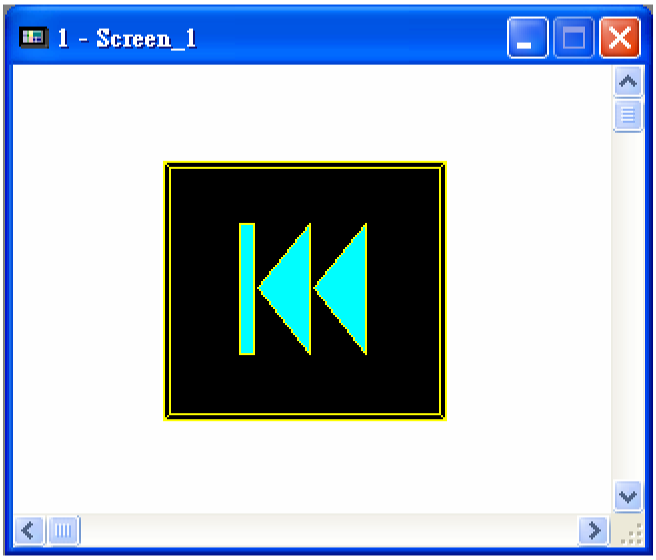


Figure 26. Select Graph in [Draw]/[Shape] for Edit

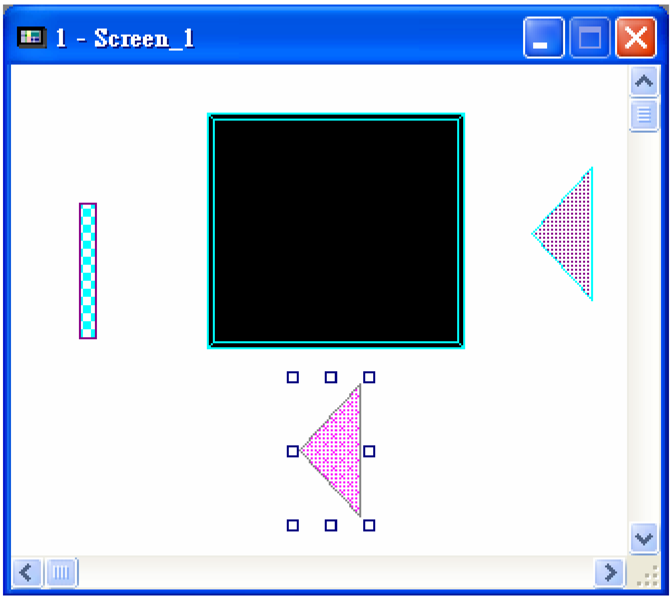


Figure 27. Select [Edit]/[Decompose] to Modify Each Decomposed Object

2.3.4. [Align] and [Make Same Size]

These two functions are mainly to align or make same size the designed objects. (Ex: Indicator, Moving Sign, Message Display, Lines, and so on) The followings are the steps for using these two commands：

1. Press [Shift] and left-click on all objects which be aligned or made same size. See Figure 28.

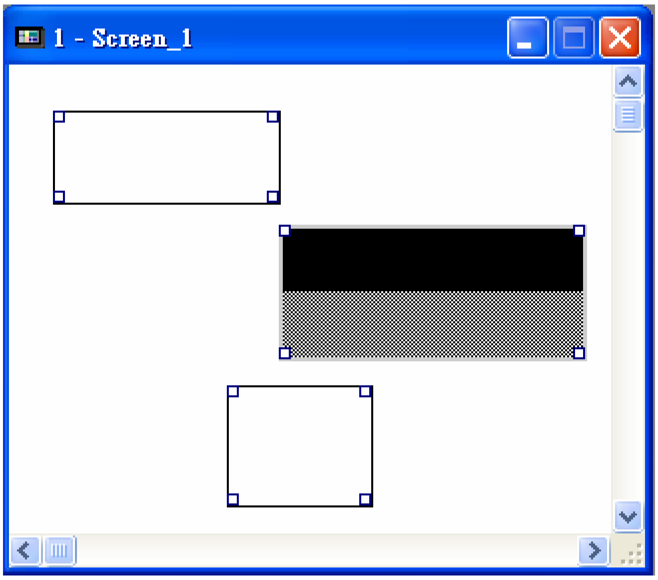


Figure 28. Step 1

2. Left-click on the master object, then four corners of this master object should be shaded. See Figure 29.

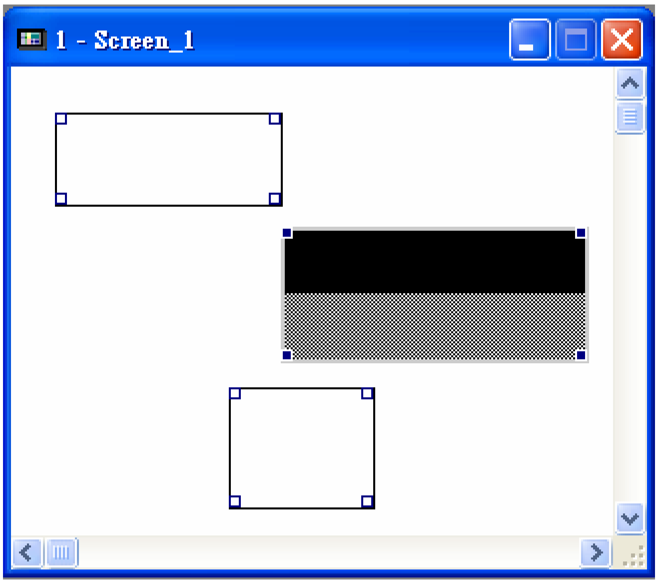


Figure 29. Step 2

3. Select the command in [Align] or [Make Same Size] to make the other objects align or make same size with the 'master' object. See Figure 30.

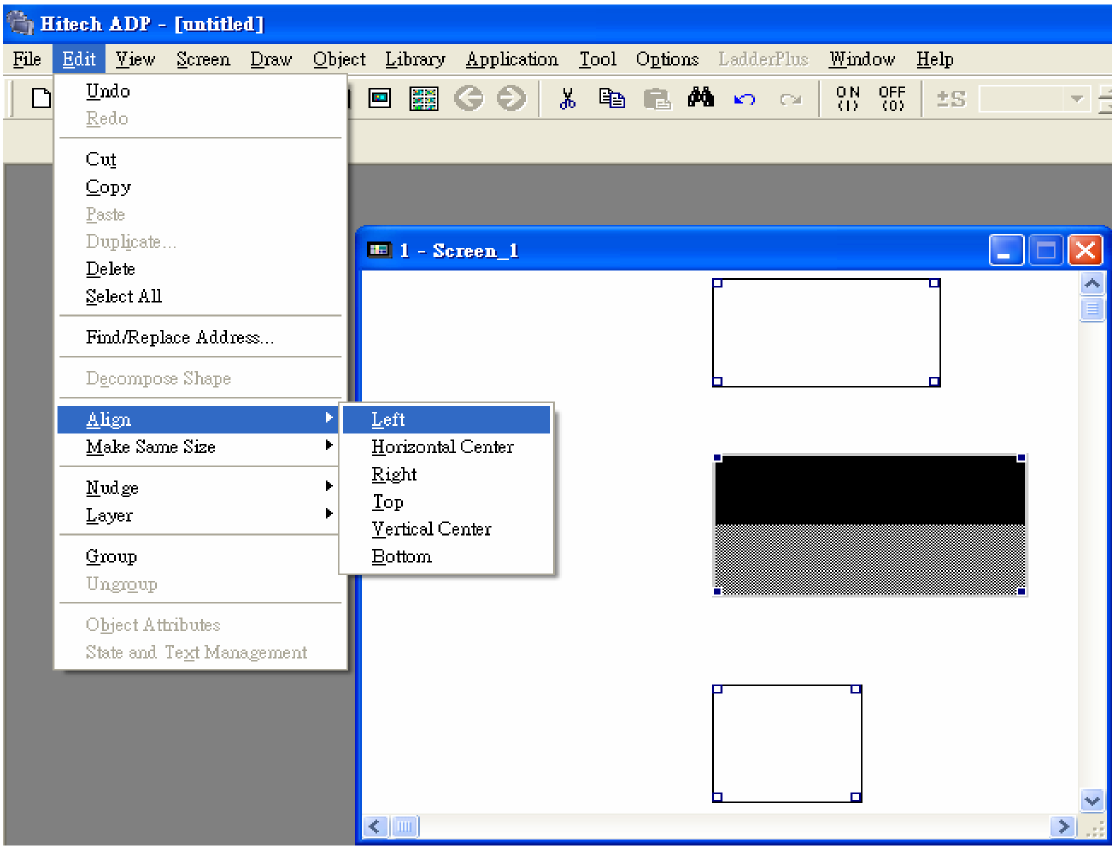


Figure 30. Step 3

2.3.5. [Nudge] and [Layer]

[Nudge]: Choose the objects for slight shift and adjustment toward appointed direction.

[Align]: If there are more than two objects, users can move the objects up-down layer. See Figure 31; Figure 32.

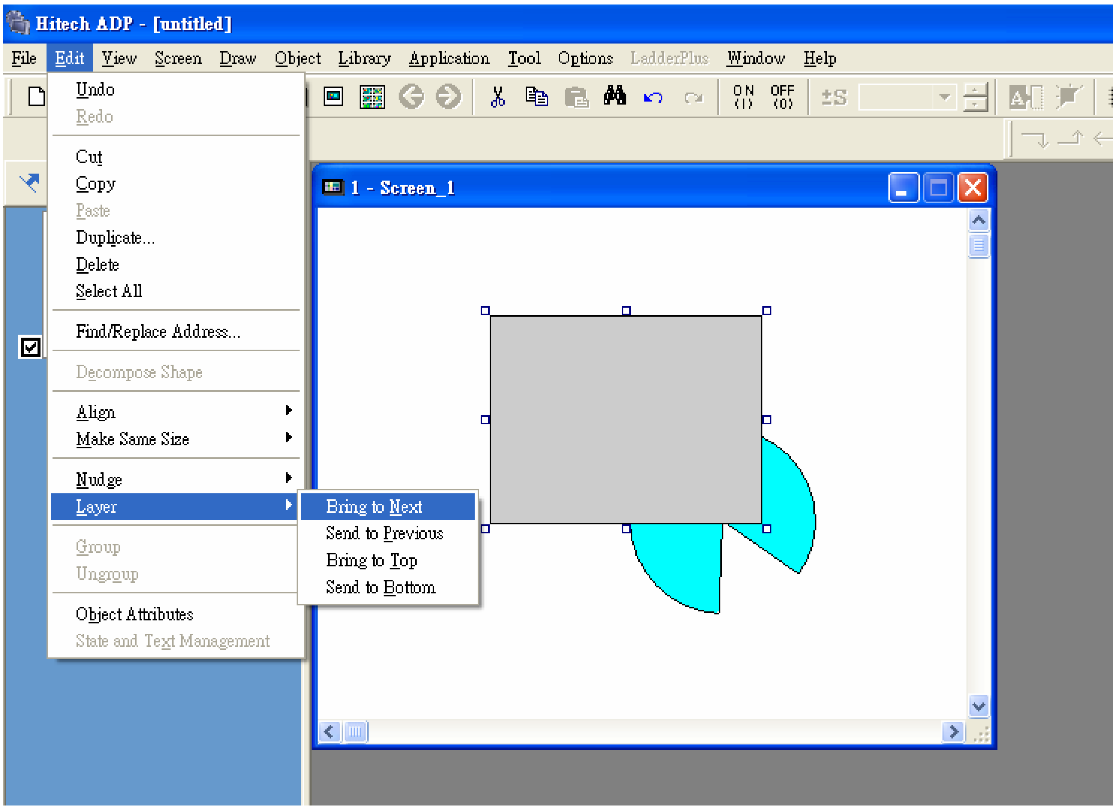


Figure 31. [Layer]/[Bring to Next] Command Makes Rectangle Graph Top

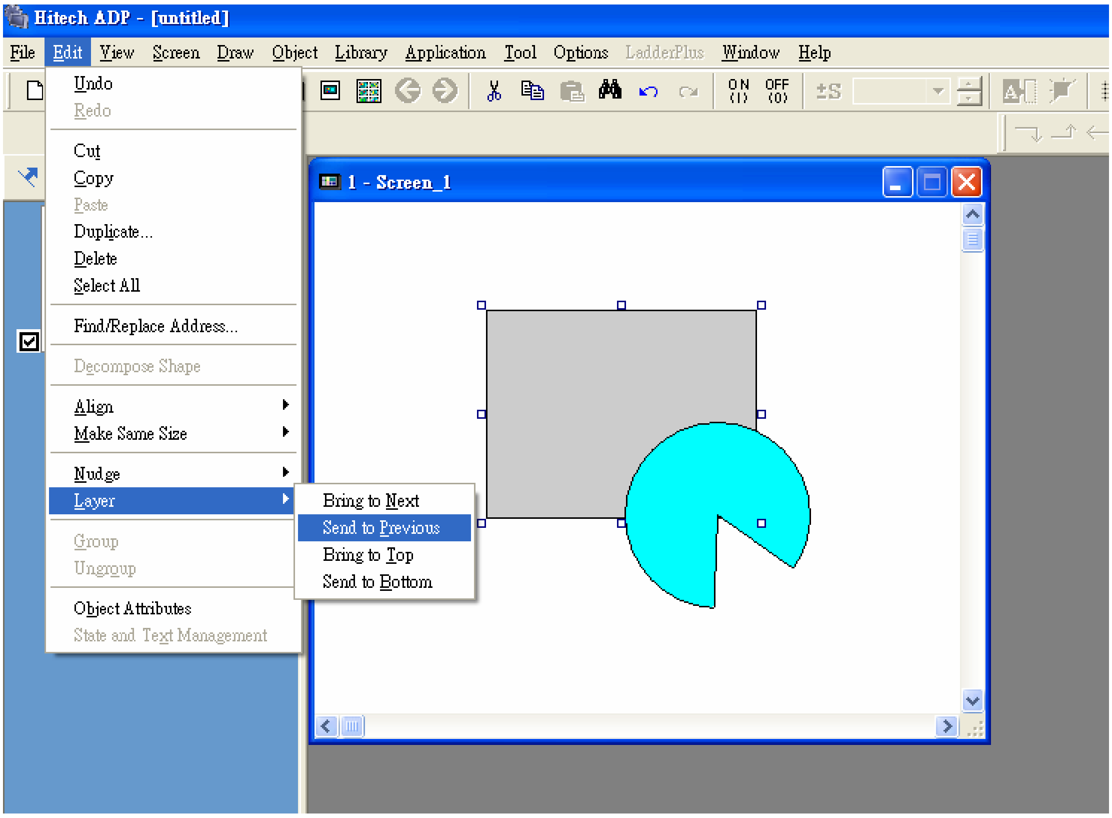
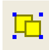
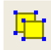


Figure 32. [Layer]/[Send to Previous] Makes the Rectangle Graph Buttom

2.3.6. [Group]  及 [Ungroup] 

If there are more than two graphs or objects in the screen for edit; frame (Shift + Left-click) all of objects which be moved and then select [Group]. All of the framed objects will be move to appointed position together as a single unit. See Figure 33.

[Ungroup] is to upgroup the selected group of objects.

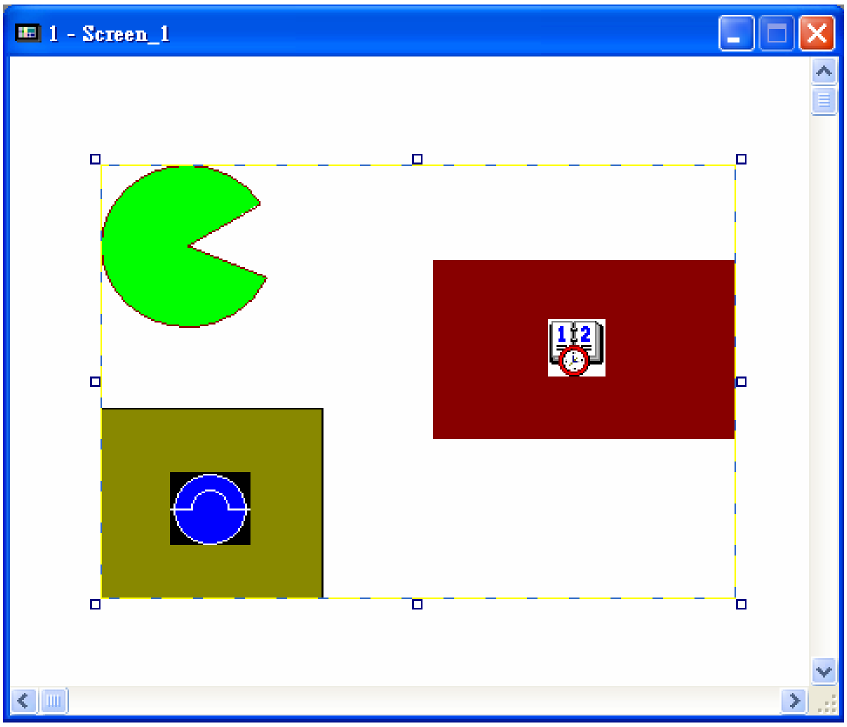


Figure 33. Select [Edit]/[Group] to Move the Selected Objects Together

2.3.7. [Object Attributes]

User can edit the content of the objects or modify data location and formats associated with PLC.

Note that different objects (ex: Push Button, Indicator, Moving Sign, Massage Display, and so on) have their own object attributes. See Figure 34 and Figure 35.

Left-click on the object and then select [Edit]/[Object Attributes], the dialog box will be displayed on the screen;or double left-click on the objects directly as well. For the properties which are not explained in this section, please refer to the section 2.7 Object.

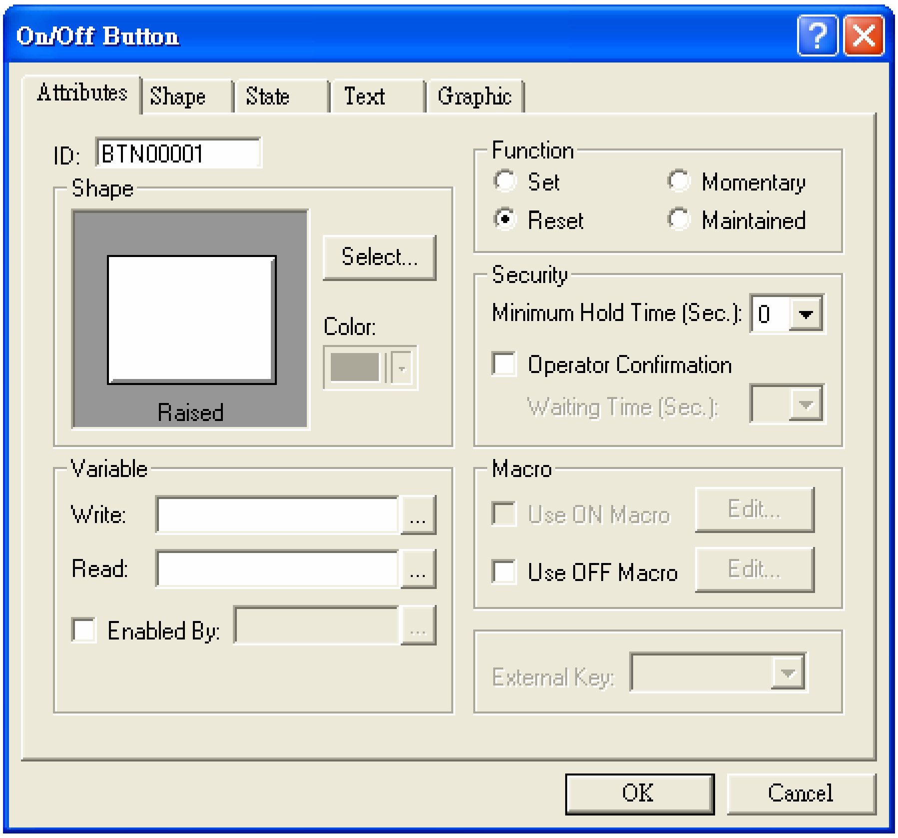


Figure 34. The [ON/Off Button] Object Attributes Dialog Box

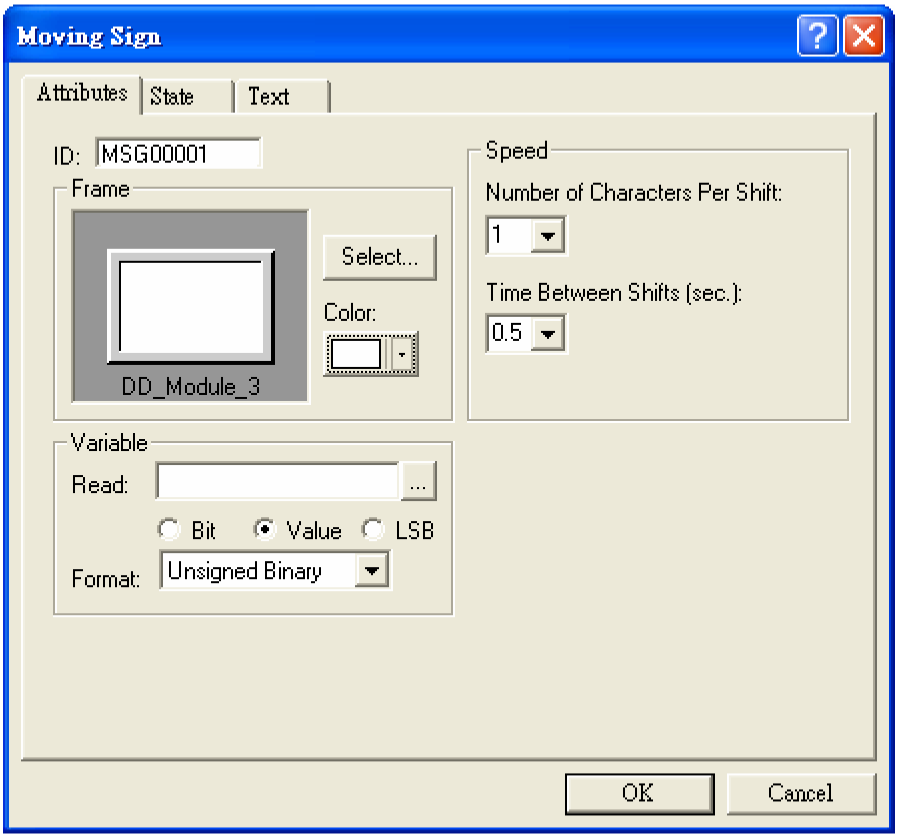


Figure 35. The [Moving Sign] Object Attributes Dialog Box

2.3.8. [State/Text Management] 

The main purposes of the [State/Text Management] include editing text, color, type revealed in designed object.Simutaneously, this object also supply users with easier operation such as the functions of copy, modify, line feed, and so on. See Figure 36.

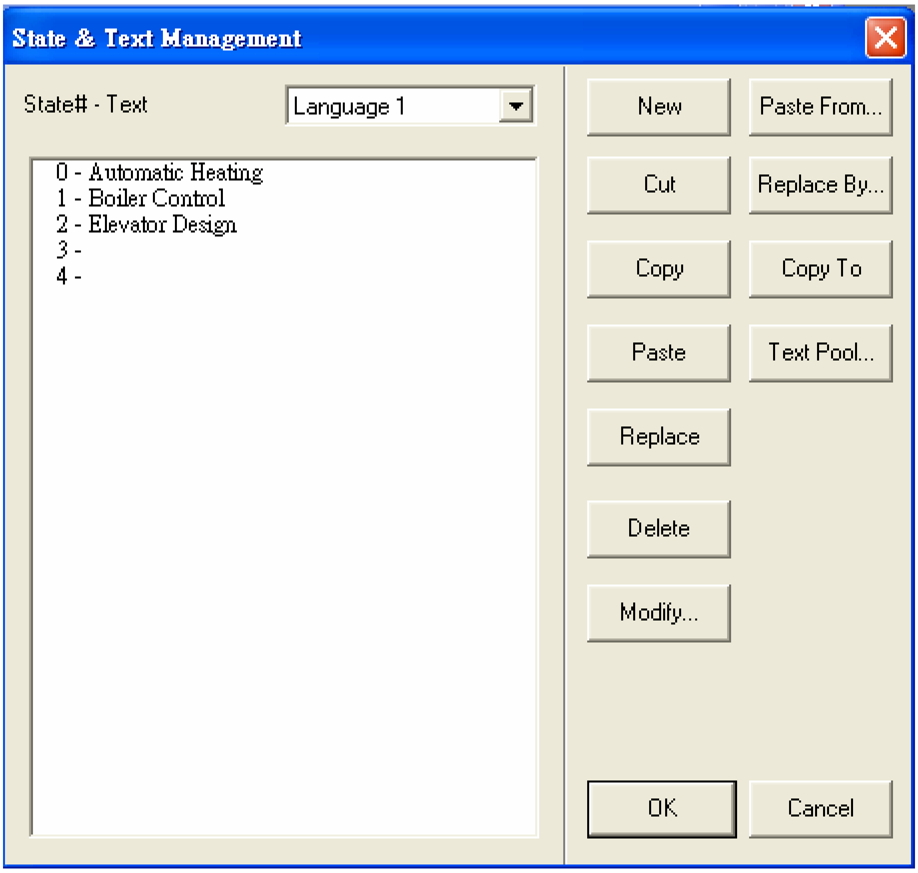


Figure 36. The [State/Text Management] Dialog Box

2.3.9. Focal Mark Style

As select [Focal Mark Style], there are five types for selection: [None], [Still Lines],[Circulating Lines],[Circulating Dots],[Swaying Dots]. See Figure 37.

This function is not limited by any application images or files, it will modify edit environment in ADP.

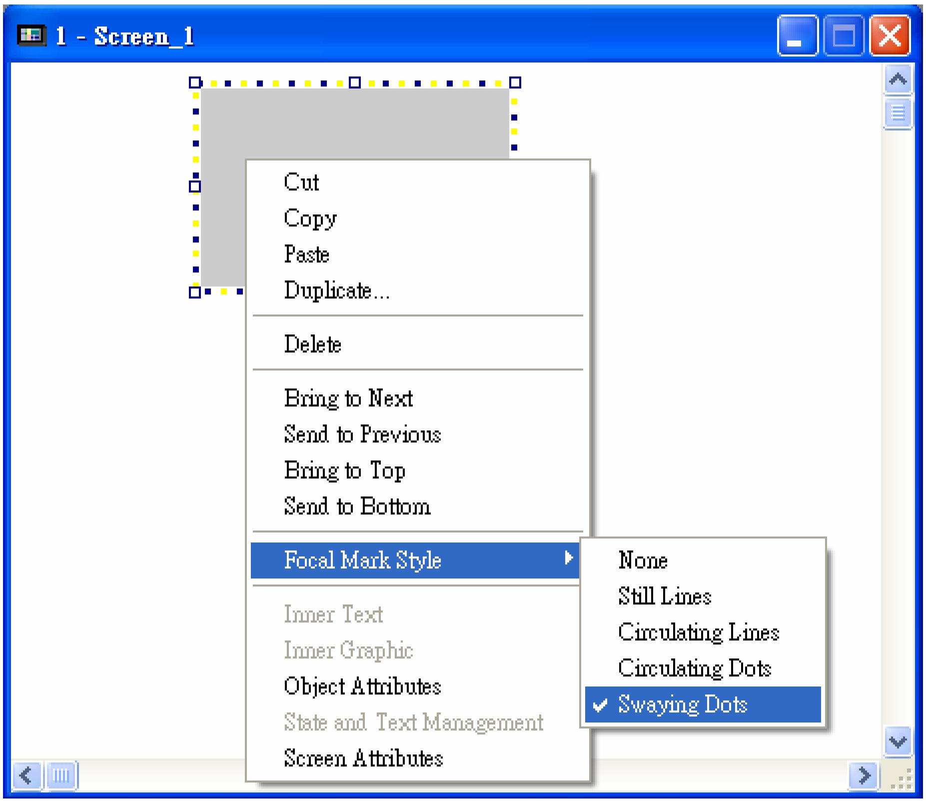


Figure 37. The [Focal Mark Style] list

Figure 38 is an illustration of objects with focal mark:

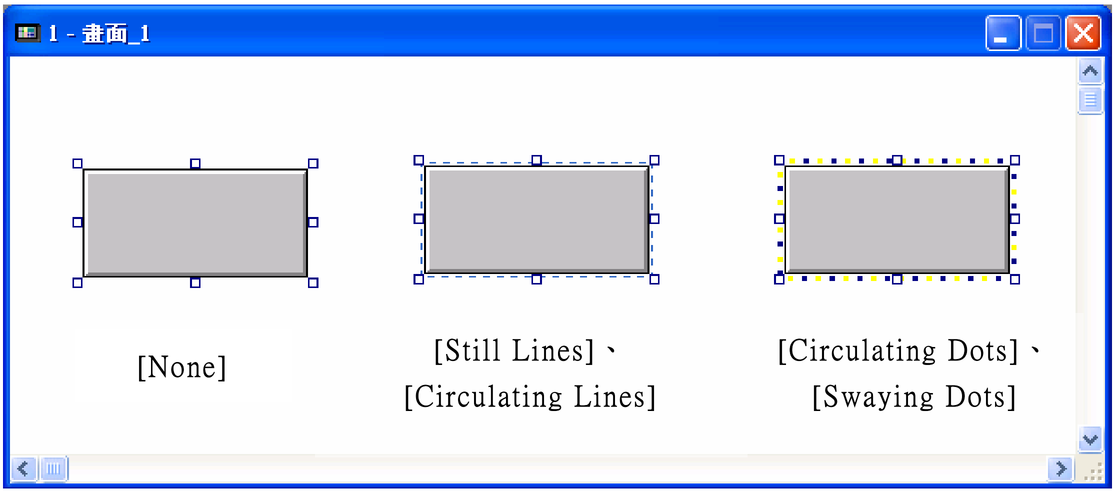


Figure 38. An Illustration of objects with focal mark

2.3.10. Common Attributes

This function is easier to edit objects simantaneously with common attributes. User can modify attributes of objects which are in a screen at a time.

First, select the objects to be edited at a time. The dialog box of

[Focal Mark Style] will be displayed on the screen by double-click on one of objects. See Figure 39.

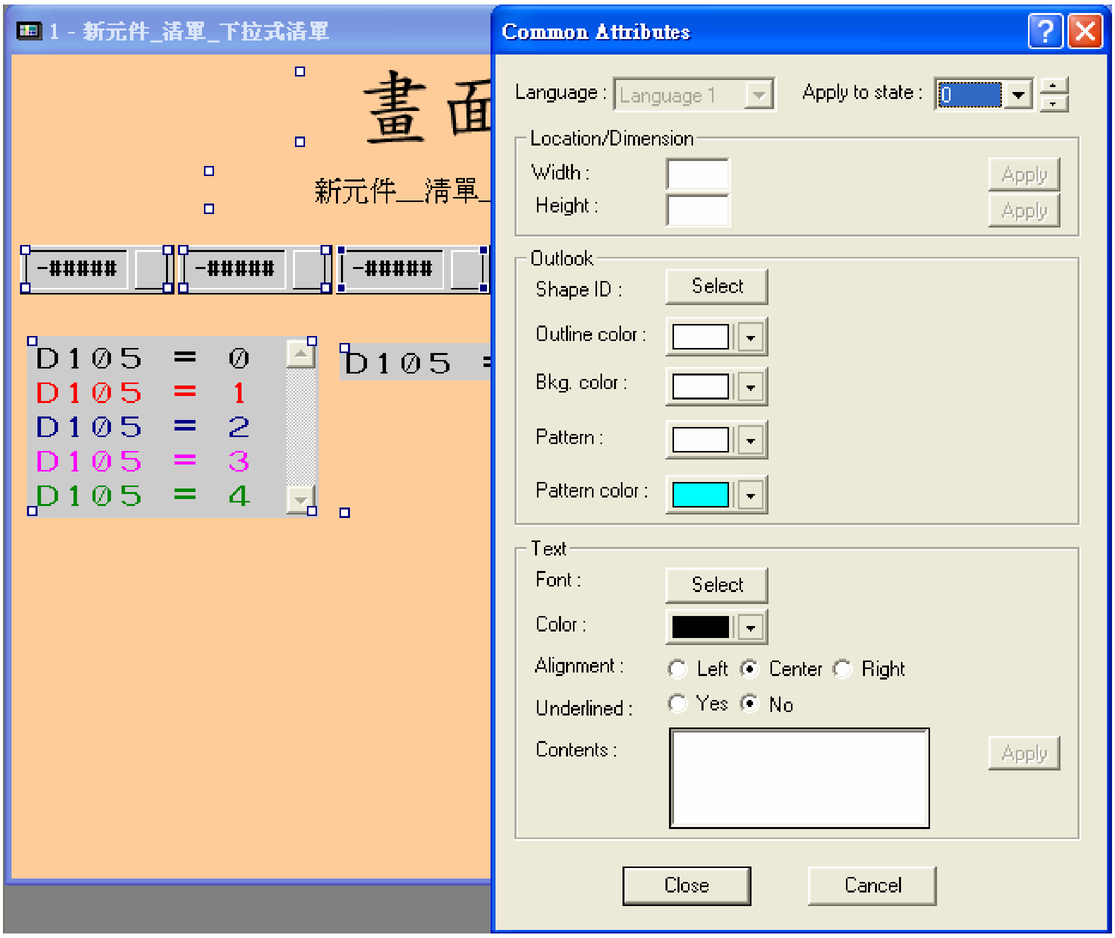


Figure 39. Open [Common Attributes] Dialog Box

User can edit the common attributes of selected objects such as location/dimension, outlook, and text. See Figure 40.

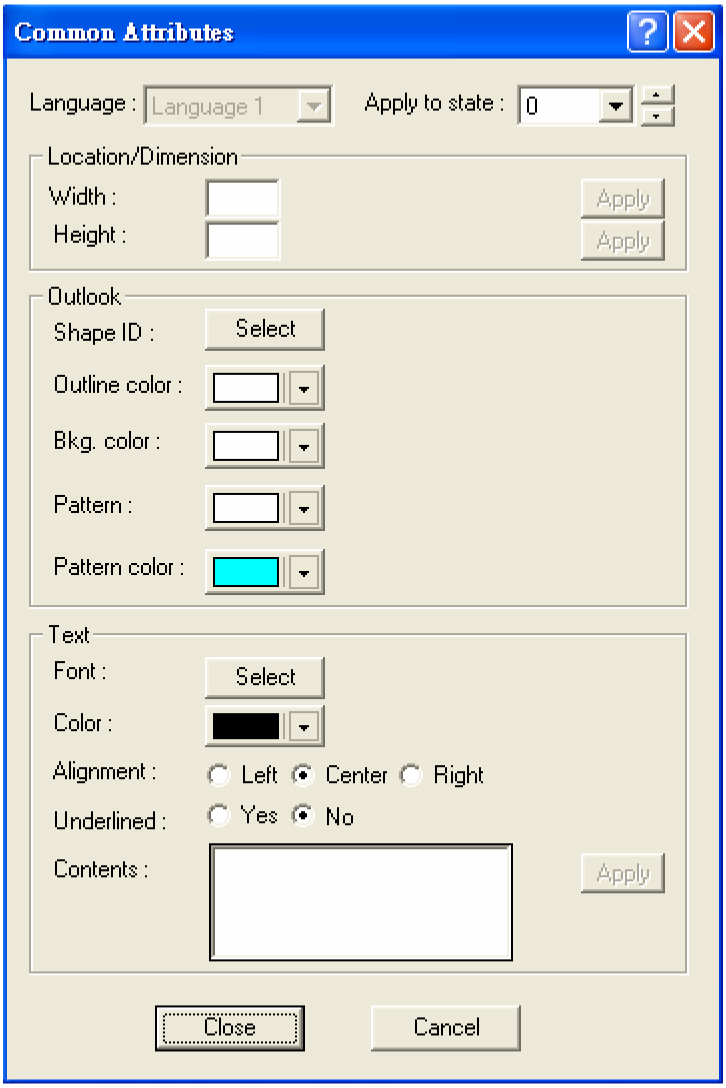


Figure 40. The [Common Attributes] Dialog Box

Option:

- [Language]：Specify language of the selected objects to reveal.
- [Apply to State]：Specify the state of the selected objects. User can edit different states in this list.
- [Location/Dimention] Block：Specify the width and height of the objects. Press [Apply] button to modify.
- [Outlook] Block：Specify the outlook of selected objects.

[Shape ID]：Specify the shape of different objects. While press [Select] button, the dialog box will be appeared on the screen as Figure 41. While the selection have made, the dialog box will be appeared on the screen as Figure 42. Then, a user can select next objectes to design.

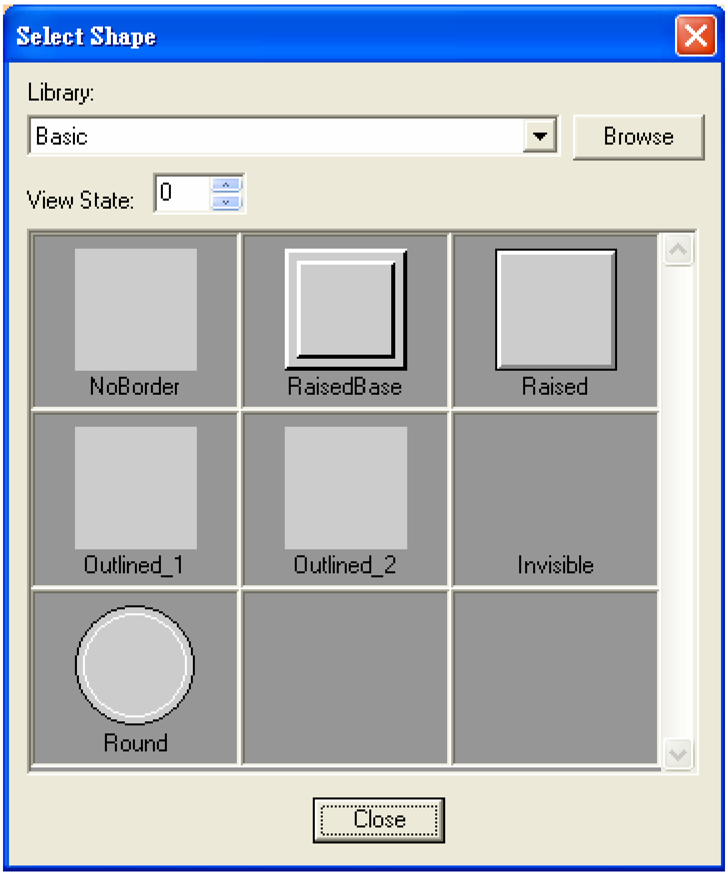


Figure 41. Specify the Shape of Object

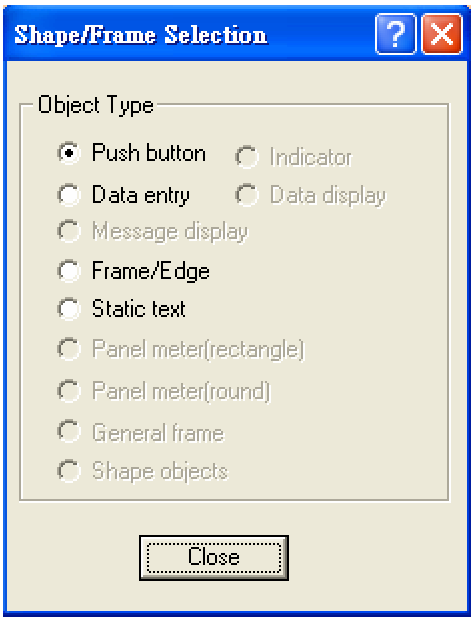


Figure 42. Select Objects to Be Designed

- [Outline Color]：Specify the outline color of all the selected objects.
- [Background Color]：Specify the background color of all the selected objects.
- [Pattern]：Specify the pattern of all selected objects which can

be set.

- [Pattern Color]：Specify the pattern color of all selected objects which can be set.

- [Text] Block：

  - [Font]：Specify the font of the text to different objects. While select [Selection] button, the dialog box will be appeared as Figure 43. User can specify the font of text to different types of objects. Remember to press [Apply] button for set up.

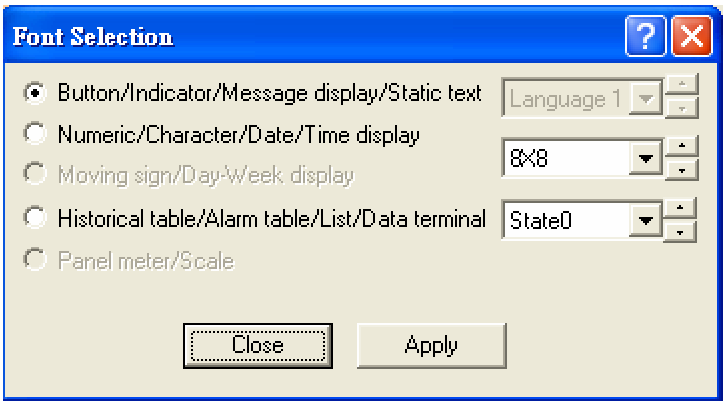


Figure 43. Specify the Font of the Text to Objects

  - [Color]：Specify the color of the text to all selected objects.
  - [Alignment]：Specify the alignment type of the text to all selected objects.
  - [Underlined]：Specify the text of all selected objects unferlined or not.
  - [Contents]：Specify the contents of the text to all selected
  - objects. Remember to press [Apply] for set up.

2.4. View Menu

The main purposes of the [View] menu include the managing functions of “whole screen”, “whole screen with I/O labels”, “five language selections”, “zoom in/out” and “eight kinds of toolbars”.

2.4.1. [Whole Screen] and [Whole Screen With I/O Lables]

[Whole Screen]: To view the whole screen of all edited objects with whole screen. User can return to previous view by left-click.

[Whole Screen With I/O Lables]: To view the whole screen with dynamic objects with write/read addresses on the top of left side displayed. User can return to the previus view by left-click. See Figure 44.

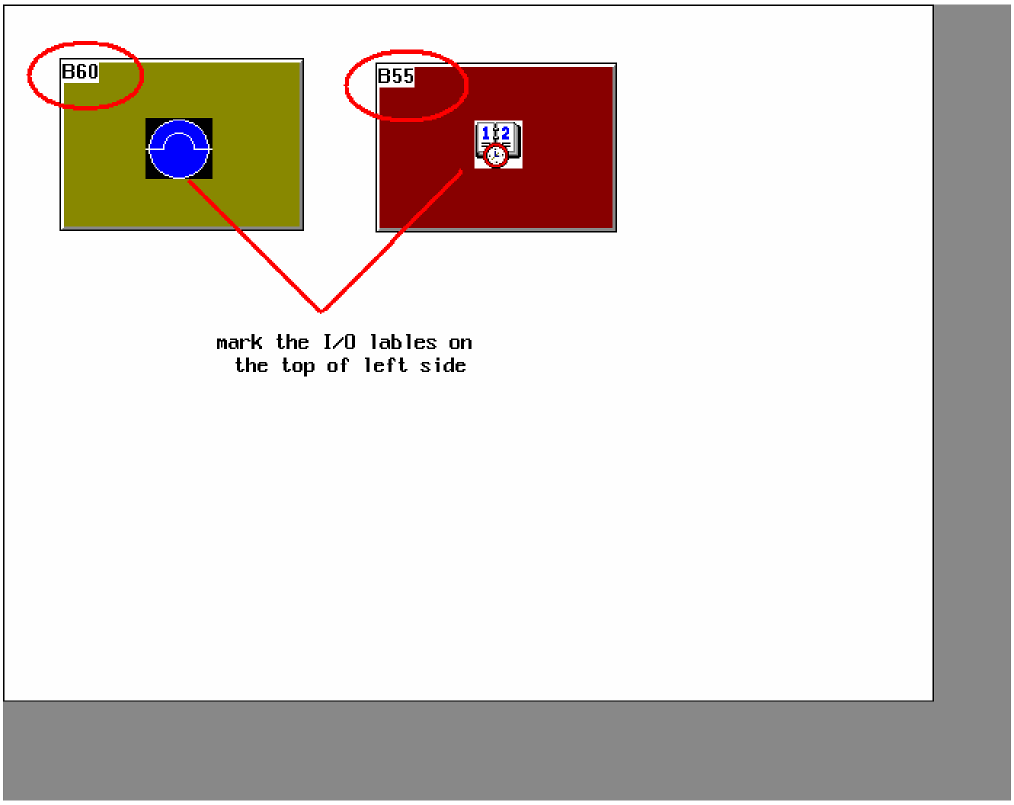


Figure 44. The Displayed Image of [Whole Screen With I/O Lables]

2.4.2. [Language 1-5]

There are five languages for user to switch ,please follow the steps below to setup [Language] command：

1. Select [Application]/[Workstation Setup]. The [Application Properties] dialog box will appear on the screen. See Figure 45.

2. On the [Gerneral] tab, check the [Multi-lingual Support] box to start setup. See Figure 45.

[Number of Languages]: Specify the number of languages to application program needed, there are five languages for selection.

[Select Language]: Specify the languages for use.

[Startup Language]: Specify the startup language to display on the screen open. User can select on the [View] menu directly for language switch of designed screen later.

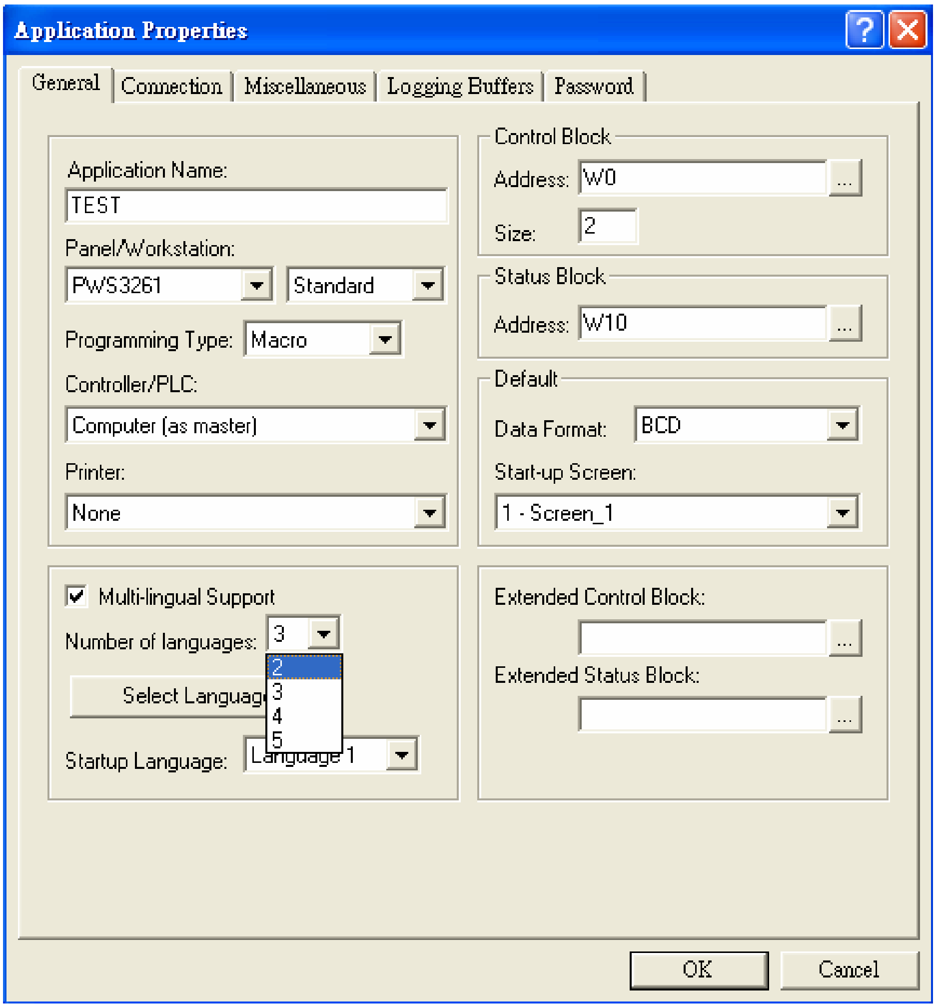


Figure 45. The [Application Properties] Dialog Box

2.4.3. [Zoom In], [Normal] and [Zoom Out]

[Zoom in]: To enlarge the image size by percentage selected 150%, 175%, 200%, 250%.

[Normal]: To adjust the image size to actual size of the screen.

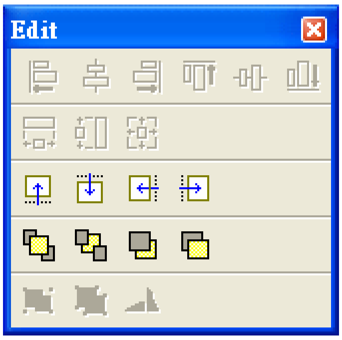
[Zoom Out]: To narrow the image size by percentage selected 75%, 50%, 25%.

2.4.4. Toolbar

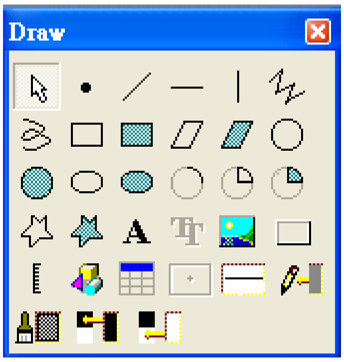
There are eight kinds of toolbars on the [View] menu. A User can decide to display the toolbars for quick-operation or not. The toolobars are shown as the following：

[Standard Toolbar]:

[Edit Toolbar]:

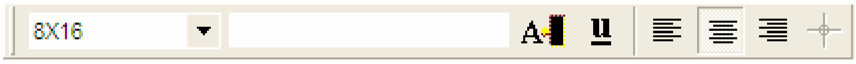


[Draw Toolbar]:



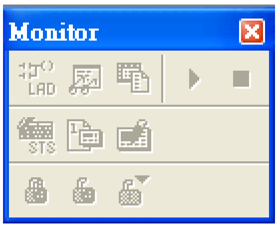
[Basic Object Toolbar]:

[Text Toolbar]:

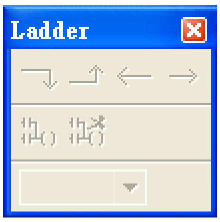


[Bitmap Tool-bar]:

[Monitor Toolbar]:



[Ladder Toolbar]:



2.5. Screen Menu

The main purposes of [Screen] menu are to name, number, edit and manage screens. The following sections will explain these commands in details.

2.5.1. [New Screen] 

Select to create a new screen.

In the [Name] blank, enter name for a new screen. Also, in the [Number] blank, enter screen number. See Figure 46.

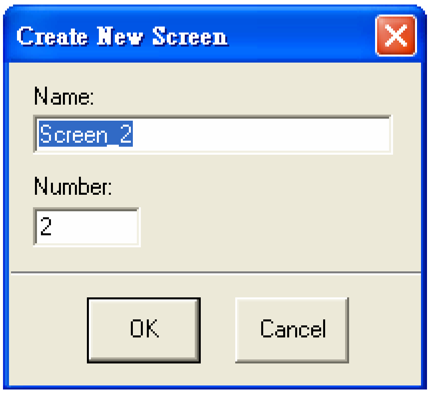


Figure 46. The dialog box of [Create New Screen]

2.5.2. [Screen Manager] 

The functions of the [Screen Manager] command are to display all of the application files in detail view or thumbnail view convient a user to search, modify, edit, and so on. Select [Screen]/[Screen Manager] or click  directly，the whole screen of [Screen Manager] will be displayed in the middle of window or minimized in left-side, See Figure 48.

In [Screen Manager] windows, click the no. or name to display the selected screen. If a user wants to open the image, just click the left key of mouse twice.

2.5.2.1. Icons in [Screen Manager]

[Screen Manager] icons provide functions of new screen, screen properties, edit, and management convenient for a user to operation. The following will explain those icons; See below:

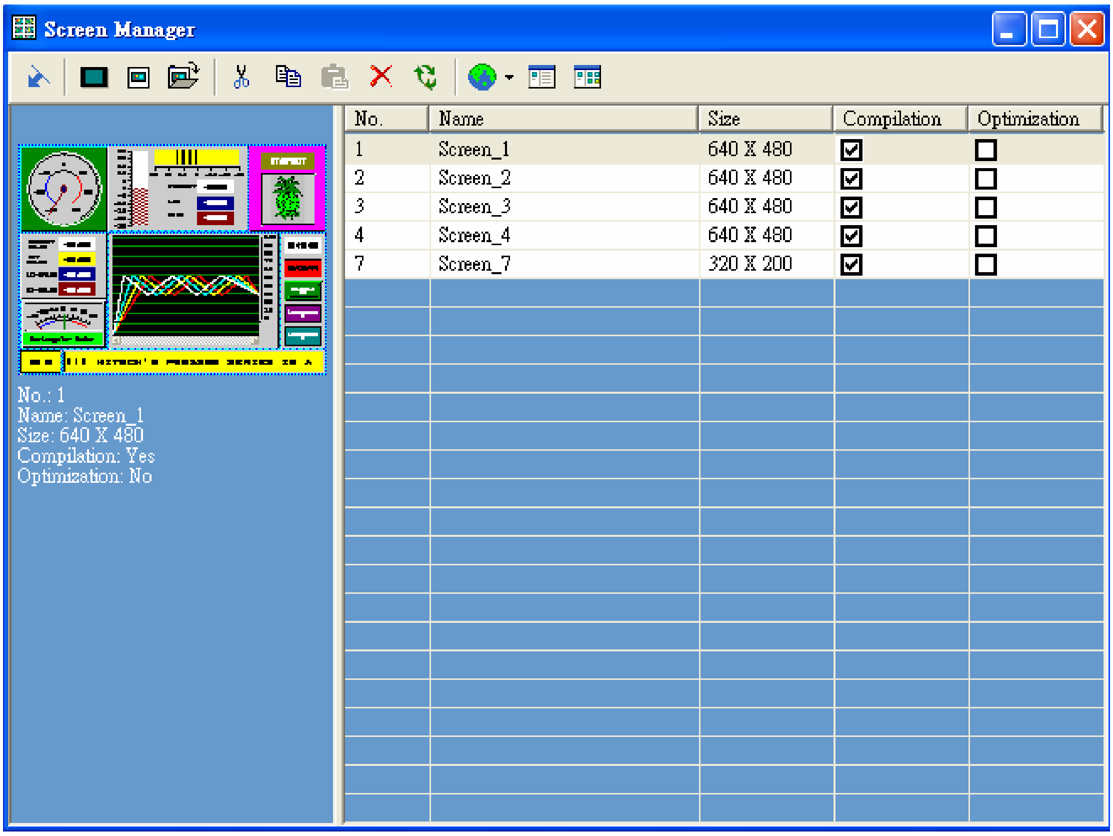
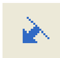
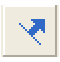
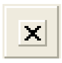
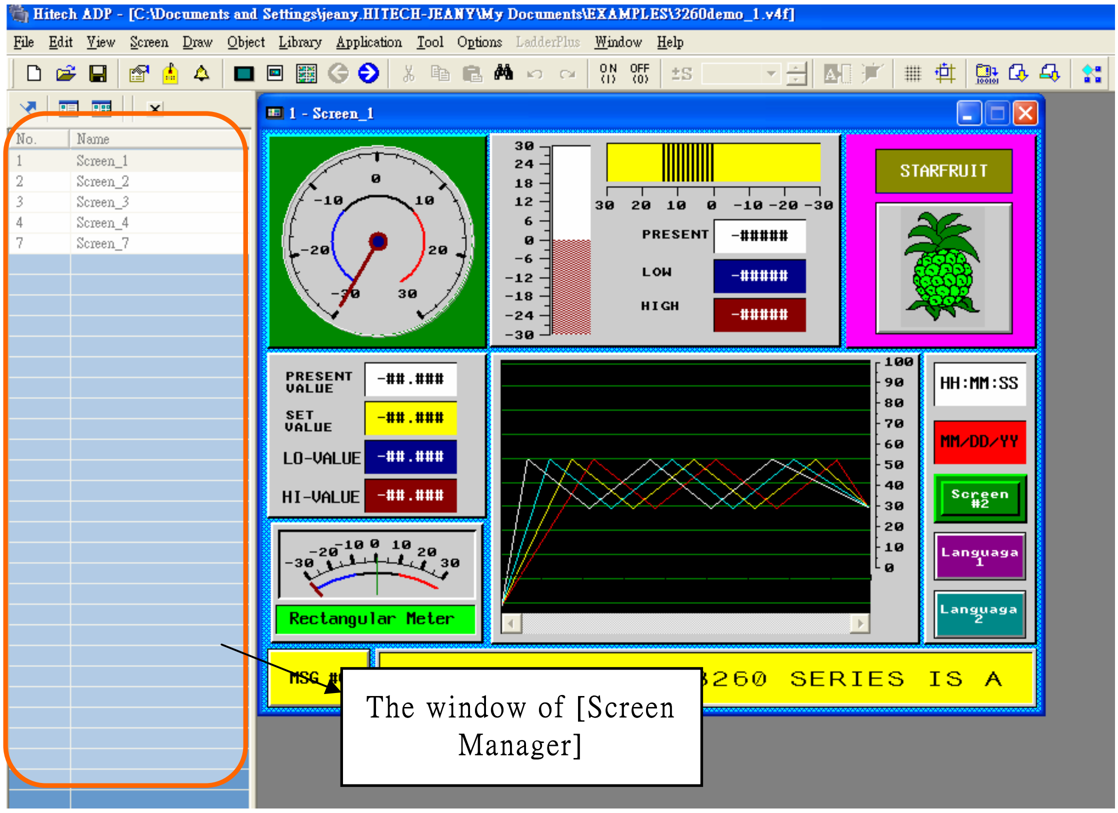
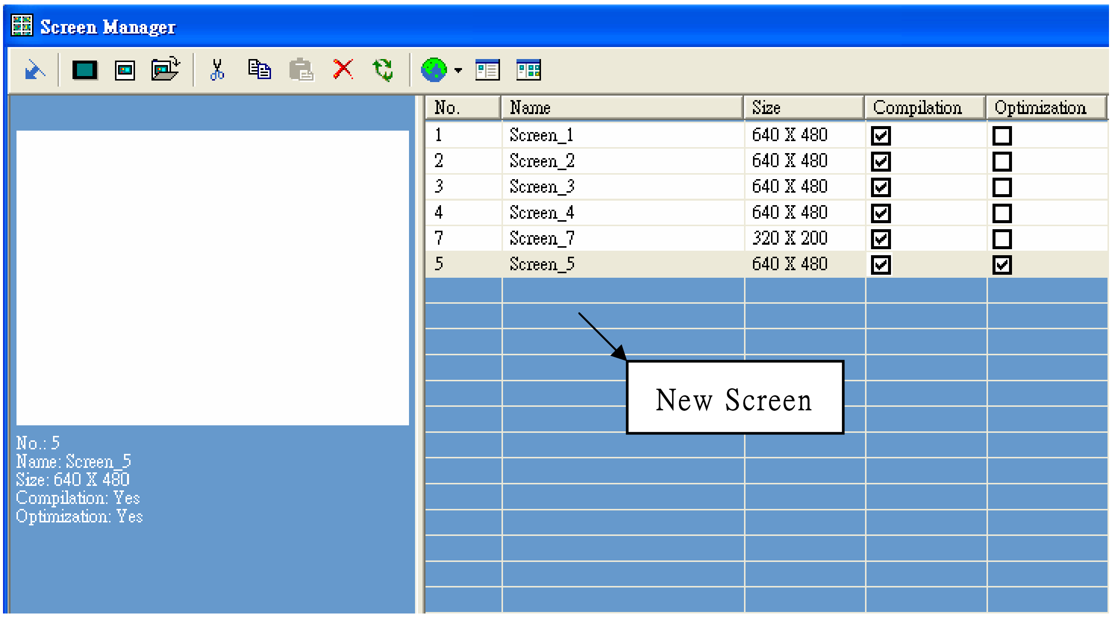


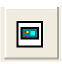
Figure 47. [Screen Manager]

-  [Dock]: The window of [Screen Manager] will be minimized in the left side, See below. In the window of [Dock], the icons are simplized to four below in the [Screen Manager]:  [Undock] is to return the window of [Screen Manager] to whole screen in the middle side;  [Close Screen Manager] is to close the window of [Screen Manager];  [Detail View] and  [Thumbnail View] are different ways to display the screen data.

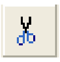
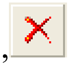


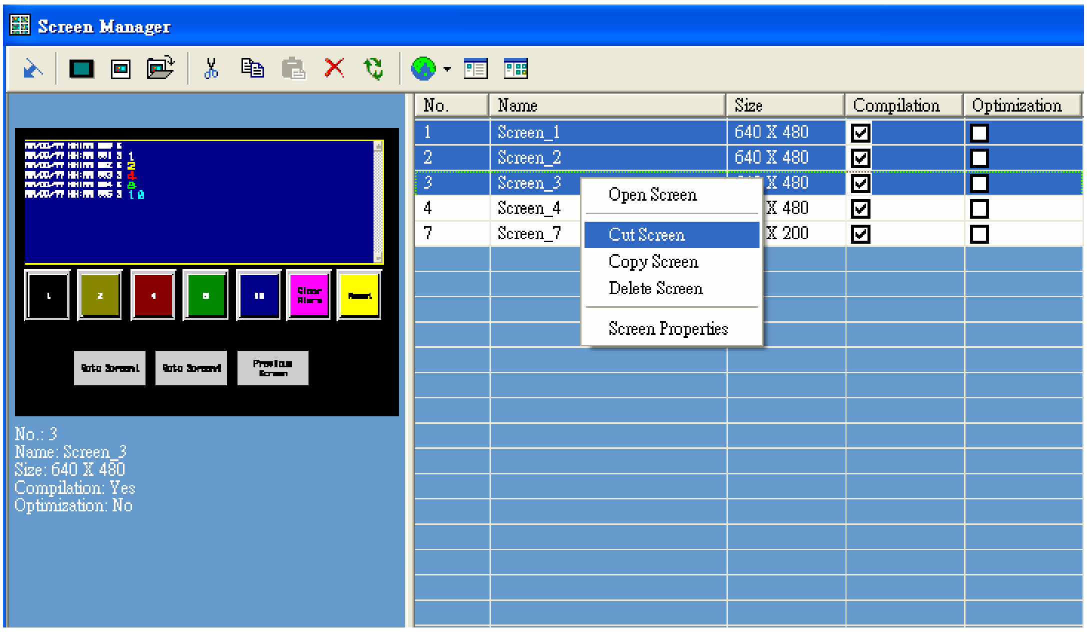
-  [New Screen]: To open a new screen with [No.] and [Name]. A new screen will be appeared as below.

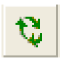
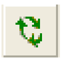


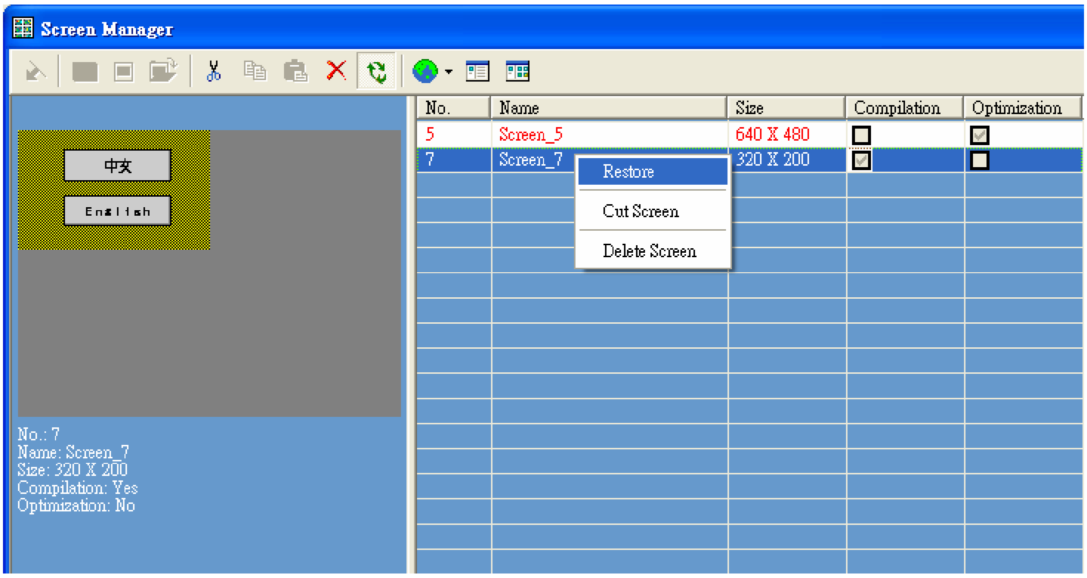
-  [Screen Properties]: To specify the screen properties in the dialog box of [Screen Properties]; please refer to Section 2.5.8. [Properties] for the complete details.

-  [Open Screen]: To open and display the selected images and the window of [Screen Manager] will be minimized to the bottom. A User can open the selected image by double-click as well.

 [Cut Screen],  [Copy Screen],  [Paste Screen],  [Delete Screen]: To edit the selected screens. Moreover, a user can get the pop-up menu by right-click for the selections of edit operation. Press Left-click + Ctrl key to edit several screens together; See below.



-  [View Recycle Bin]: To list all of the deleted screens marked with red color. Right-click on the screen list; and then select [Restore] from the displayed list, See below. Re-click  can return to the previous window of the [Screen Manager].



-  [Select Language]: To specify the language displayed in the screen, see below.

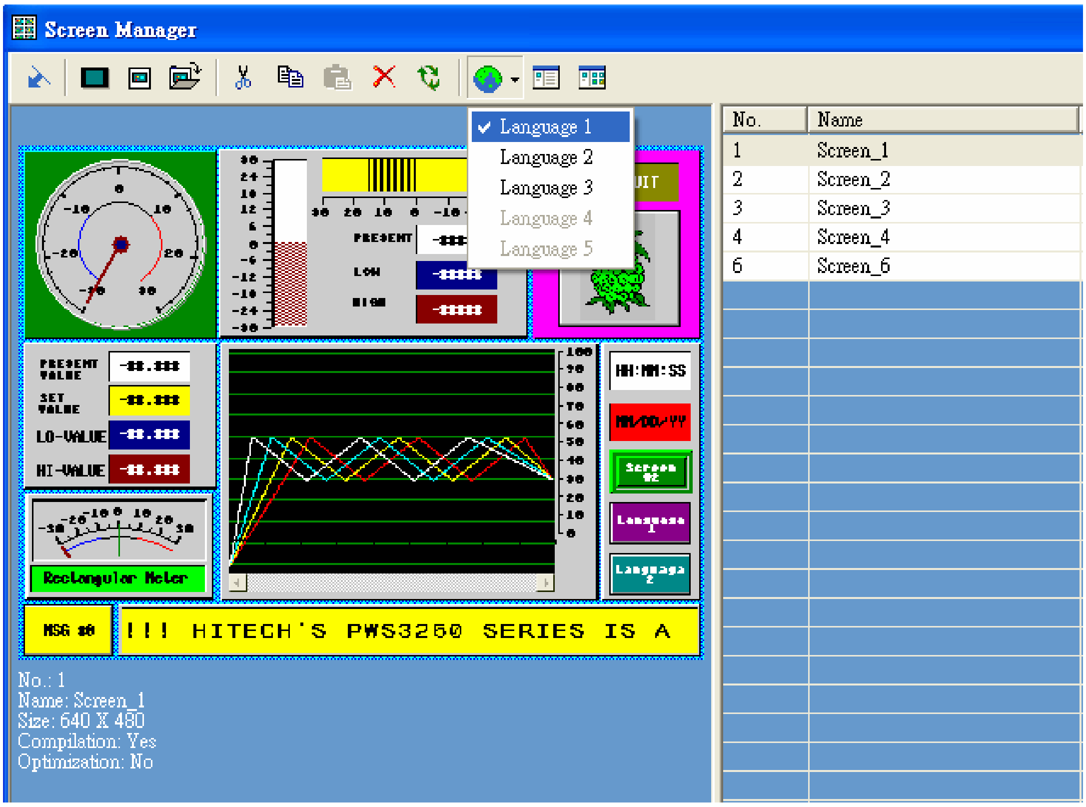


Figure 48. Screen displayed by “Language 1”(English)

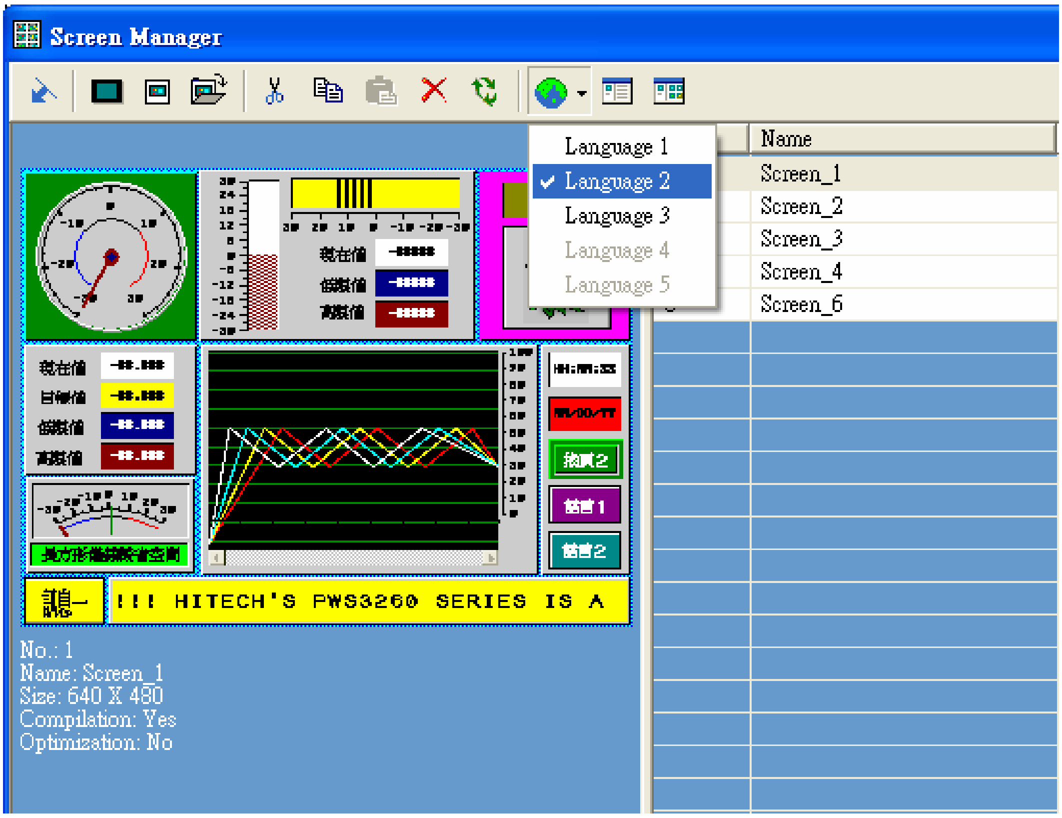
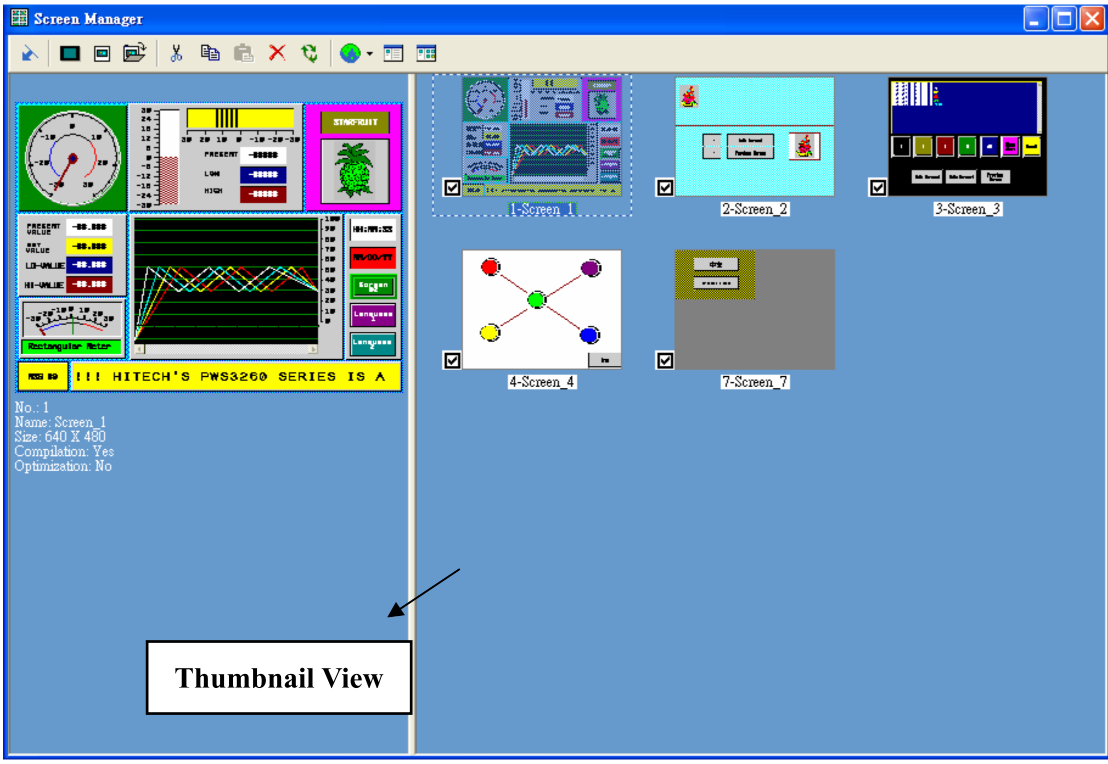


Figure 49. Screen displayed by “Language 2” (Traditional Chinese)

-  [Detail View]: To view the detail data of screens in list. See Figure 50.

-  [Thumbnail View]: To view all of the screens in thumbnail; See below.



2.5.2.2. Screen Table

On the [Screen Manager], select the [Detail View] button. The detailed data will be listed in the table including five columns: **[No.], [Name], [Size], [Compilation] and [Optimization].** While click the headline, the data will be listed in increasesd or decreased order such as numeral order, dimentional order, and so on. See Figure 50.

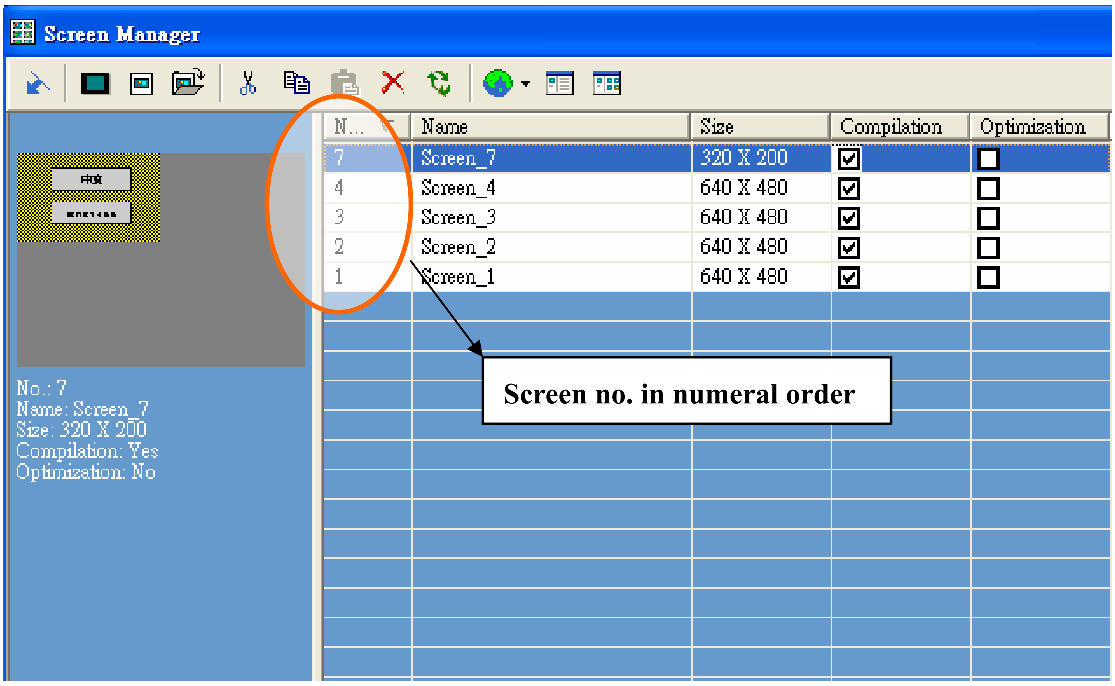
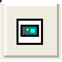


Figure 50. [No.] in numeral order

[Screen Manager] also can help a user manage and edit the screen objects with convenience and efficiency. If the data in these columns should be modified, a user can click  [Screen Properties] on the toolbar and modify the the screen properties in the displayed dialog box. (Or click right key of the mouse for the [Screen Properties] selection) See Figure 51; See Figure 52, See Figure 53.

Take notice of [Compilation] and [Optimization] columns, a user can decide to check [Compilation] or not; or setup in the dialog box of [Screen Properties] as well, See Figure 53. A user can decide to check [Optimization] or not to perform the block optimized while compilation; or setup in the dialog box of [Screen Properties]. See Figure 53.

For the dialog box of [Screen Properties], please refer to Section 2.5.8 [Screen Properties] for the complete details.

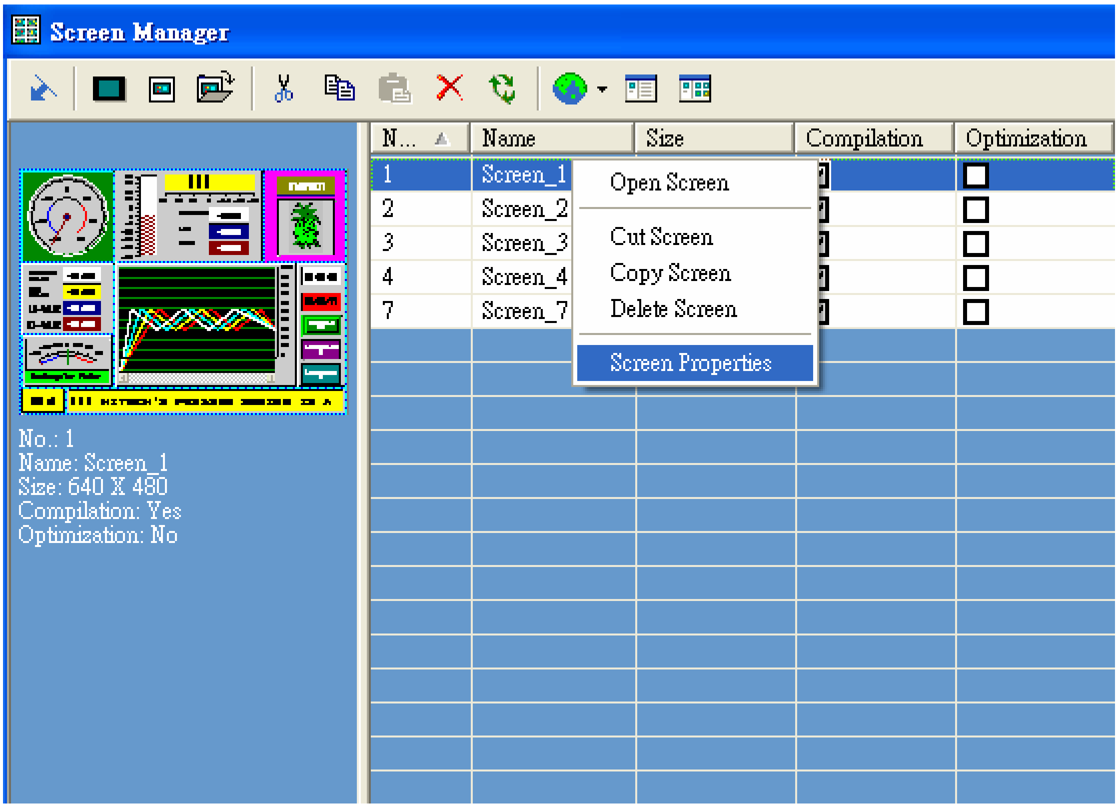


Figure 51.   Select [Screen Properties]

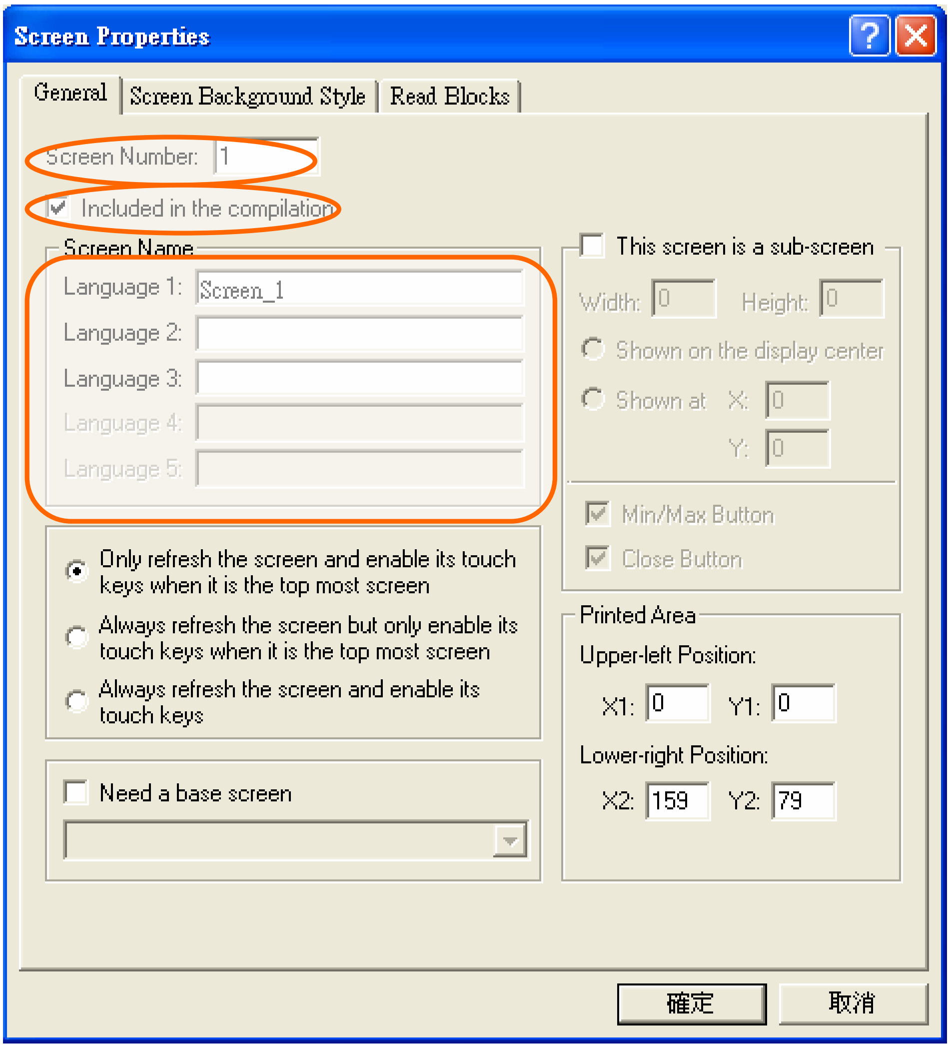


Figure 52. Modify the screnn properties

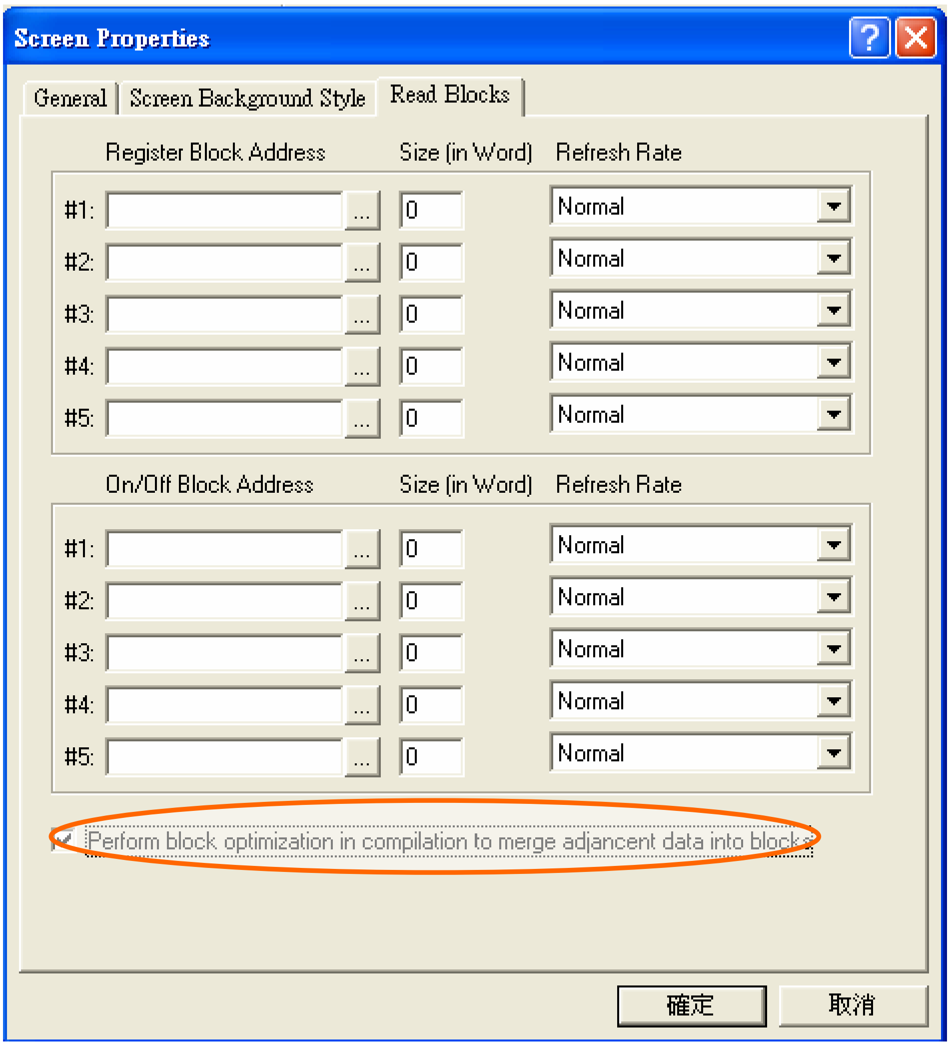


Figure 53. Modify the screen properties

2.5.3. [Close Screen]

Close the current existing screen.

2.5.4. [Cut Current Screen], [Copy Current Screen] and [Delete Current Screen]

[Cut Current Screen]: Select this command to cut the executive screen and then paste it on others.

[Copy Current Screen]: Select this command to copy the excutive screen.

[Delete Current Screen]: Select this command to delete the excutive screen.

2.5.5. [Cut Screen], [Copy Screen] and [Delete Screen]

Note that these three commands are only applicable on [Screen Manager] which is minimized to the right side of the window.

[Cut Screen]: Select this command to cut the selected screens and then paste them on others.

[Copy Screen]: Select this command to copy the selected screens.

[Delete Screen]: Select this command to delete the selected screens.

2.5.6. [Paste Screen]

Paste the screens which are cut and copied.

2.5.7. [OPEN Macro]、[CLOSE Macro] and [CYCLIC Macro]

These three Macros enable Workstation to execute data initialization, display control, and internal register or contact initialization. Once select these commands, the workstation will display the edit screen. See Figure 54.

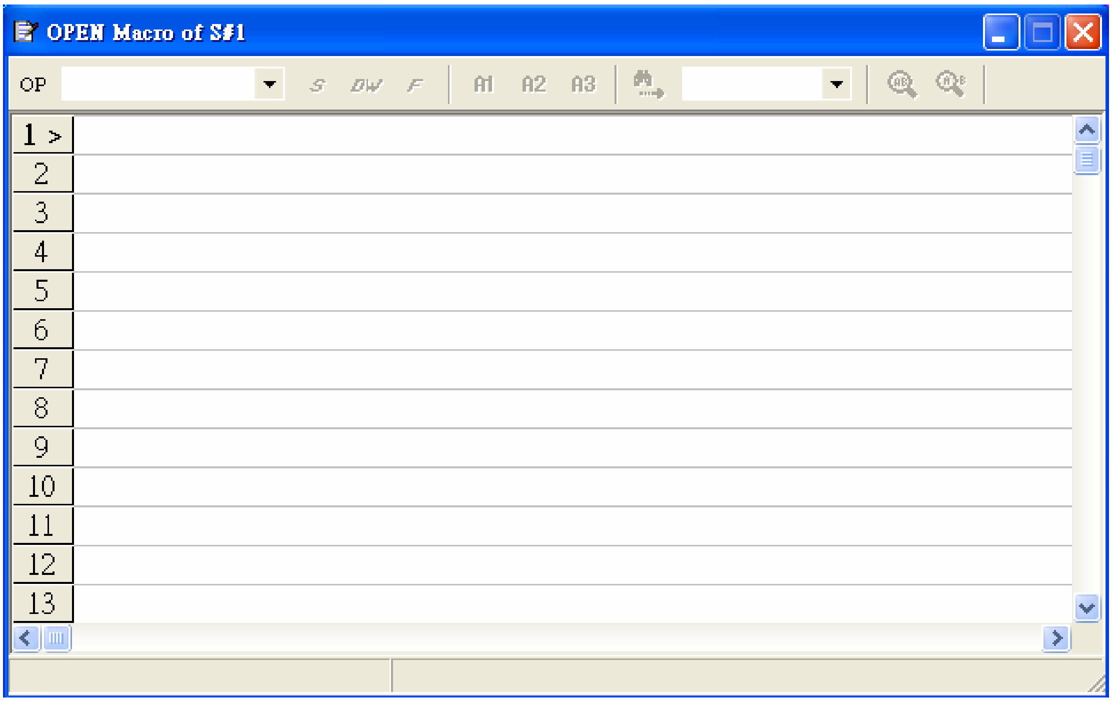


Figure 54. The [OPEN Macro] Edit Screen

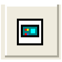
[OPEN Macro]: OPEN Macro is executed when the screen is commanded to be opened. A screen is not displayed until the OPEN Macro is executed completely. There is one OPEN Macro in one screen.

[CLOSE Macro]: CLOSE Macro is executed when the screen is commanded to be closed. A screen is not erased until the CLOSE

Macro is executed completely. There is one CLOSE Macro in one screen.

[CYCLIC Macro]: CYCLIC Macro is excuted cyclically when the screen is displayed. The Workstaion stops execting the Macro when it encounters an End command or reaches the end of the macro.

Please refer to Chapter 8 Macro for complete details.

2.5.8. [Screen Properties] 

The function of [Screen Properties] command is to display the properties of current screen including [Genernal], [Screen Background Style] and [Read Block] tabs. See Figure 55.

2.5.8.1. [Genernal] Tab

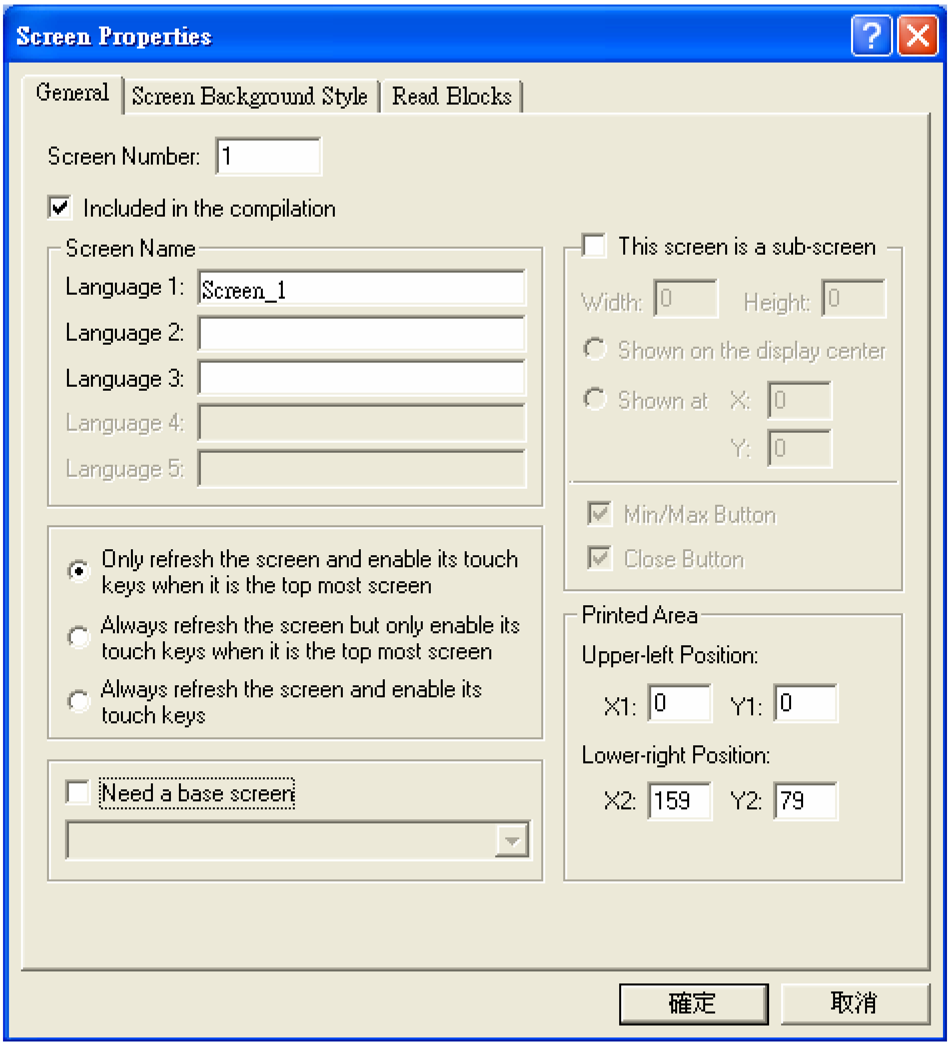


Figure 55. The [Screen Properties] Dialog Box

- [Screen Number]: Specify the number of the current screen.

- [Included in the compilation]: Check this option to compile the selected screen or not. This feature is convenient screen editing but unnecessary to a draft screen.
- [Screen Name]: Enter name for a current screen.
- [Screen Update and Key function]: Specify the types of screen update.
- [Need a base screen]: Check this option for a base screen. A base screen can be the background of various screens.
- [This screen is a sub-screen]: Check this option to display the selected screen as a sub-screen. A user can design the width, height, location and buttons of a sub-screen in this block. (The maximum width=180; height=160).

  For the steps of a sub-screen design, please refer to Section 2.5.8.5 Sub-screen.
- [Printed Area]: Specify the area to print. Note that this feature is not applicable on some models without PRINTER PORT.
- [Slide-out Menu]: Specify the slide-out menu of the screen.

2.5.8.2. [Screen Background Style] Tab

I. Filled With Pattern

Select [Pattern], the tab will be shown as below:

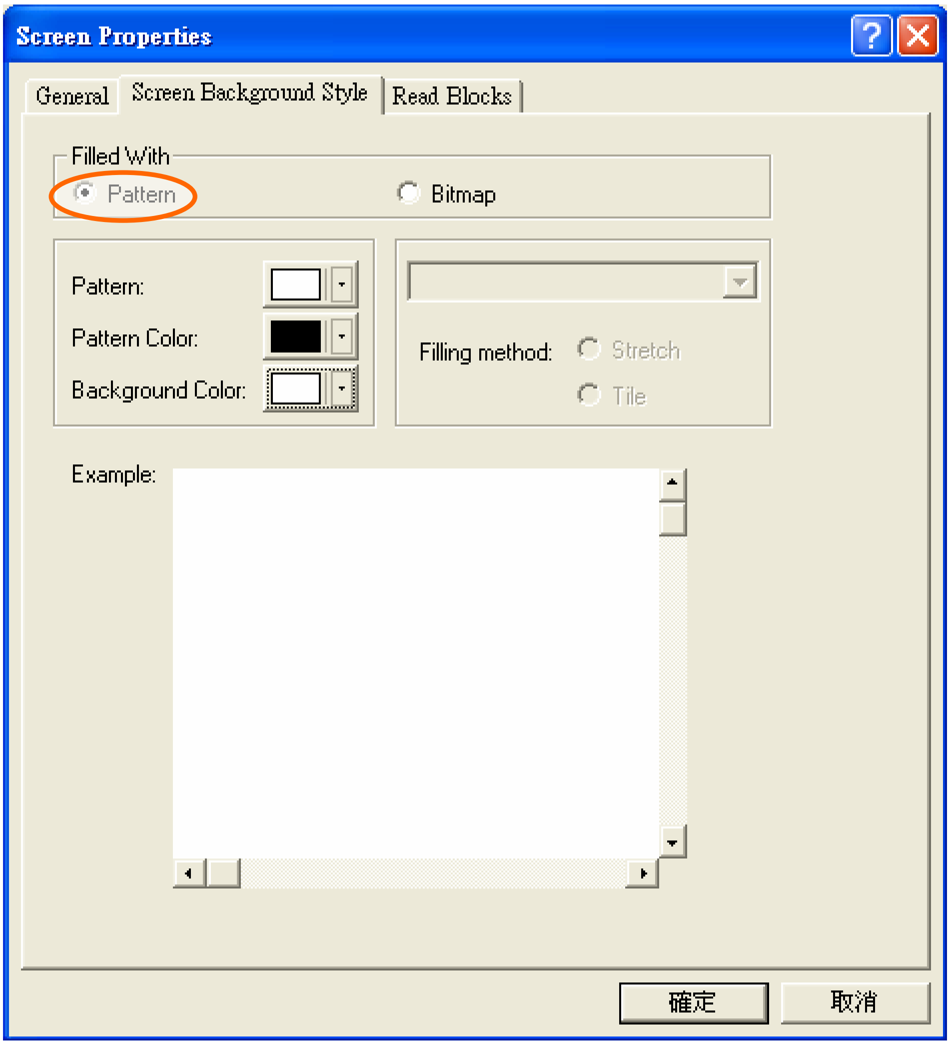


Figure 56. The [Screen Background Style] Tab – Pattern

- [Pattern]：Select the pattern of screen background
- [Pattern Color]：Select the color of the selected pattern.
- [Background Color]：Select the background color.

II. Filled With Bitmap

Select [Bitmap], the tab will be shown as below:

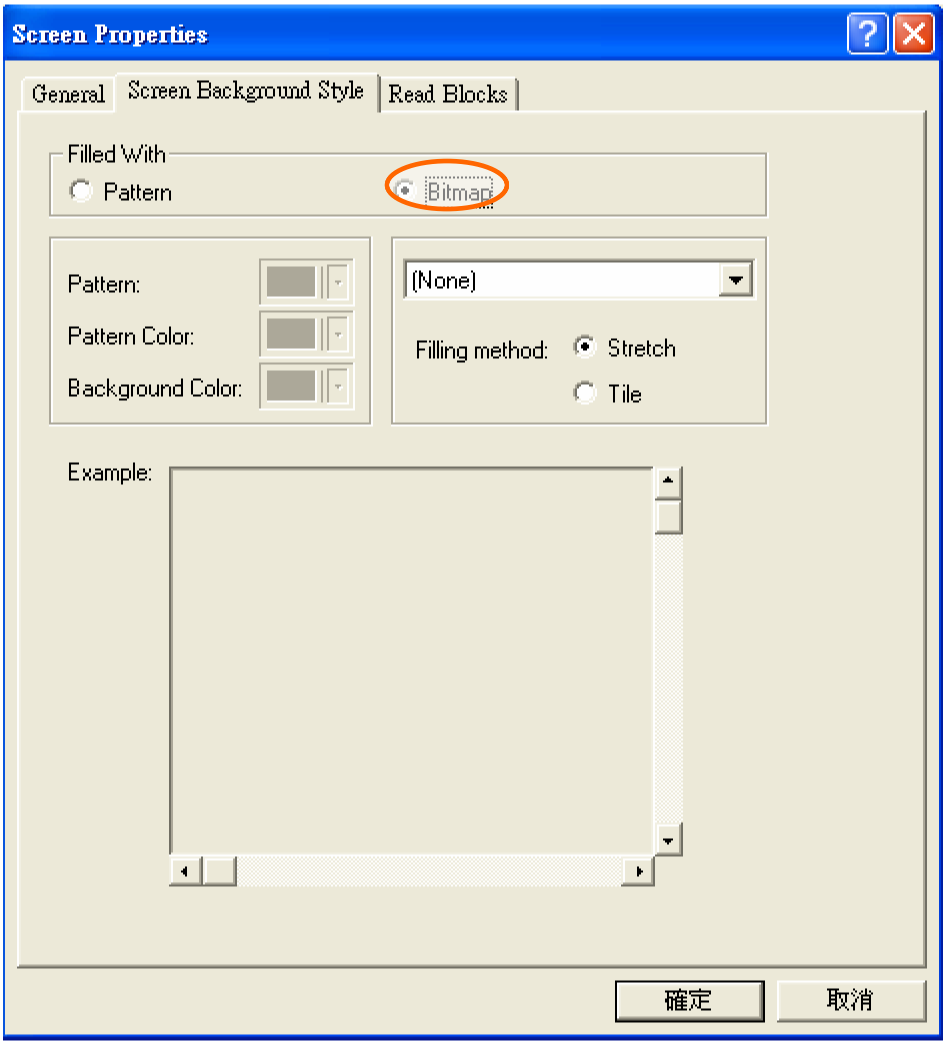
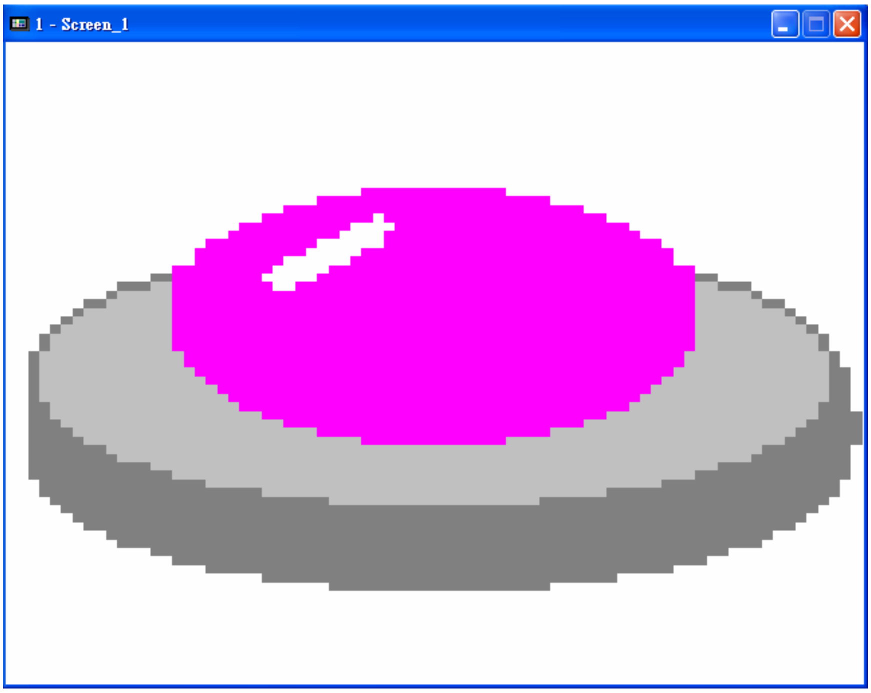


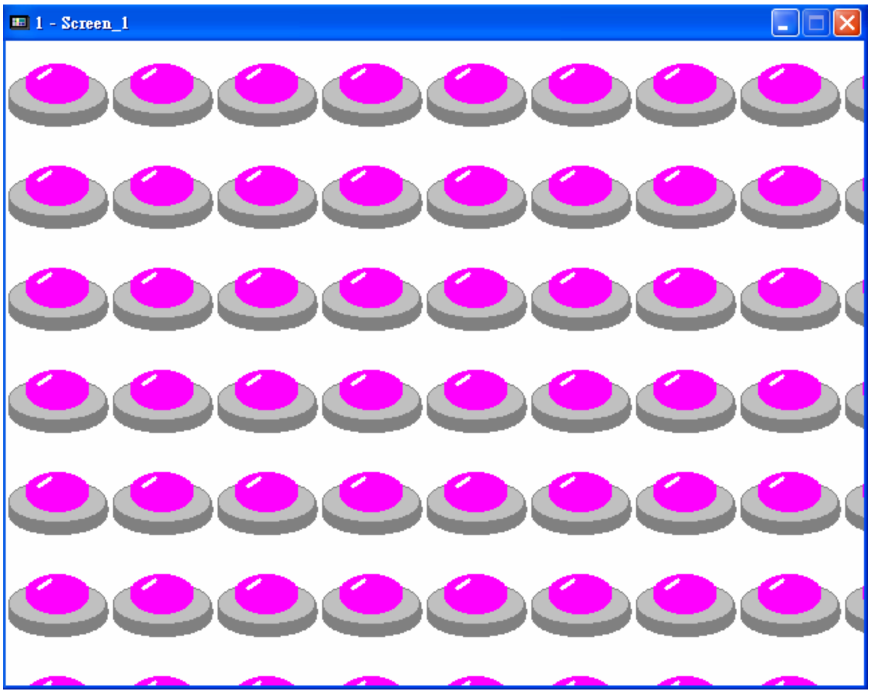
Figure 57. The [Screen Background Style] Tab – Bitmap

Select the bitmap from drop-down list, there are two filling methods:

- [Stretch]：To display the bitmap entirely on a whole screen. Select this option; the bitmap could be enlarged to match the designed screen. See below.



- [Tile] ： To display the dulplicate bitmaps ranked on the designed screen. Each bitmap keeps original size. See below.



2.5.8.3. [Read Block] Tab

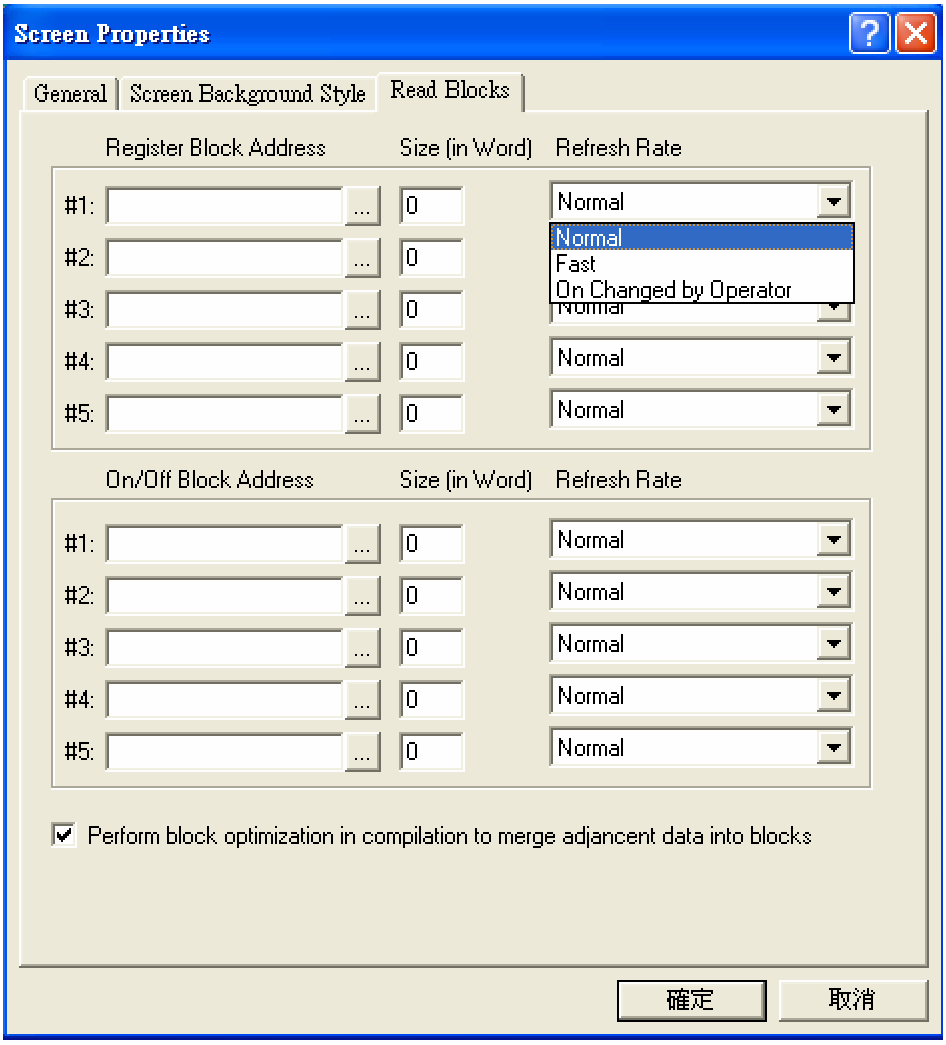


Figure 58. The [Read Block] Tab

The function of [Read Block] tab is to specify register block address, on/off block address, size (in word) and refresh rate.

- [Register Block Address]: Specify the register block address in accord with PLC. A screen can be specified five register addresses at most.
- [On/Off Block Address]: Specify the On/Off block address. A screen can be specified five register addresses at most.
- [Size]: Specify the size of block.
- [Refresh Rate]: Provide “Normal”,”Fast” and “On Unchanged by Operator” for selection.
    - ♦ “Normal”: Read data in normal speed of PLC.

- ♦ "Fast": Read data in double-quick of "Normal" speed. Subject to the same time, "Fast" be two-times more than "Normal" in reading data.
- ♦ "On Unchanged by Operator": Enable users to change the value on HMI but unchange the value in PLC

- Optmization: Check this option to merge adjancent data into block. Note that the data address of PLC is recommended to continuity as to well communication with PLC.

2.5.8.4. [Auxiliary Key] Tab

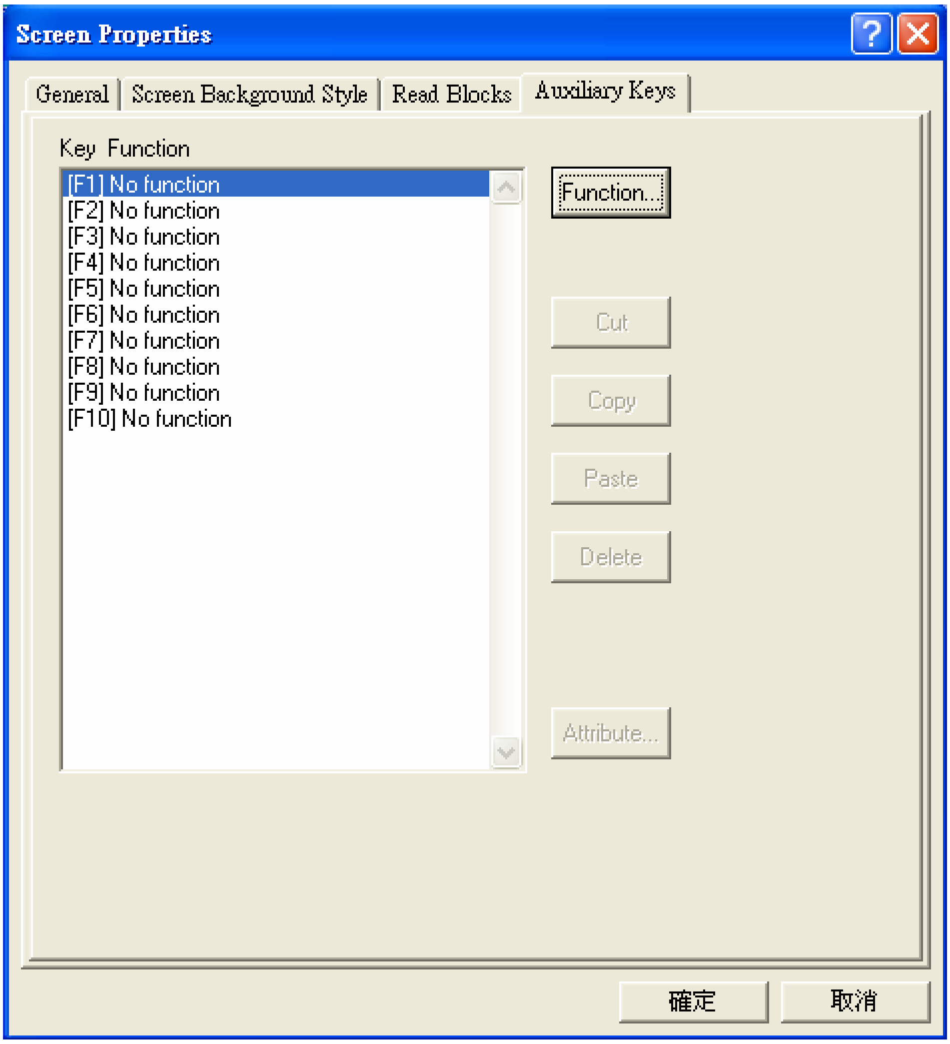


Figure 59. The [Auxiliary Keys] Tab

The main function of [Auxiliary Keys] is to design the attributes of external button. The buttons definded in [Auxiliary Keys] tab is only available for the current screen. If a user defines "F1" key as screen '5' to screen '1', this feature is only available on screen '5'.

Press [Function] key, the function assignment dialog box will be appeared in windows. See Figure 60.

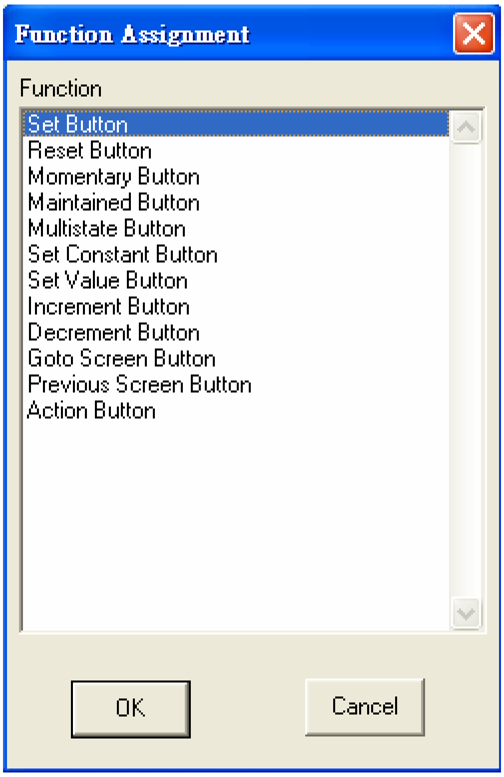


Figure 60. The [Function Assignment] Dialog Box

Select [Application]/[Common Keys] to define the auxiliary keys which are available on all of screens. Please refer to Section 2.9.4. [Common Keys].

Note that this function is not applicable on all HMI models; please refer to Appendix A. - Table of the ADP 6.0 Features and the HMI Models.

2.5.8.5. Sub-screen

A sub-screen is a screen that is smaller than the usual screen. The Workstaion displays a sub-screen in the center of the screen without destroying the existing display and adds a raised frame to it automatically.

The following are the steps to create a **sub-screen**:

1. Create a new screen; enter the screen name and number.
2. Open the [Screen Properties] dialog box and check the [This screen is a sub-screen] box.
3. Enter the width and height of the sub-screen.
4. Specify the position of sub-screen display (shown on the display center or appointed specific postion). See below.

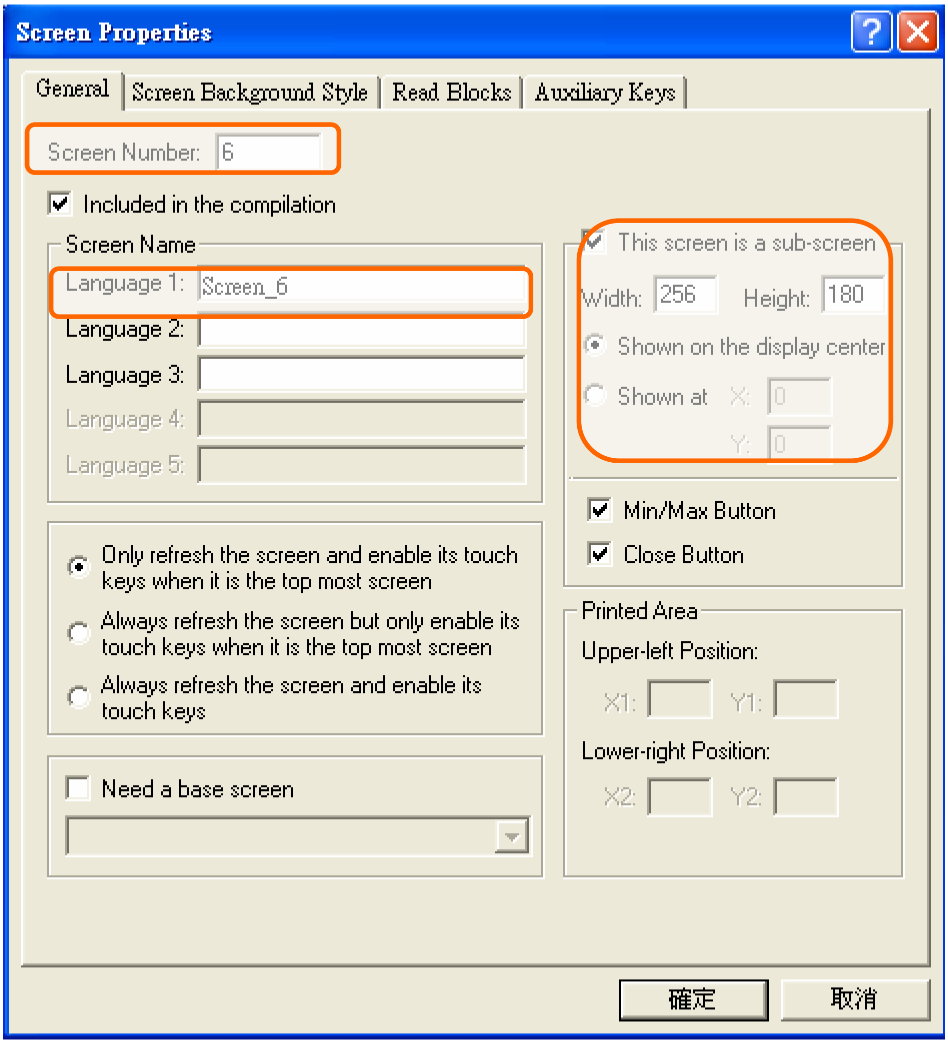


Figure 61. Modify the attributes of sub-screen

5. After press [Enter], the screen will be minimized to specified size. See below.

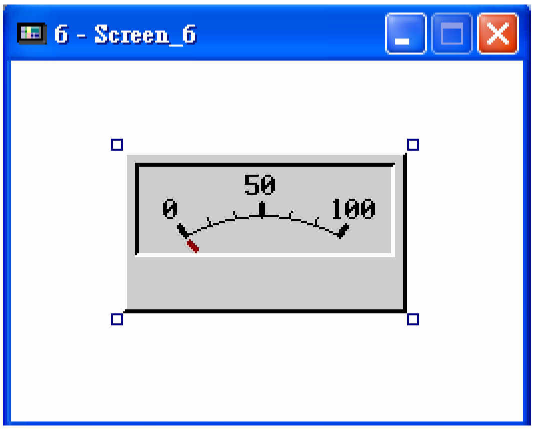


Figure 62. Sub-screen

2.5.8.6. Base Screen

A base screen is a screen which may be used as a template for a many different screens. Once edit a base screen, all of the same base screens in application will be changed at the same time.

The following are the steps to create a **base screen**:

6. Create a base screen first. See below.

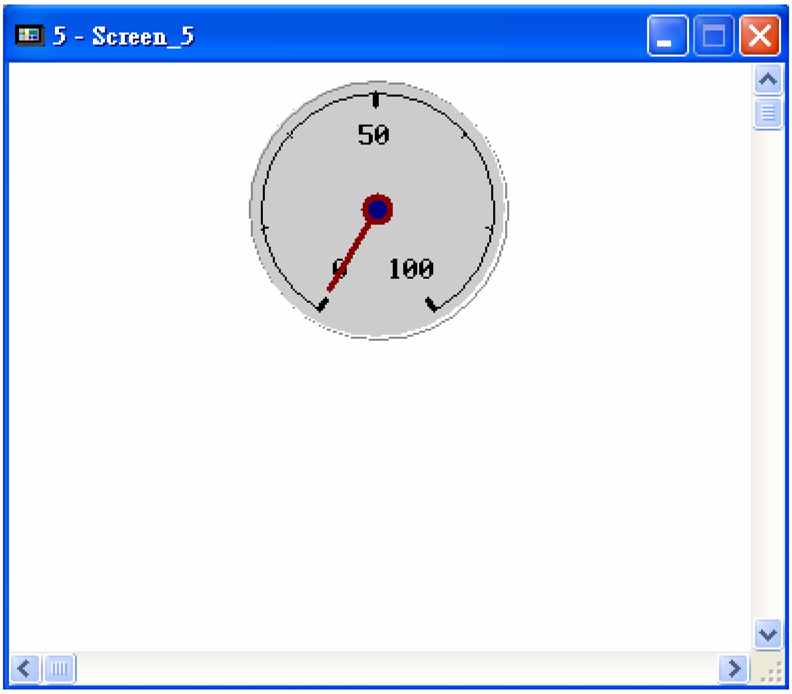


Figure 63. Base Screen

7. Select [Screen]/[[Properties] to create a new screen (screen-6). Then check the [Need a Base Screen] box and specify a base screen (screen-5) in the [Screen Properties] dialog box. See below.

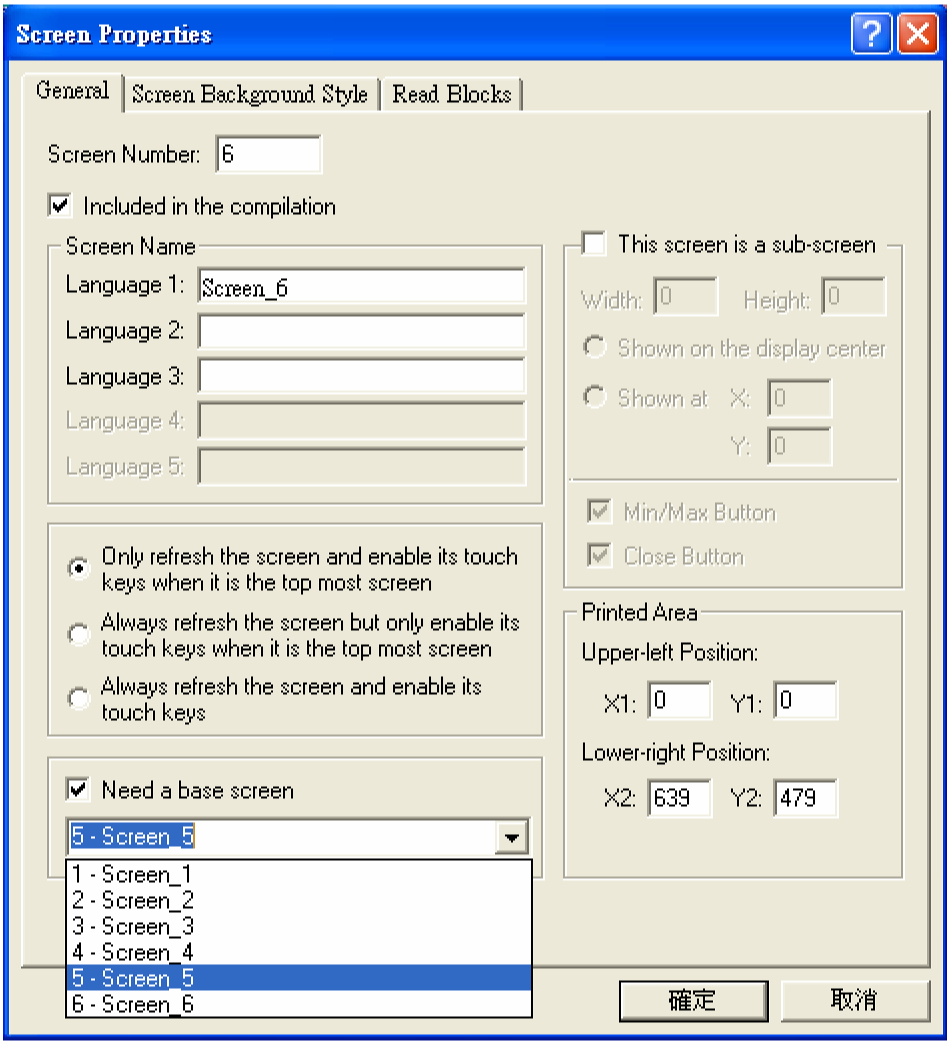


Figure 64. Specify a base screen

8. Specify a base screen (screen-5) displayed on the current screen (screen-6). See below.

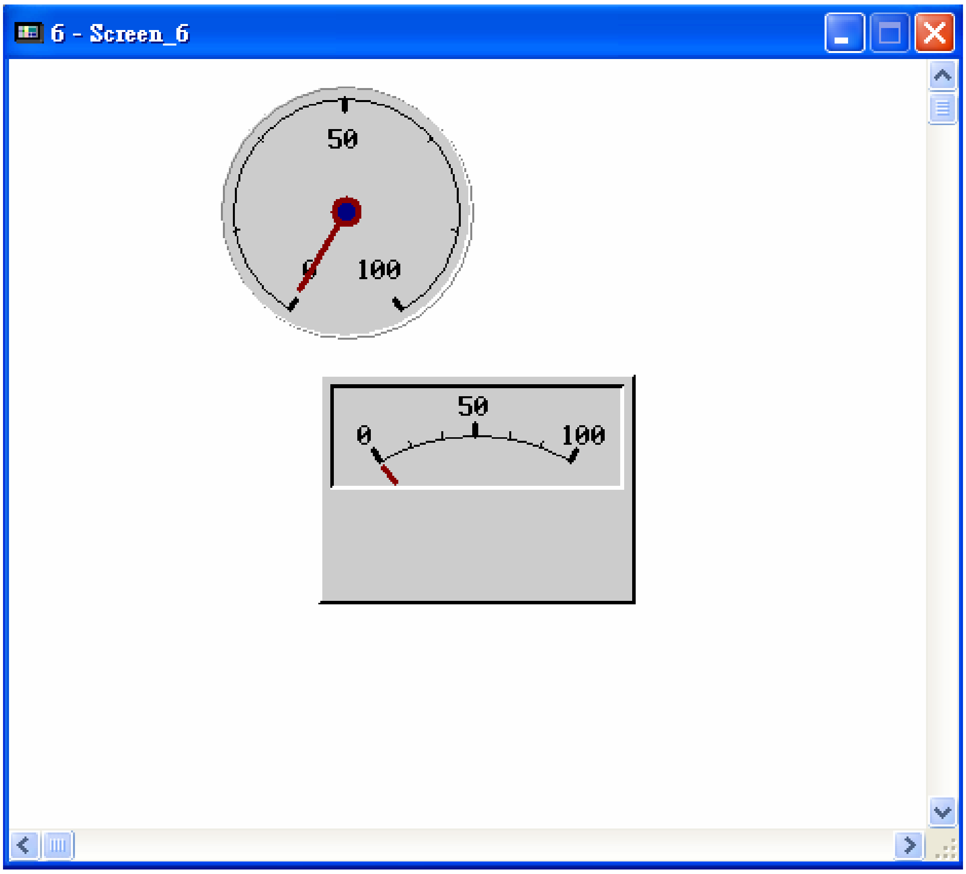
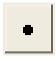
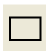
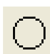
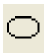


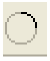
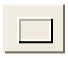
Figure 65. Base screen displayed on current screen

2.6. Draw Menu

To strengthen the display of your designed objects, it is often to draw a rectangle, a line or a scale to label its data. This will help users to read and take note of the data.

The function of geometric shapes is only the static shapes irrelative to PLC dynamic data.

Geometric Shape	Button	Function	Section
Dot		draw a dot	2.6.1.1. [Dot]
Line		draw a line	2.6.1.2. [Line],[Horizontal Line] and [Vertical Line]
Horizontal Line		draw a horizontal line	2.6.1.2. [Line],[Horizontal Line] and [Vertical Line]
Vertical		draw a vertical line	2.6.1.2. [Line],[Horizontal Line] and [Vertical Line]
Connected Lines		connect the lines with mouse movement	2.6.1.3. [Connected Lines] and [Free Form]
Free Form		connected lines and curves with mouse movement	2.6.1.3. [Connected Lines] and [Free Form]
Rectangle		draw a rectangle	2.6.1.4. [Rectangle] and [Solid Rectangle]
Solid Rectangle		draw a solid rectangle	2.6.1.4. [Rectangle] and [Solid Rectangle]
Parallelogram		draw a parallelogram	2.6.1.5. [Parallelogram] and [Solid Parallelogram]
Solid Parallelogram		draw a solid parallelogram	2.6.1.5. [Parallelogram] and [Solid Parallelogram]
Circle		draw a circle	2.6.1.6. [Circle],[Solid Circle],[Ellipse] and [Solid Ellipse]
Solid Circle		draw a solid circle	2.6.1.6. [Circle],[Solid Circle],[Ellipse] and [Solid Ellipse]
Ellipse		draw a ellipse	2.6.1.6. [Circle],[Solid Circle],[Ellipse] and [Solid Ellipse]
Solid Ellipse		draw a solid ellipse	2.6.1.6. [Circle],[Solid Circle],[Ellipse] and [Solid

			Ellipse]
Acr		draw a acr	2.6.1.7. [Acr],[Pie] and [Solid Pie]
Pie		draw a pie	2.6.1.7. [Acr],[Pie] and [Solid Pie]
Solid Pie		draw a solid pie	2.6.1.7. [Acr],[Pie] and [Solid Pie]
Polygon		draw a polygon	2.6.1.8. [Polygon] and [Solid Polygon]
Solid Polygon		draw a solid polygon	2.6.1.8. [Polygon] and [Solid Polygon]
Text		static text display and design	2.6.2.1. [Static Text]
True Type Text		similar with static text (only applicable on Softpanel)	2.6.2.2. [True Type Text]
Bitmap		display the bitmap	2.6.2.3. [Bitmap]
Frame/Edge		draw a frame/edge	2.6.3.1. [Frame/Edge]
Scale		draw a scale	2.6.3.2. [Scale]
Table		draw a table	2.6.3.3. [Table]
Shape		display the shape	2.6.4. [Shape]

The following sections are to explain the objects with the same attributes.

2.6.1. Geometric Shape

Geometric shapes includes [Dot],[Line],[Horizontal Line],[Vertical Line],[Connected Lines],[Free Form],[Rectangle],[Solid Rectangle],[Parallelogram],[Solid Parallelogram],[Circle],[Solid Circle],[Ellipse],[Solid Ellipse],[Acr],[Pie],[Solid Pie],[Polygon] and [Solid Polygon].

Double-click on the object or click right key for the option [Object Attributes]. The dialog box which is correspondant with the object will be appeared. See Figure 66.

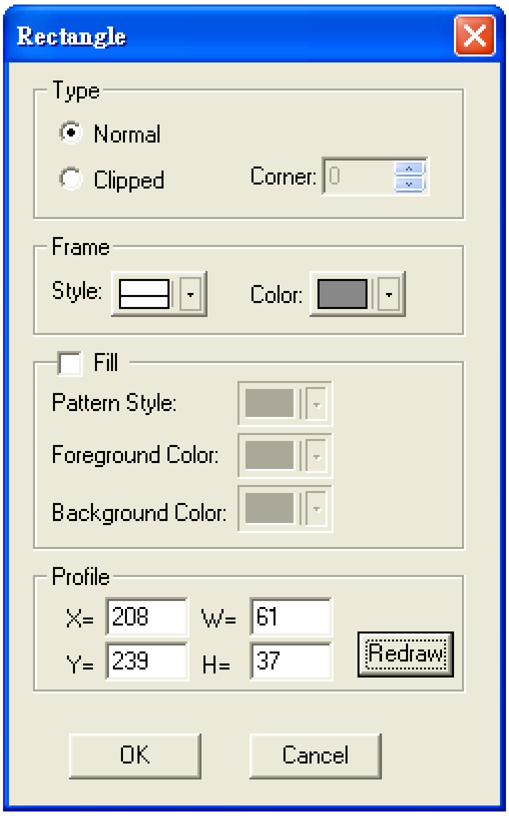


Figure 66. The [Rectangle] Dialog Box

2.6.1.1. [Dot]

A user can specify [Type], [Color] and [Frame] in the dot dialog box. See Figure 67.

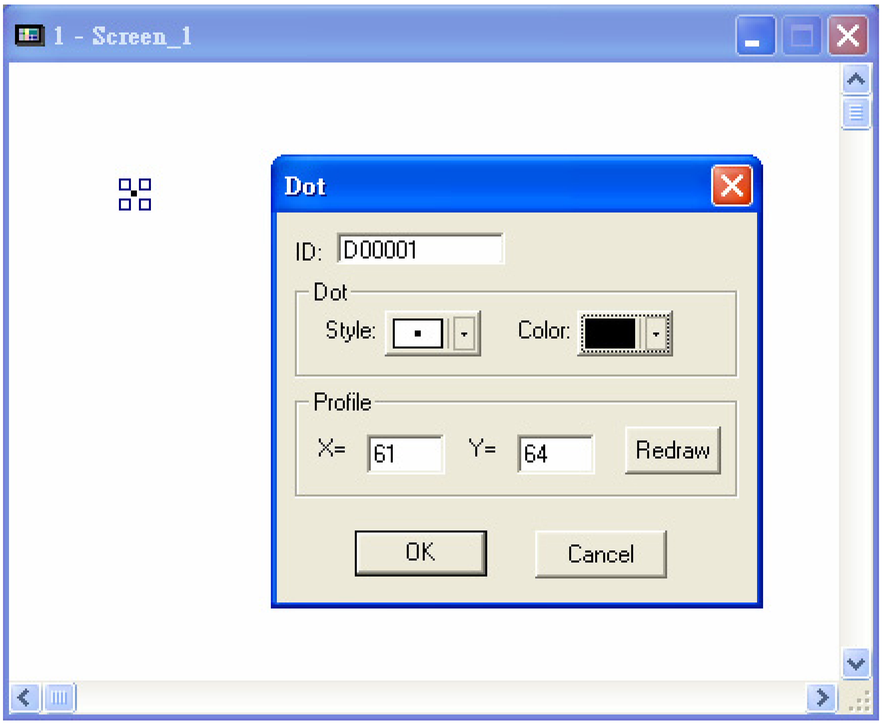


Figure 67. Draw a Dot

2.6.1.2. [Line],[Horizontal Line] and [Vertical Line]

Figure 68 is an illustration of [Line], [Horizontal Line] and [Vertical Line].

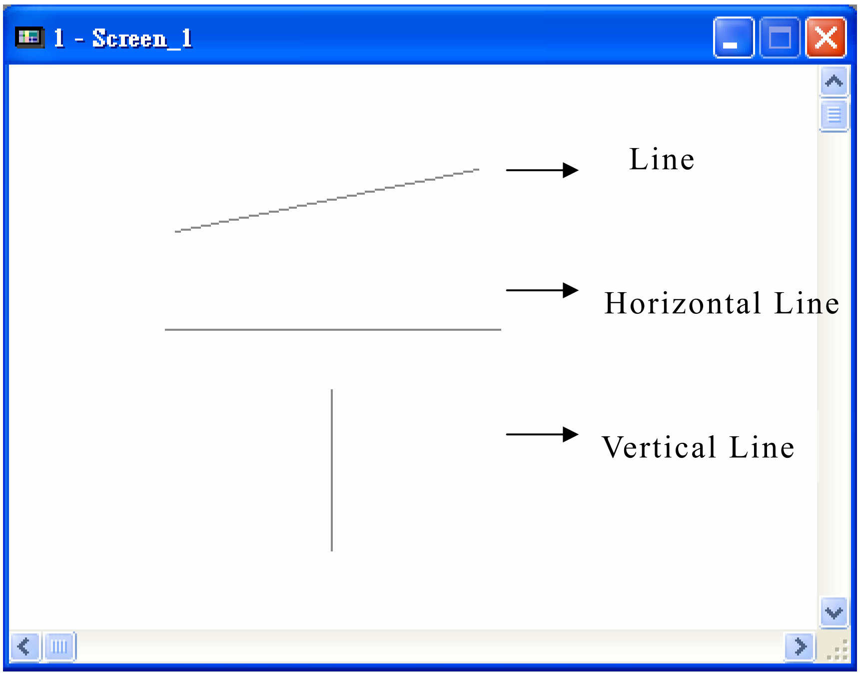


Figure 68. Line, Horizontal Line and Vertical Line

A user can specify the [Type], [Color], [Arrows], [Style] in the line, horizontal line and vertical line dialog box. See Figure 69.

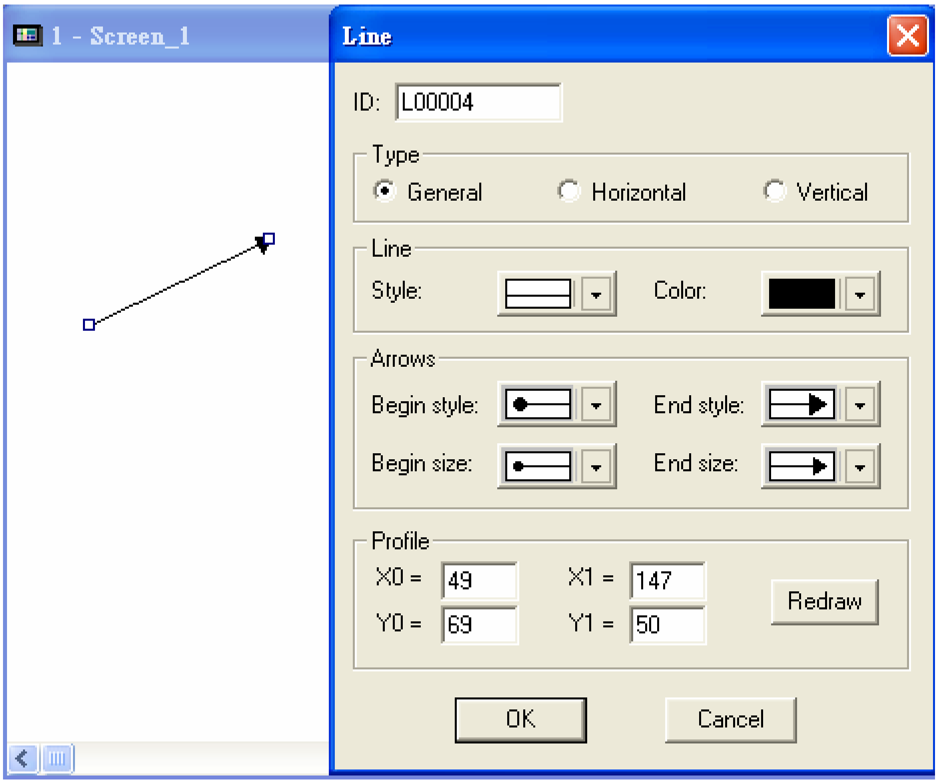


Figure 69. Draw a Line with Arrows

2.6.1.3. [Connected Lines] and [Free Form]

[Connected Lines] is to connect lines with the movement of the mouse cursor. If a user presses left mouse button once then moves cursor elsewhere on screen, a straight line will be drawn between the two points. This will continue until a user clicks right key of mouse.

[Free Form] is to connect the lines and curves by holding down left mouse button while scrolling mouse the cursor follows mouse movement. This will continue until a user clicks right key of mouse

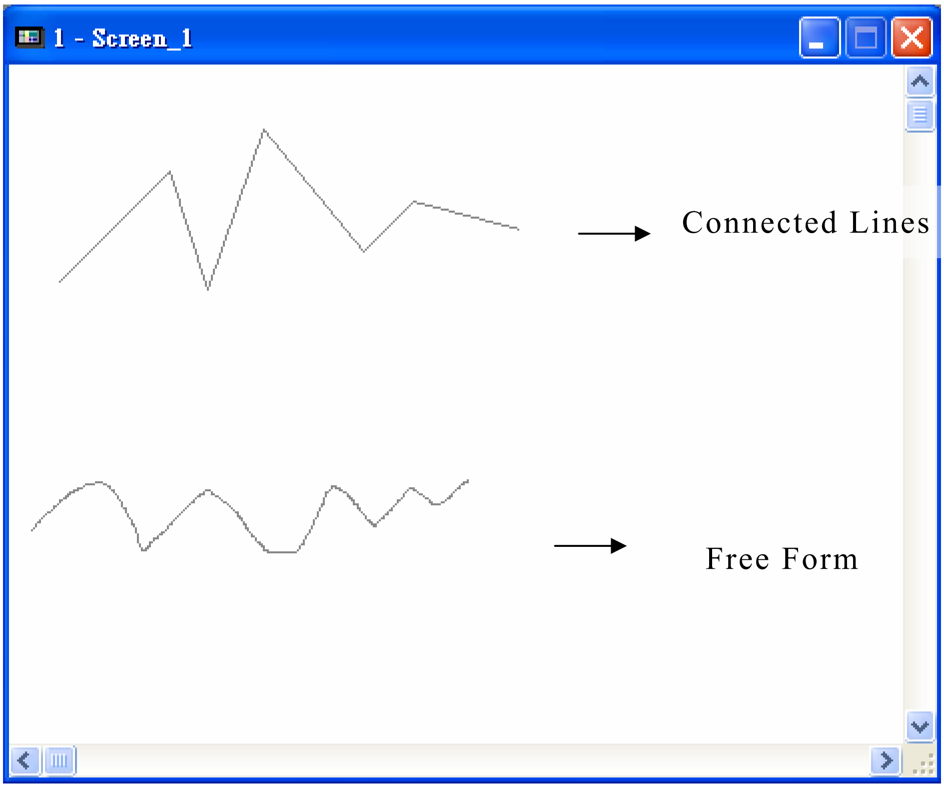


Figure 70. Connected Lines and Free Form

A user can specify [Style], [Color], [Arrows] and [Profile] in connected lines and free form dialog box. See Figure 71.

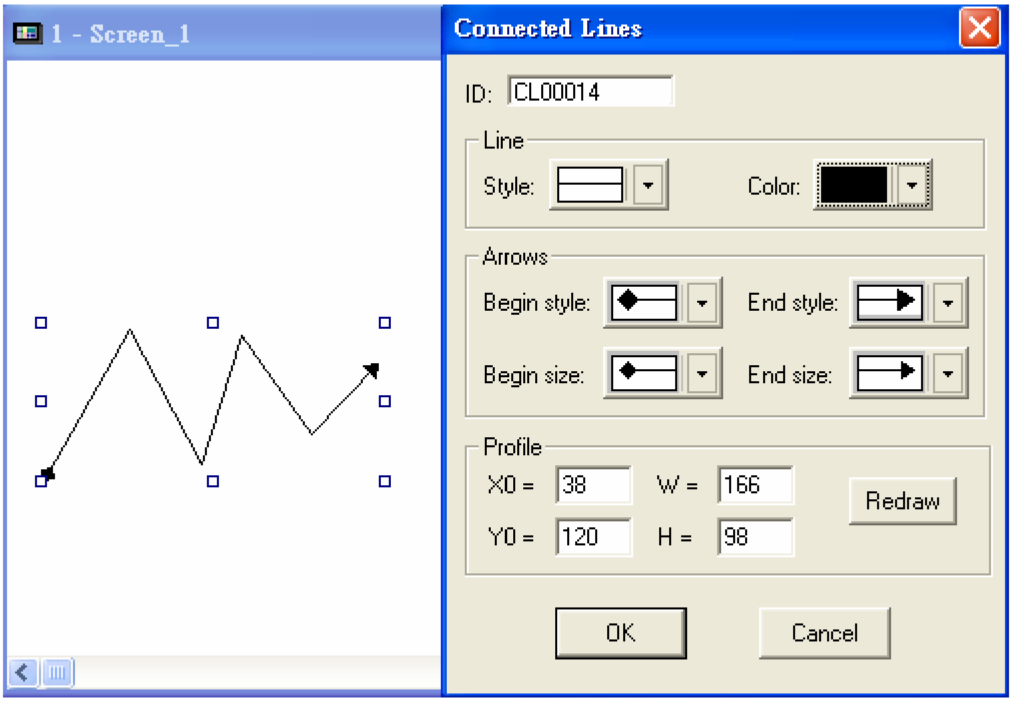


Figure 71. Draw Connected Lines with Arrows

2.6.1.4. [Rectangle] and [Solid Rectangle]

Figure 72 is an illustration of rectangle and solid rectangle.

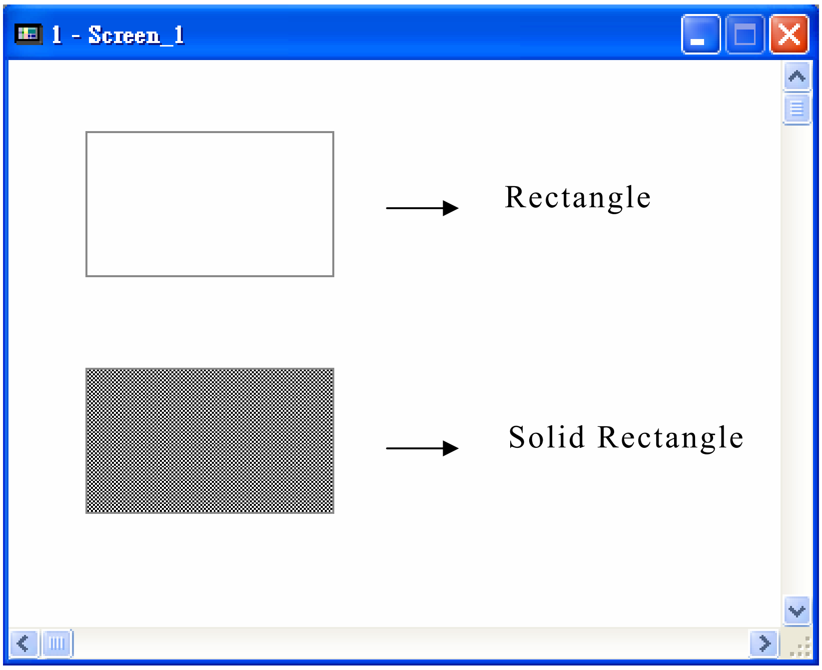


Figure 72. Rectangle and Solid Rectangle

A user can specify [Style], [Frame], and [Profile] in the rectangle dialog box. Figure 73 is a rectangle which is clipped with specified [corner].

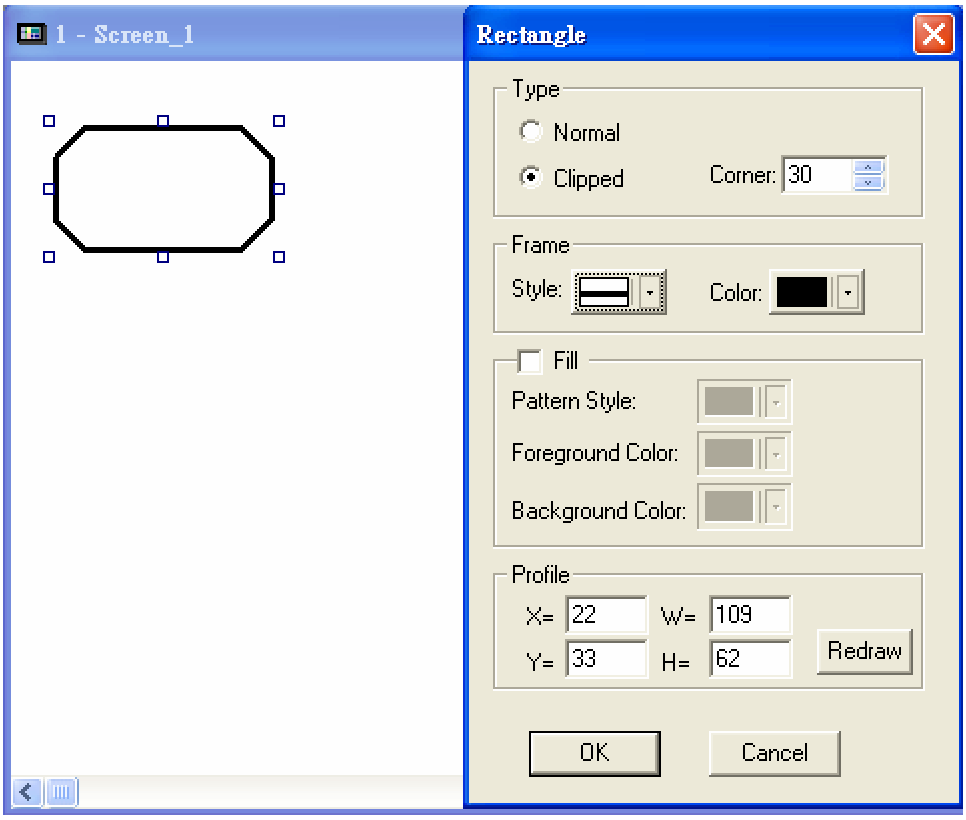


Figure 73. Draw a Clipped Rectangle

2.6.1.5. [Parallelogram] and [Solid Parallelogram]

[Parallelogram] is to draw a paeallelogram by holding down left mouse button to draw one side. This side will continue until a user click left key of the mouse. Then, drag this side to configure a rectangle until a user click right key of mouse. See Figure 74.

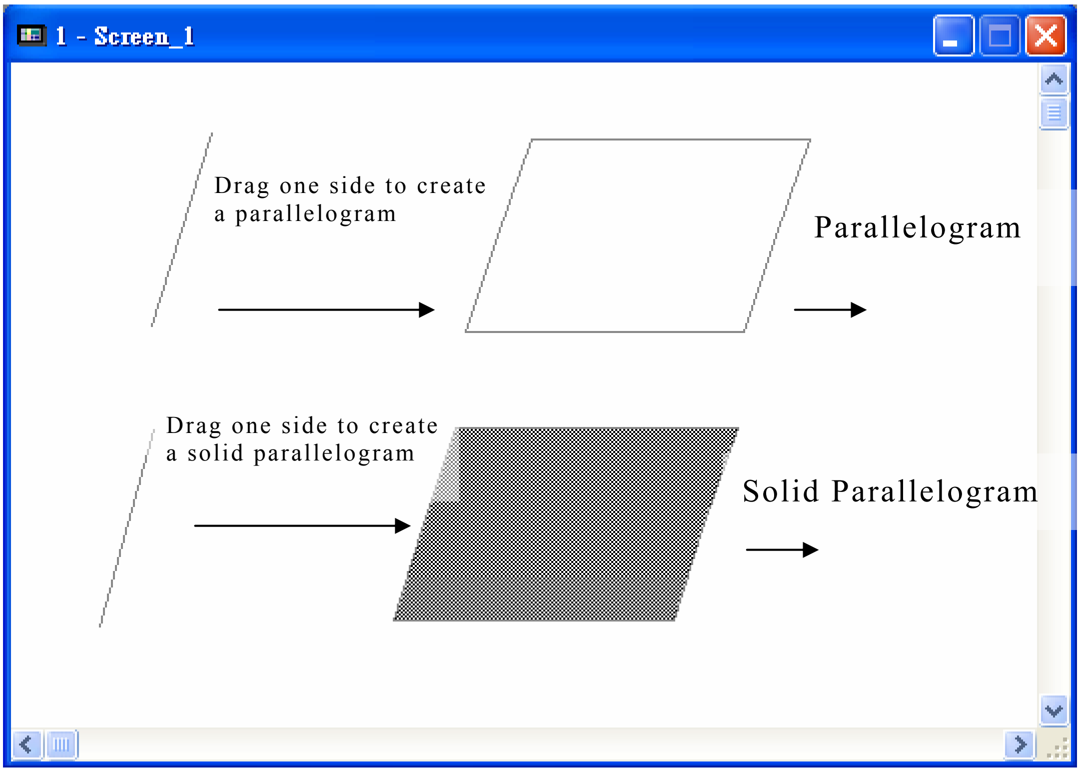


Figure 74. Draw a Parallelogram

A user can specify the attributes of rectangle in [Border] and [Profile]; and specify the attributes of solid rectangle in [Border], [Fill] and [Profile]. See Figure 75.

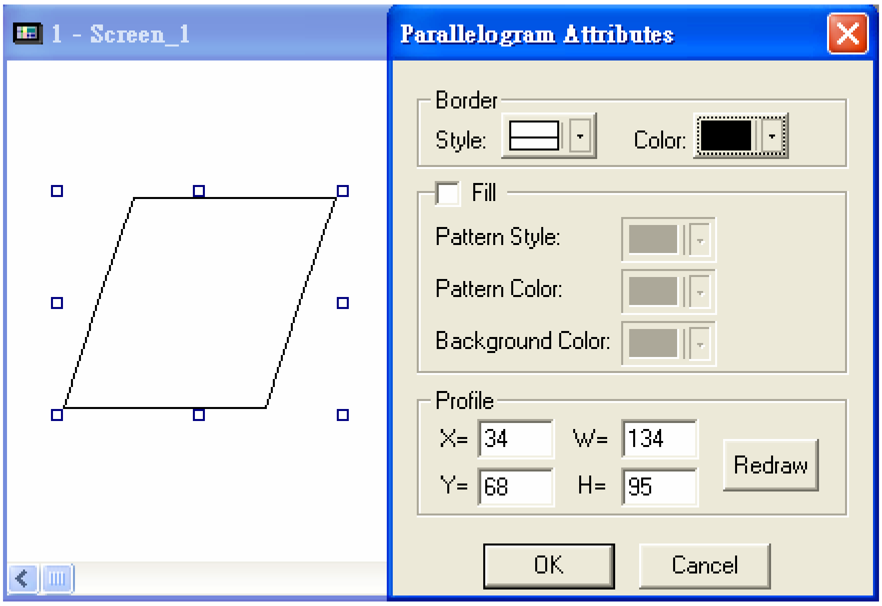


Figure 75. Draw a Parallelogram

2.6.1.6. [Circle],[Solid Circle],[Ellipse] and [Solid Ellipse]

Figure 76 is an illustration of a circle and an ellipse.

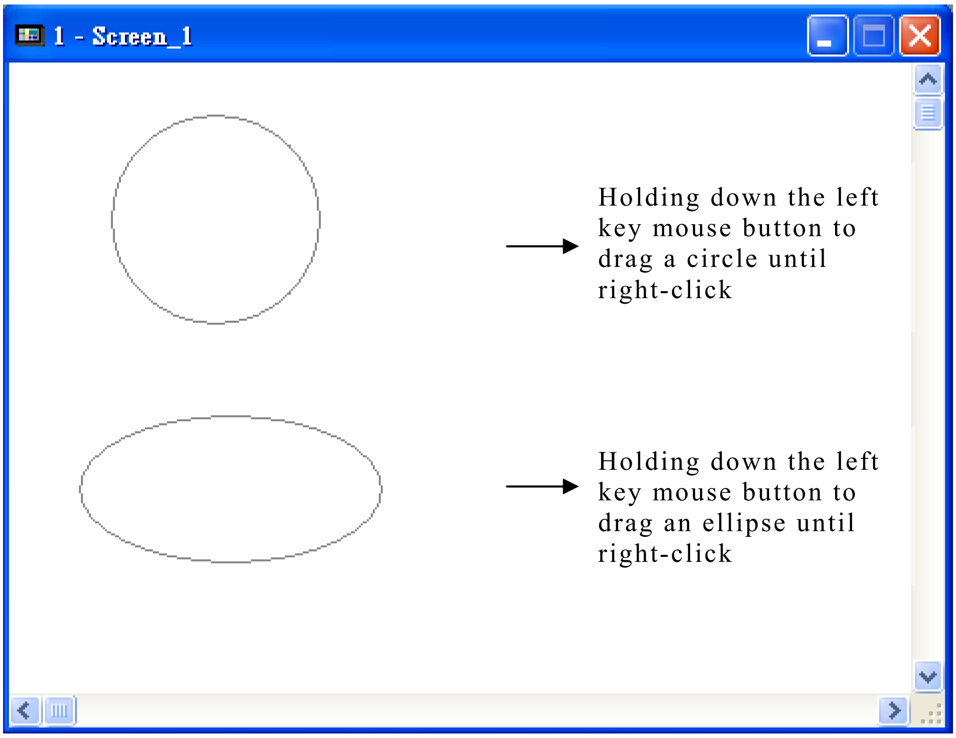


Figure 76. Draw a Circle and Ellipse

A user can specify the attributes of circle in [Border] and [Profile]; and specify the attributes of ellipse in [Border], [Fill] and [Profile]. See Figure 77.

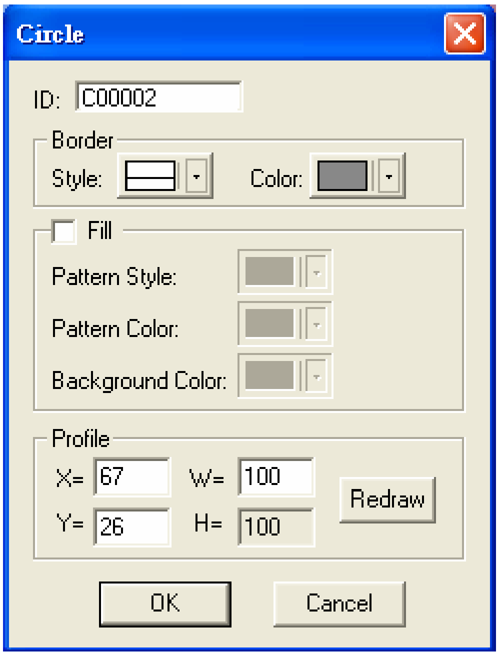


Figure 77. The [Circle] dialog box

2.6.1.7. [Acr]、[Pie] and [Solid Pie]

[Acr] is to draw a circle by holding down left mouse button. This will continue until configure desied size by right-click. Left-click for a radius display, a user can drag radius to configure a desired acr until re-click left key. See Figure 78. A user can adjust the width and height to configure an acr of an ellipse. See Figure 79.

The way to draw a pie and a solid pie is similar to [Acr]. The difference of a pie from an acr is two lines connected between the two-side of an acr and center. See Figure 79.

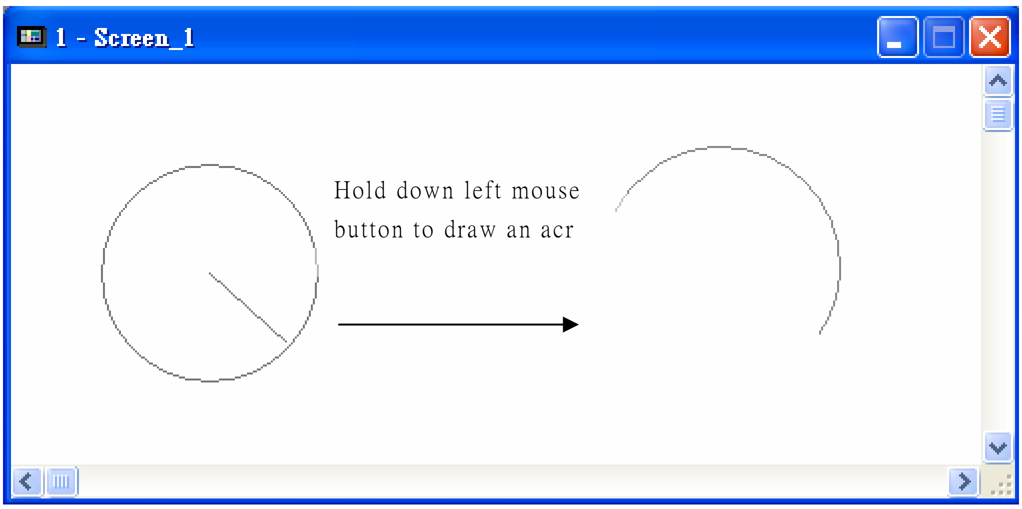


Figure 78. Draw a Acr

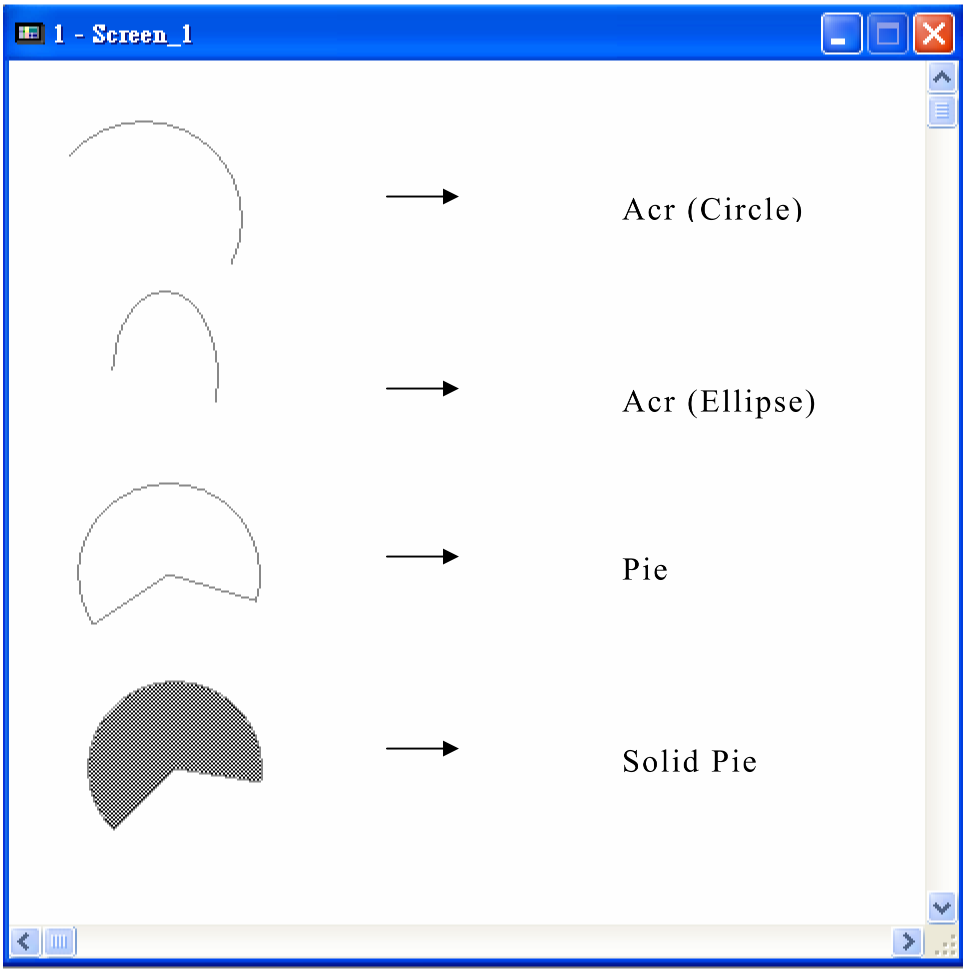


Figure 79. Acr, Pie and Solid Pie

The acr, pie and solid pie dialog box are the same; See Figure 80. Check [Arc] box to draw an arc; Check [Fill] box to draw a solid arc and secify [Pattern] there; Check [Arc] box and adjust the width and height in [Profile] to configure an arc of ellipse.

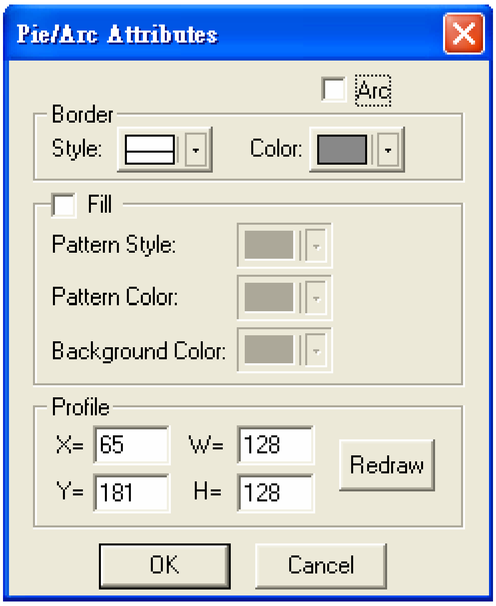


Figure 80. The [Pie/Arc Attributes] Dialog Box

2.6.1.8. [Polygon] and [Solid Polygon]

[Polygon] is to draw sides of a polygon with the movement of the mouse cursor and connect the lines between the starting point and the terminal point with shortest distance; See Figure 80. The way to draw a polygon is dragging the mouse cursor until left-click on the turning point and right–click to be a polygon.

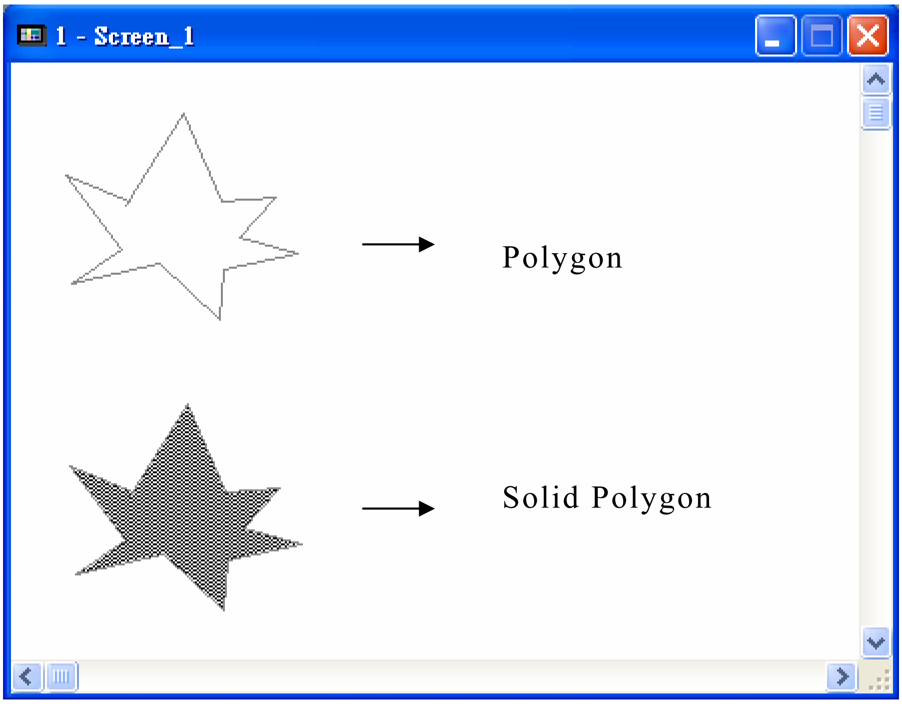


Figure 81. Polygon and Solid Polygon

A user can specify the attributes of polygon in [Border] and [Profile] and the attributes of solid polygon in [Border], [Fill] and [Profile]. See Figure 81.

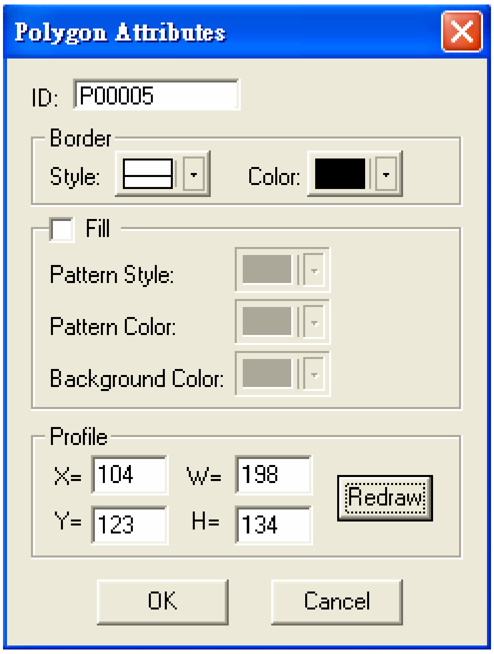


Figure 82. The [Polygon Attributes] Dialog box

2.6.2. [Static Text] ,[True Type Text]  and [Bitmap] 

2.6.2.1. [Static Text]

The [Static Text] provides users with the choices of text, font, color, reading order, alignment and frame/edge. Double-click on the object, the [Static Text] dialog box as in Figure 82 will be appeared on the screen.

- [Text] Tab: Enter text on the [Text] block. There are sixteen types of fonts in all for users to specify as Figure 82. A user can specify the font, sixteen types in all. For the properties which are not explained in this section, please refer to the Section [Font Library].

- [Frame/Edge] Tab: Click [Select] button to specify the style of frame/edge as Figure 83.

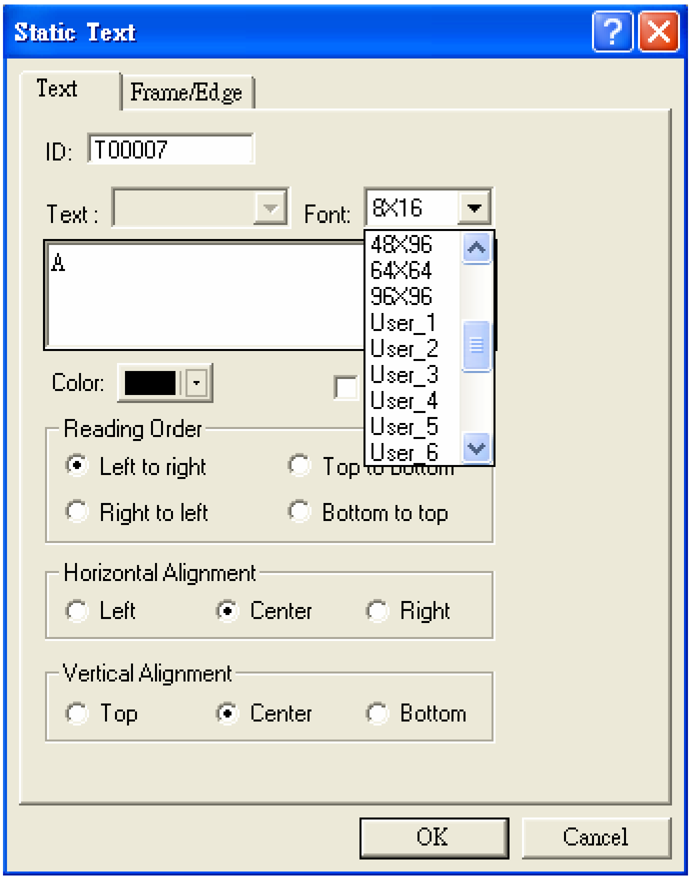


Figure 83. The [Static Text] Dialog Box

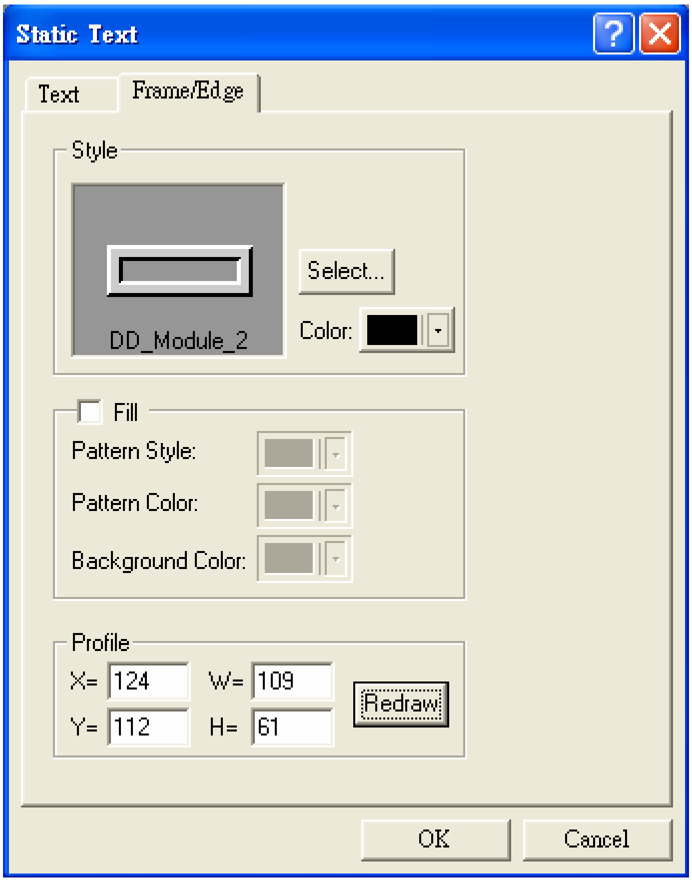


Figure 84. The [Frame/Edge] Tab

2.6.2.2. [True Type Text]

The functions of [True Type Text] and [Static Text] are similar only applicable on SoftPanel.

2.6.2.3. [Bitmap]

The purpose of [Bitmap] is to provide graphes for selection as the figure below.Double-click on the object; a user can select the bitmap form the drop-down list in the [Static Graphic] dialog box.

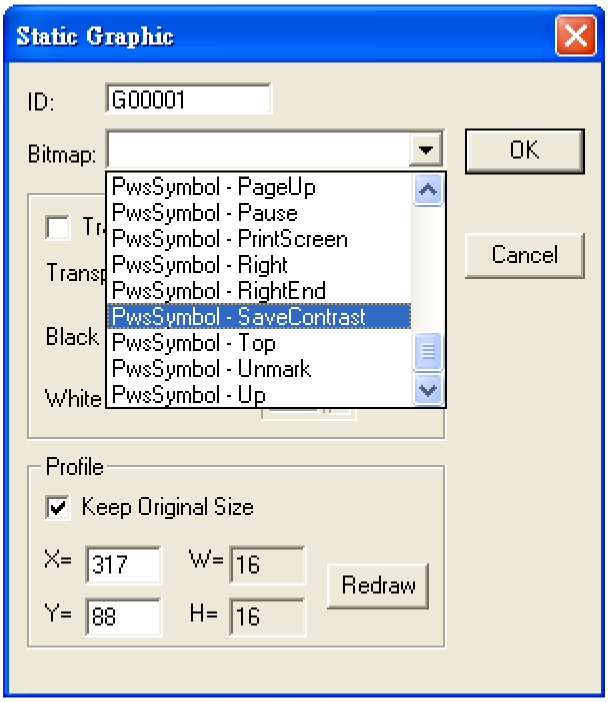
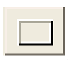


Figure 85. The [Static Graphic] Dialog Box

2.6.3. [Frame/Edge] ,[Scale]  and [Table] 

2.6.3.1. [Frame/Edge]

[Frame/Edge] provides style, pattern style, background and color for selection. See Figure 86.

Note that there is flow chart style for selection; See Figure 86.

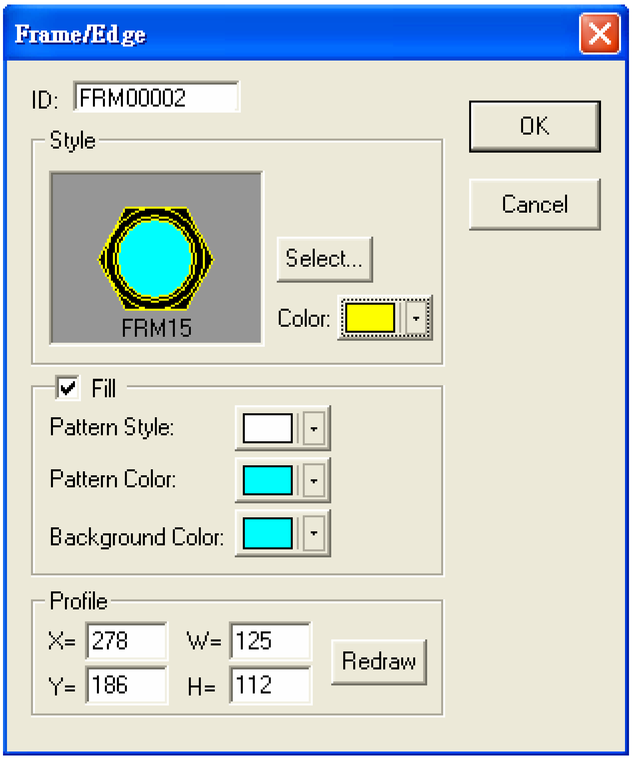


Figure 86. The [Frame/Edge] Dialog Box

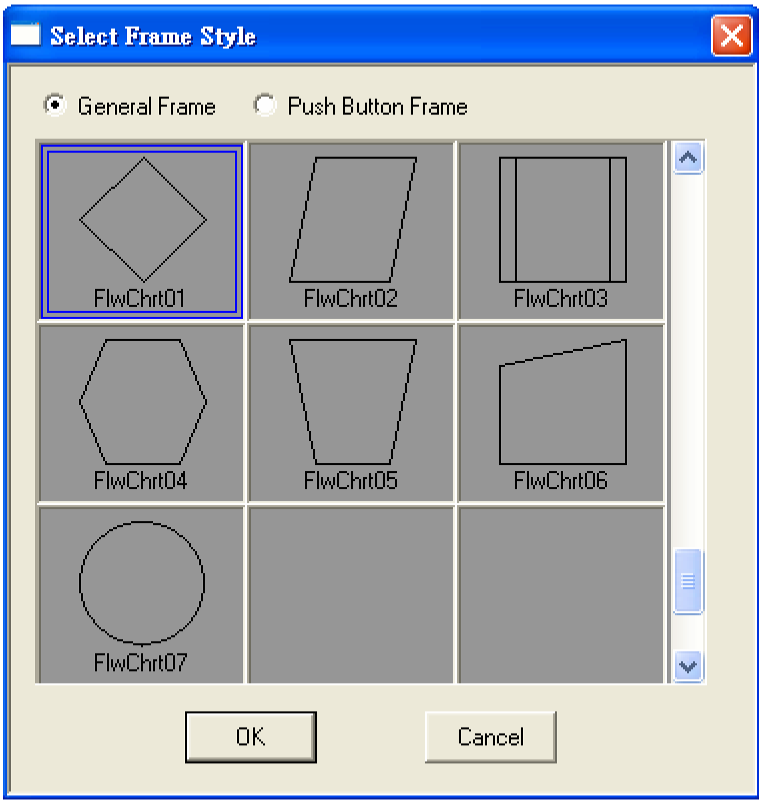
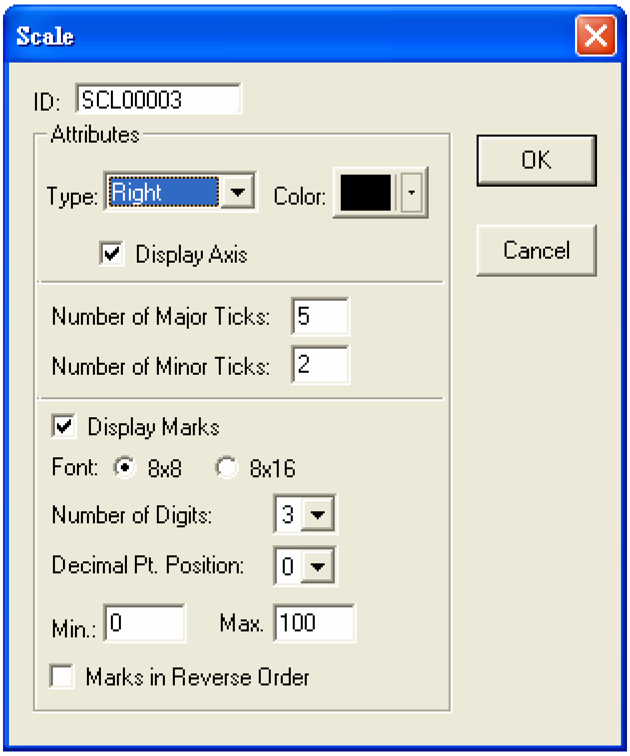


Figure 87. Select Frame Style

2.6.3.2. [Scale]

[Scale] provides left, right, up, down direction, color, number of ticks and display marks as below.



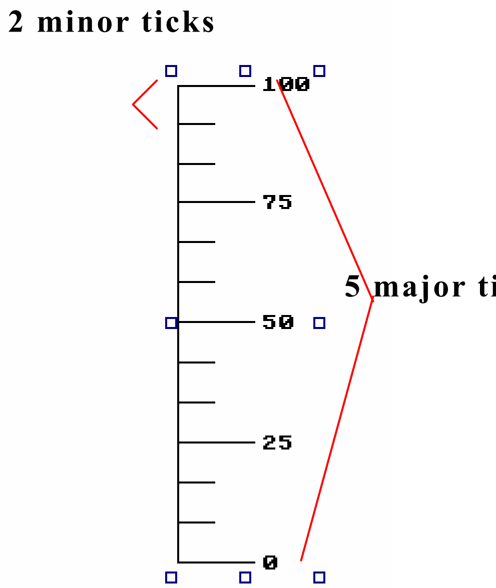


Figure 88. The [Scale] Dialog Box

2.6.3.3. [Table]

The function of [Table] is to create a table as below.

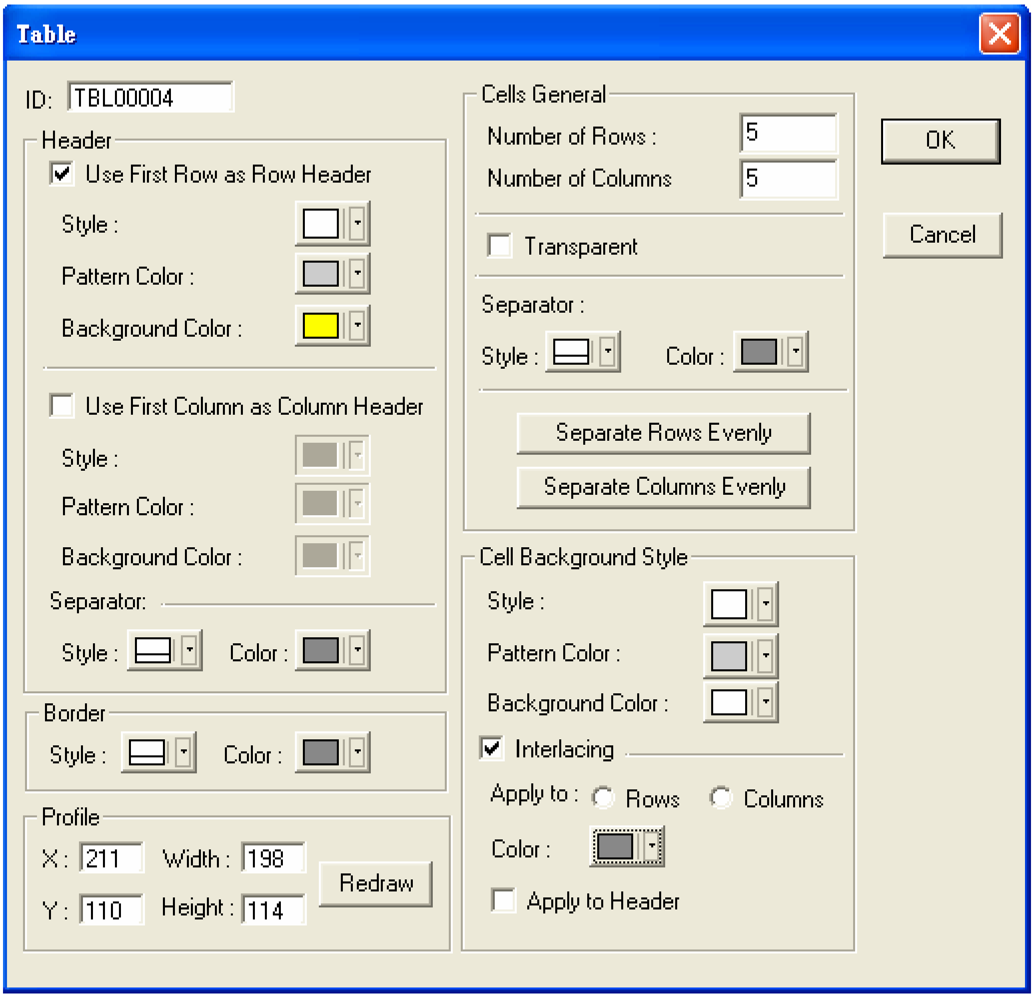


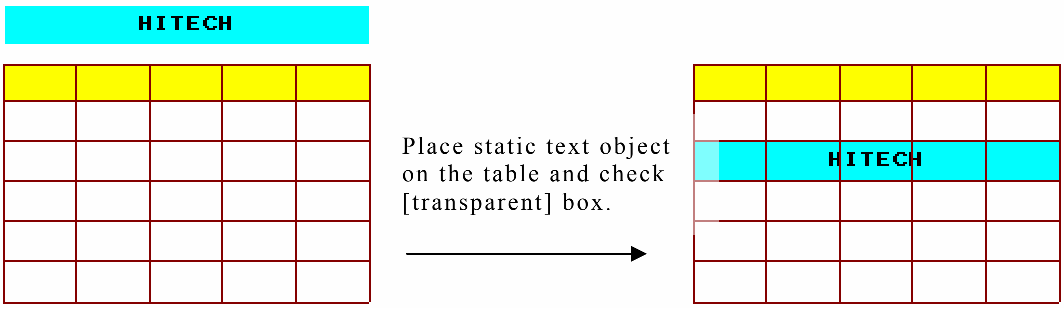
Figure 89. The [Table] Dialog Box

- [Use First Row as Row Header]：Specify the pattern style and color of row header.
- [Use First Column as Column Header]：Specify the pattern style and color of column header.
- [Border]：Specify the style and color of border.
- [Profile]：Specify the location and size of a table.
- [Cells General]：Specify number of rows/columns, and style.

- [Transparent]：Display other object(s) in the table but remembert to place the table up.

  Example：Static Text 

and Table as below.



- [Interlacing]：Interlace rows or columns; See below. (Only applicable on distransparent table)

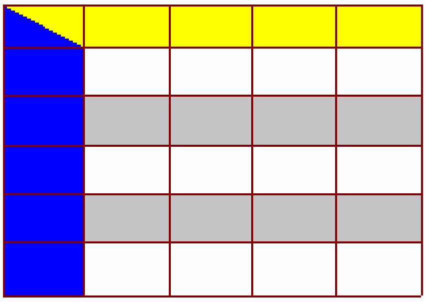


Figure 90. [Interlacing]

- [Apply to Header]：Interlace applied to header; See below. (Only applicable on distransparent table)

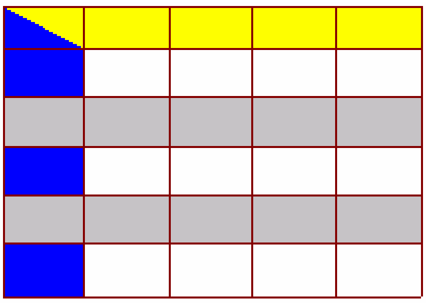


Figure 91. [Apply to Header]

2.6.4. [Shape] 

[Shape] provides graphes for selection; Double-click on the object, a user can press [select] for the shape library in the [Shape] dialog box as below.

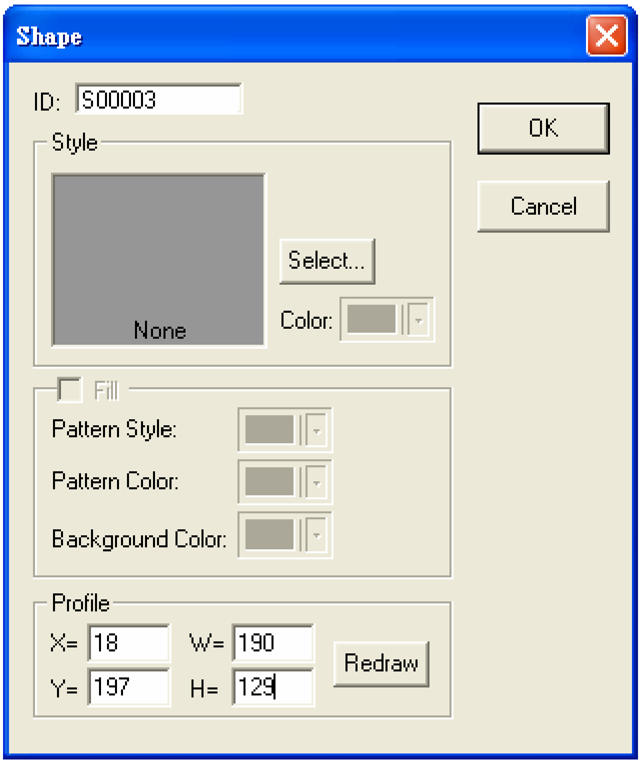


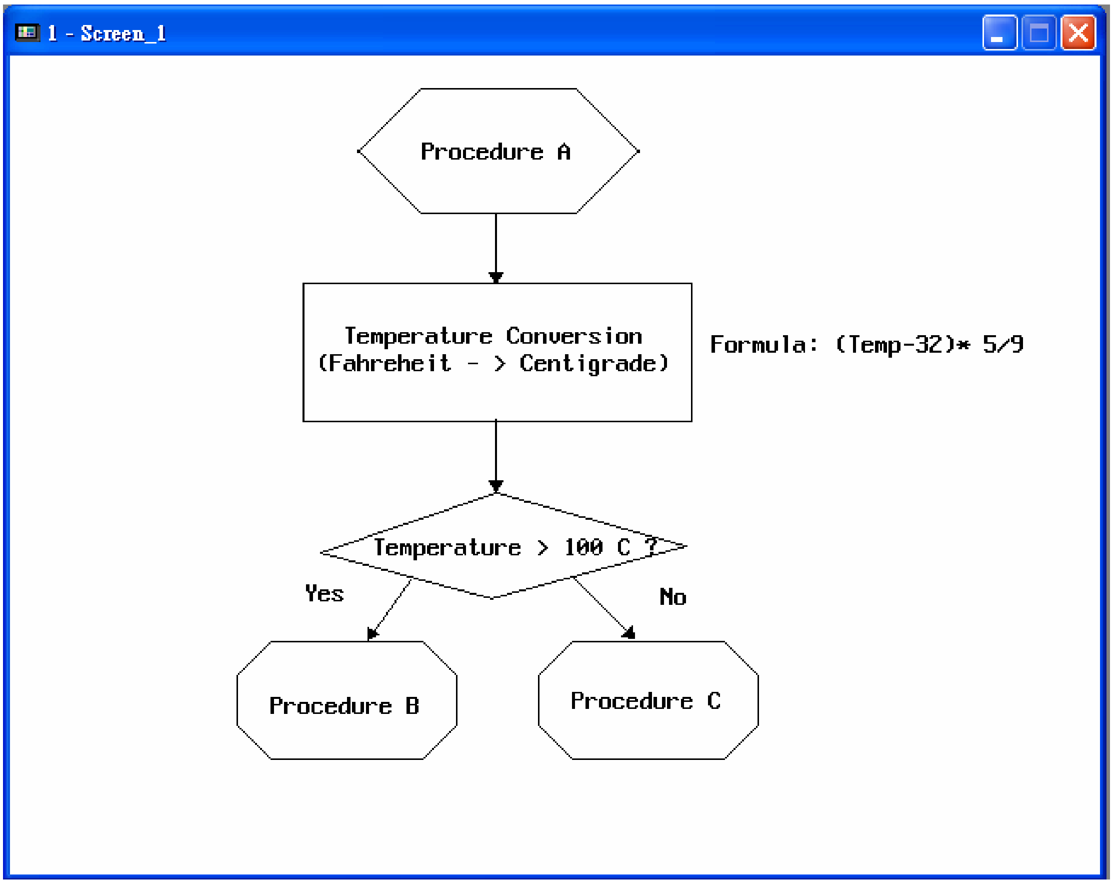
Figure 92. The [Shape] Dialog Box

2.6.5. Flow Chart

Flow chart is one of the applications in [Draw] to lines, geometric graphes and frame/edge editing. A user can illustrate an applied folw chart clearly to facilitate the operation.

Example:

Convert the boiler temperature in procedure A into centigrade (°C). Once the temperature > 100°C, it will enter procedure B; once the temperature ≤ 100°C will enter procedure C. The following flow chart is made up of polygon, rectangle, lines with arrows and static text:


1 - Screen_1
Procedure A
Temperature Conversion
(Fahreheit - > Centigrade)
Formula: (Temp-32)* 5/9
Temperature > 100 C ?
Yes
No
Procedure B
Procedure C

2.7. Object Menu

I. Introduction

A screen object is an item placed on the screen to perform a particular function. Each object has its unique user configurable properties and the object allows to be set to perform exactly the method desired.

Objects are divided into four categories: (1) related to screen button and dynamic data; (2) irrelative to screen button but related to dynamic data; (3) related to PLC dynamic data and Workstation memory buffer zone; and (4) related to application. See Figure 93.

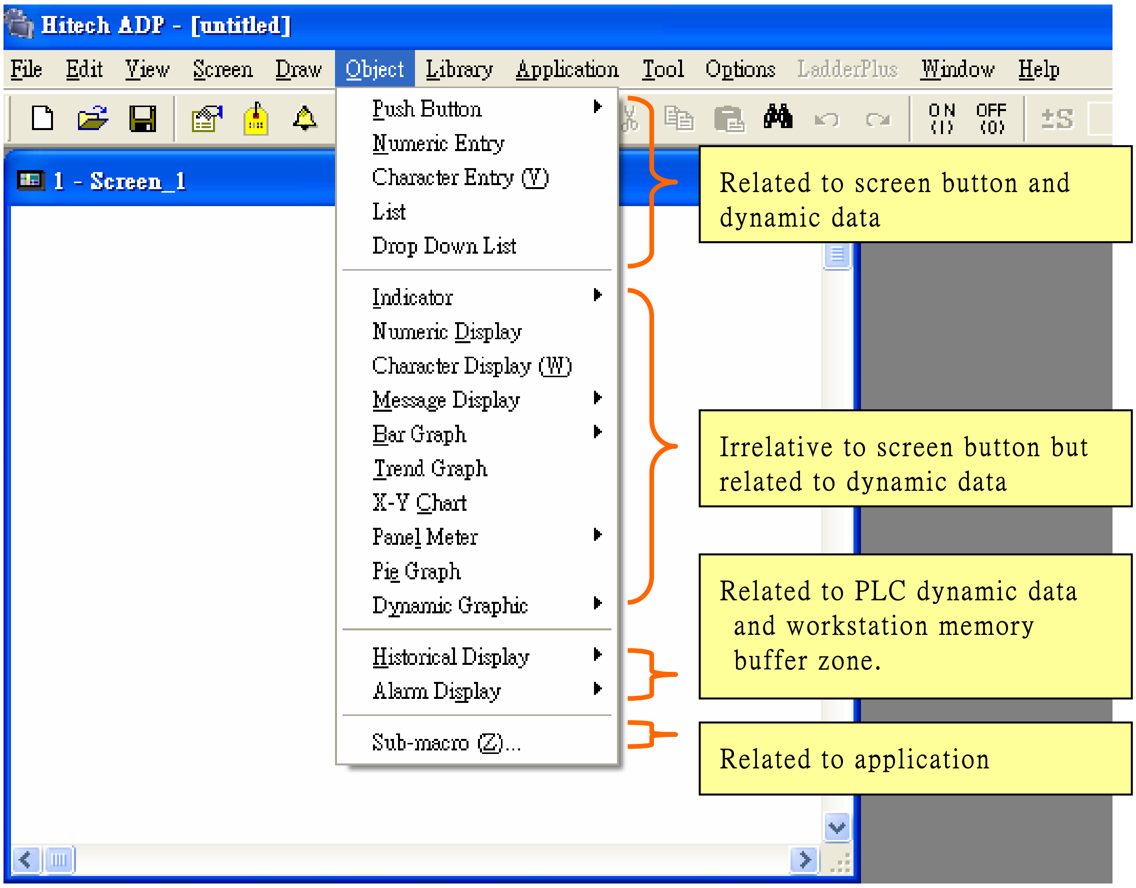


Figure 93. The [Object] Commands List

Four Categories of objects:

1. Related to screen button and dynamic data: [Push Button],[Numeric Entry],[Character Entry]....etc.

There are 13 sub-commands in [Push Button] list; See Figure 94.

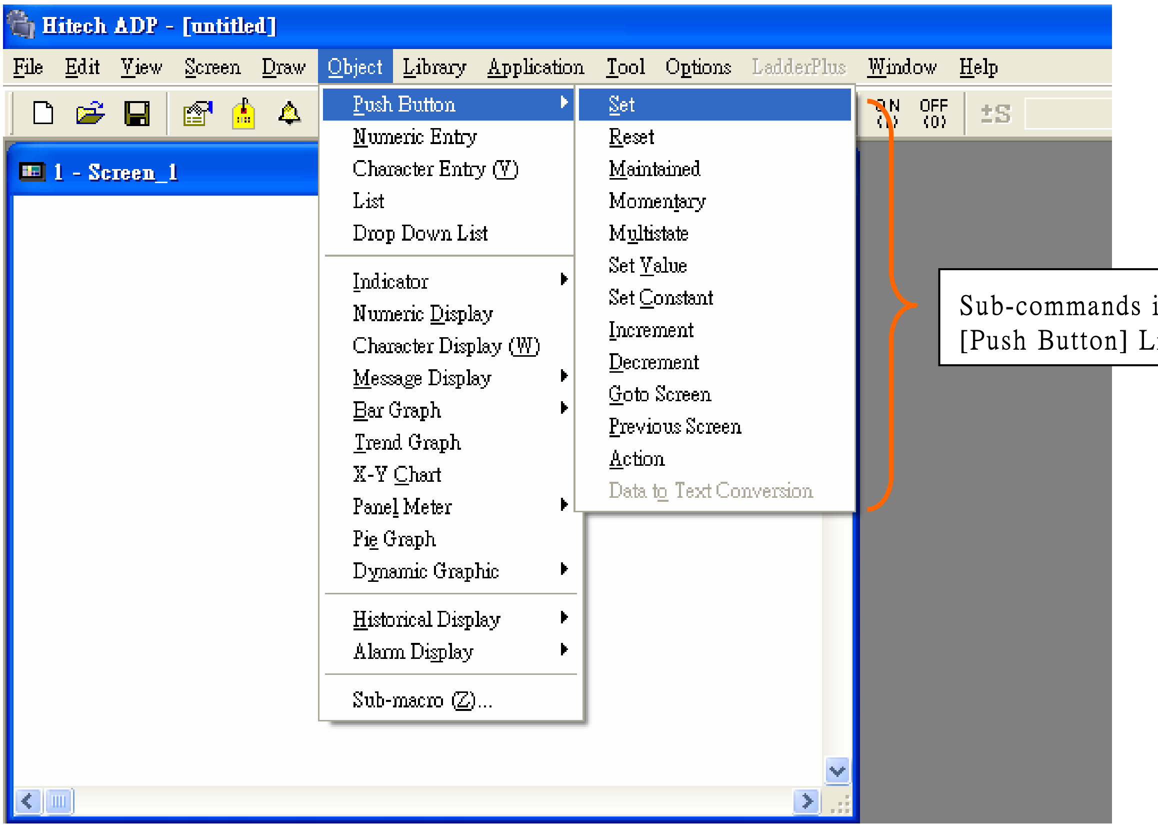


Figure 94. The sub-commands in [Push Button] list

2. Irrelative to screen button but related to dynamic data : [Indicator],[Numeric Display],[Character Display],[Message Display],[Bar Graph],[Trend Graph],[X-Y Chart],[Panel Meter],[Pie Graph],and [Dynamic Graphic].

3. Related to PLC dynamic data and Workstation memory buffer zone: [Historical Display] and [Alarm Display].

4. Related to application: Data contents are connected with whole system. One of the contents is modified such as text display or PLC data format, the other objects with the same application will be changed simultaneously as [Sub-macro].

II. Create Object

A user can select object type from the [Object] menu to edit. There are some objects with sub-commands list as Figure 94. Futhermore, [Basic Objects] toolbar provides part of objects for the editing as well; See Figure 95.

Figure 95. The [Basic Objects] Toolbar

Select a desired object from the list (ex: [Push Button]/[Set Button]), it will give you a cursor (+) that allows you to drag an object to desired size by press left mouse button until left-click. See Figure 96.

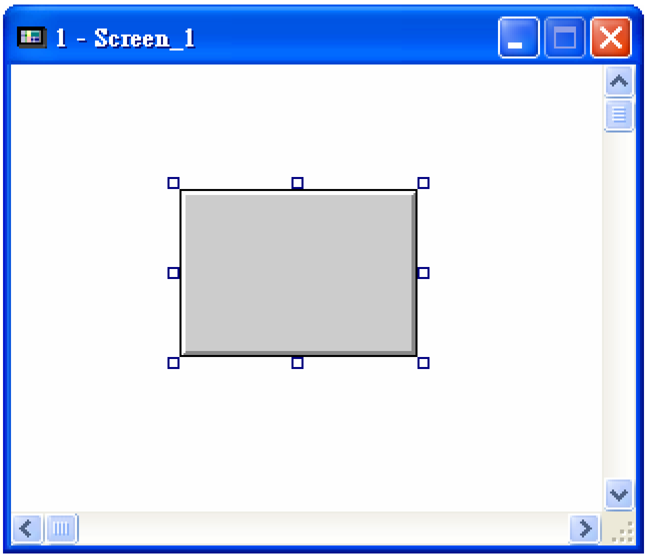


Figure 96. An Illustration of a Object

Once created, the object can be resized by clicking on one of the objects handlebars and dragging to resize it. To move the object, click and drag from the center of the object. (If the object handlebars are not visible, clicking anywhere on the object will bring up the handlebars).

III. Specify Object Properties

There are three ways to specify the properties of an object: (1) Users can select [Object Attributes] from the [Edit] menu. (2) Alternatively, double left-click on the object, or (3) right-click on the object and then select [Object Attributes] from the pop-up menu. Above ways will bring up the dialog box for properties specified. The [Set/Reset Button] dialog box as in Figure 97 will be appeared on the screen.

In ADP software, each object has its corresponding dialog box. For example, there is the [On/Off Button] dialog box in [Set Button] object; there is the [Numeric Entry] dialog box in [Numeric Entry] object.

The following will explain the common properties of most objects; concerning some specific properties will be explained later. The following are five tabs in object properties.

1. [Attributes] Tab: To specify the major properties. Each object has its attributes that define the operation; See Figure 97.

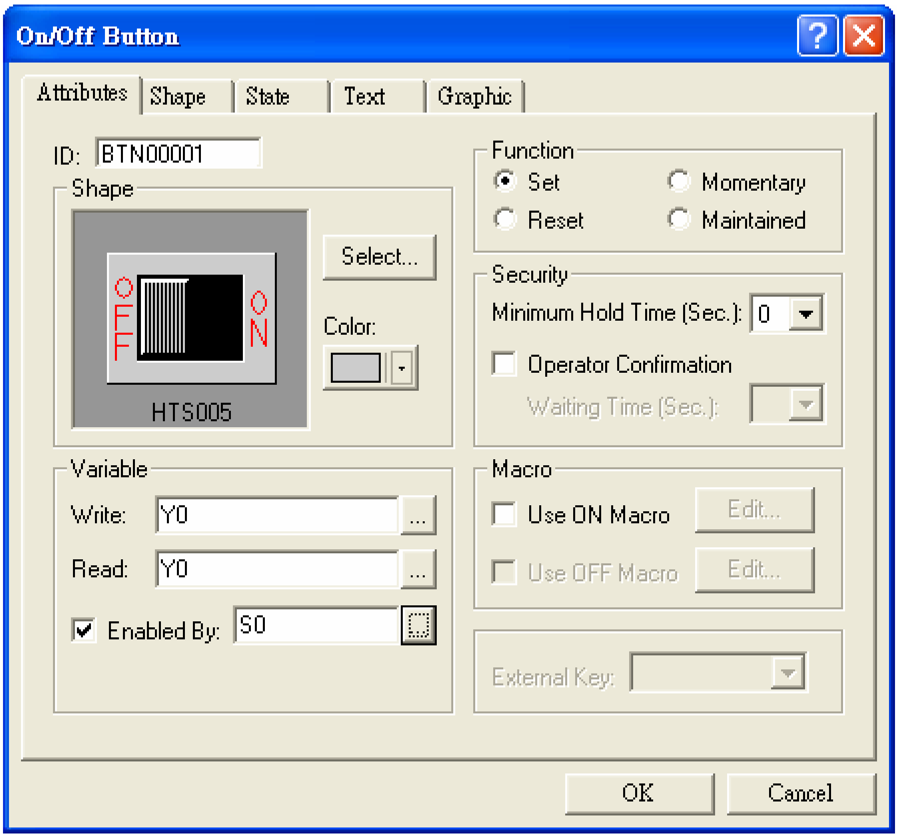


Figure 97. The [On/Off Button] Dialog Box

- [Shape] Block:
  - ♦ [Select]: Specify shape from library.
  - ♦ [Color]: Specify the color of selected shape.
- [Variable] Block:
  - ♦ [Write]: Write to the specified PLC register.
  - ♦ [Read]: Read the value from the specified PLC register. If the location is not specified, then the HMI reads from the [Write] location.

- [Enabled By]: Specify the PLC register to ON button. This isinapplicable on OFF state labeled⊘; See Figure 98. This is only applicable on ON state; See Figure 99. *(This feature is only applicable on objects with input text/numeric or specific state.)*

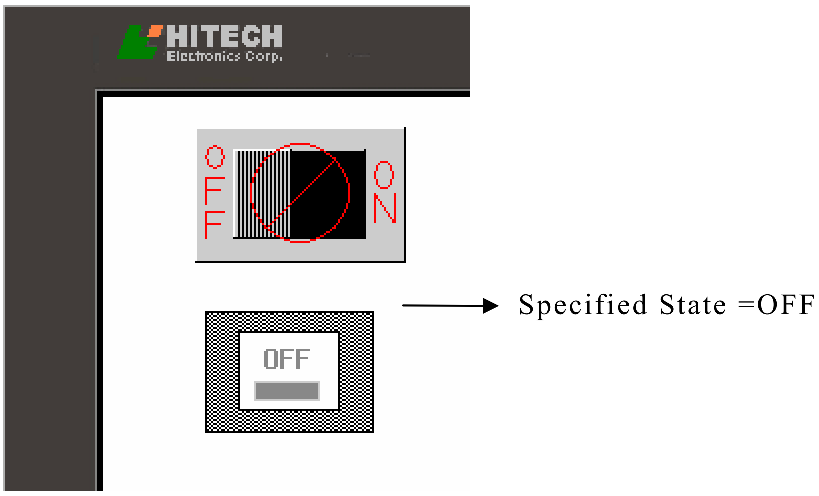


Figure 98. Specified State =OFF, inapplicable object with label ⊘

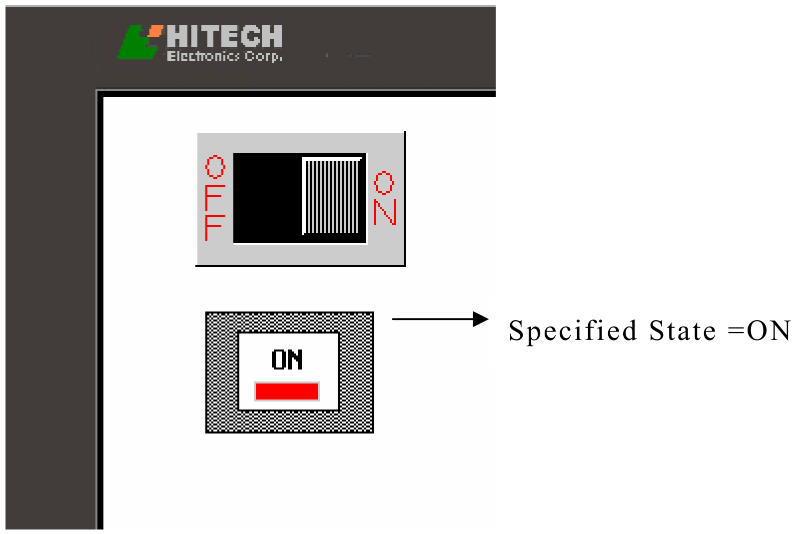


Figure 99. Specified State =ON

2. [Shape] Tab: Specify the shape style of a selected object as Figure 100.

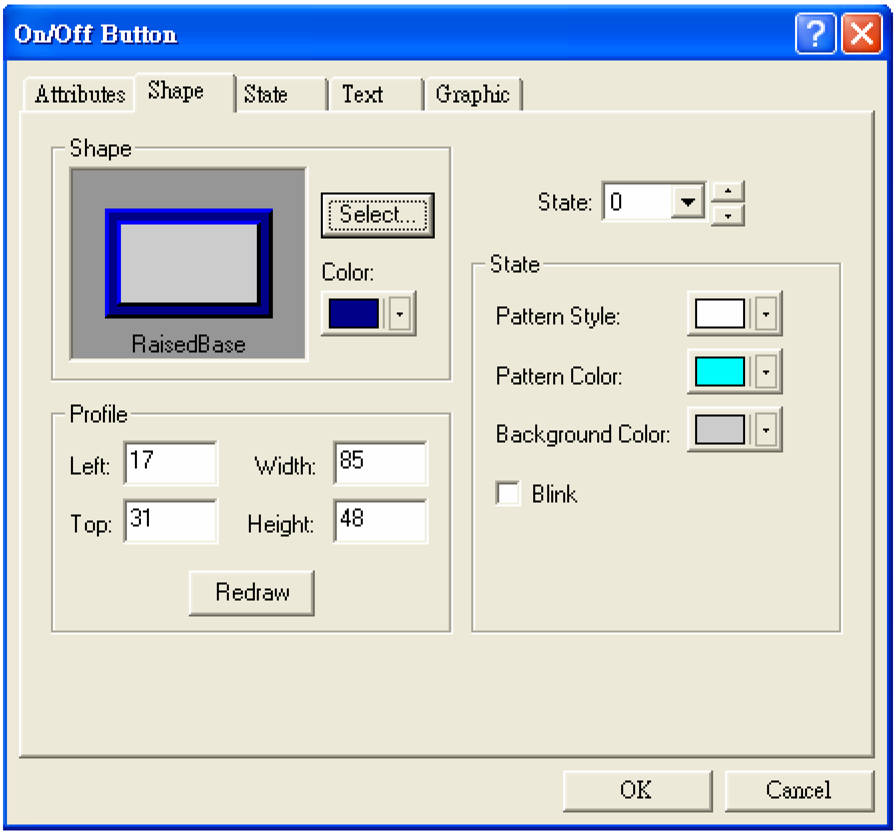


Figure 100. The [Shape] Tab

- [Shape] Block:
    - ♦ [Select]: Select shape from library.
    - ♦ [Color]: Specify the color of the shape.
- [Profile] Block: Specify the location, width and height of the object.
- [State] Block: Specify the object design to corresponding state.
    - ♦ [Pattern Style]: Specify the pattern style for the object.
    - ♦ [Pattern Color]: Specify the color of the pattern for the object.
    - ♦ [Bkg. Color]: Specify the background color of the object.
    - ♦ [Blink]: Check the object with blink or not.

3. [State] Tab: Specify [New]/[Copy]/[Delete] state to the object as Figure 101.

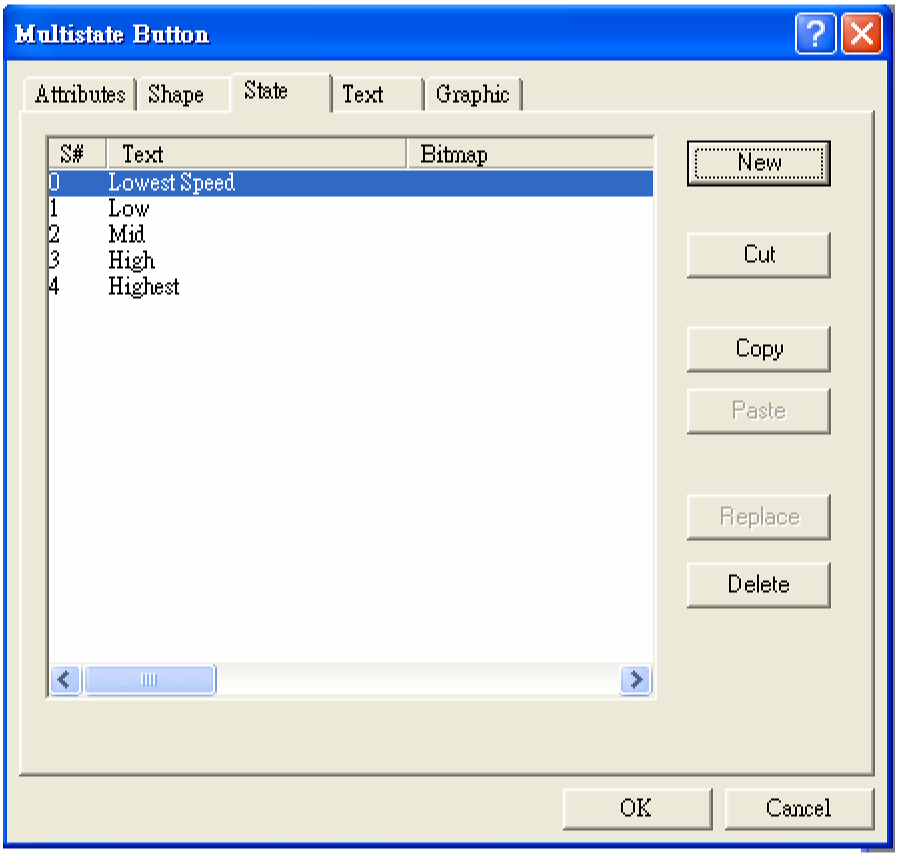


Figure 101. The [State] Tab

- [New]: Add new state to the object.
- [Cut]: Cut the specified state in the clipboard.
- [Copy]: Copy the specified state of the object and keep the original state.
- [Paste]: Paste the state from the clipboard.
- [Replace]: Replace the current specified state from the clipboard.
- [Delete]: Delete the current specified state.

4. [Text] Tab: Specify [Font],[Underlined],[Color],[Bkg. Color] and [Blink] as Figure 102.

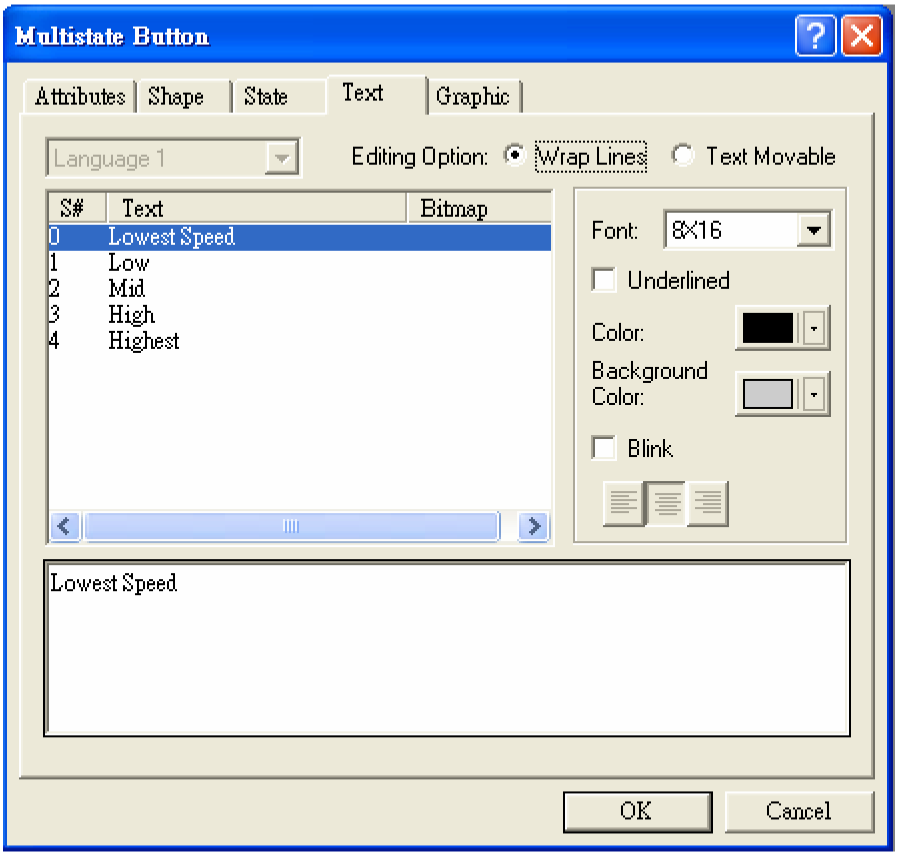


Figure 102. The [Text] Tab

- [Editing Option]:
  - ♦ [Wrap Lines]: When the length of the text is longer than the width of the button, it will be wrapped lines.
  - ♦ [Text Movable]: When the length of the text is longer than the width of the button, it won't be wrapped lines. Click the text object on the selected object, the text will be surrounded with the handlebars for drag.
- [Font]: Specify the size of the font.(be greater than *"16X16"*)
- [Underlined]: Check the text with underlined.
- [Color]: Specify the color of the text.
- [Bkg. Color]: Specify the background color of the text.
- [Blink]: Check the text with blink.
- : Align the text "Left/Center/Right"

5. [Graphic] Tab: Specify bitmap style, color…etc for each state as Figure 103.

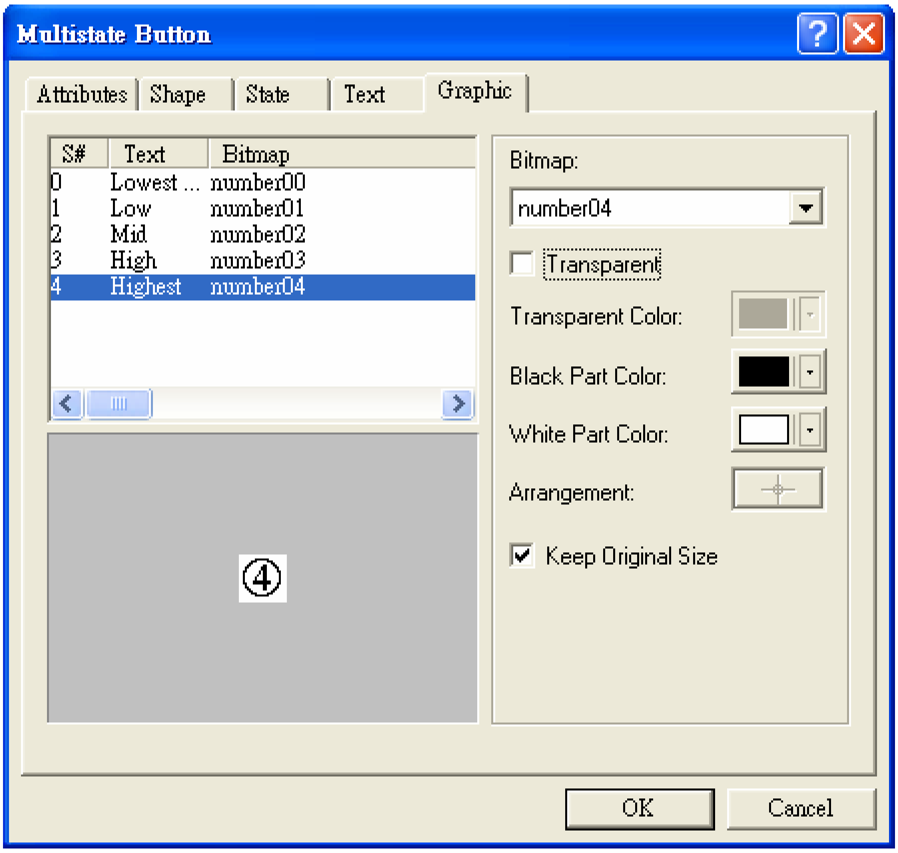


Figure 103. The [Graphic] Tab

- [Bitmap]: Specify the bitmap to display.
- [Transparent]: Check the bitmap with transparent.
- [Transparent Color]: Specify the color of the bitmap with transparent.
- [Black Part Color]: Replace the black part color.(only applicable on monochrome)
- [White Part Color]: Replace the white part color.(only applicable on monochrome)
- [Arrangement]: Arrange the moveable bitmap to previous location.
- [Keep Original Size]: Keep the bitmap original size.

The following sections will talk each basic object.

2.7.1. [Basic Objects]

There are 13 buttons in sub-command list on the [Push Button]. The following are these objects' table:

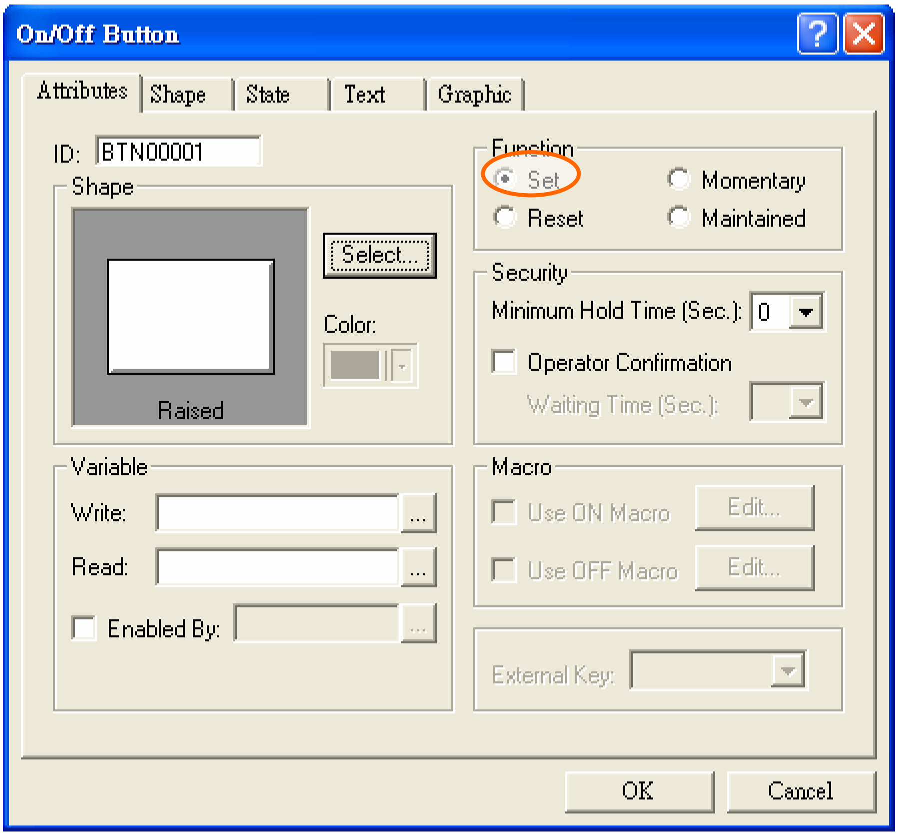
Basic objects	Icon	Function
Set Button	ON	Press to set the contact as ON,release or re-click still be ON.
Reset Button	OFF	Press to set the contact as OFF,release or re-click still be OFF.
Maintained Button		Press to set the contact as ON, release still be on; re-click be OFF.
Momentary Button		Press to set the contact as ON; release be OFF.
Multistate Button		Press to change a register to the next (previous) state of a referenced register. S0⇨S1⇨S2⇨S3⇨S4⇨S0 (a straightforward cycle) or S0⇨S4⇨S3⇨S2⇨S1⇨S0 (a reverse cycle).
Set Value Button	V	Press to a numeric keypad display. Press ENTER button to write a numeric entry to corresponding PLC register.
Set Constant Button	123	Press to write a constant to a register.
Increament/Decrea-ment Button	+ / −	Press to write the value obtained by adding/substracting a constant to/from the corresponding register value corresponding PLC register.
Goto Screen Button		Press to change the current screen to the specified screen.
Previous Screen Button		Press to change the current screen to the previous screen.
Action Button	!	Please refer to Section 2.7.1.12. [Action Button].
Data to Text Conversion Button		Convert logging buffer,recipe, alarm history and alarm frequency to *.PRN file readed by EXCEL, WORD, WORDPAD and so on.

2.7.1.1. [Set Button] ON

I. Function

When pressed, Workstaion sets the PLC corresponding bit location to be ON. A [Set] button will still be ON whenevr pressed or released

II. Properties



- [Function] Block： Select [Set] to create a [Set Button]

- [Security] Block：

  - ♦ [Minimum Hold Time (Sec.)]: Specify how long to activate the button's function; There are 0~10 (Sec.) for selection.
  - ♦ [Operator Comfirmation]: If any changes have been made, the dialog box will appear on the screen to ask a user to confirm the desired operation. There are 5~60 (Sec.) waiting time for selection.

- [Macro] Block：Check the [Use ON Macro] for a [Set Button]. When pressed [Edit] button, the [ON Macro] dialog box will appear as in Figure 104 on the screen. For the properties which are not explained in this section, please refer to the Chapter 8 Macro.

  - ♦ [Use ON Macro]: When pressed the [Set Button], Workstation will run the program which is designed in ON macro. This feature is to data control, screen display, PLC register, bits initialized and so on.

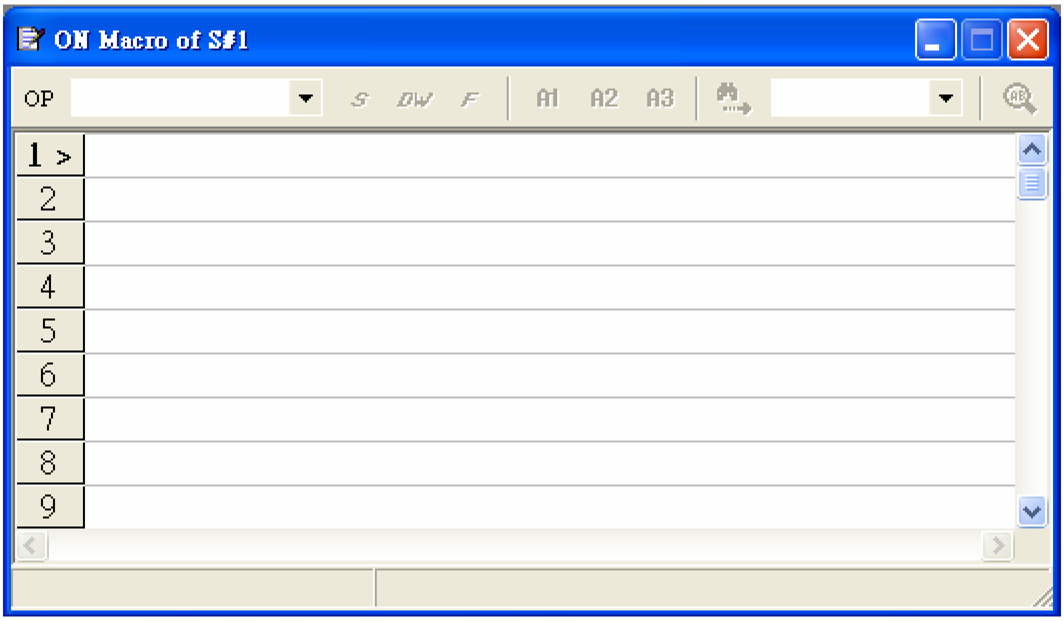


Figure 104. The [ON Macro] Edit Window

- [External Key]：To set the external key and definite the key function F1~F9, this feature is only applicable on PWS500.

For the properties which are not explained in this section, please refer to the Section 2.7. Object III Specify Object Properties.

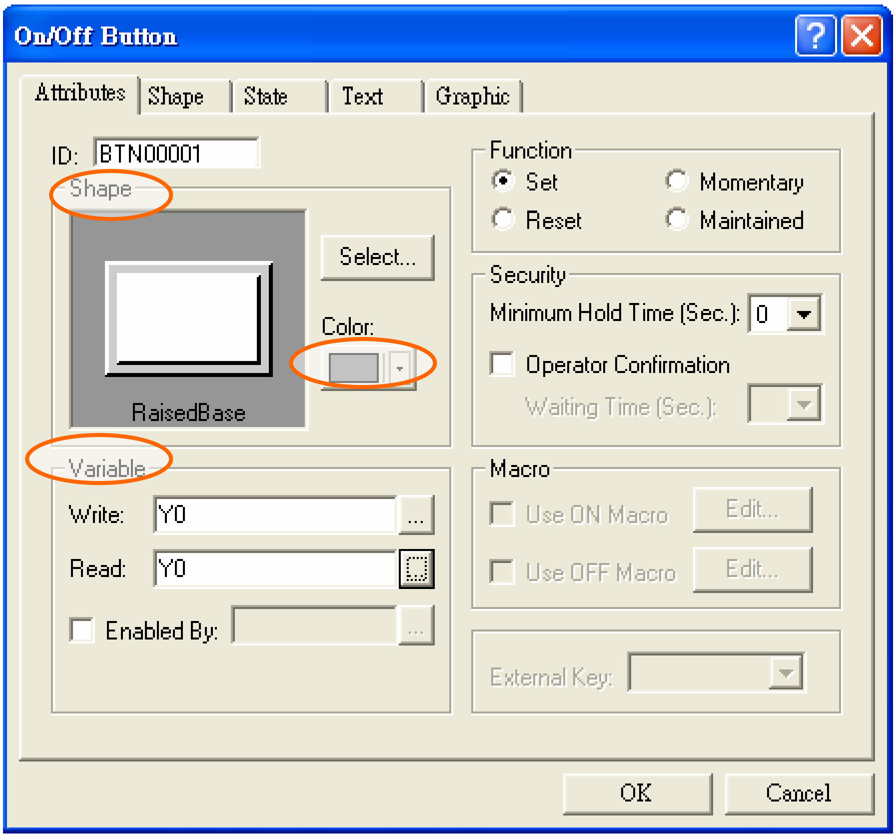
III. Example

To design a [Set] button as shown in the following：

1. Shape：Select "Raised".

2. [Write]：Specify the PLC register "Y0" to write in.
   [Read] ：Specify "Y0". (The HMI model is PWS3261 and the PLC model is Mitsubishi FX2N.)

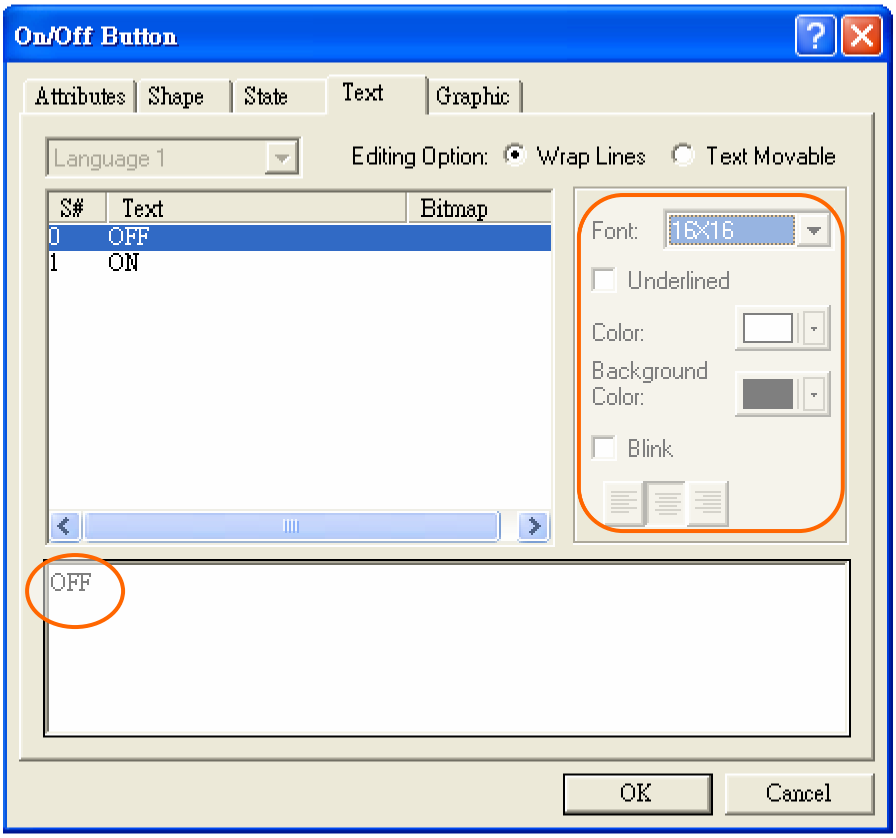
To design a [On/Off] button on the [Attributes] tab as shown below:



3. Enter text "OFF" in state 0 (OFF); the font is "16x16", the color is "White" and the bkg. color is "Black".

4. Enter text "ON" in state 1 (ON); the font is "24x24", the color is "Black" and the bkg. color is "White".

To design a [On/Off] button on the [Attributes] tab as shown below:



Above-mentioned steps will create a [ON] button. The bkg. color is "White" and the text is "ON" in state 1; the bkg. color is "Black"and the text is "OFF" in state 0. See Figure 105.

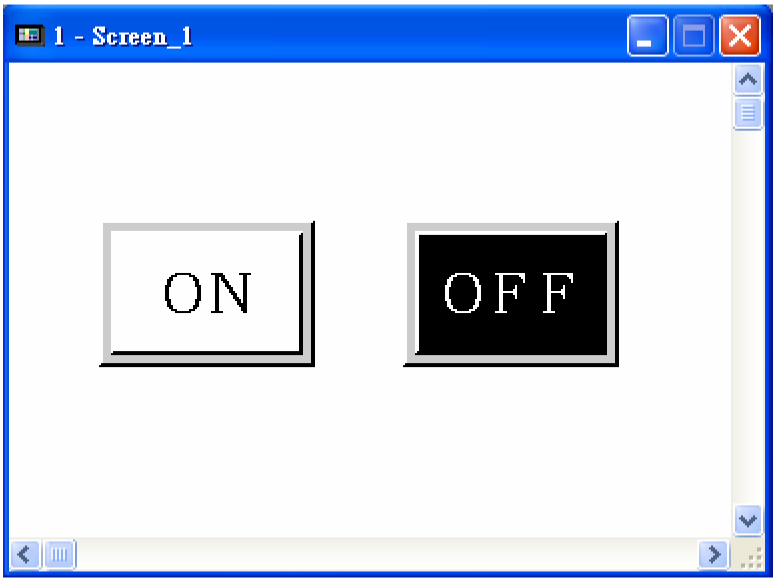


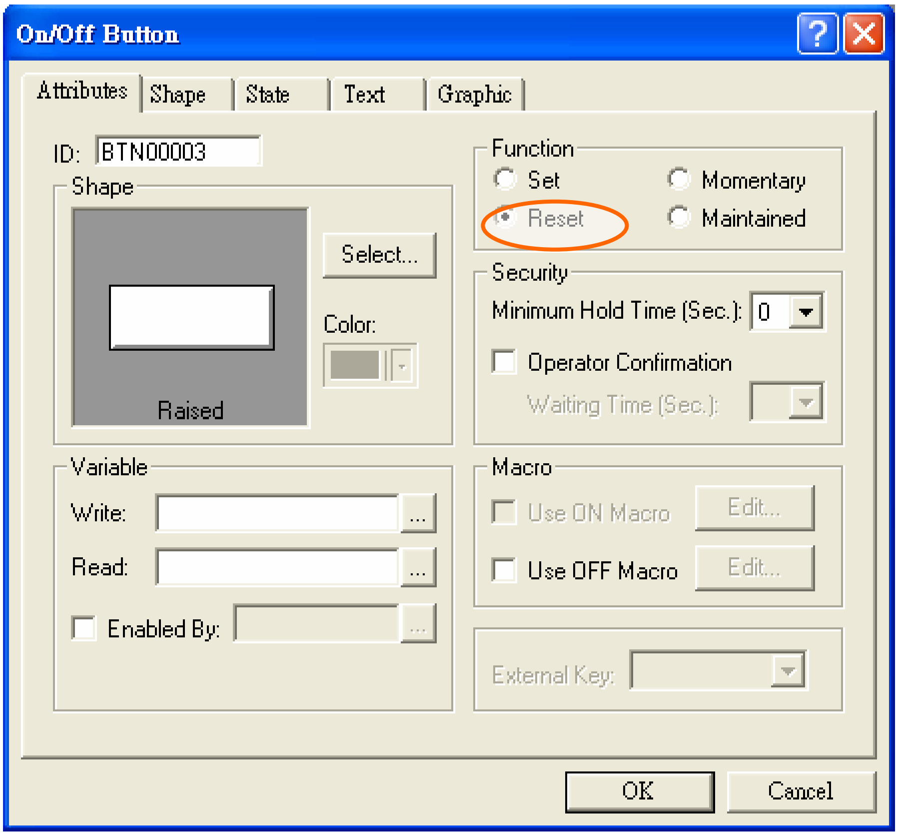
Figure 105. Left-side button displays [ON] in state 1; Right-side displays [OFF] in state 0

2.7.1.2. [Reset OFF] 

I. Function

The command is contrary to an [ON] button. A [Reset] button sets a bit-location to OFF whenever pressed or released.

II. Properties



- [Function] Block：Select [Reset] to create a [OFF] button.

All other properties are the same as [Set Button], please refer to 2.7.1.1. [Set Button].

III. Example

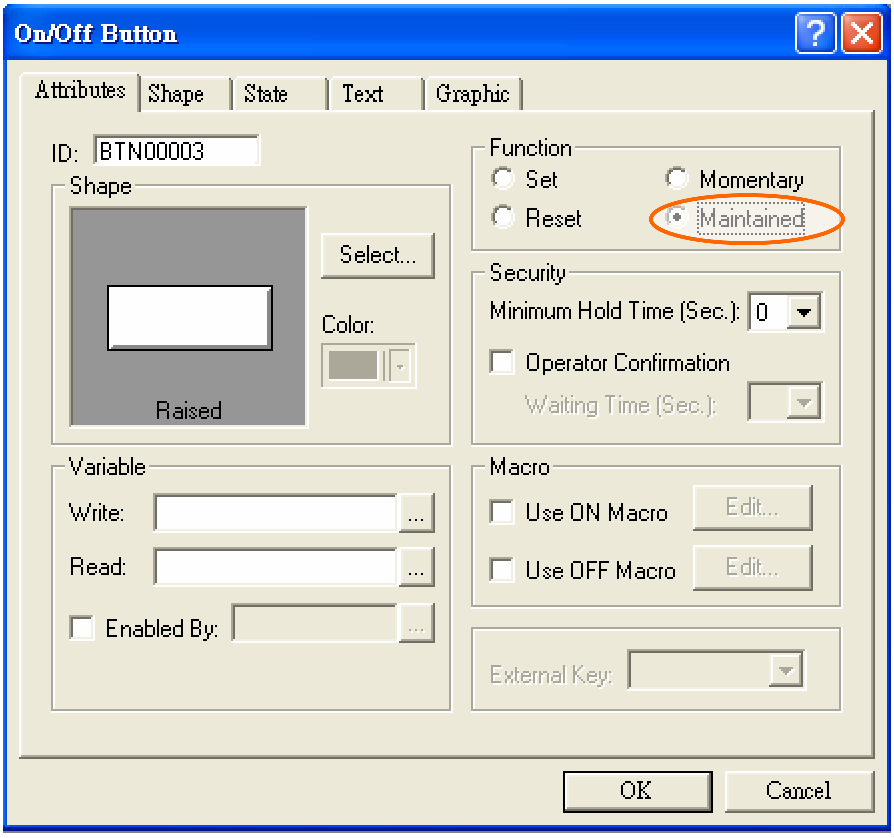
To design two state displays as a [ON] button simultaneously; please refer to the Section 2.7.1.1. [Set Button].

2.7.1.3. [Maintained Button]

I. Function

This function is to changes the button states by press. Press to be ON and release still be ON until re-click to be OFF.

II. Properties



- [Function] Block：Select [Maintained] to create a [Maintained] button.
- [Macro] Block：There are [User ON Macro] and [User OFF Macro] options for [Maintained Button]. For the properties which are not explained in this section, please refer to the Chapter 8 Macro.

Other properties are the same as [Set Button], please refer to the 2.7.1.1. [Set Button].

III. Example

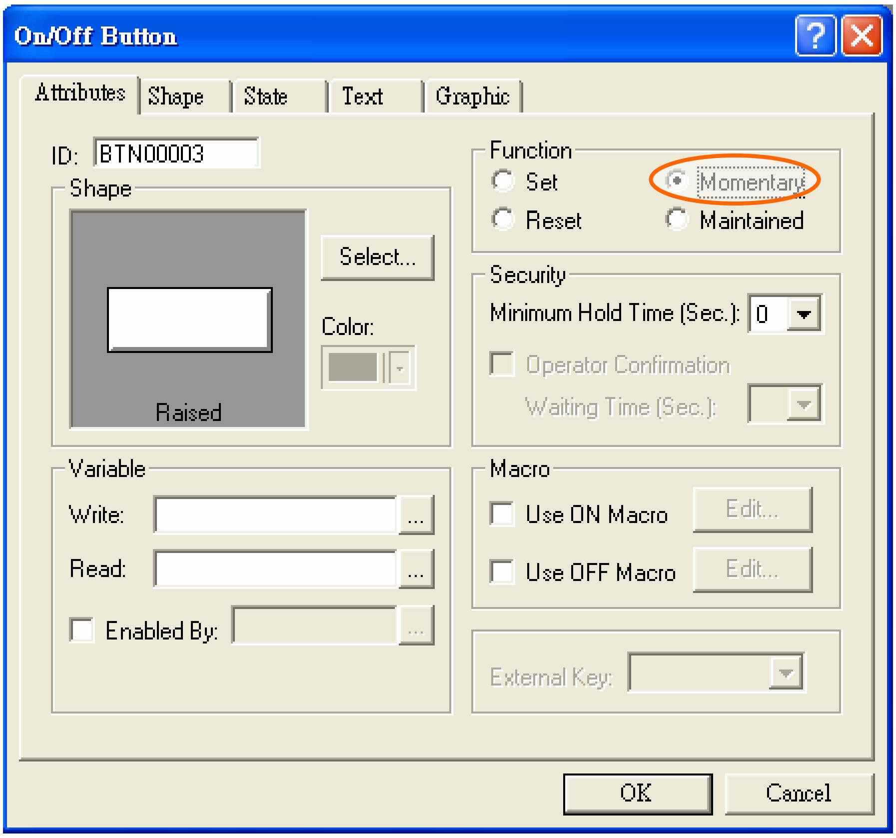
To design two states as a [ON] button; please refer to 2.7.1.1. [Set Button].

2.7.1.4. [Momentary Button] 

I. Function

The function of this command is to changes the state by press and release. Once the button is pressed, the bit-location is ON; Release to be OFF.

II. Properties



- [Function] Block：Select [Momentary] to create a [Momentary] button.
- [Macro] Block：There are [Use ON Macro] and [Use OFF macro] options for [Momentary Button]. For the properties which are not explained in this section, please refer to the Chapter 8 Macro.

To design two states as a [ON] button simultaneously; please refer to 2.7.1.1. [Set Button].

Notice that this command does not provide [Use ON Macro] and [Use OFF Macro].

I

II. Example

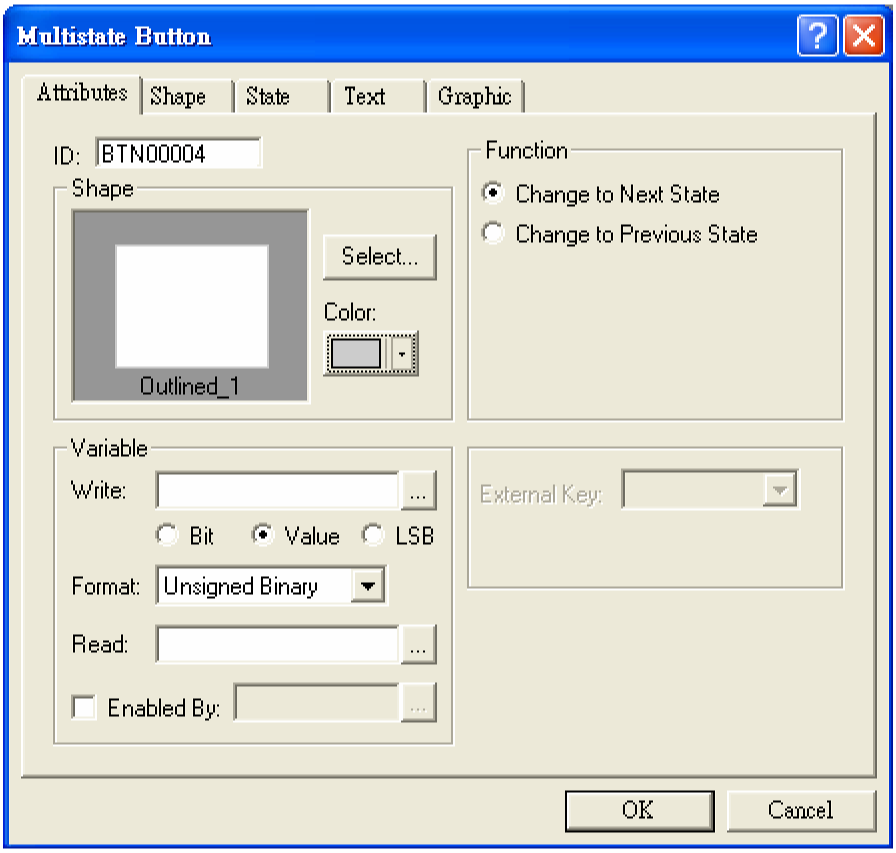
To design two states as a [ON] button simultaneously; please refer to 2.7.1.1. [Set Button].

2.7.1.5. [Multistate Button]

I. Function

Once the button is pressed, Workstation will write the command to a correspondent PLC bit-location or register. The option [Change to Next State] is to change states in straightforward cycle (S0⇨S1⇨S2⇨S3⇨S4⇨S0); the option [Change to Previous State] is to changes states in reverse cycle (S0⇨S4⇨S3⇨S2⇨S1⇨S0).

II. Properties



- [Variable] Block：

- ♦ [Write]: Write the specified command to a correspondent PLC bit-location and register.
  - [Bit]: Only two states. (Enable a user to enter multi-stated text but only two states can be displayed on Workstation)
  - [Value]: 256 (0-255) states in all, 0 represents state 0; 1 represents state 1…etc.
  - [LSB]: 16 states in all represented by bit. The Workstation takes the bit number of the least bit that is on as the state number.
- ♦ [Format]: Only applicable on [Value] option. There are [BCD], [Signed Binary], and [Unsigned Binary] options.
- ♦ [Read]: Specify a register/bit location to read in; if the location is not specified, then the HMI reads from the [Write] location.

- [Function] Block：

  - ♦ [Change to Next State]: Change the [Write] location to its next state in straightforward cycle S0⇨S1⇨S2⇨S3⇨S4⇨S0.
  - ♦ [Change to Previous State]: Change the [Write] location to its previous state in reverse cycle S0⇨S4⇨S3⇨S2⇨S1⇨S0.

Note that the number of states can be edited in [State] tab.

For other properties which are not explained in this section, please refer to the Section 2.7. III Object Specify Object properties.

III. Example

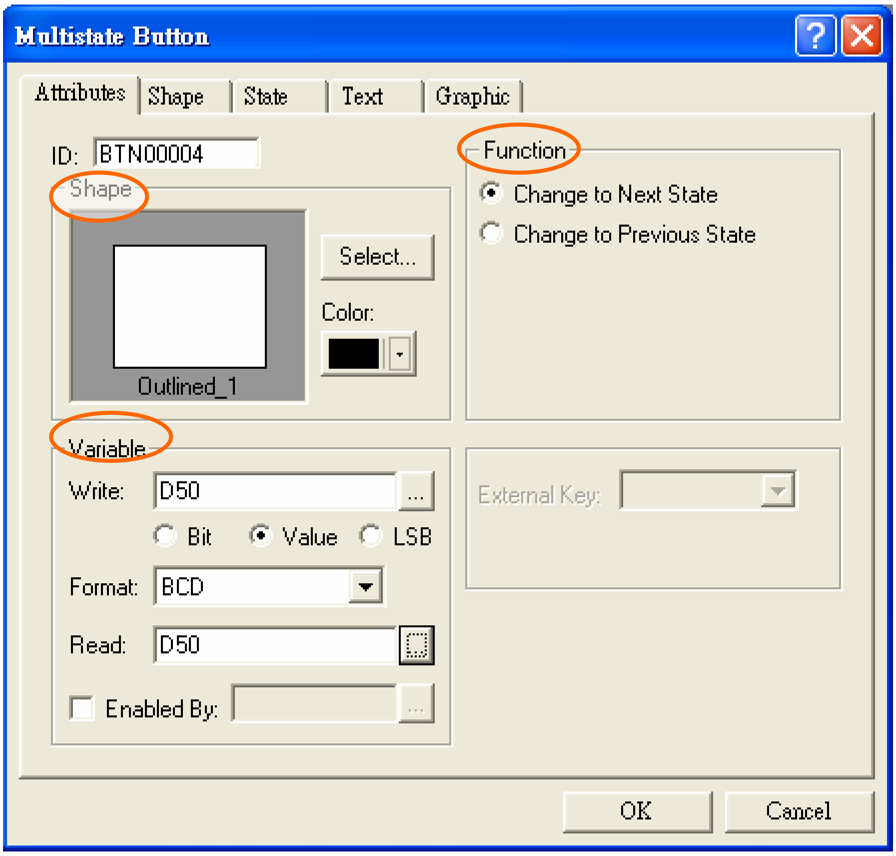
To design a [Multistate] button as the following:

1. [Write]：Specify the PLC register “D50” to write in. [Read] ：Specify as “D50”. (The HMI model is PWS3261 and the PLC model is Mitsubishi FX2N.)

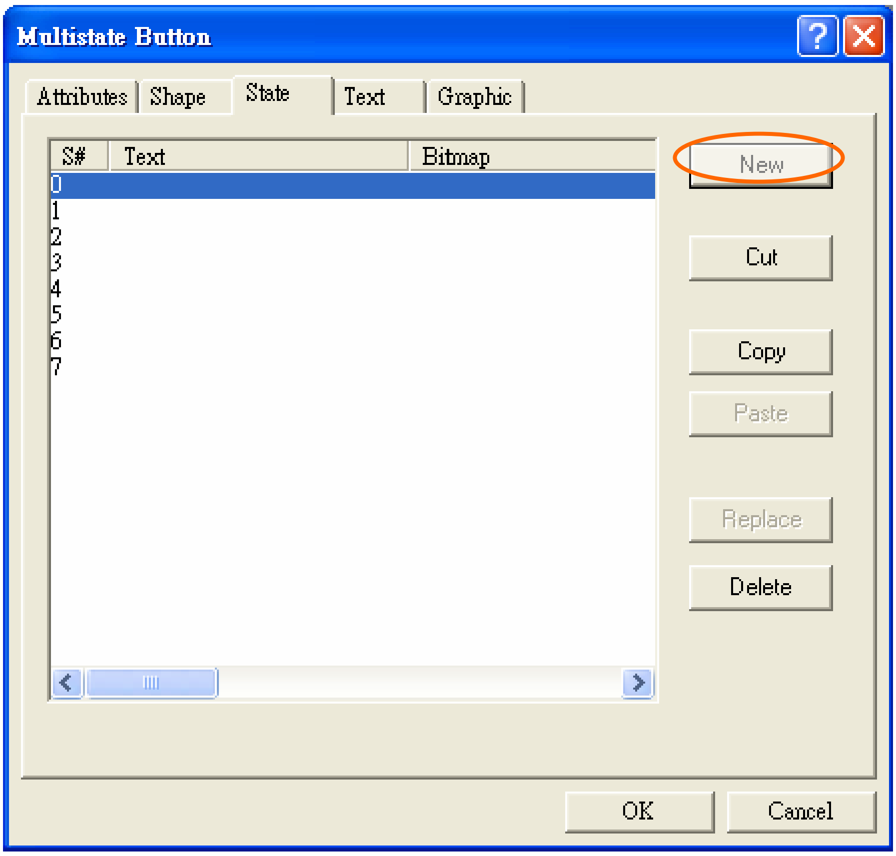
2. The format is [Value].

3. The [Function] is [Change to Previous State].

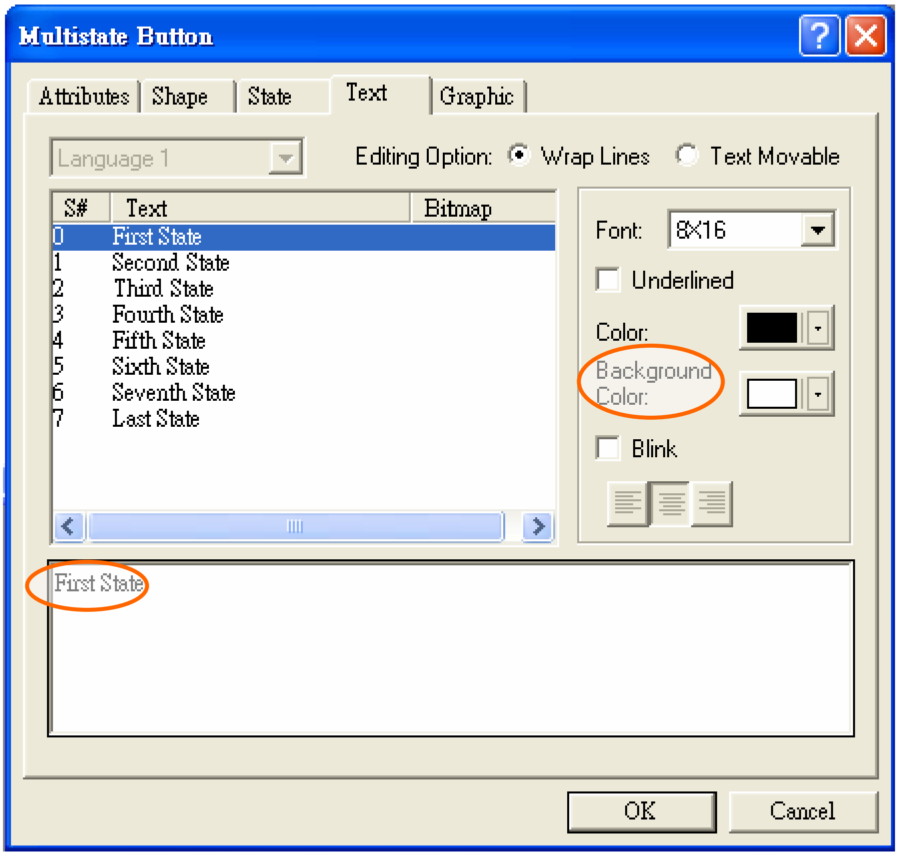
4. Shape：Select “Outlined _1” and the color is black.



5. Add 8 states in [State] tab.



6. Enter the correspondent words on the [Text] tab and specify the text display.



Aboved-mentioned steps will create a [Multistate Button]. The button displays “First State” in state 1; the button displays “Second State” in state 1...etc. See Figure 106.

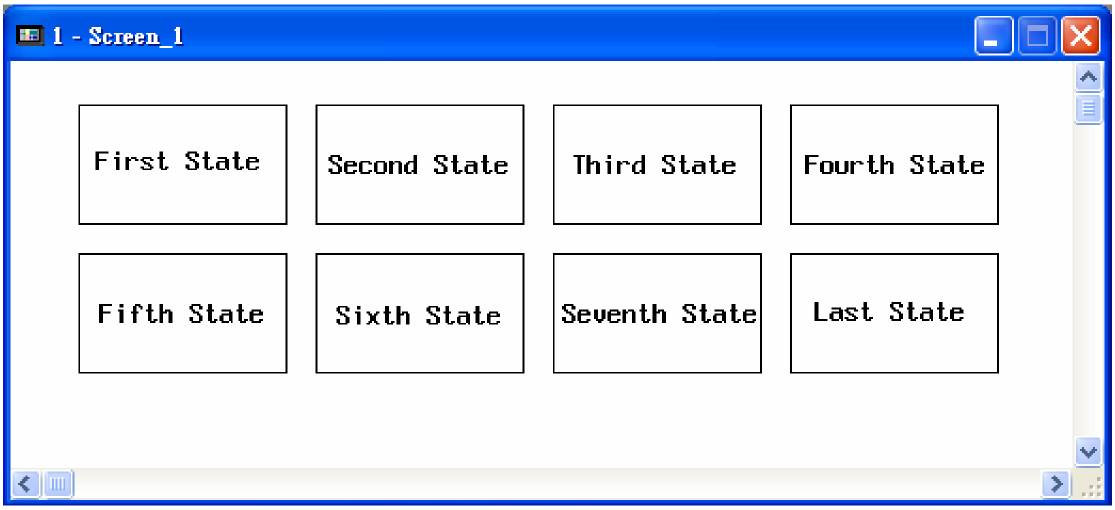
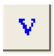


Figure 106. The 8 states in [Multistate Button]

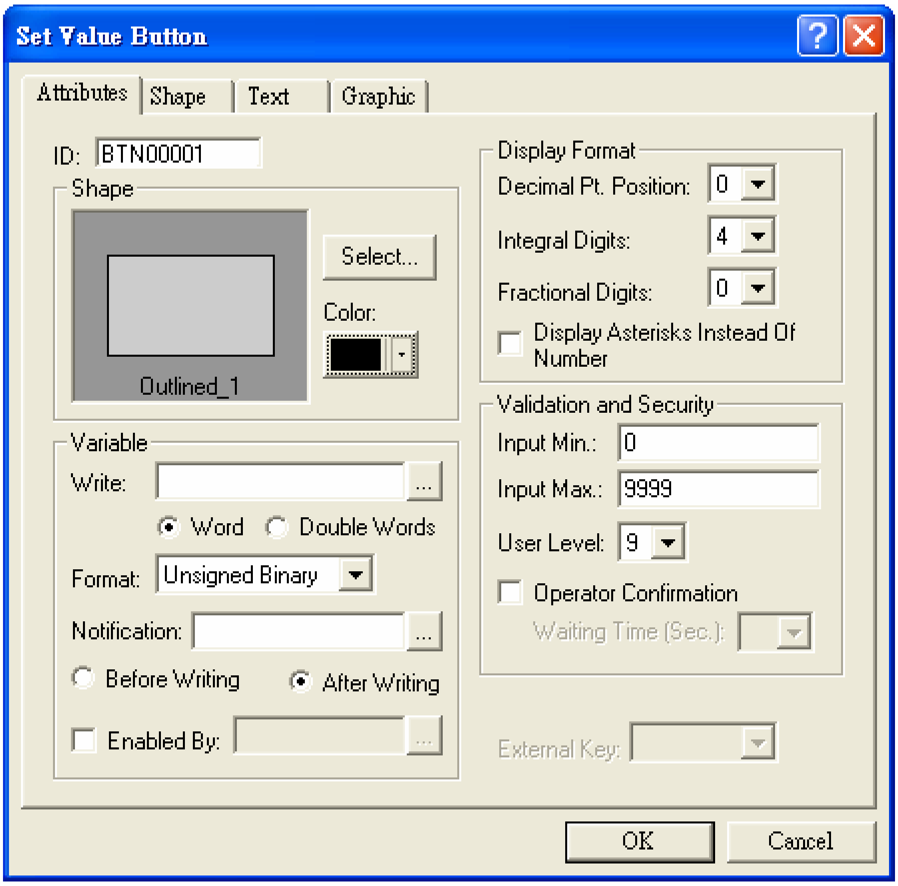
2.7.1.6. [Set Value Button] 

I. Function

The function of this command is for numeric entry. When pressed, theWorkstation displays a numeric keypad on the screen. When pressed [ENT], the Workstation will store the input value to the correspondant PLC register.

Note that the correpondant PLC value is not applicable on [Set ValueButton].

II. Properties



- [Variable] Block:
  - ♦ [Word]：The entered value is a 16-bit data; the maximum 65,535.
  - ♦ [Double Word]：The entered value is a 32-bit data; the maximum is 4,294,967,295.
  - ♦ [Format]：There are “BCD”, “Signed Binary”, “Unsigned Binary” and “Hexadecimal” options.
  - ♦ [Notification]：Specify a register/bit location to be notified;

the HMI will set the bit to be ON.

- [Before Writing]: The HMI sets the Notification to be ON when the numeric keypad appears and sets the location to be OFF when the numeric keypad disappear.
- [After Writing]: The Worksation sets the [Notification] location to be ON after writing the input value to the [Write] location.

- [Display Format] Block:
  - ♦ [Decimal Pt. Position] ：Specify the number of digits after the integral part of the number.(The maximum is based on the specified format)
  - ♦ [Intergral Digts]：The number of the integral part in a number.
  - ♦ [Fractional Digts]：The number of decimal digits.
  - ♦ [Display Asterisk Instead of Number]：Display asterisk instead of input value for security.

- [Validation and Security] Block:
  - ♦ [Input Min]：Set the minimum input value. (Less than the minimum input value will be warned and rejected.)
  - ♦ [Input Max]：Set the maximum input value. (Greater than the maximum will be warned and rejected.)
  - ♦ [User Level]：There are 9 levels, the order is 1 > 2 … > 8 > 9.
  - ♦ [Operation Comfirmation]：When enter the value, the dialog box should appear on the screen to ask for the User's comfirmation; the longest waiting time is 5~60 (Sec.).

For other properties which are not explained in this section, please refer to the Section 2.7. III Object Specify Object Properties.

III. Example

To design a [Set Value] button as the following:

1. Shape：Select "Raised Base"。

2. [Write]：Specify the PLC register "D100" to write in. [Notification] ：Specify "M10". (The HMI model is PWS3261 and the PLC model is Mitsubishi FX2N.)

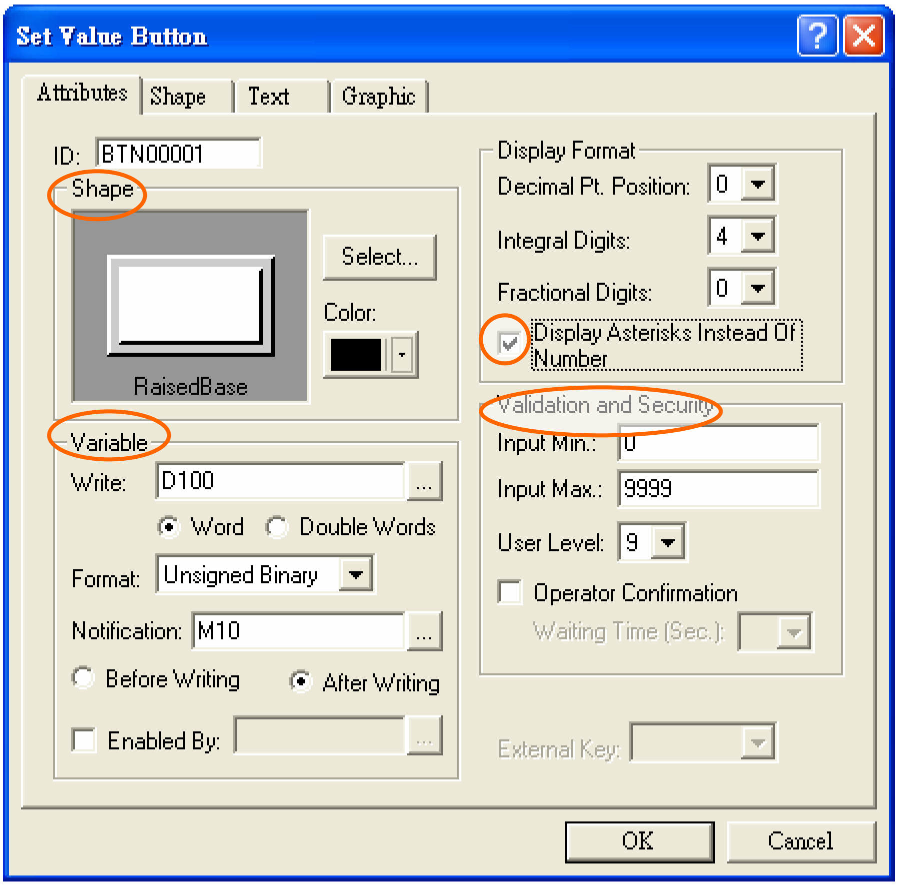
3. The Numeric Entry is [Word].

4. Specify the [Notification] location to be ON after writing the input value to the [Write] location.

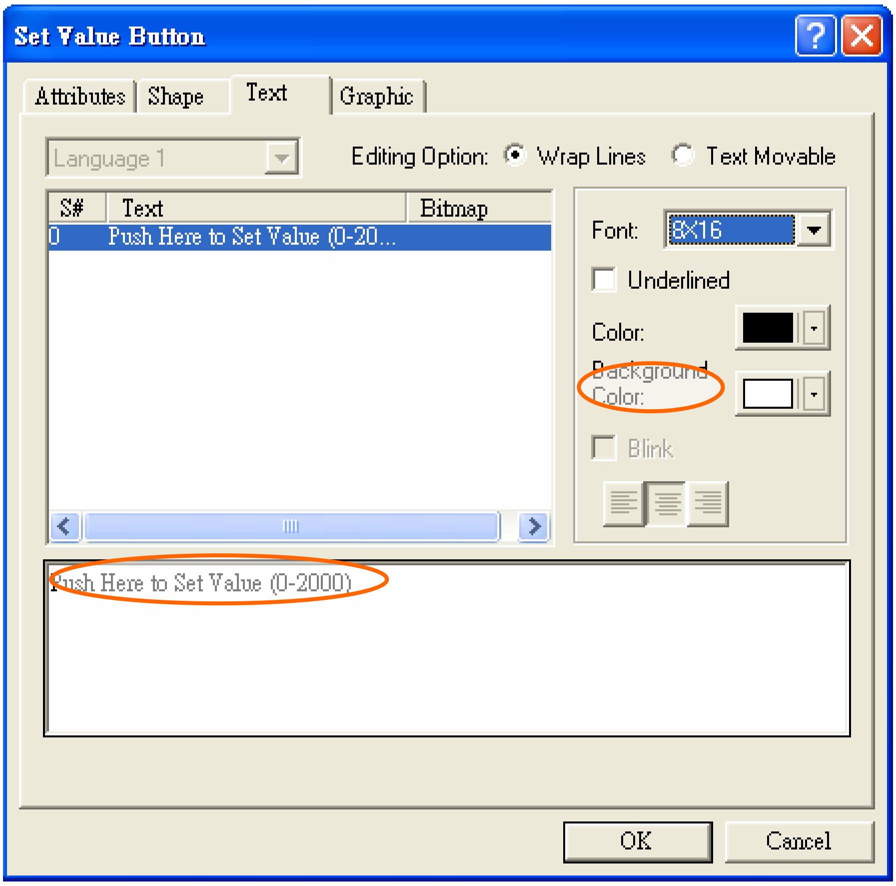
5. The numeric display is [Display Asterisks Instead of Number] on the numeric keyapad.

6. The input min. is ‘0’, the input max. is ‘2000’.

7. After numeric entry, it’s needed operator comfirmation.



8. Enter the desired text on the [Text] tab and the bkg. color is white.



Above-mentioned steps will create a [Set Value] Button. When pressed this button, the numeric keypad will display on the screen. After numeric entry, the input value can not display on a [Set Value] button directly. Therefore, a user can design the other object [Numeric Display] to display the input value; See Figure 107.

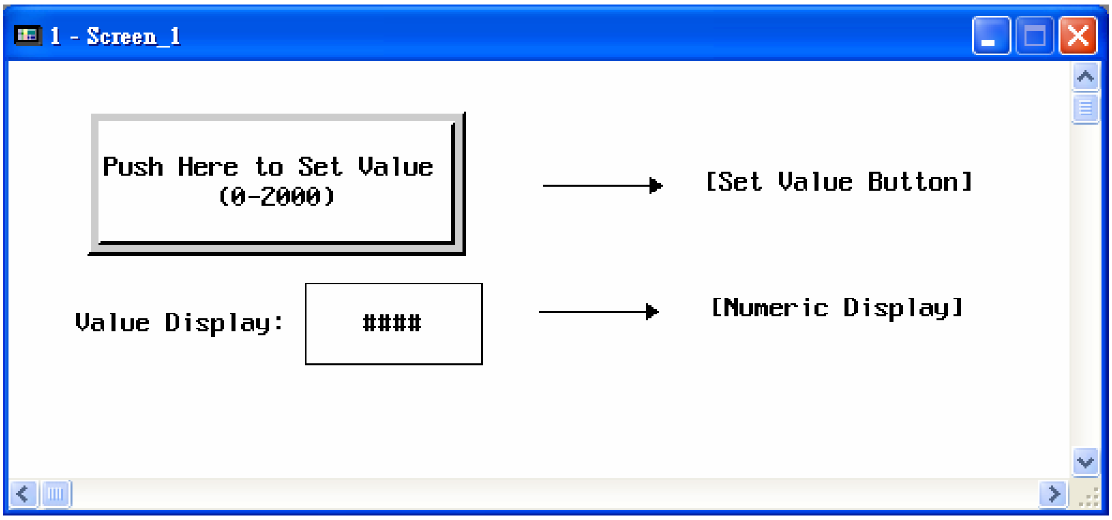


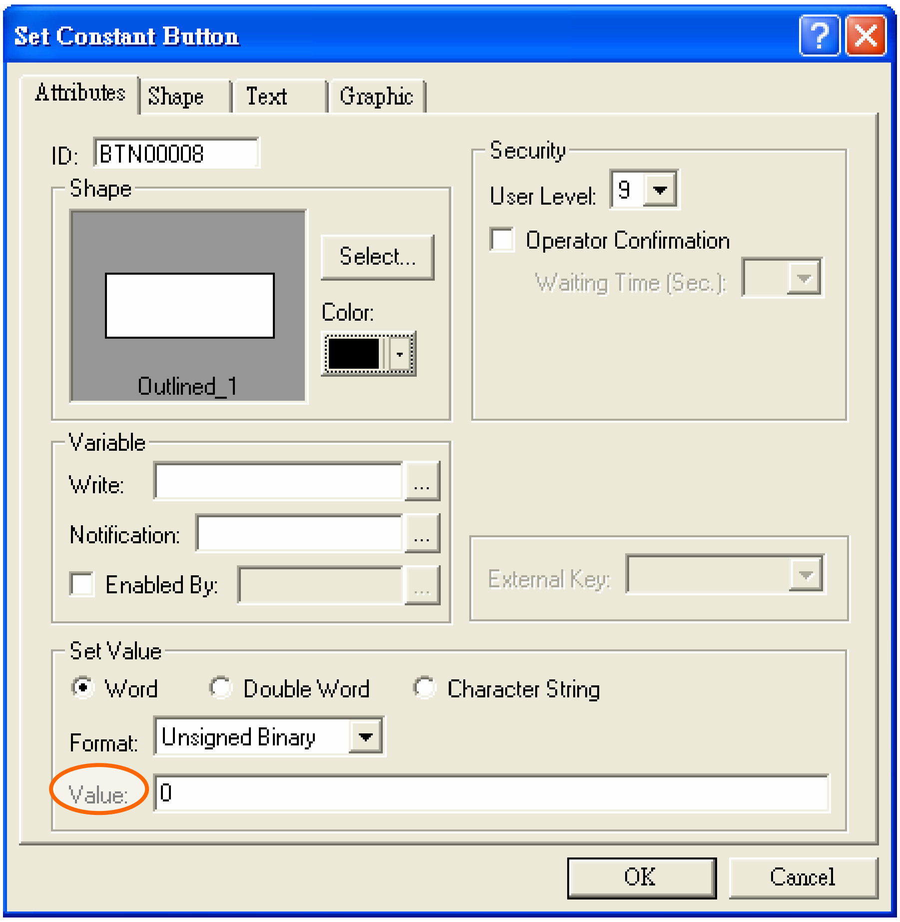
Figure 107. The [Set Value] Button and [Numeric Display] object

2.7.1.7. [Set Constant Button] 

I. Function

When pressed this button, the Workstation will write a constant to thecorrepondant PLC register. The numeric keypad will not display on the screen due to the constant have been set in PLC.

II. Properties



- [Value]：Specify the constant value here.

For other properties which are not explained in this section, please refer to the Section 2.7.1.6. [Set Value Button] and the Section 2.7. Object III Specify Object Properties.

III. Example

Here takes the glass list as example. When press one of these buttons, the Workstation will write the specified constant value to the correpondant PLC register. In this example, “4mm glasses” represents the contant value “400”, “5mm glasses” represents the constant value “500”…etc. See Figure 108.

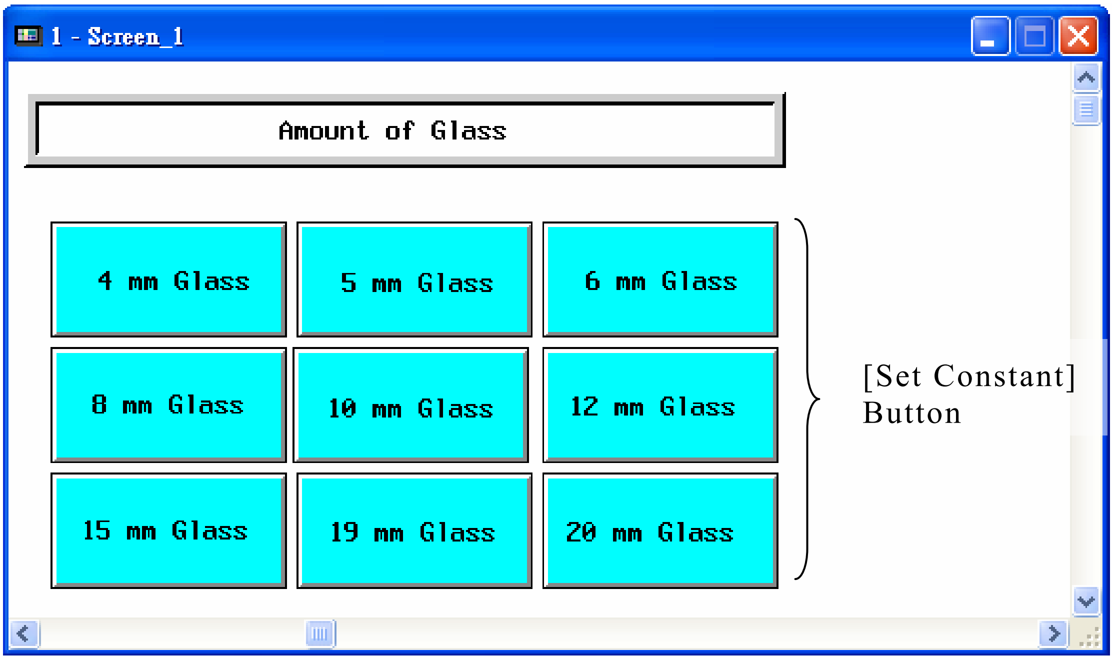
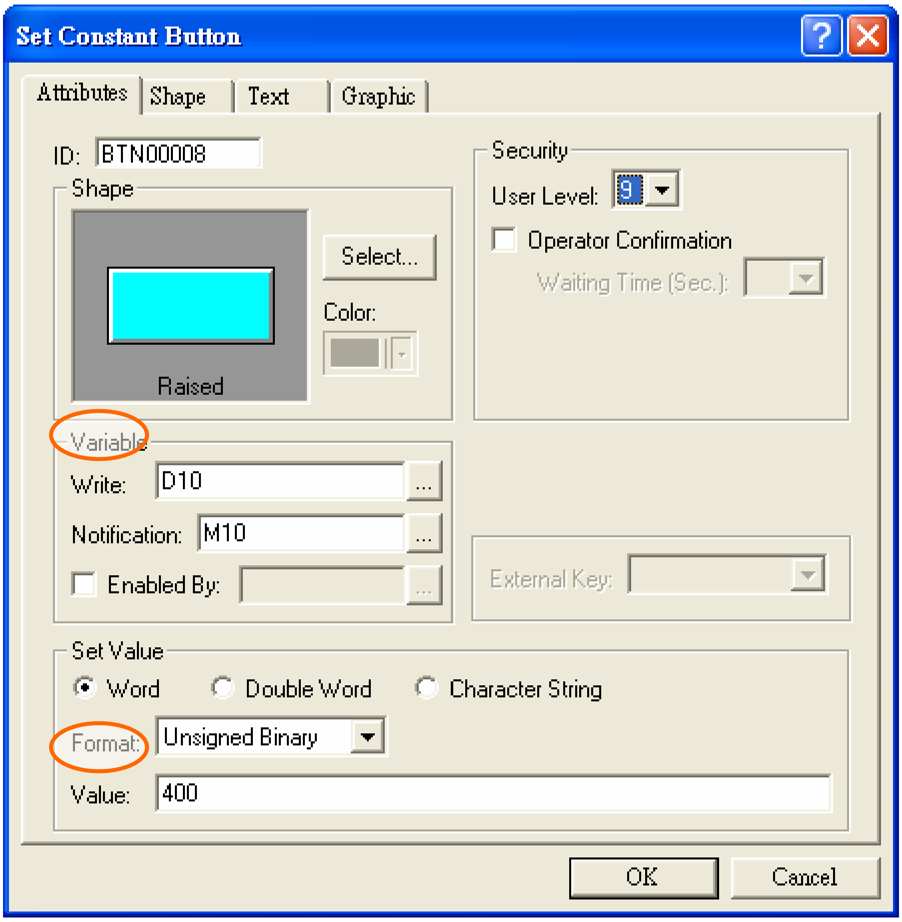


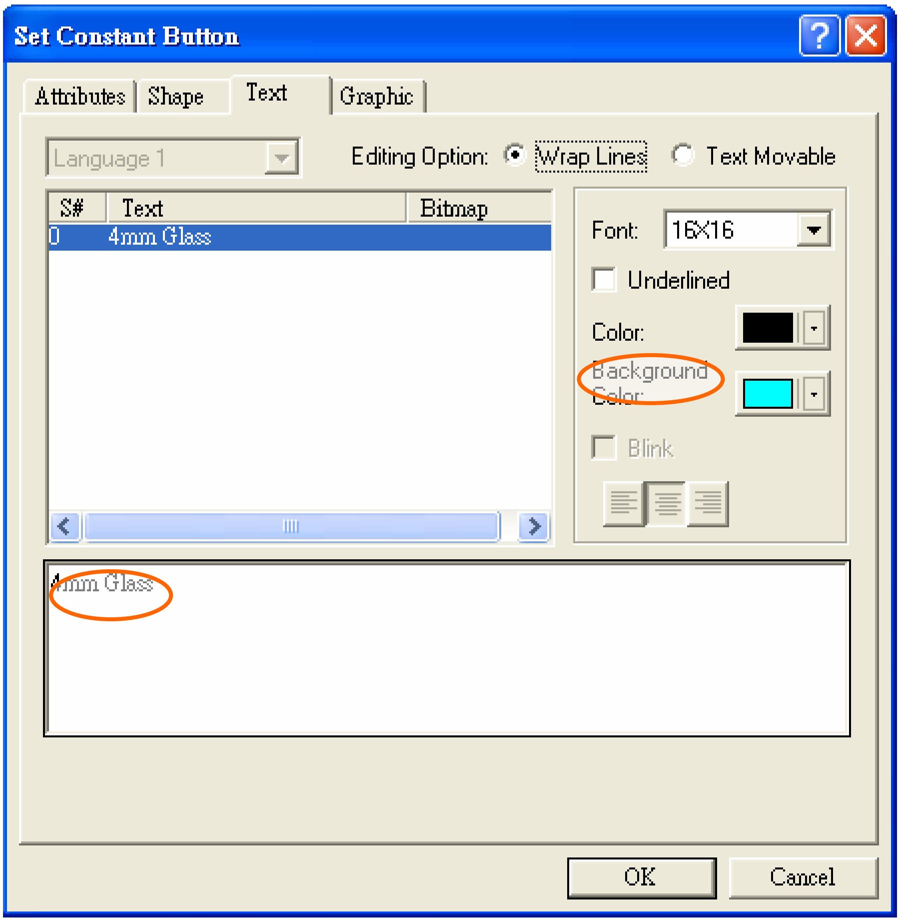
Figure 108. The Example of [Set Constant] Buttons- glass list

The properties of [Set Constant] buttons above (ex. “4 mm Glass”):

1. [Write] ： Specify the PLC register “D10”. [Notification] ： Specify “M10”. (The HMI model is PWS3261 and the PLC model is Mitsubishi FX2N.)
2. The numeric entry is [Word].
3. Specify the constant value “400” to a “4 mm Glass” button.



4. Enter the desired text on the [Text] tab and the bkg. color is green.



Above-mentioned steps will create a "4mm glasses" button. When pressed, the Workstation will store the constant value "400" to the register "D10".

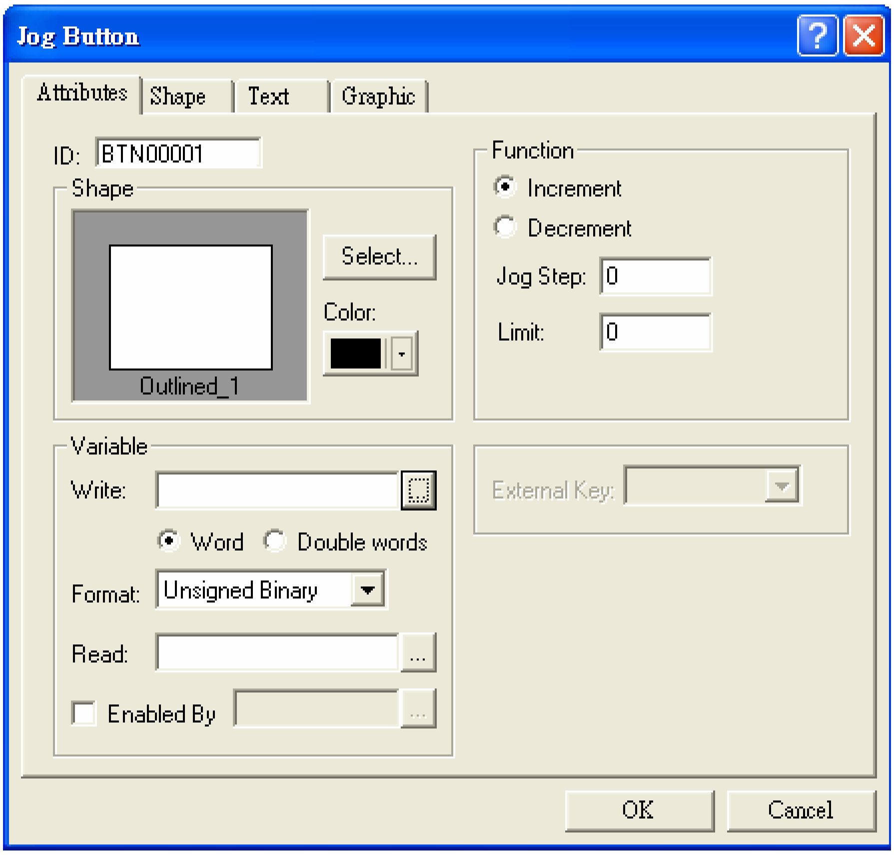
Following the same steps to design other glass buttons but the constant value should be reset.

2.7.1.8. [Increment Button]

I. Function

When pressed, the Workstation reads the constant variable stored in the PLC register. Then the value obtained by adding the specified constant will be written in the correspondent PLC register.

II. Properties



- [Function] Block:
  - ♦ [Increment]：Select [Increment] to create an [Increment] button; one press increases a specified constant.
  - ♦ [Jog Step]：The [Increment] button is to add the specified constant by a press.
  - ♦ [Limit]：Specify the **maximum** written in a register if the button is an Increment Button.

For other properties which are not explained in this section, please refer to the Section 2.7.1.6. [Set Value Button] and the Section 2.7. Object III Specify Object Properties.

III. Example

Figure 109 is an illustration of an [Increment] button. Once pressed the [Increment] key, the incresead value stored in the PLC register will be displayed in bar graph. ([Bar Graph] is an object used to display the dynamic data in ADP)

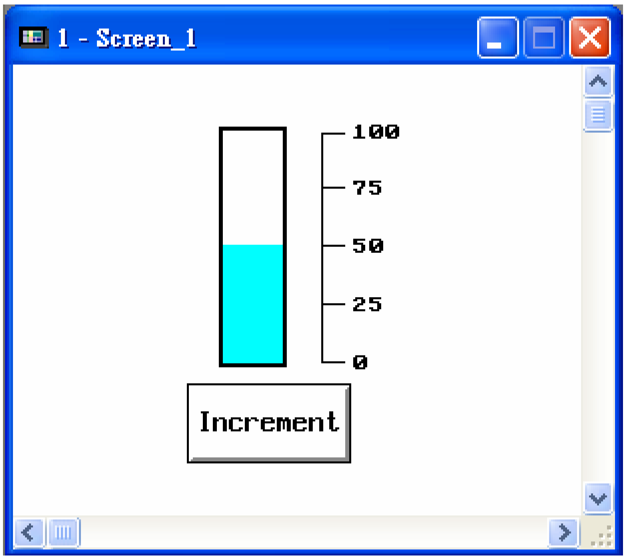


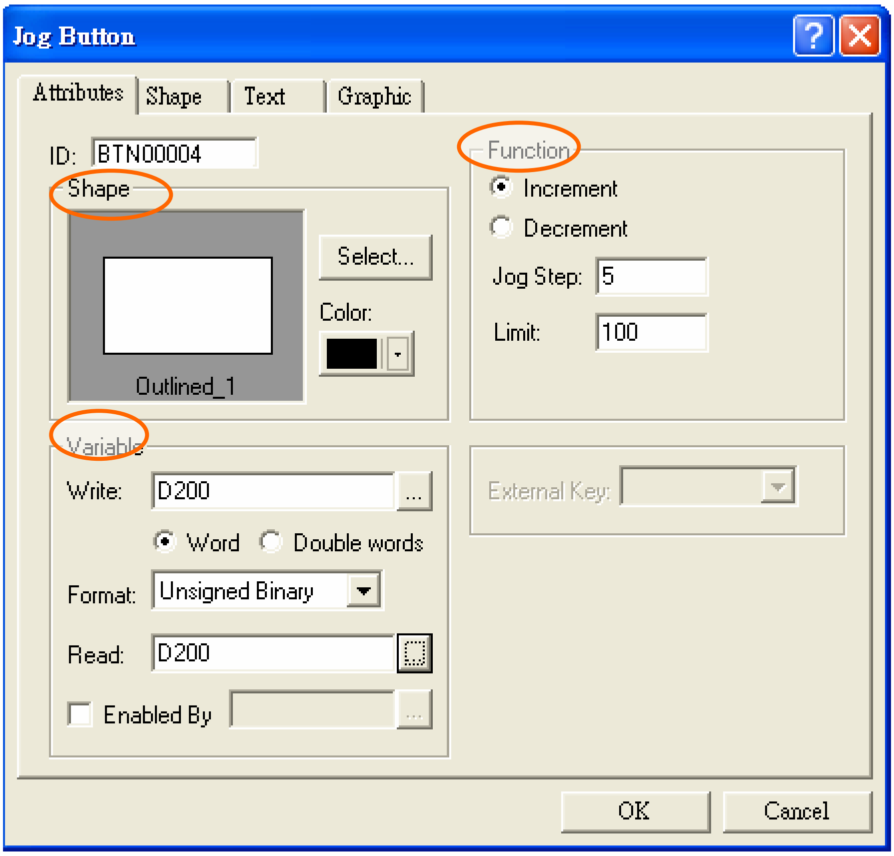
Figure 109. An Illustration of an [Increment] Button

The properties of an [Increament] button above:

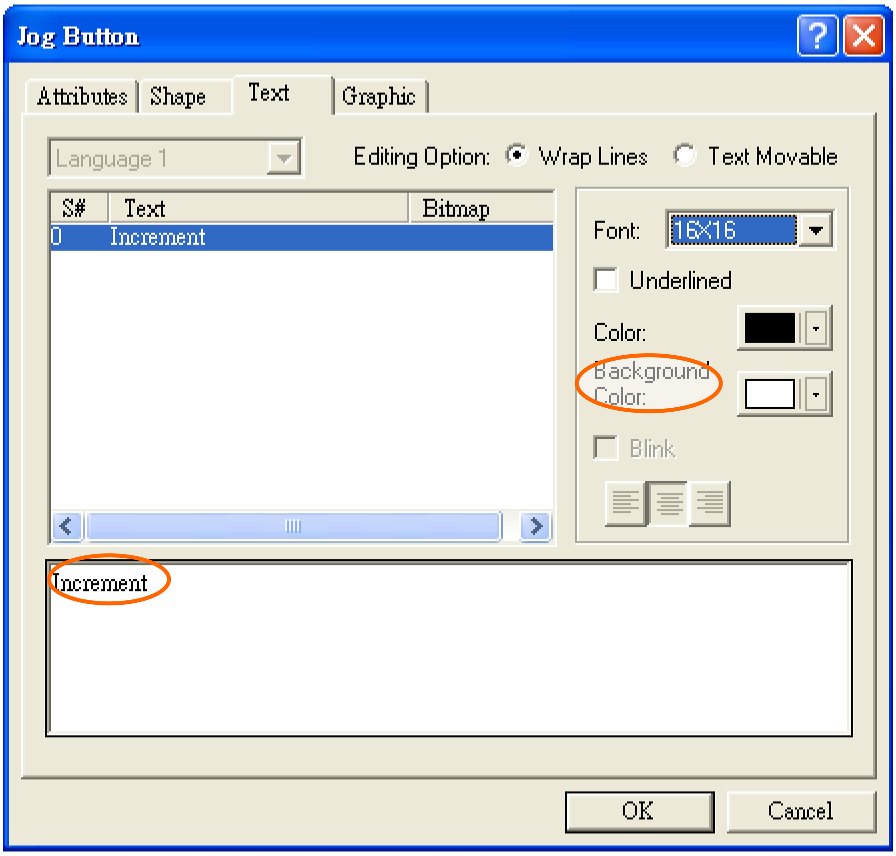
5. [Write]：Specify the PLC register "D200" to write in. [Notification] ：Specify as "D200". (The HMI model is PWS3261 and the PLC model is Mitsubishi FX2N.)

6. Shape：Select "Outlined_1"。

7. The jog step is '5', the limit is '100'.



8. Enter the desired text on the [Text] tab and the bkg. color is “White”.



The following is an illustration of an [Increment] button.

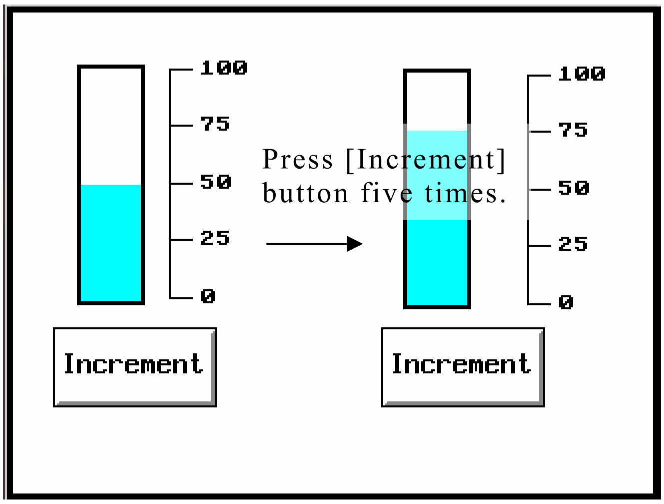
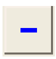


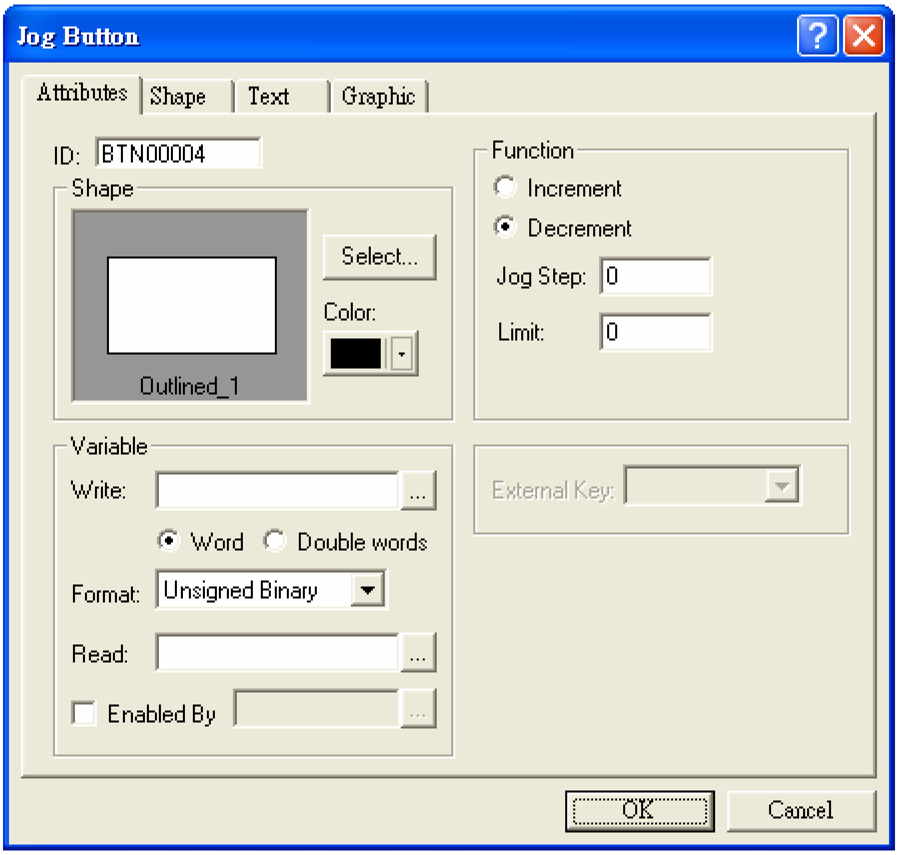
Figure 110. Press butoon five times to add ‘25’ to the PLC constant

2.7.1.9. [Decrement] 

I. Function

When pressed, the Workstation reads the constant variable stored in the PLC register. Then the value obtained by subtracting the specified constant will be written in the correspondent PLC register.

II. Properties



- [Function] Block:
  - ♦ [Decrement]：Select [Decrement] to crate a [Decrement] button. One press is to one subtraction.
  - ♦ [Jog Step]：Secify the constant of jog step to subtract for a [Decreased] Button.
  - ♦ [Limit]：Specify the minimine limit to a register for a [Decreased] button.

For more properties wich are not explained in this Section, please to the Section 2.7. Object III Specify Object Properties.

III. Example

Figure 111 is an illustration of a [Decrement] button. When pressed the [Decrement] button, the subtracted constant value stored in a PLC register will be displayed in a bar graph. ([Bar Graph] is an object used to display the dynamic data in ADP)

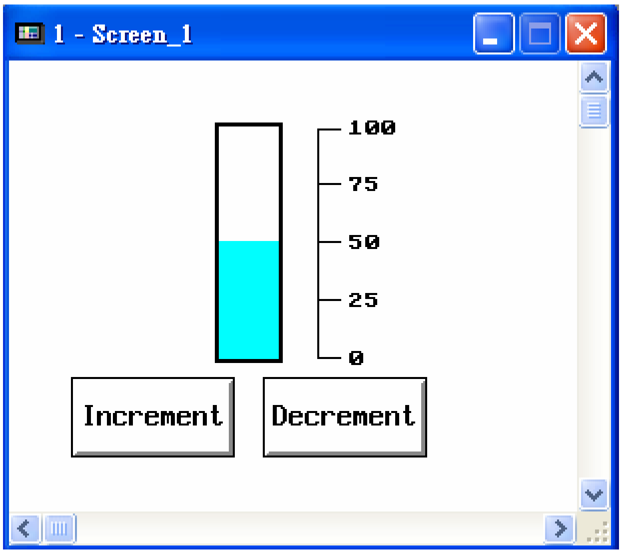
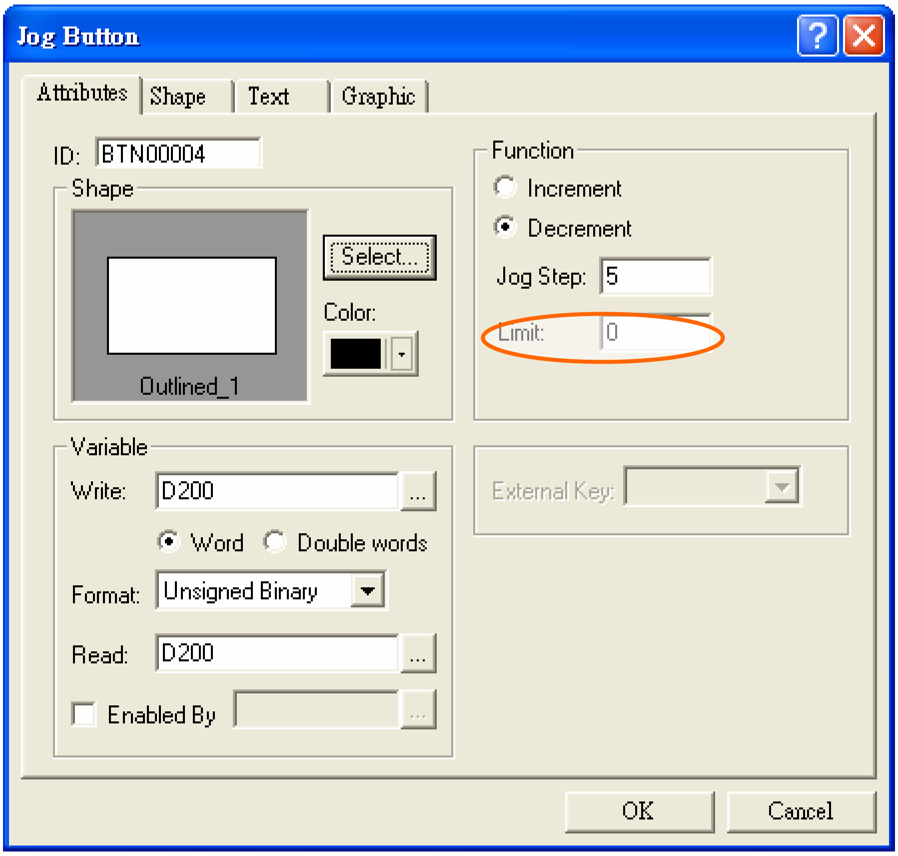


Figure 111.   An illustration of the [Increment]/[Decrement] button

The steps to design a [Decrement] button are the same as Section 2.7.1.8. [Decrement Button] III. Example, remember to change the limit to ‘0’.



The following is an illustration for the [Decrement Button].

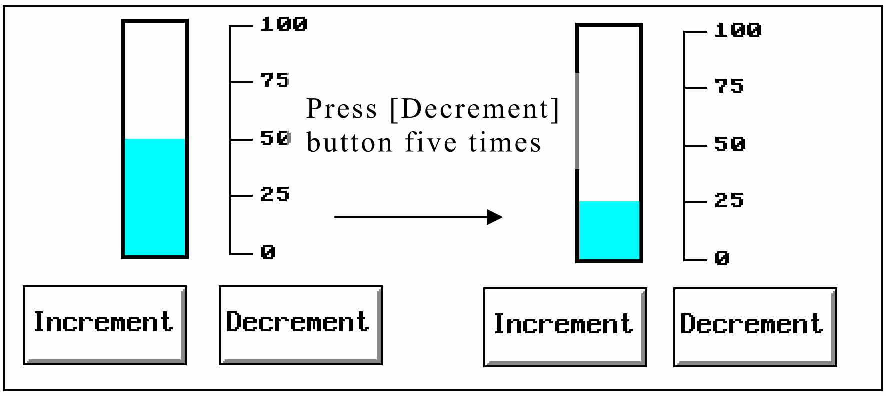


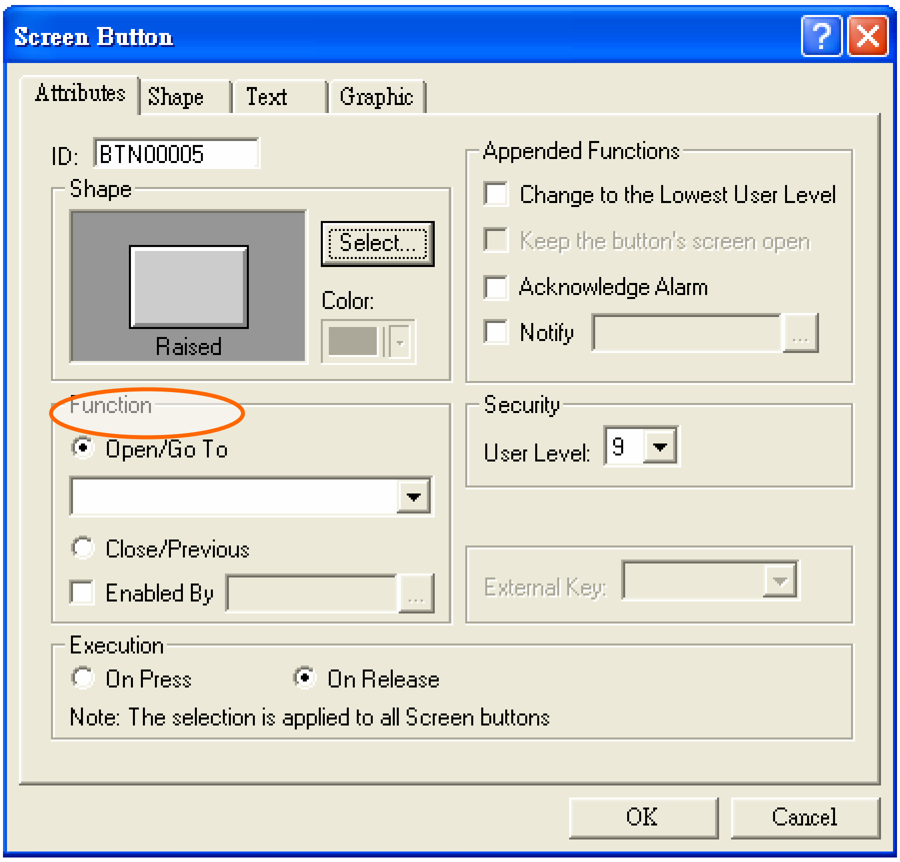
Figure 112. Press [Decrement] button five times to subtract '25' to the PLC constant

2.7.1.10. [Goto Screen Button] 

I. Function

When pressed, the Workstaion will change the current screen to the specified screen.

II. Properties



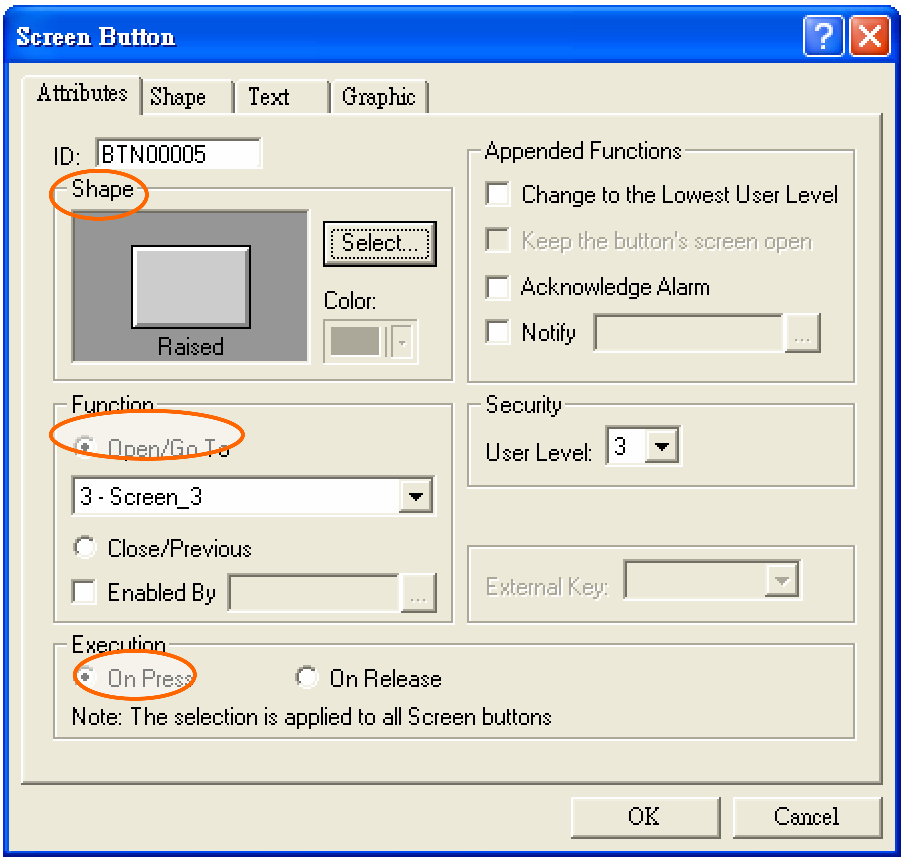
- [Function] Block:
  - ♦ [Open/Go To]：Check this option to create a [Open/Go To] button. A user can specify the screen to change from the drop-down list.
  - ♦ [Enabled By]：Only change the screen when the PLC register is **ON**.
- [Execution] Block:
  - ♦ [On Press]：Execute the command when pressed.
  - ♦ [On Release]：Execute the command when released.
- [Appended Functions] Block:
  - ♦ [Change to the Lowest User Level]：Set the current user level as the lowest level (User Level 9).
  - ♦ [Keep the Button's Screen Open]：Keep the button's screen up on the screen.(only applicable on sub-screen in xx60 series)
  - ♦ [Acknowledge Alarm]：Acknowledges the curren active alarm when pressed.
  - ♦ [Notify]：Specify a bit-location to notify after press.
- [Security] Block:
  - ♦ [User Level]：9 levels in all, the levels are 1 > 2 … > 8 > 9.

For other properties which are not explained in this Section, please refer to the Section 2.7. Object III Specify Object Properties.

III. Example

To design a [Goto Screen] button as the following：

1. Shape：Select "Raised".
2. Press this button to change to "Screen_3".
3. The command is excuted when pressed.



4. Enter the desired text on the [Text] tab.

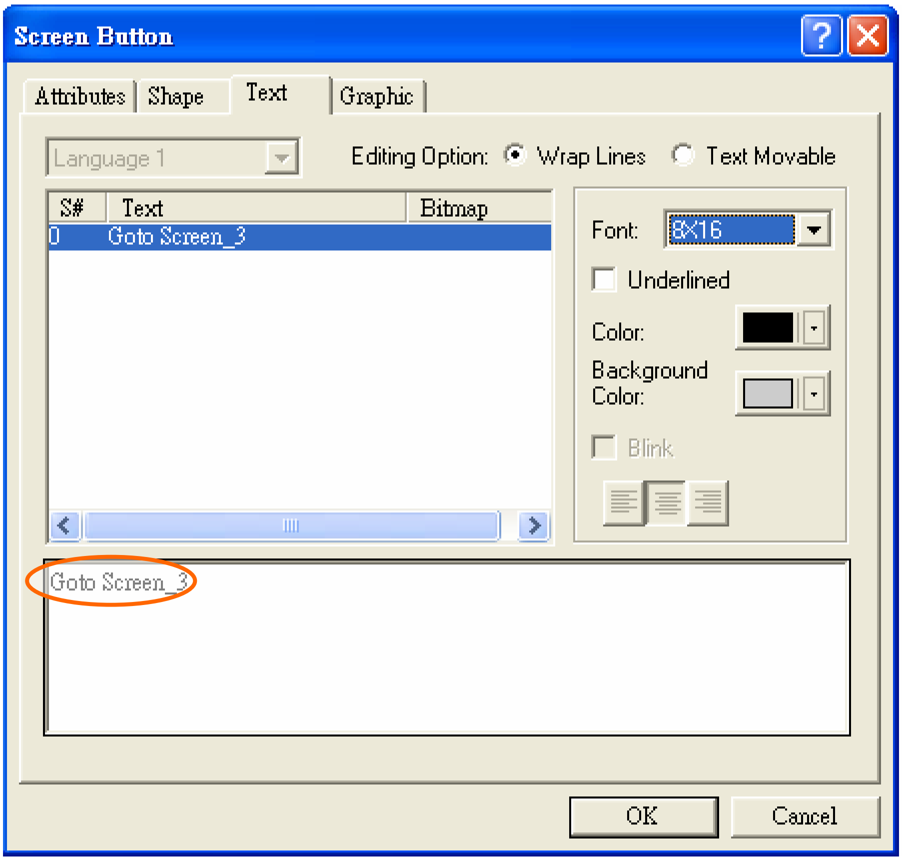


Figure 113 is an illustration of the [Goto Screen] button.

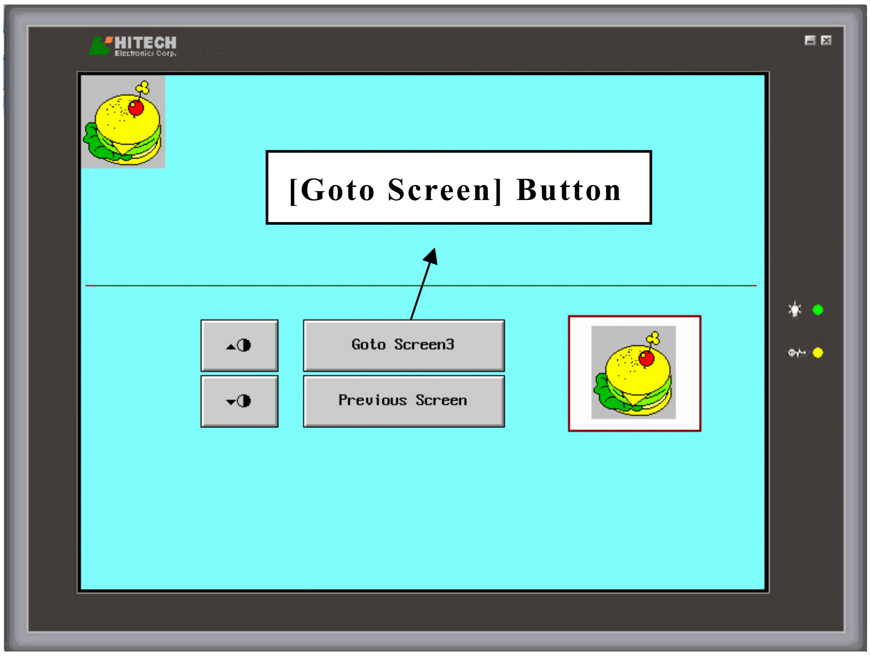
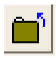


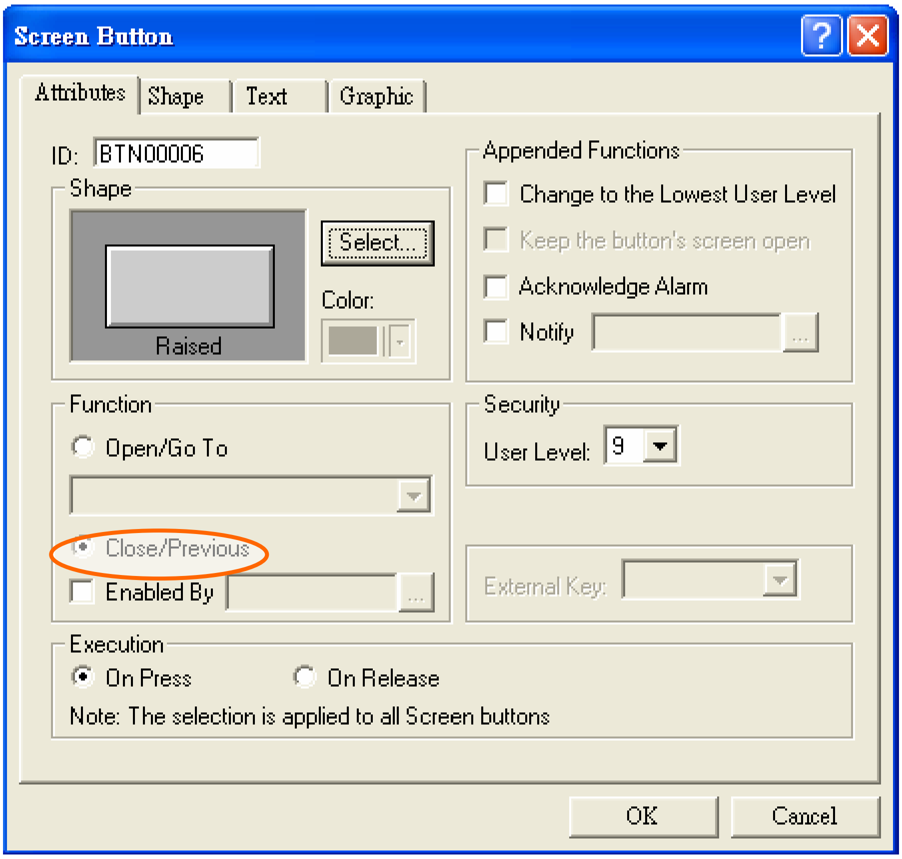
Figure 113. An illustration of a [Goto Screen] Button

2.7.1.11. [Previous Screen Button] 

I. Function

When pressed this button, the Workstation will change the current to previous screen.

II. Properties



- [Function] Block:
  - [Close/Previous] ： Select [Close/Previous] to create a [Close/Previous] button.

For other properties which are not explained in this Section, please refer to the Section 2.7.1.10. [Goto Screen Buttons] and Section 2.7. Object III Specify Object Properties.

III. Example

The steps to design a [Close/Previous] button are the same as the Section 2.7.1.10. [Goto Screen Button] III. Example .**Remember to check the [Close/Previous] option.**

Figure 114 is an illustration of a [Close/Previous] button.

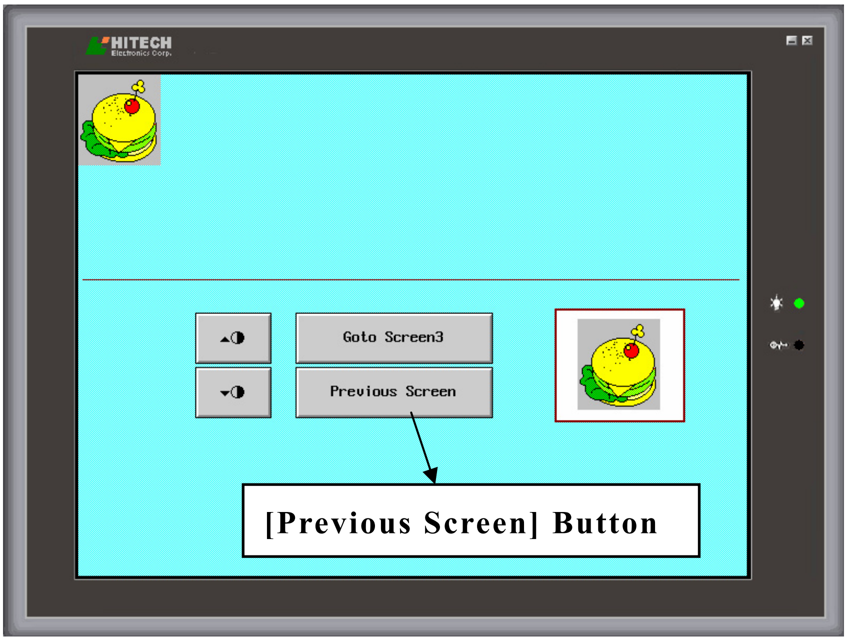


Figure 114. An Example of the [Previous Screen] Button

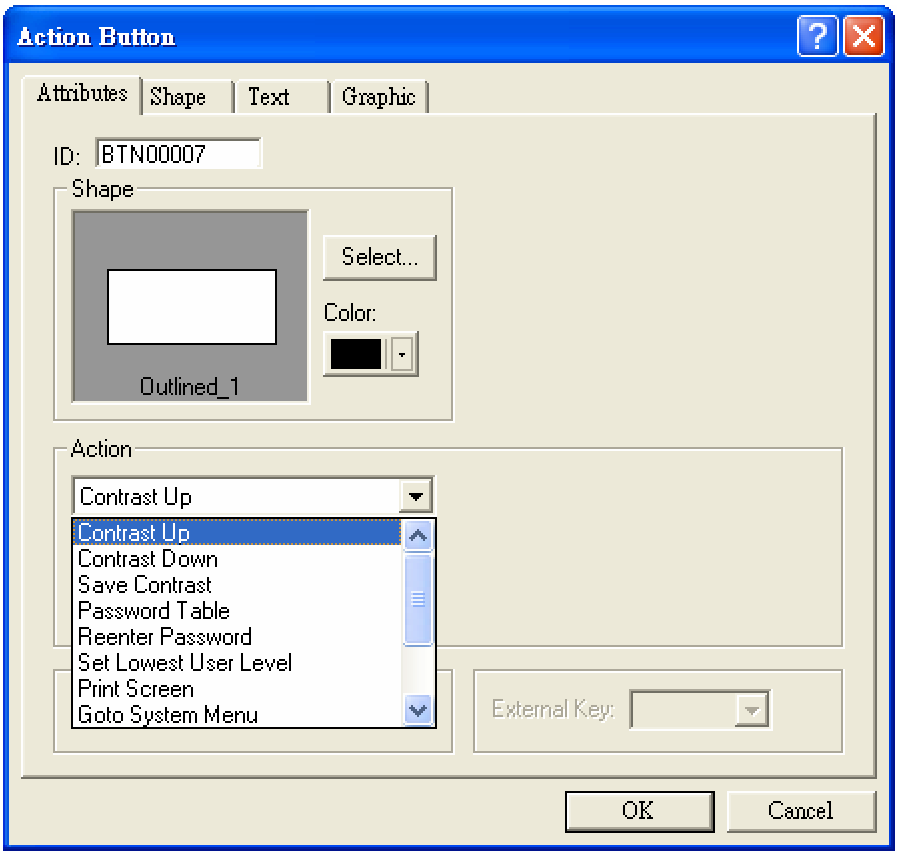
2.7.1.12. [Action Button] 

I. Function

An Action button performs a built-in function.

II. Properties

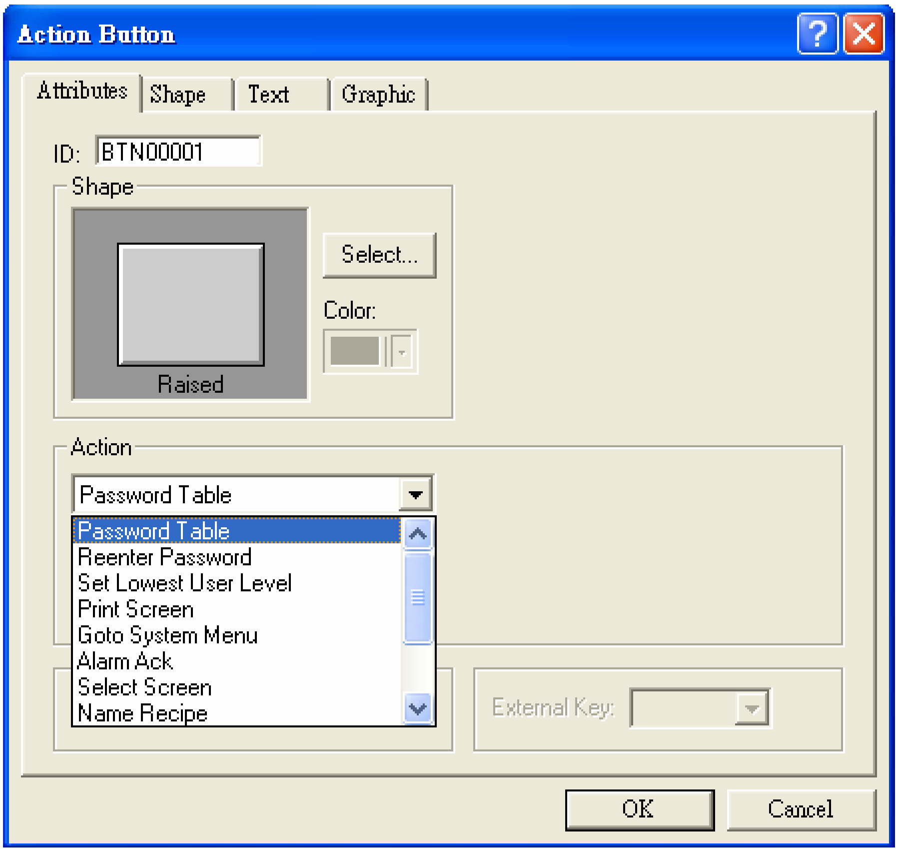
1. To use the action buttons below in PWS models:



- [Action] Block:
  - ♦ "Contrast Up": Increase the contrast or brightness of the display.
  - ♦ "Contrast Down": Decrease the contrast or brightness of the display.
  - ♦ "Save contrast": Save the setting of contrast or brightness.
  - ♦ "Password Table": Display the password table.
  - ♦ "Reenter Passward": Display the password table to reenter.
  - ♦ "Set Lowest User Level": Change to the lowest user level = 9.
  - ♦ "Print Screen": Print the specified region (HARDCOPY) of current screen.
  - ♦ "Goto System Menu": Change to the system menu.
  - ♦ "Turn off Backlight": Turn off the backlight.
  - ♦ "Alarm Ack": Acknowledge the current active alarm to keep going on.
  - ♦ "Set Time & Date": Set the time and date.
  - ♦ Select Language #1~#5: Display the screen by the specified language, 5 languages for selection.

These features are not applicable on all HMI models; please refer to the Appendix A. - Table of the ADP 6.0 Features and HMI Models.

2. To use the action buttons below in SoftPanel:



- [Action] Block:
  - "Password Table": Display the password table on SoftPanel.
  - "Reenter Password": Display the password table to reenter on SoftPanel.
  - "Set Lowest User Level": Change to the lowest user level = 9 on SoftPanel.
  - "Print Screen": Print the specified region (HARDCOPY) of current screen on SoftPanel.
  - "Goto System Menu": Change to the system menu on SoftPanel.
  - "Alarm Ack": Acknowledge the current active alarm to keep going on SoftPanel.
  - "Select Screen": Select the screen to change from the dialg box when pressed on SoftPanel.
  - "Name Recipe": Name the recipe which data and number have been specified from the dialog box when pressed on SoftPanel, Chinese/English is allowable.

- “Select Recipe”: Enter the recipe which data and number have been specified from the dialog box for search when pressed on SoftPanel. This object is used to great number of recipes; Chinese/English is allowable.
- “Print Report”: Print the edited report which report format is recipe, logging buffer and alarm…etc on SoftPanel.
- “Run Application”: Run the application based on the specified route when pressed on SoftPanel.
- Select Language #1~#5: Display the screen by the specified language, 5 languages for selection.

  These features are not applicable on all HMI models; please refer to the Appendix A. - Table of the ADP 6.0 Features and HMI Models.

For other properties which are not explained in this Section, please refer to the Section 2.7. Object III Specify Object Properties.

III. Example

Figure 115 is an illustration of [Action] buttons. When press the button, the contrast of the display will be changed.

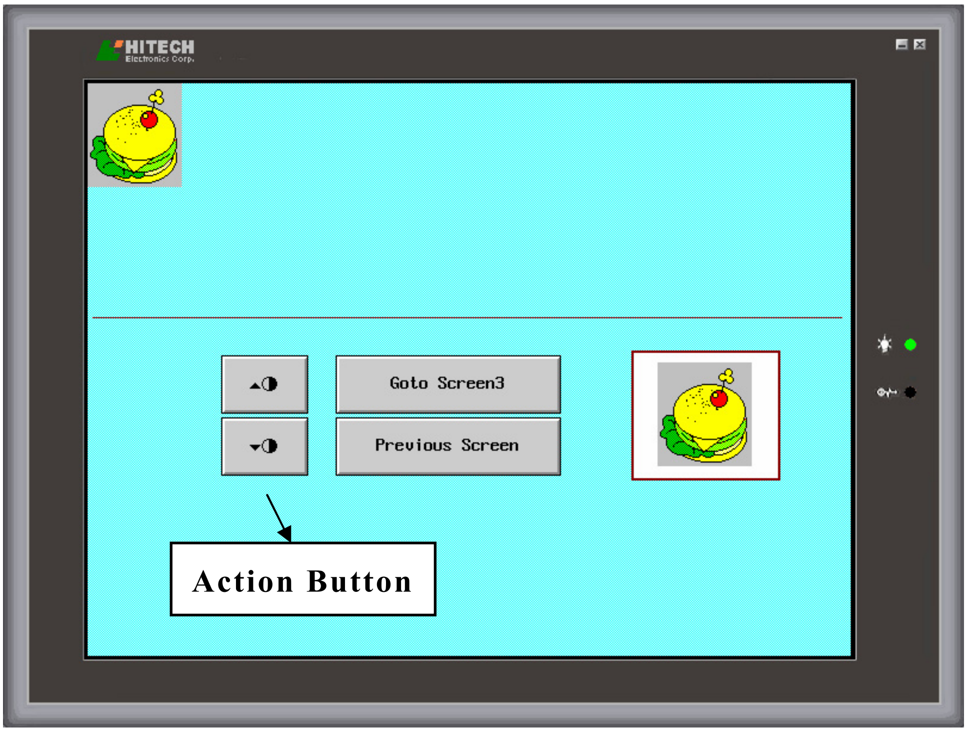


Figure 115. An Illustration of [Action] buttons

To design a [Action] Button as below：

1. The [Action] is “Contrast Up”. See Figure 116.

2. The Bitmap is “PwsSymbol – ContrastUp”.See Figure 117.

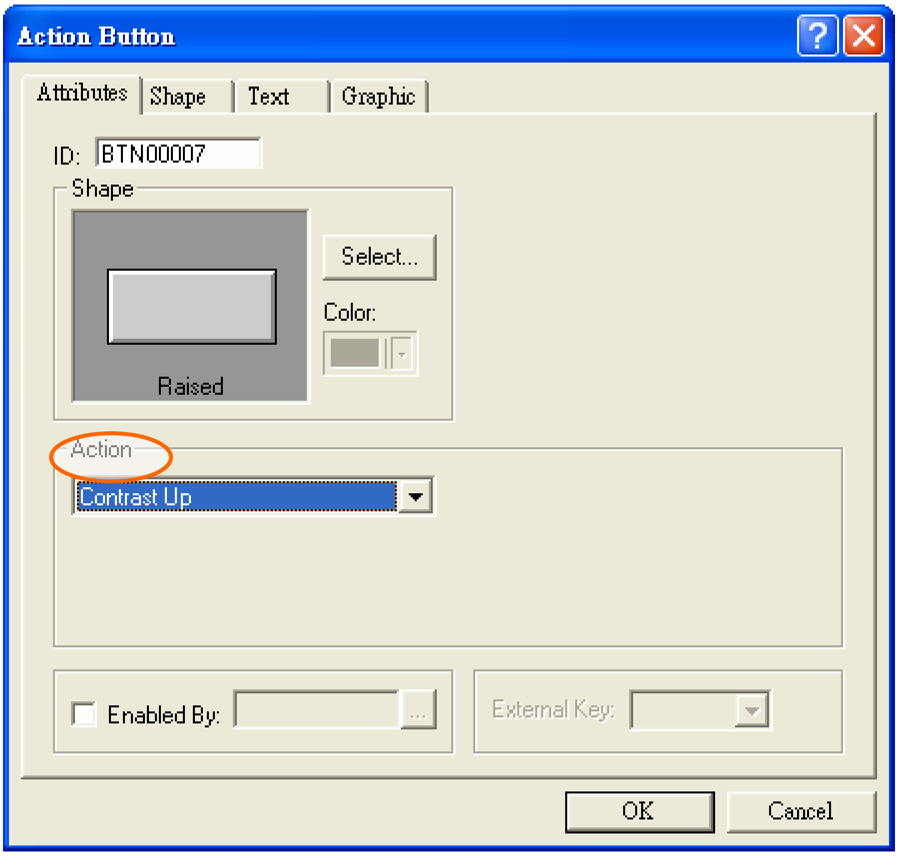


Figure 116. Select [Contrast Up] in [Action]

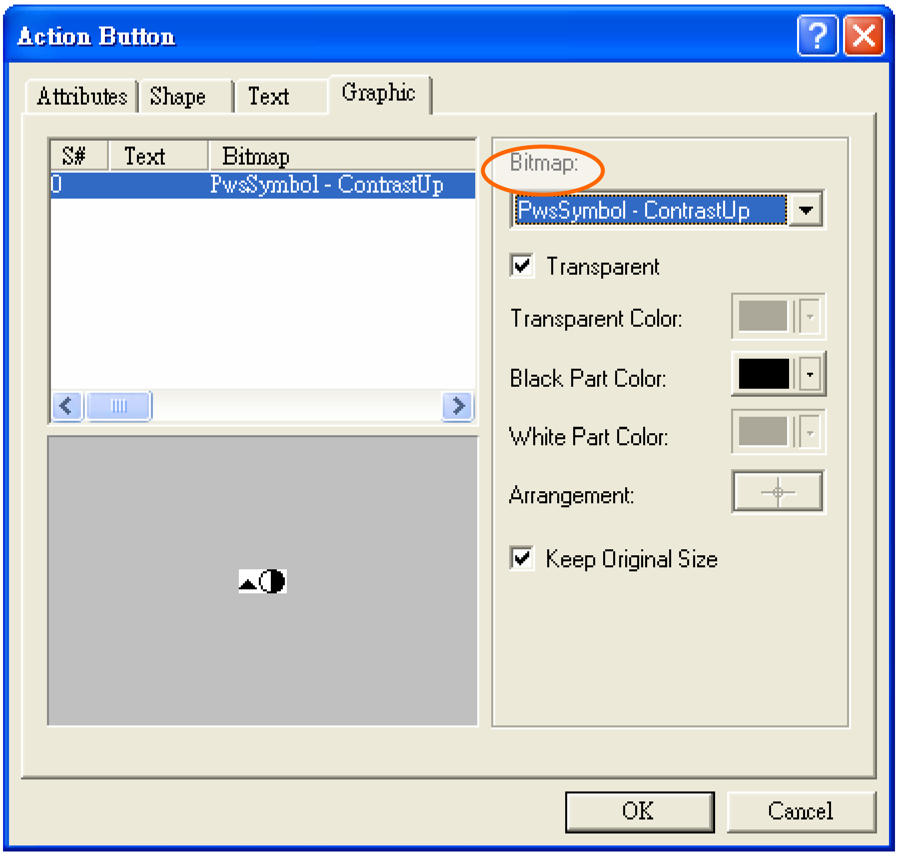
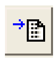


Figure 117. Select bitmap to an [Action] Button

2.7.1.13. [Data Text Conversion Button] 

I. Function

This Fteature is only applicable on SoftPanel. This command is to convert the data such as logging buffer, recipes, alarm history buffer,alarm frequency buffer to the text file saved as *.PRN file. Then, it can be readed in text software (ex. Excel, Word, Notpad, and so on.)

II. Properties

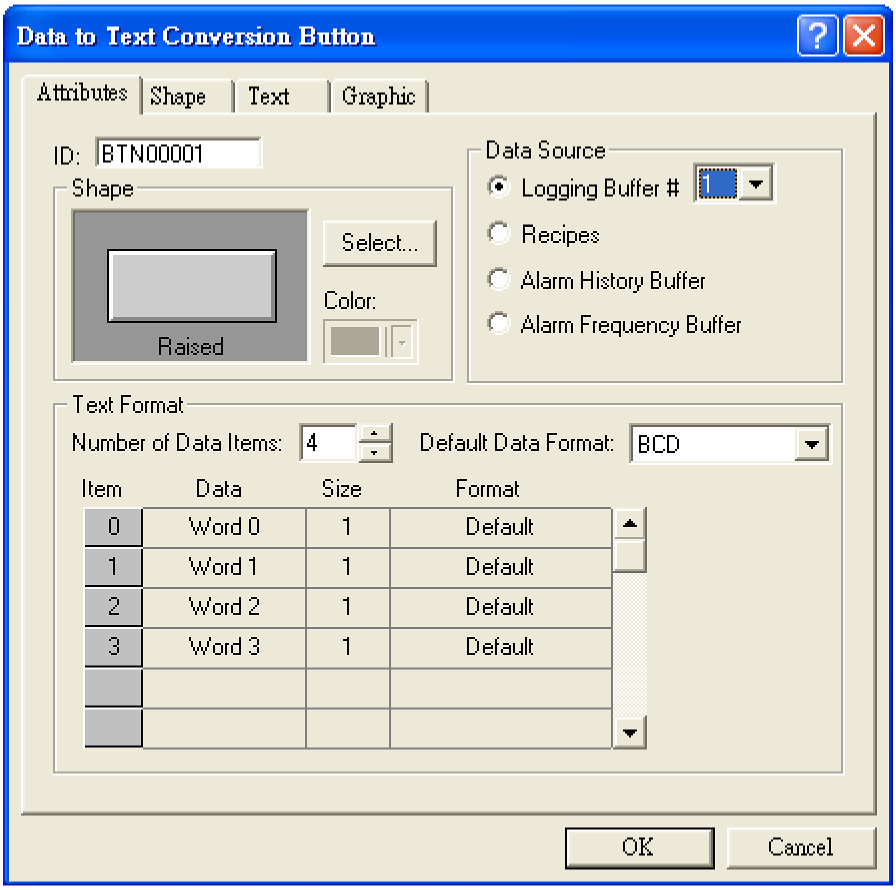


Figure 118. The [Data to Text Conversion Button] Dialog Box

- [Data Source] Block：Convert [Logging Buffrt], [Recipes], [Alarm History Buffer] and [Alarm Frequency Buffer] to text file.

- [Text Format] Block：

  - ♦ [Number of Data Item]：Sepcify the number of items to be converted to text file; the maxmum is 32 items.
  - ♦ [Default Data Format]：[BCD], [Signed BIN] and [Unsigned BIN].
  - ♦ Text Format Table：Click one of cells to select the format from the drop-down list.

For other properties which are not explained in this Section, please refer to the Section 2.7. Object III Specify Object Properties.

III. Example

一. Button Design

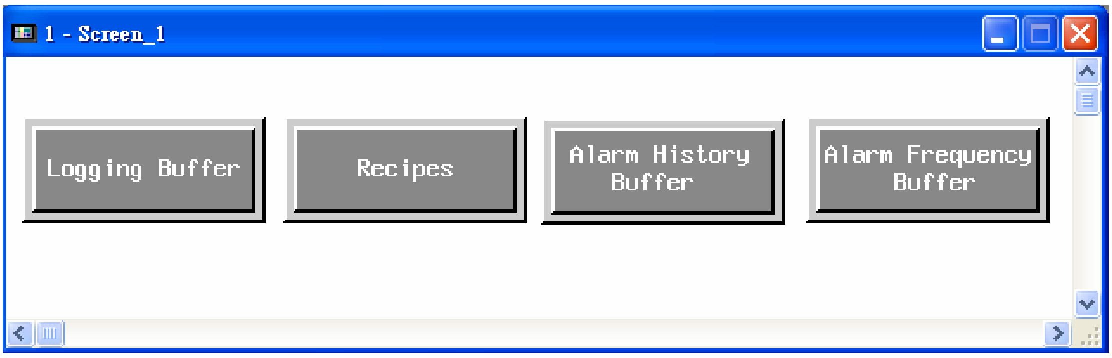
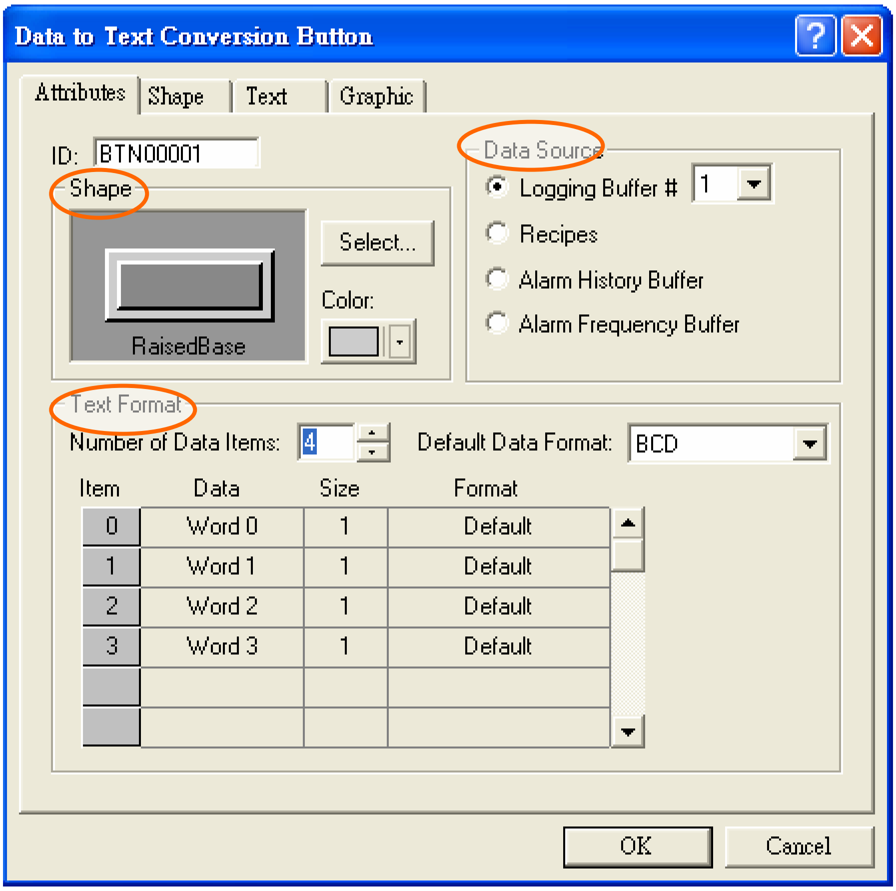


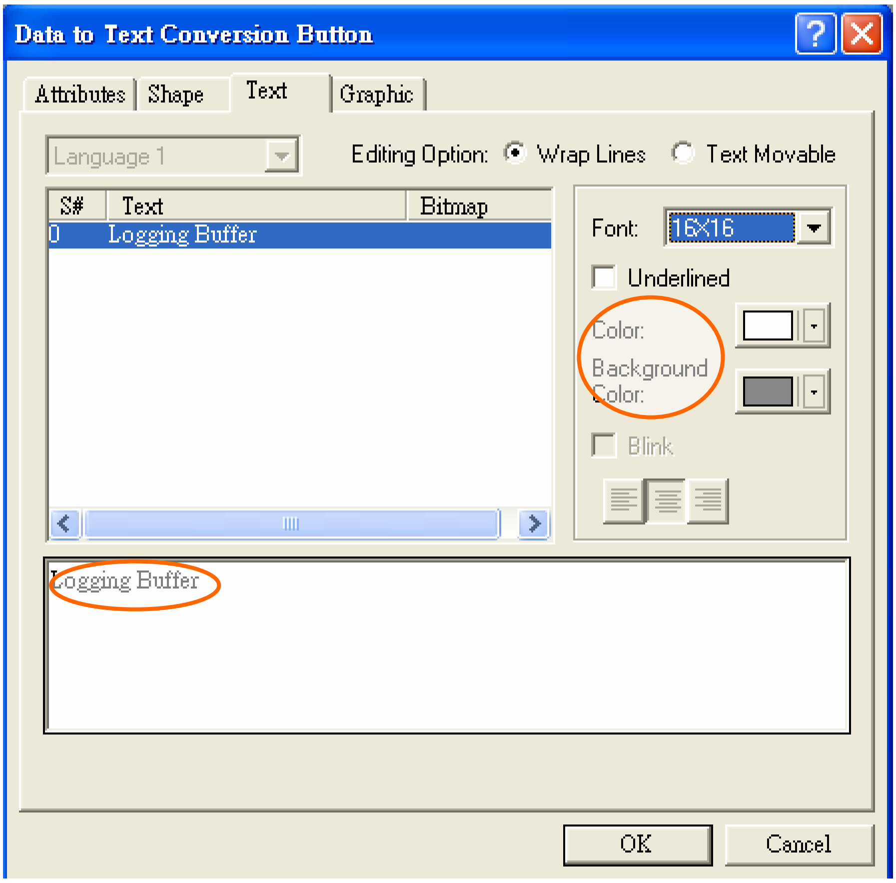
Figure 119. An Illustration of the [Data to Text Conversion Button]

To design [Data to Text Conversion Button] buttons as Figure 109; See below：

1. Shape：Select “Raised Base”.
2. [Data Source] is [Logging Buffer].
3. [Number of Data Items] is 4; [Default Data Format] is “BCD”.



4. Enter the desired text on the [Text] tab; the text color is ‘White’and the bkg. color is ‘Gray’.



The steps to design the other [Data to Text Conversion Button] are thesame (ex. [Recipes], [Alarm History Buffer] and [Alarm Frequency Buffer]) but remember to change the option in [Data Souce].

二. Steps

1. Execute the *.SP2 file which is designed in ADP on Soft-Panel.

2. Select the correspondent [Data to Text Conversion] button (ex. [Logging Buffer],[Recipes]…etc) to specified data. Then, the dialog box will ask for enter the file name (*.PRN) to save. See Figure 120.

2. Instructions

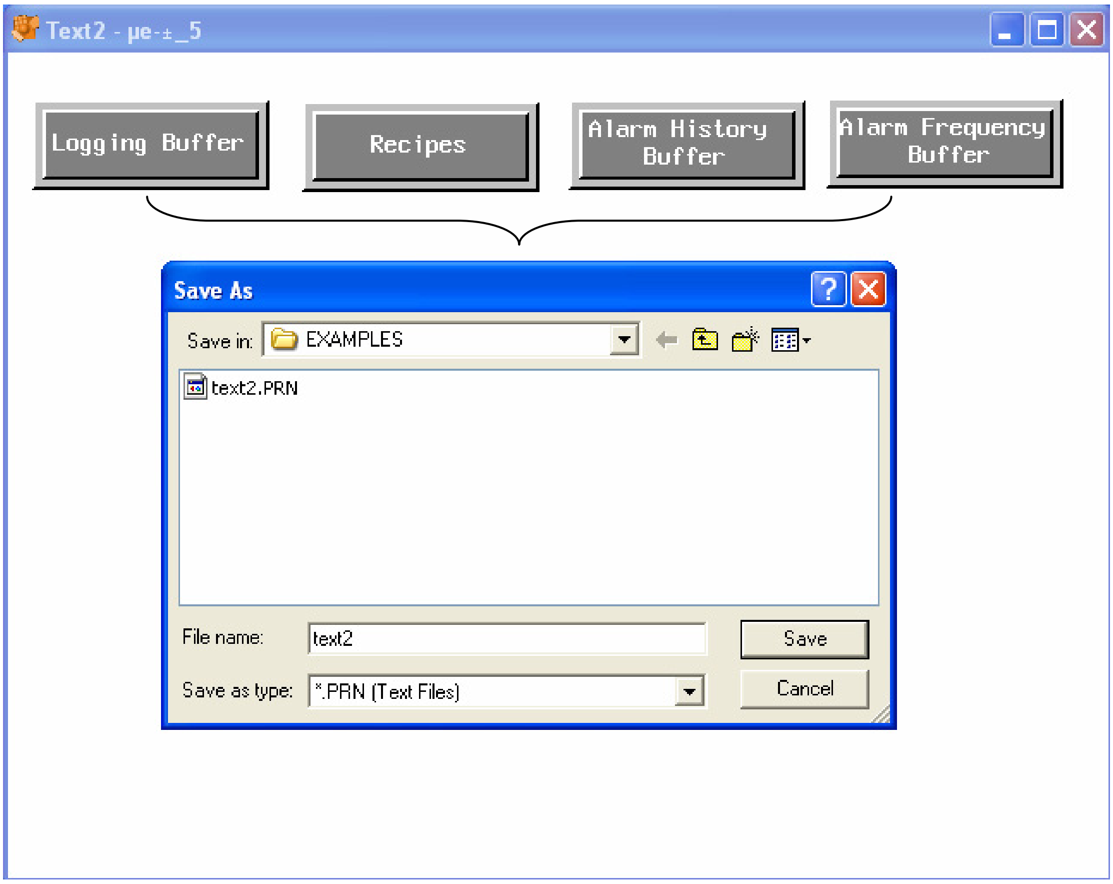
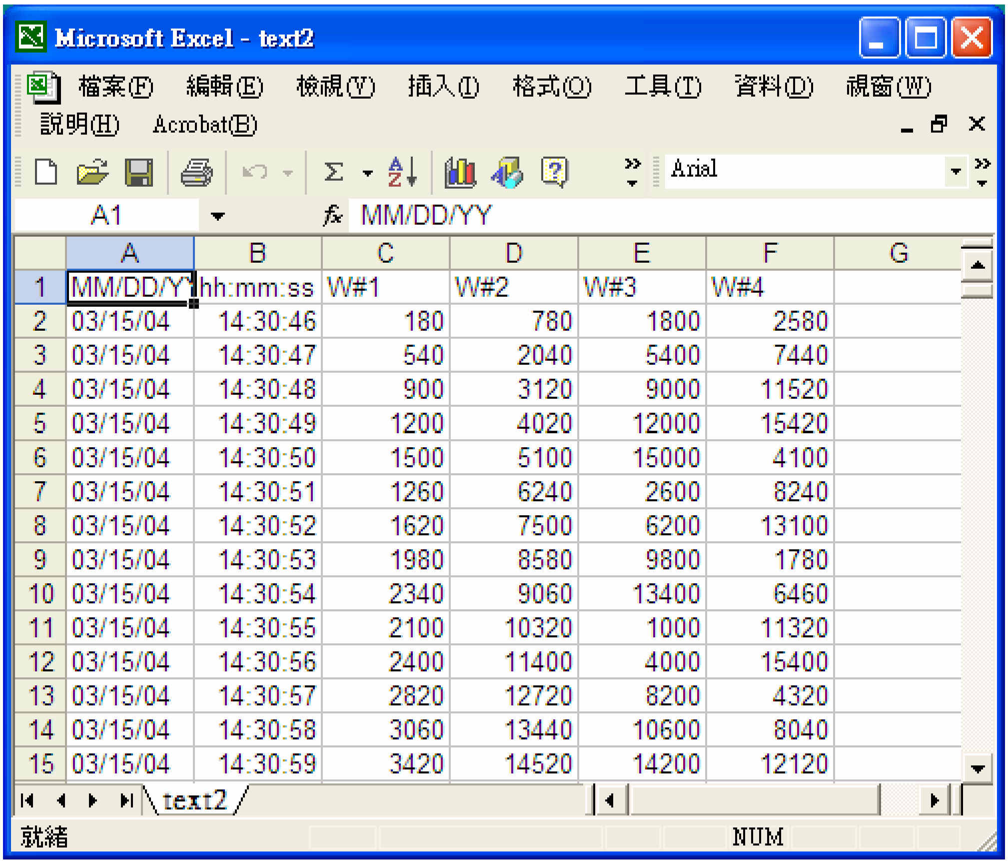


Figure 120. Execute the [Data to Text Conversion] Button

3. Open the converted file in the text software (ex. Word, Excel…etc) to read. See Figure 121.



	A	B	C	D	E	F	G
1	MM/DD/YY	hh:mm:ss	W#1	W#2	W#3	W#4	
2	03/15/04	14:30:46	180	780	1800	2580	
3	03/15/04	14:30:47	540	2040	5400	7440	
4	03/15/04	14:30:48	900	3120	9000	11520	
5	03/15/04	14:30:49	1200	4020	12000	15420	
6	03/15/04	14:30:50	1500	5100	15000	4100	
7	03/15/04	14:30:51	1260	6240	2600	8240	
8	03/15/04	14:30:52	1620	7500	6200	13100	
9	03/15/04	14:30:53	1980	8580	9800	1780	
10	03/15/04	14:30:54	2340	9060	13400	6460	
11	03/15/04	14:30:55	2100	10320	1000	11320	
12	03/15/04	14:30:56	2400	11400	4000	15400	
13	03/15/04	14:30:57	2820	12720	8200	4320	
14	03/15/04	14:30:58	3060	13440	10600	8040	
15	03/15/04	14:30:59	3420	14520	14200	12120	

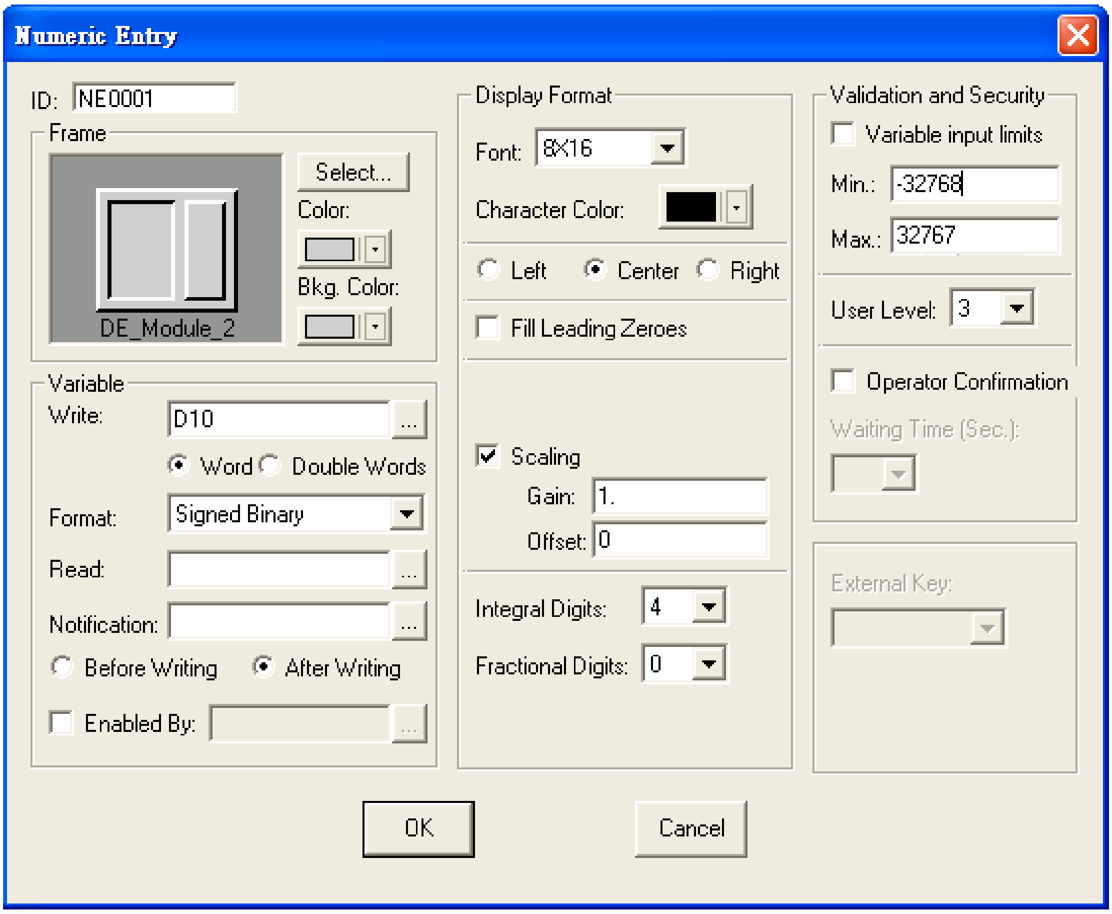
Figure 121. Open the coverted file (*.PRN) in Excel

2.7.2. [Numeric Entry] 

I. Function

Once the button is pressed, a numeric keypad will be displayed on the screen. Enter a value and then press the [ENT] on the keypad. The HMI will then write the input value to the specified PLC register. The functions of this button are to provide users with a numeric input and its display.

II. Properties



- [Variable] Block：

    - ♦ [Format]：There are “BCD”, “Signed Binary”, “Unsigned Binary”, “Hexadecimal”, “32-bit Floating-point” and “Octal”.
    - ♦ [Notification]：Specify a register/bit location to be notified; the HMI will set the bit to be ON.

        - [Before Writing]: The HMI sets the Notification location to be ON when the numeric keypad appears and sets the location to be OFF when the numeric pad disappears.

- [After Writing]: The Workstation sets the [Notification] location to be ON after writing the input value to the [Write] location.

- [Display Format] Block：

  - ♦ [Fill Leading Zero]：Select this option to fill leading zeros; for example, “5902.1”is displayed as “005902.1”.
  - ♦ [Decimal Pt. Position] ：Specify the number of digits after the integral part of the number. There are 0~10 digits for choice.
  - ♦ [Fractional Digts]：The number of decimal digits.

    (Fractional Digts + Integral Digts or Decimal Pt. Position <= the maximum number of digits.)
  - ♦ [Integral Digts]：The number of the integral part in a number.

    (Fractional Digts + Integral Digts or Decimal Pt. Position <= the maximum number of digits.)
  - ♦ [Scaling]：The formula is Y = aX+b (Note that this only the formats “Signed Binary”, “Unsigned Binary” and “32-bit Floating-point” support this option.)

    - [Gain]：Y = aX，where X = the value stored in PLC and Y= HMI displayed value.
    - [Offset]：If the ininitial value is not zero, then set the [Offset].

- [Validation and Security] Checking box：

  - ♦ [Variable Input Limits]：Set the input limits as variable. The minimum is stored in the bit following the [Write] location; the maximum is stored in the bit following the minimun input value. For example, if the [Write] location is “D10”, then the minimum is stored in “D11”; the maximum is stored in “D12”.
  - ♦ [Min]：Set the minimum input value. (Less than the minimun input value will be warned and rejected.)
  - ♦ [Max]：Set the maximum input value. (Greater than the maximum will be warned and rejected.)

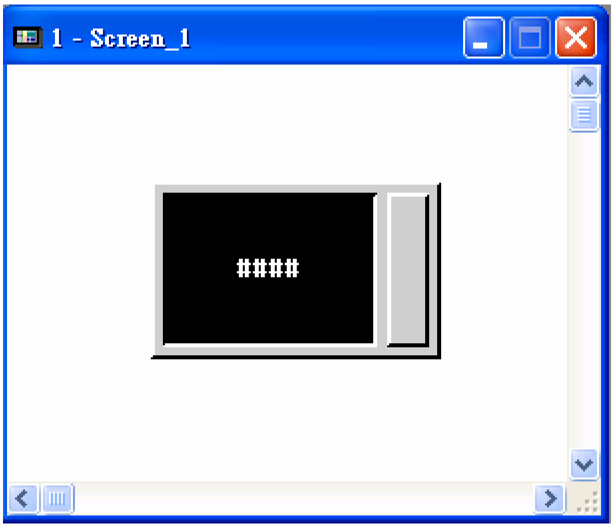
Address	X	X+1	X+2
	Write	Min	Max
Example:	D10	D11	D12

For the properties which are not explained in this section, please refer to the Section 2.7.1.6. [Set Constant Value] and the Section 2.7. Object III Specify Object properties.

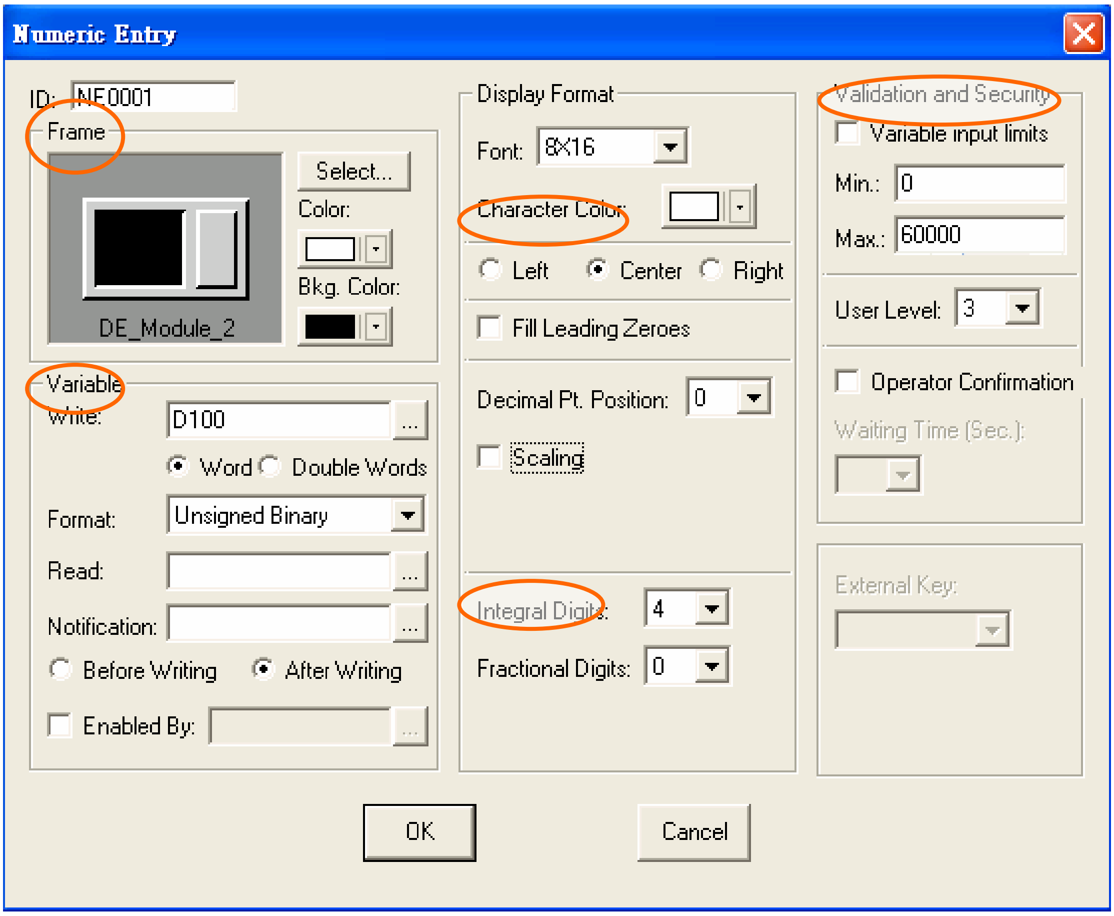
III. Example

一. A Basic Numeric Entry Button

The following are the steps to create a [Numeric Entry] button：



1. Frame Style: Select "DE_Module_2"; and the background color is "Black"; the character color is "White".
2. [Write]：Specify the PLC register "D100" to store the value. (The HMI model is PWS3261 and the PLC model is Mitsubishi FX2N.)
3. [Format] is "Unsigned Binary".
4. Allow 4 integral digits in a number.
5. The minimum of an input value is "0" and the maximum of an input value is "60000."



The steps above will create a [Numeric Entry] button. Once the button is pressed, a numeric keypad will be displayed on the screen. After entering a value, the HMI will show the input value on the button.

Users can also design a [Numeric Display] object to display the value stored in the PLC. Therefore, for this basic numeric entry button, if one enters “10” on the HMI, then both of the [Numeric Entry] button and the [Numeric Display] object will show “10.” See Figure 122.

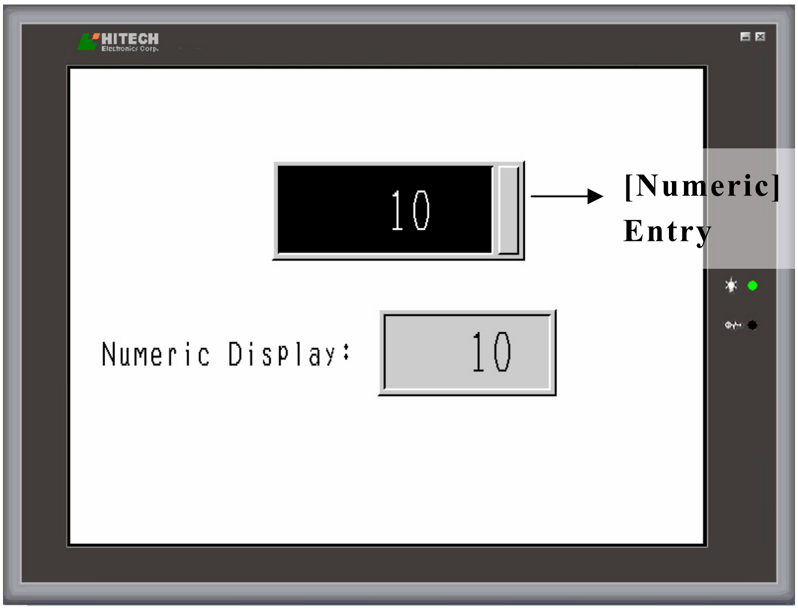
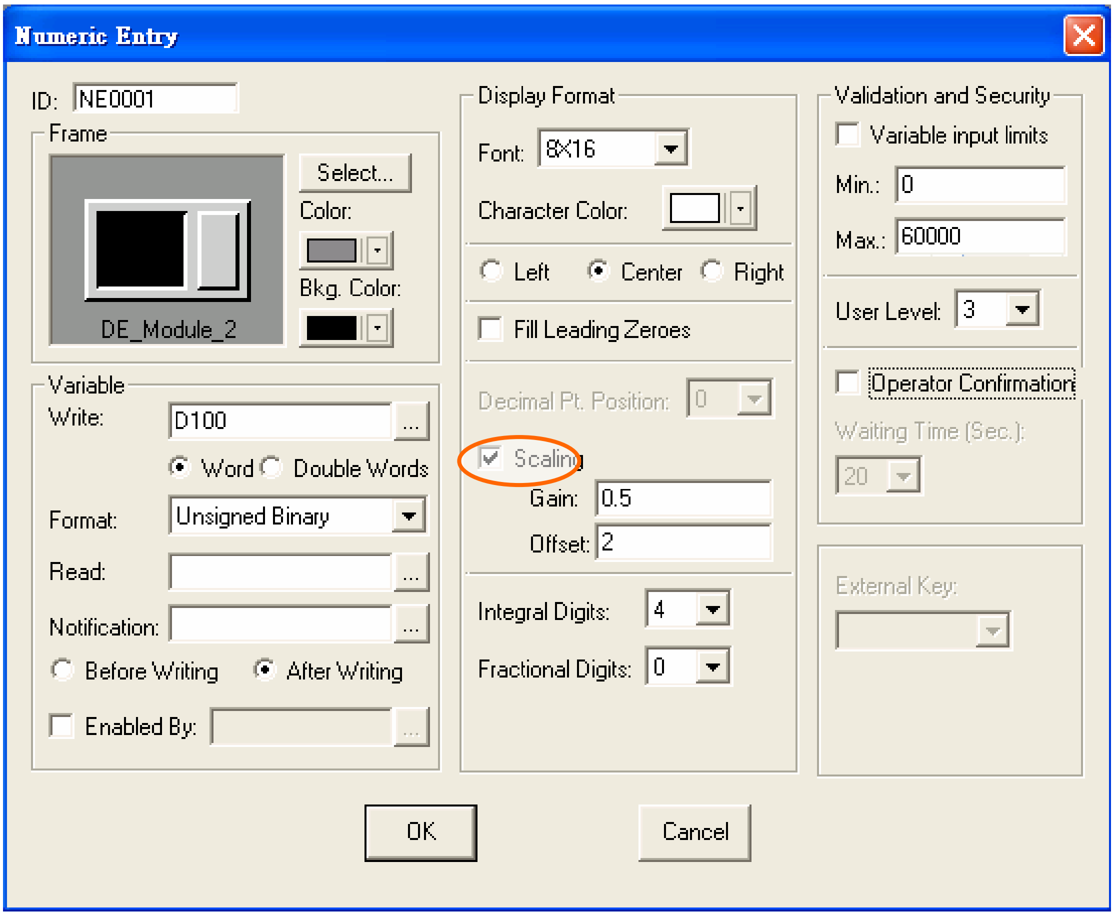


Figure 122. A basic [Numeric Entry] button and a [Numeric Display] object

二. A Numeric Entry Button with the Scaling Feature

To design a [Numeric Entry] button with the [Scaling] feature, [Gain] = 0.5; [Offset] = 2:

All other properties are the same as the example above.



This example will create a [Numeric Entry] button with the [Scaling] feature. After entering a value, the HMI will show the input value on the button. Users can also design a [Numeric Display] button to display the value stored in the PLC. Therefore, for this example of the button with the [Scaling] feature, if one enters “10” on the HMI, then the [Numeric Entry] button will show “10” and the [Numeric Display] object will show “16.” See Figure 123.

(Y = aX + b: X is the value stored in the PLC, Y is the input value on an HMI; where a=0.5 and b=2 here)

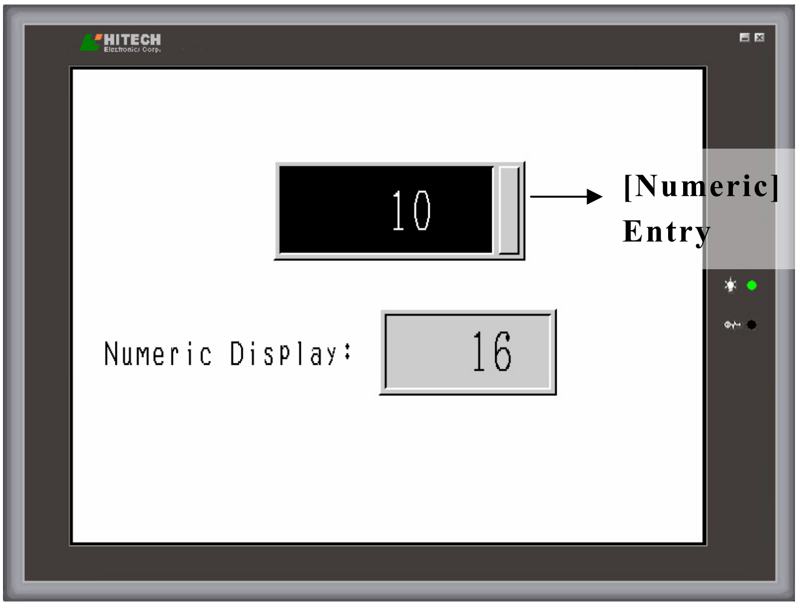


Figure 123. A [Numeric Entry] button with [Scaling] feature and a [Numeric Display] button

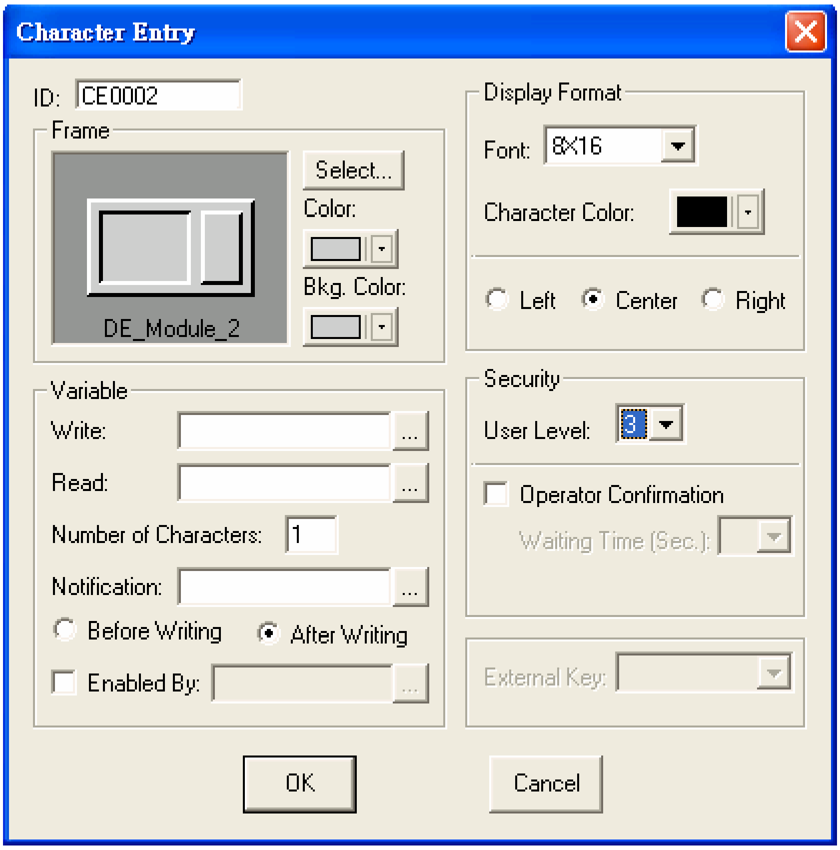
2.7.3. [Character Entry] 

I. Function

Once the button is pressed, an alphabetic keypad will be displayed on the screen. Enter character(s) and then press the [ENT] on the keypad. The HMI will then write the input entry in ASCII to the specified PLC register. The functions of this button are to provide users with an alphabetic input and its display.

The object is not applicable on all HMI models; please refer to Appendix A. - Table of the ADP 6.0 Features and the HMI Models for the complete details.

II. Properties



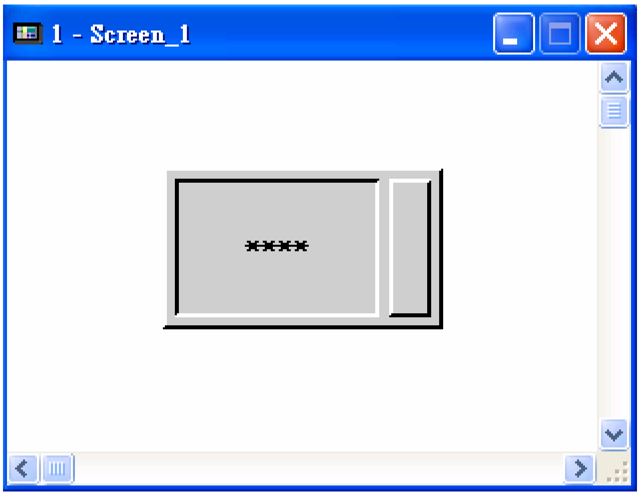
- [Variable] Block：
  - ♦ [Number of Characters]：The number of characters; the maximum is "28." (2 words in ASCII = 1 Word in a PLC register)

For the properties which are not explained in this section, please refer to the Section 2.7.1.6. [Set Value Button] and the Section 2.7. Object III Specify Object Properties.

III. Example

The following are the steps to create a [Character Entry] button：

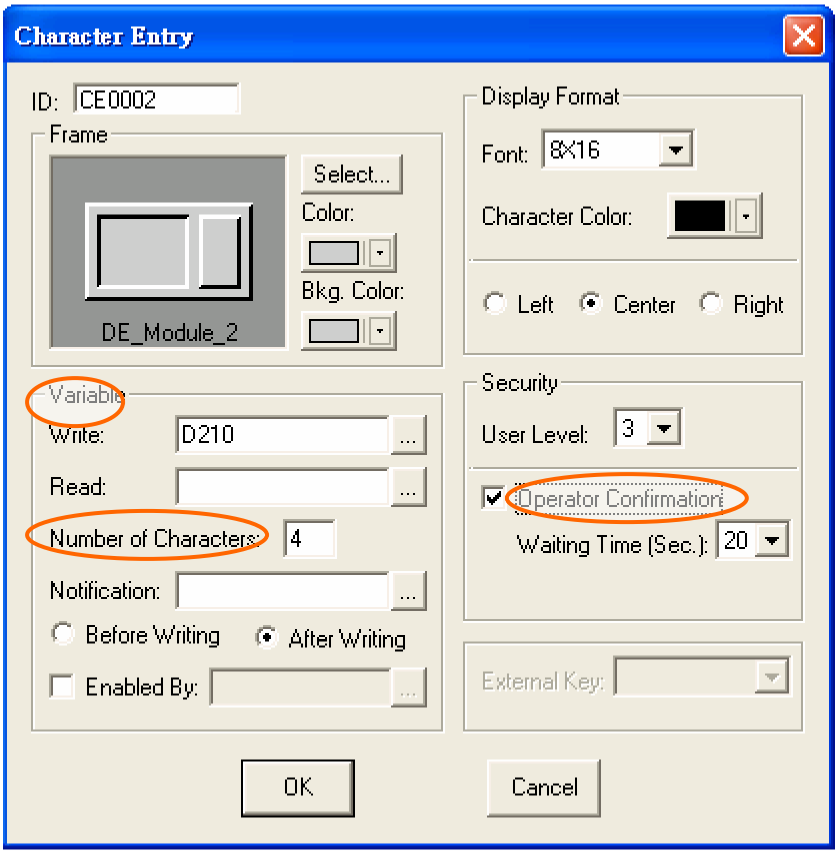
2. Instructions



1. [Write]：Specify the PLC register "D210" to store the input value. (The HMI model is PWS3261 and the PLC model is Mitsubishi FX2N)

2. The [Number of Characters] is "4".

3. The [Waiting Time (Sec.)] is "20" seconds.



The steps above will create a [Character Entry] button. Once the button is pressed, an alphabetic keypad will be displayed on the screen. After entering the characters, press the [ENT] on the keypad. Then a dialog box should appear on the screen to ask for the user's confirmation. See Figure 124.

Note that press the [ALT] key for the keypad shift.

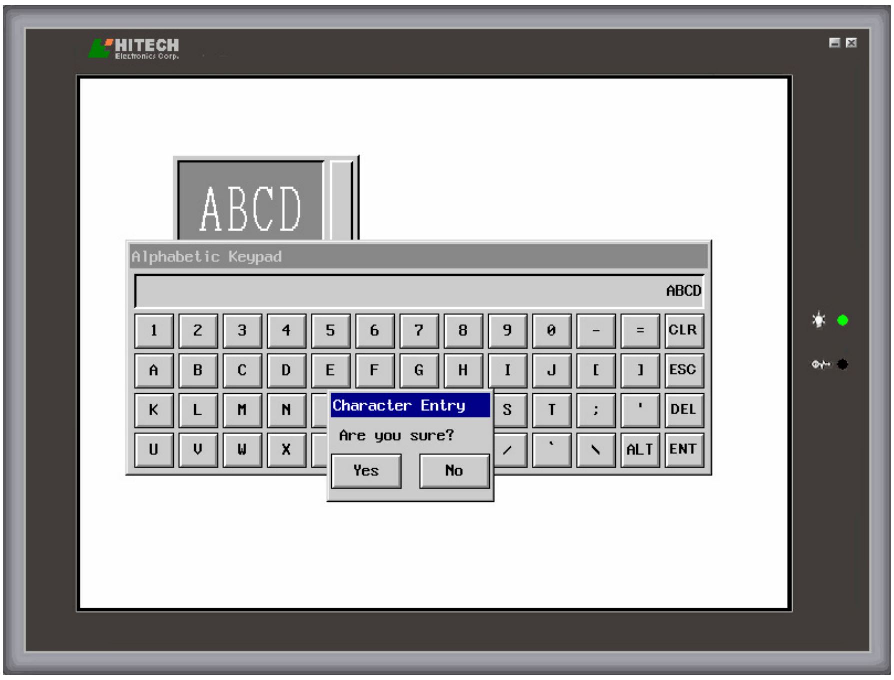


Figure 124. The [Character Entry] button

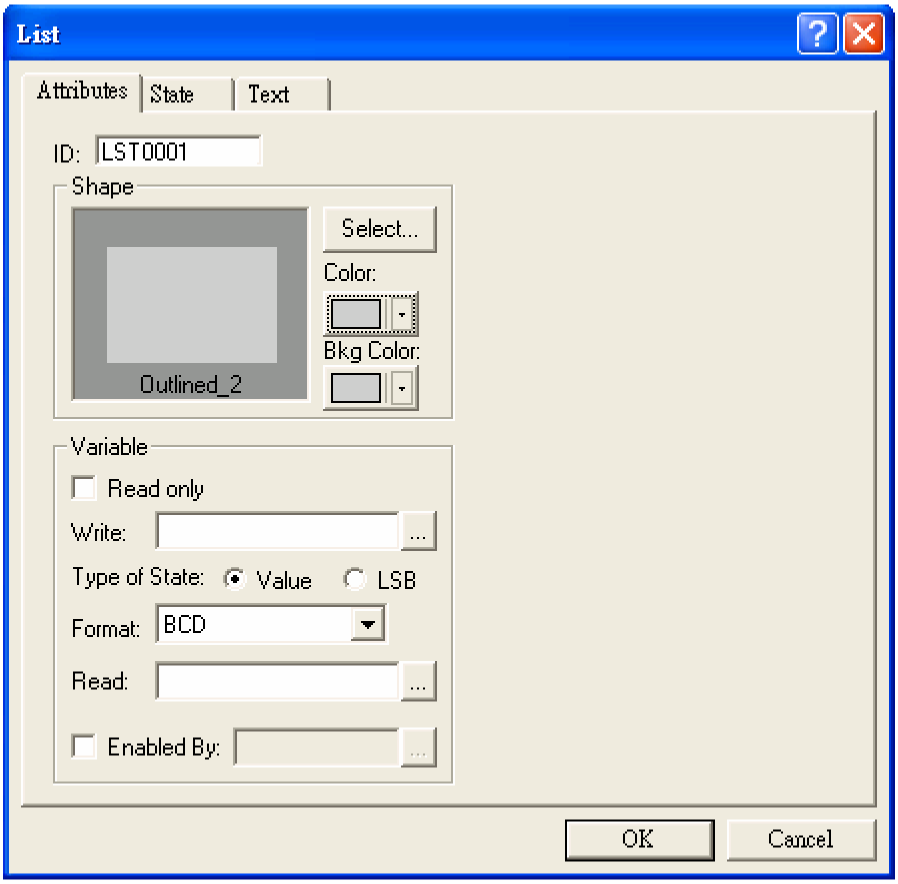
2.7.4. [List] 

I. Function

Each item in the [List] object is correspondant to desinated register value in PLC. The first item represents the register value as "0". The second item represents the register value as "1", and so on. When user chooses one of the items in the list, the Workstation will store the correspondant value in PLC register.

The corresponding item will be highlighted in a [List] object. Furthermore, a user can change the value of a PLC register by making a selection from a [List] object. This object is not applicable on all HMI models; please refer to the Section Appendix A. – Table of the ADP 6.0 Features and the HMI Models.

II. Properties



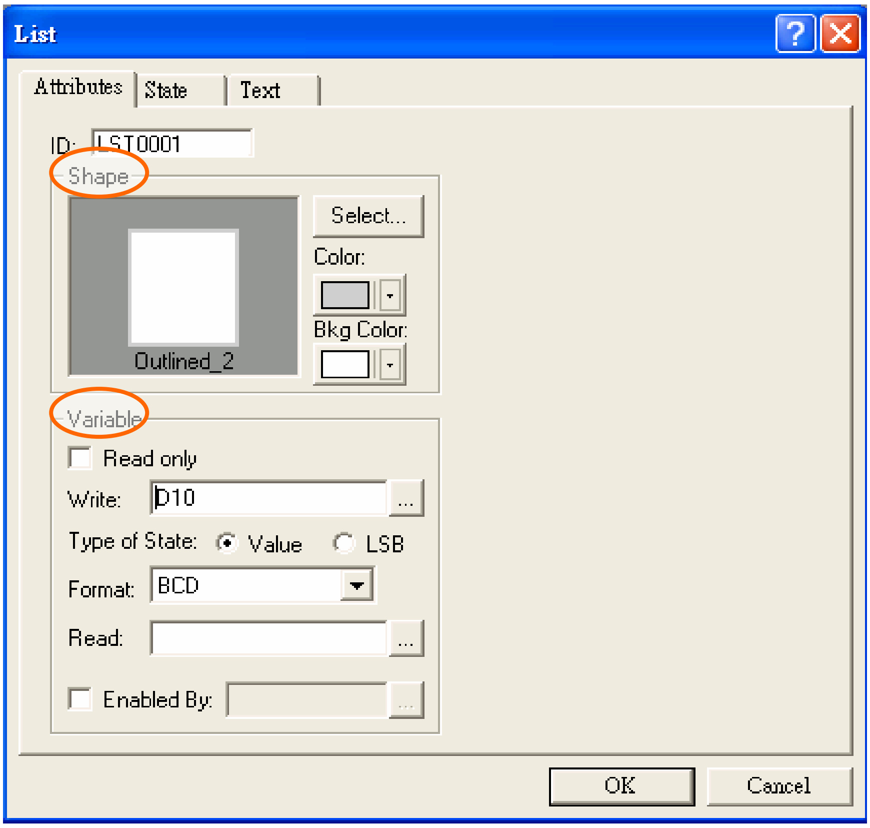
- [Variable] Block：
  - ♦ [Read Only]: For the purpose of display. Users are not able to make a selection from the list.
  - ♦ [Write]: Writes the value to the specified PLC register.
  - ♦ [Type of State]:
    - [Value]: There are 256 states (0-255). The value of “0” represents state 0; the value of “1” represents state 1, and so on.
    - [LSB]: There are 16 states. If more than 2 bits are to be ON, the PLC register will store the value of the lower bit.
  - ♦ [Format]: This is only applicable when [Value] option is selected. There are three selections “BCD”, “Signed Binary”, and “Unsigned Binary”.
  - ♦ [Read]: Reads the value from the specified PLC register. If the location is not specified, then the HMI reads from the [Write] location.

For the properties which are not explained in this section, please refer to the Section 2.7. Object III Specify Object Proerties.

III. Example

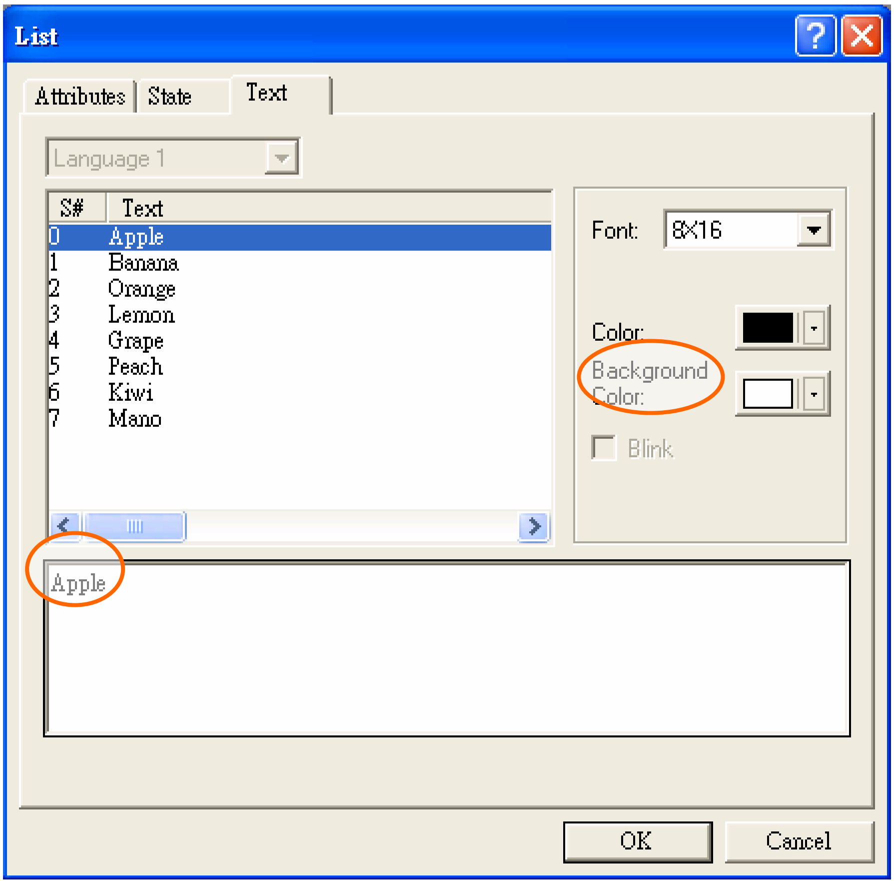
The following are the steps to create a [List] object：

1. Shape：Select "Outlined_2"; and the background color is "White".
2. [Write]：Specify the PLC register "D10" to store the value.(The HMI model is PWS3261 and the PLC model is Mitsubishi FX2N)
3. The [Type of State] is "Value".
4. The [Format] is "BCD".



5. On the [State] tab, add new states. There are 8 states in this object.

6. On the [Text] tab, enter the text and set up the format of the display.



The steps above will create a [List] object. When a user selects an item from the [List] object, the HMI will write the value associated with the item to the specified PLC register. Therefore, if the item "Peach" is selected, then the value of the PLC register will be "5."

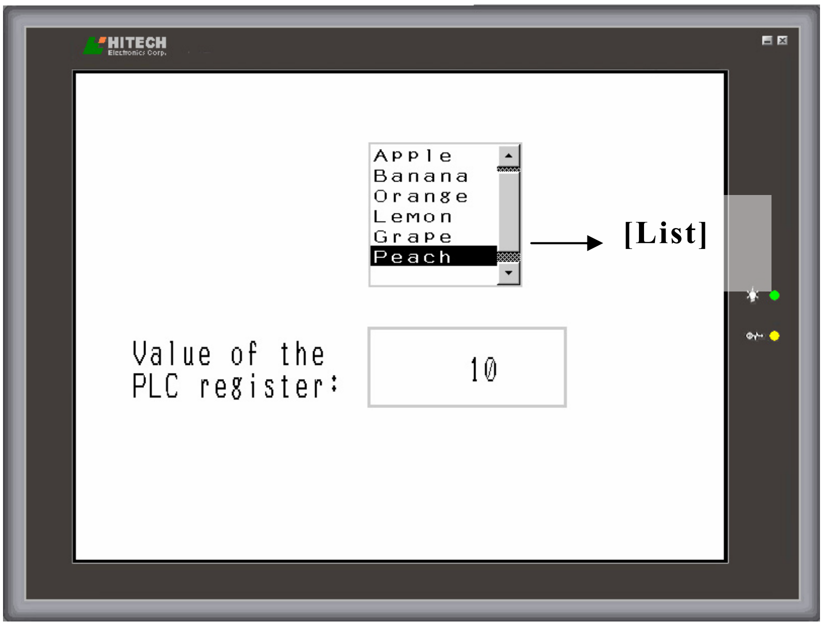


Figure 125. The [List] object and the display of the PLC register value of the item

2.7.5. [Drop Down List]

I. Function

Each of the items in a [Drop Down List] object also corresponds to a value of a PLC register. Therefore, for a [Drop Down List] object, the value associated with the displayed item is the current value of the PLC register.

Click the object to display the list. The object will then drop down a list of items which a user can choose from. Furthermore, a user can change the value of a PLC register by making a selection from a [Drop Down List] object. Once a selection is made from the object, the list will be disappeared. This object is not applicable on all HMI models, please refer to Appendix A.- Table of the ADP 6.0 Feature and the HMI models for the complete details.

II. Properties

The properties of the [Drop Down List] object are similar to those for the [List] object, please refer to the Section 2.7.4. [List] and the Section 2.7. Object III Specify Object Properties.

III. Example

The steps to create a [Drop Down List] object are similar to those for a [List] object. Please refer to the Section 2.7.4. [List] III. Example for the complete details. Remember to adjust the length of a list accordingly so that a user is able to display all items of the list.

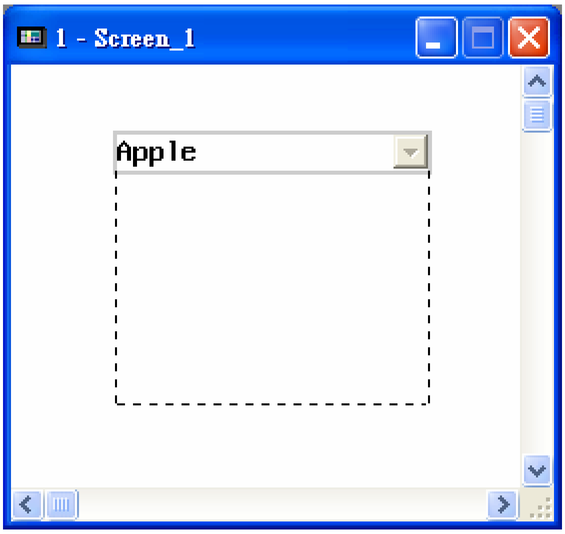


Figure 126 is an example of a [Drop Down List] object on the HMI. Click the object to display the list. The object will then drop down a list of items which a user can choose from. When a user selects an item from the list, the HMI will write the value associated with the item to the PLC register. Therefore, if the item “Peach” is selected, then the value of the PLC register will be “5.”

Notice that once a selection is made from the object, the list will be disappeared.

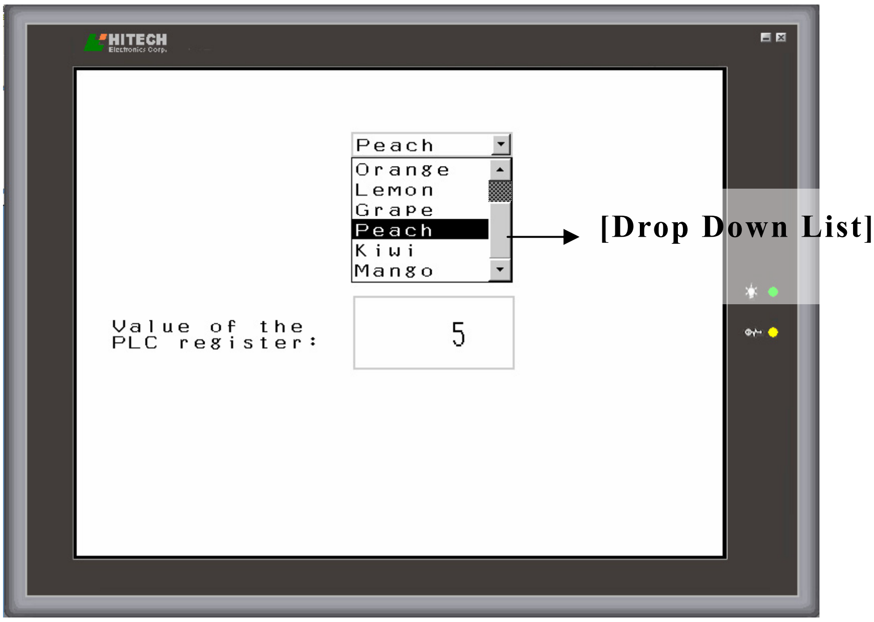


Figure 126. The [Drop Down List] object and the display of the register value of the item

2.7.6. [Indicator]

2.7.6.1. [Multistate Indicator] 

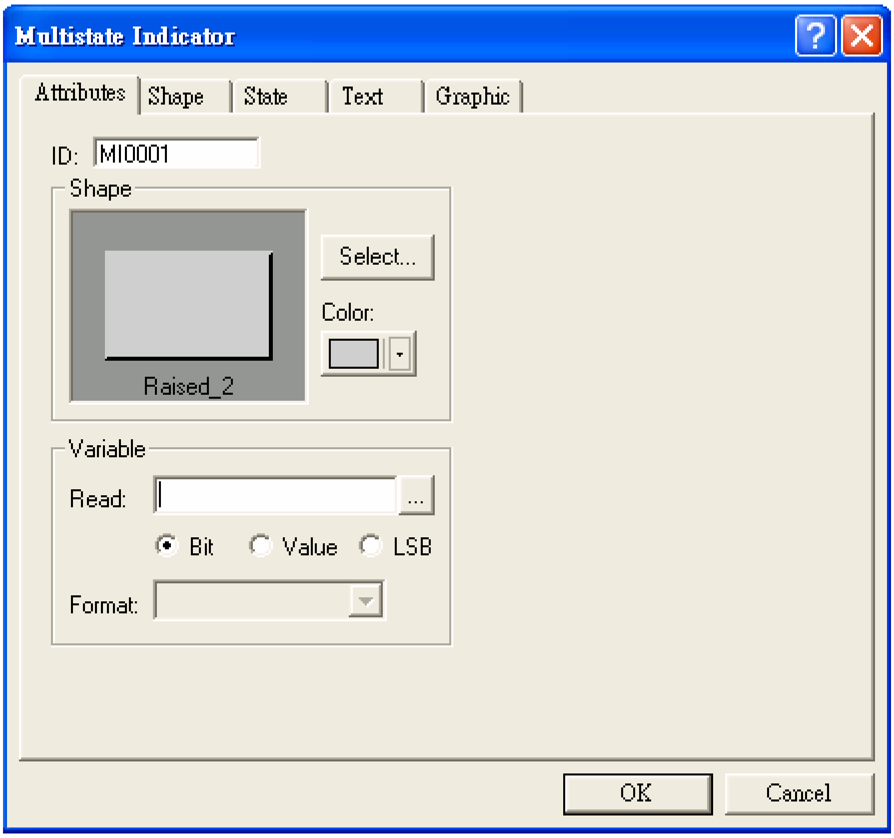
I. Function

[Multistate Indicator] is to indicate which state it is with text and /or a graphic. Therefore, as the HMI reads the contact status or the register value from the PLC, it can automatically display the corresponding designed content on the HMI screen according to the indicator.

The following are the number of the states:

1. [Bit]: The maximum number of the states is "2";
2. [Value]: The maximum number of the states is "256";
3. [LSB]: The maximum number of the states is "16".

II. Properties



- [Variable] Block:
  - ♦ [Read]: Specify the register/bit location.
    - [Bit]: Two states in all. (User can input more than two states but the object only displays two states on HMI.)

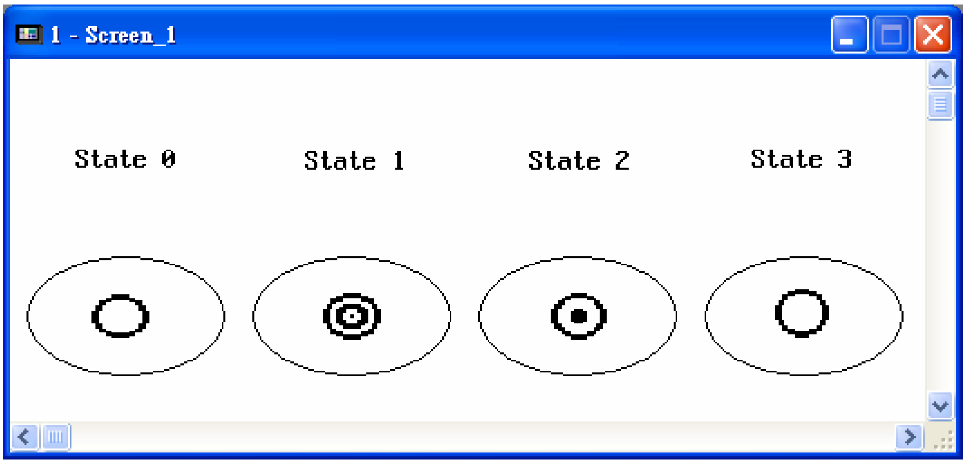
- [Value]: 256 states (0-255) in all ; value 0 represents state 0; value 1 represents state 1; value 2 represents state 2, and so on.
- [LSB]: 16 states in all ; the Workstation takes the bit number of the least bit that is on as the state number.

♦ [Format]: Specify the data format. There are three options: [BCD], [Signed Binary], and [Unsigned Binary].

For the properties which are not explained in this section, please refer to the section 2.7. Object Menu III Specify object properties .

III. Exapmple

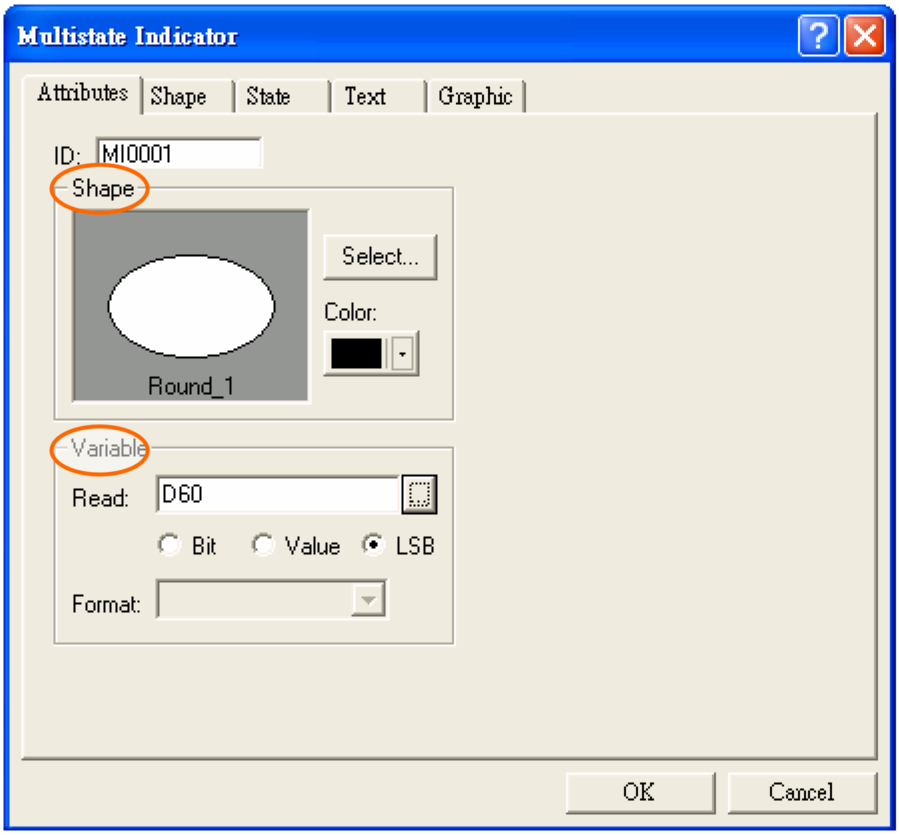
The following are the steps to create an [Multistate Indicator] object：



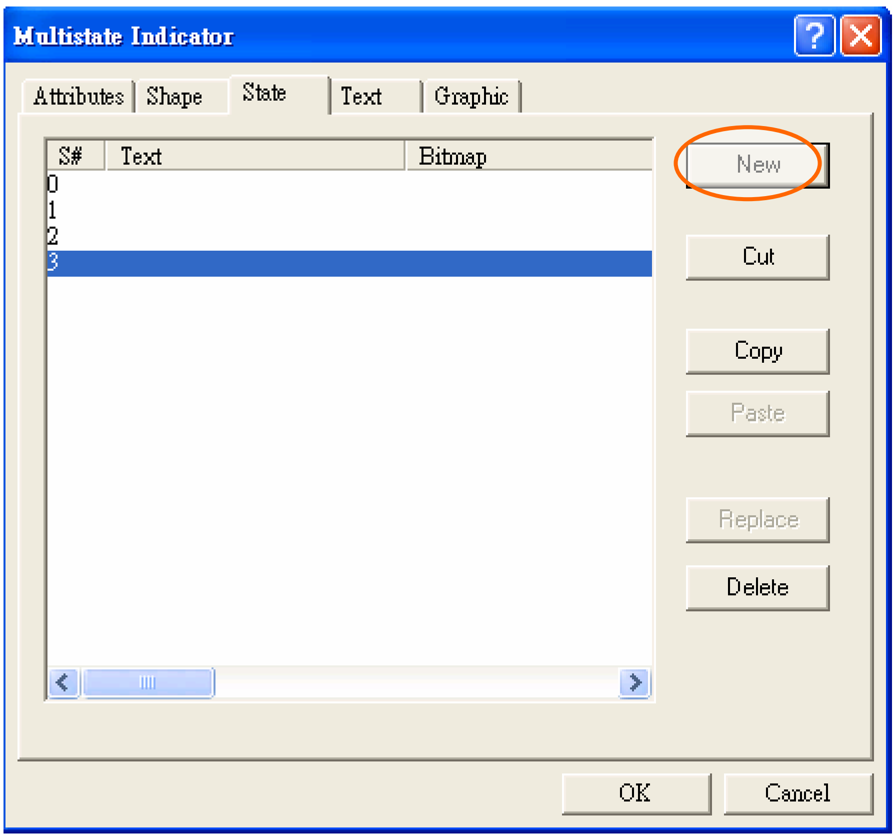
1. [Read]：Specify the PLC register “D60” to read from. (The HMI model is PWS3261 and the PLC model is Mitsubishi FX2N)

2. The [Format] is “LSB”.

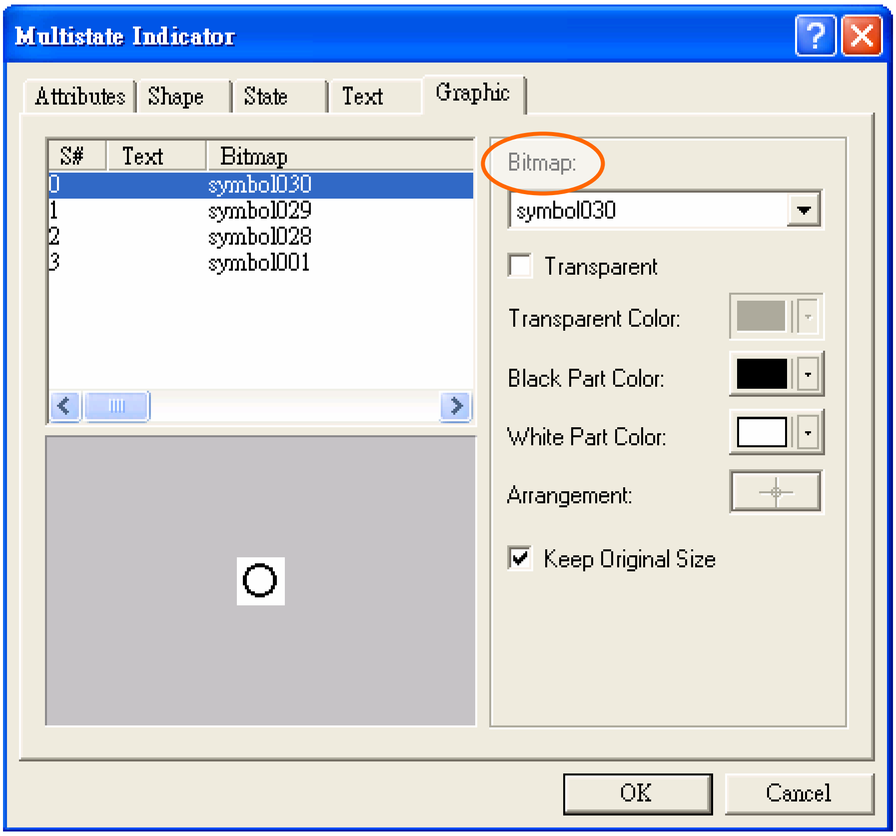
3. Select “Round _1” ; and the boder color is “Black” .



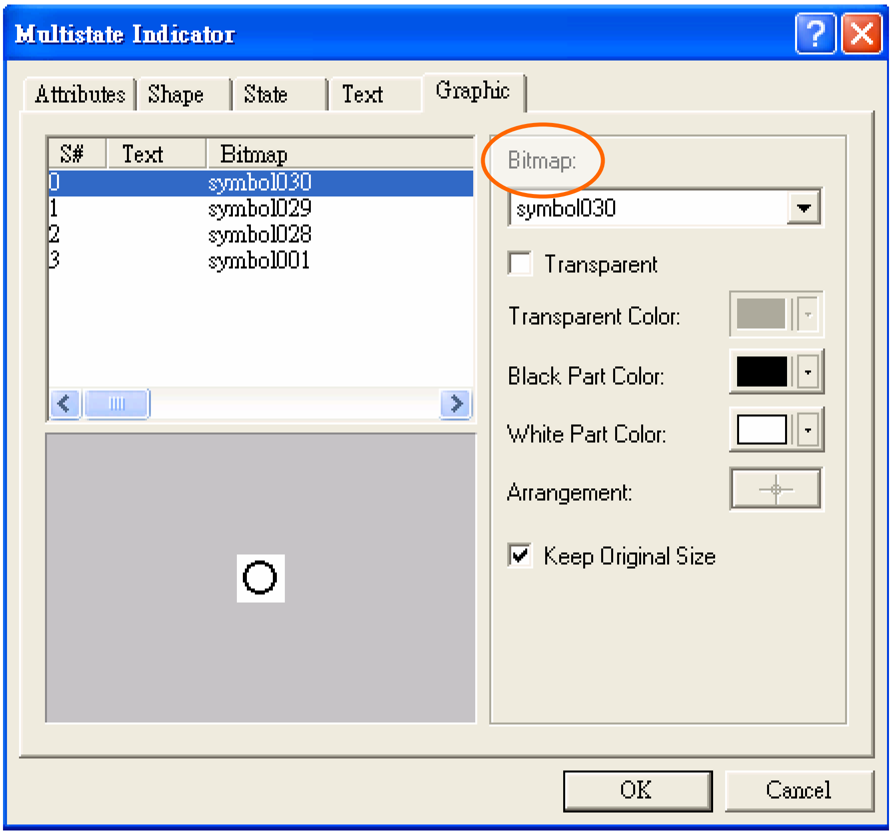
4. On the [State] tab, add new states. There are 4 states in this object.



5. Select bitmap on [Graphic] tab. This example does not display text but graphics. (These graphics are in “SYMBOLS.GBF” library)



6. The [Background Color] is “White” on the [Text] tab.



The above-mentioned steps will create a [Multistate Indicator] object. In this example, the [Numeric Entry] buttons are desgined for the numeric entry written in the PLC register. The [Multistate Indicator] objects will display the corresponding states according to the register value. See Figure 127.

Therefore,for this example of the object, if one enters "1" on the HMI, then [Multistate Indicator] object will show "State 0";if one enters "4", the object will show "State 2" ; if one enters "8", the object will show "State 3" .

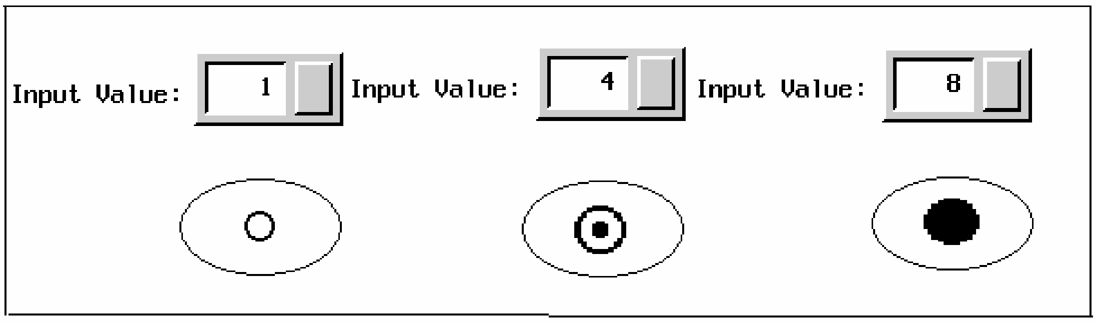
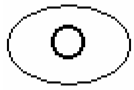
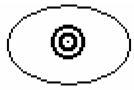
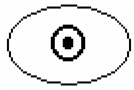
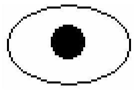


Figure 127. The [Multistate Indicator] object displayed the correspondant graphic

The [format] in this example is "LSB", please refer to the following table:

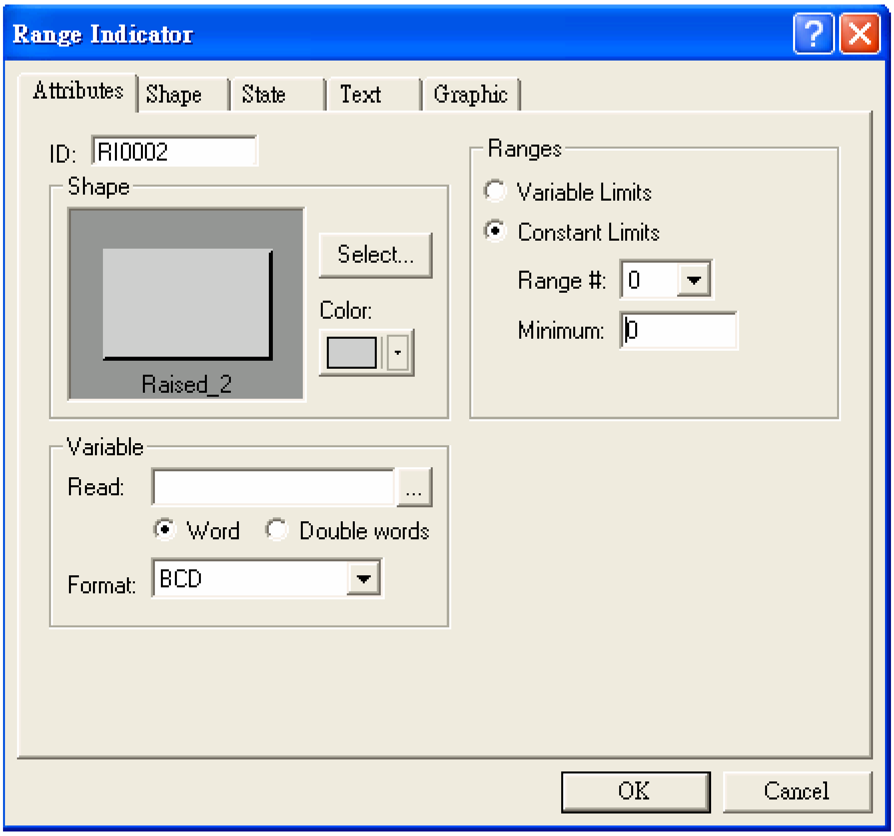
Numeric Entry (LSB)	Bit State	Multistate Indicator	Graphics
1	0 bit is ON; the others are OFF	State 0	
2	1 bit is ON; the other are OFF	State 1	
4	2 bit is ON; the other are OFF	State 2	
8	3 bit is ON; the other are OFF	State 3	

2.7.6.2. [Range Indicator]

I. Function

A [Range Indicator] displays one of several indicator labels depending on the register value. The HMI reads register values from the PLC and automatically caculates the difference according to the boundary value of current states. Then, the contents of current status are displayed on the HMI screen according to the caculated results.

Read value from PLC → Caculated result → Display the corresponding states



- [Ranges] Block：
    - ♦ [Variable Limits]：Specify the minimum of the ranges are to be read from registers following the read location. If the [Read] address is “Dn”, the minimunof Range#0 is stored in “Dn+1”, the minimum of Range#1 is stored in “Dn+2”, and so on.
    - ♦ [Constant Limits]：The minimum of the ranges is “Constant”.
        - [Range#]：The number of ranges, 15 ranges is the most.
        - [Minimum]：The minimum of ranges.

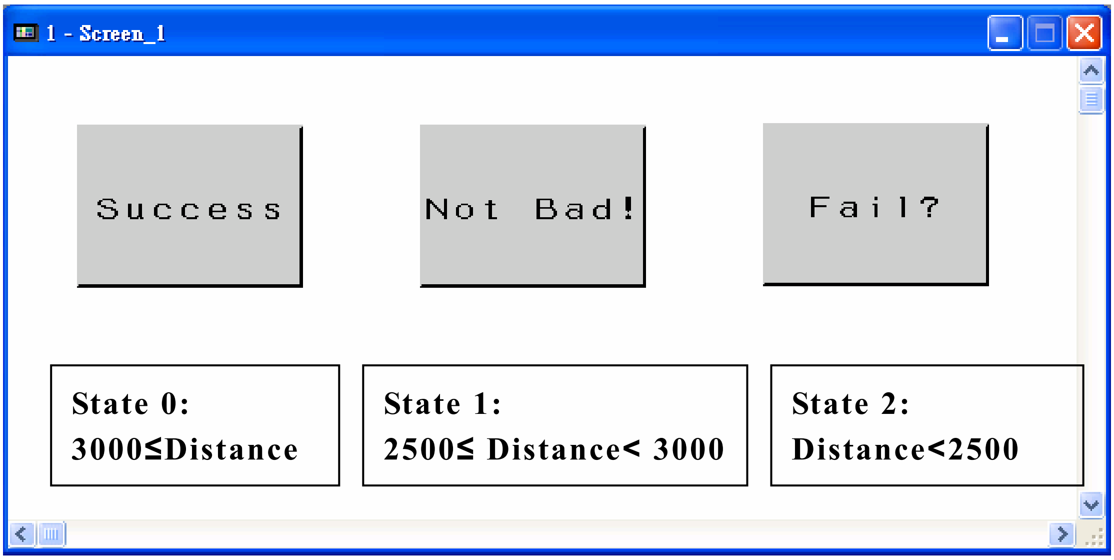
Note：numbers of ranges = number of states − 1

For the properties which are not explained in this section, please refer to the Section 2.7. Object III Specify Object Properties.

III. Example

The following are the steps to create an [Range Indicator] object：

2. Instructions

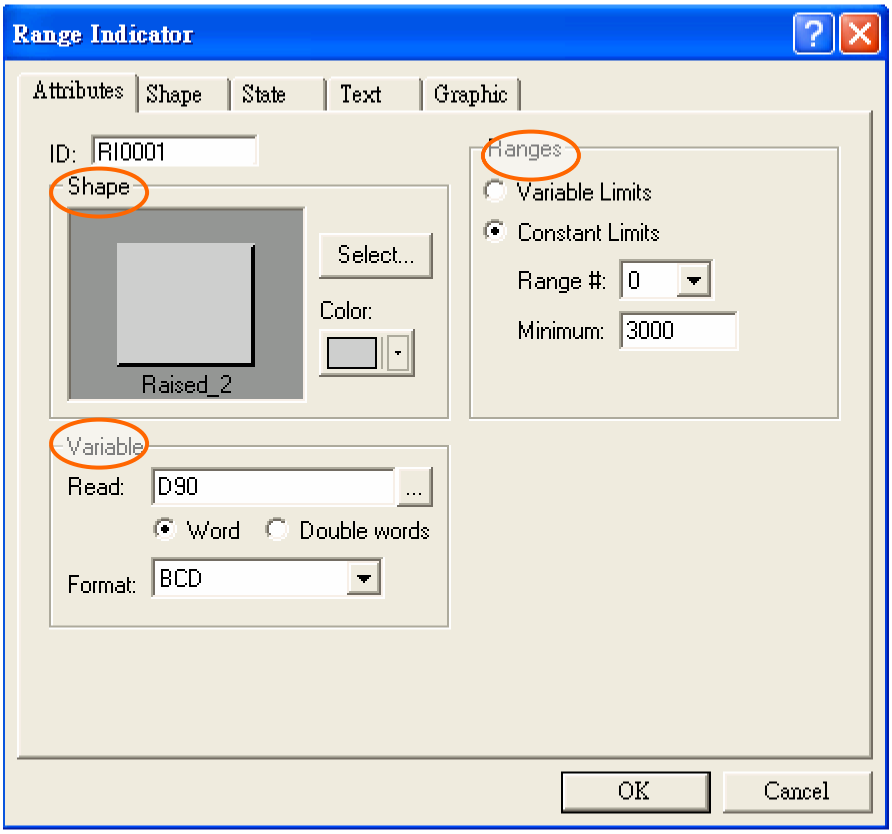


1. [Read]：Specify the PLC register “D90” to read from. (The HMI model is PWS3261 and the PLC model is Mitsubishi FX2N.)

2. Shape：Select “Raised _2”.

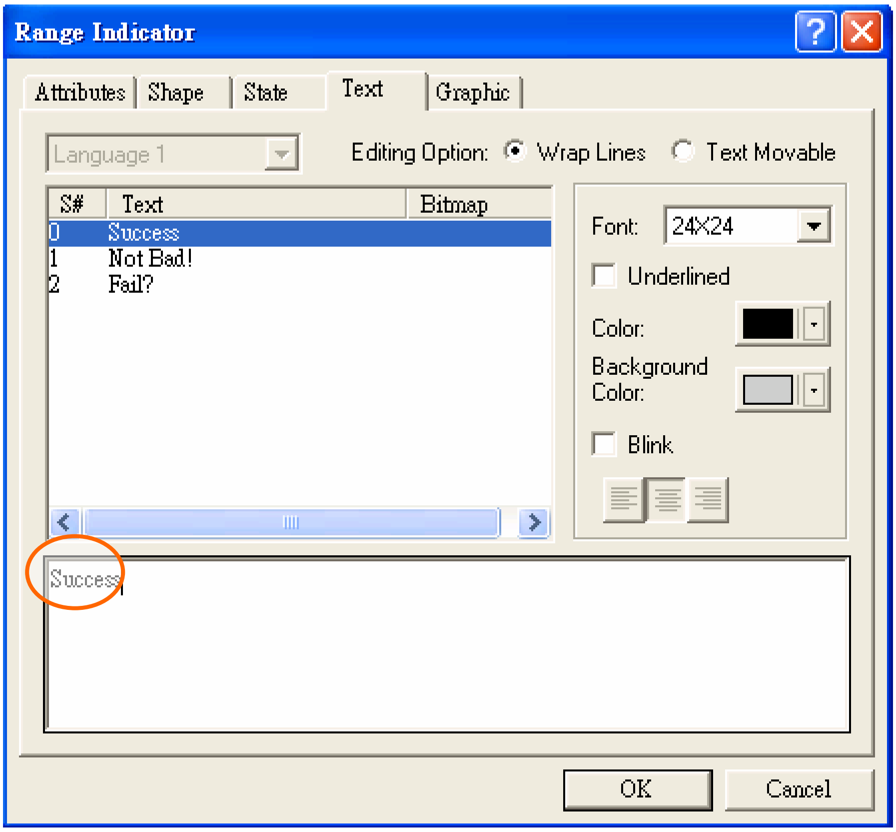
3. The minimum of ranges are constant limits.

4. The minimun of range#0 is “3000”; the minimun of range#1 is “2500”.



5. On the [State] tab, add new states.This object has 3 states.

6. On the [Text] tab, enter the text to states.



The above-mentioned steps will create a [Range Indicator] object. In this example, a [Numeric Entry] button is to input value in the PLC register; and a [Range Indicator] object is to calculate the result and display its corresponding state associated with the specified range. See Figure 128.

If a user enters the input value "3500", the correspondant range is range# 0. Therefore, the [Range Indicator] object will show "Success" Object.

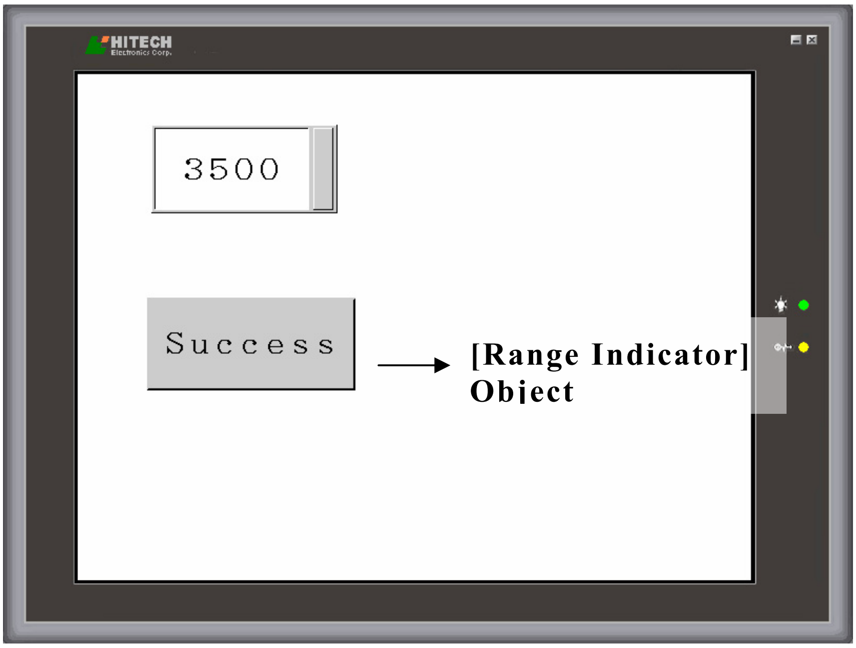


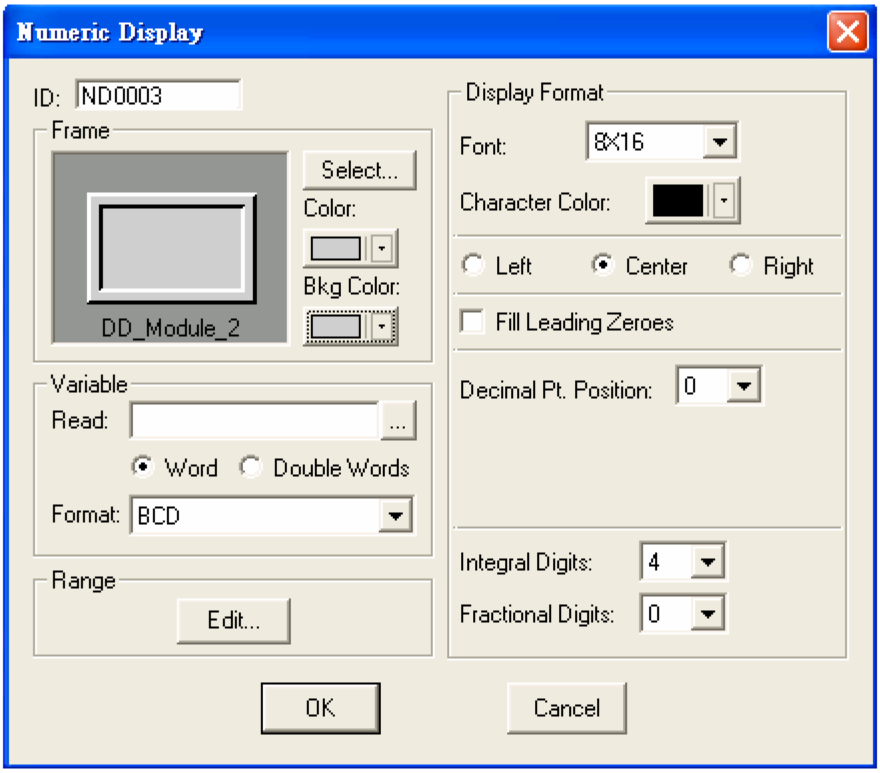
Figure 128. [Range Indicator] object displayed the corresponding state

2.7.7. [Numeric Display] 

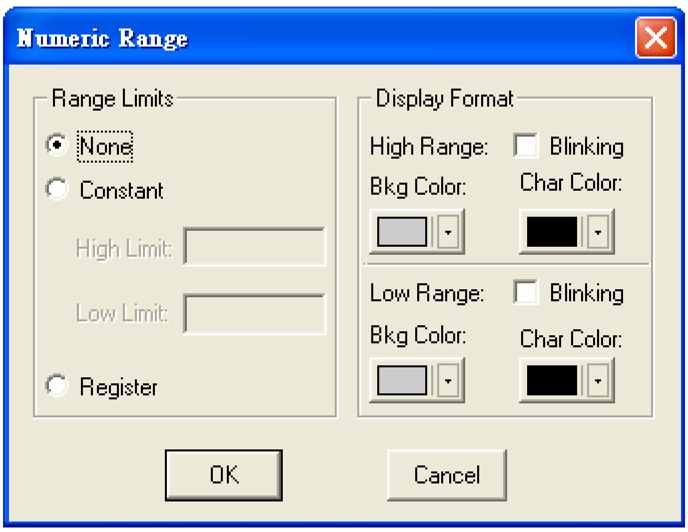
I. Function

The function of the [Numeric Display] object is to display the register value stored in PLC. This object does not support press-button function.

II. Properties



- [Variable] Block：
  - ♦ [Read]：Specify a register/bit location.
  - ♦ [Format]：There are "BCD", "SignedBinary", "UnsignedBinary", "Hexadecimal", "32-bit Floating-point" and "Octal".
- [Range] Block：
  - ♦ [Edit] Button： When press this button, the displayed dialog box provides display format with high/low range.



- [None]：None of high/low limit.
- [Constant]：Enter the constant variable of high/low limit.

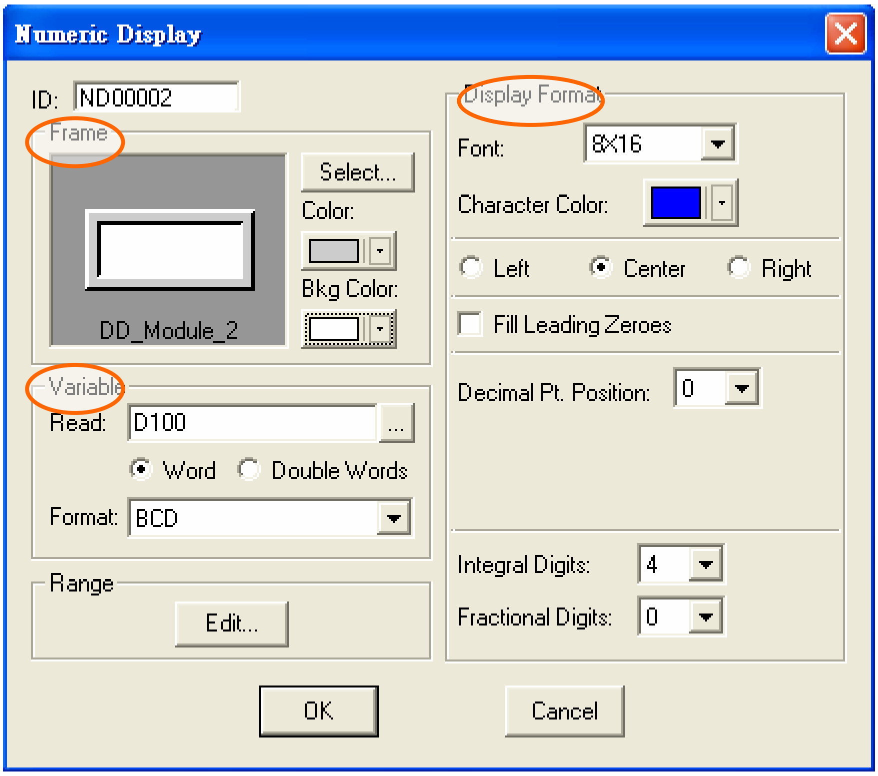
- [Register]：Read high/low limit from register. If the read location is "Dn", the high limit stored in "Dn+1" and the low limit stored in "Dn+2.
- [Display Format]：Specify the format to display when the variable is equal or more/less than high/low limit.

For the properties which are not explained in this section, please refer to the Section 2.7.1.6. [Set Value Button] and the Section 2.7. Object III Specify Object Properties.

III. Example

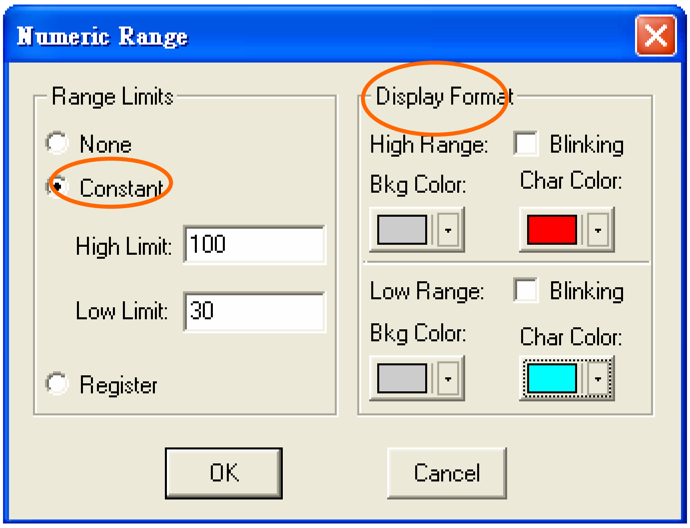
The following are the steps to create an [Numeric Display] object：

1. [Frame]：Select "DD_Module_2"; and the bkg. color is "White".
2. [Read]：Read the value from the specified PLC register 'D100'.(The HMI model is PWS3261 and the PLC model is Mitsubishi FX2N)
3. [Character Color]： The character color is "Blue".



4. [High Limit]**:** Specify '100'; [Low Limit]**:** Specify '30'.
5. If the variable is equal or less than '30', it would display "Light Blue"; If the variable is equal or more than '120',it

would display "Red"; If the variable is between '30' and '120', it would display "Blue" as original setting.



Above-mentioned steps will create a [Numeric display] object. In this example, a [Numeric Entry] button is to input value in the PLC register. The variable will display different format on the screen according to its range. See Figure 129.

Therefore, the variable will display "Light Blue" if one enters '10'; the variable will display "Blue" if one enters '50'; the variable will display "Red" if one enters '120'.

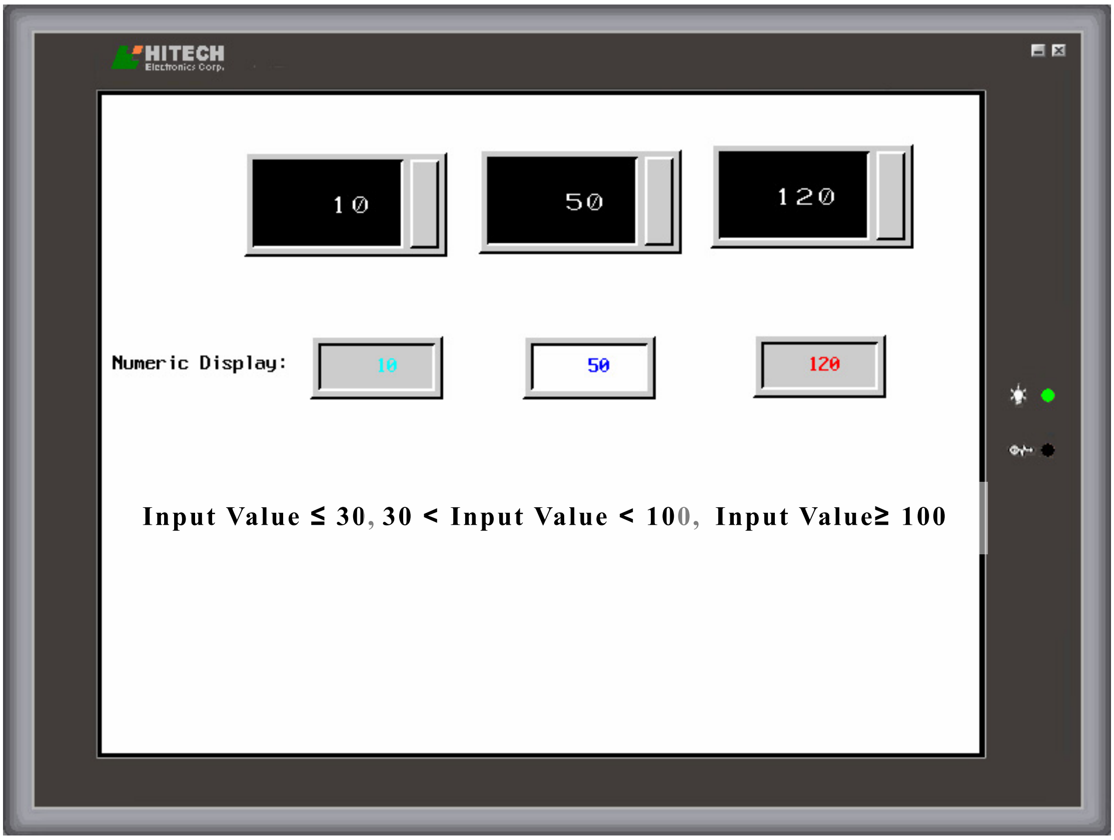


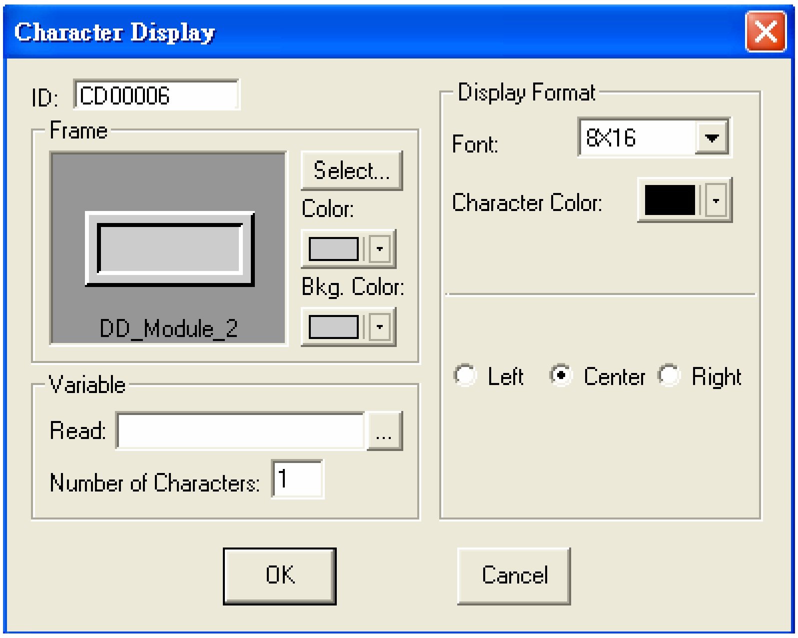
Figure 129. An Illustration of the [Numeric Display] objects

2.7.8. [Character Display] 

I. Function

The function of a [Character Display] button is to provide an alphanumeric display for an ASCII variable in the PLC register. Note that it does not support press-button function.

II. Properties

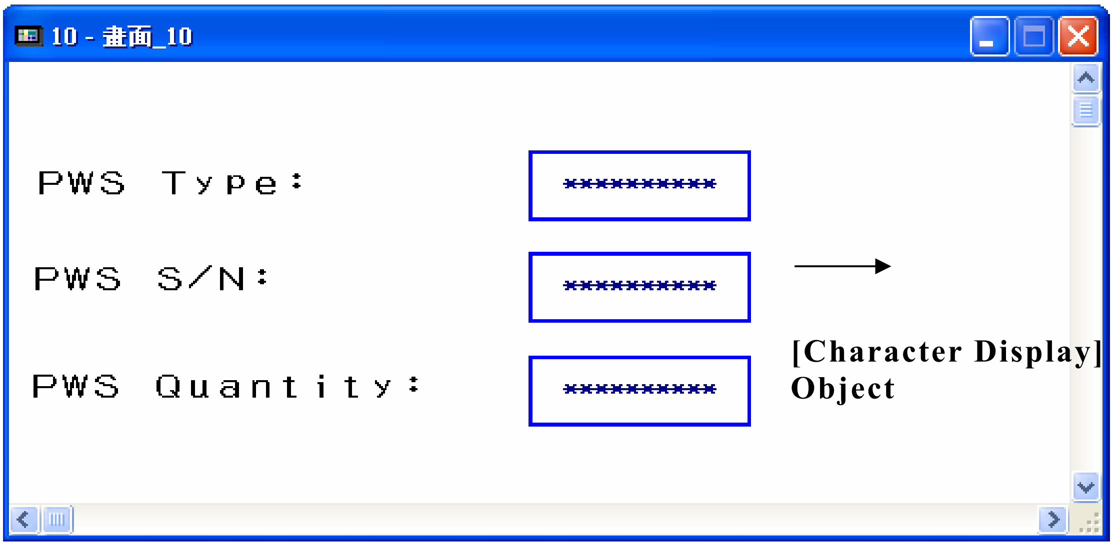


- [Number of Character]：Specify the number of characters to display. It can have up to 28 characters which are limited by the width of the object.

For othet properties which are not explained in this Section, please refer to the 2.7. Object III Specify Object Properties.

III. Example

The following are the steps to create a [Prestored Message Display] object; this function can be applied in the factory for the product management：

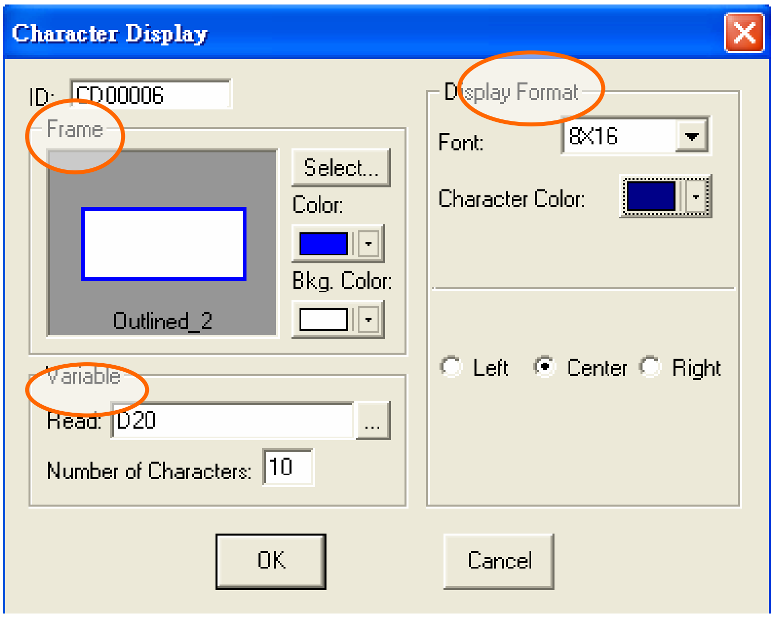


1. [Frame] : Select "Outlined_2"; "Blue" border color and "White" background color.

2. [Read] : Specify "D20".(The HMI model is PWS3261; the PLC model is Mitsubishi FX2N)

3. [Number of Characters] is 10.

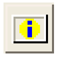
4. The [Character Color] is "Dark Blue".



2.7.9. [Message Display]

There are six types of Message Display Buttons : [Prestored Message], [Moving Sign], [Data Terminal], [Time Display], [Data Display], [Day-of-Week Display].

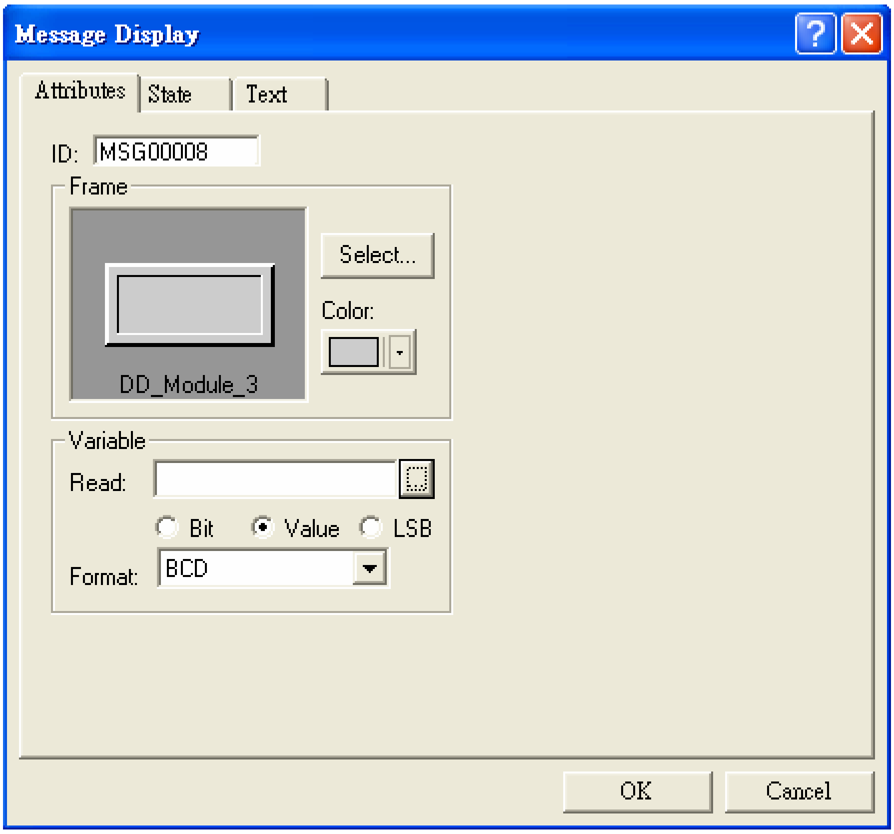
Please note that a Message Display Button contains only text; however an Indicator Button can have both text and graphic.

2.7.9.1. [Prestored Message Display] 

I. Function

The HMI reads the contact state (ON/OFF) or the register value from the PLC and automatically displays designed content on the HMI screen according to the state/value.

II. Properties



Please refer to the Section 2.7.6.1. [Multistate Indicator] for the conpelte details.

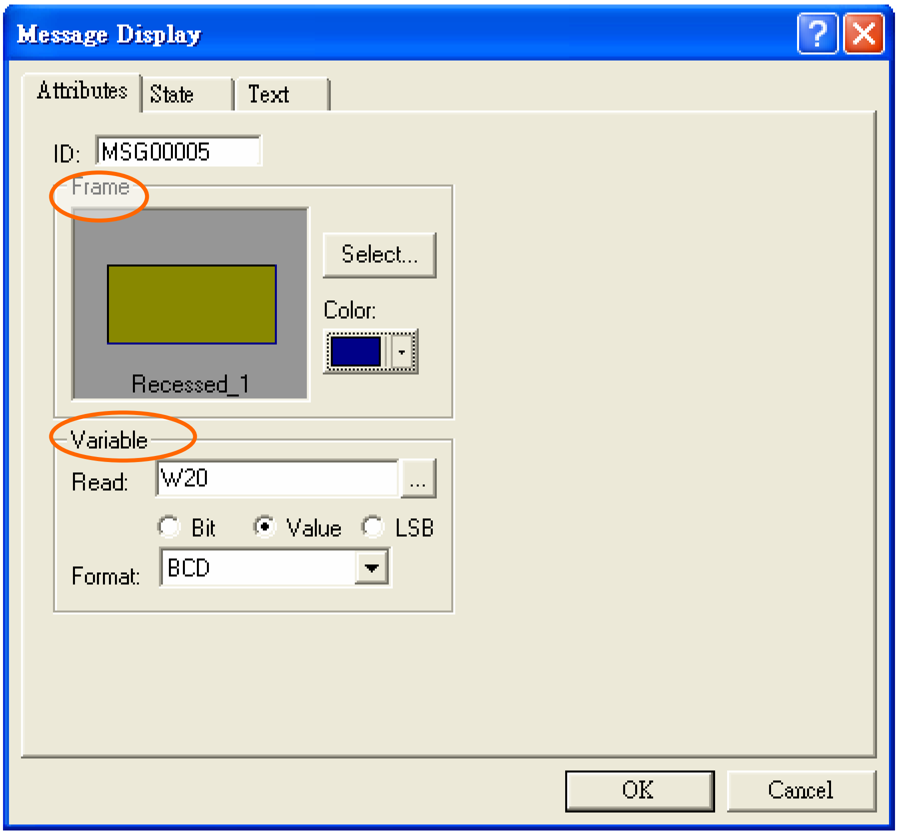
III. Example

The following are the steps to create a [Prestored Message Display] object:

1. Frame：Select “Recessed_1”; and “Dark Blue” borlder color.

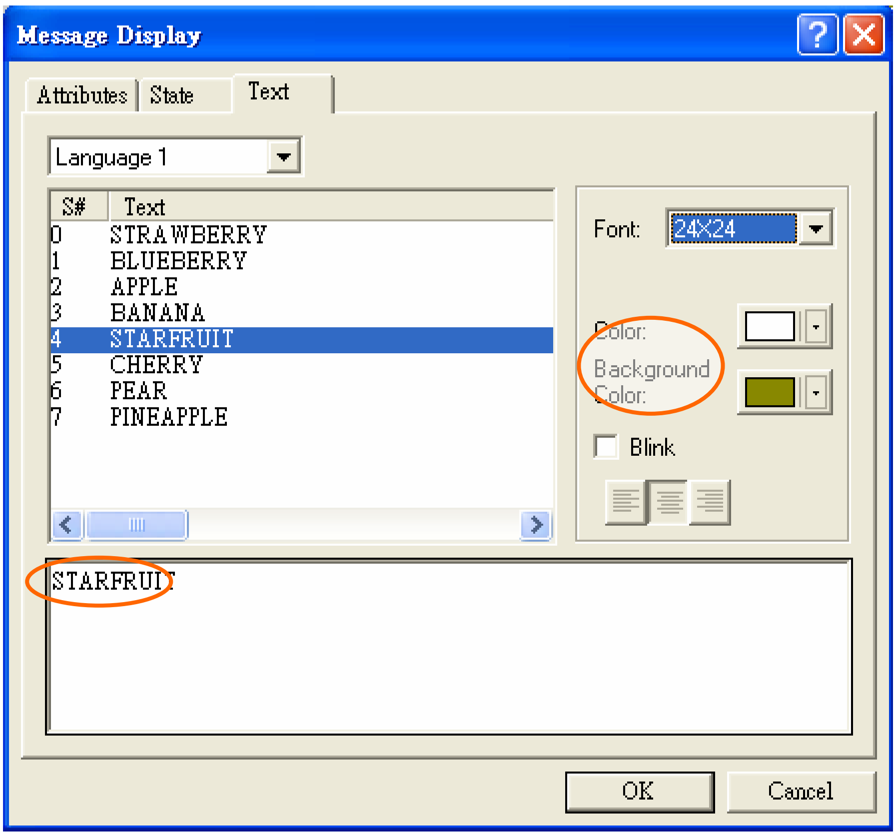
2. [Read]：Specify “W20”.

3. Select [Value] state.



4. Add new states on [State] tab to configure 8 states.

5. Enter the desired text and specify the format of text on [Text] tab.



Above-mentioned steps will create a [Prestored Message Display] object. When pressed the [Multistate] button (under the [Prestored Message Display] object) once, the HMI writes the command to PLC for state change. Therefore, once the state is changed, the [Prestored Message Display] will display the corresponding state. See Figure 130.

For instance, once the state is "Blueberry"; the [Prestored Message Display] object will display its corresponding content "Blueberry". Once the state is "Starfruit", the [Prestored Message Display] object will display its corresponding content "Starfruit".

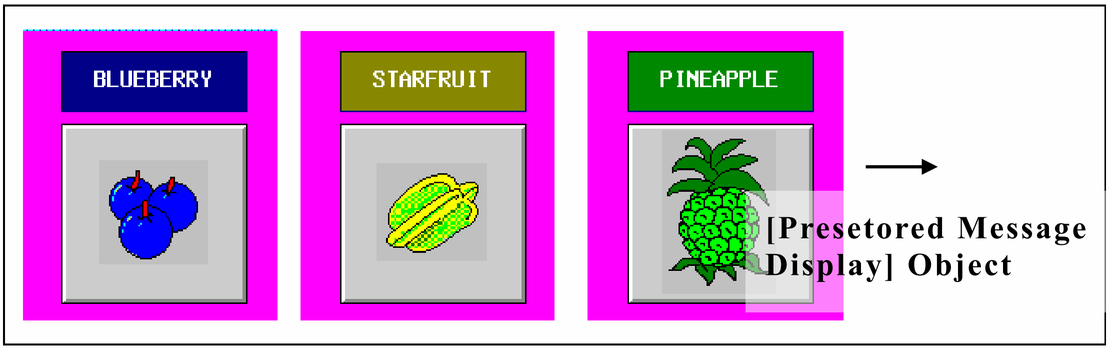


Figure 130. The [Prestored Message Display] Object

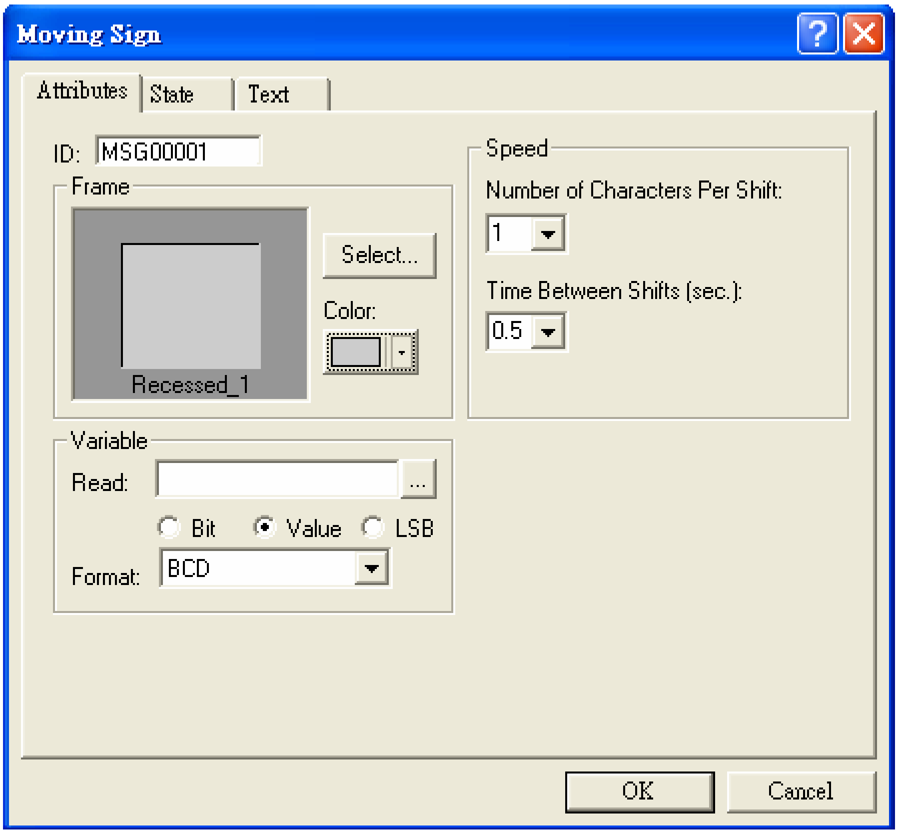
2.7.9.2. [Moving Sign]

I. Function

The [Moving Sign] object display its content one by one from right to left in circle.

When the HMI reads the value from a bit-location (ON/OFF) or register in PLC, the [Moving Sign] object will display its content or message according to the corresponding state on the screen.

II. Properties



- [Speed] Block：
  - ♦ [Number of Characters Per Shift]：Specify the number of characters per shift.
  - ♦ [Time Between Shifts (sec.)] ：Specify the time between shifts. The unit is second.

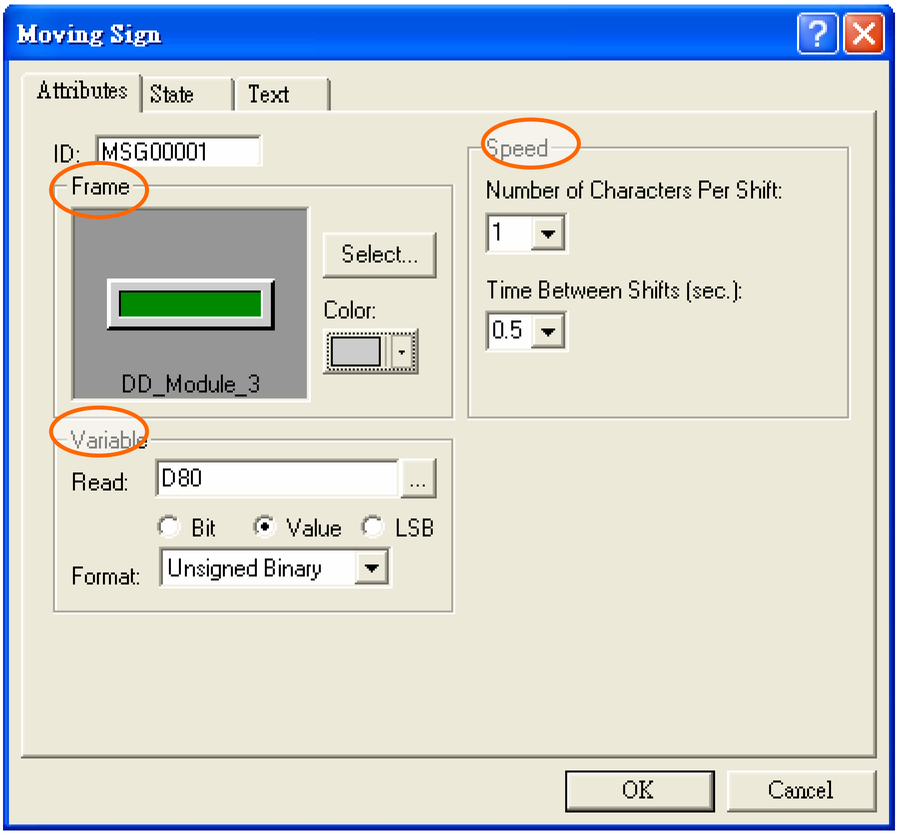
For the properties which are not explained in this Section, please refer to the Section 2.7. Object III Specify Object Properties.

III. Example

To design a [Moving Sign] object as the following:

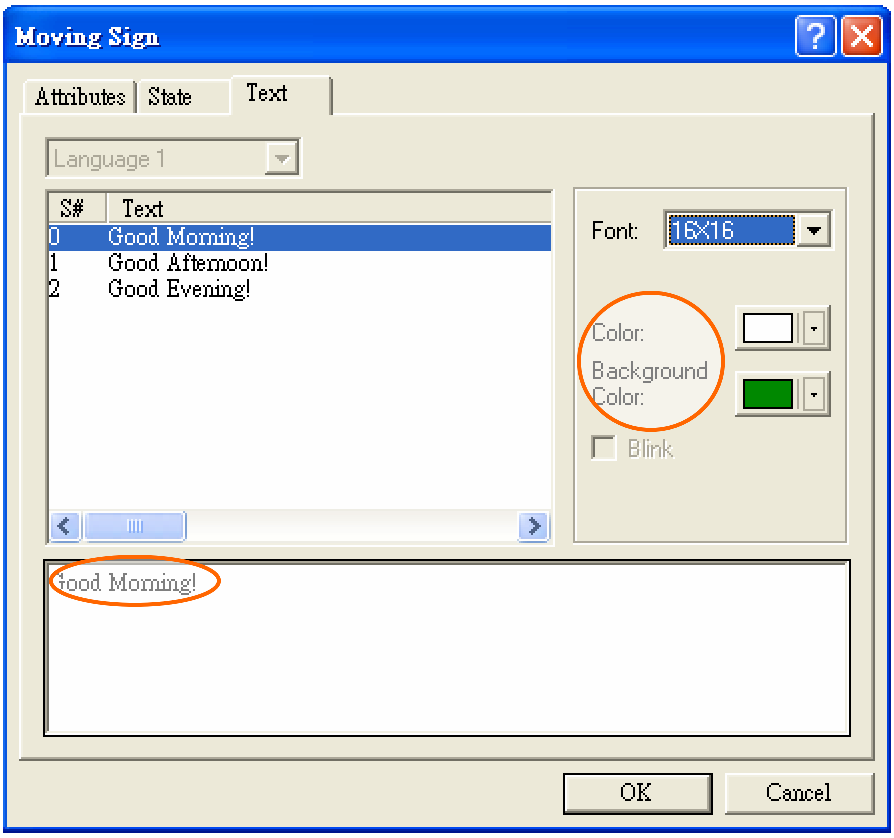
1. Frame：Select “DD_Module_3”.
2. [Read]：Specify “D80”. (The HMI model is PWS3261; the PLC model is Mitsubishi FX2N.)
3. Select [Value] to display the variable; the [Format] is “Un-signed Binary”.
4. The number of characters per shift is ‘1’ and the time between shifts is ‘0.5’ seconds.

2. Instructions



5. 3 states in all, the number of states can be modified on [State] tab.

6. Enter the text to its corresponding state on the [Text] tab to display.



Above-mentioned steps will create a [Moving Sign] object. The left [Multistate] button here is designed to write the command to PLC when pressed. Therefore, the [Moving Sign] object will display the corresponding content according the current state. See Figure 131.

For example, if the state is “Morning”, the [Moving Sign] object will display “Good Morning! Good Morning! Good Morning!” The text here is the revolving display, moving per character from right to the left.

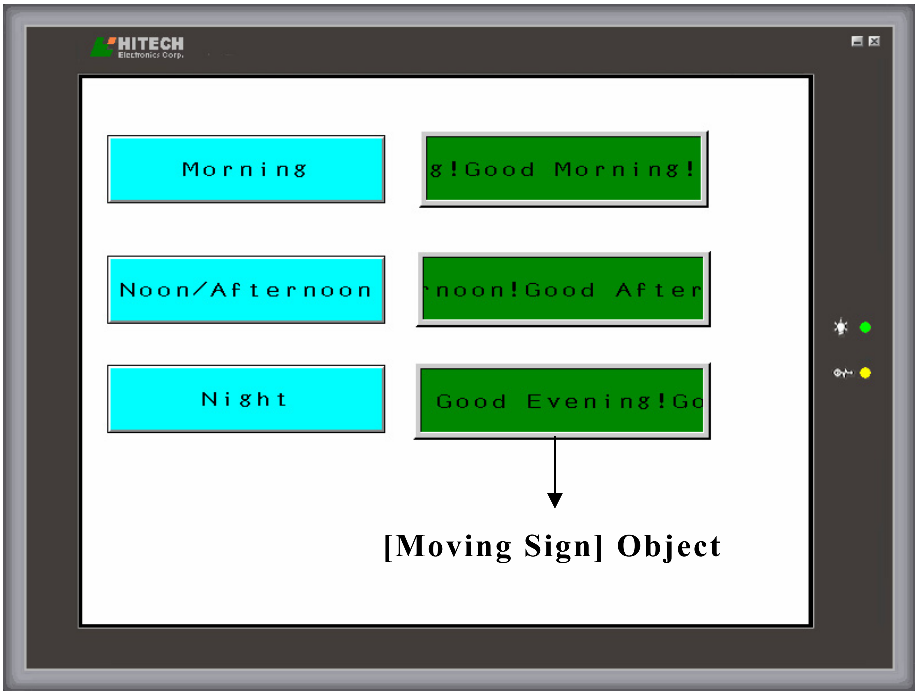


Figure 131. An Illustration of the [Moving Sign] objects

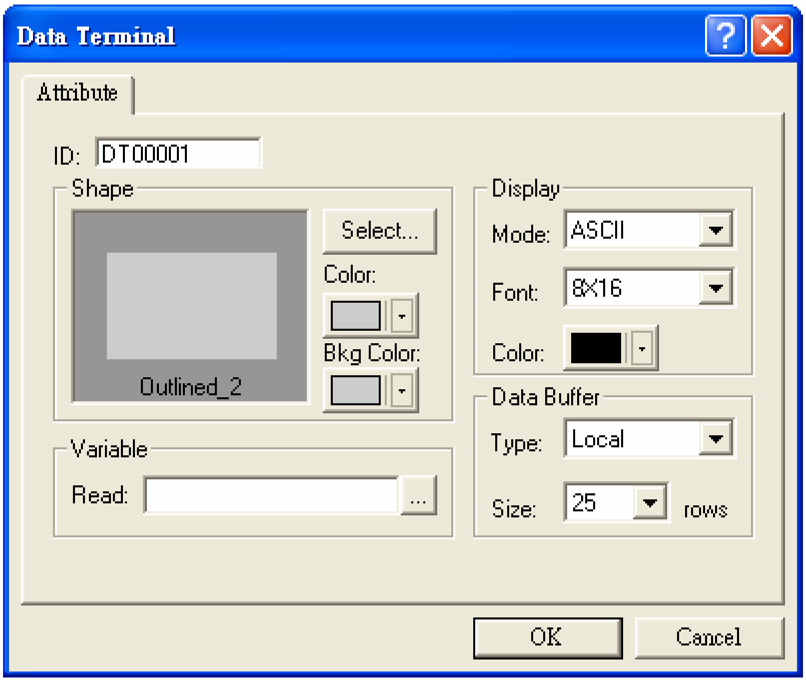
2.7.9.3. [Data Terminal]

I. Function

The function of this object is to simulate ASCII terminal. The Workstation and the terminal can be connected with another specified communication port and the specified communication parameter to the data terminal displayed with ASCII /HEX mode.

Remember to set "ASCII Device" to communicate and specify the communication port. Note that this function is not applicable on all models; please refer to the Appendix A. - Table of the ADP 6.0 Featutres and HMI models.

II. Properties

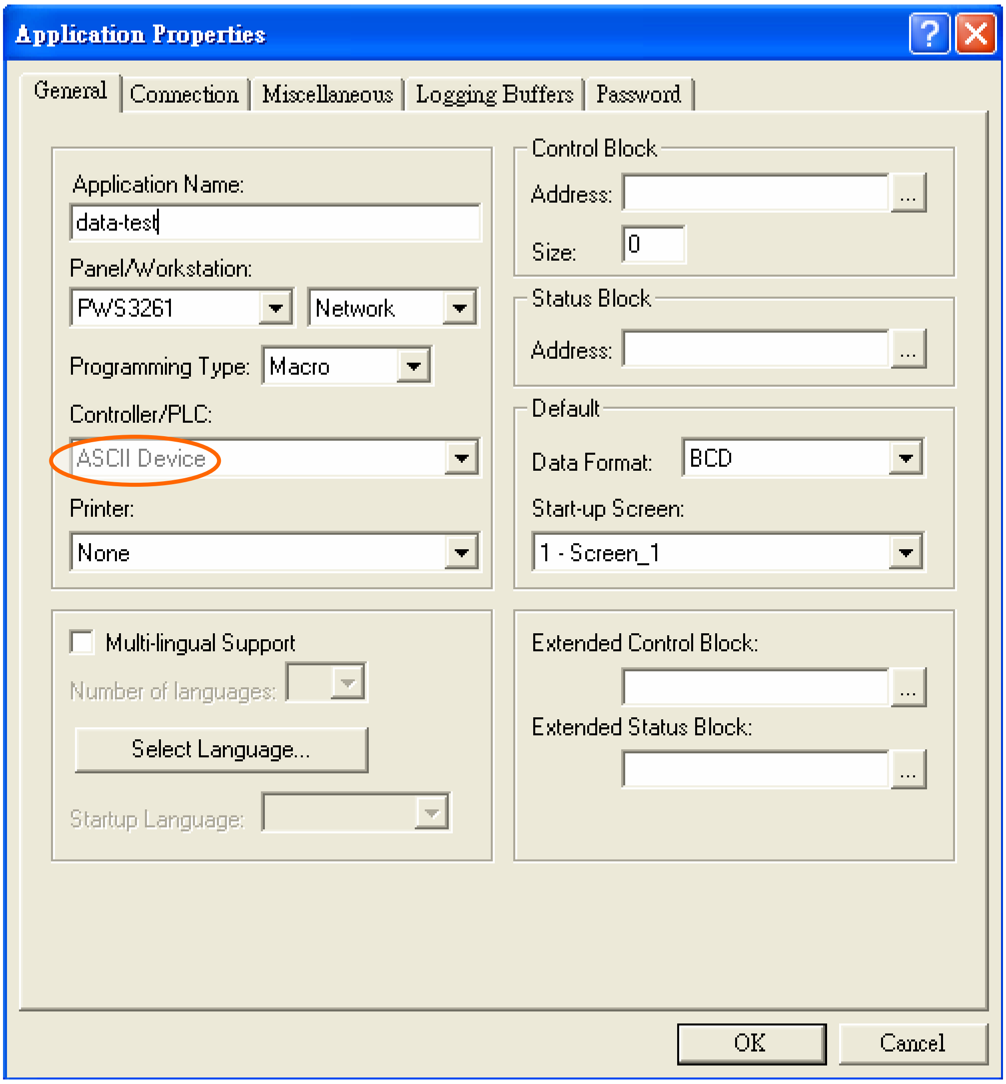


- [Variable] Block:
  - ♦ [Read]: Specify a bit-location to read from. “ASCII Device” provides “RX”, “RXSTS”, “TX” and “TXSTS” contacts.
- [Display] Block:
  - ♦ [Mode]: Display the data terminal in ASCII/HEX mode.
- [Data Buffer] Block:
  - ♦ [Type]:
    - “Local”: Select to display the current terminal data but the last display data is not included when the screen is changed.
    - “Global”: Select to display the terminal data including the last one when the screen is changed.
  - ♦ [Size]: Specify the number of rows in terminal data.

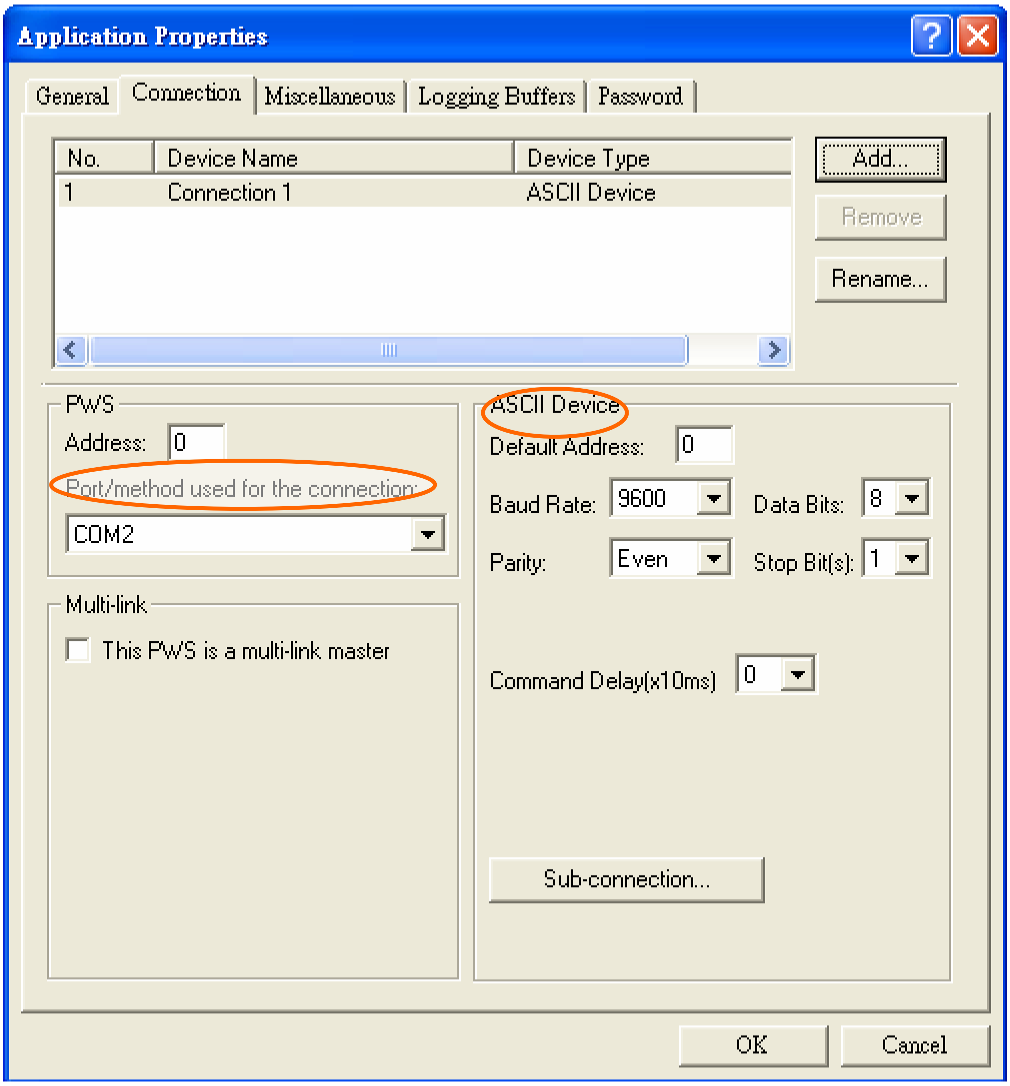
III. Example

The following are the steps to create a [Terminal Data] object:

1. Click [Application]/[Workstation Setup] to set “ASCII Device” as Contoller/PLC in the [Application Properties] dialog box.

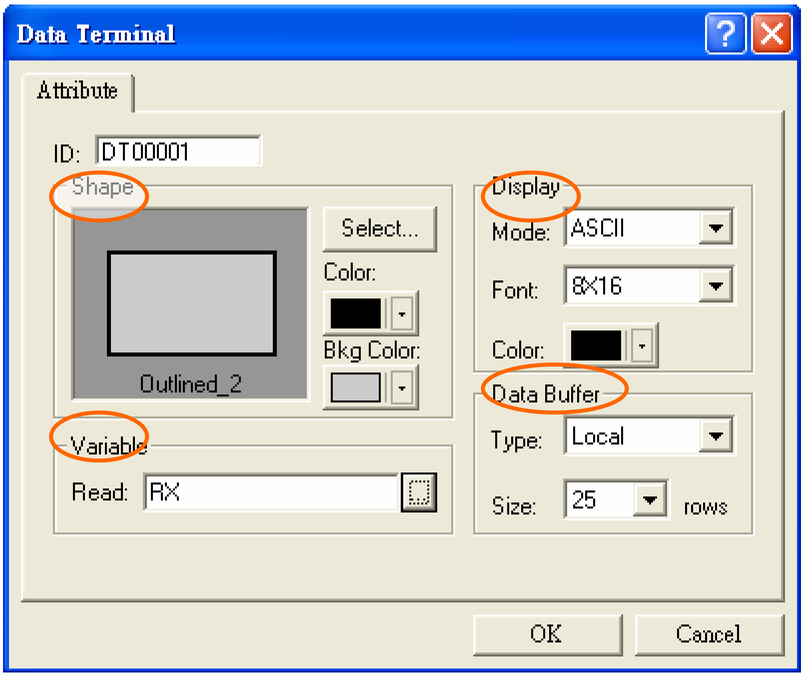


2. Specify the port/method used for the connection on the [Connection] tab.

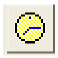


3. Shape：Select “Outlined_2”; and the color is “Black”.
4. [Read]：Specify “RX”.(The HMI model is PWS3261N; the Contoller/PLC is ASCII Device)
5. The mode is “ASCII” to display the terminal data.
6. The buffer type is “Local”.

2. Instructions



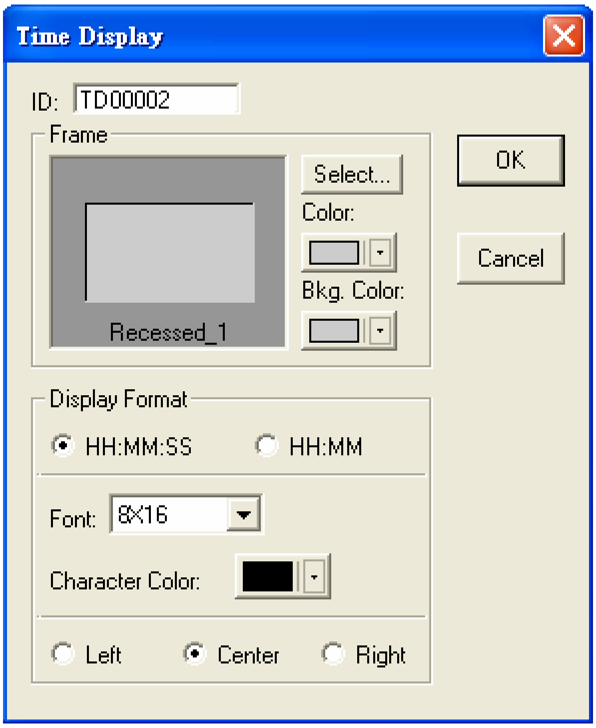
Above-mentioned steps will create a [Data Terminal] object; it displays the terminal data in ASCII model.

2.7.9.4. [Time Display] 

I. Function

The HMI reads the time value of the internal REAL TIME CLOCK (RTC) and displays the content directly on the HMI screen. Note that this function is not applicable on all HMI models; please refer to the Appendix A. - Table of the ADP 6.0 Feature and the HMI Models.

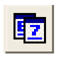
II. Properties



- [Display Format] Block：
  - ♦ [HH:MM:SS]: Display Hour: Minute: Second.
  - ♦ [HH:MM]: Display Hour: Minute.

III. Example

See Section 2.7.9.5. [Date Display] III Example.

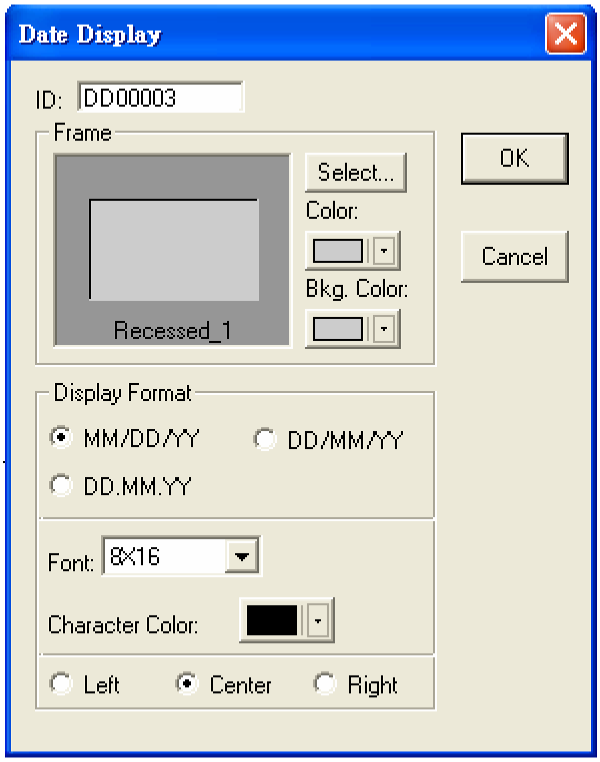
2.7.9.5. [Date Display] 

I. Function

The HMI reads the date value of the internal REAL TIME CLOCK (RTC) and displays the content directly on the HMI screen. Note that the function is not applicable on all HMI models; please refer to Appendix A. - Table of the ADP 6.0 Features and the HMI Models.

II. Properties

2. Instructions



- [Display Format] Block：
  - ♦ [MM/DD/YY]: The format is Month/Date/Year.
  - ♦ [DD/MM/YY]: The format is Date/Month/Year.
  - ♦ [DD.MM.YY]: The format is Date.Month.Year.

III. Example

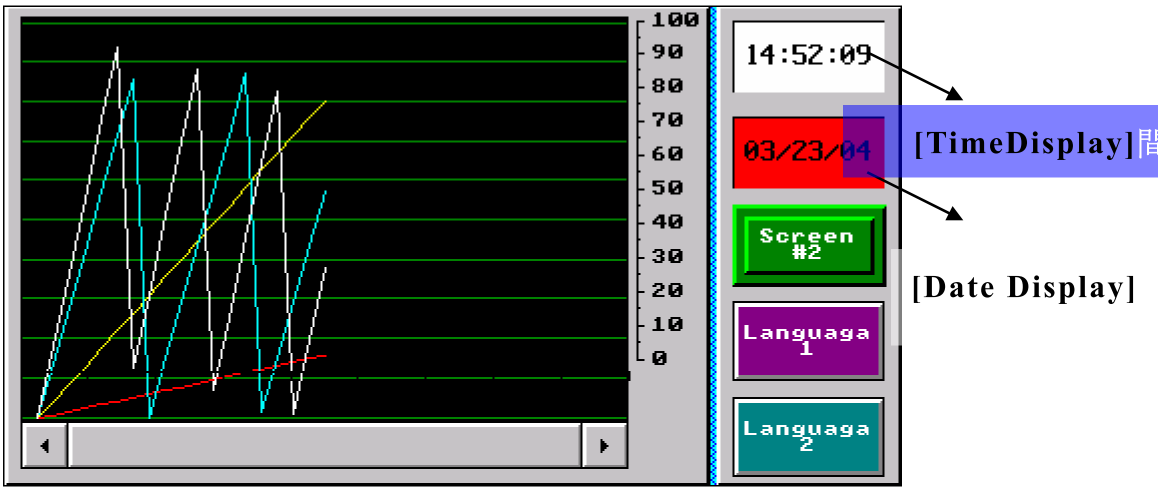


Figure 132. The [Time Display] and [Date Display] Objects

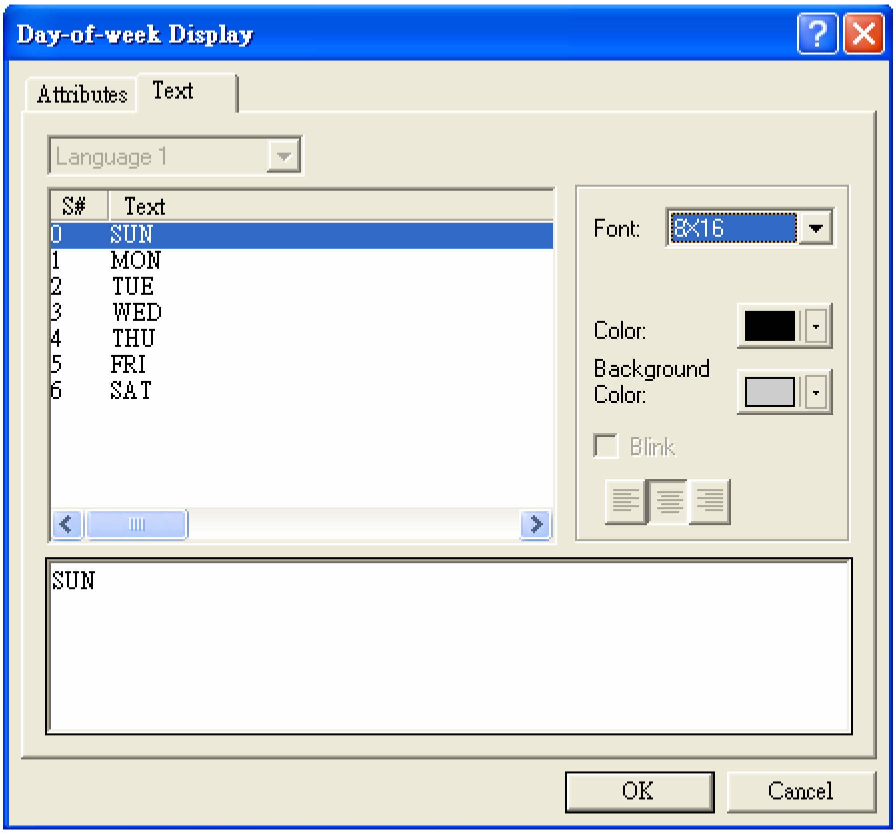
2.7.9.6. [Date of week Display]

I. Function

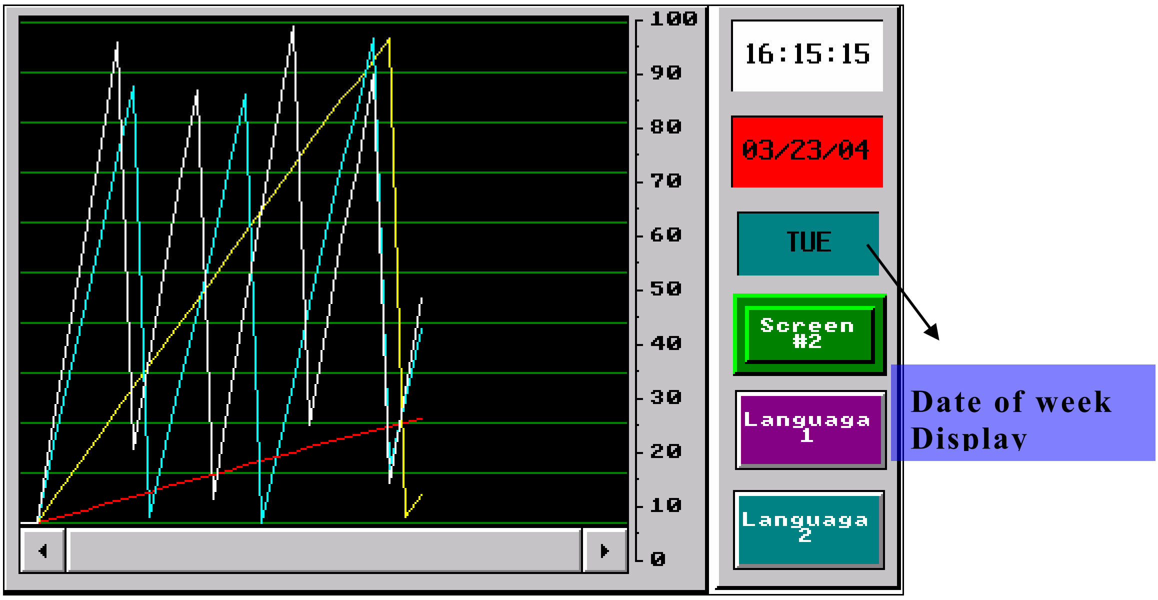
The HMI reads the date of week value from internal REAL TIME CLOCK (RTC) and displays the content directly on the HMI screen. Note that this function is only applicable on all HMI models; please refer the Appendix A. - Table of the ADP 6.0 Features and the HMI Models.

II. Properties

The HMI will display the date of week automatically. The following is the [Text] tab in the [Date of week Display] dialog box.



III. Example



2.7.10. [Bar Graph]

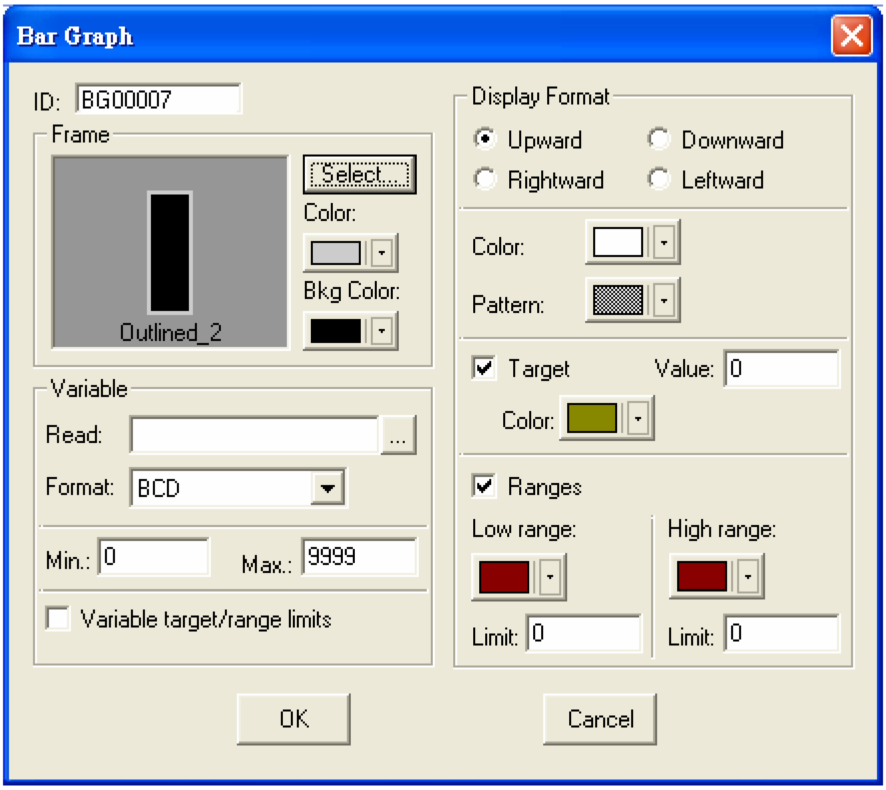
Two types of [Bar Graph]：[Normal] and [Deviation].

2.7.10.1. [Normal] 

I. Function

The HMI reads the value of the PLC register and convert the data into a [Bar Graph] and then displays the graph on the HMI.

II. Properties



- [Variable] Block：
  - ♦ [Min.] ：Specify the minimum the bar graph can display.
  - ♦ [Max.]：Specify the maximum the bar graph can display.
  - ♦ [Variable target/range limits]: Select this option if the target value and the range limits are read from the PLC.
  - ♦ [Target Variable] stored in a bit-location follows the [Read]. [Low Limit] stored in a bit location follows the [Target Variable]. The [High Limit] stored in a bit location follows the [Low Limit]. For example, if [Read] is “D10”, [Target Variable] is “D11”, [Low Limit] is “D12”, [High Limit] is “D13”.

Regiser	X	X+1	X+2	X+3
	Read	Target Variable	Low Limit	High Limit
Example:	D10	D11	D12	D13

- [Display Format] Block：
  - ♦ [Upward],[Downward],[Rightward] and [Leftward]：Select the direction to fill.
  - ♦ [Color]：Specify the color of the bar graph.
  - ♦ [Pattern]：Specify the pattern style to display.
  - ♦ [Target]：Set the target to display.

- [Value]：Specify the constant target value.
- [Color]：Specify the color of target line.

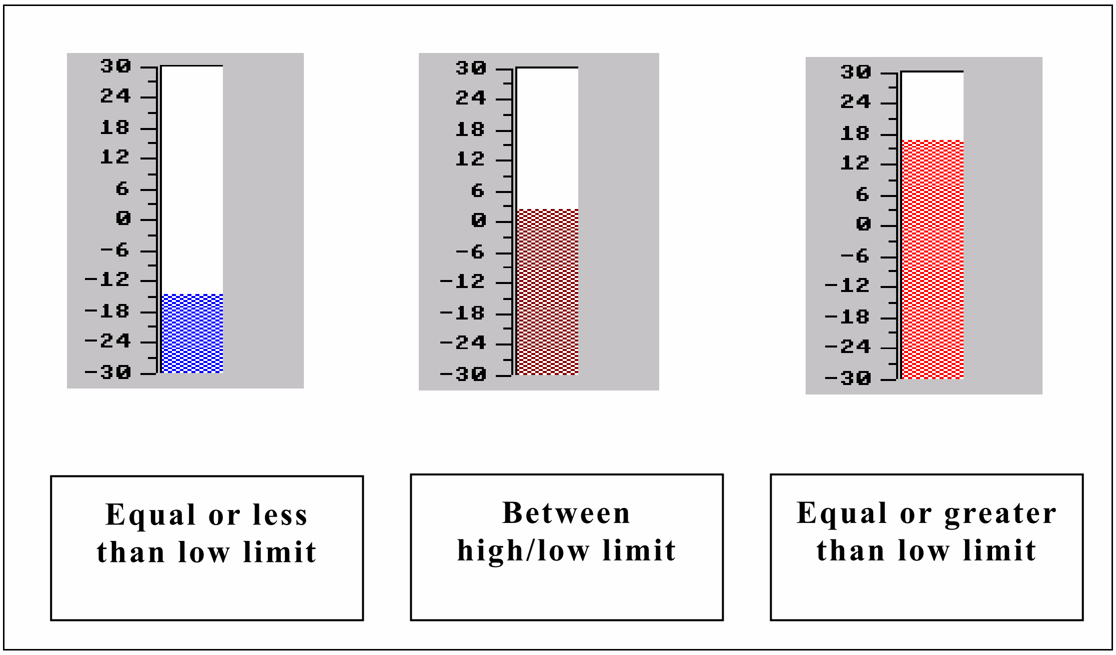
♦ [Ranges]：Select this option to fill the graph with a different color when the register value is beyond a normal range.

- [Low Range]：Specify the color to fill the graph with if the register value is equal to or less than the low range limit.
- [Limit]：Specify a constant for the low range limit.
- [High Range]：Specify the color to fill the graph with if the register value is greater than or equal to the high range limit.
- [Limit]：Specify a constant for the high range limit.

For other properties which are not explained in this Section, please refer to the Section 2.7. III Object Specify Object Properties.

III. Example

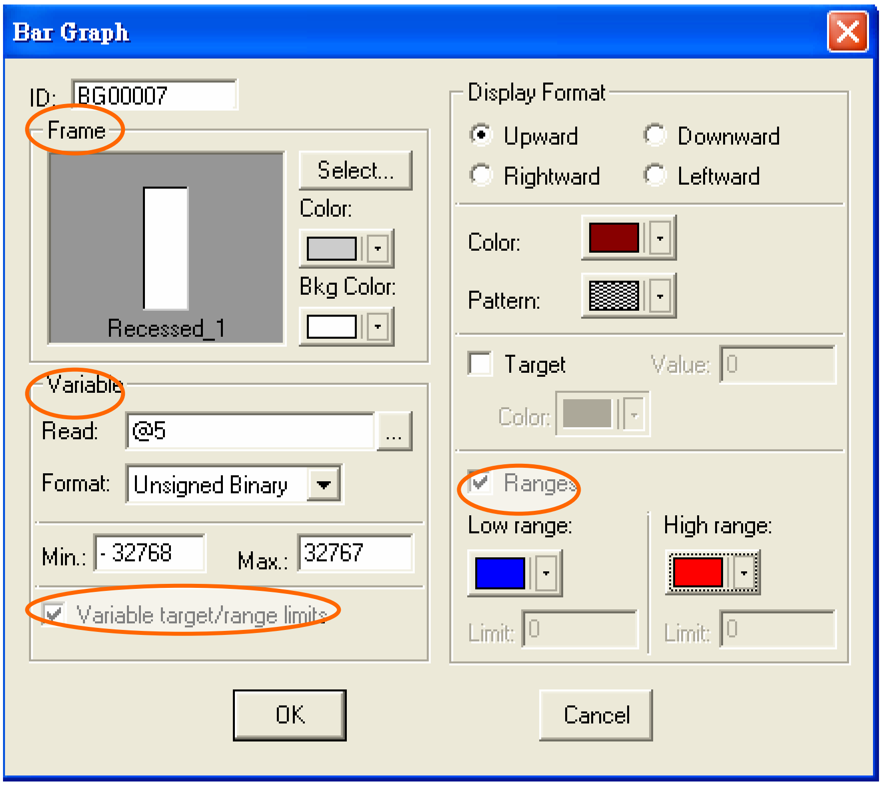
The following are the steps to create a [Bar Graph] object:



1. Frame：Select “Recessed_1”; the bkg. color is “White”.
2. [Read]：Specify “@5” (Local Internal Memory).
3. [Format] is “Unsigned Binary”.
4. The minimun is -32,768 and the maxmum is 32,767.

5. Check the option [Variable target/range limits].

6. When the register value is equal or less than the low limit, the graph will be filled with “Blue” color; when the register value is equal or greater than the high limit, the graph will be filled with “Red” color.



Above-mentioned steps will create a [Bar Graph] object. The [Numeric Entry] object here is to set the high/low limit and the left of the [Bar Graph] is a scale. The [Low Limit] here is −15000; and the [High Limit] is 15000. See Figure 133.

Variable ≤ −15000, the graph is filled with “Blue’; −15000 < Variable < 15000, the graph is filled with “Black”; Variable ≥ 15000, the graph is filled with “Red”.

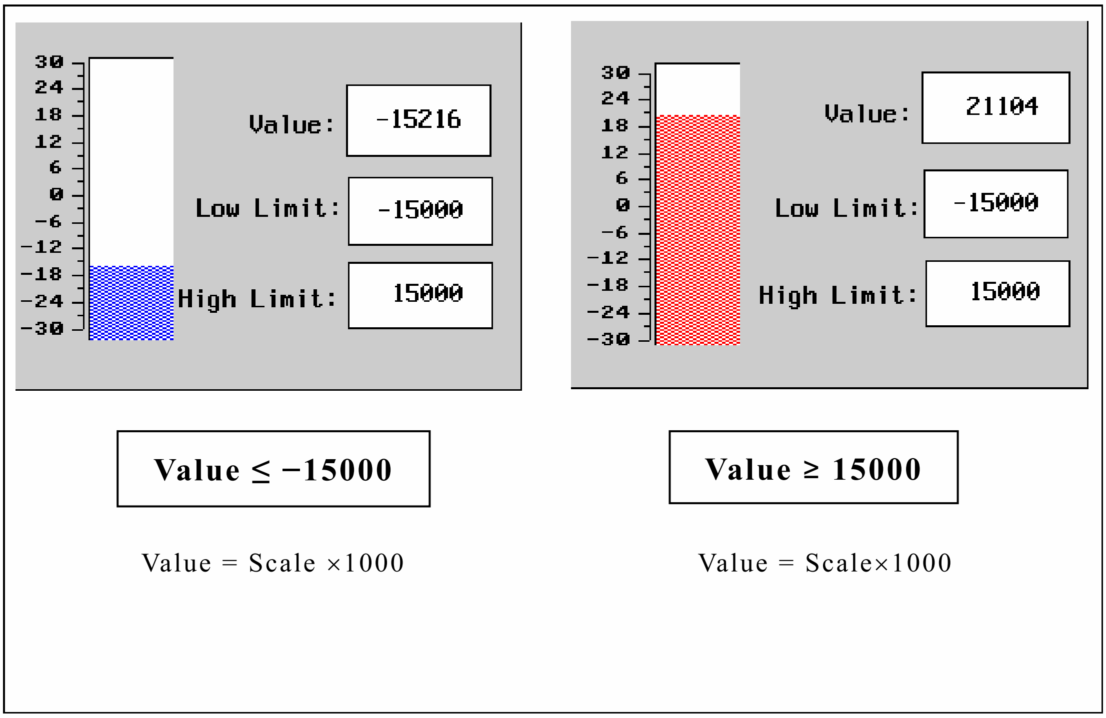


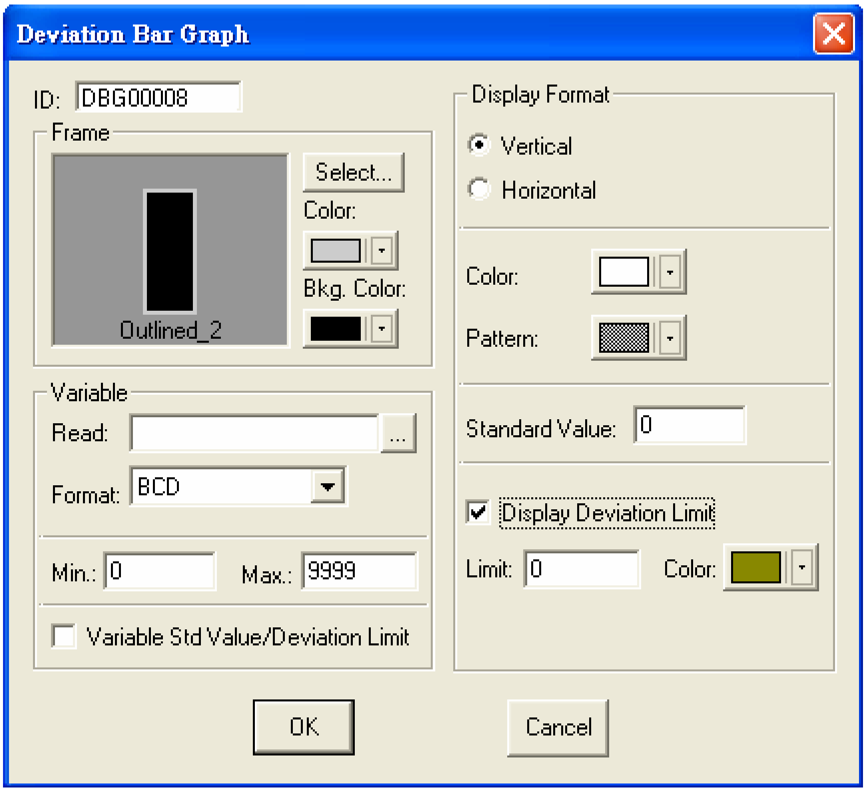
Figure 133. The Example of the [Bar Graph] object

2.7.10.2. [Deviation]

I. Function

The HMI reads the values of the PLC register and compares them with the normal value. Then the HMI converts the difference and presents it on a Bar Graph on the HMI.

II. Properties



- [Variable] Block：
  - [Variable Std Value/Deviation Limit]：Select this option if the standard value and deviation limit are read from the PLC. If [Read] address is "D10", [Standard Value] will be stored in "D11"; [Deviation Limit] will be stored in "D12".

- [Display Format] Block：
  - [Vertical],[Horizontal]：Choose the direction for filling a graph.
  - [Standard Value]：Specify the constant standard value. The standard value will be a datum line on the bar graph.
  - [Display Deviation Limit]：Select this option to fill the bar graph with selected color when the difference of the register value and the standard value is beyond the limit.

    - [Limit]：Specify the constant limit.

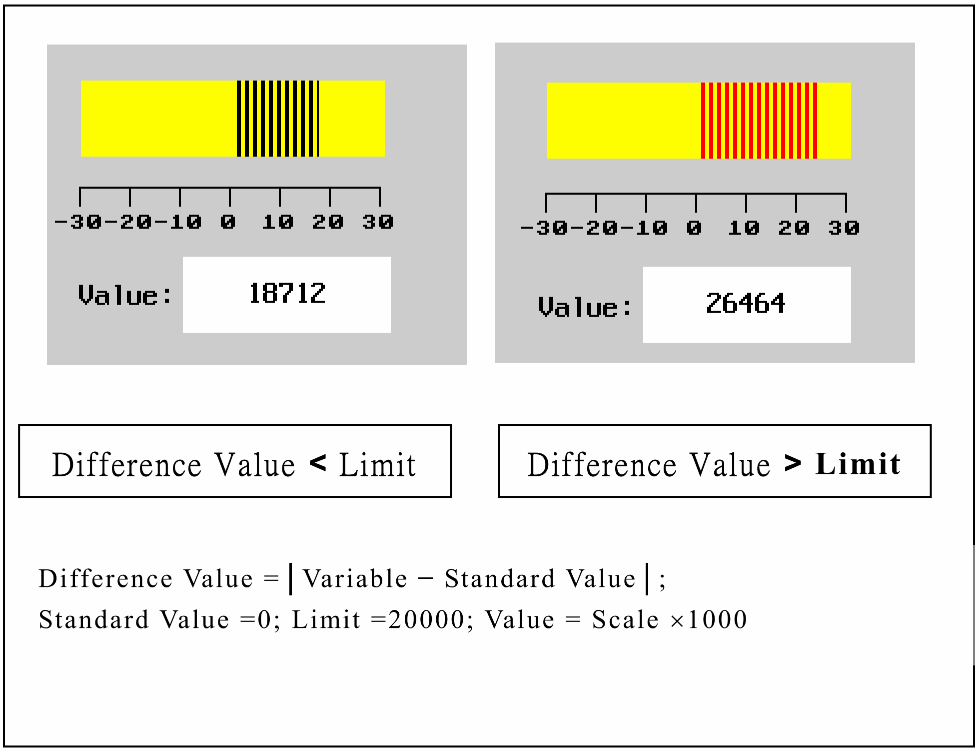
      $$\text{Difference Value} = \left|\,\text{Variable} - \text{Standard Value}\,\right|$$

    - [Color]：Specify the color to fill the graph with when the difference of the register value and the standard value is beyond the limit.

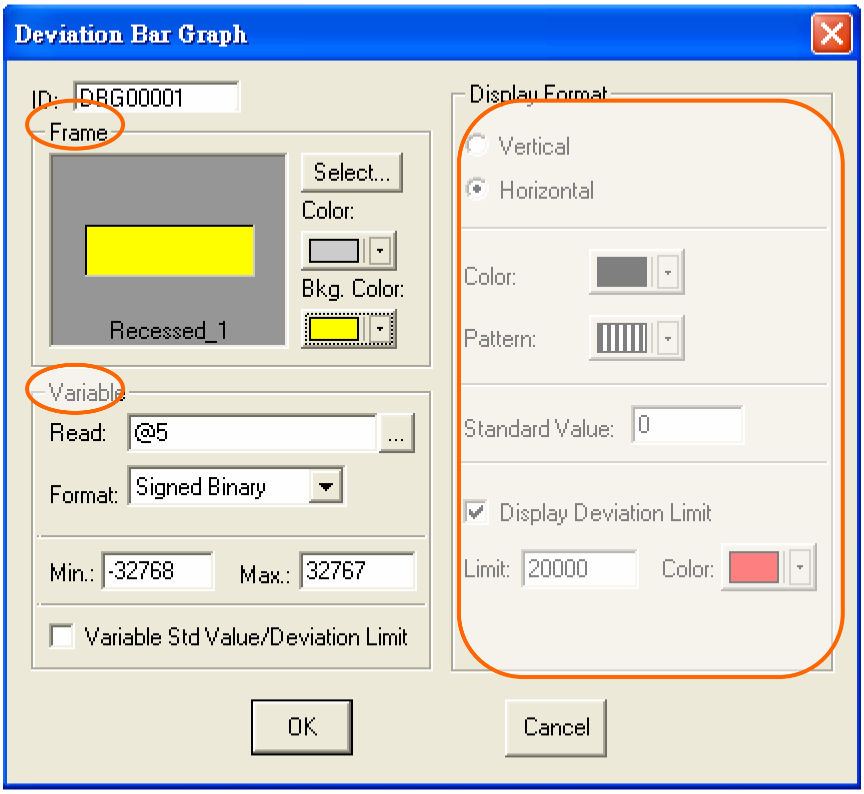
For the properties which are not explained in this Section, please refer to the Section 2.7.10.1. [Bar Graph] and Section 2.7. Object III Specify Object Properties.

III. Example

The following are the steps to create a [Deviation] object:



1. Frame：Select “Recessed_1”; and the bkg. color is “Yellow”.
2. [Read]：Specify “@5”. (Local Internal Meomory)
3. [Format] is “Signed Binary”.
4. The minimum is -32,768; the maximum is 32,767 on the deviation bar graph.
5. The deviation bar graph is horizontal direction.
6. The datum point is ‘0” on the deviation bar graph.
7. Specify the ‘Red’ color to fill the graph with when the differnce of the register value and the standard value is beyond the limit ‘20000’.



2.7.11. [Trend Graph]

I. Function

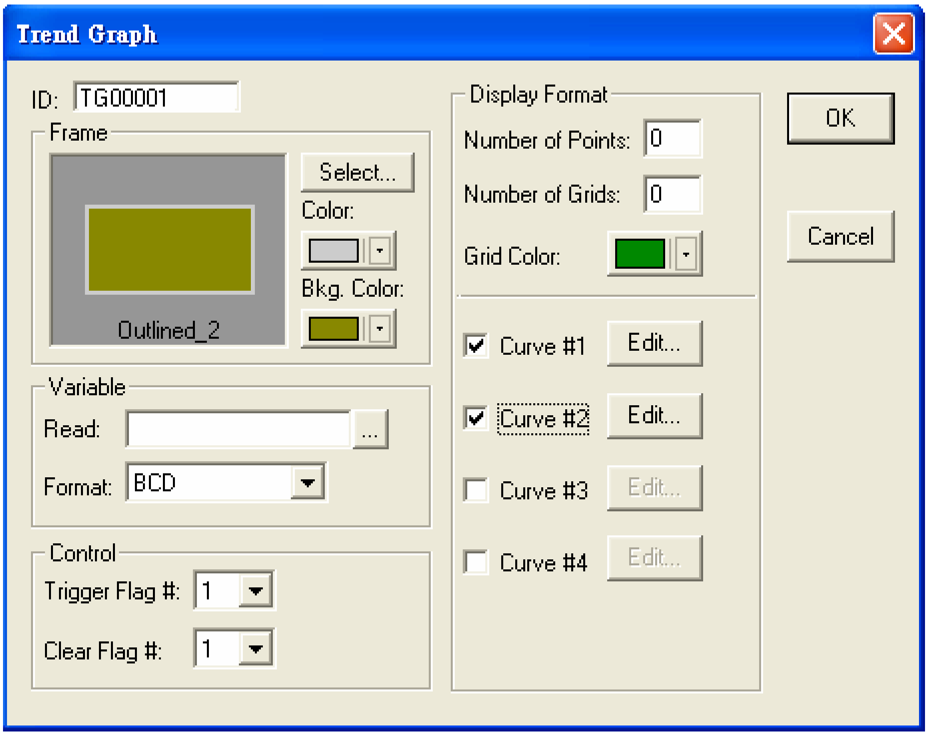
The function is to read a series of values from the related PLC register. Then the HMI converts these values and presents it on a Trend Graph on the HMI.

Suppose that the register is “Dn” to read from and three curves in all.The data will be readed as the following format:

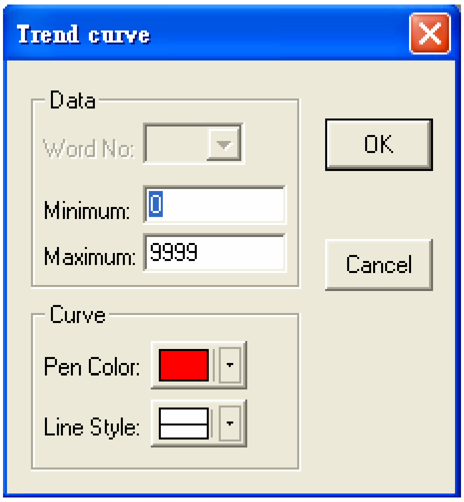
Value in Dn = “m” is the real sampling points;
Value in Dn+1 is the first point of Y direction on the curve #1;
Value in Dn+2 is the first point of Y direction on the curve #2;
Value in Dn+3 is the first point of Y direction on the curve #3;
Value in Dn+4 is the 2nd point of Y direction on the curve #1;
Value in Dn+5 is the 2nd point of Y direction on the curve #2;
Value in Dn+6 is the 2nd point of Y direction on the curve #3;
:
:
and so on. The Workstation reads PLC registers from Dn to Dn+3m in total.

For example, if the value in Dn is m = 25 sampling points; the HMI will read data from 76 (=3×25+1) PLC registers.

II. Properties



- [Control] Block：To control the trend graph by PLC.
  - [Trigger Flag #]：The Trigger Flag No.of the tred graph is 12-15 bits in CFR. The HMI reads data from PLC and display the trend graph when the Trigger Flag turns on.
  - [Clear Flag #]：：The Clear Flag No.of the tred graph is 8-11 bits in CFR. The HMI clears the trend graph when that Clear Flag tuns on.
- [Display Format] Block：
  - [Number of Points]：Specify the maximal number to diplay on the Y-direction.
  - [Number of Grids]：Specify the number of evenly spaced horizontal grids to be displayed.
  - [Grid Color]：Specify the color of the horizontal grids.
  - [Curve # 1] ~ [Curve # 4]：Provide four curves for edit. When pressed [Edit] button, the dialog box will appear as the following：



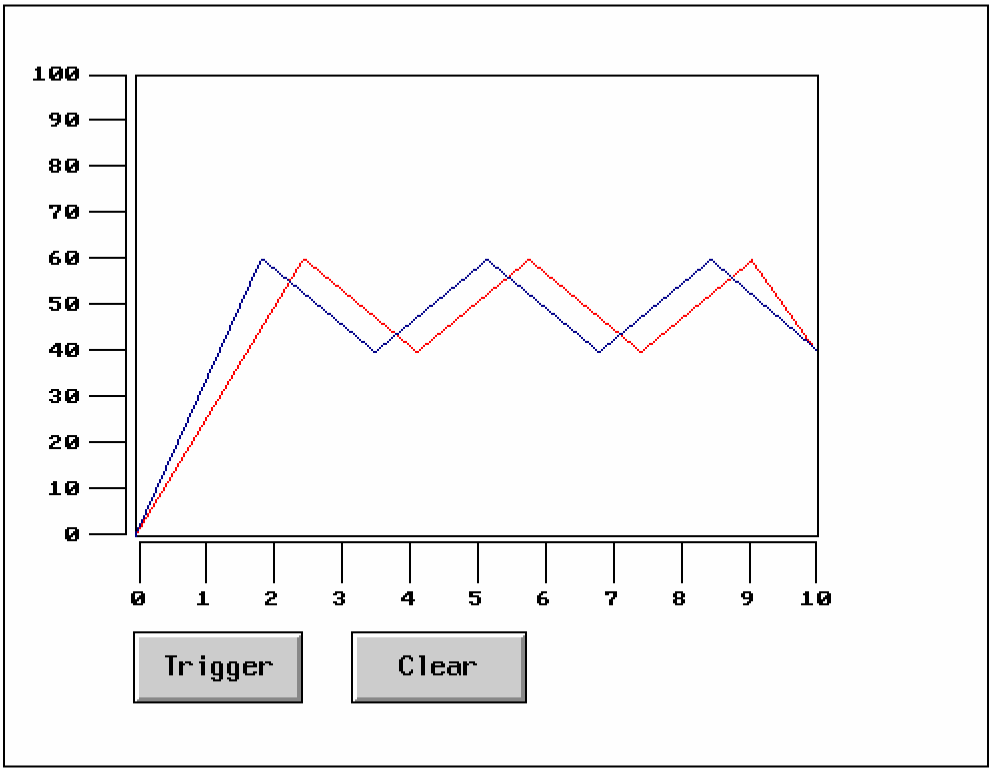
- [Minimum]：Specify the value corresponding to the lowest point on the trend graph. When the data is equal to or less than the [Minimum], the Workstation places the dot at the bottom pixel of the drawing area of the trend graph.
- [Maximum]：Specify the value corresponding to the highest point on the trend graph. When the register is equal to or greater than the [Maximum], the Workstation places the dot at the top pixel of the drawing area of the trend graph.
- [Pen Color]：Specify the color of the trending curve.
- [Line Style]：Specify the line style of the trending curve.

For the properties which are not explained in this Section, please refer to the Section 2.7. Object III Specify Object Properties.

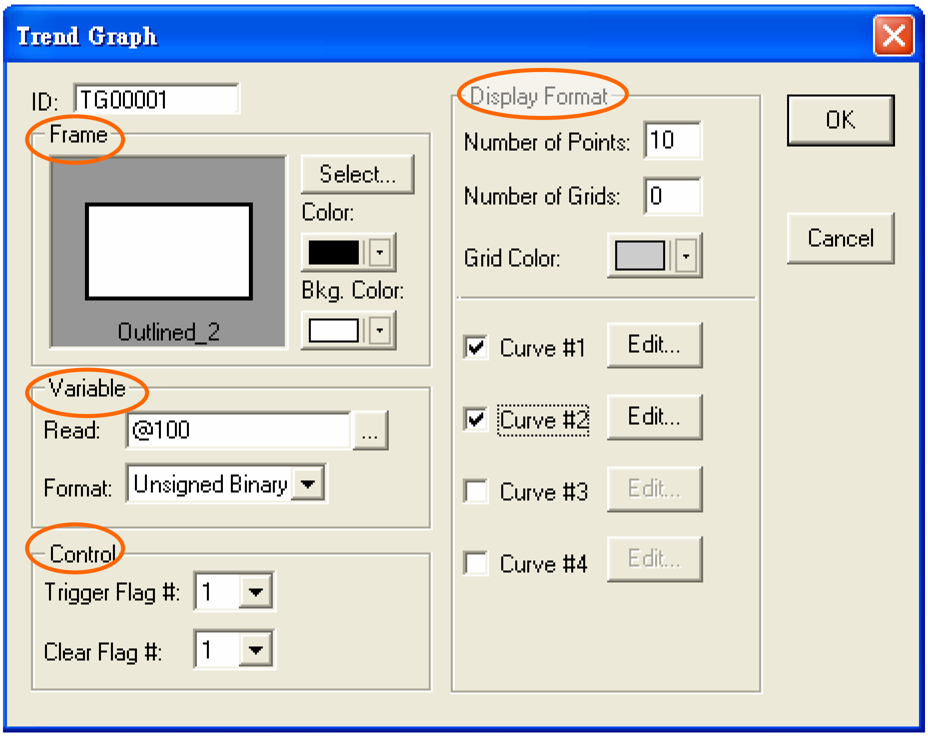
III. Example

The following are the steps to create a [Trend Graph] object:

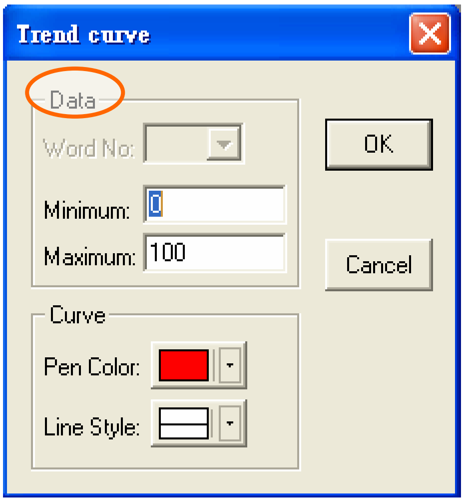
2. Instructions



1. Frame：Select “Outlined_2”; and the bkg. color is “White.
2. [Read]：Specify “@100”. (Local Internal Memory)
3. [Format] is “Unsigned Binary”。
4. [Trigger Flag] and [Clear Flag] are #1。
5. Number of Points is 10.



6. The minimum is "0"; and the maximum is 100.



2.7.12. [XY Chart]

I. Function

The Function is to read a series of values from the related PLC register. Then the HMI converts these values and presents it on an X-Y Chart on the HMI.

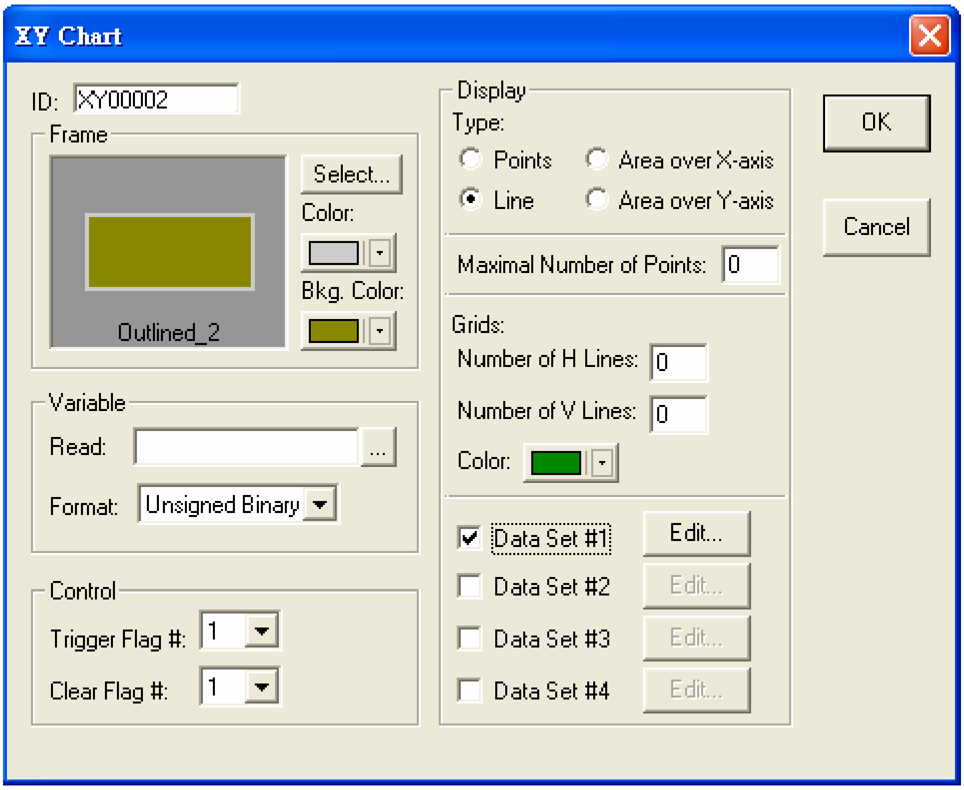
Suppose that the register is "Dn" to read from; and two curves in all. The data will be readed as the following format:

Value in Dn = "m" is the real sampling points;
Value in Dn+1 is the first point of X-axis on the curve #1;

Value in Dn+2 is the first point of Y-axis on the curve #1;
Value in Dn+3 is the first point of X-axis on the curve #2;
Value in Dn+4 is the first point of Y-axis on the curve #2;
Value in Dn+5 is the 2nd point of X-axis on the curve #1;
Value in Dn+6 is the 2nd point of Y-axis on the curve #1;
Value in Dn+7 is the 2nd point of X-axis on the curve #2;
Value in Dn+8 is the 2nd point of Y-axis on the curve #2;
:
:
and so on. The Workstation reads PLC registers from Dn to Dn+2m in total.

For example, if the value in Dn is m = 15 sampling points; the HMI will read data from 61 (=2×2×15+1) PLC registers.

II. Properties

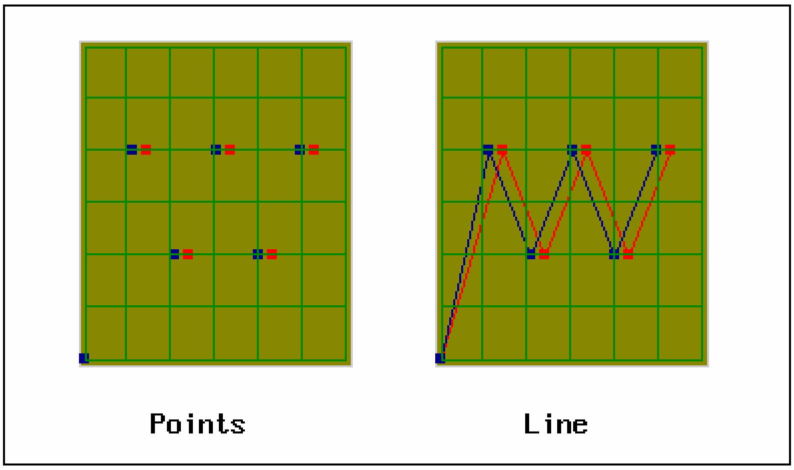


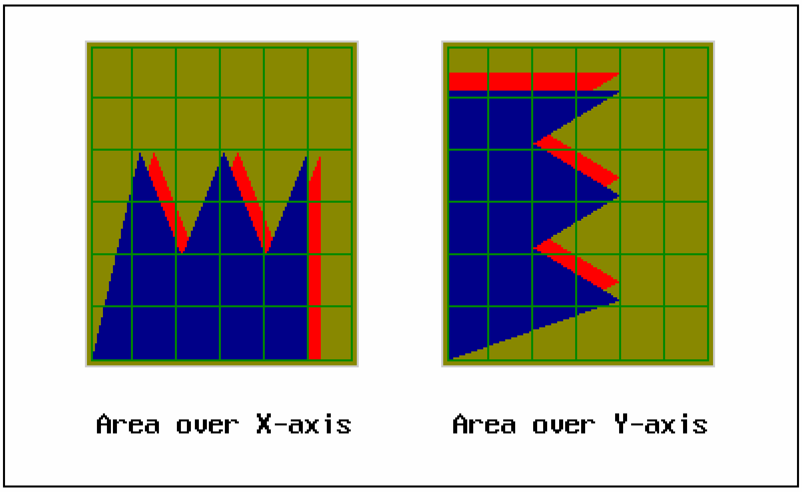
- [Control] Block：To control the trend graph by PLC.

  - [Trigger Flag #]：The Trigger Flag No.of the tred graph is 12-15 bits in CFR. The HMI reads data from PLC and display the XY chart when the Trigger Flag turns on.
  - [Clear Flag #]：：The Clear Flag No.of the tred graph is 8-11 bits in CFR. The HMI clears the trend graph when that Clear Flag tuns on.

- [Display] Block：

♦ [Points],[Line],[Area over X-axis] and [Area over Y-axis]：See the illustration below.





♦ [Maximal Number of Points]：Specify the maximal number of points to display on XY chart.

♦ [Number of H Lines]：Specify the number of horizontal lines.

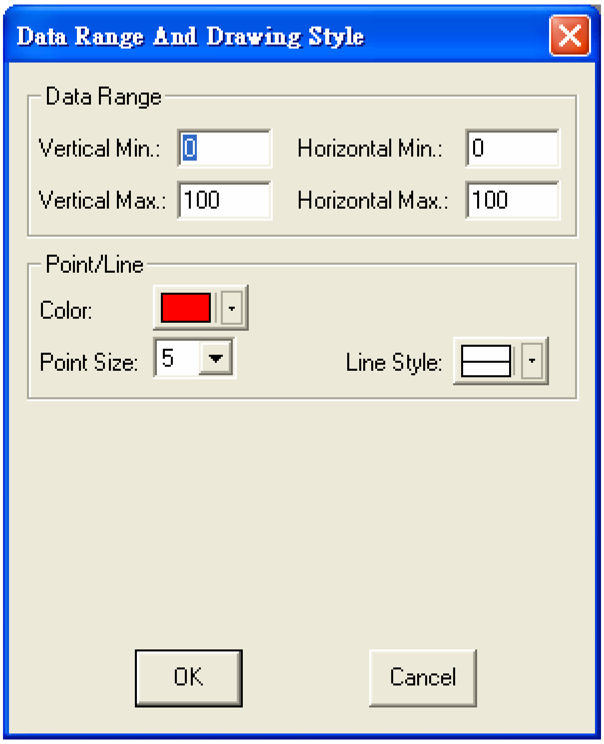
♦ [Number of V Lines]：Specify the number of vertical lines.

♦ [Color]：Specify the color of the lines.

♦ [Curve # 1] ~ [Curve # 4]：Provide four curves for edit. When pressed [Edit] button, the dialog box will appear as the following：

♦ [Data Set # 1] ~ [Data Set # 2]：When press [Edit] button, the dialog box will appear as the following：

2. Instructions

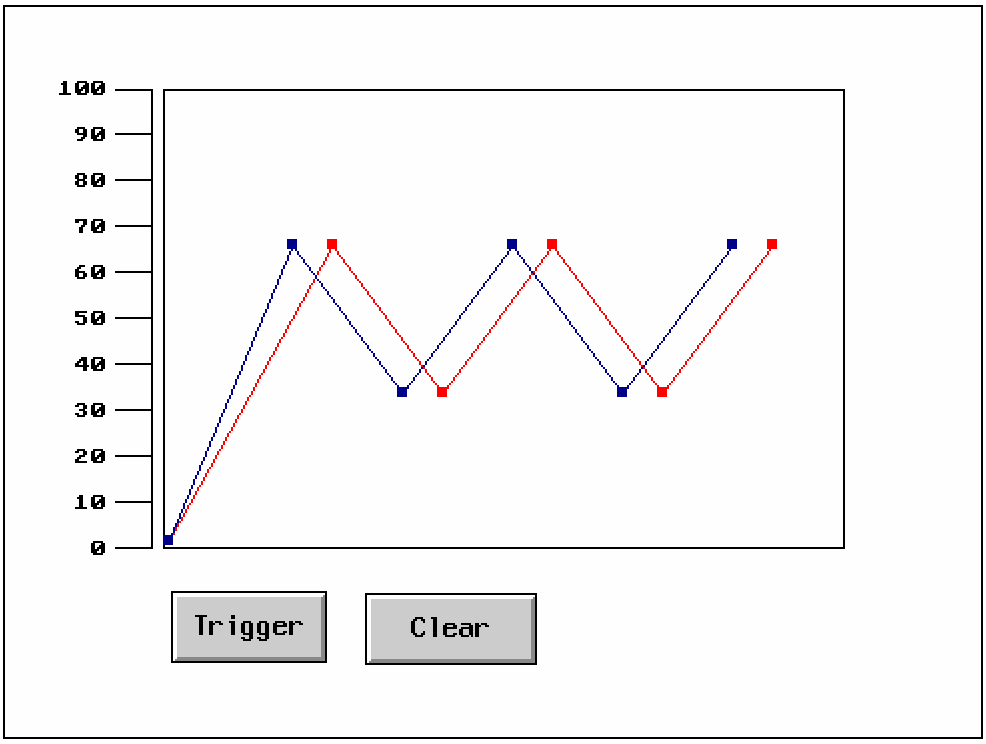


- [Vertical Min.] and [Vertical Max.] ：Specify the minimum and maximum value for Y-axis.
- [Horizontal Min.] and [Vertical Max]：Specify the minimum and maximum value for X-axis.
- [Color]：Specify the color for point/line.
- [Point Size]：Specify the size of the point to display.

For other properties which are not explained in this Section, please refer to the Section 2.7. Object III Specify Object Properties .

III. Example

The following are the steps to create a [XY Chart] object:



1. Frame：Select “Outlined_2”and the bkg. color is “White”.

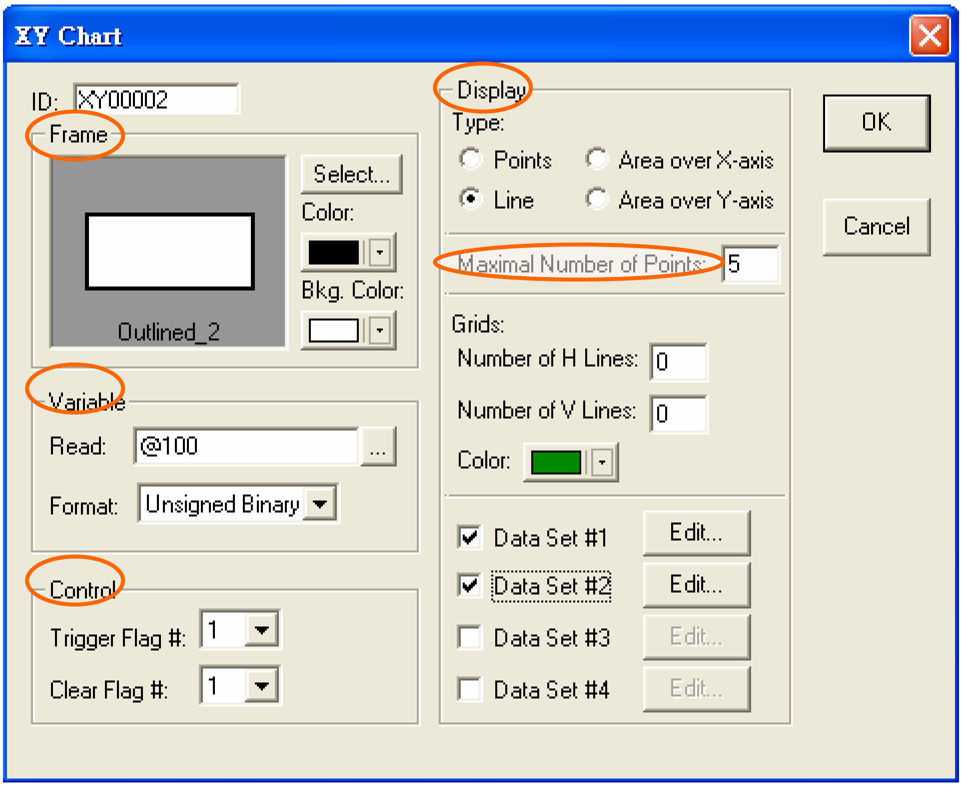
2. [Read]：Specify “@100”. (Local Internal Memory)

3. [Format] is “Unsigned Binary”.

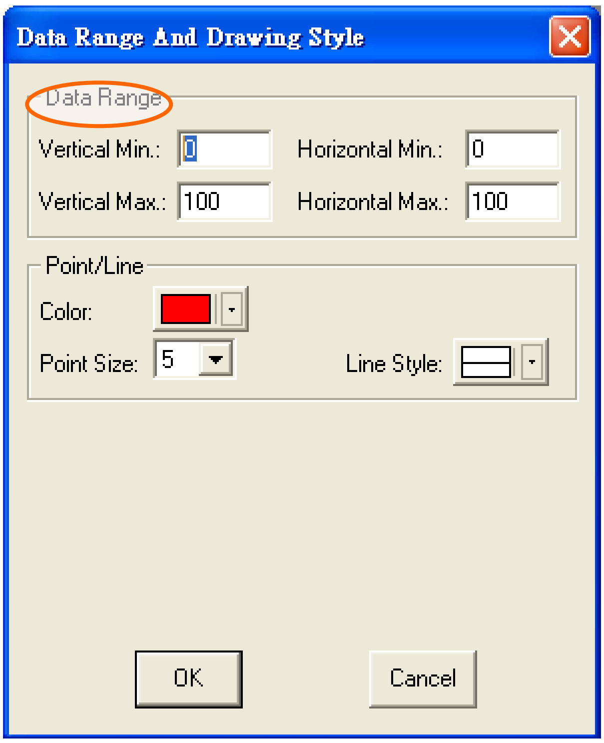
4. [Trigger Flag] and [Clear Flag] are # 1.

5. Select “Line” type to display.

6. The maximal number of points is 5.

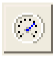


7. The vertical and horizontal minimum are “0”, the maximum are “100”.



2.7.13. [Panel Meter]

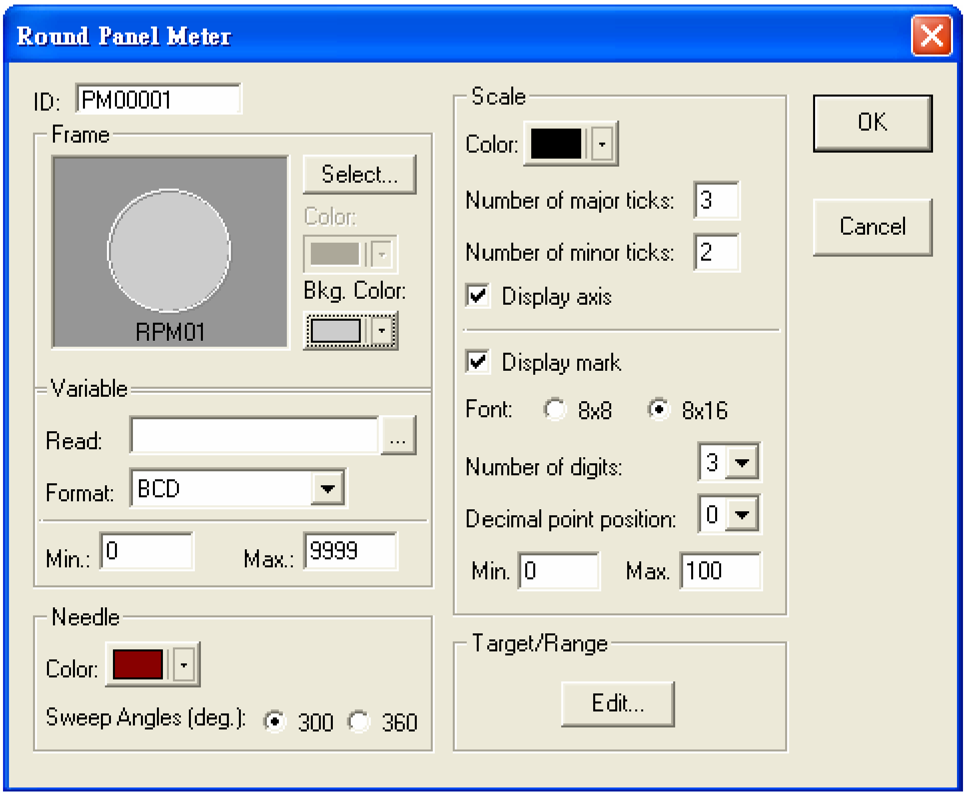
There are two types of panel meters - [Round] and [Rectangular].

2.7.13.1. [Round Panel Meter] 

I. Function

The HMI reads the value from PLC register and reflects the value on the Round Panel Meter object on the screen.

II. Properties



- [Needle] Block：
  - ♦ [Color]：Specify the needle's color.
  - ♦ [Sweep Angles (deg.)] ：There are 300 degrees and 360 degrees.
- [Scale] Block：Specify the color and the number of ticks.
  - ♦ Scale
    - [Color]：Specify the color to display the scale.
    - [Number of major ticks]：Specify the number of major ticks on the scale. If the number is less than 2, no ticks are

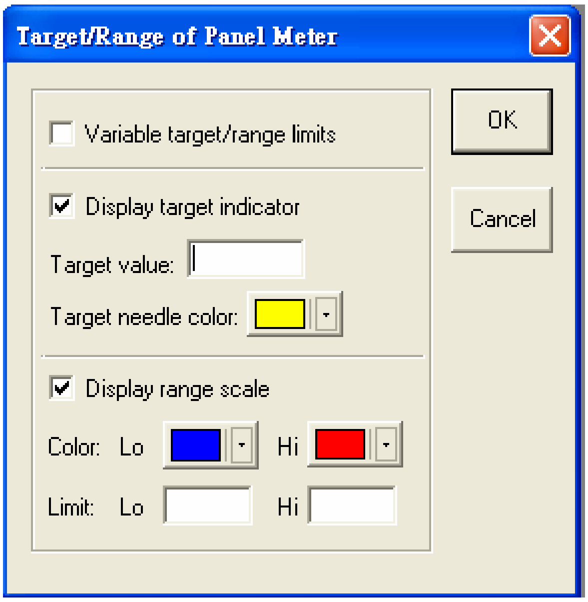
displayed.

- [Number of minor]：Specify the number of minor ticks on the scale.
- [Display axis]：Check this option to display an arc as the axis of the scale.

♦ [Display mark]：Check this option to display marks on the scale.

- [Font]：There are “8X8” and “8X16” types.
- [Number of digits]：Specify the number of digits including precision and scale.
- [Decimal point position]：Specify the position of the marks digit. If the number is 0, no decimal point is displayed.
- [Min.] and [Max.]：Specify the minimum and maximum of the marks.

• [Target/Range] Block：Select [Edit] button, its dialog box will appear as the following.



♦ [Variable target/range limits]：The target value and the range limits are read from PLC. The “target value” is stored in a bit-lcation whch is next to the [Read] location. The “low limit” is next to the “target value”. The “low limit” is next to the “high limit”. When the [Read] location is specified “D10”, the “target value” is stored in “D11”; the “low limit” is stored in “D12”; the “high limit” is stored in “D13”.

♦ [Display target indicator]：Check this option to display target-indicator.

- [Target value]：Specify the target value.

- [Target needle color]：Specify the color for needle.

♦ [Display range scale]：Specify the color of range scale to display.

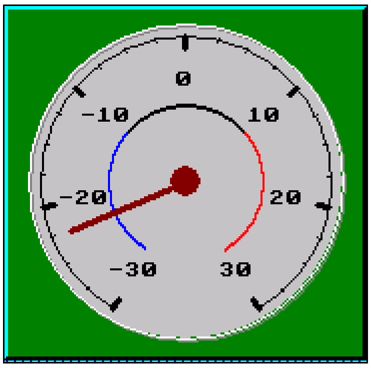
- [Low Range Color] and [High Range Color]：Specify the color to display on the scale when the value is less/greater than low/high range.

- [Low Limit] and [High Limit]：Specify the low limit and high limit constant.

For other propties which are not explained in this Section, please refer to the 2.7. Object III Specify Object Properties.

III. Example

The following are the steps to create a [Round Pannel Meter] object:



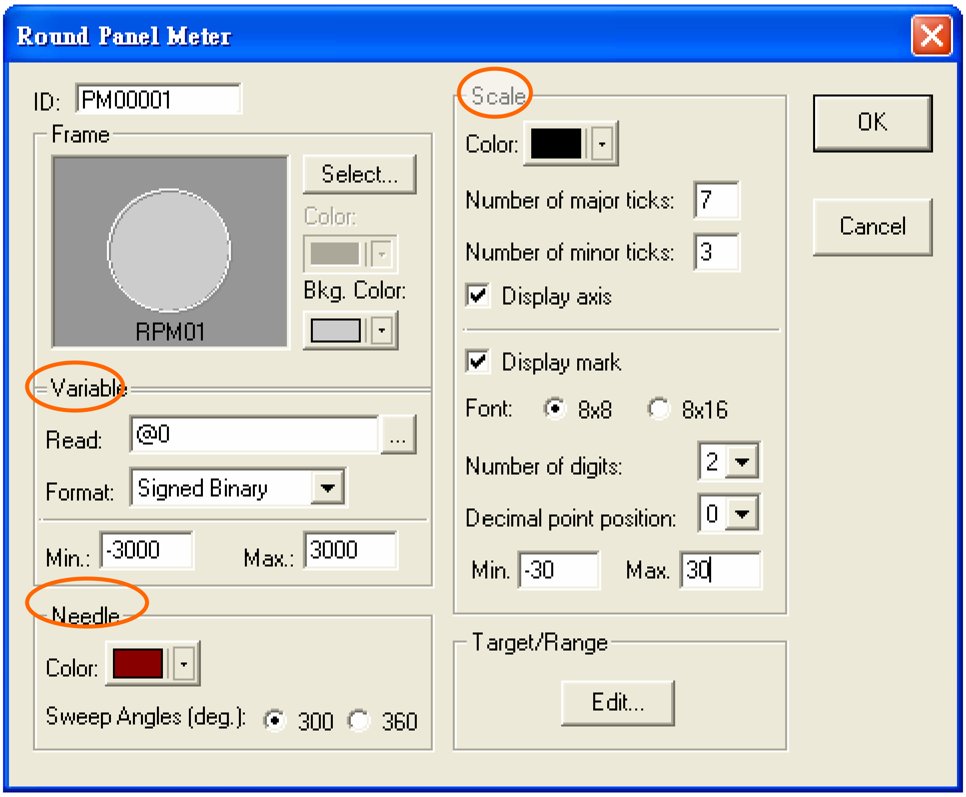
1. [Read]：Specify "@0". (Local Internal Memory)

2. [Format] is "Signed Binary".

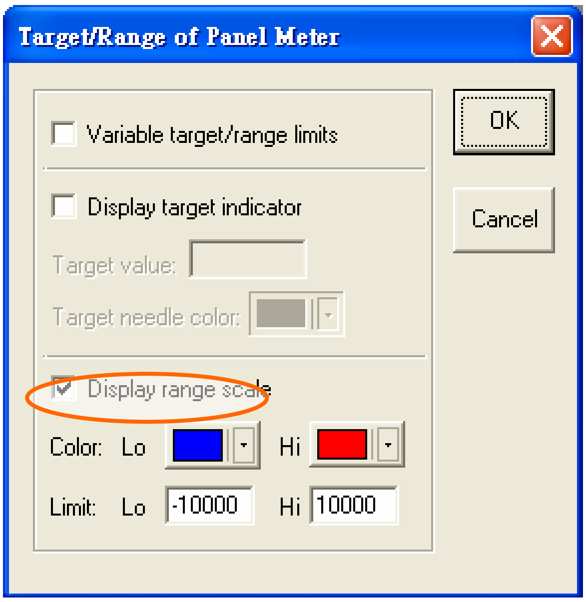
3. The minimum is -30,000 and the maximum is 30,000.

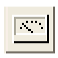
4. The sweep angle is 300 degrees.

5. The number of major ticks is '7' and the number os minor ticks is '3'; the maximum mark is '30' and the minimum number is '-30'.

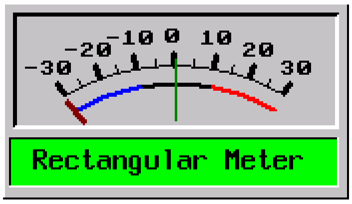


6. The low rang limit is '-10000' and the color is "Blue"; the high range limit is '10000' and the color is "Red".



2.7.13.2. [Rectangle Panel Meter] 

The properties of [Recrangle Panel Meter] are the same as [Round Panel Meter]; please refer to the Section 2.7.13.1. [Round Panel Meter].

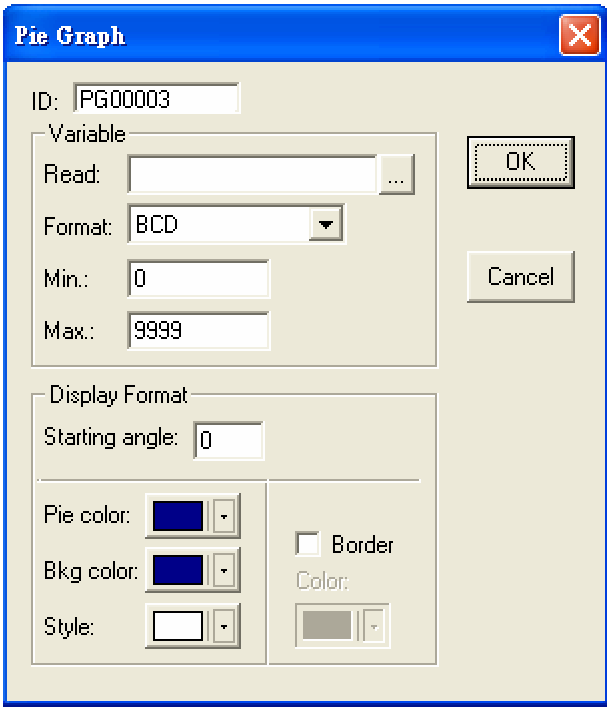


2.7.14. [Pie Graph]

I. Function

The HMI reads the register values in the PLC. Then it converts the values into a 360° pie graph and displays the graph on the HMI screen.

II. Properties

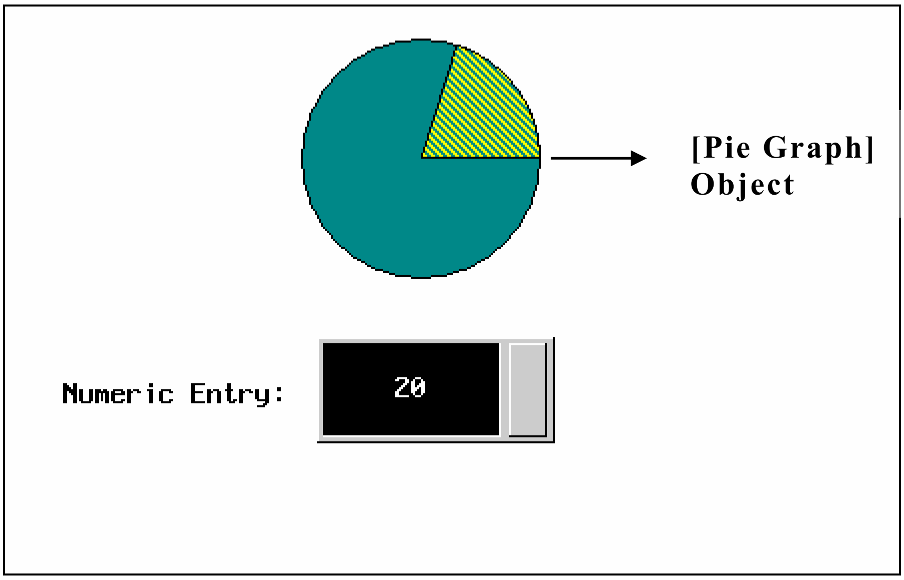


- [Display Format] Block：
  - ♦ [Starting angle]：Specify the original angle of the pie graph.
  - ♦ [Pie color]：Specify the color for filling the pie graph.
  - ♦ [Bkg. color]：Specify the color of the unfilled part of pie graph.
  - ♦ [Style]：Specify the pattern style for filling the pie graph.
  - ♦ [Border]：Check this option to display the pie graph with a border.
  - ♦ [Color]：Specify the border color of the pie graph.

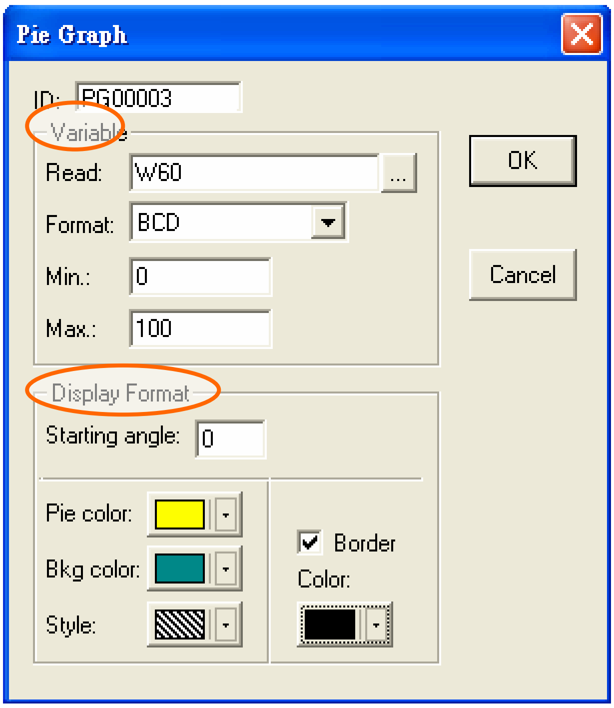
For other properties which are not explained in this Section, please refer to the Section 2.7.10.1. [Bar Graph] and the Section 2.7. Object Specify III Object Properties.

III. Example

The following are the steps to create a [Pie Graph] object:



1. [Read]：Specify "W60"。
2. [Format] is "BCD".
3. Specify the minimum is '0' and the maximum is '100' which the pie graph can display.
4. The starting angle is '0'.
5. Specify the pattern style, pie color, bkg. color and border color.



A Pie object is drawn from (+) X-axis (starting angle = 0). When the input value is '20', the area of the pie is one-fifth of a circle (= 20/100).

2.7.15. [Dynamic Graphic]

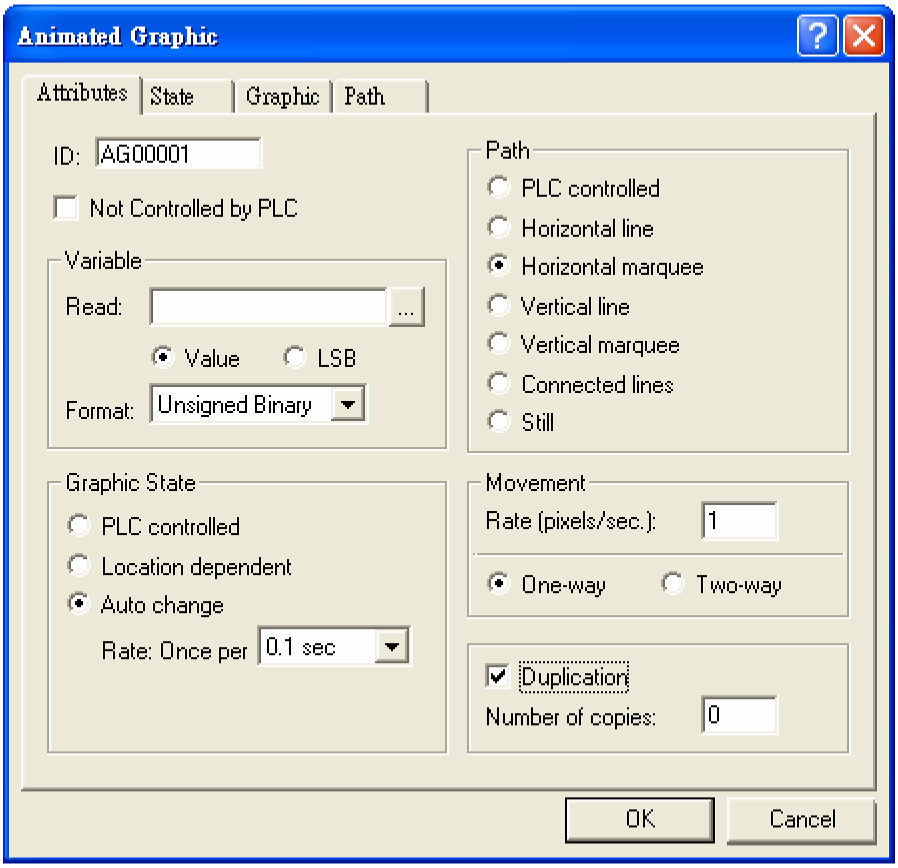
The following are the options in the [Dynamic Graphic] sub-menu: [Animated Graphic], [GIF Graphic], [State Graphic], [Dynamic Circle] and [Dynamic Rectangle].

2.7.15.1. [Animated Graphic]

I. Function

This function enables a user to control a graph includes its position and moving-path to display on the HMI screen over PLC or not. For instance, the PLC can control the graphic movement along X-axis, Y-axis or the display of different graphics.

II. Properties



[Attributes] Tab

- [Not Controlled by PLC]：Check this option that the graph is not controlled by PLC.

- [Graphic State] Block：

  - ♦ [PLC controlled]：To display the graphic states controlled by PLC.
  - ♦ [Location dependent]：To display the different state according to the location.
  - ♦ [Auto change]：To change the graphic state automatically.

    - [Rate (Once per)]：Specify the rate to change the graphic state.

- [Path] Block：

  - ♦ [PLC controlled]：Controll the object's movement path by PLC.
  - ♦ [Horizontal line]：To move the object along horizontal line.
  - ♦ [Horizontal marquee]：To move the object along horizontal line with marquee.Check the [Dulplication] option to move the dulplicated graphes along horizontal line.
  - ♦ [Vertical Line]：To move the object along the vertical line.
  - ♦ [Vertical marquee]：To move the object along the vertical line with marquee. Check the [Dulplication] option to move the dulplicated objects along vertical line.
  - ♦ [Connected Lines]：To move the object along the route of the connected lines.

    - *path*：Double-click the left key on the object to display the movement path.

    - *Path Point*：Click right key on the object to to select [Add Path Point] or [Delete Path Point] from the drop-down list for the connected lines setup. Please refer to to select III. Example for the complete details.

    Note that a curve path can be configured with the the various path points.
  - ♦ [Still]：To change the state without movement.

- [Movement] Block：

  - ♦ [Rate (pixels/sec.)]：Specify the rate of the movement.

    - [One-way]：To move the object in one-way.

    - [Two-way]：To move the object in two-way.

- [Dulplicate]：Select this option to move the dulplicate objects with marquee; and the number of copies can be specified as well.

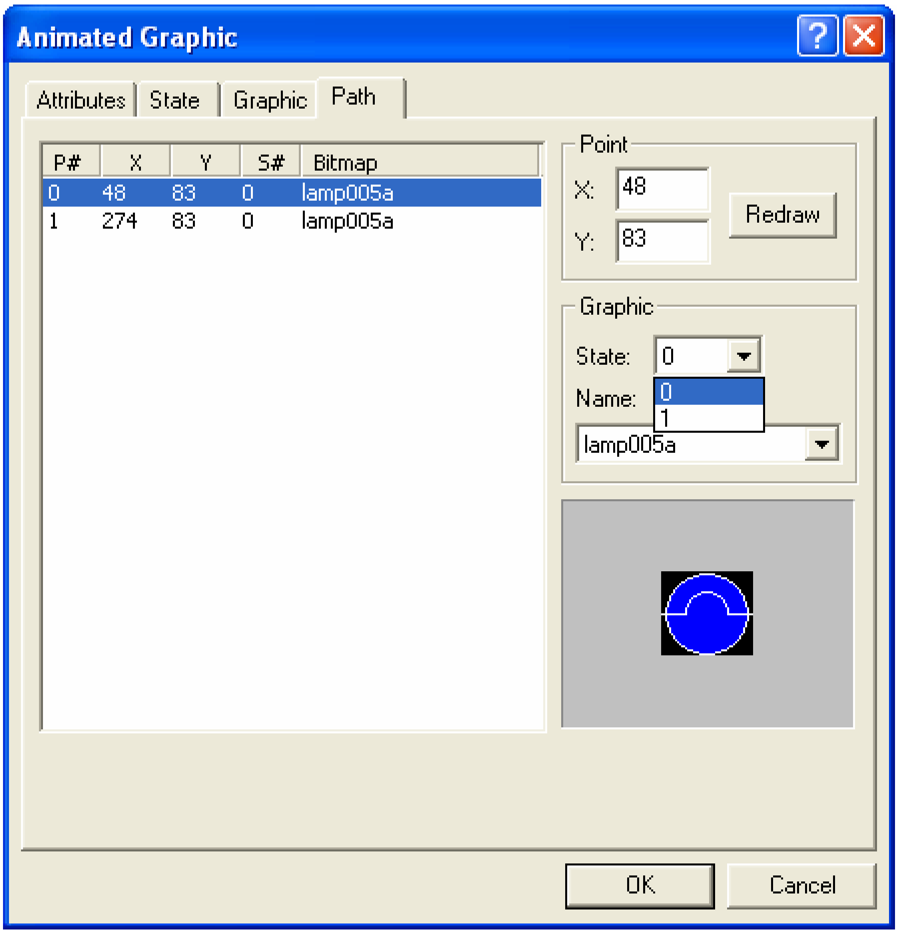
For the properties which are not explained in this Section, please refer to the Section 2.7. III Object Specify Object Properties.

[State] and [Text] Tab

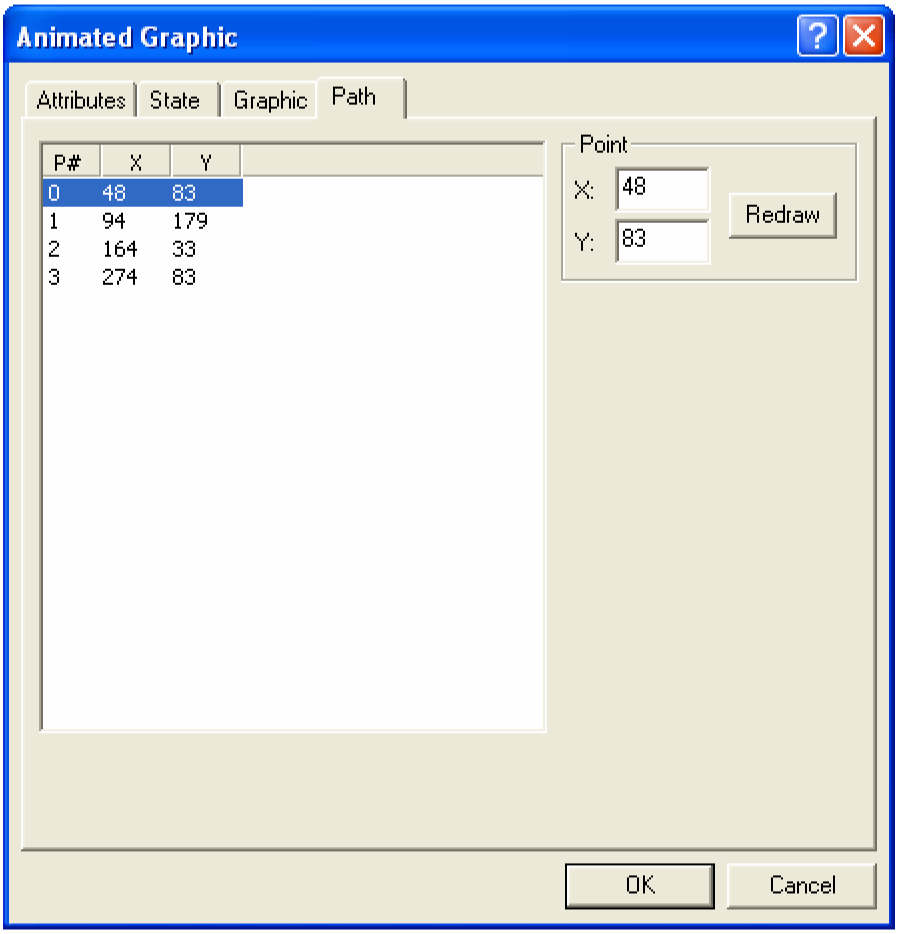
Please refer to the Section 2.7. Object III Specify Object Properties for the complete details.

[Path] Tab

一. **The [Graphic State] is [Location dependent]**：On the [Path] tab, this feature enables a user to specify the graphic states to be cah-nged according to different location. For instance, the point # 0 displays the graphic state in state # 0; the point # 1 displays the graphic state in state # 1. See below.



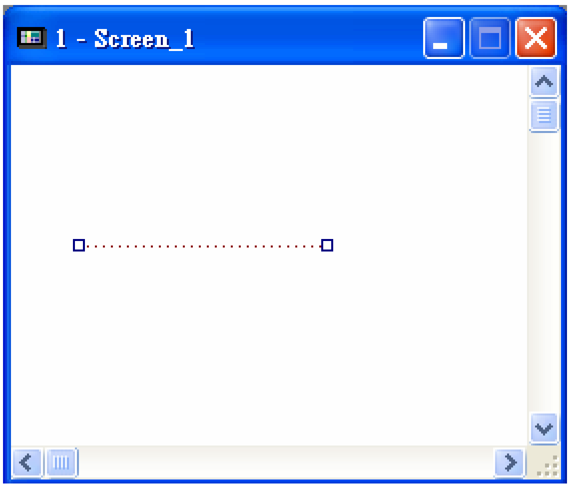
二. **The [Graphic State] is [Auto Change]**：On the [Path] tab, the object changes state along the specified path. A user can setup the staring point and the ending point of path which is displayed on this tab.



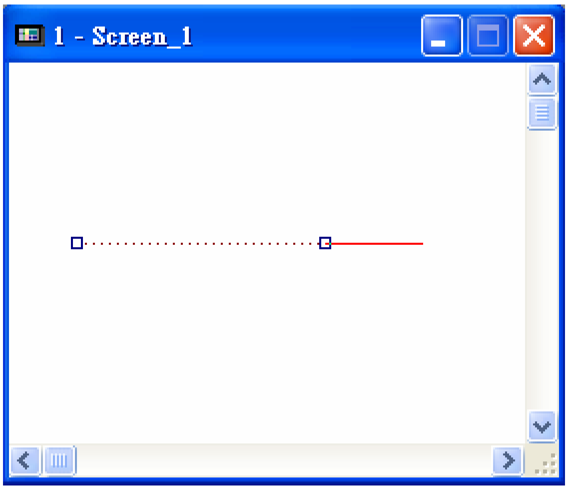
III. Example

一. To design a horizontal/vertical line as path：

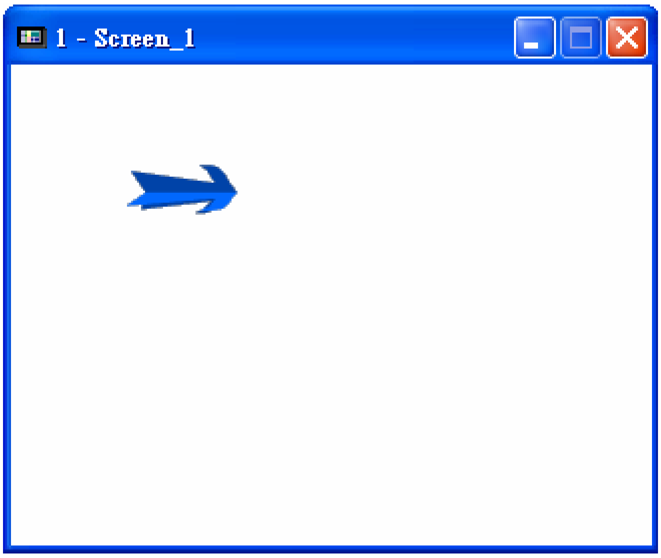
Step 1：Double-click left key on the object to display the movement path.



Step 2：Move the cursor on the point (icon is '□'), then press leftkey to draw the movement path. The revised path should be marked with red line. See below.



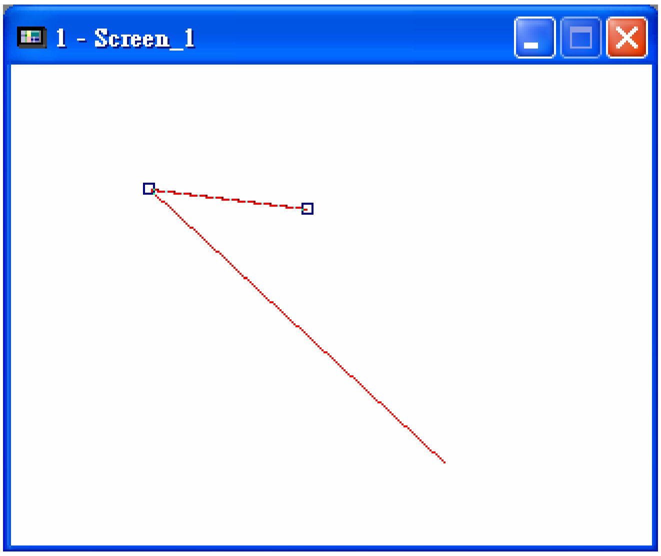
Step 3：Click left-key elsewhere on the screen to display the object graphic.



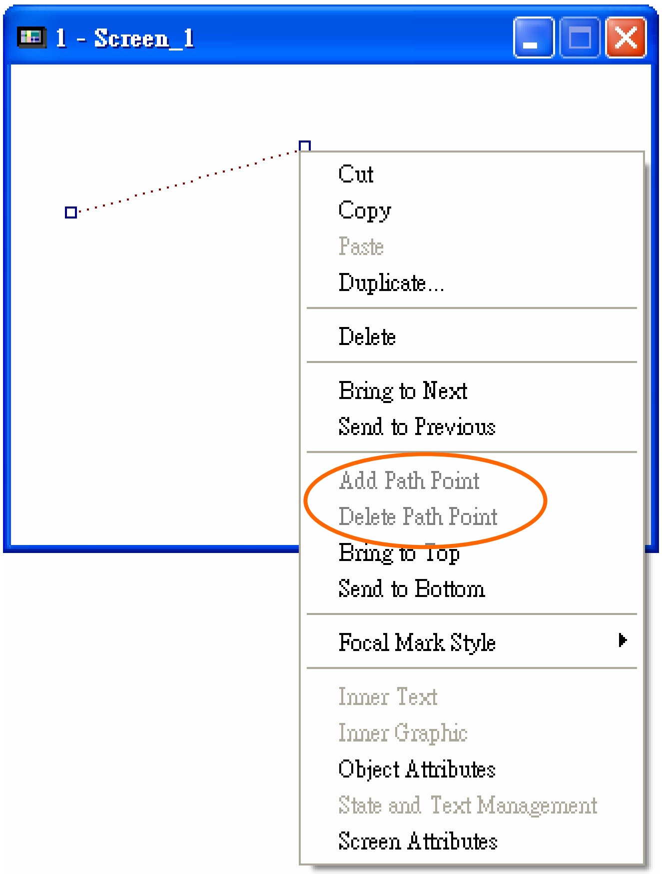
二. To design connected lines as path：

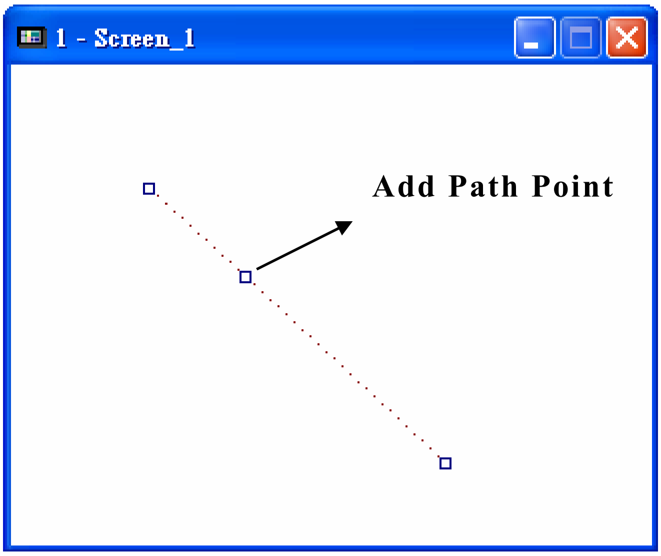
Step 1：Double-click left key on the object to display the movement path.

Step 2：Press left-key on the point of connected lines (icon is '□') to draw the movement path. The revised path should be marked with red line. See below.

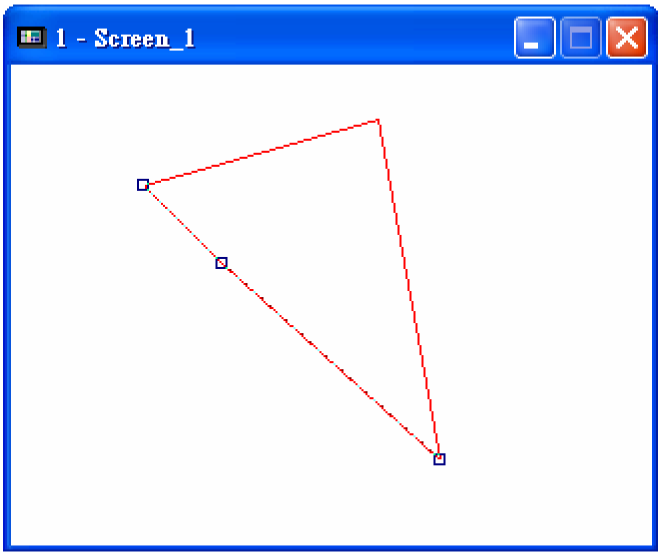


Step 3：Move the cursor to any one of points and press right key to select [Add Path Point] or [Delete Path Point] from the drop-down list. See below.





Step 4： Simutaneously, the way to edit a new path is to press left key on the added path point to drag movement path which is marked with red lines. See below.



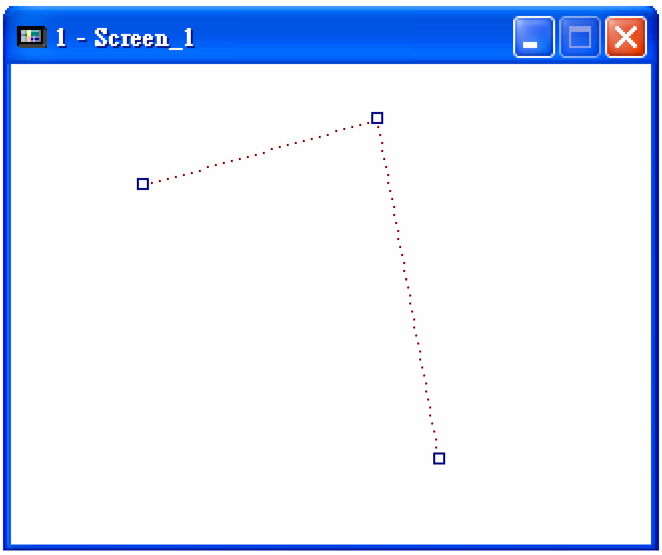


Figure 134 is to display the [Animated Graphic] object which is moving along the specified [Connected Lines] path.

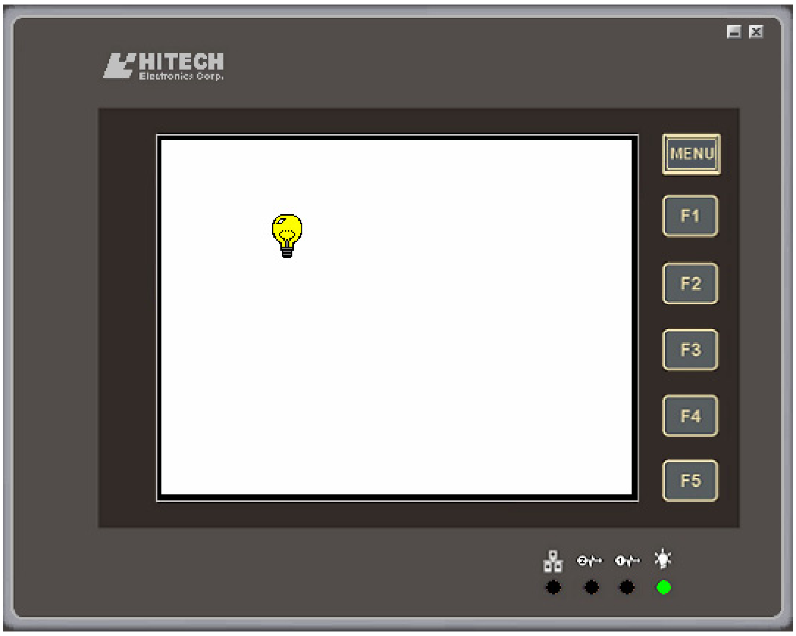
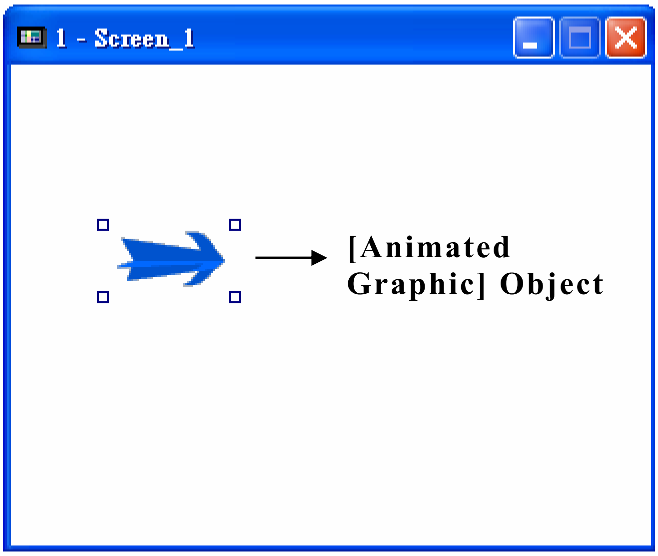


Figure 134. Moving along the [Connected Lines] path

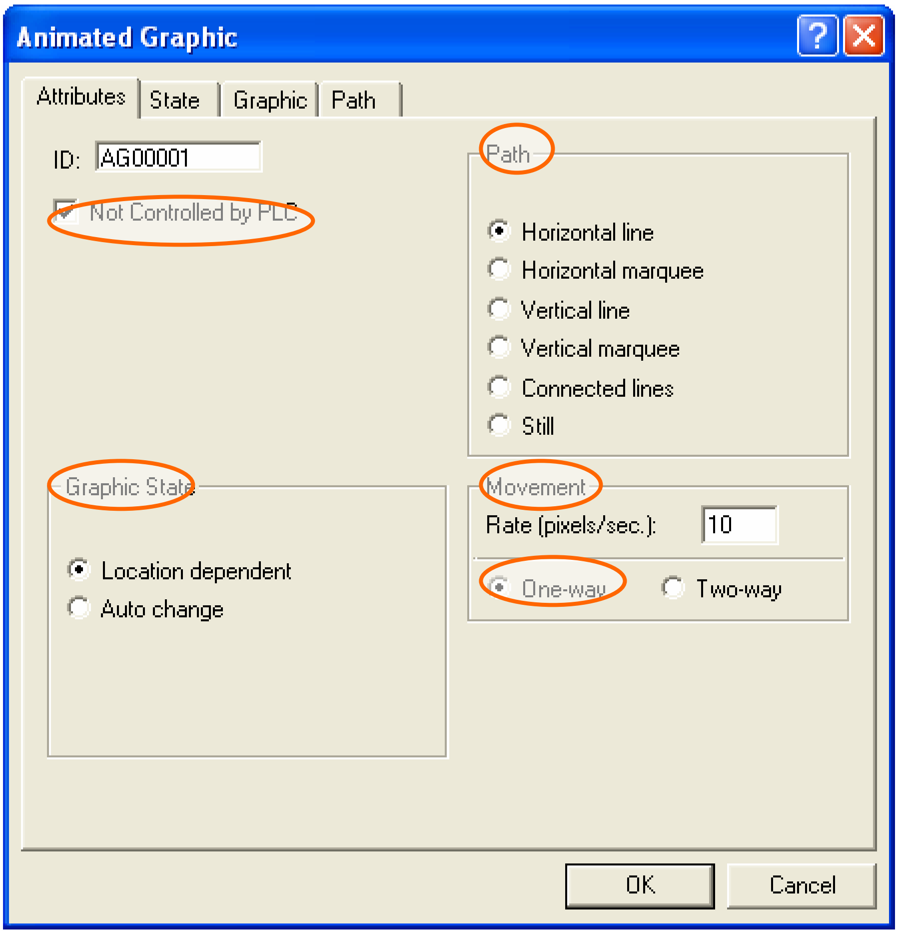
IV. Example

一. Not Controlled by PLC, One-way, Horizontal Line

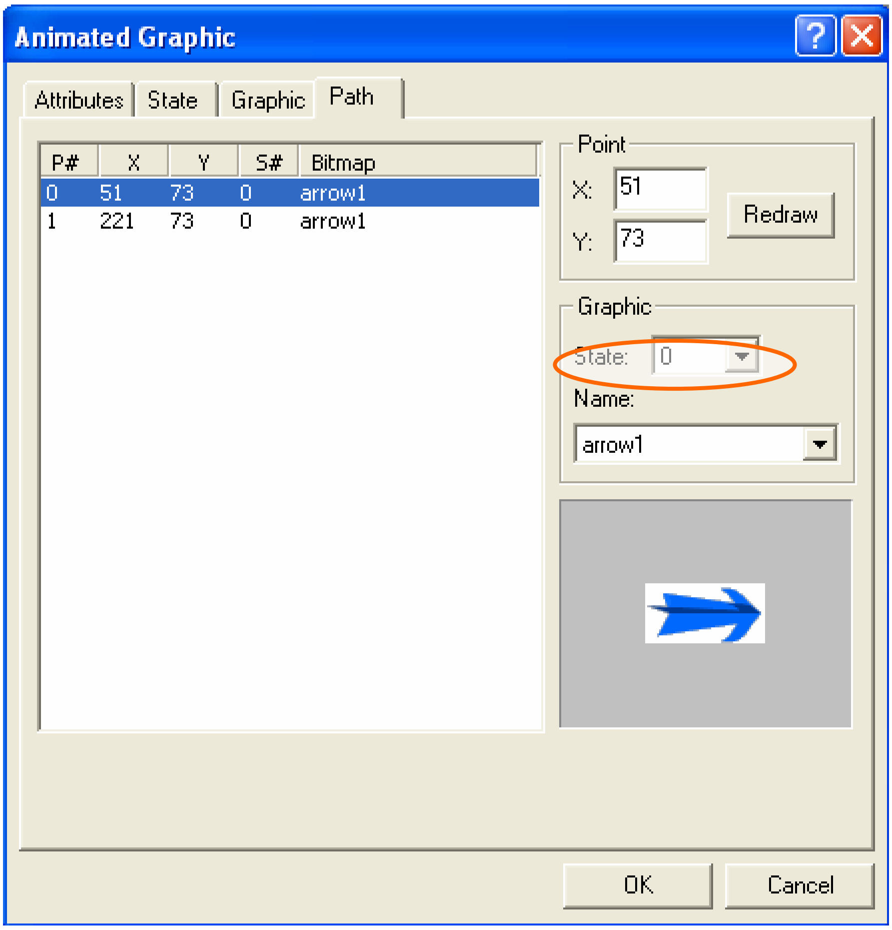


1. Check the option [Not Controlled by PLC].
2. The graphic state is [Location dependent].
3. The path is [Horizontal line].

4. The movement rate is '10' pixels/sec. and the direction is [One-way].



5. This object is one state; and the graphic is "arrow 1".



Therefore, this animated graphic is not controlled by PLC and moving along horizontal line at 10 pixels/sec. in one-way; the graphics both are "arrow 1". See Figure 135.

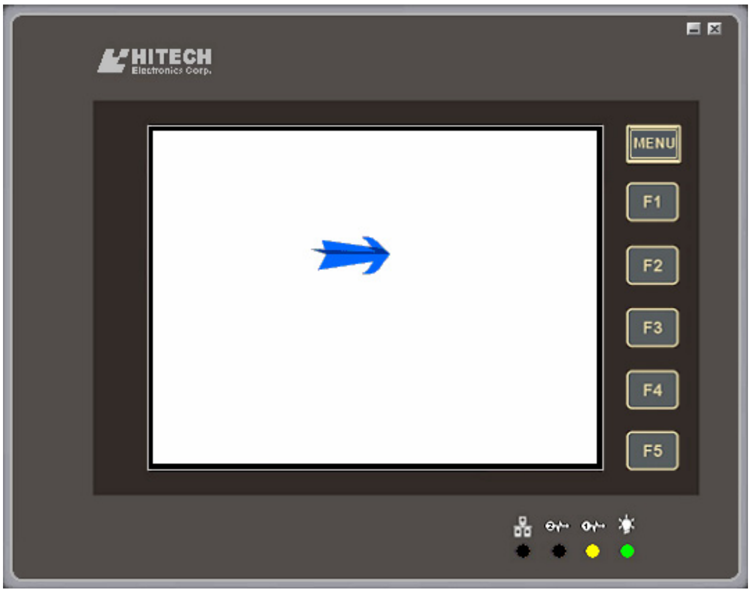
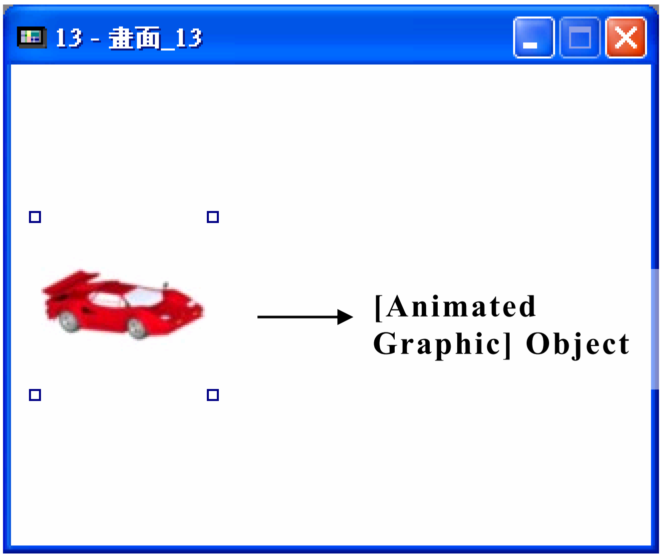


Figure 135. Moving along [Horizontal line]

二. Not Controlled by PLC, Two-way, Horizontal Marquee

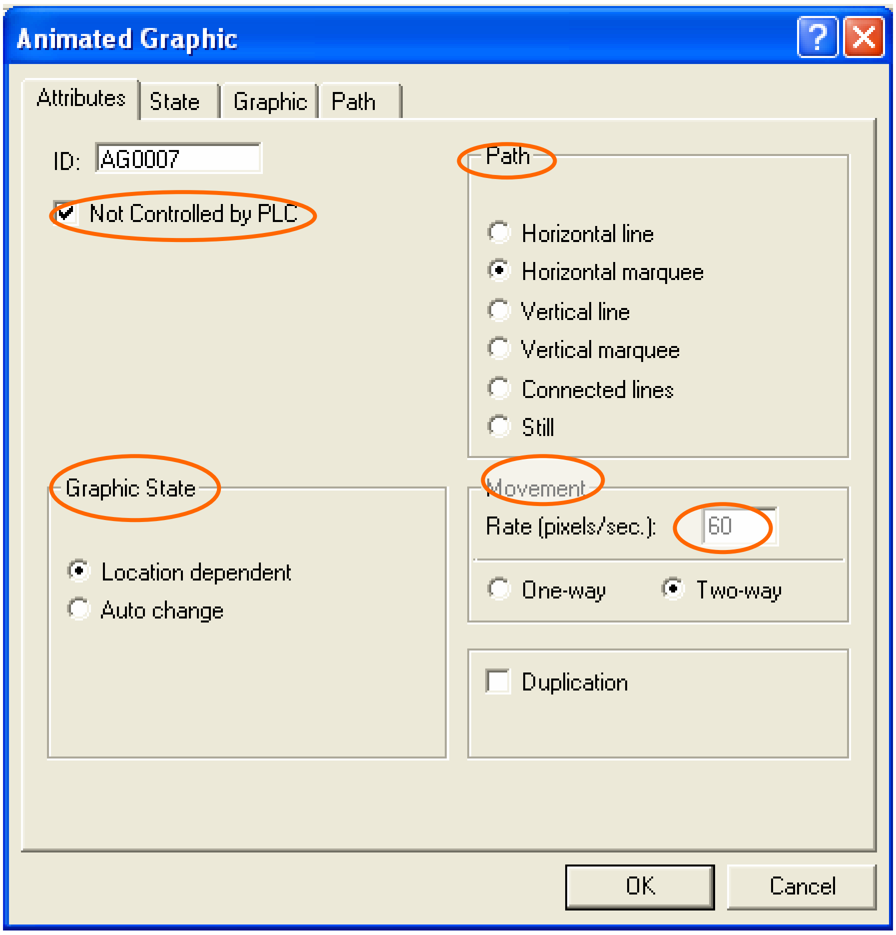


1. Check the option [Not Controlled by PLC].

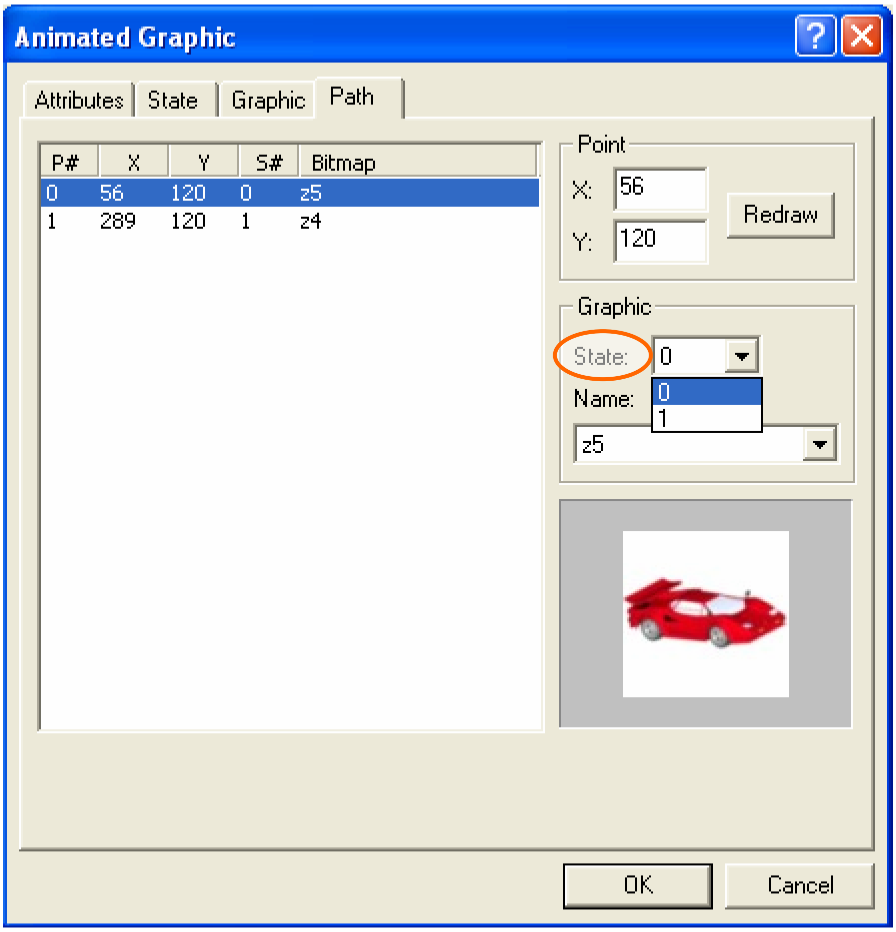
2. The graphic state is [Location dependent].

3. The path is [Horizontal marquee].

4. The movement rate is 60 pixels/sec. and the direction is [Two-way].



5. The graphic state is location dependent, so it should setup two states.



Therefore, this object is not controlled by PLC and moving along horizontal marquee at 60 pixels/sec. This object will move to and fro when it comes to the ending point. See Figure 136 and Figure 137.

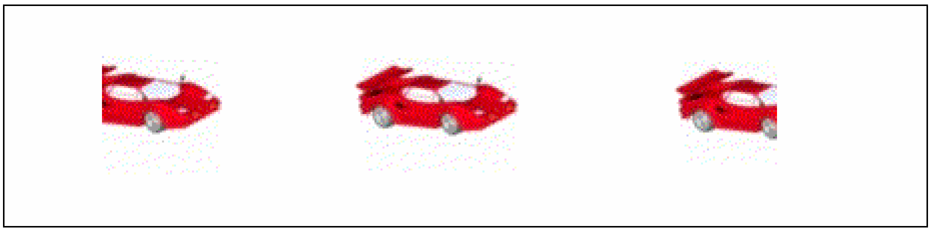


Figure 136. Moving to the right side along horizontal marquee

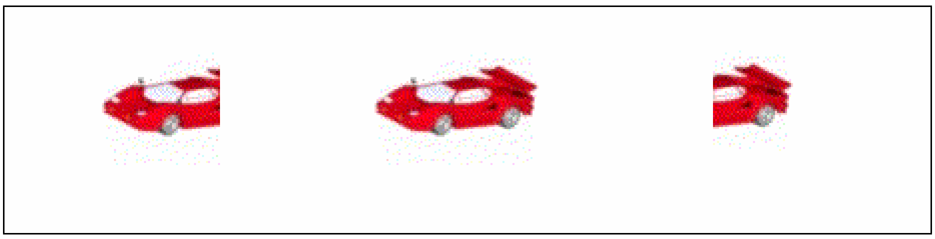
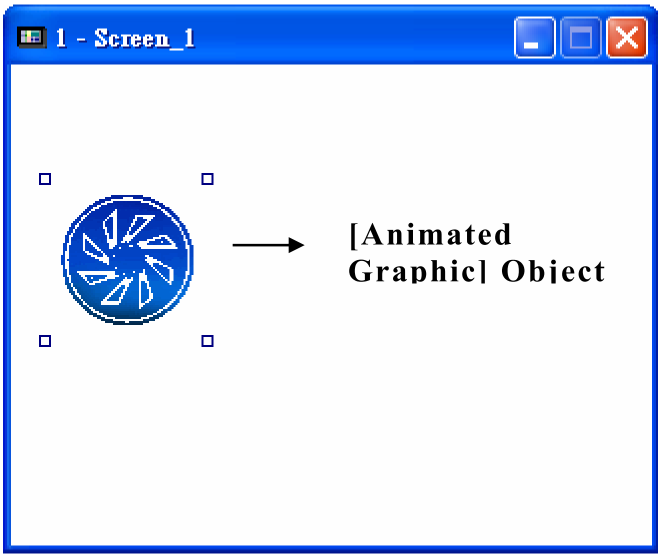


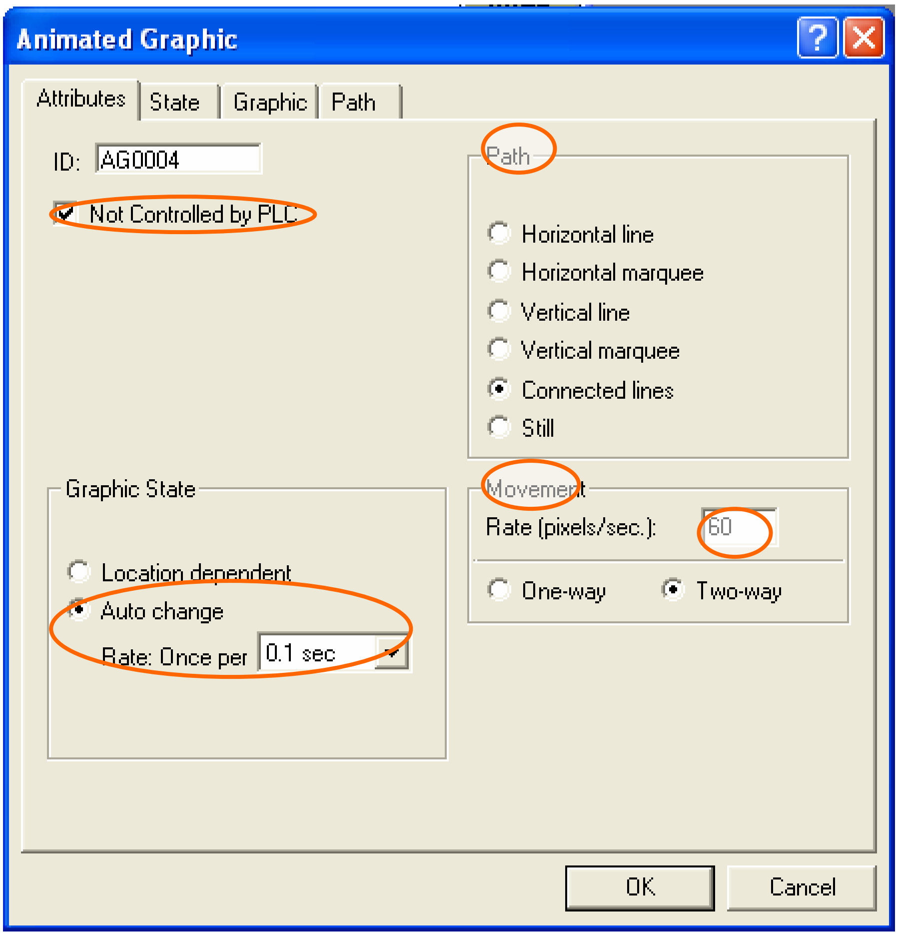
Figure 137. Moving to the left side along horizontal marquee

三. Not Controlled by PLC, Auto Change, Connected Line

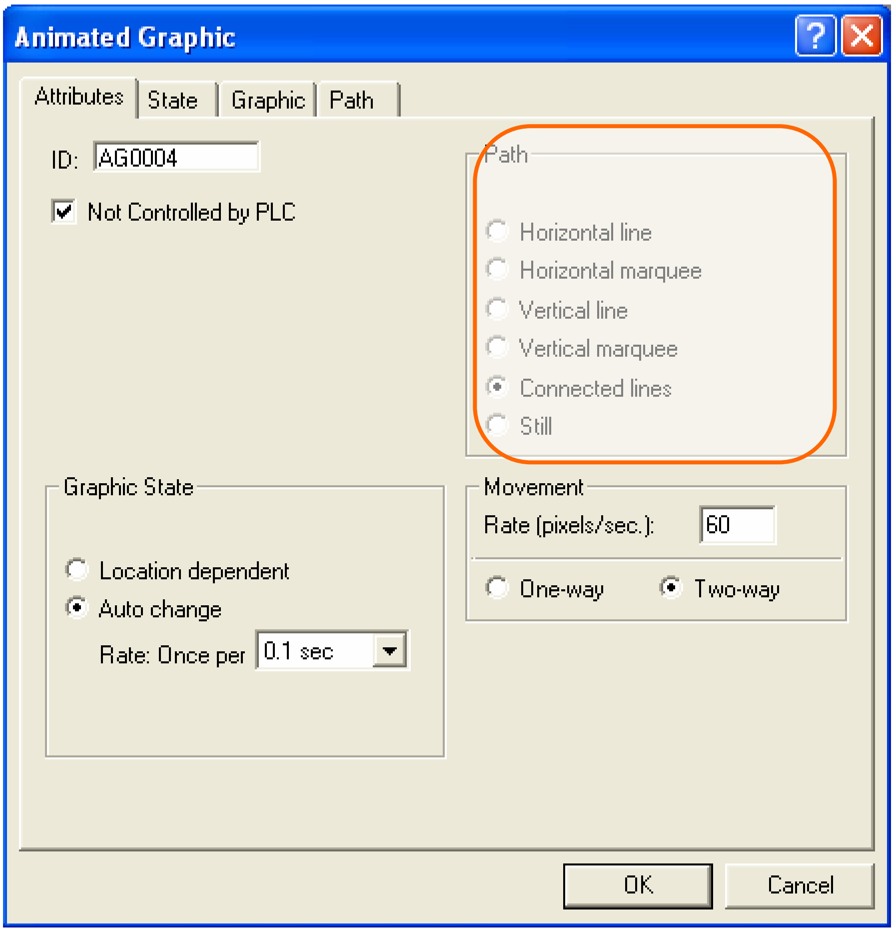


1. Check the option [Not Controlled by PLC].
2. The graphic state is [Auto change] and the [Rate] is “0.1 sec”.
3. The path is [Connected line].
4. The movement rate is 60 pixels/sec.; the direction is [Two-way].

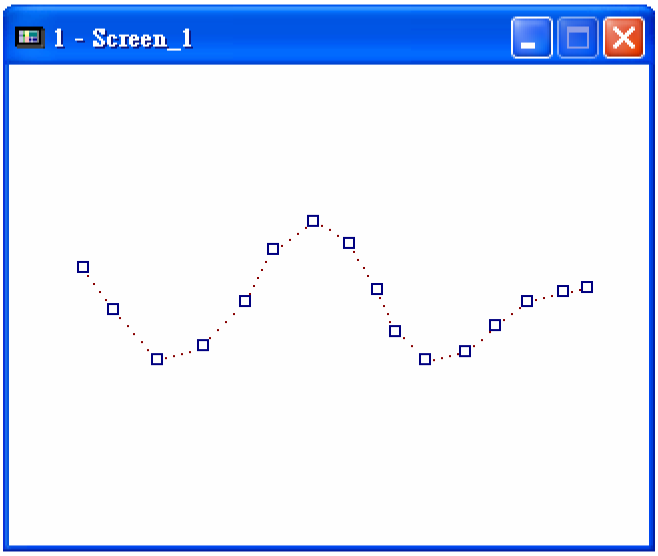
2. Instructions



5. Setup 8 graphic for auto change. The example takes 8 wheels with different angle to cause rolling image when the graphic state is changed automatically.



6. Add more points to make the movement path look smoother.



Therefore, this animated graphic object is not controlled by PLC and moving at 60 pixels/sec. along the curve to and fro. The graphic state is auto change to display rolling effect. See Figure 138.

2. Instructions

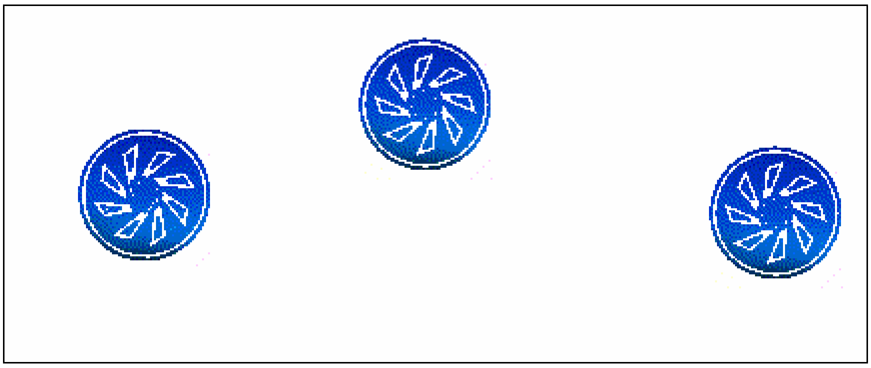


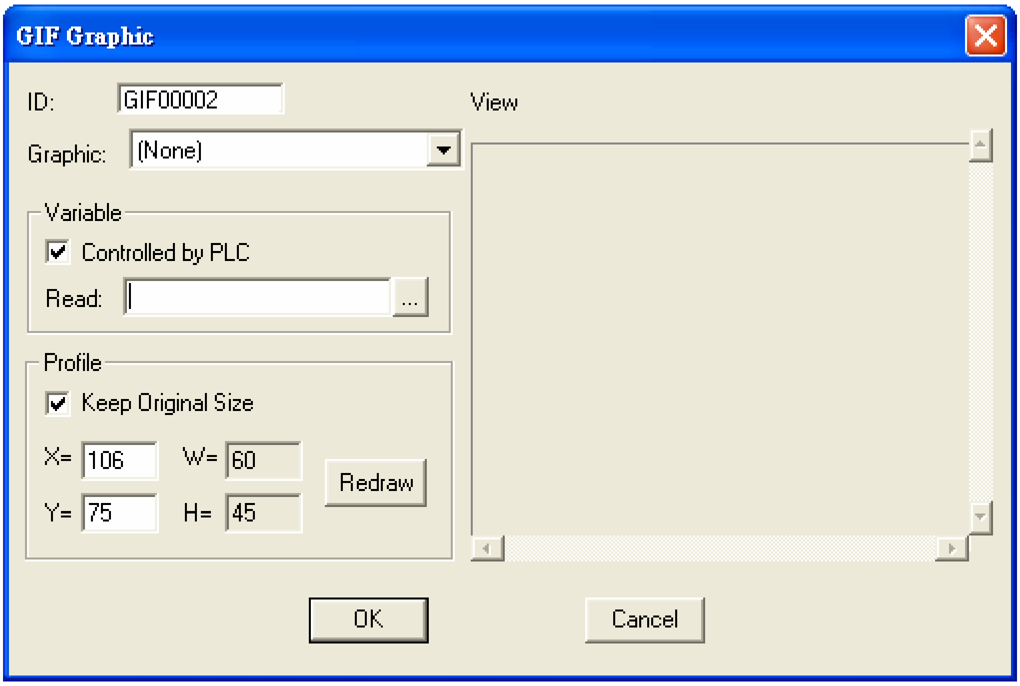
Figure 138. Moving along the curve with auto change in two-way

2.7.15.2. [GIF Graphic] 

I. Function

This feature is to display the GIF graphic controlled by PLC or not.

II. Properties



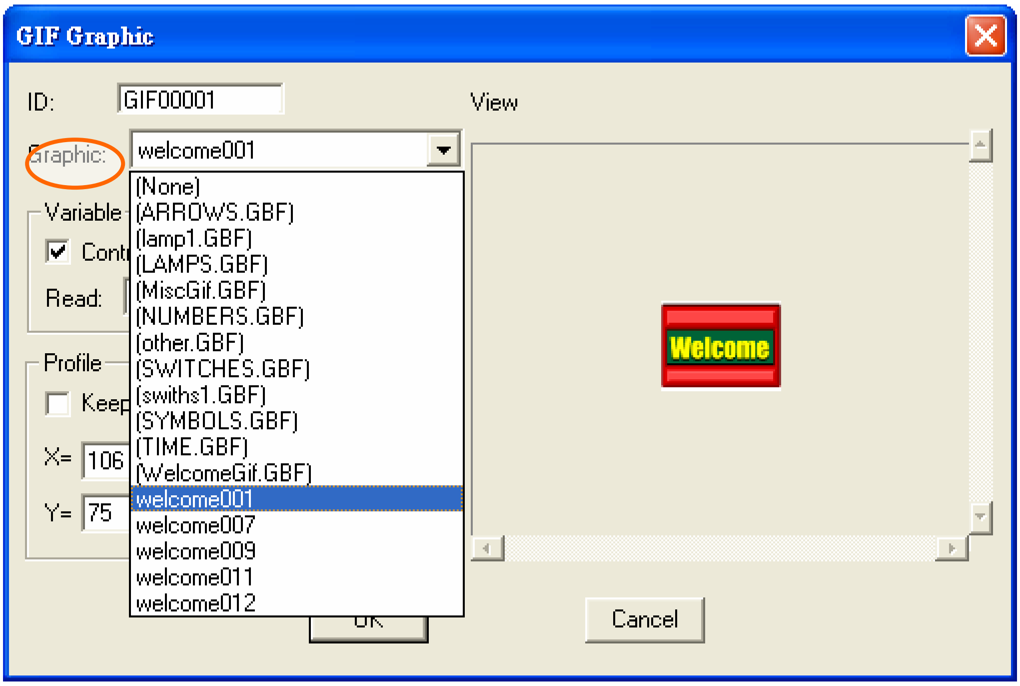
- [Graphic]：Select the graphic to display form the drop-down list, the graphic will appear on the [View] block.

- [Profile] Block：Modify the location and size of objects.

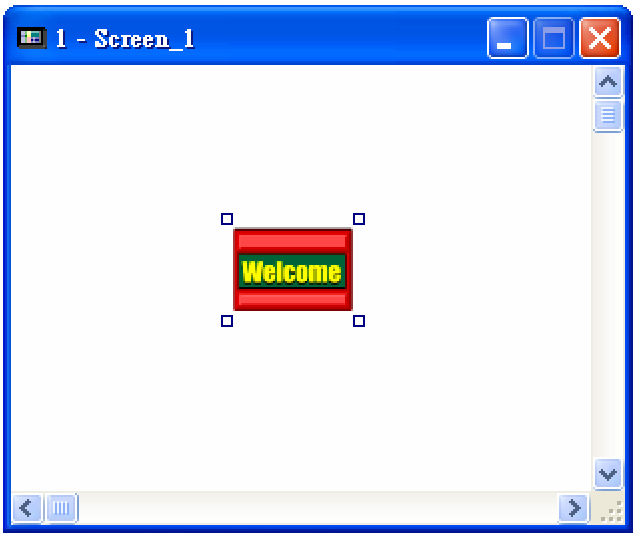
For the properties which are not explained in this Section, please refer to the Section 2.7. Object III Specify Object Properties.

III. Example

To design a [GIF Graphic] object as the following:



Select a GIF graphic form the [Graphic] drop-down list; specify the PLC register to read from (if check the option [Controlled by PLC]) and modify its profile. The specified GIF graphic will appear on the object as below.

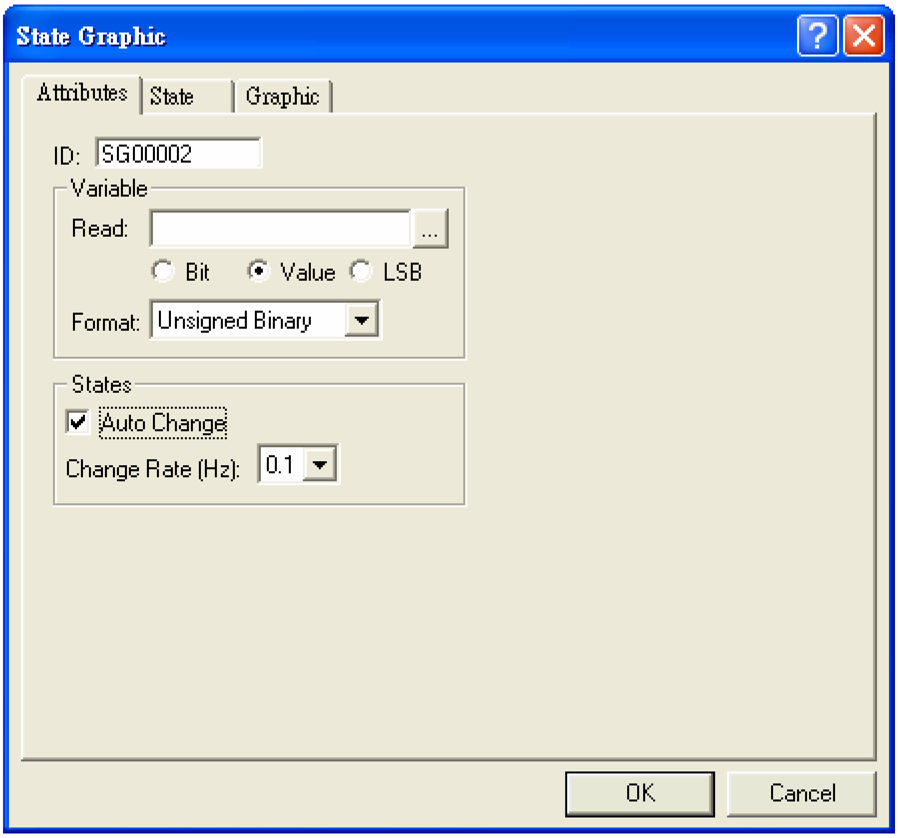


2.7.15.3. [State Graphic] 

I. Function

This object is to display one of several bitmaps depending on the state of PLC register constantly.

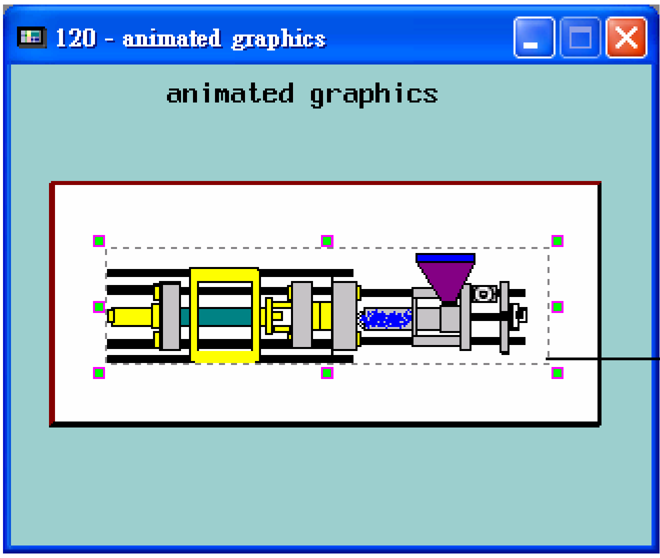
II. Properties



- [States] Block：
    - [Auto Change]：Check this option to change the graphic automatically.
        - [Change Rate (Hz)]：Specify the rate to change.

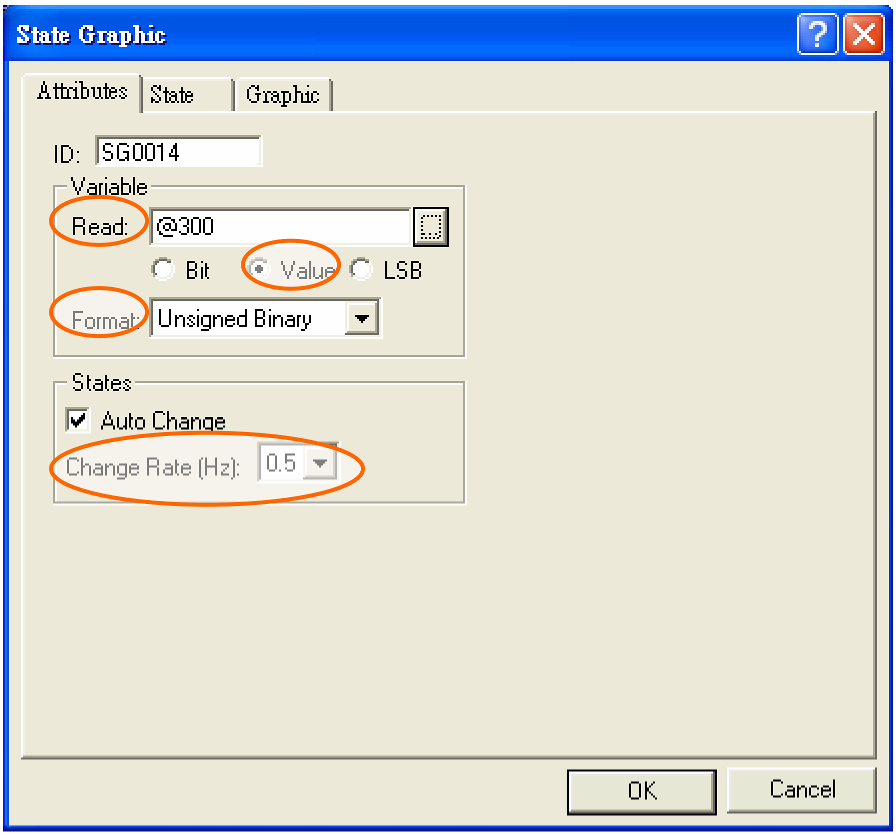
For the properties which are not explained in this Section, please refer to the Section 2.7. Object III Specify Object Properties.

III. Example



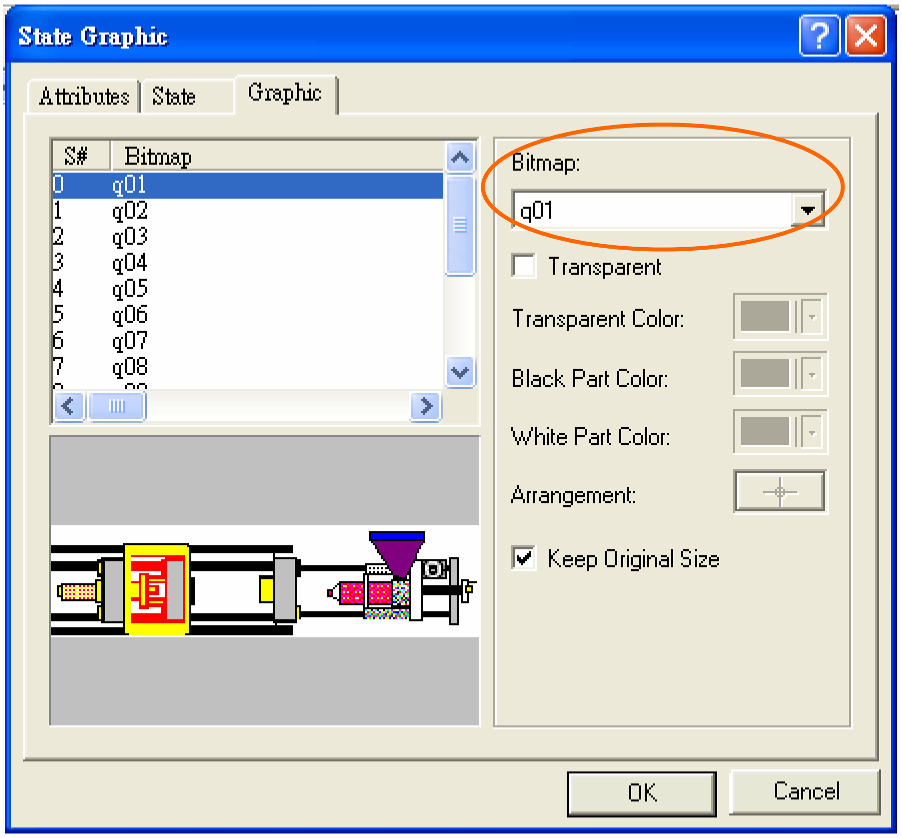
[State Graphic] Object

1. [Read]：Specify “@300”. (Local Internal Memory)
2. Select [Value] to display.
3. [Format] is “Unsigned Binary”.
4. Check the option [Auto Change]; [Change Rate (Hz)] is “0.5 sec”.



5. 14 states in all. Add states on the [State] tab and select specific graphic to display on the [Graphic] tab.

2. Instructions



Therefore, the object changes its state per 0.5 sec controlled by PLC repeatly. And a pumping effect will be generated in the HMI screen. Figure 139 displays the graphics corresponding state 0~2.

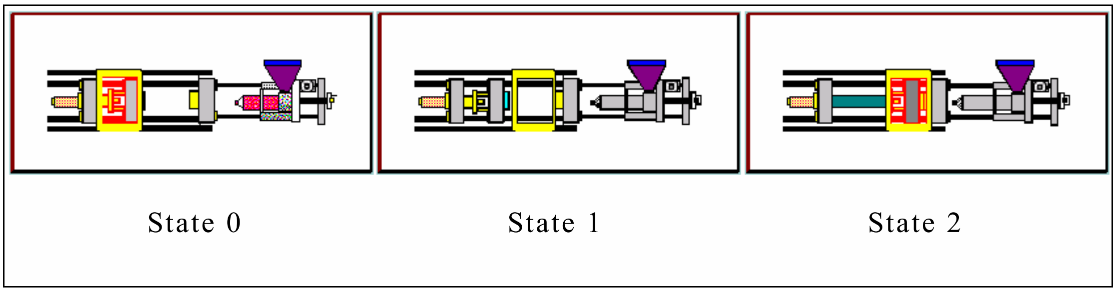


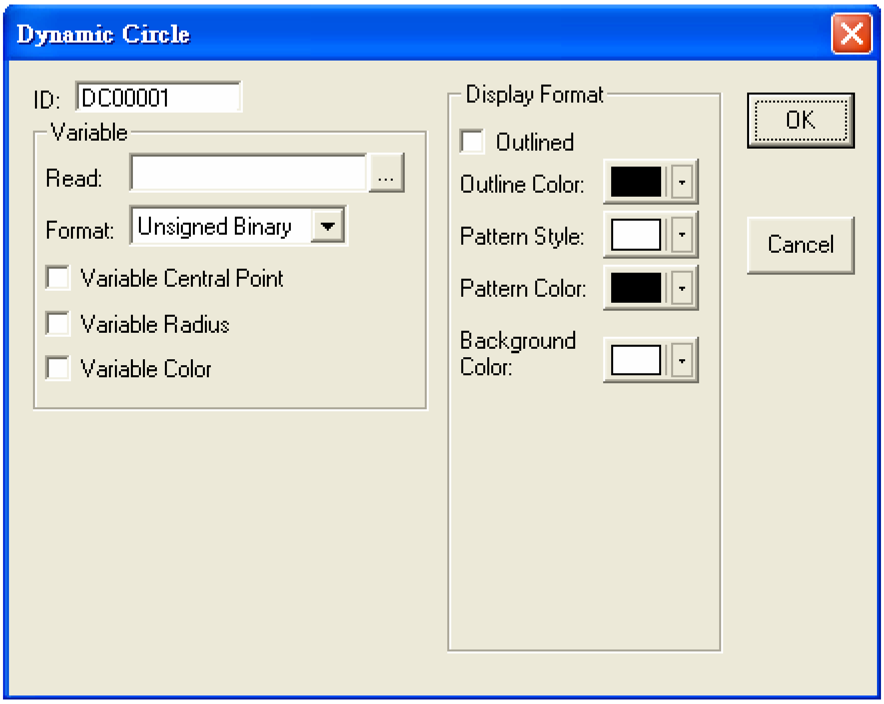
Figure 139. The object displays auto change (ex. state 0~2)

2.7.15.4. [Dynamic Circles]

I. Function

A [Dynamic Circles] object is to change its position, radius and color according its controlling registers.

II. Properties



- [Variable] Block:
    - ♦ [Variable Central Point]: The position of central point is controlled by PLC.
    - ♦ [Variable Radius]: The length of radius is controlled by PLC.
    - ♦ [Variable Color]: The color of the object is controlled by PLC.
- [Display Format] Block: Specify the format of the object to display.

For the properties which are not explained in this Section, please refer to the Section 2.7. Object III Specify Object Properties .

III. Example

Suppose that dynamic circle's central point, radius and color are controlled by PLC. The [Read] address is "D430".

The HMI can read four datum once at most, and the [Read] address here are D430, D431, D432 and D433. The following is the table of PLC address and graphic properties.

2. Instructions

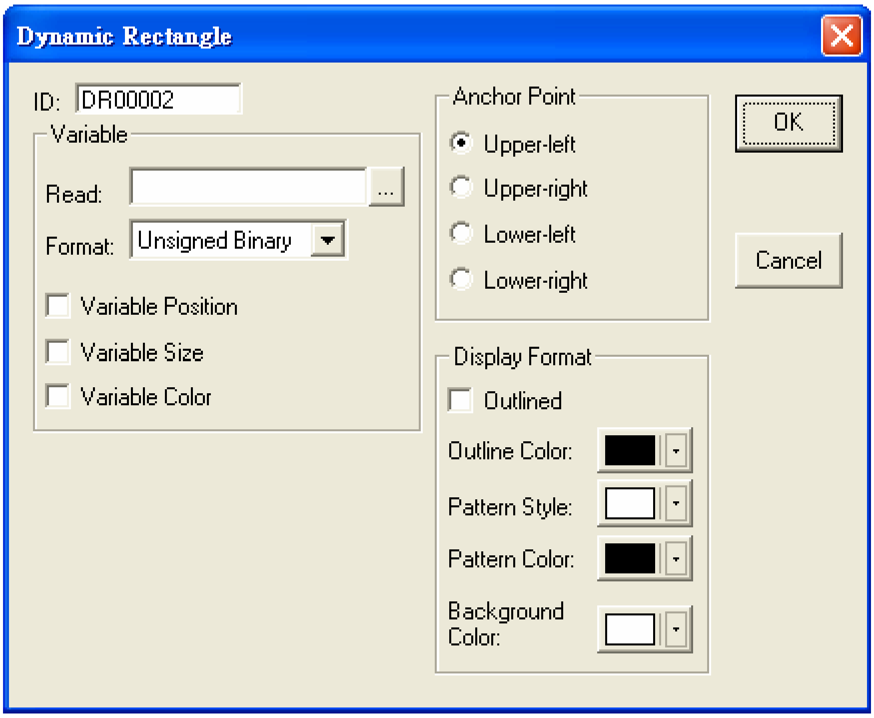
Re-central point Re-radius Fix Color Dn= Radius Dn+1= X Dn+2= Y Dn+3= Color	Re-central point Re-radius Fix Color Dn= Radius Dn+1= X Dn+2= Y	Re-central point Re-radius Re-coloring Dn= Radius Dn+1= Color	Fix Central Point Re-radius Fix Color Dn= Radius	Re-central Point Re-radius Fix Color Dn= X Dn+1= Y Dn+2= Color	Re-central point Fix Radius Fix Color Dn= X Dn+1= Y	Fix Central Point Fix Radius Re-coloring Dn= Color

2.7.15.5. [Dynamic Rectangle]

I. Function

A [Dynamic Rectangle] object is to change its position, radius and color according its controlling registers.

II. Properties



- [Variable] Block:
    - ♦ [Variable Position]: The position of the object is controlled by PLC.
    - ♦ [Variable Size]: The length of the object is controlled by PLC.
    - ♦ [Variable Color]: The color of the object is controlled by PLC.
- [Anchor Point]: Specify the anchor point for the dynamic rectangle whose position is variable and size is fixed.

- [Display Format] Block: Specify the format of the dynamic rectangle to display.

For the properties which are not explained in this Section, please refer to the Section 2.7. Object III Specify Object Properties.

III. Example

Suppose that the position, size and color are variable which is controlled by PLC. The [Read] address is “D420”.

The HMI reads five data from PLC once at most. The [Read] addresses here are D420, D421, D422, D423 and D424. The following is the table of PLC address and graphic properties.

Re-positione Re-size Re-coloring D420= Width D421= Height D422= X D423= Y D424= Color	Re-position Re-size Fix Color D420= Width D421= Height D422= X D423= Y	Fix Position Re-size Re-coloring D420= Width D421= Height D422= Color	Fix Color Re-size Re-coloring D420= Width D421= Height	Re-position Fix Size Re-coloring D420= X D421= Y D422= Color	Re-position Fix Size Fix Color D420=X D421=Y	Fix Position Fix Size Fix Color D420= Color

2.7.16. [Historical Display]

The [Historical Display] drop-down list includes the followings：[History Trend Graph], [Historical Data Table] and [Historical Event Table].

The [Historical Display] datum are stored in **logging buffers**, a user should assign its area and size first. Logging buffer is to store the sampling datum in HMI battery backup RAM.

Note that this feature is not applicable on all HMI models; please refer to Appendix A.- Table of the ADP 6.0 Features and HMI Models.

Logging Buffer:

Select the [Logging Buffers] tab from [Application]/ [Workstaion Setup]. Its dailog box will appear as the following.

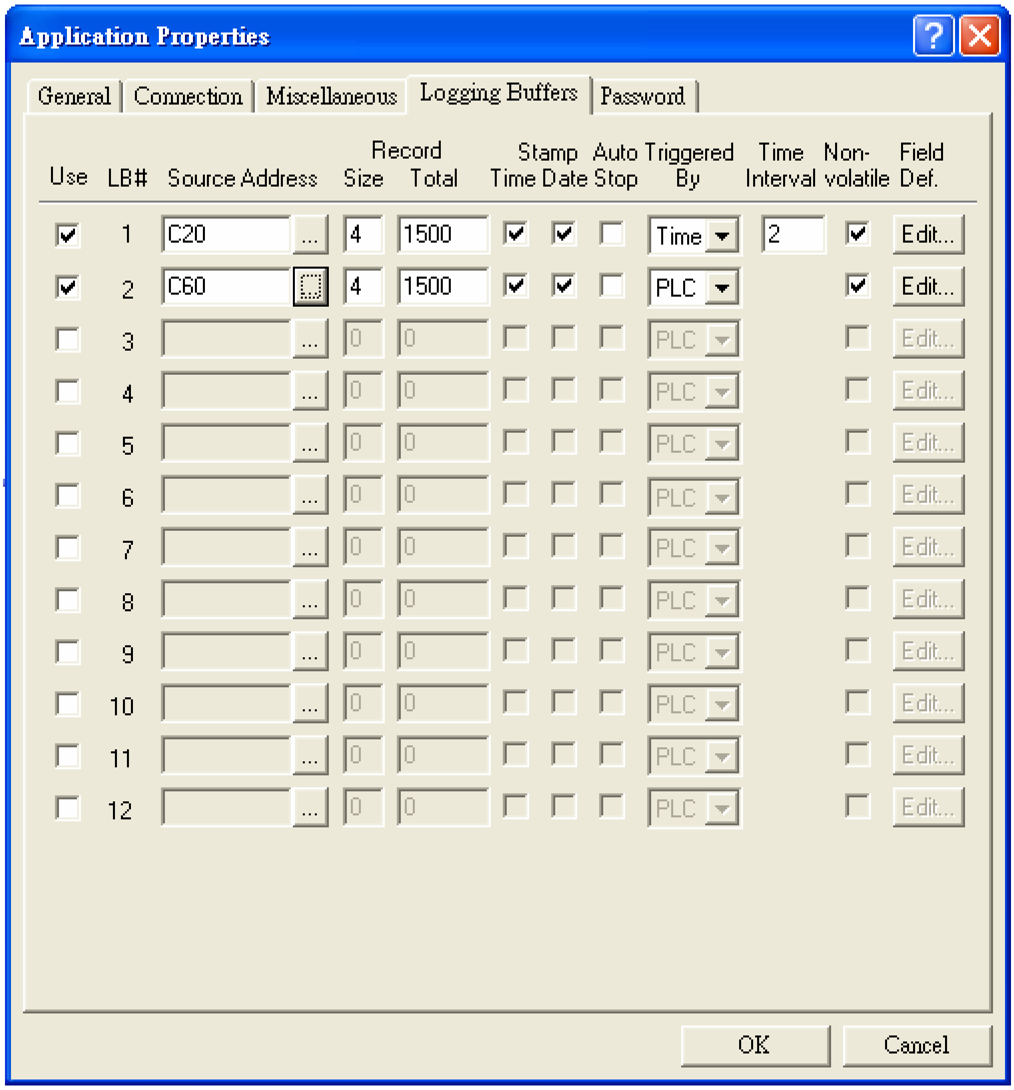


Figure 140. The [Logging Buffers] Tab

1. [Source Address]：Specify the starting address to read from, e.g. “C20” is starting address of a block of PLC registers from which the logging buffer reads from. See Figure 140.

2. [Size]：Specify the size of a record to read form at a time, e.g. [Size] = “4” represents 4 Words = C20，C21，C22，C23.

3. [Total]：Specify the total to store in, e.g. “1500” represents that the HMI reads 4 Words each time sampling 1500 times in total.

4. [Time]/[Date]：Check this box to record the [Time]/[Data] while sampling.

5. [Auto Stop]：Check this box to stop sampling when it reaches the specified total = 1,500. If the option is not selected, the 1st data will be overwritten when the 1501st data records is readed.

6. [Triggered By]：Select "Timer" to trigger period on fixed time or select PLC to be triggered by PLC. If select PLC for triggered by, it's triggered by the specified corresponding bit-locations Dn+2, Dn+3 and Dn+4.

7. [Time Interval]：Specify how often the logging buffer gets one record of data from Timer. (Unit: sec.)

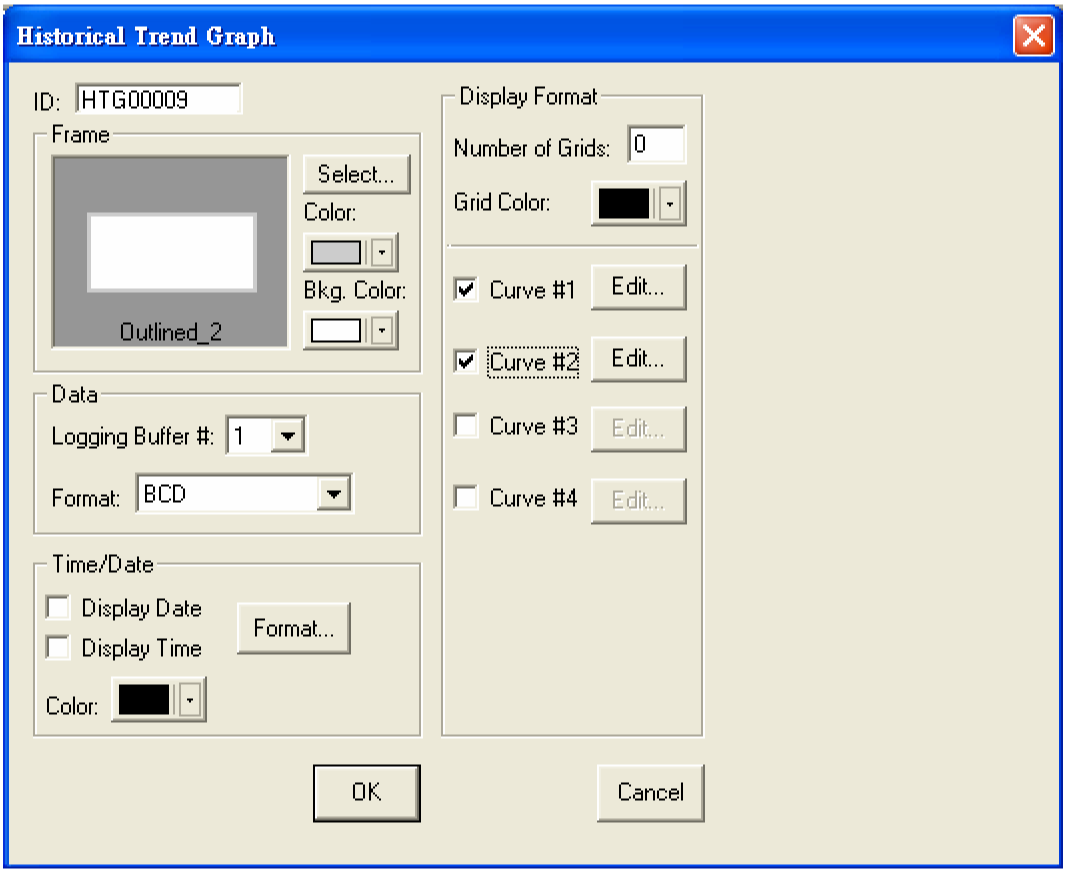
After completing the setup on [Logging Buffers] tab , a user can create three types of [Historical Display] objects：

2.7.16.1. [Historical Trend Graph]

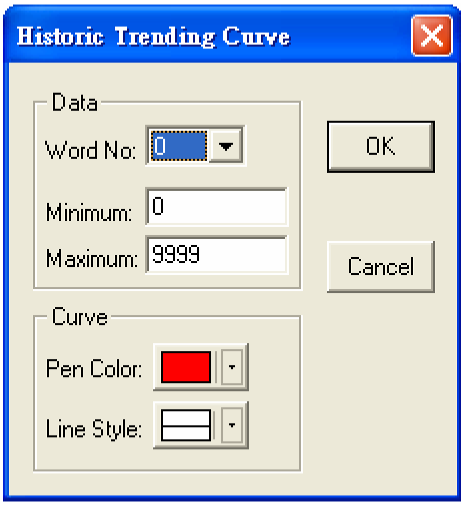
I. Function

The HMI may have a fixed sampling period or the PLC may as well initiate a data read from the specified registers and then store the data in the logging buffers in the HMI memory. After a period of sampling, the data then is converted to continuous curve(s) and displayed on HMI.

II. Properties



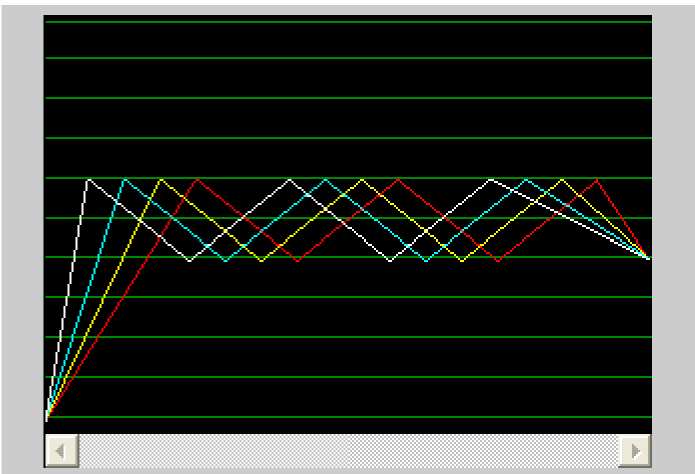
- [Data] Block：
  - [Logging Buffer #]：Specify the number of the logging buffer where the historical data is stored, numbered 1 to 12.
  - [Format]：“BCD”, “Signed Binary” and “Unsigned Binary”.
- [Time/Date] Block：
  - [Display Date] and [Display Time]：Check this box (es) to display date and time; click [Format] button to setup. (This feature is inapplicable on PWS700)
  - [Color]：Specify the color of characters to be displayed.
- [Display Format] Block：
  - [Number of Grids]：Specify how many evenly spaced horizontal lines shall be displayed.
  - [Grid Color]：Specify the color of the horizontal grids.
  - [Curve #1-#4]：There are four curves to be selected. If click [Edit] button, its dialog box will appear as the following.



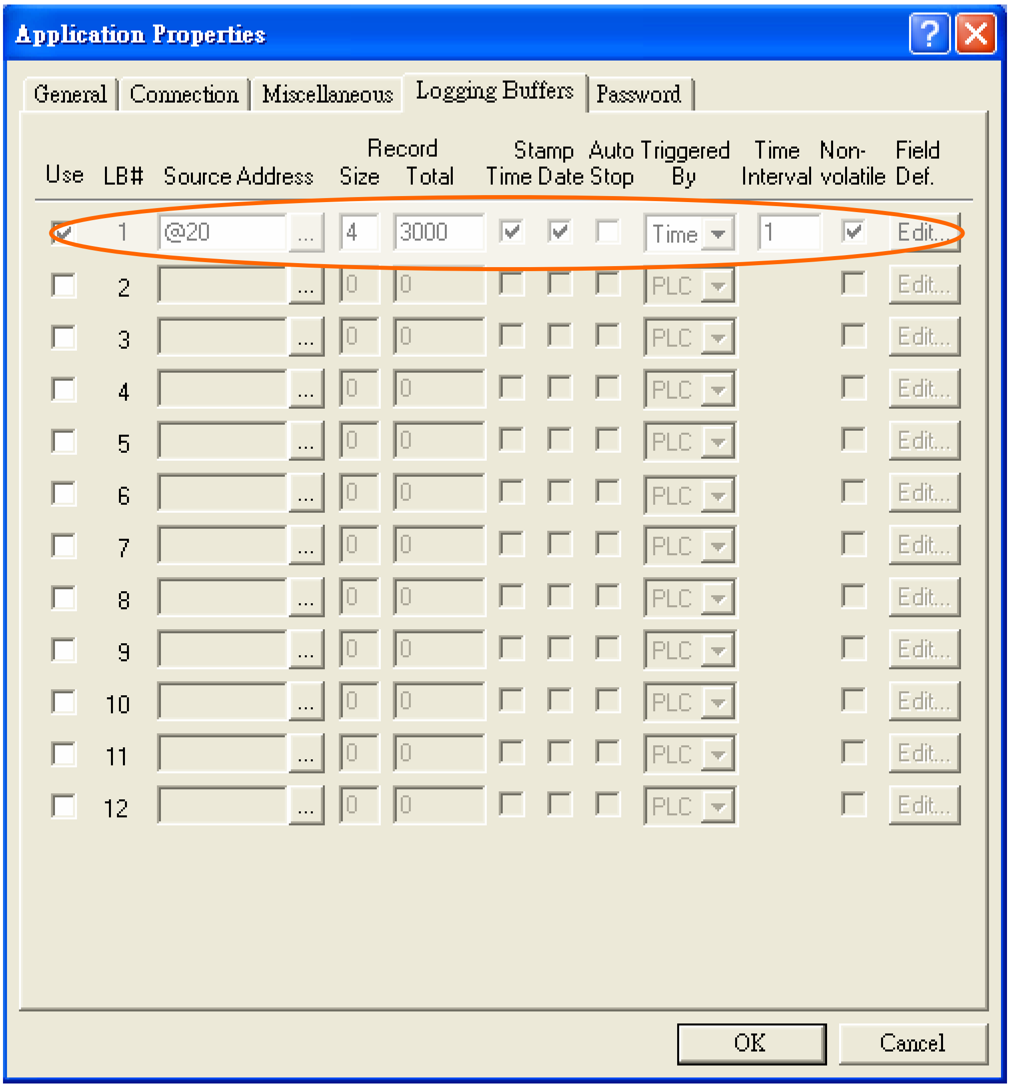
- [Word No]：Specify the number of the words to display on the historic trending curve.
- [Minimum] and [Maximum]：Specify the value corresponding to the lowest and highest point on the historical trending curve.
- [Pen Color]：Specify the color to draw the trending curve.
- [Line Style]：Specify the line style of the trending curve.

III. Example

To design a [Historical Trending Graph] as the following：



To use [Historical Trend Graph]; first assign its corresponding logging buffers size and area. A user must setup the ptoerties e.g. source address, size, total on the [Logging Buffers] tab in [Application]/[Workstation Setup]. After setup, the [Historical Trending Buffer] object can read the data stored in the memory.



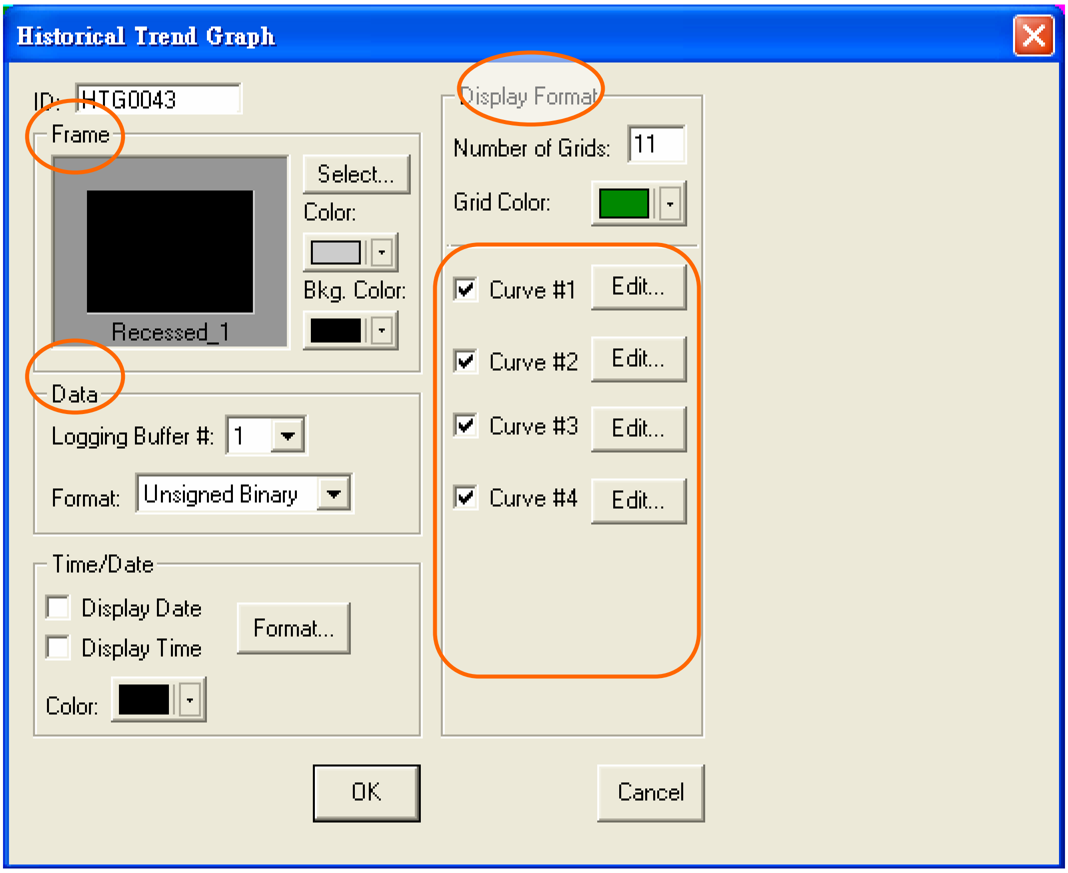
Steps to creat a [Historical Trending Graph] object as the following：

1. Frame：Select “Recessed_1”；Bkg. color：Black.

2. Read the data form the logging buffer #1.

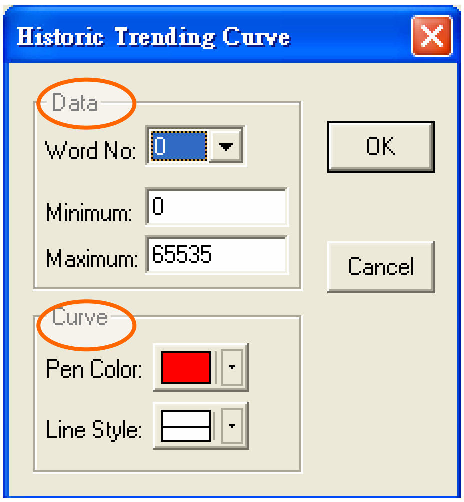
3. [Format] is “Unsigned Binary”.

4. The number of grids is ‘11’ and the grid color is “Green”.



5. Check four curves to display; curve #1 displays the data record sored in the word "0". Curve #2 displays the data record sored in the word "1"…etc. See below.

6. The minimum value is "0"; the maximum value is "65535"; and specify the different color to each curve.



The steps above will create a [Historical Trending Graph] ob ject. The four curves display the data stored in logging buffer #1 on the object which has 11 grids on it. See Figure 141.

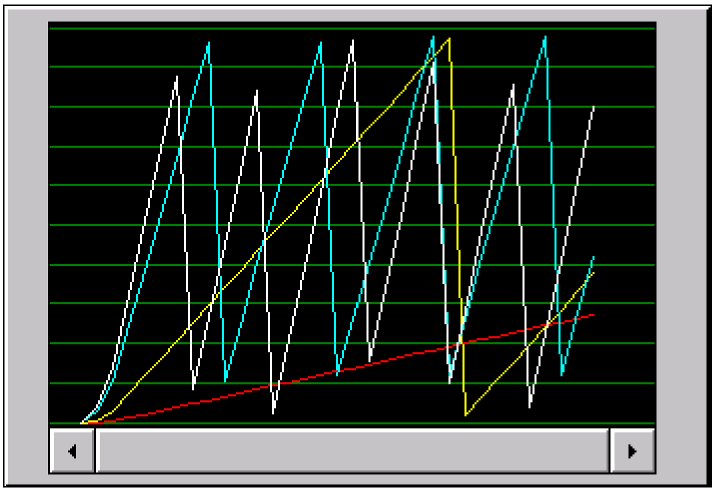


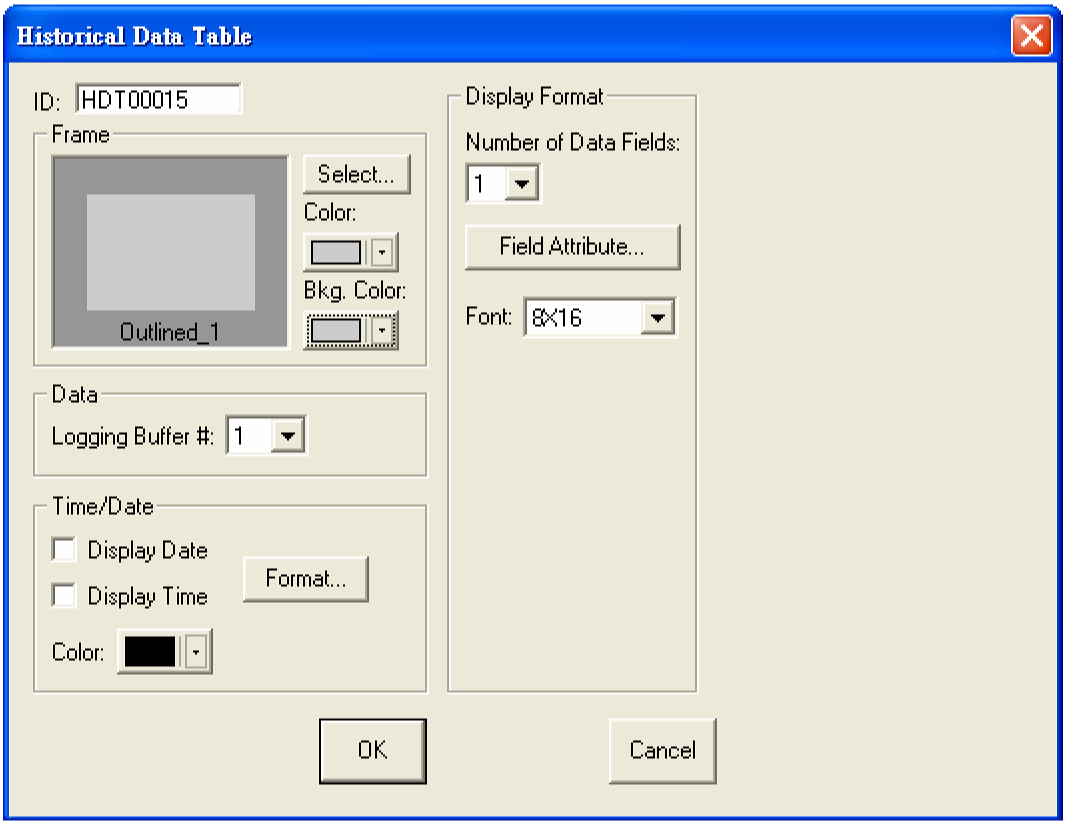
Figure 141. The [Historical Trending Graph] object

2.7.16.2. [Historical Data Table]

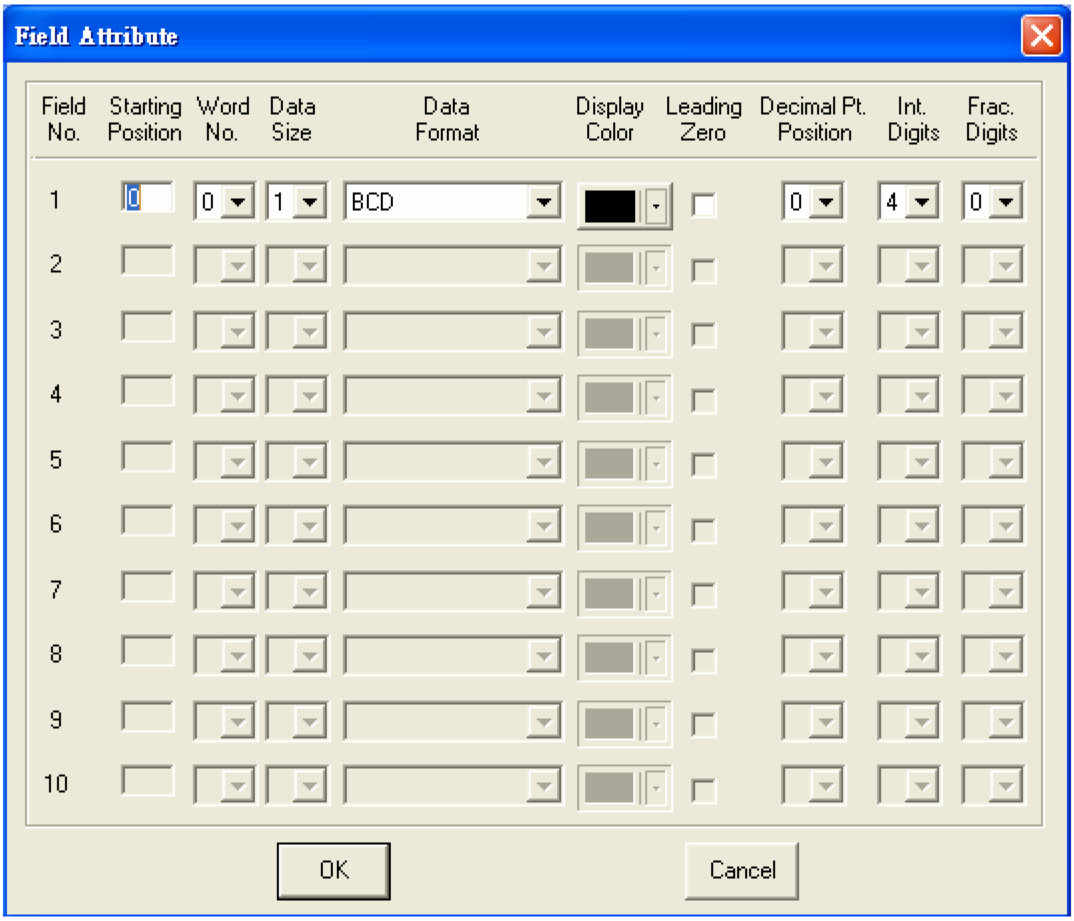
I. Function

The HMI may have a fixed sampling period or the PLC may as well initiate a data read from the specified registers and then store the data in the logging buffers in the HMI memory. After a period of sampling, the data then is converted to numeric data table and displayed on HMI.

II. Properties



- [Display Format] Block：
    - ♦ [Number of Data Field]：Specify how many data fields to display; it is up to 10 data fields.
    - ♦ [Field Atteibute] button，its dialog box will appear as the following：



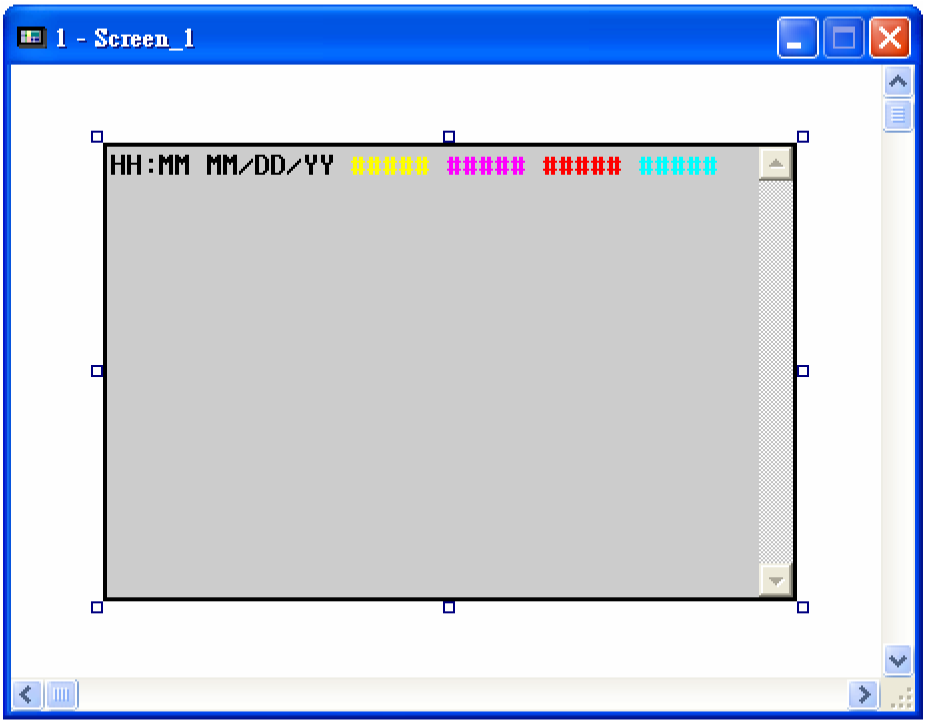
- [Starting Position]：Specify the position of a data field to display. Note that if the starting position is 0 for field No.1; the time will display in field no.1, the date will display in field no.2 and the first data field will display in field no.3. If there is no time/date displayed, the first data field will be displayed in field no.1.
- [Word No.]：There are 0~31 numbers of character can be specified.
- [Data Size]：“1” represents one-word；“2” represents double-word.
- [Data Format]：There are four options [BCD], [Signed Binary], [Unsigned Binary] and [Hexadecimal].
- [Display Color]：Specify the character color of a data field.
- [Leading Zeros]：Check this box to display leading zeros.
- [Decimal Pt. Position] ：Specify how many number of digits following the decimal point.
- [Int. Digits] ：Specify how many digits to the left of the decimal point.
- [Frac. Digits]：Specify how many digits to the right of the

decimal point.

For the properties which are not explained in this Section, please refer to the Section 2.7.16.1 [Historical Trending Graph].

III. Example

To design a [Historical Data Table] object as the following：

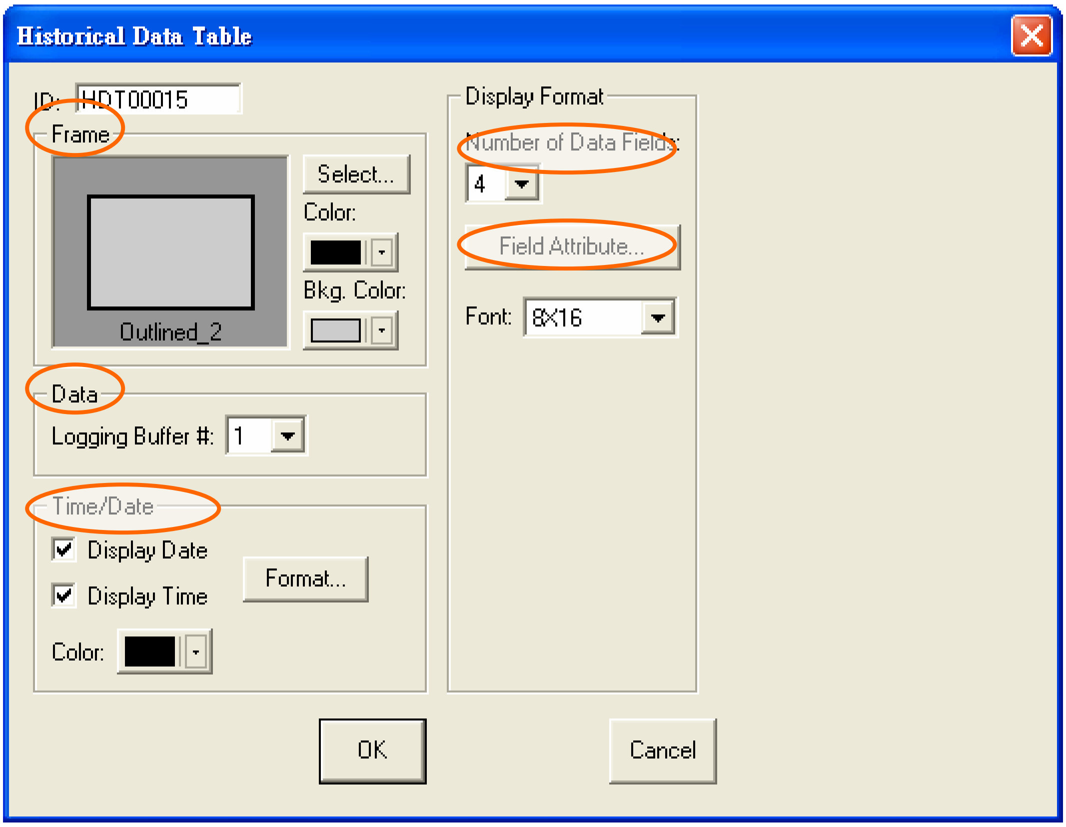


Suppose that there is historical data stored in logging buffer #1.

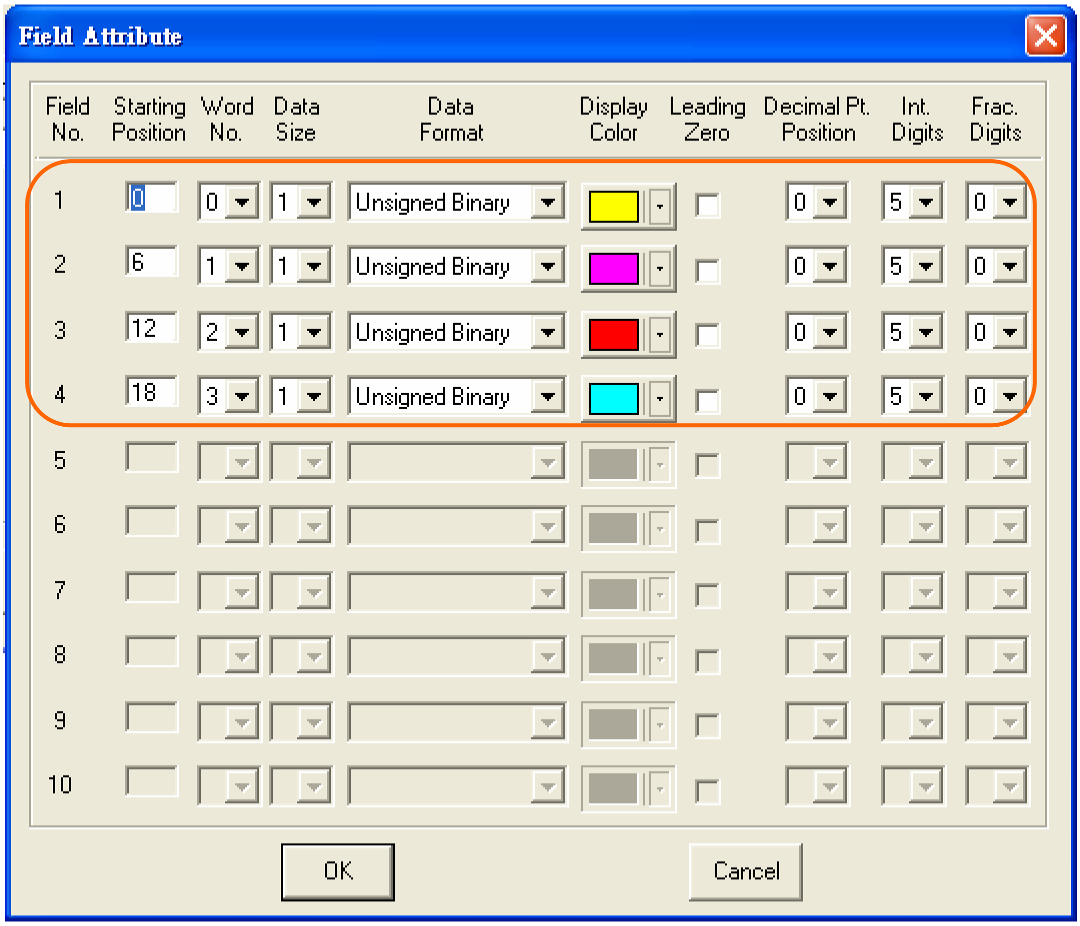
The object's properties as the following：

1. Frame：Select "Outlined_2"；the color is "Black".
2. Read the historical data from logging buffer #1.
3. Display date and time in data table.
4. The number of data field is "4".

2. Instructions



5. The properties in four fields as the following：



The steps above will create a [Historical Data Table] object. The HMI will read the historical data recorded in logging buffers #1 and display its content on the screen. See Figure 142.

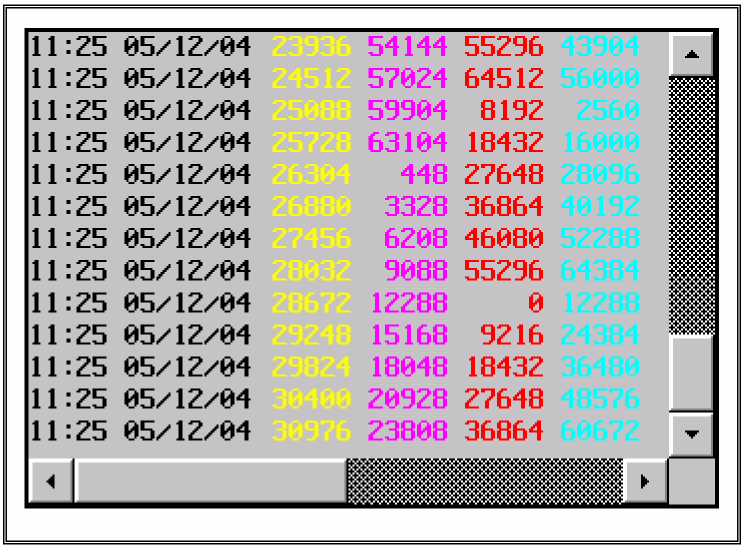


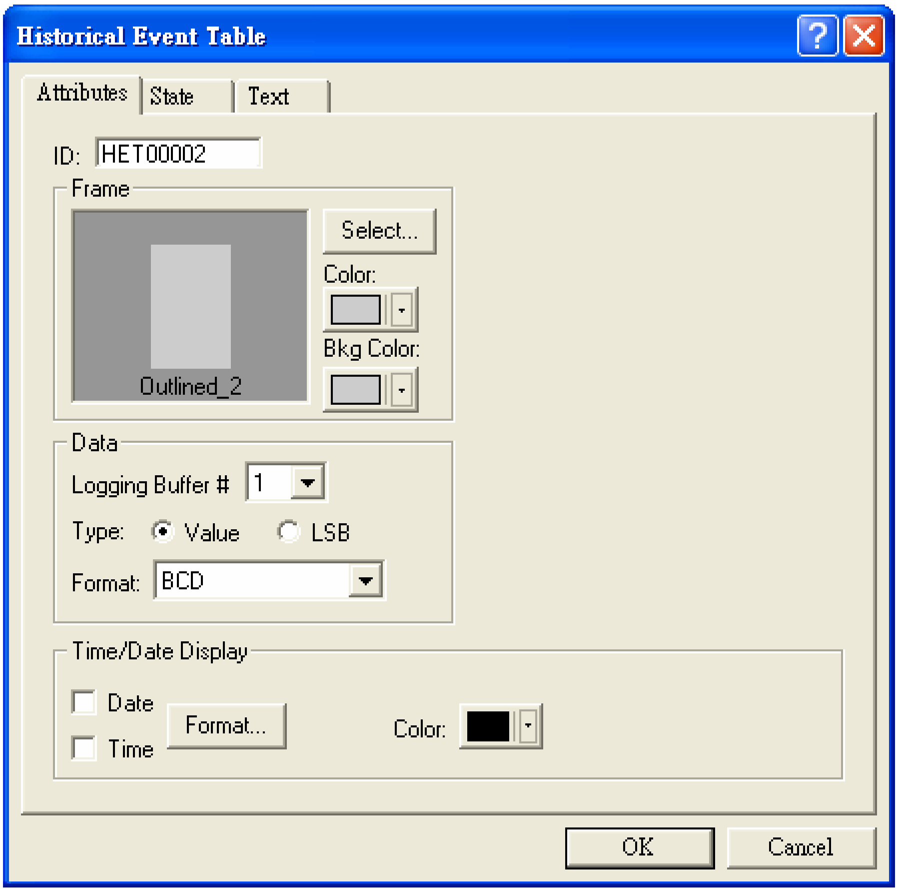
Figure 142. The [Historical Data Table] object

2.7.16.3. [Historical Event Table]

I. Function

The HMI may set a fixed sampling period or the PLC may as well initiate a data read from the specified registers or the related bits in LSB. Thereafter, the data is converted into pre-defined message text(s) and then displays line-by-line on the HMI.

II. Properties



- [Data] Block：
  - ♦ [Logging Buffer #]：Specify the number of the logging buffer where the historical data is stored, numbered 1 to 12.
  - ♦ [Type]：
    - [Value]: 256 states in all (0-255), 0 represents state 0; 1 represents state 1…etc.
    - [LSB]: 16 states in all, the HMI takes the bit number of the least bit that is ON as the state number.
  - ♦ [Format]: Only applicable on [Value], there are [BCD], [Signed Binary], [Unsigned Binary], [Signed Binary] three options.

For the properties which are not explained in this Section, please refer to Section 2.7.16.1. [Historical Trend Graph] and Section 2.7. Object III Specify Object Properties.

2.7.17. [Alarm Display]

There are four types of [Alarm Display] in its sub-menu：[Alarm History], [Active Alarm List],[Alarm Frequency Table] and [Alarm Marquee].

To use objects obove, a user must set up the address of alarm block and its parameters. The HMI reads the value stored in PLC and displays its corresponding messages, it's up to 512 messages can be set.

Note that this feature is only applicable on some models, please refer to Appendix A. - Table of the ADP 6.0 Features and HMI Models.

Alarm Setup:

Select [Application]/[Alarm Setup], its dialog box will appear as the following. See Figure 143.

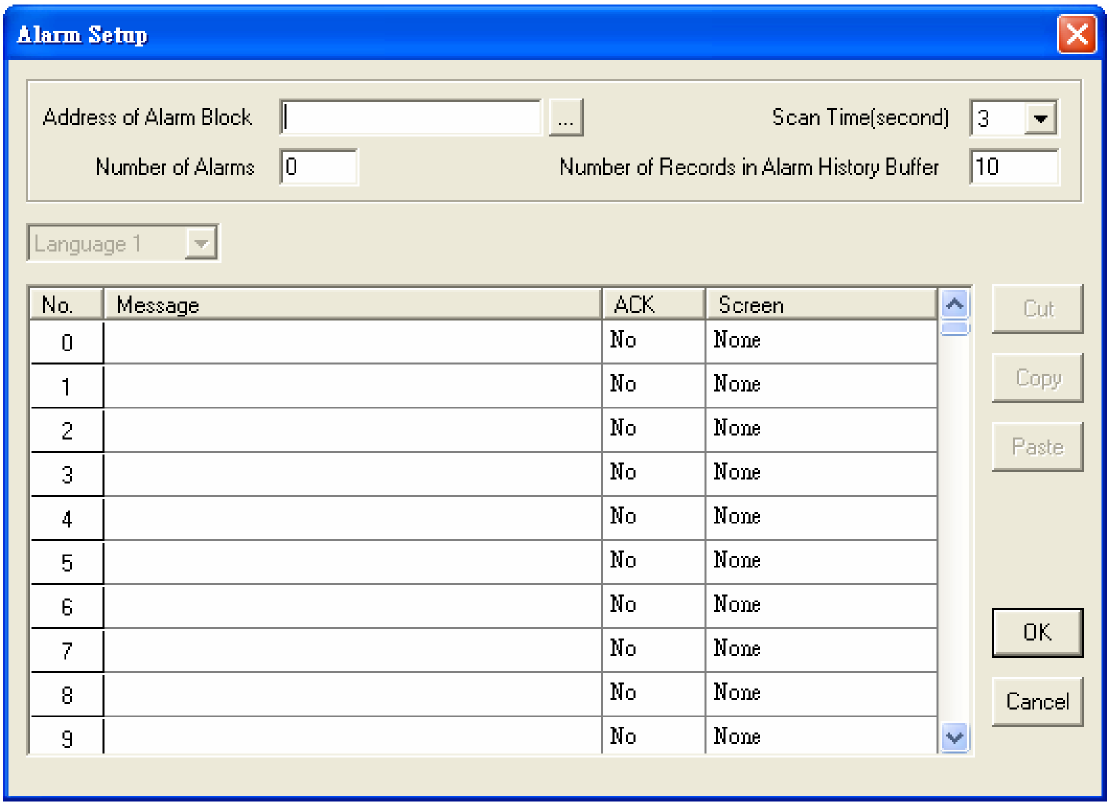


Figure 143. The [Alarm Setup] Dialog Box

- [Address of Alarm]：To use a bit (LSB) as a corresponding alarm address. If D130 is the starting position and the number of alarm is set 160; the HMI will monitor 160 bits = 10 words and this corresponds to D130, D131, and D132……D139. When bit D130 turns on, the HMI will sample and record an alarm message. It's up to 512 alarm messages can be set.

- [Number of Alarms]：Specify the number of alarms.

- [Scan Time(Second)]：Specify the sampling time to monitor the PLC data, 1~10 second(s).

- [Number of Records in Alarm History]：Specify the maximum number of event stored in the alarm buffer. For example 100 means the 101st alarm event happens the 1st alarm message will be overwritten.

- Table：

  - ♦ [Message] Column：Enter the text to the alarm message. The format can be modified in its dialog box.
  - ♦ [ACK] Column：Acknowlege the message which has received to conceal the alarm.
  - ♦ [Screen] Colum：Specify the screen to display when the alarm occurs.

After the setup compeleted, there are four types of [Alarm Display] objects below：

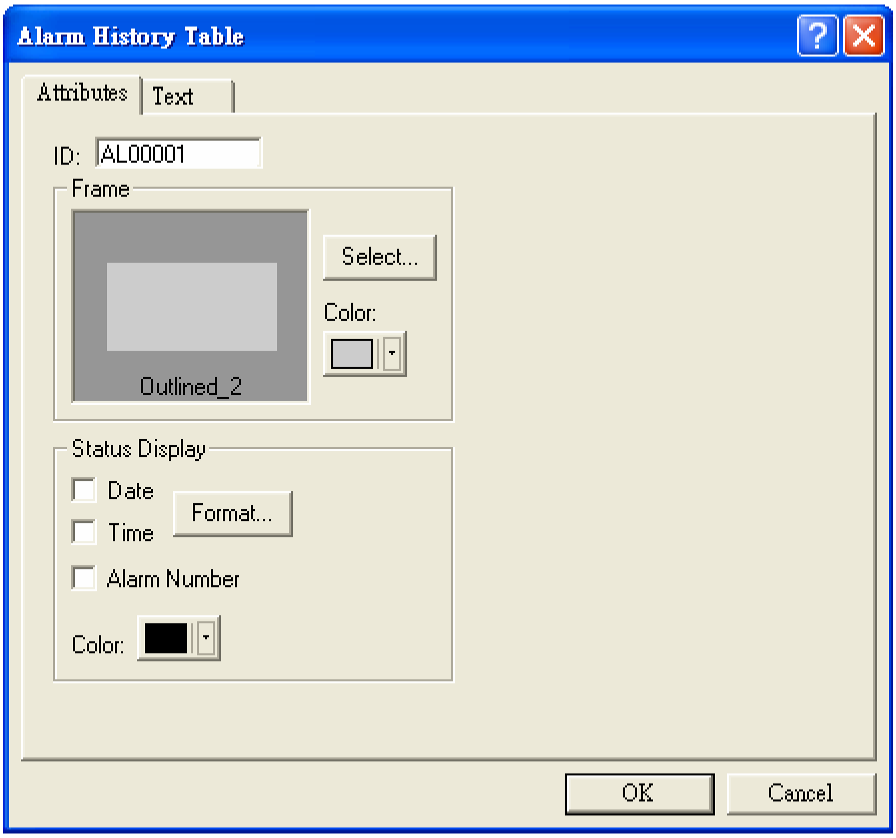
2.7.17.1. [Alarm History Table]

I. Function

The HMI reads the reference bits in the PLC with fixed period and then activates the corresponding alarm massages. Thereafter, this command enables the HMI to show its alarm history in the sequence as an [Alarm History Table].

II. Properties

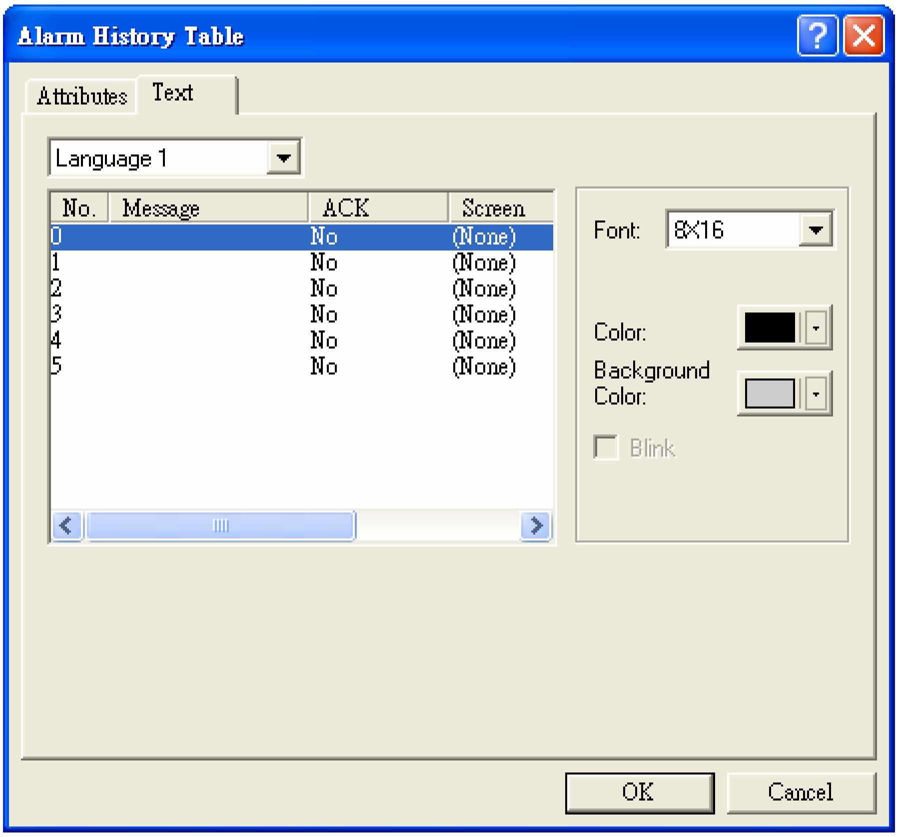
[Attributes] Tab



- [Status Display] Block ：
  - ♦ [Date] and [Time]：Check this box to display the date and time and select the [Format] button to specify its format.
  - ♦ [Alarm Number]：Check this box to display alarm number.
  - ♦ [Color]：Specify the color of the message.

[Text] Tab

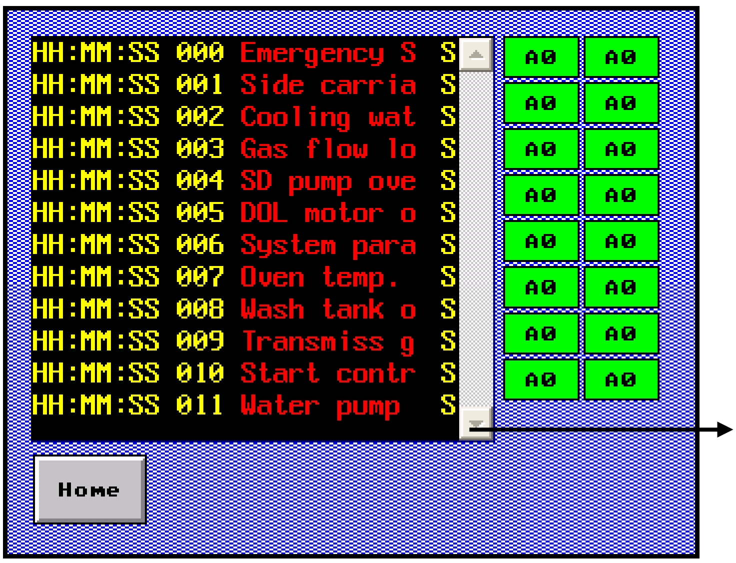
2. Instructions



On this tab, it enables a user to setup the [Font], [Color] and [Bkg. Color] for alarm messages.

III. Example

To design an [Alarm History Table] object as the following：



[Alarm History Table] Object

一. **Alarm Setup：**

1. Select [Application]/[[Alarm Setup], its dialog box will appear as in Figure 144.

2. Specify [Alarm of Alarm Block] “@230” and ‘16’ alarms; the maximum number of records is limited to ‘100’.

3. The scan time is set ‘1’ second to sample the PLC data.

4. Enter the text in message block, select if acknowledge the alarm and screen to display.

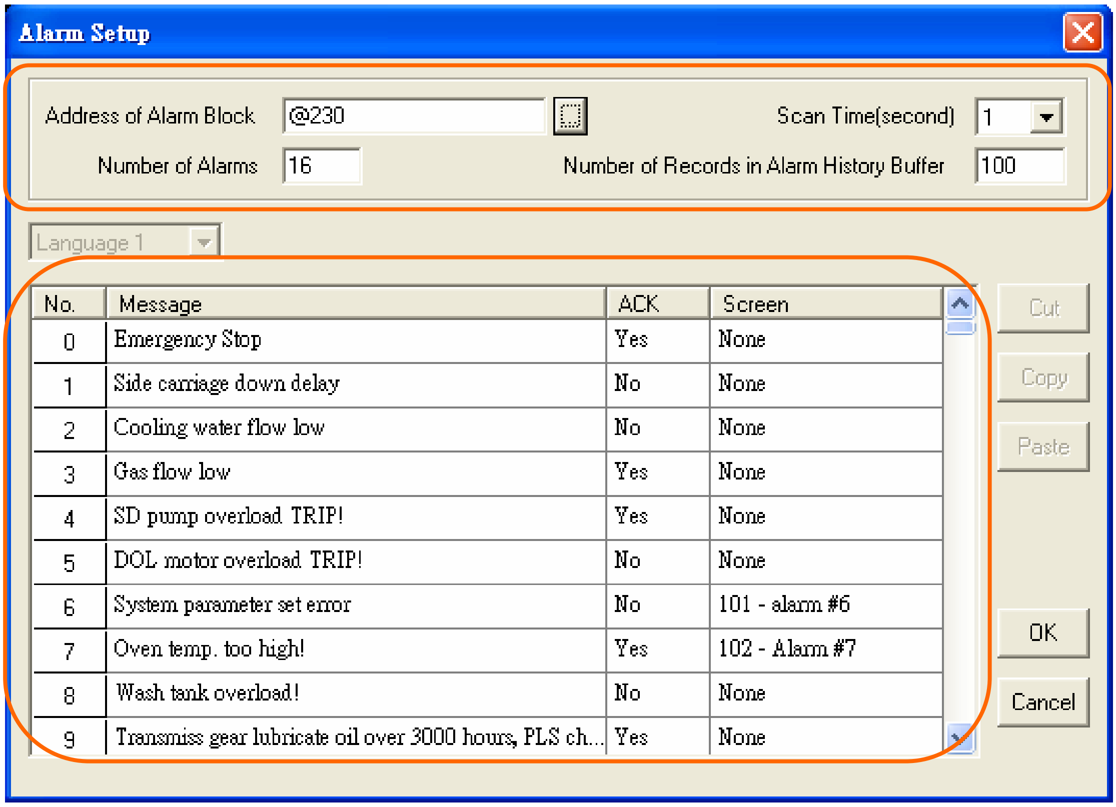


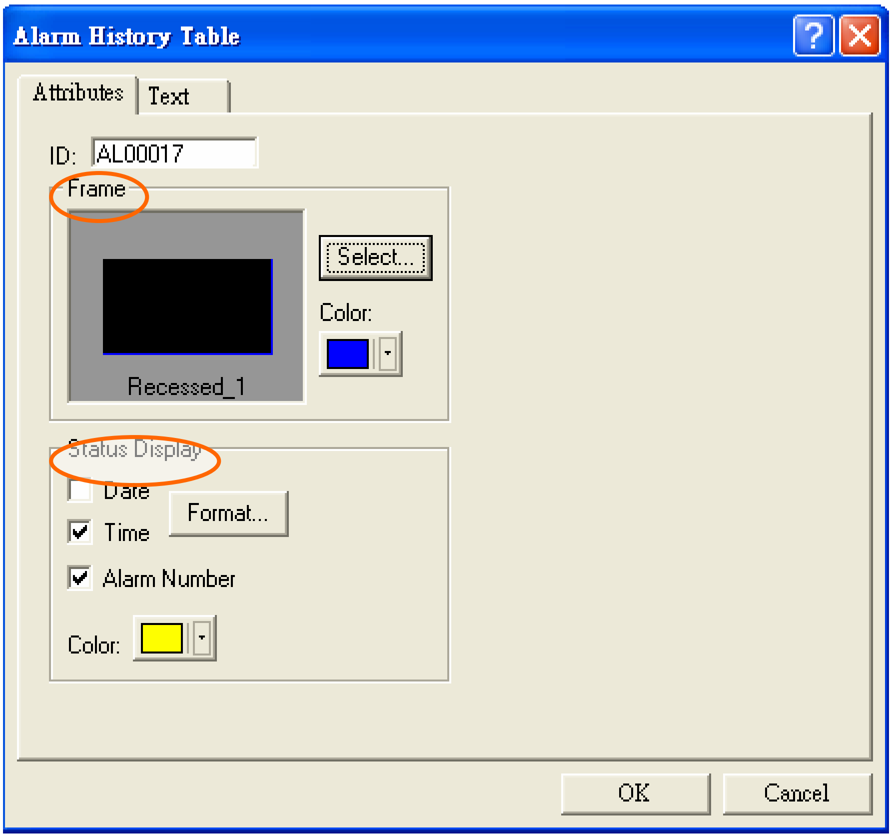
Figure 144. An Illustration of [Alarm Setup] dialog box

二. Setup the properties：

1. Frame：Select “Recessed_1”；Color：Blue.

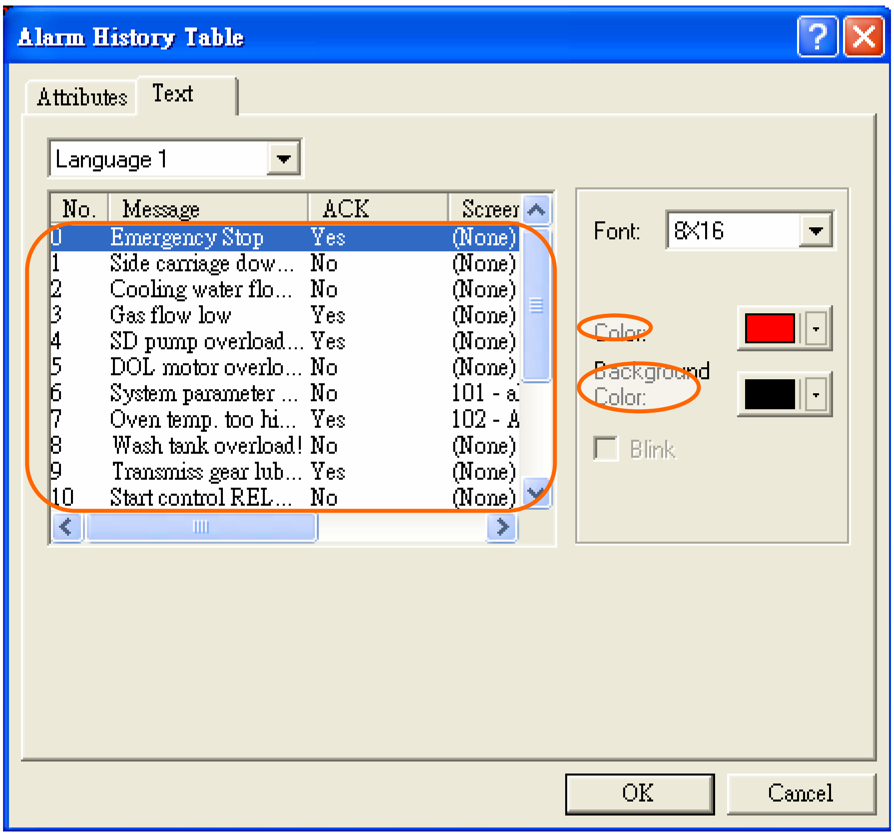
2. Display time and alarm number state; the color is “yellow”.

2. Instructions



3. Note that the message, ack, screen which set in the [Alarm Setup] dialog box will show on the [Text] tab.

4. The message color is “red”; the bkg. color is “black”.



The steps above will create a [Alarm History Table] object; See Figure 145. This example uses 16 On/Off buttons to send the alarm message.The HMI will read the reference bits in the PLC at fixed period; then convert the data into its corresponding messages in sequence and display on the screen.

Note that the alarm state “A” represents activate; “C” represents clear.

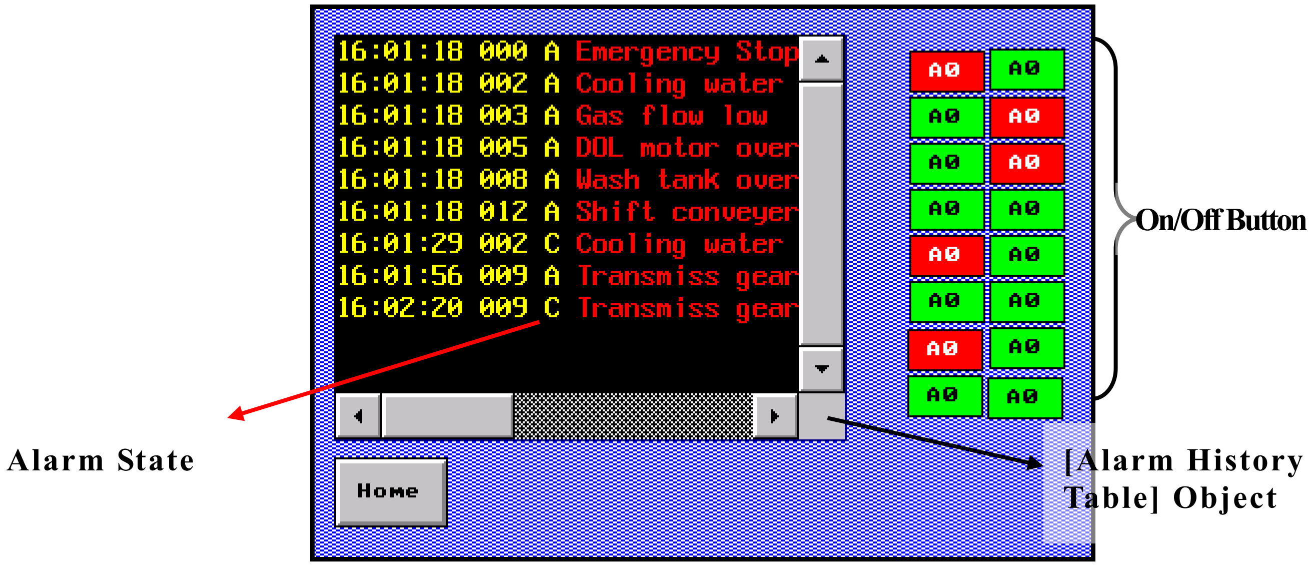


Figure 145. The [Alarm History Table] object

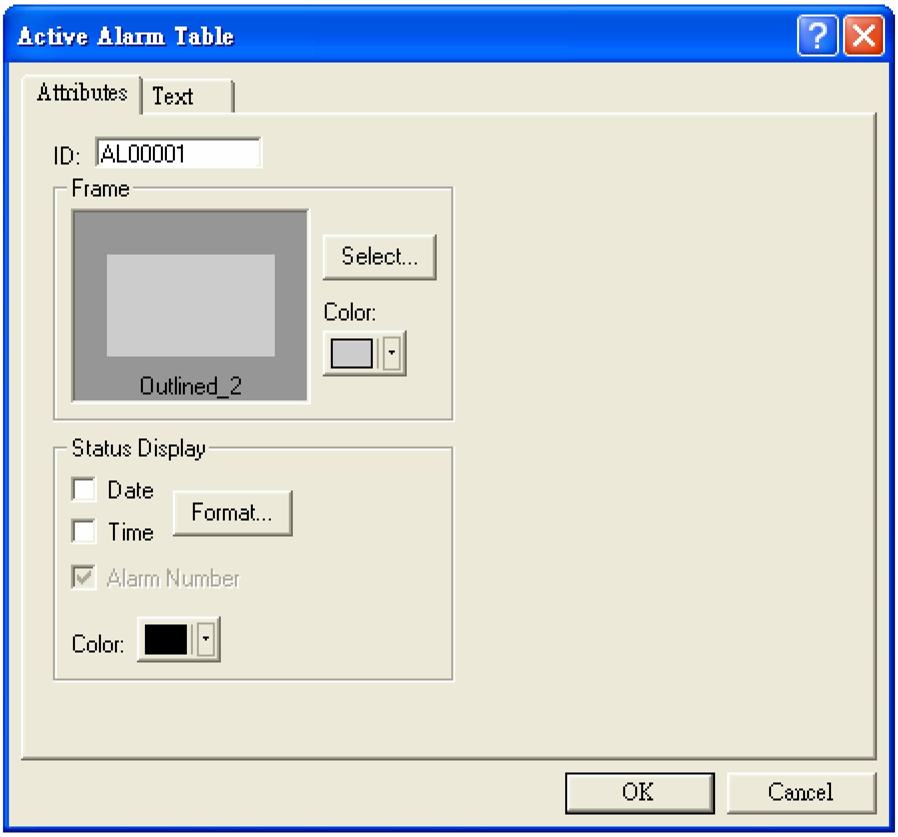
2.7.17.2. [Active Alarm List]

I. Function

The HMI displays only the active alarms that its refernce bit in PLC = ON and sort the data according to the order of the state number.

II. Properties

2. Instructions



All the properties are the same as [Alarm History Table] object, please refer to Section 2.7.17.1. [Alarm History Table] .

III. Example

The steps to create an [Active Alarm Table] object are the same as an [Alarm History Table] object. A user must complete the alarm setup first, and then specify its properties. Pleaser refer to Section 2.7.17.1. [Alarm History Table].

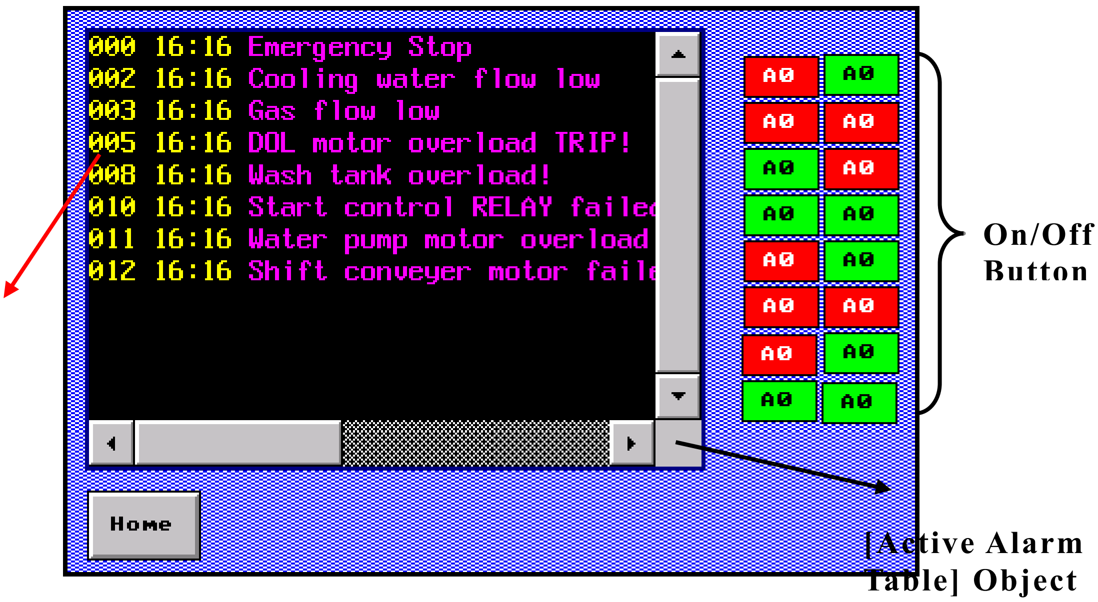


Figure 146.   The [Active Alarm Table] Object

The steps above will create a [Active Alarm Table] object as in Figure 146. This example also uses 16 On/Off button to start the alarm messages. The HMI displays only the active alarms that its refernce bit in PLC = ON and sort the data according to the order of the state number.

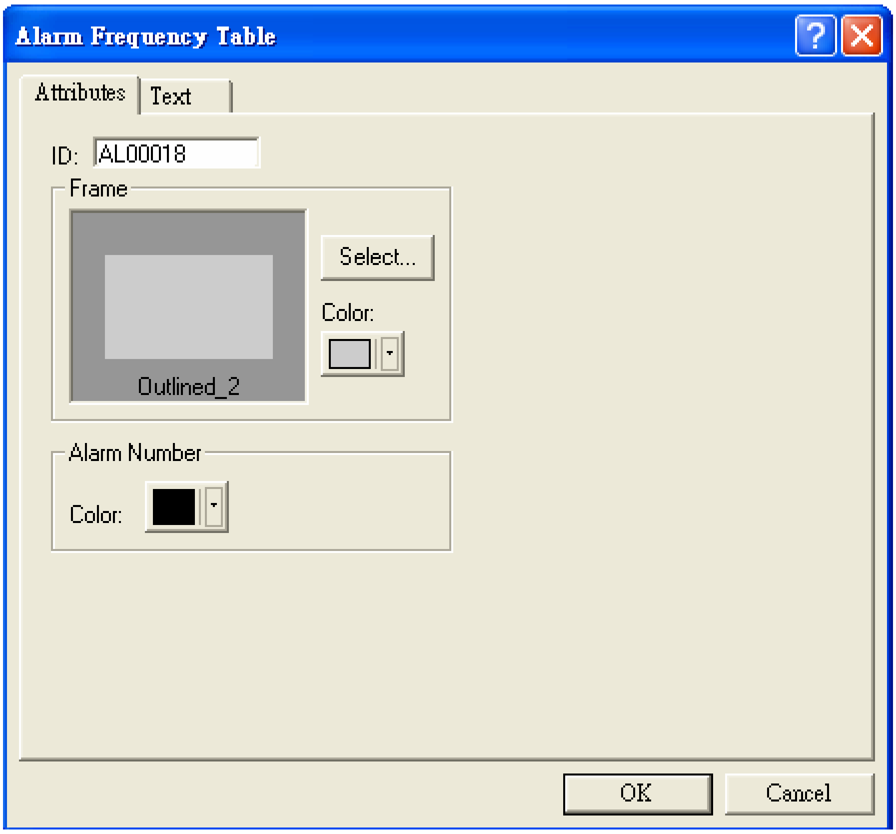
2.7.17.3. [Alarm Frequency Table]

I. Function

The HMI summarizes the number of occurrence of each alarm which be monitored and display on the screen.

.

II. Properties



The properties are the same as [Alarm Frequency Table] object, please refer to Section 2.7.17.1. [Alarm History Table].

III. Example

The steps to create an [Alarm Frequency Table] object are the same as an [Alarm History Table] object. A user must complete the alarm setup first, and then specify its properties; please refer to Section 2.7.17.1. [Alarm History Table].

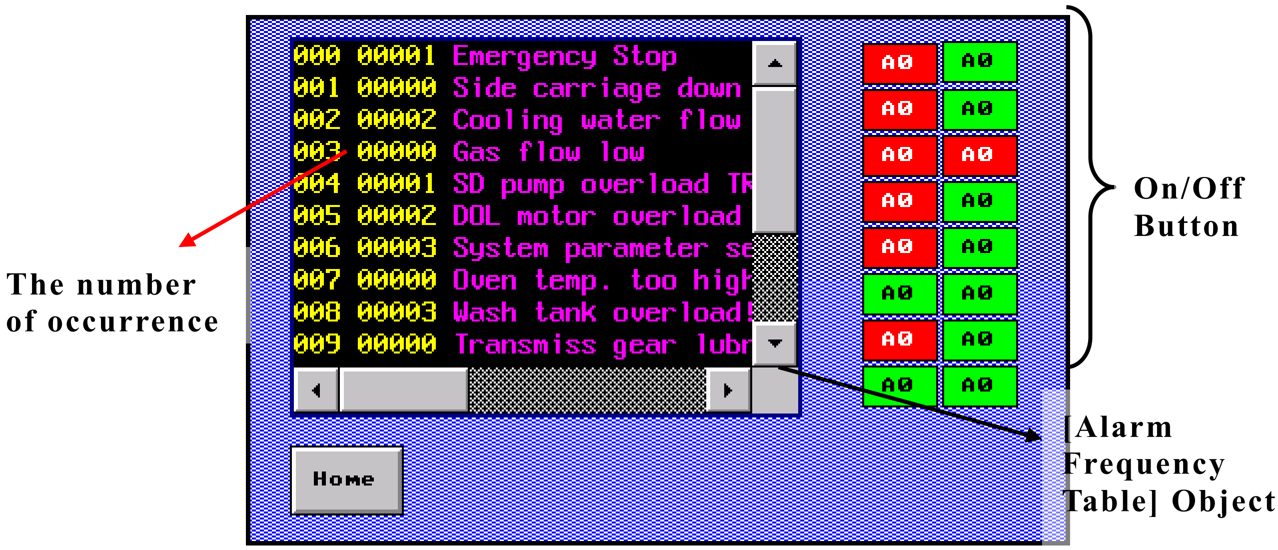


Figure 147. The [Alarm Frequency Table] Object

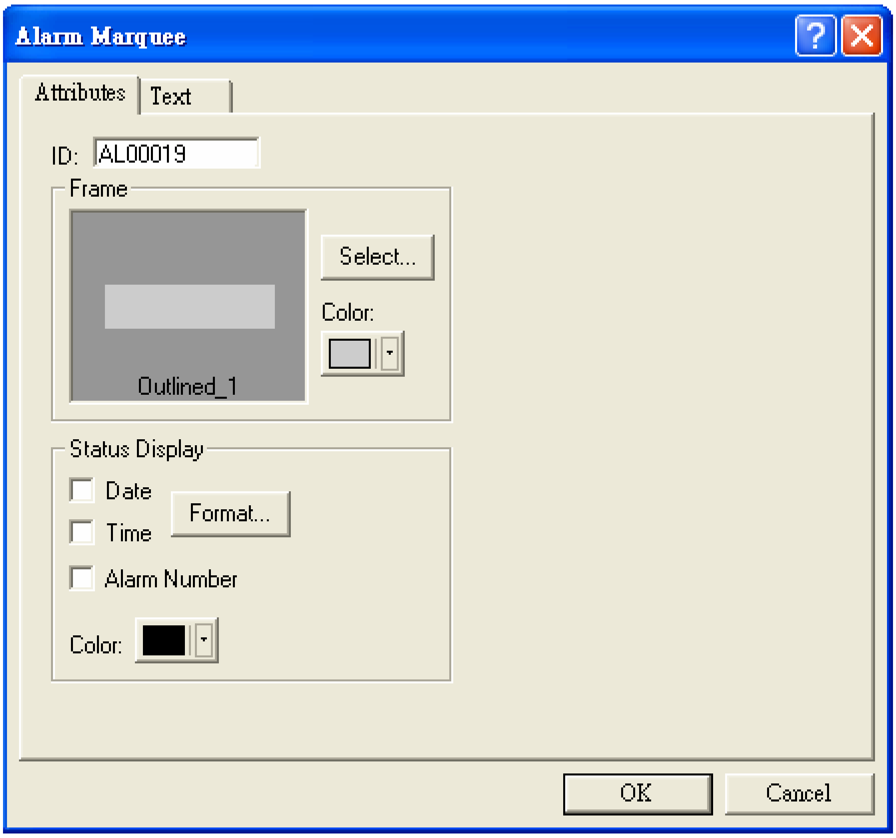
The steps above will create a [Alarm Frequency Table] object as in Figure 147. This example also uses 16 On/Off button to start the alarm message. The HMI will display the number of occurrence of each alarm on the screen.

2.7.17.4. [Alarm Marquee]

I. Function

The HMI displays alarm messages of the active alarms as a moving sign.

II. Properties



The properties are the same as [Alarm History Table] object, please refer to Section 2.7.17.1. [Alarm History Table].

III. Example

The steps to create an [Alarm Marquee] object are the same as an [Alarm History table] object. A user must complete the alarm setup first, and then specify its properties; pleaser refer to Section 2.7.17.1. [Alarm History Table].

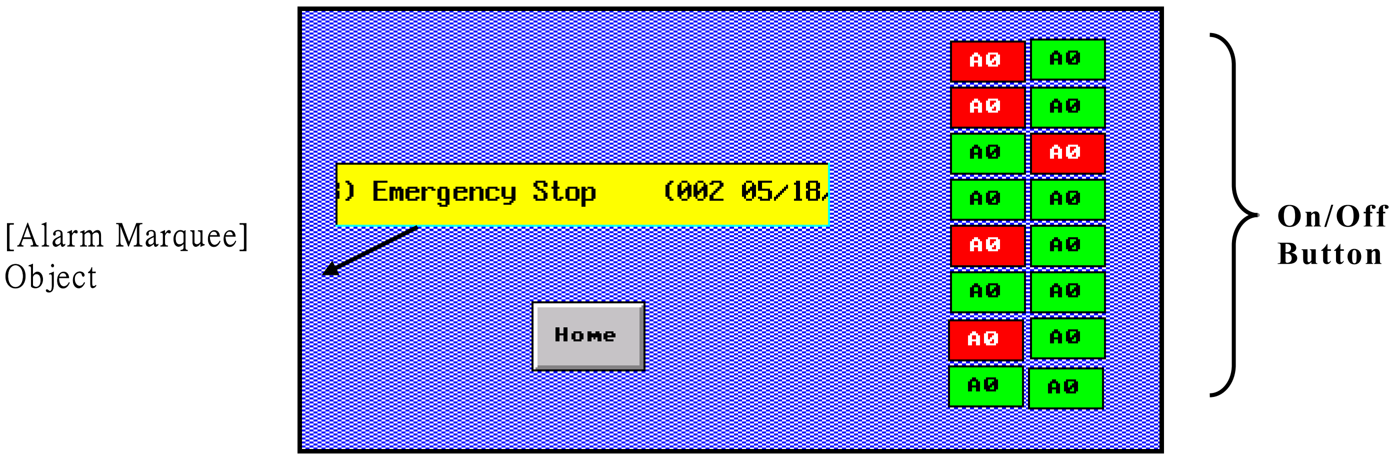


Figure 148. The [Alarm Marquee] Object

The steps above will create an [Alarm Marquee] object as in Figure 148. This example also uses 16 On/Off buttons to start the alarm message. The HMI displays the message of active alarms as a continual moving sign on the screen.

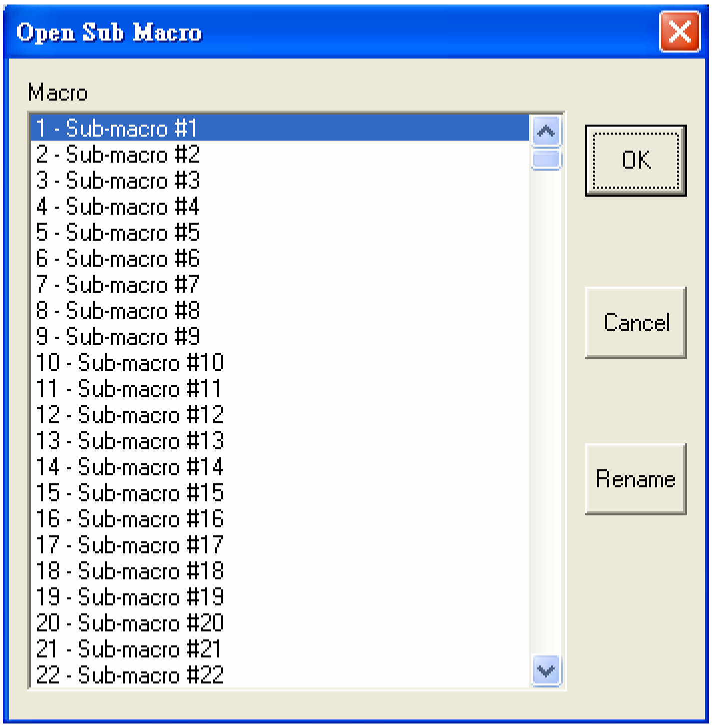
2.7.18. Sub-macro

I. Function

[Sub-macro] is the macro's sub-application. The main function is to call commands directly. Some common functions or operation commands which are used frequently can be edited and saved in [Sub-macro] for call commands.

II. Properties

There are 512 options in [Sub-macro], please refer to Chapter 8 Macro for the complete details.



III. Example

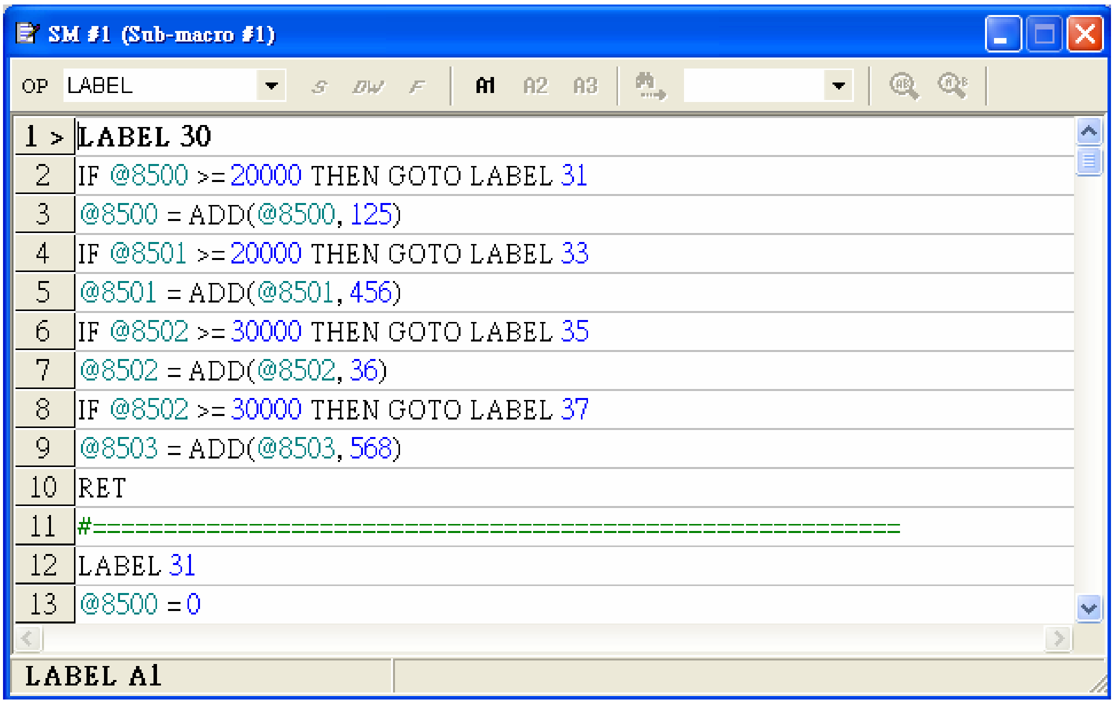


Figure 149. An example of the [Sub-screen] edit screen

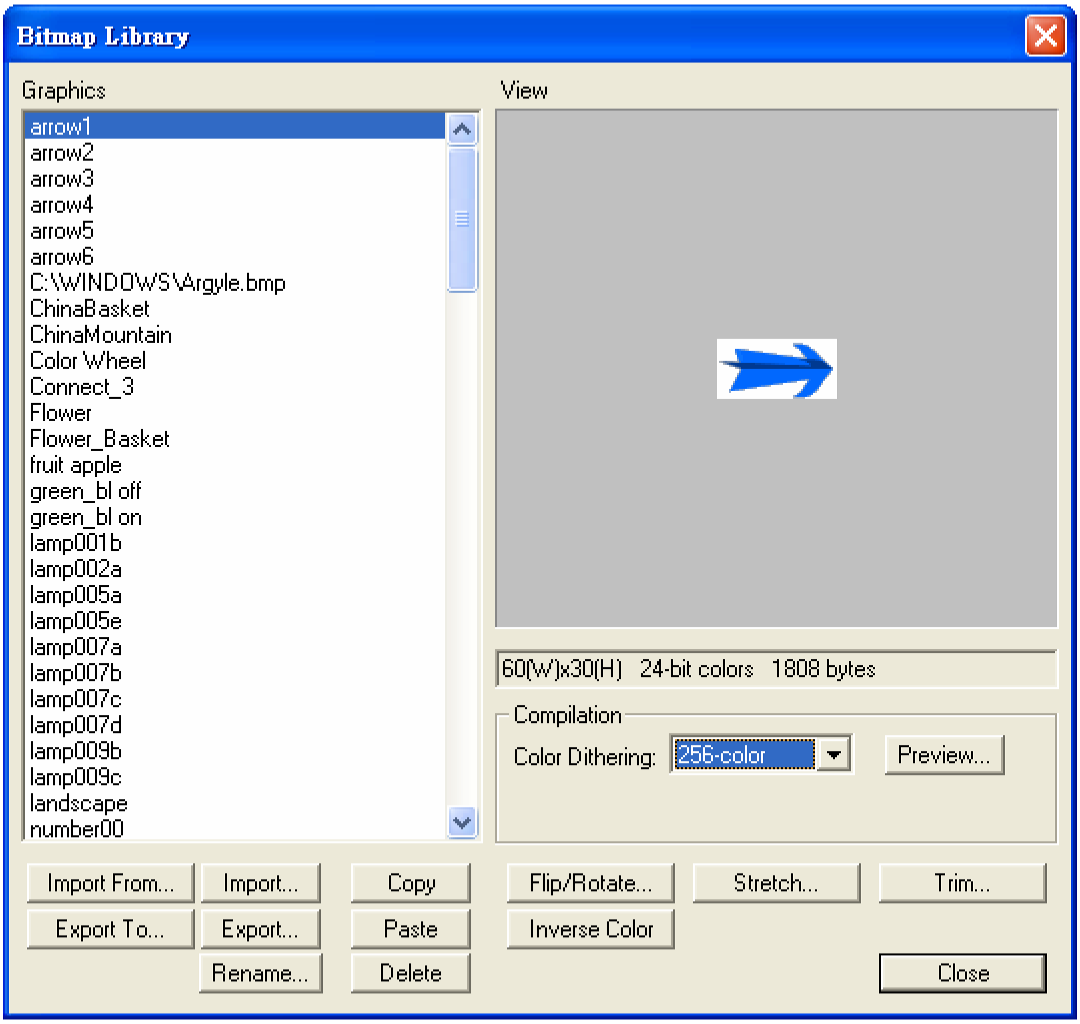
2.8. Library

There are five commands in [Library] menu：They are [Bitmap Library], [Save as Shape], [Shape Library Manager] and [Text Pool]. The main function is to edit, import and export the bitmaps, shapes, fonts or text pool.

2.8.1. [Bitmap Library]

[Bitmap Library] is mainly to import, export and edit the bitmaps.

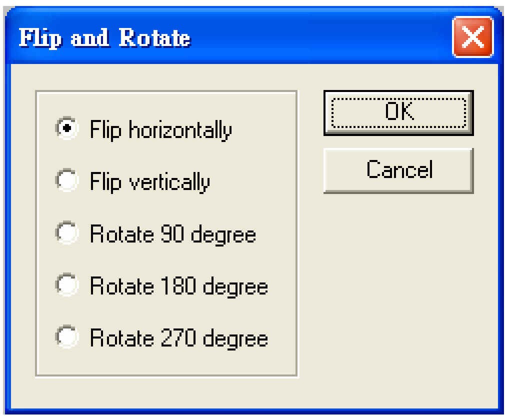
Select [Library]/[Bitmap Library], the dialog box will be as the following.



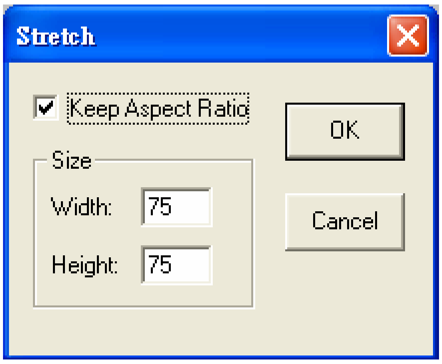
- [Graphics]：List all of the graphics for selection.
- [View]：Display the specified graphic to view.
- [Compilation] Block：
  - ♦ [Color Dithering]：Process the graphic (16-bit, 24-bit or JPEG) to display the image vividly as the original one on the screen.

There are [8-color],[16-color] and [256-color] options, The higher color is selected , the higher contrast of the figure will be displayed.

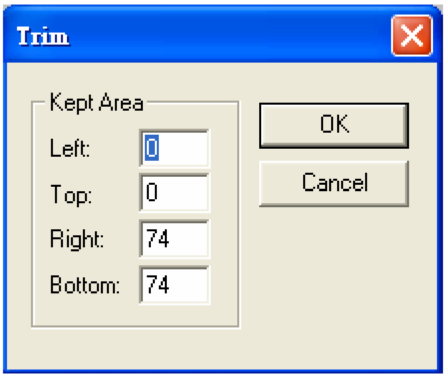
- [Import from]：Allows user to import bitmap(s) from a selected library *.GBF or *.GIF graphics.
- [Export to]：Allows user to export bitmap(s) to a selected library *.GBF.
- [Import]：Import the graphic into bitmap library from computer. The importable formats of graphics include Bitmap Image (*.BMP), Jpeg Image Files (*.JPG), AutoCad Files (*.DWG), AutoCad Files (*.DXF), PWS bit mapped graphic (*.BMG) and GIF Files (*.GIF).
- [Export]：Export the graphic stored in bitmap library to computer.
- [Rename]：Modify the name of the graphic.
- [Copy]：Select to export selected bitmap to the clipboard.
- [Paste]：Select to import a bitmap from the clipboard. When pressed, a dialog box will appear and ask name for the imported graphic.
- [Delete]：Select to delete selected bitmap.
- [Flip and Rotate]：Allow a user to change a bitmap's orientation. When pressed, the dialog box will appear and flip or rotate degree options are available as the following.



- [Inverse Color]：Invert a bitmap's colors.
- [Scretch]：Adjust the width and height of a bitmap.



- [Trim]：Allows user to cut unused area around a bitmap.



2.8.2. [Font Library]

[Font Library] supports all windows fonts; it enables a user to define up 16 types. A user can define the fonts of their own choice to design a more attractive interface. See below.

Select [Library]/[Font Library], its dialog box will be as in Figure 150 shown on the screen.

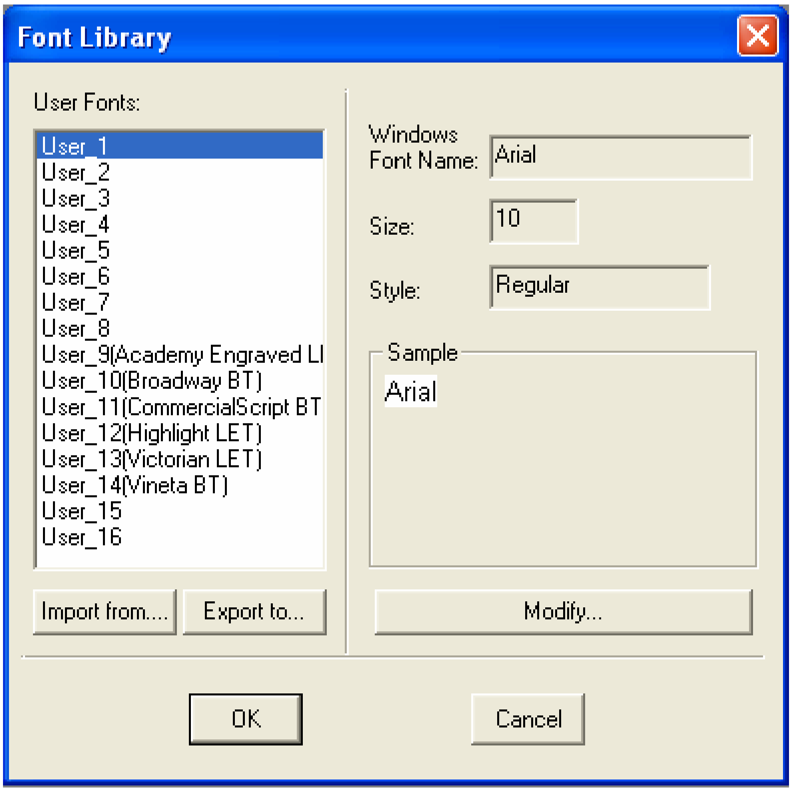
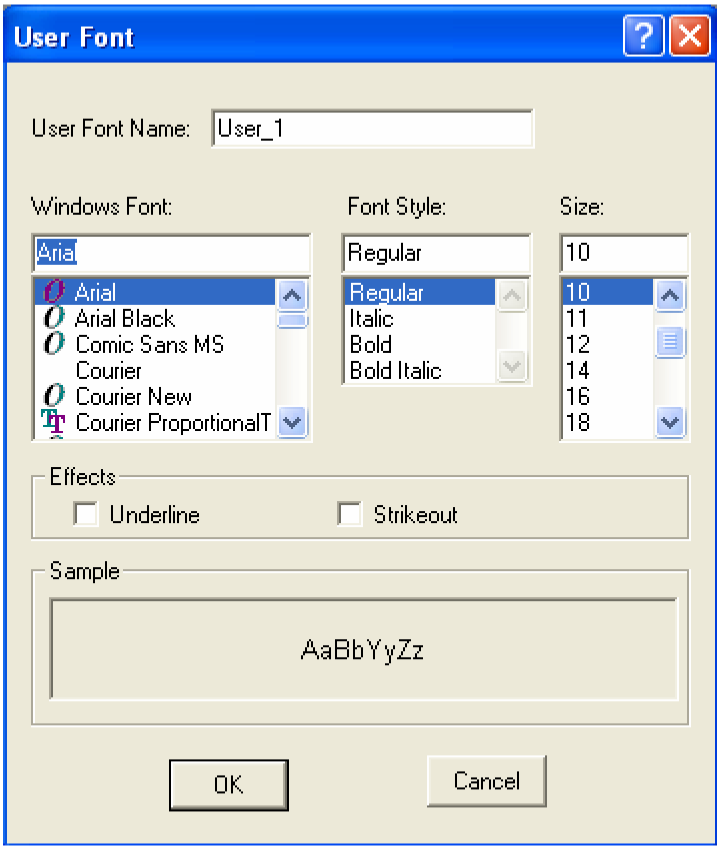


Figure 150. The [Font Library] Dialog Box

- [Import from]：Select to import fonts into font library.
- [Export to]：Select to export fonts to font library.
- [Modify]：Modify the format of selected font. When pressed, the ddailog box will appear as the following.



2.8.3. [Save as Shape]

This command allows the user to save shape(s) to a file. A shape must be selected before the user can save the shape. Multiple shapes may be selected simultaneously.

The function of [Save as Shape] is to save the basic objects (ex. Line, Rctangle, Ellipse, Circle, Polygon, Pie, Freeform, Arc, Scale…etc) or multiple shapes in [Library]. See Figure 151.

Select [Library]/[Save as Shape], the dialog box will be as the following. A user can select the library from the drop-down list to save and name for shape in [Shape Name] block.

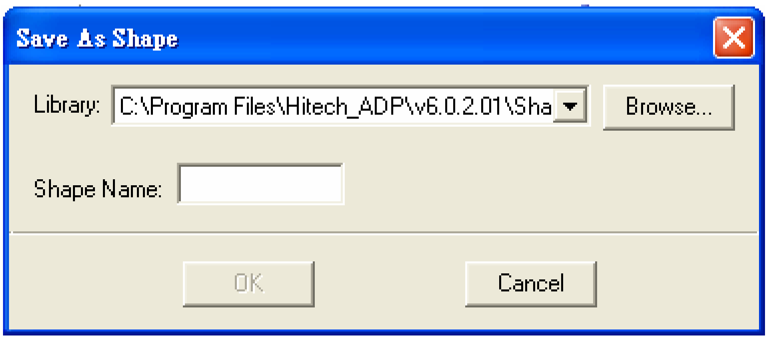


Figure 151. The [Save as Shape] Dialog Box

2.8.4. [Shape Library Manager]

The function of [Shape Library Manager] is mainly to build a entire attributes management.

Select [Library]/[Shape Library Manager], the dialog box will be as the following. See Figure 152.

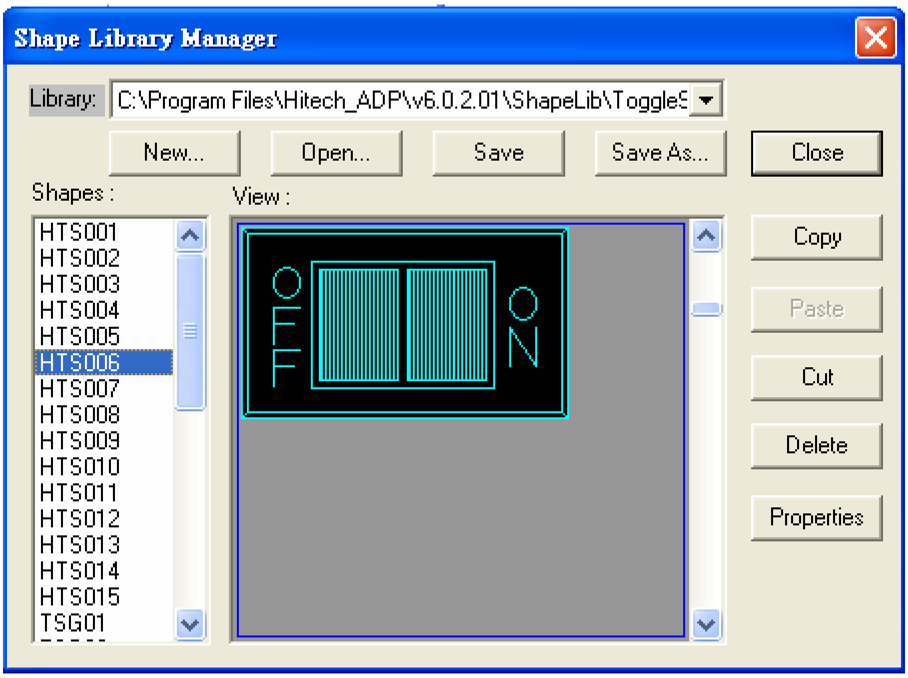
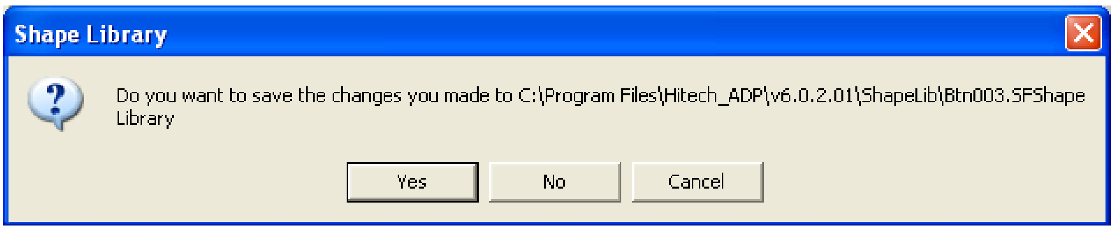


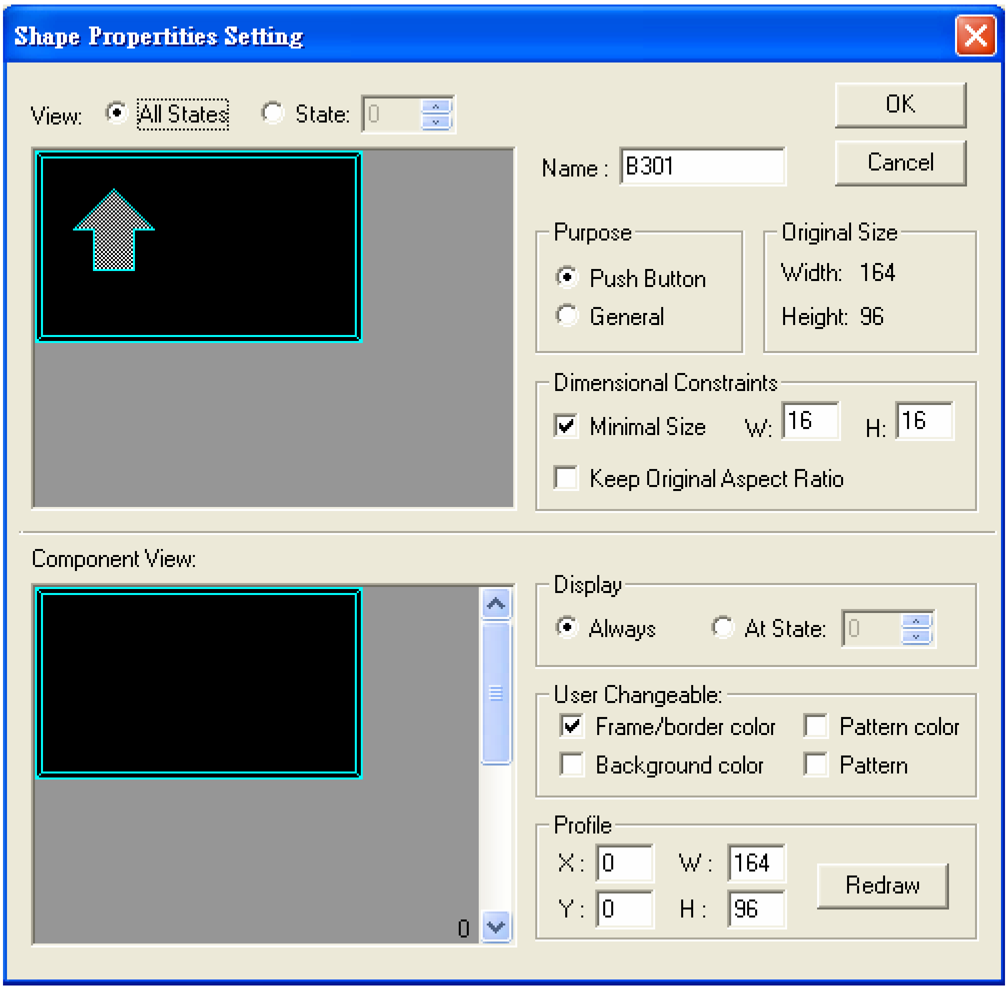
Figure 152. The [Shape Library Manager] Dialog Box

- [New]：Create a new shape library.
- [Open]：Open an existing shape library.
- [Save]: Saves the active shape library to a file.
- [Save As]: Allows user to choose which file to save to.
- [Close]: Select to close the [Shape Library Manager]. If the changes have not been saved, the dialog box will ask for save



- [Copy]: Copy selected shape to clipboard.
- [Paste]: Import the shape from the clipboard.
- [Cut]: Moves selected shape to clipboard.

- [Delete]: Deletes selected shape.
- [Properties]: Click to display the properties of the selected shape. See the following figure.



♦ [View]：Display the shape to view.

- [All States]：Select to view all states of selected shape.
- [State] option：Select to view individual states of selected shape.

♦ [Name]：Specify the name of selected shape.

♦ [Purpose]：The function of the selected shape, there are [Push Button] and [Genernal] options.

♦ [Oringnal Size]：Display the width and height of original shape.

♦ [Minimal Size]：Specify the minimal width and height of selected shape.

♦ [Keep Original Aspect Ratio]：Select this option to keep the the size of shape in original ratio.

♦ [Display]：Show the shape used in States, there are [Always] and [At State] options.

- [User Changeable]：Select changeable shape to change its properties including frame/border color, background color, pattern color and pattern.
- [Profile]：Secify the position of the component object and display the specified view here.

2.8.5. [Tex Pool]

The function of [Text Pool] is mainly to manage and edit the texts used in application file commonly.

Select [Library]/[Text Pool], the dialog box enables a user to edit and manage the texts. See Figure 153.

Step:

1. Enter the desired texts in the [Text Pool] dialog box to save in. See below.

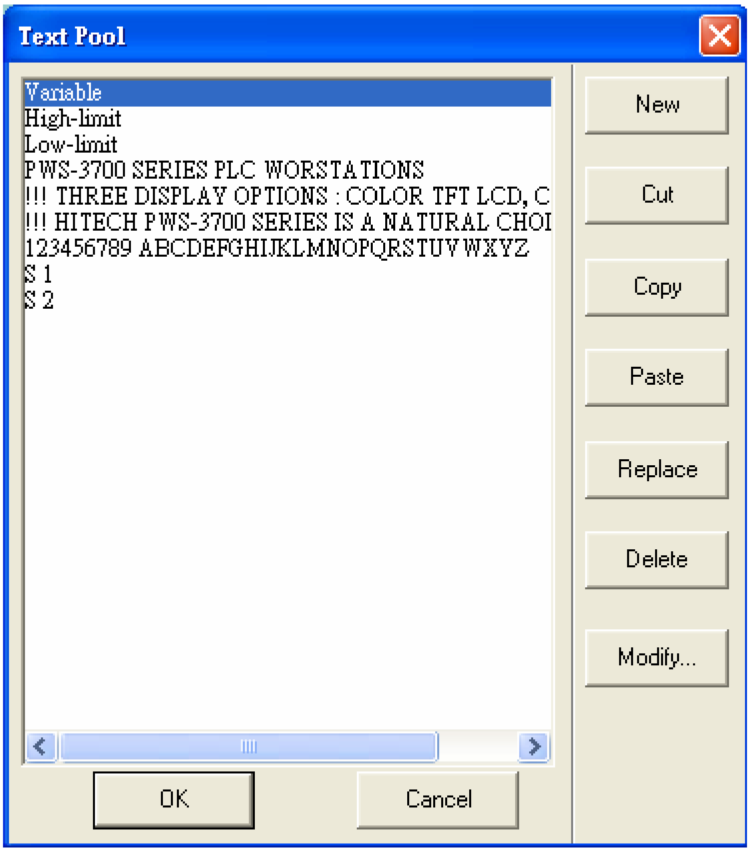


Figure 153. The [Text Pool] Dialog Box

2. **Click the object to edit an object which has texts as in [Text Pool],** then select [Edit]/[State and Text Management]. See below.

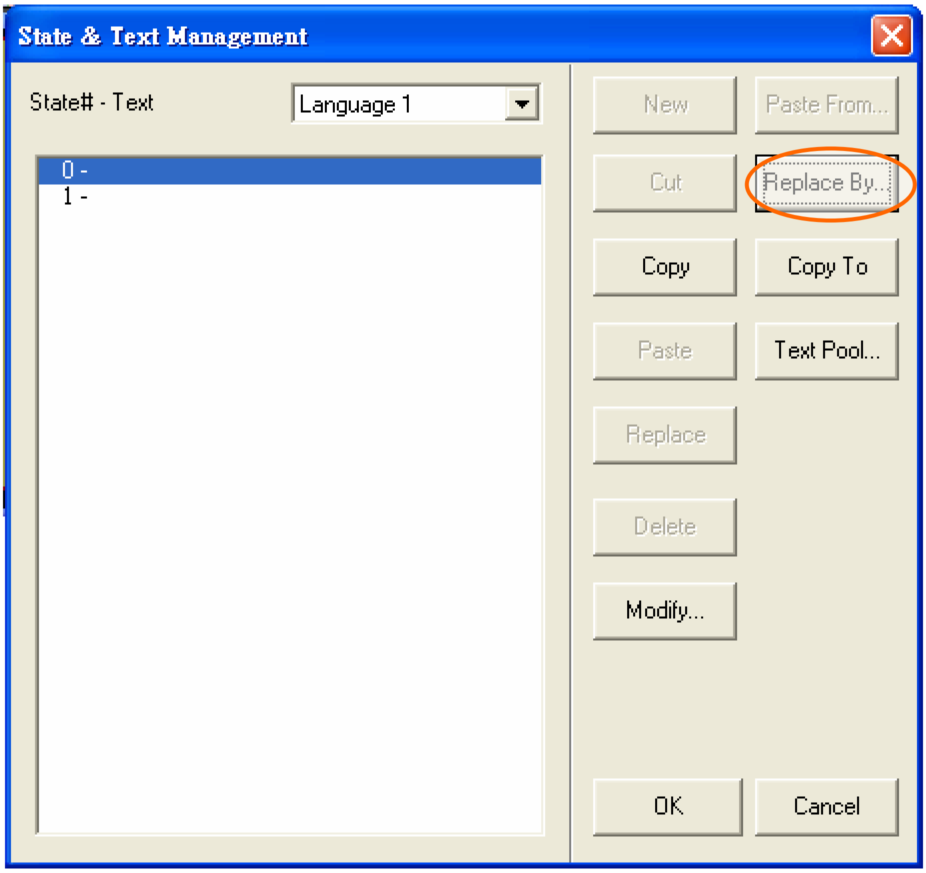
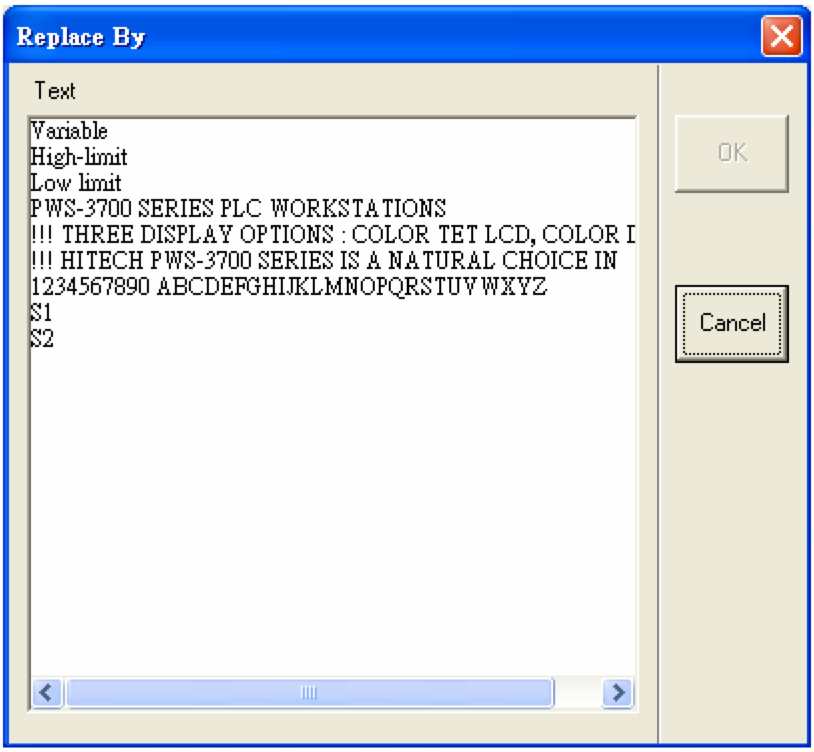
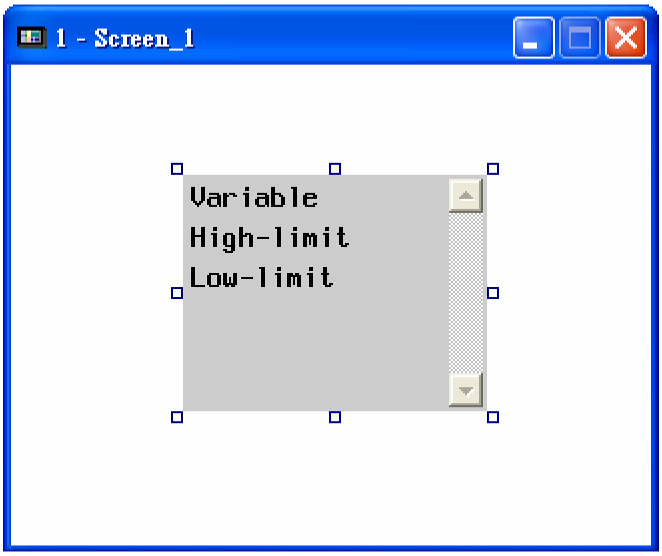


Figure 154. The [State & Text Management] Dialog Box

3. In [State & Text Management] dialog box, select [Replace By] to edit. A user can select the desired text which edited in [Text Pool] to display.



4. The following [List] object displays the text which edited in [Text Pool].



2.9. Application

The [Application] menu is a general management area for the Workstation and the software. One can set up the parameters of the configuration for the Workstation such as PLC type, Workstation type, logging buffers and alarm setup. In addition, Compile and Download are also available in this menu.

Select [Appliaction], the menu will be as in Figure 155,

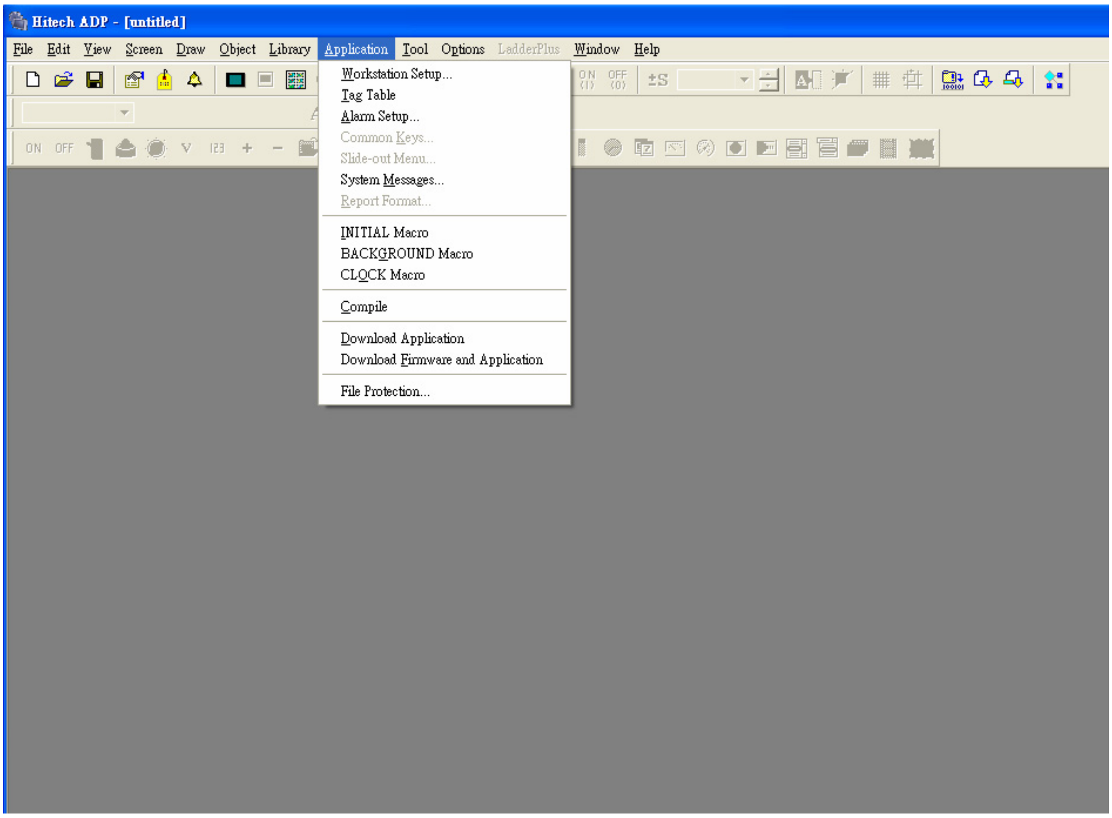


Figure 155. The [Application] Menu

2.9.1. [Workstation Setup] 

[Workstation Setup] is to set up the parameters of the Workstation.

Select [Application]/[Workstation Setup], its dialog box wil be as in Figure 156.

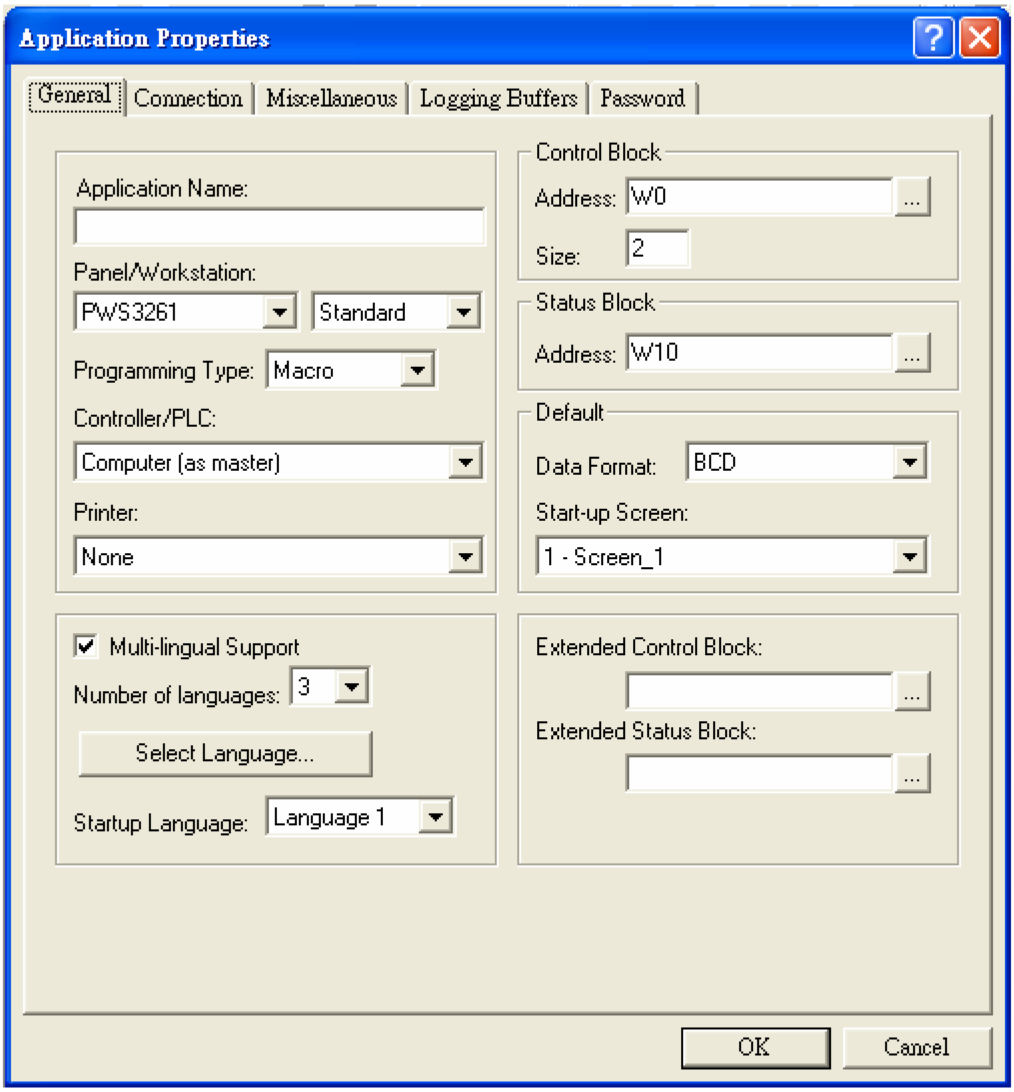


Figure 156. The [Application Properties] Dialog Box

2.9.1.1. [General] Tab

On the [General] tab, a user can set up panel/Workstation, controller/ PLC, startup language and screen, and control block and status block. See Figure 156.

- [Application Name]: Enter the name of the application.
- [Panel/Workstation Type]: Specify the model of Workstation. Note the resolution, size and color while selecting.
- [Programming Type]：Select [Macro] or [Standard].
- [Controller/PLC Type]: Specifies the type of PLC the Work- station will communicate with. ADP 6.0 later, the "ModBus TCP/IP Device" option is available.

- [Printer Type]: Specifies the type of printer the Workstation will print to.

- [Multi-lingual Support]: Check the option to support multi-lingual and specify the startup language. It supports up to 5 languages including “Arabic”, “Chinese Simplified”, “Chinese Tradtional”, “Cyrillic”, “English”, “Greek”, “Japanese”, “Ko-rean”, “Thai”, “Turkish”, and “Western European”. Please refer to 2.4.2. [Language 1] ~ [Language 5] for setup.With this op-tion enabled, you can maintain only one application file for a machine that can support up to 5 languages.

- [Control Block]：Specify the PLC address to control and size, the minimum size is 2 Words, the maximum size is 32 Words (The maximum size is 6 for recipe). The control block enables the PLC to control actions on the Workstation such as change screen, print, send recipes….etc. Please refer to Chapter 4. Control & Status Block for complete details.

- [Status Block]：Specify the starting address for Status Block; the fixed size is 10 Words. The Status Block provides the communication between the Workstation and the PLC. The HMI will write a continuous block of data in. Please refer to Chpater 4. Control & Status Block.

- [Data Format]：Specify the data format to read in.

- [Start-up Screen]：Specify the screen to display once the power is ON.

2.9.1.2. [Connection] Tab

On the [Connection] Tab, it enables a user to add or delete device to connect with and set up the address, connection method or IP. See Figure 157.

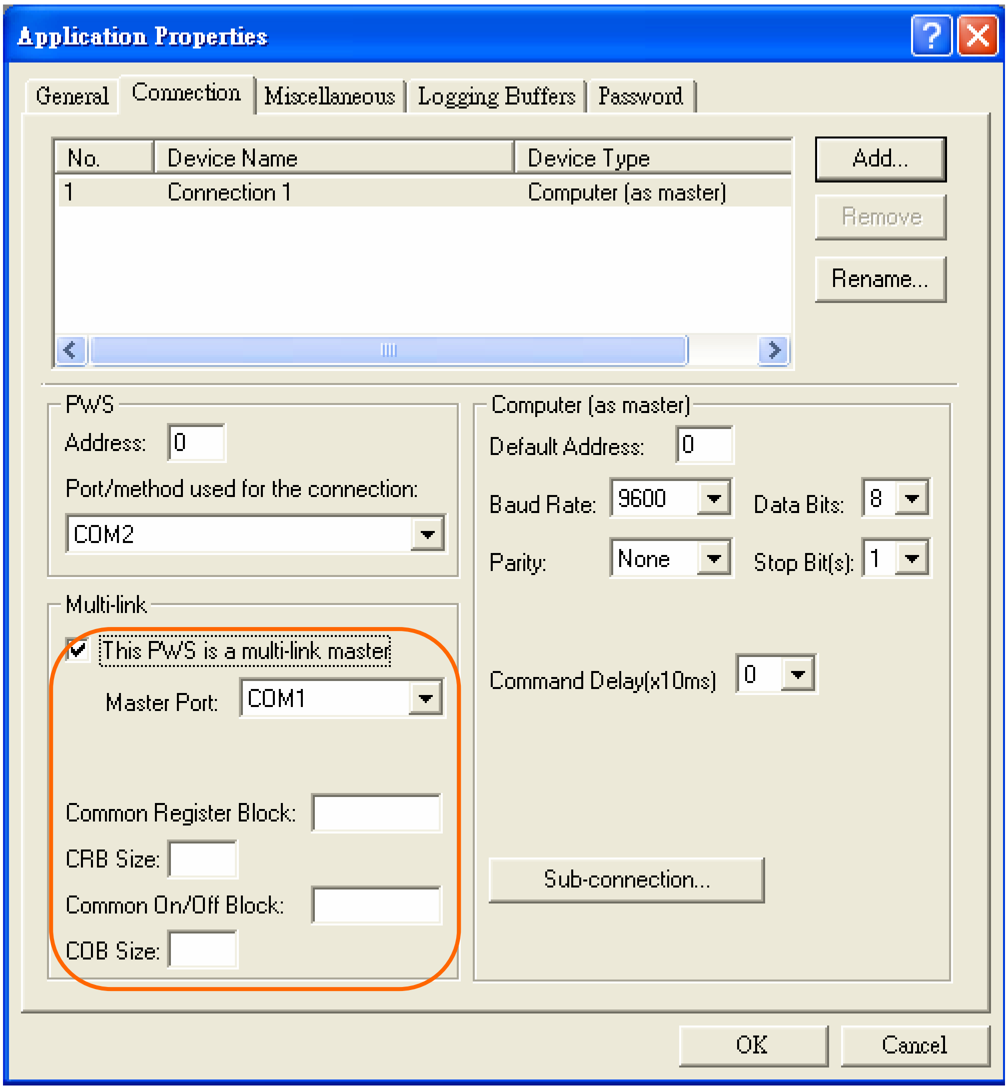


Figure 157. The [Connection] Tab (Multi-link)

- [Add]：Add new device(s) to connect with including Muti-link- select PLC type to connect with. For the steps or methods related to setup, please refer to Chapter 5. Multi-link.
- [Remove]：Remove the connected device, the no. 1 can be removed.
- [Rename]：Modify the device name and type but the device type cannot be modified in No. 1. To modify the device type in No. 1, a user must change it on the [General] tab.
- [PWS] Block：
    - ♦ [Address]：Set up the station of Workstation. Once the multi-link is made, the address can be repeated and the range is 0~255.
    - ♦ [Port/method used for the connection]：Specify the port and method to connect with PLC or other HMI models including

"COM1", "COM2", "Ethernet(Cross-link)","COM1"(Multi-link slave) and"COM2" (Multi-link slave) and Ethernet (Multi-link slave).

The HMIs made multi-link (one master; multi-slave); See Figure 157：

Note that this feature is only applicable on some models, please refer to Appendix A. - Table of the ADP 6.0 Features and HMI Models.

- [Multi-link] Block：Specify a PLC to connect with HMIs.
  - ♦ [This PWS is a multi-link master]：Check this option to specify the PWS as a master.
  - ♦ [Master Port]：Specify the port which connects master with slaves including "COM1", "COM2" and "Ethernet".
  - ♦ [Commom Register Block (CRB)]：Specify the Starting location for the "CRB" which master and slaves use.
  - ♦ [CRB Size]：Specify the size of "CRB".
  - ♦ [Commom On/Off Block (COB)]：Specify the starting location for "COB".
  - ♦ [COB Size]：Specify the size of "COB".

The HMIs made Cross-link (all masters); See Figure 158.

Note that this feature is only applicable on some models; please refer to Appendix A. - Table of the ADP 6.0 Features and HMI Models.

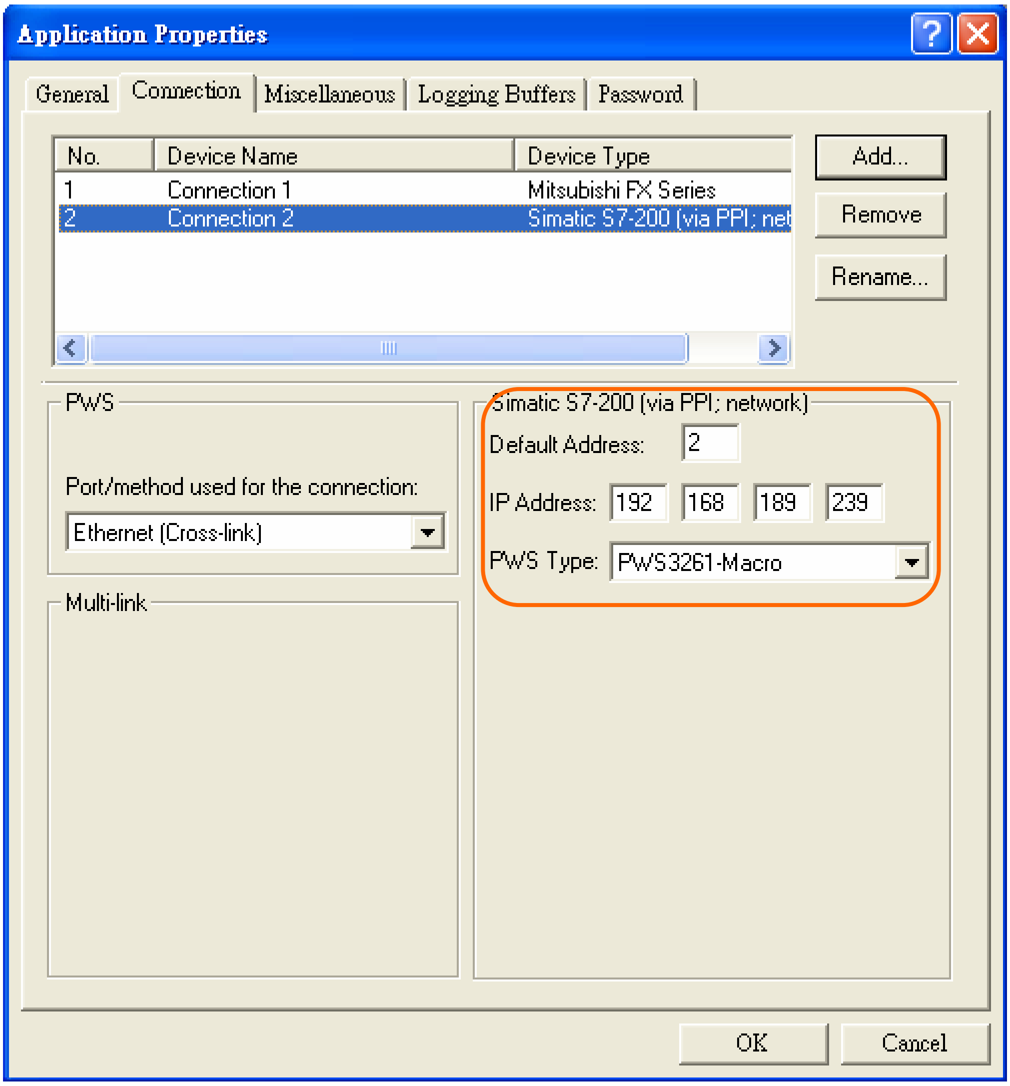


Figure 158. The [Connection] Tab (Cross-link)

Figure 158 takes "Simatic S7-200 (via PPI; 1-to-1)" as example.

- [IP Address]：Specify the IP address of other HMI. The specified HMI connects with PLC through other HMI.
- [PWS Type]：Specify the model to connect with PLC. (other HMI).

For the setup of Multi-link and Cross-link, please refer to Chapter 6. Ethernet Connection.

Note that the transmission parameters for the HMI and the PLC must be identical as they are linked together. After the PLC model specified, the ADP will set up as the PLC default, but a user must if its setup is identical with the PLC

For the setup of each PLC, please refer to thier PLC manual or Ch 9. Communication between PLC and PWS.

2.9.1.3. [Miscellaneous] Tab

On [Miscellaneous] tab, it enables a user to set up recipe function and write time and data ti PLC. See Figure 159.

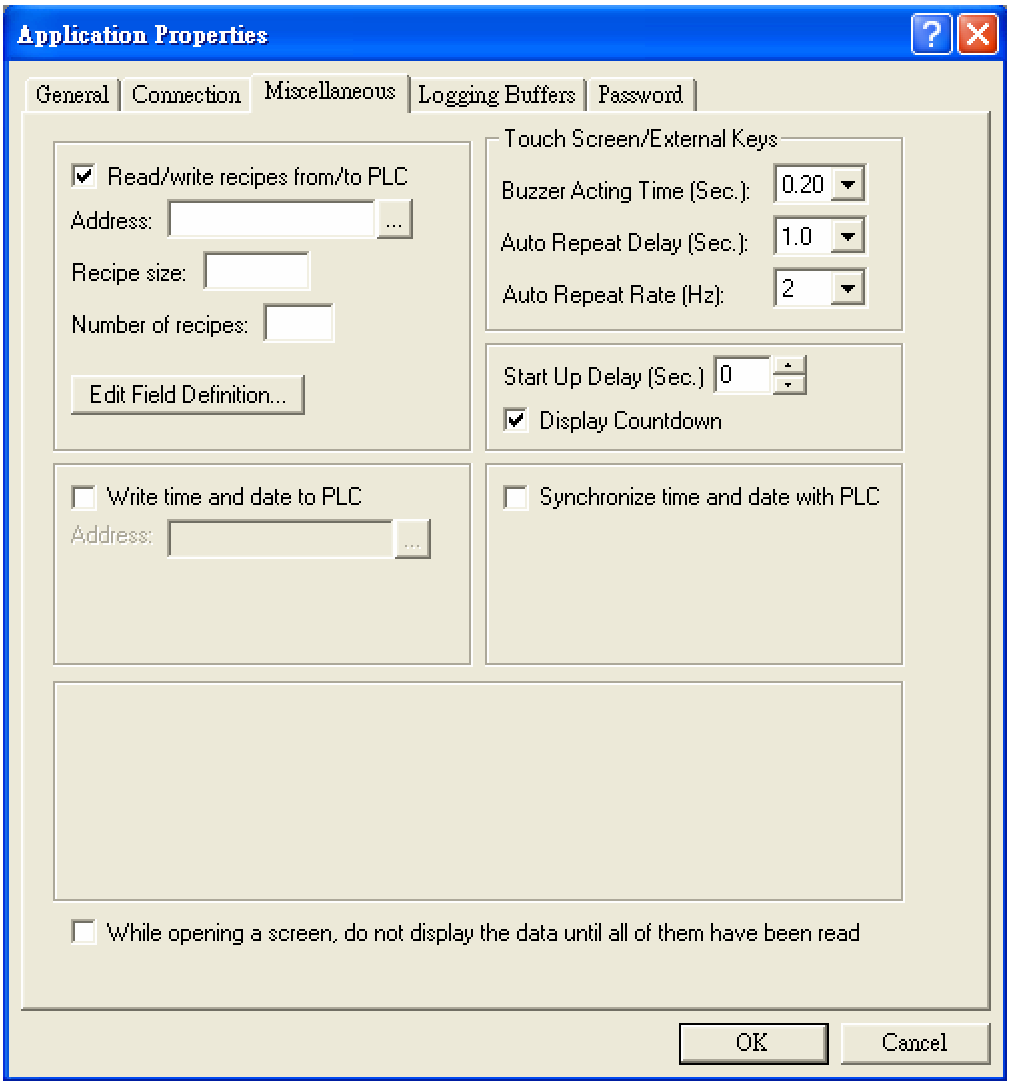


Figure 159. The [Miscellaneous] Tab

- Recipe Block：Specify the memory of recipe data, please refer to Chapter 3. Recipe and Section 4.3. Recipe Register Block. Note that this feature is only applicable on some models; please refer to Appendix A. - Table of the ADP 6.0 Features and HMI models.

- [Write time and date to PLC]: Select this option to enable the Workstation to write time and date to the RTC in the PLC. Please refer to Section 4.4. Time_Block.

- [Touch Screen/External Keys] Block：Specify the format of buffer.

- [Start up Delay (Sec.)] Block：Specify the length of time before the screen start up.

2.9.1.4. [Logging Buffers] Tab

Logging Buffer Block is to collect data from battery backup RAM. It is a contiguous data block and there are twelve buffers available. Note that this feature is only applicable on some models; please refer to Appendix A. - Table of the ADP 6.0 Features and HMI Models .

When design a [Historical Display] object, a user must set up the logging buffer's area and size first. See Figure 160. Concerning the steps to set up and data read from, please refer to Section 2.7.16. [Historical Display].

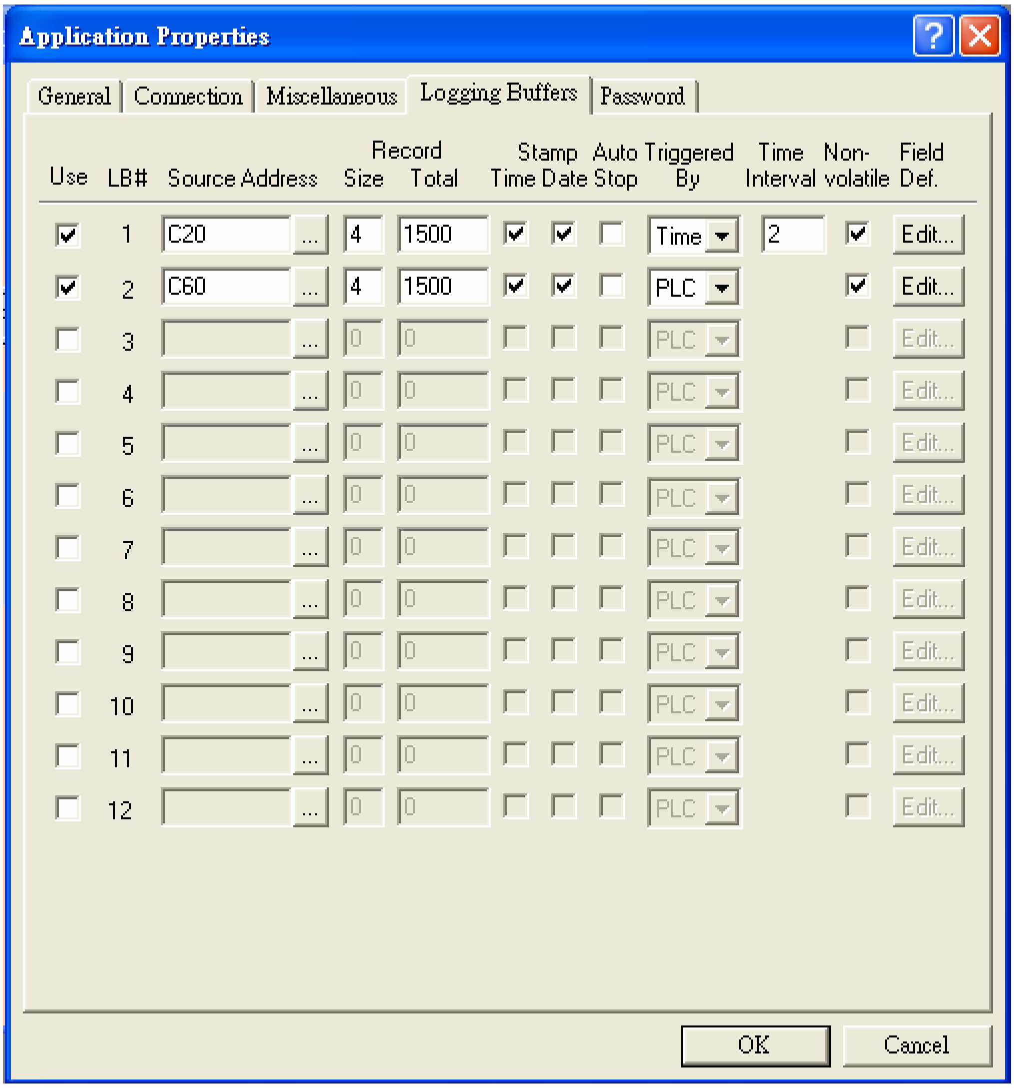


Figure 160. The [Logging Buffer] Tab

- [Source Address]：Specify the starting address of a block of registers in the PLC from which the Logging Buffer reads data. Here the souce address is specified “C20” as in Figure 160.

- [Size]：Specify the size of a record. [Size] = “4” represents 4 Words = C20，C21，C22，C23.

- [Total]: Specify the maximum number of records a Logging Buffer can have; The total “1500” represents reading 4 Words at a time and reading 1500 times.

- [Time]/[Date]：Select this option to record [Time]/[Date] while sampling.

- [Auto Stop]：The logging buffer stops collecting data after its buffer is full if this option is selected. Otherwise, when the 1,501 data records reads the 1st data will be overwritten.

- [Trigger By]：Select “Timer” to collect data at a fixed period or select “PLC” to trigger. If the “PLC” is selected, the tigger is controlled by corresponding bit-location “Dn+2”, “Dn+3 and Dn+4.

- [Time Interval]：Specify how often the Logging Buffer reads one record of data from the PLC (Unit: sec.) when the “Timer” is selected.

2.9.1.5. [Password] Tab

When a user wants to copy the screen or upload the application to ADP, the HMI will ask for the password.

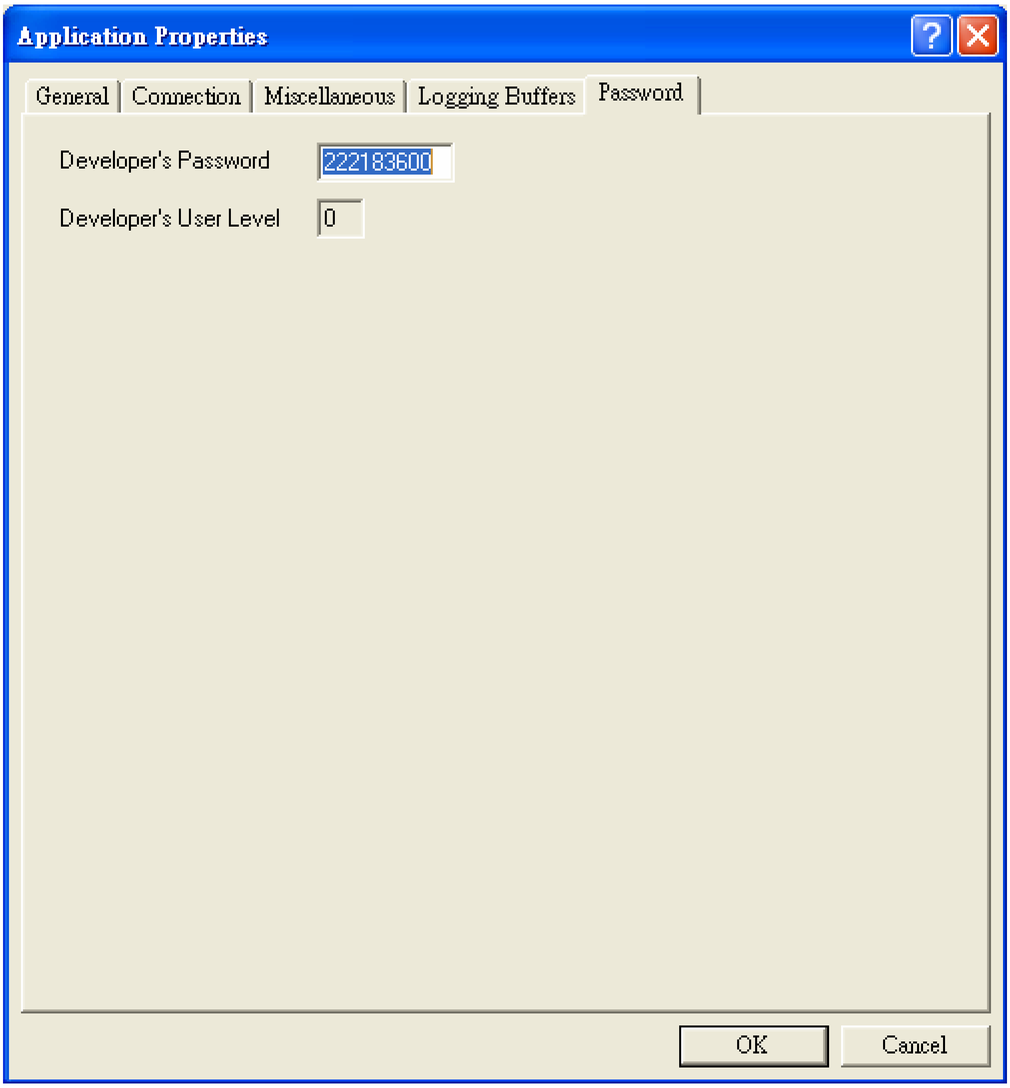
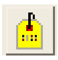


Figure 161. The [Password] Tab

2.9.2. [Tag Table] 

[Tag Table] enables a user to name for the PLC address and specify the refresh rate. See Figure 162.

Select [Application]/[Tag Table], the edit window will be as the following.

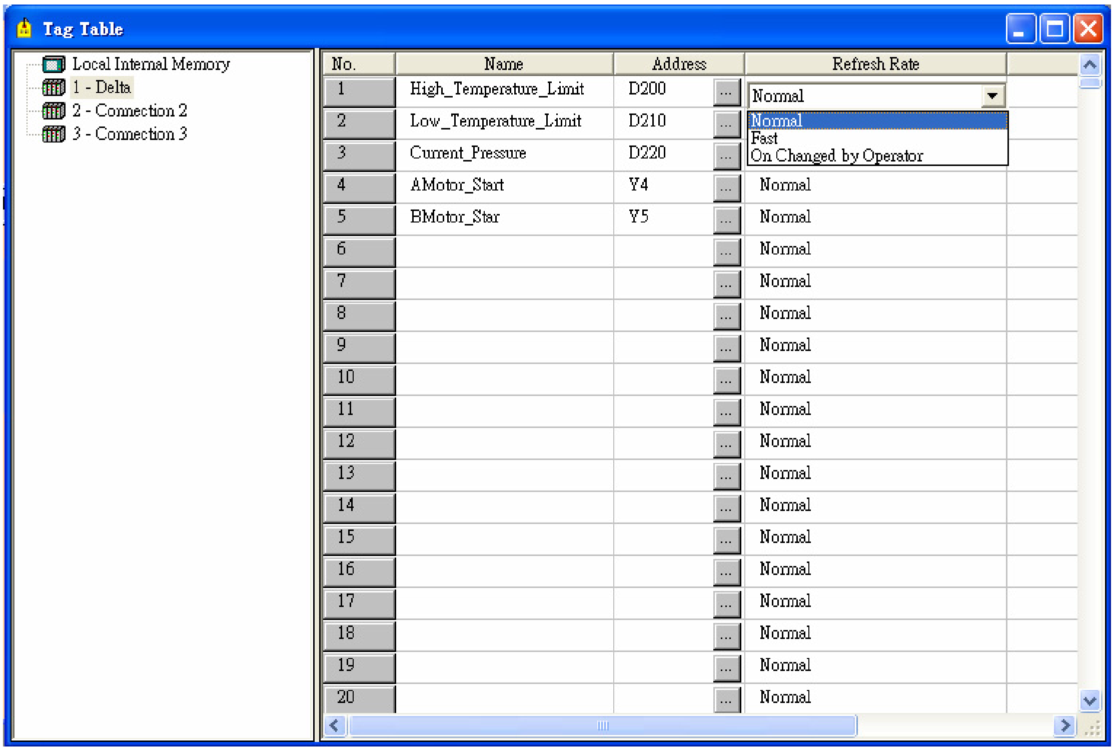


Figure 162. The [Tag Table] window

2.9.3. [Alarm Setup] 

To use [Historical Display] object, a user must set up its address andparameters first. Then the HMI will display the corresponding messages after reading the PLC value, it is up to 512 messages can be specified. See Figure 163. For the alarm setup, please refer to Section 2.7.17. [Historical Display].

Select [Application]/[Alarm Setup], its edt window will be as the following.

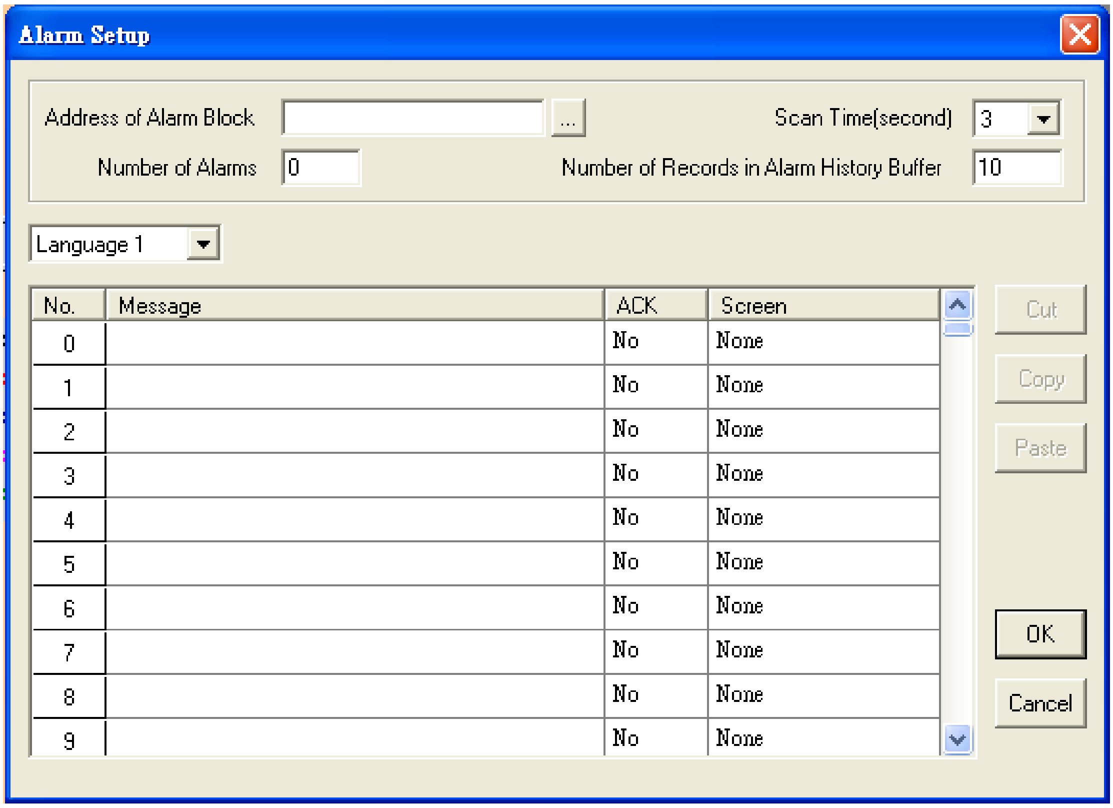


Figure 163. The [Alarm Setup] window

- [Address of Alarm Block]：Display the data with LSB format. If “D130” is the starting address, the HMI monitors 160 bits =10 words, the corresponding addresses are D130,D131……D139. When D130 No.0=ON, the HMI will sample and record the alarm data. There are up to 512 messages available.

- [Number of Alarm]：Specify the number of alarm to display.

- [Scan Time(Second)]：Specify the period to sample the PLC data which is monitored by HMI, 1 to 10 second(s) is available.

- [Number of Records in Alarm History Buffer]：Specify the number of records can be saved in alarm history buffer. For example 100 means when the 101st alarm event happened, the 1st alarm message will be overwritten.

- Table：

  - ♦ [Message] Column：Enter the text to the alarm message. The format can be modified in its dailog box.
  - ♦ [ACK] Column：Acknowledge the message which has re-ceived to conceal the alarm.
  - ♦ [Screen] Column：Specify the screen to display when the alarm occurs.

2.9.4. [Commom Keys]

[Commom Keys] is to edit the properties of external keys. The feature is commom whatever the screen is. For example, if “K00” means go to the 1st page, press “K00” will go to the 1st page in each screen.

Select [Application]/[Commom Keys], the edit window enables a user to set up its function. Figure 164 displays all the commom keys which can be specified in PWS6600.

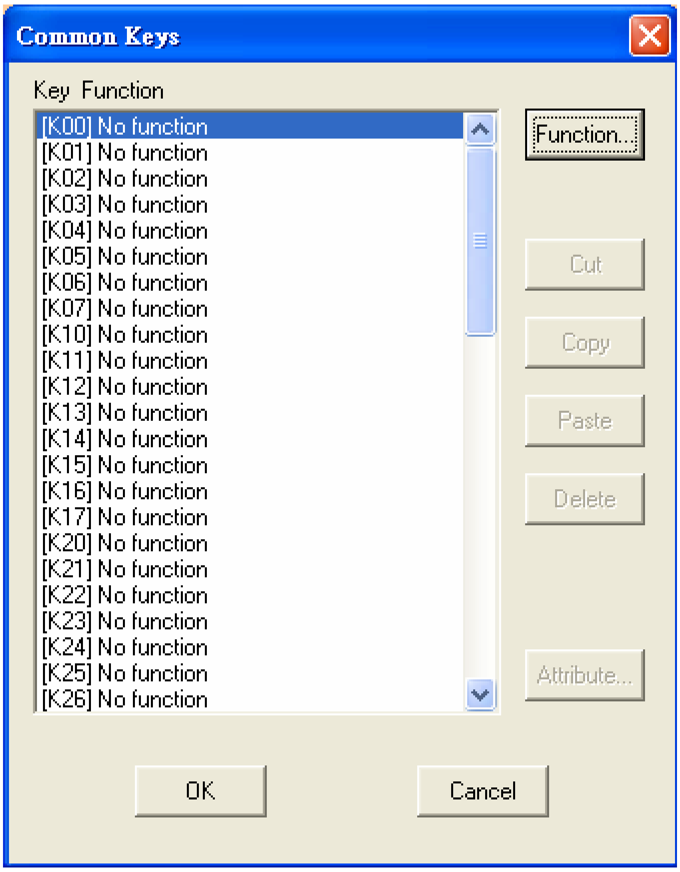


Figure 164. The [Commom Keys] Edit Window (HMI model PWS6600)

When pressed the [Function] key, the window will display the functions to specify. See Figure 165.

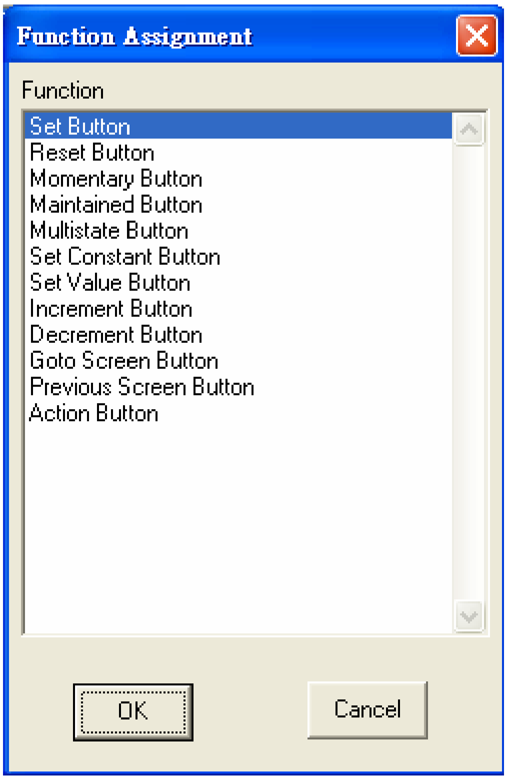


Figure 165. Specify the Function

If a user wants to define the feature just applicable on current screen, select [Screen]/[[Properties] to set up on the [Auxiliary Keys] tab. Please refer to Section 2.5.8.4. [Auxiliary Keys] for the complete details.

Note that this feature is only applicable on some models, please refer to Appendix A. - Table of the ADP 6.0 Features and HMI Models. For the connection, please refer to Appendix A. - External keys' Connection (Network&Enhanced).

2.9.5. [Slide-out Menu]

The function of [Slide-out Menu] is to operate the functional keys conviently on HMI. (ex. [Set Button],[Reset Button],[Momentary Button]......etc.) In PWS6600 series, a user can define 5 functional keys. When pressed [Menu] button, the HMI will display the slide-out menu with specified functional keys. See Figure 166.

Note that this feature is only applicable on some models, please refer to Appendix A. - Table of the ADP 6.0 Features and HMI models. **Besides, the number of the functional keys is depending on the selected model.**

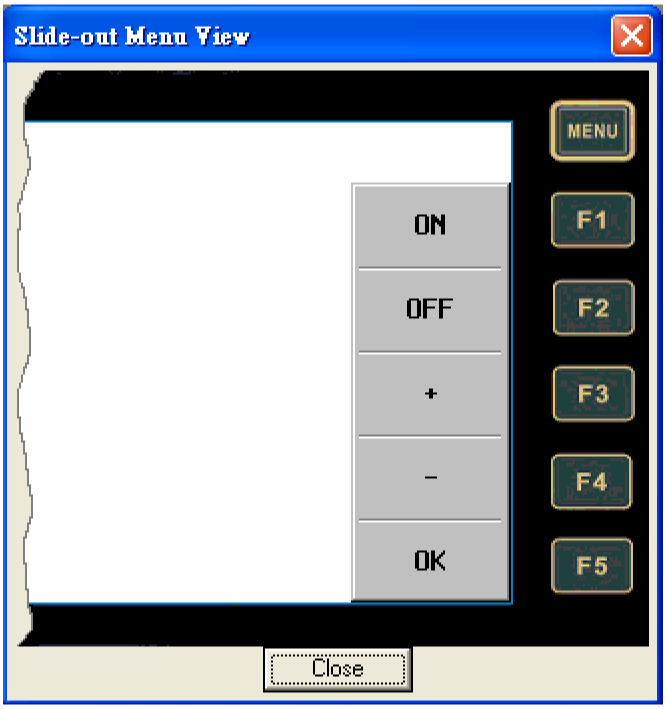
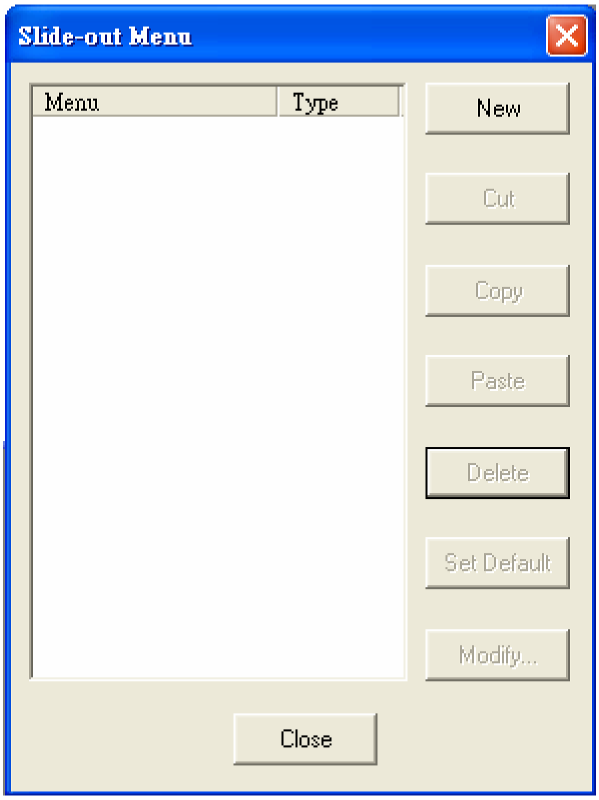


Figure 166. The [Slide-out Menu] Object

Select [Application]/[Slide-out Menu], its edit window will be as the following.



When pressed [New] button, the edit window will be as in Figure 167.

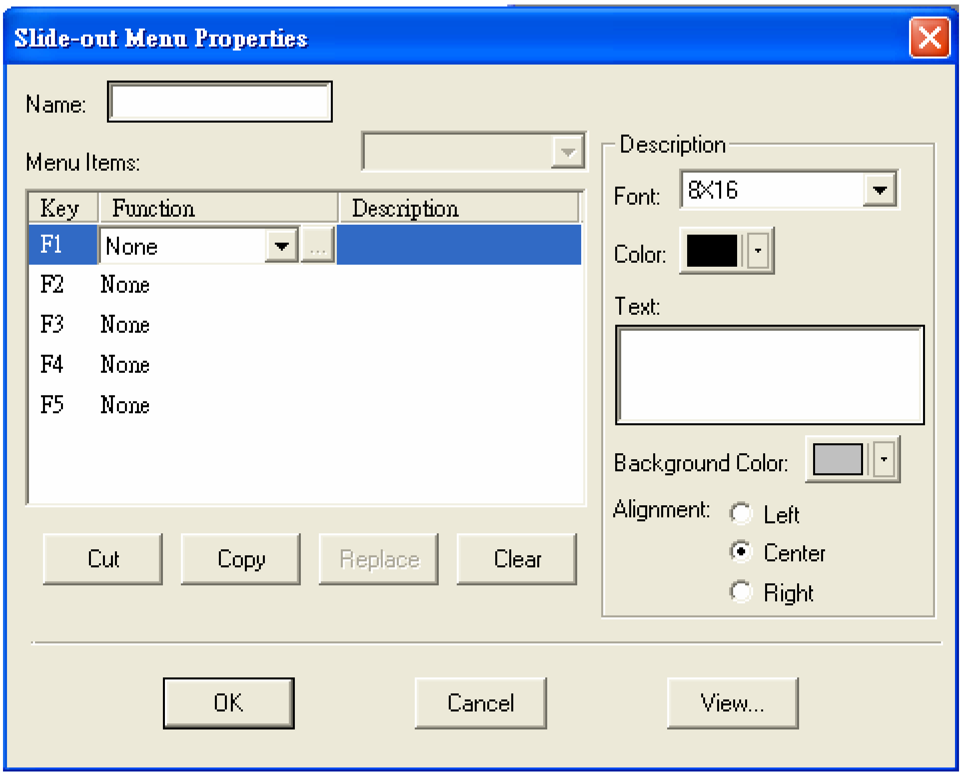
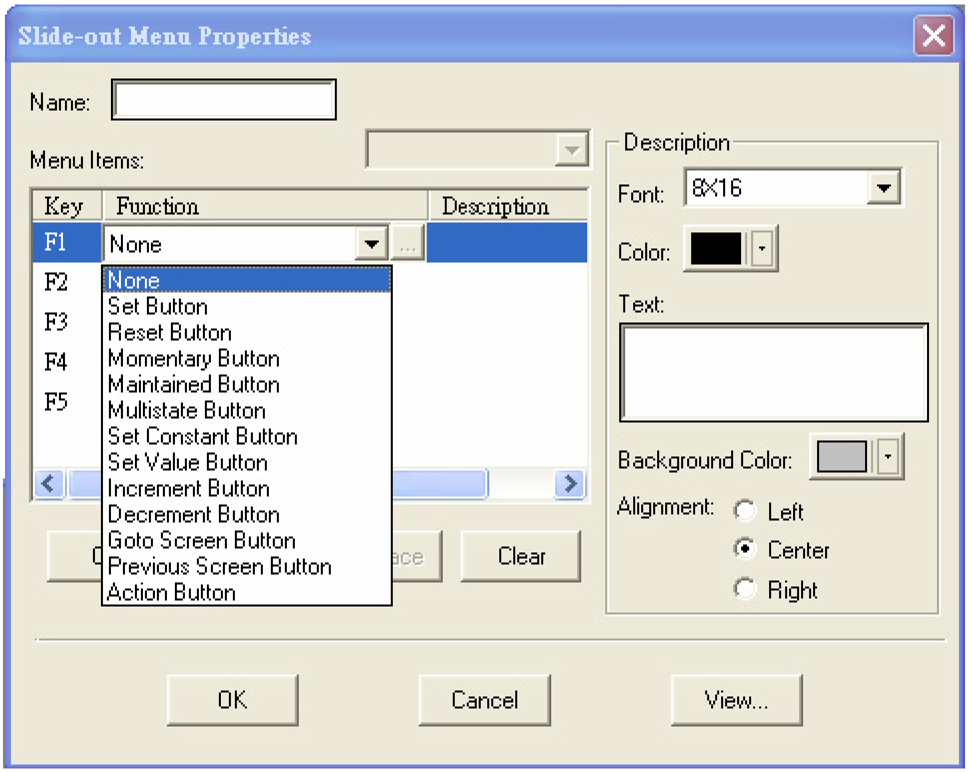


Figure 167. Setup [Slide-out Menu]

- [Name]：Enter the name for slide-out menu.
- [Function] Block：
  - ♦ [Select]：Press ▼ key to specify the functional key from the drop-down list.



- ♦ [Cut],[Copy],[Replace],[Clear]：To cut, copy, replace, and clear the button's content.

- [Description] Block：Enter the name for the button in the [Text] block.

- [View] Key：Press the key to view the designed menu as in Figure 166.

2.9.6. [System Message]

[System Message] is to edit the message for HMI system. When the option [Operator Confirmation] is selected, executing the object will display its system message.For example, the system message "Are you sure?" will display after the numeric entry. See Figure 168.

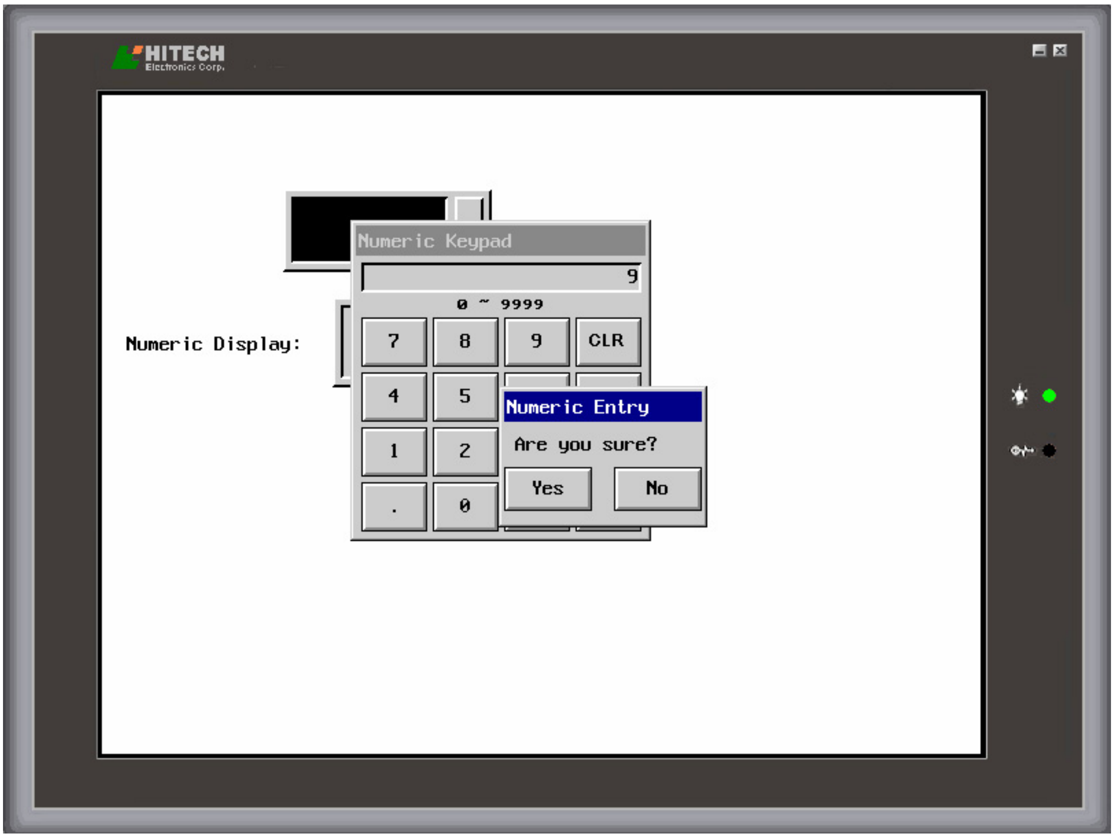


Figure 168. An example of [System Message]

Select [Application]/[System Message], the edit window will be as the following. See Figure 169.

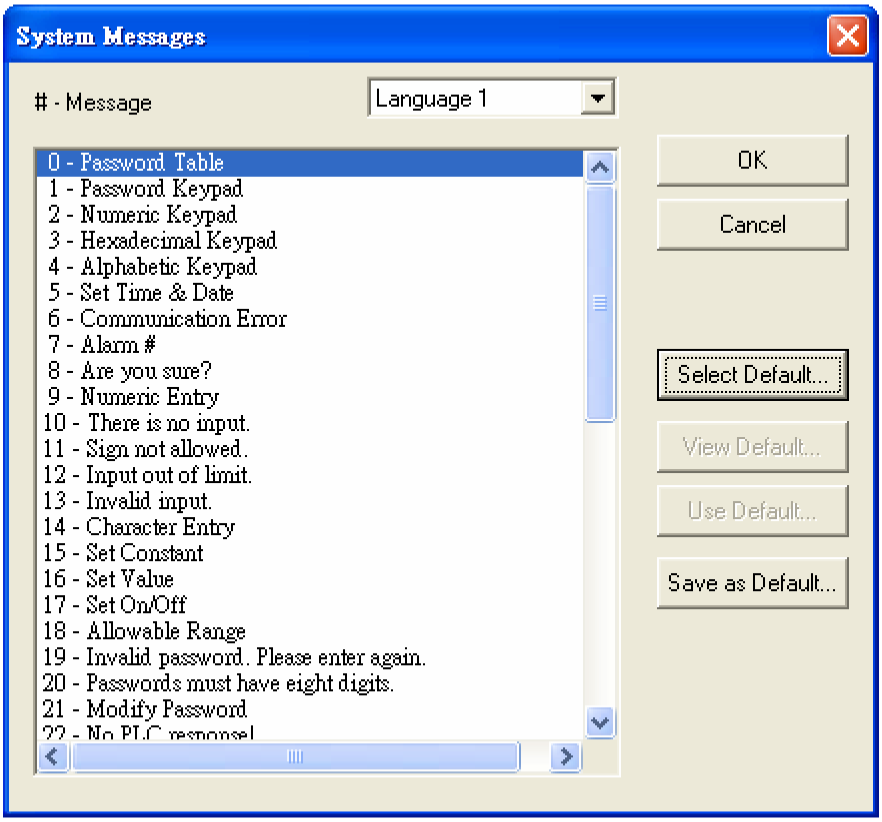
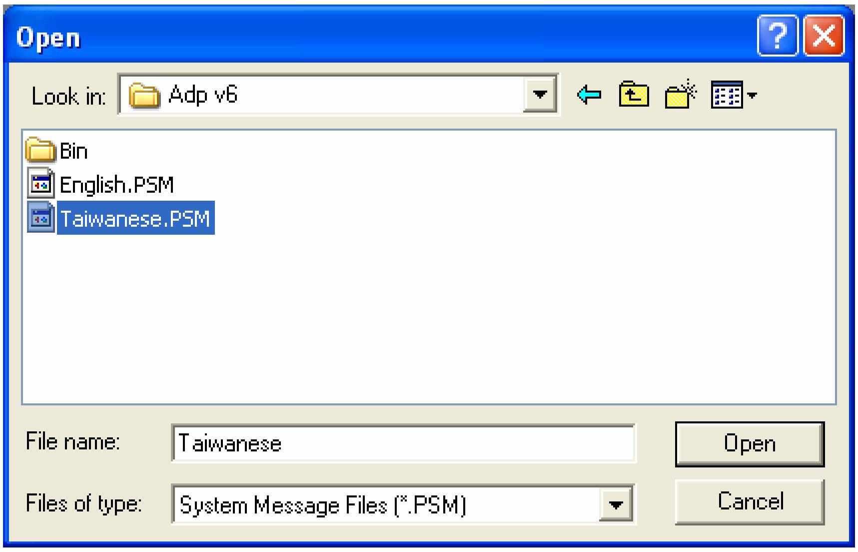


Figure 169. The [System Messages] Edit Window

Double-click on the message block; the message can be modified in its dialog box as the following.

Press [Select Default]; select the default file from the dialog box as the following.



Select [View Default] to view the content of deful message. Select [Use Default] to use the specified default message. See Figure 170 (The default message is Chinese).

[Save as Default] button is to save the system messages as defalt file (*.PSM).

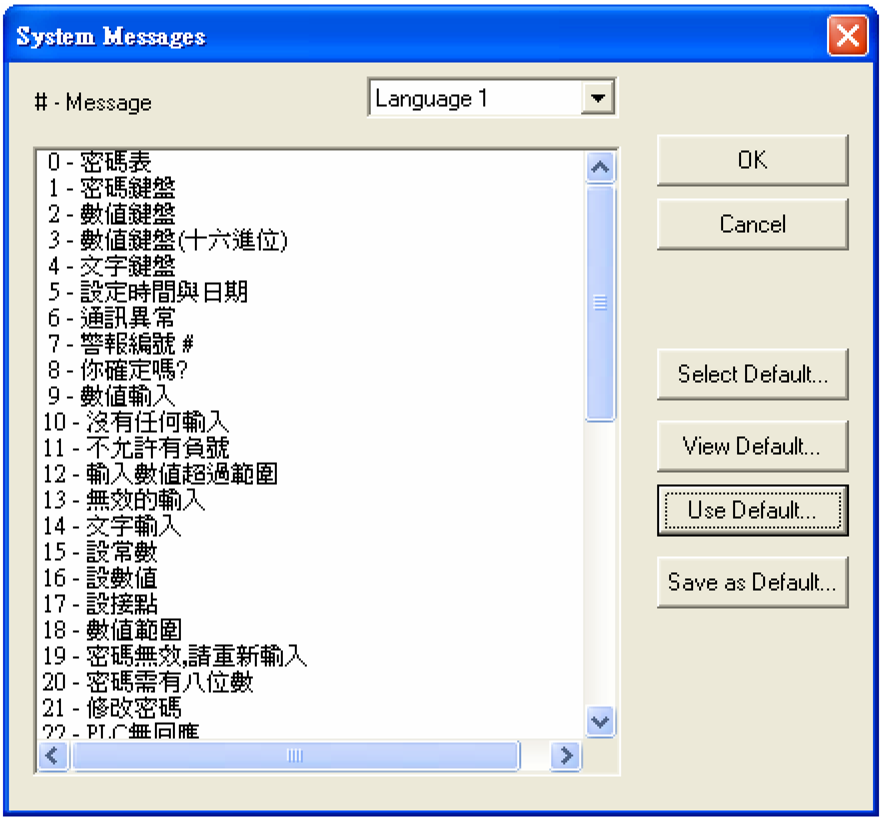


Figure 170. Update System Messages

[System Message] means the message from HMI system itself. The default message will be used in general usage. If the message need to be changed, please comply with the definition of default message.

2.9.7. [Report Format List]

This command is only applicable on SoftPanel; please refer to SoftPanel for the complete details.

2.9.8. Macros

When select Macro command, the Macro edit window will display on the screen. See Figure 171. Macro enables the Workstation to excute a number of task including folw control, data transfer, conversion, counter, system service instructions, etc. Using Macro not only can communicate to the PLC but also connect to other device. This feature provides an efficient integration system as well as an economical structure in hardware application. Besides, Using Macro can also significantly save the program size and optimize the efficiency in PLC.

Please refer to Chapter 8. Macros. for the complete details.

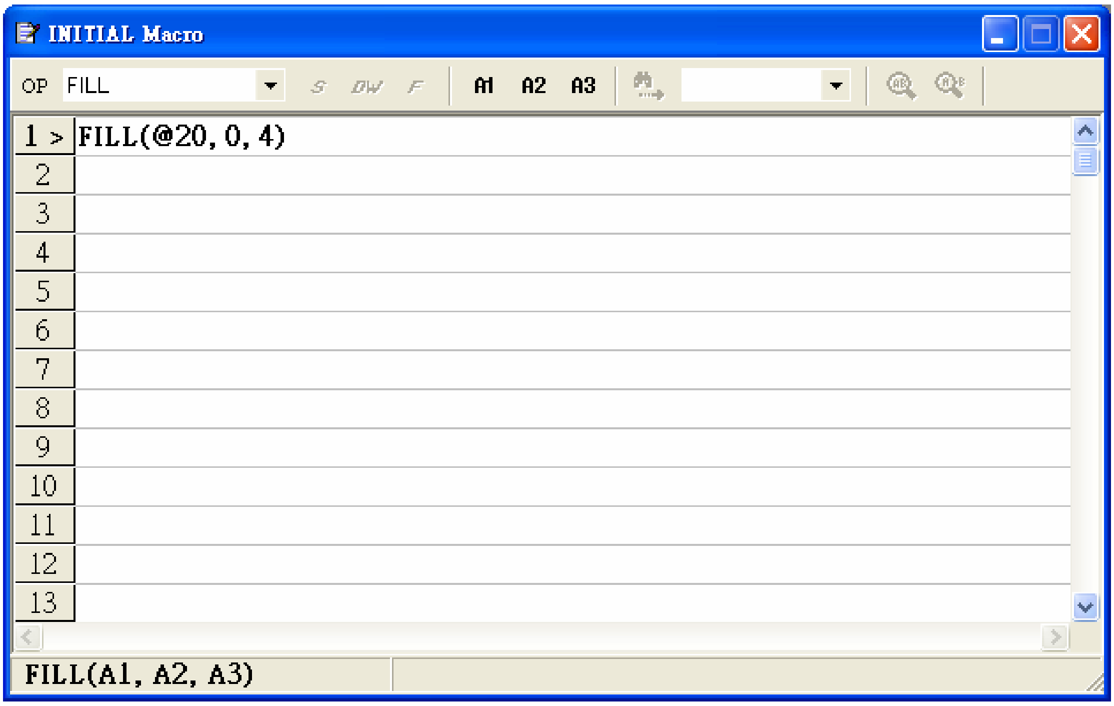


Figure 171. The Initial Macro Edit Window

2.9.8.1. [INITIAL Macro]

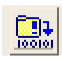
When the first time the HMI run the application(It menas the first time to execute the application after power off), this command is only executed once. The purpose of INITIAL Macro is data initialization and communication parameters declaration….etc.

2.9.8.2. [BACKGROUND Macro]

When the HMI run the application, the command will be executed cyclically. The maximam 30 lines of Macro commands can be executed once. Whatever ths screen is, the Macro commands will be executed. The purpose of BACKGOUND Macro is communication control, Data conversion….etc.

2.9.8.3. [CLOCK Macro]

When the HMI runs the application, the entire Macro will be executed once every 500ms. The purpose of CLOCK Macro is screen control, bit setting, command control, data transfer…etc.

2.9.9. [Compile] 

The [Compile] button is used to test the application if any errors happen before the application is excuted. After the errors modified, then the application can be excuted.

Select [Application]/[Compile], the dialog box as in Figure 172 will appear as the following. Note that Figure 172 an error found in the application. After ADP 6.0 later, this function will provide detailed error message(s).

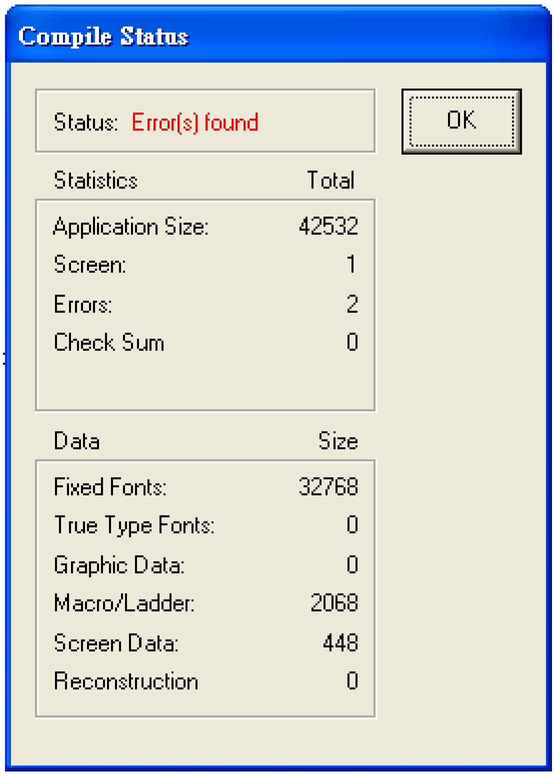


Figure 172. The [Compile Status] Dialog Box

After [OK] button pressed, its dialog box as in Figure 173 wil be on the screen. A user can double-click on the error message, the object or macro screen will appear on the screen. Alternatively, a user can check [Open dialog box automatically] box, then they will appear on the screen automatically.

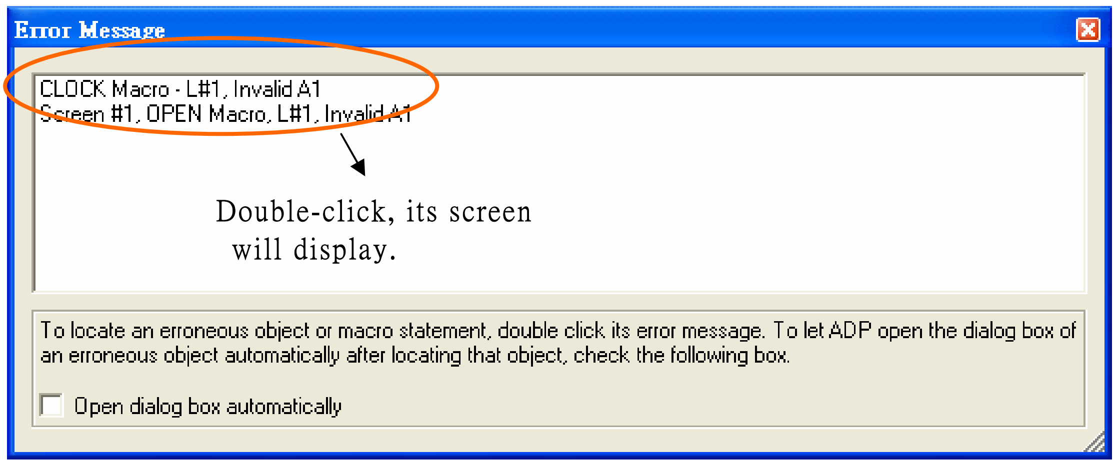
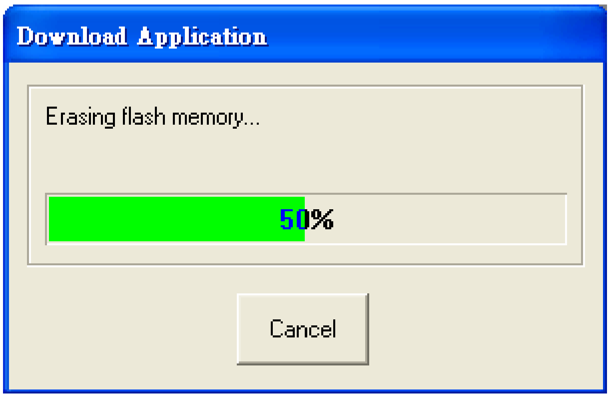


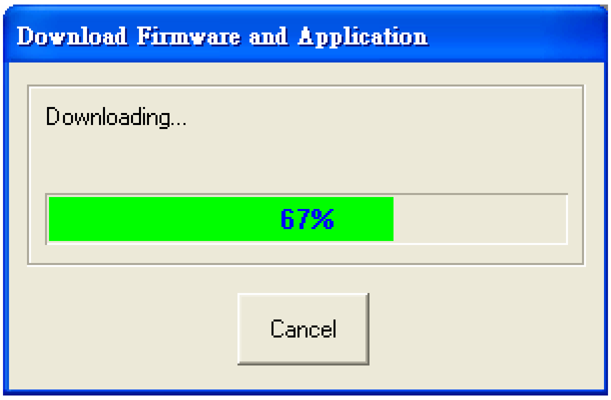
Figure 173. The [Error Message] Dialog Box

2.9.10. [Download Application]  and [Download Fireware and Application] 

[Download Application] is used to download the update application and screen to HMI. See below.



[Download Fireware and Application] is to download the fireware and application to HMI, the first time download the application must select this application. See below.



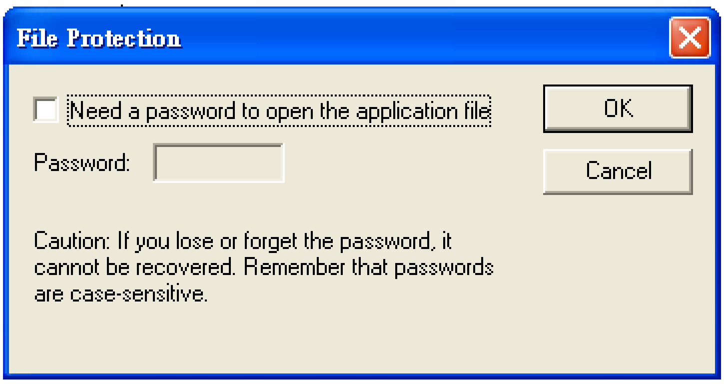
If the model of the connected PWS unit is not the model required, its message box will appear on the screen as the following. Besides, remember to excute [Compile] before download.

2.9.11. [File Protection]

[File Protection] is to protect the application; a user must enter the password to open the application file.

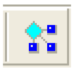
Select [Application]/[File Protection], the dialog box will be as the following.

Note that this command is totally different from Section 2.9.1.5 [Password] Tab. This password is used to protect the application file from modifying by those unathirized users. However, the password in Section 2.9.1.5. [Password] Tab is a security against copy and upload.



2.10. Tool

[Tool] is to manage, simulate the application and edit recipe. There are four options : [Cross Reference],[Off-line Simulation],[On-line Simulation] and [View/Edit Recipe].

2.10.1. [Cross Reference] 

The [Cross Reference] helps a user to consult the Screen, Serial No., Address and Macro-in use quickly. See Figure 174.

In the [Cross Reference] window, select the icon to sort serial No., screen or address in numerical or alphabetical order. The right table will list its object and properties. The preview window below will display the selected object .Click on a heading of a column in the table (ex. [Serial No.],[Name]….etc.) to sort the properties in ascending or descending order. See Figure 174 .

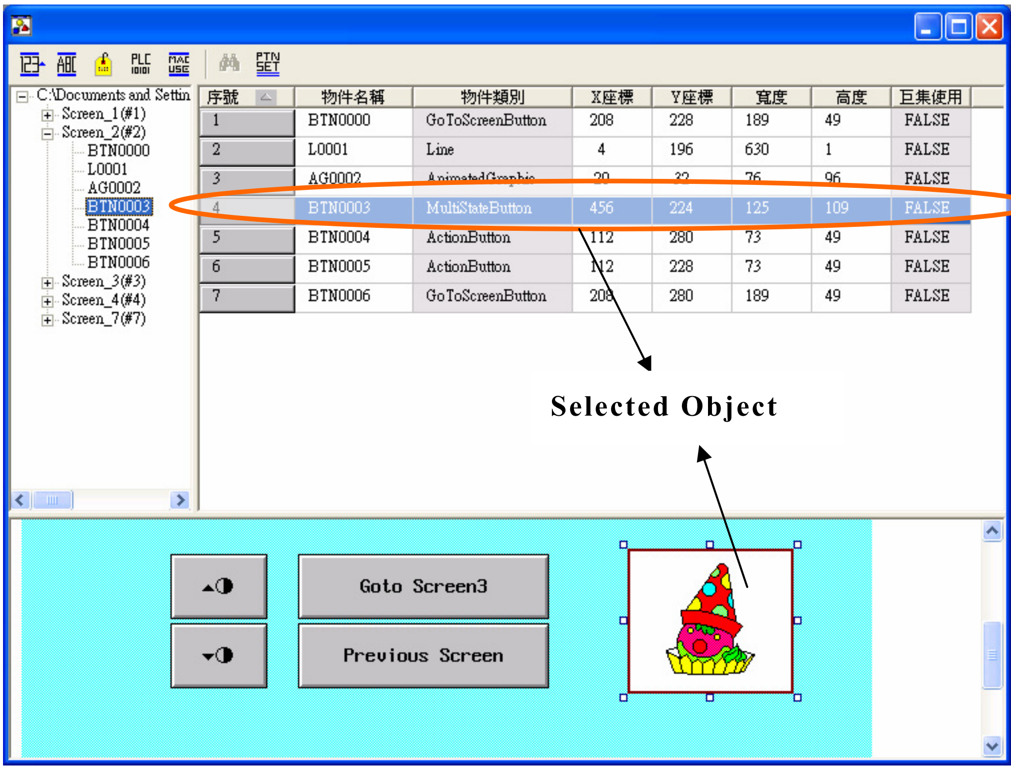
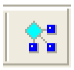
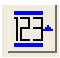
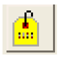
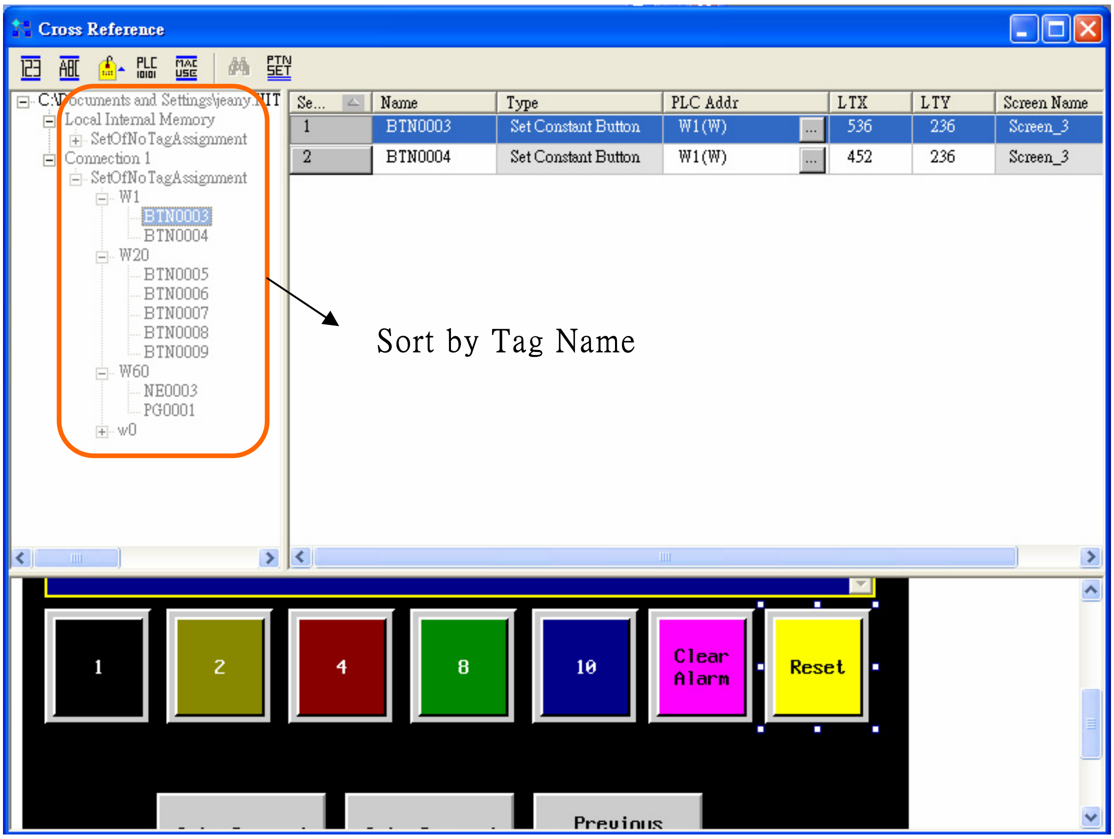


Figure 174. The [Cross Reference] window 

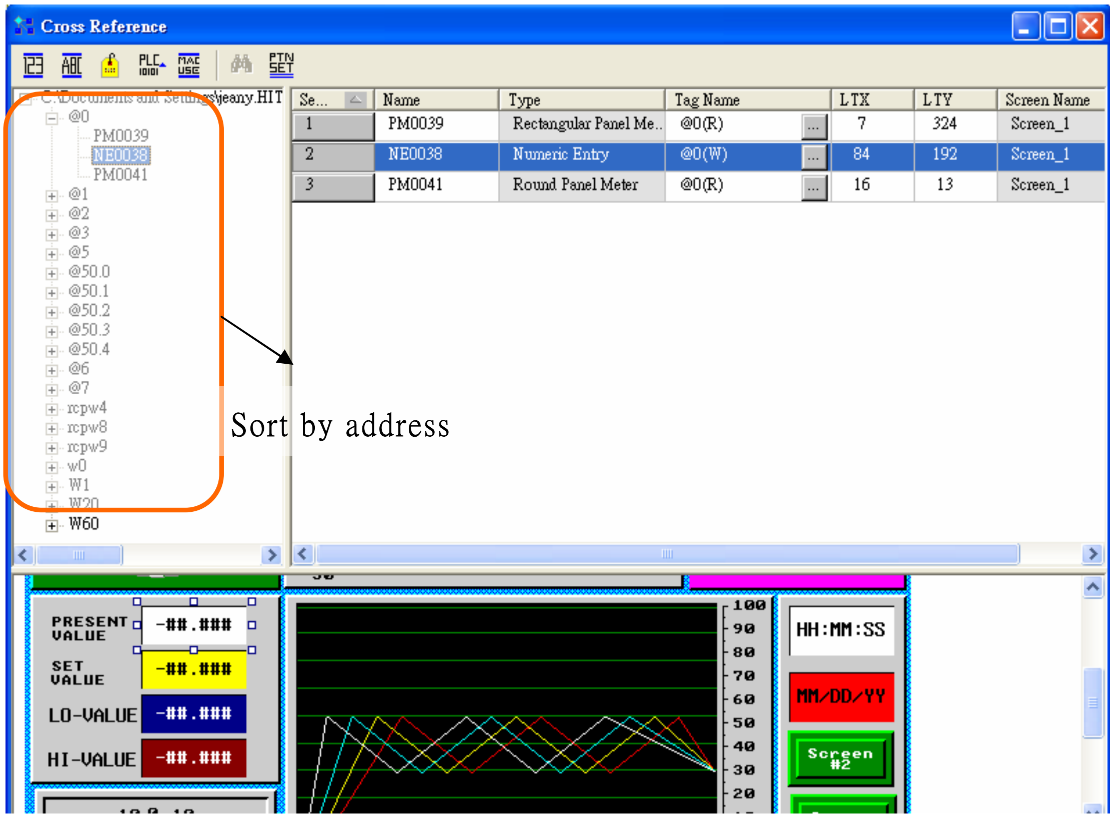
2. Instructions

Icons Introduction:

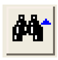
- : Select this icon to sort by screen number.
- : Select this icon to sort by name.
- : Select this icon to sort by tag name.



- : Select this icon to sort by PLC address. The property is sort by address in ascending order; click the address to list the object.



- : Select this icon to sort by Macro-in use Objects.

- : Select this icon to sort by search pattern, this feature is only applicable on search PLC address or tag name.

- : Set the desired pattern for search. Select [by PLC Addr] or [by Tag Name], [Exact match] or [Partical match] options to search. See Figure 175. If the search pattern is “W”, and select [Partical match]. The cross refrence will display the objects which PLC addresss has “W”- “W0”, “W1”, “W20”, “W60”. See Figure 176.

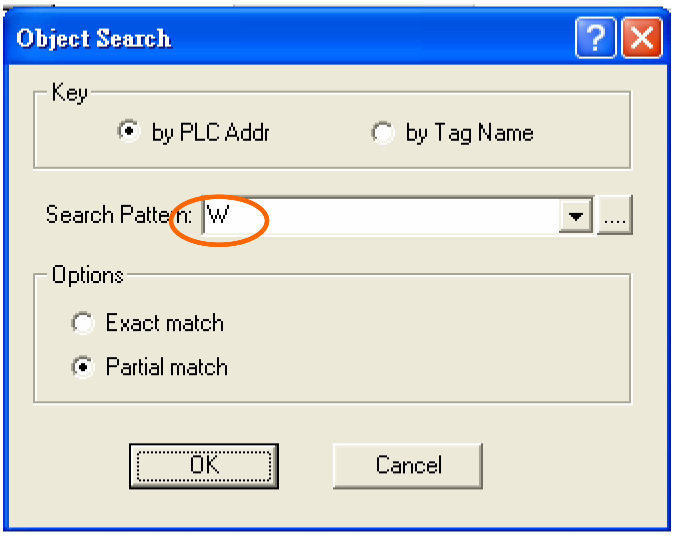


Figure 175. Specify the search pattern

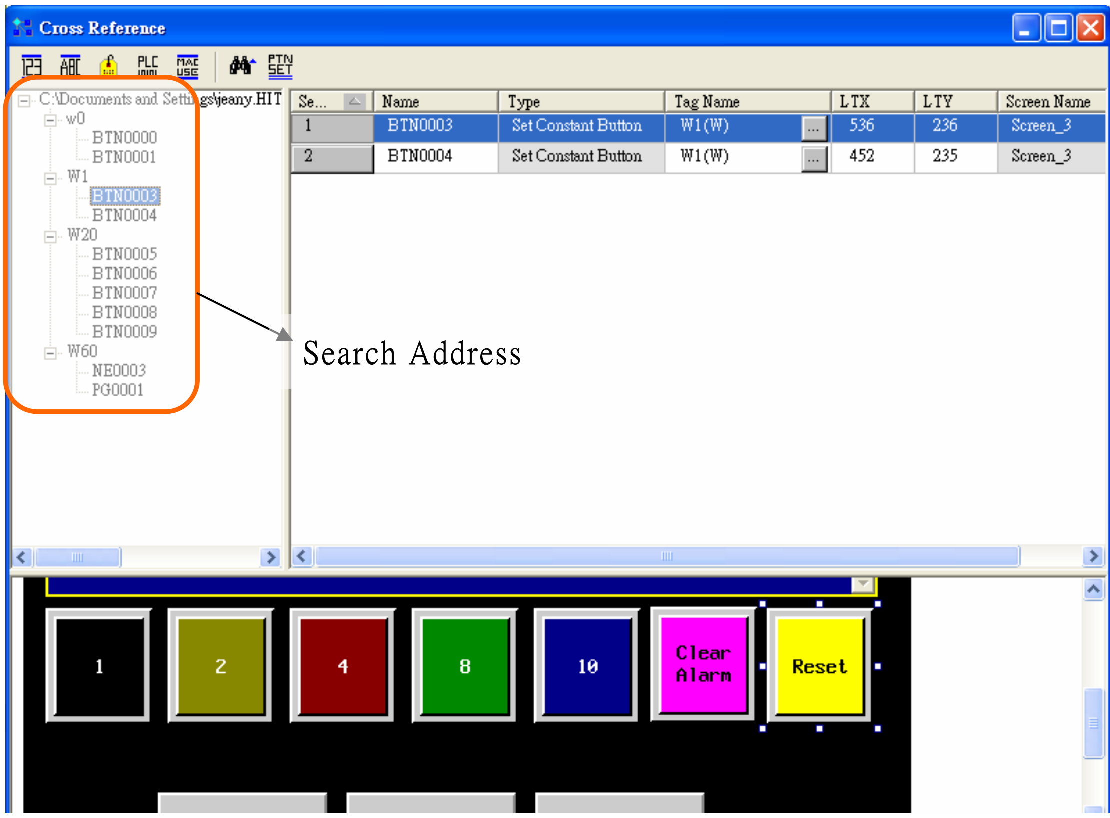


Figure 176. Display the search address

2.10.2. [Off-line Simulation] and [On-line Simulation]

ADP supports two types of simulation. One is [Off-line Simulation], the other is [On-line Simulation]. They both offer a user the simulation for HMI in the PC. *Note that the application must compile before simulation.*

[Off-line Simulation] is applicable on all PLCs which ADP offers but [On-line Simulation] is only applicable on some PLCs.

2.10.2.1. [Off-line Simulation]

By using [Offline Simulation], the result can be seen in the PC which is the same operation mode between HMI and PLC. For example, PWS6300 Off-line Simulation will display its operation mode. See Figure 177. PWS6600 Off-line Simulation will display its operation mode as in Figure 178 and the externl keys will display as well. See Figure 179.

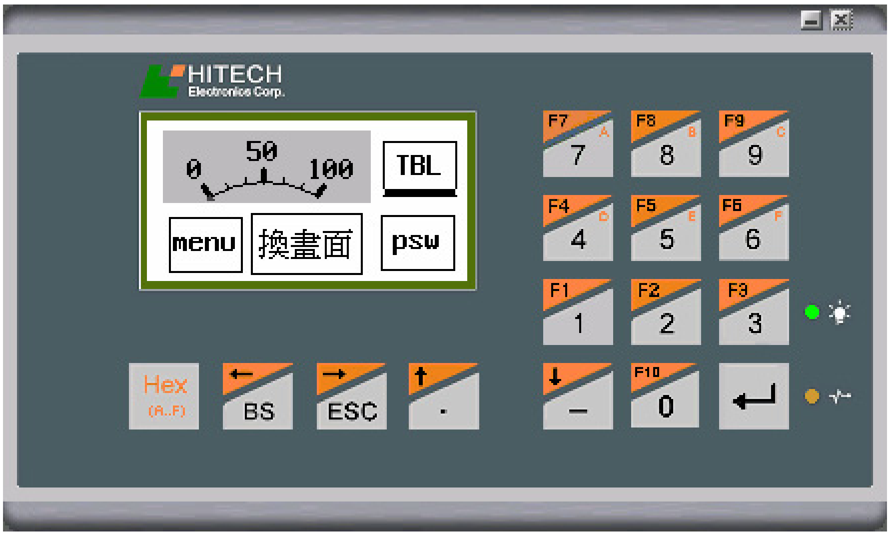


Figure 177. PWS6300 Off-line Simulation

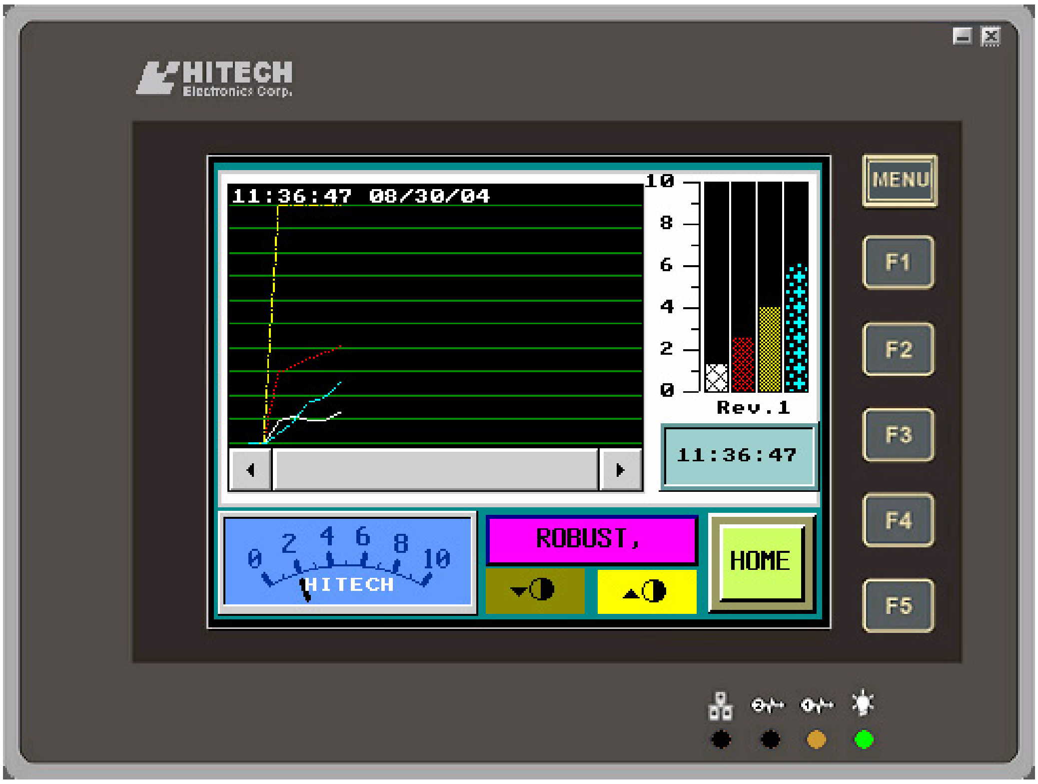


Figure 178. PWS6600 Off-line Simulation

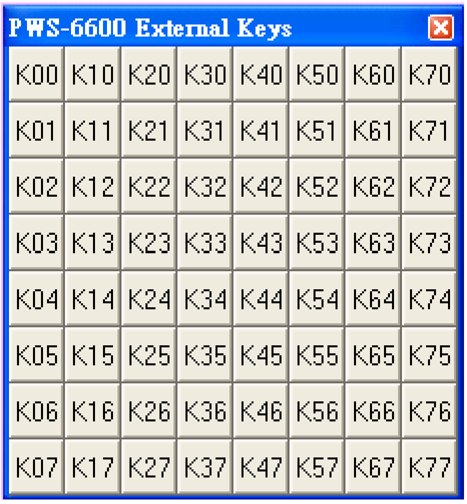


Figure 179. PWS6600 External Keys

This function is without communicating with PLC, the following are the convenience：

1. Before purchase, a user can simulate operation and recognize the HMI functions sufficiently.

2. Before download, a user can simulate in the PC to test the application including the screen change, buttons' function and display….etc.

3. Before the completion of the PLC program, the HMI application can be present to the customer.

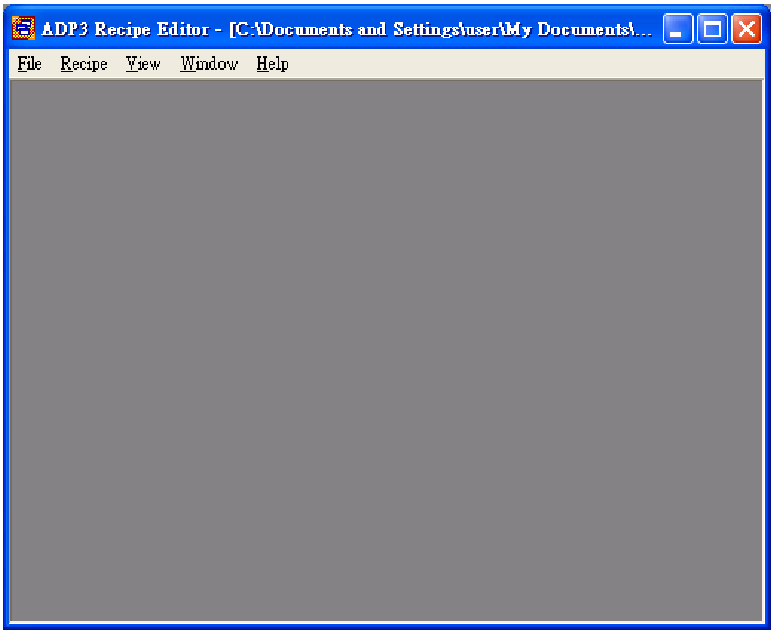
2.10.2.2. [On-line Simulation]

ADP offers user [On-line Simulation] for the connection between PC and PLC communication ports. If there is only one RS232C serial port in PC, then user need to add another adapter for transferring the singnal from RS232C to RS422 or RS485 in order to connect with the RS422 or RS485 port in PLC. Notice that the communication time between ADP and PLC is 60 mins. If you need to connect again, please close the ADP and restart it. If you want to remove this limitation, you need to install the licensed Software and a PLC adapter which has the function of RS-232C/422/485 and anit-noise (3000 volt).

For the development of the newest software, you may contact the nearby dealer or visite website http://www.hitechsite.com to understand recently tendency.

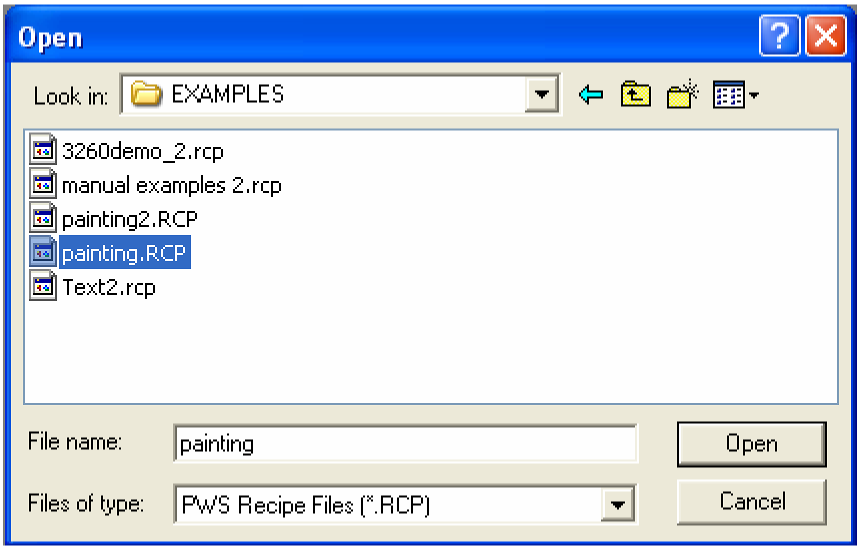
2.10.3. [View/Edit Recipes]

Select [Tool]/[View/Edit Recipes], the recipe editor window will be as the following：



Note that the recipe must upload the file from HMI to PC and saved the file, the data size and total of recipe can not be modified. Note that this feature is only applicable on some models; please refer to Appendix A. - Table of the ADP 6.0 Features and HMI Models. For the setup steps, please refer to Section 2.9. [Application] and Chapter 3. Recipe.

Select [File]/ [Open] to open the selected recipe file (ex. "painting.RCP"); See below. Note that the recipe file is *.RCP.



Open the recipe files, then select [Recipe]/[Open Recipe]; its dialog box will be as the following and input the recipe number to the open recipe.

The recipe displays its number on the screen for a user to edit. See Figure 180.

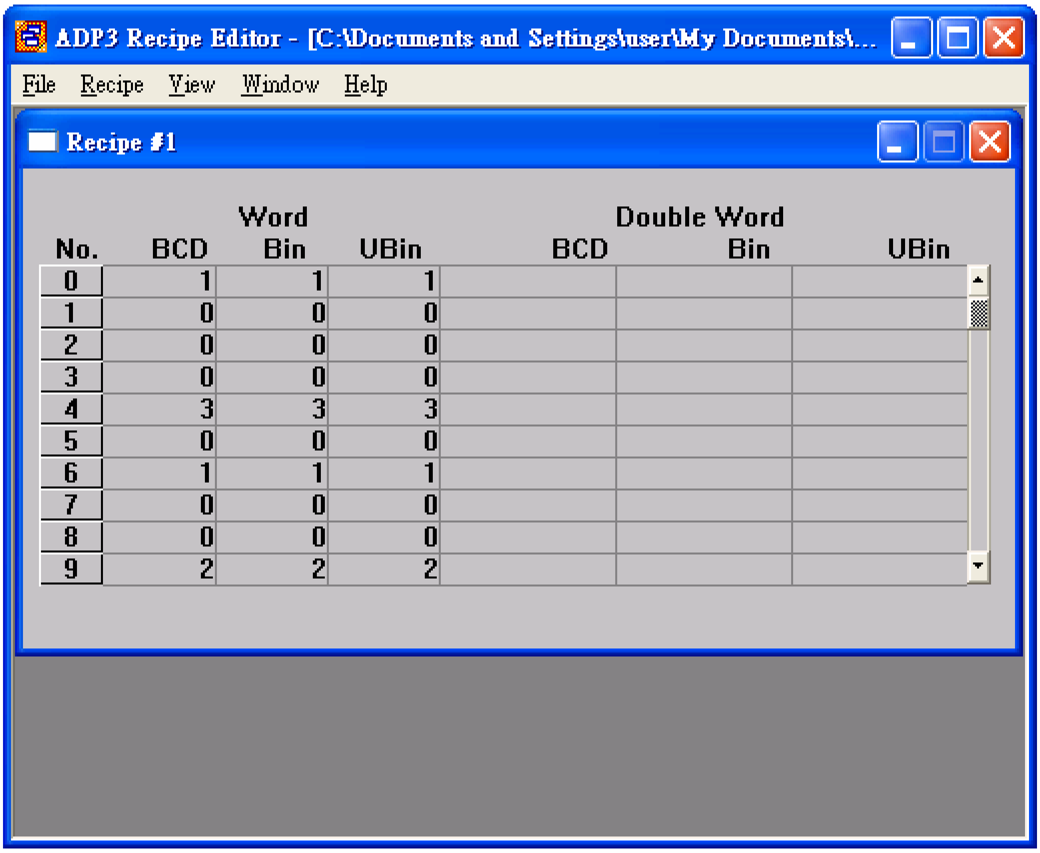
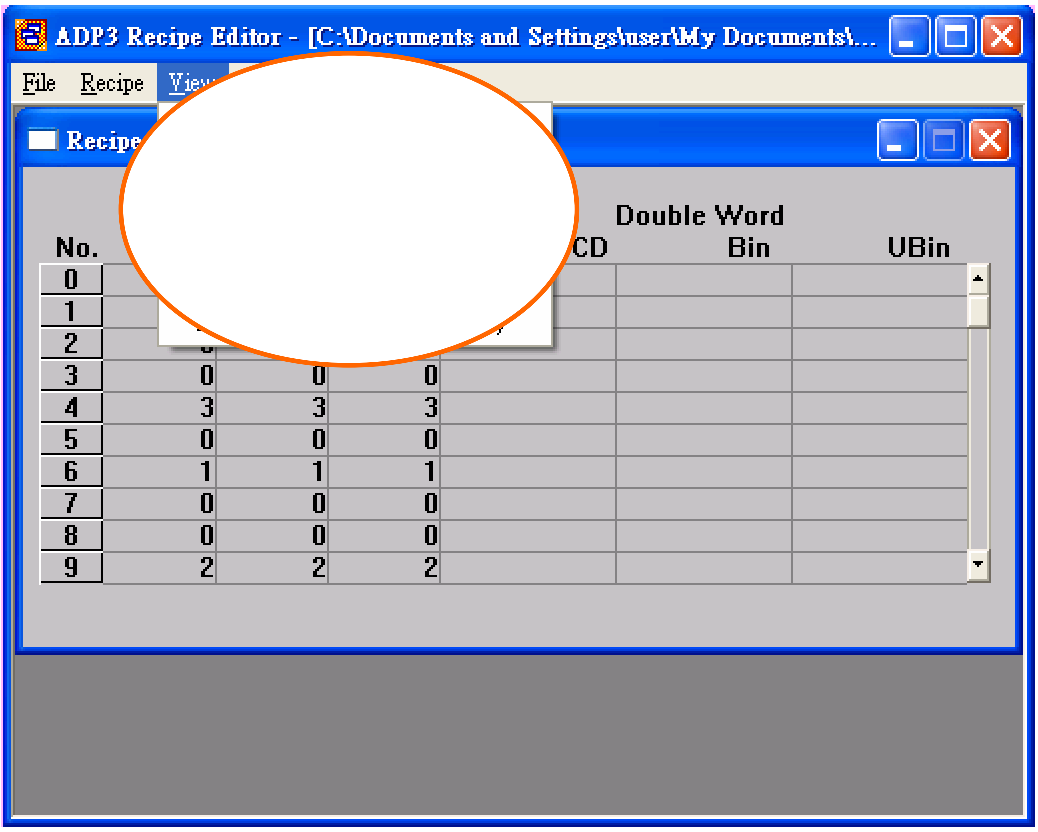


Figure 180. Edit Recipe #1

The finction of recipe editor is the same as common edit tool; it includes open, save, print, view the recipe file and window arrangement. The following figure displays various formats to view the recipe data.

2. Instructions



2.11. Options

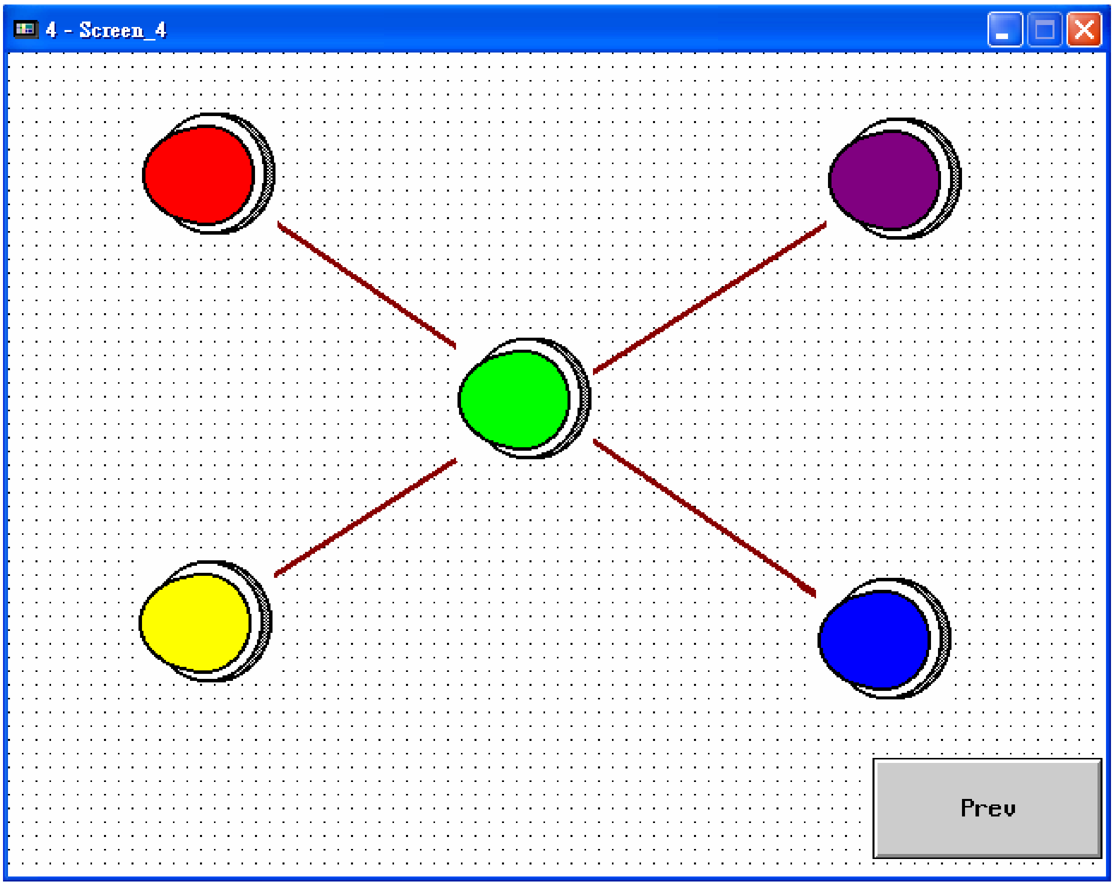
[Options] is offer a user options for edit and tansmission.

2.11.1. [Snap to Grid]

If a user selects [Snap to Grid] on the edit screen, the edit objects will align (See Section 2.11.2. [Display Grid]) the nearby grid. This command is convenient for a user to align objects.

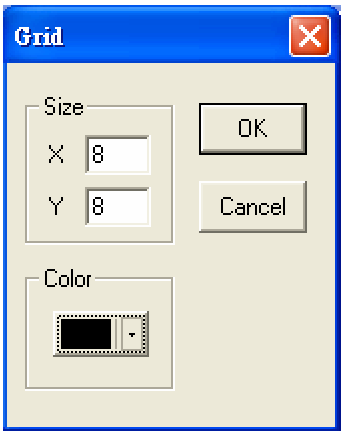
2.11.2. [Display Grid]

If select this option, the edit screen will display the grid to align conveniently. See below.



2.11.3. [Grid Attributes]

Select this option; a user can specify the grid size in its dialog box as the following. The bigger grid size is, the longer the distance between point and point will be.



2.11.4. [Transmission Setup]

Select [Options]/ [Transmission Setup], it dialog box will be as the following. See Figure 181. A user can specify the download/upload port and baud rate between PC and HMI. The PC port options are “Ethernet”, “COM1”…. “COM16” and “USB”, “115200” baund rate is recommended.

Notice that the communication parameter setting is different from the [Connection] tab's setting in [Application]/[Workstation Setup] . The former is the setting between PC and HMI, the latter is the setting between HMI and PLC.

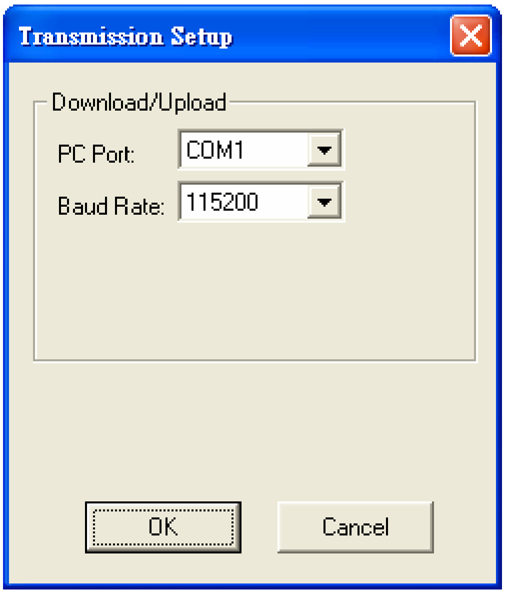
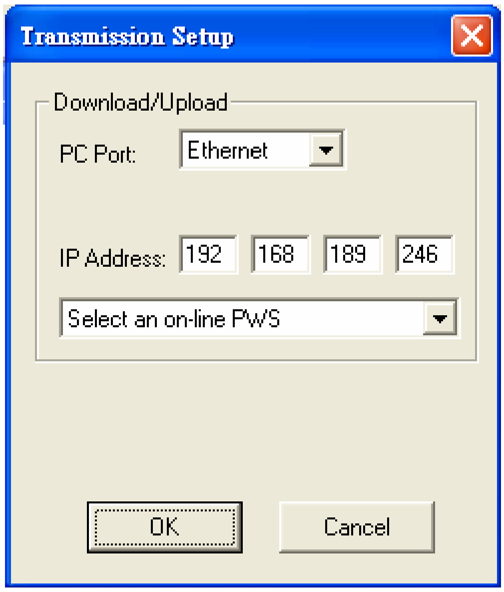


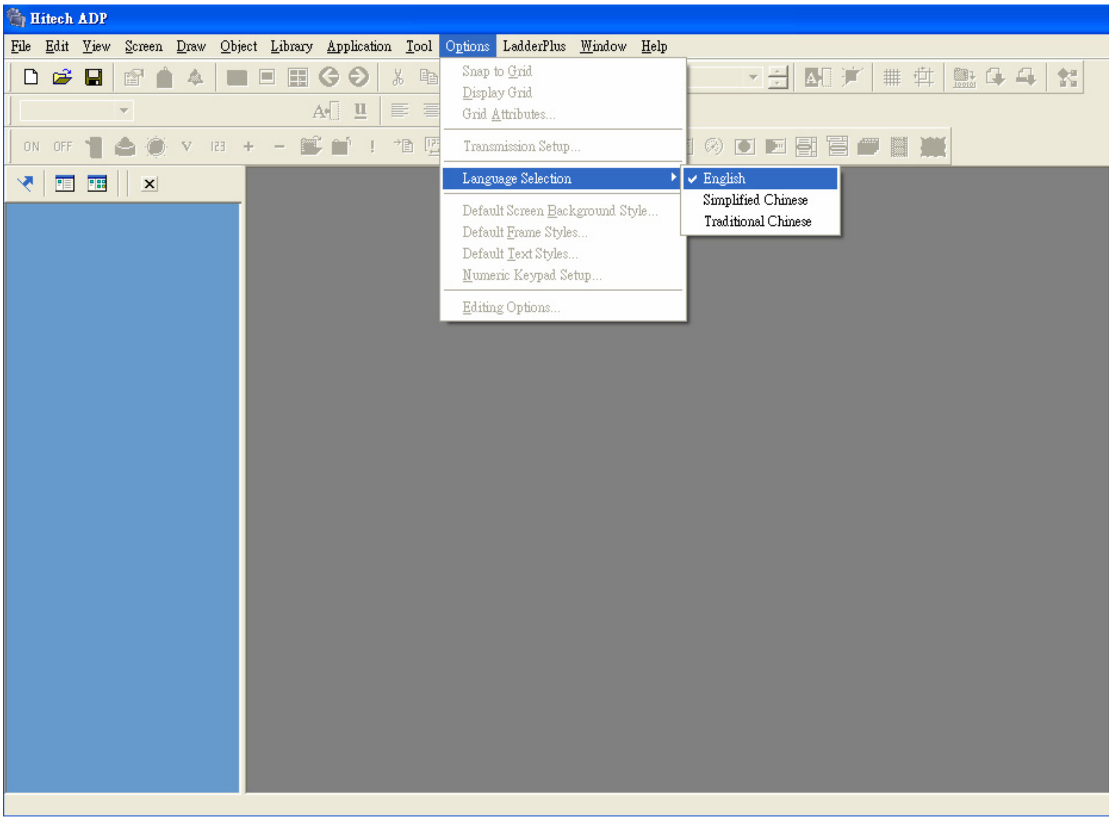
Figure 181. The [Transmission] Dialog Box

If [PC Port] is “Ethernet”, a user needs to input PC address or select from the drop-down list. See below.



2.11.5. [Language Selection]

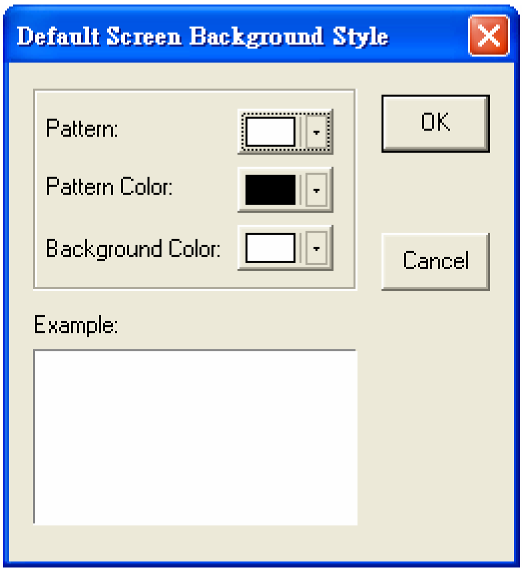
Select [Options]/[Language Selection], it will display three language options for the operation environment : They are English,Simpified Chinese and Traditional Chinese.



Select the language to convert; the message box will be as the following. You should exit the application first to let the new language selection take effect. Do you want to the new language selection?

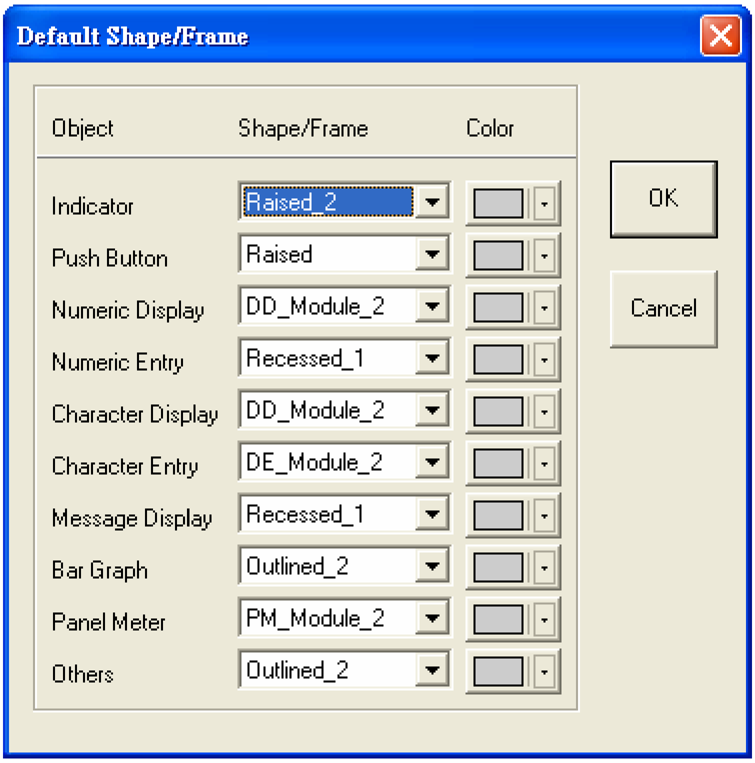
2.11.6. [Default Screen Background Style]

Select [Options]/[Default Screen Background Style], the dialog box will be as the following. A user can specify the pattern, its color and background color for all screens. The default setting will display in all screens except for the screen with special edit.



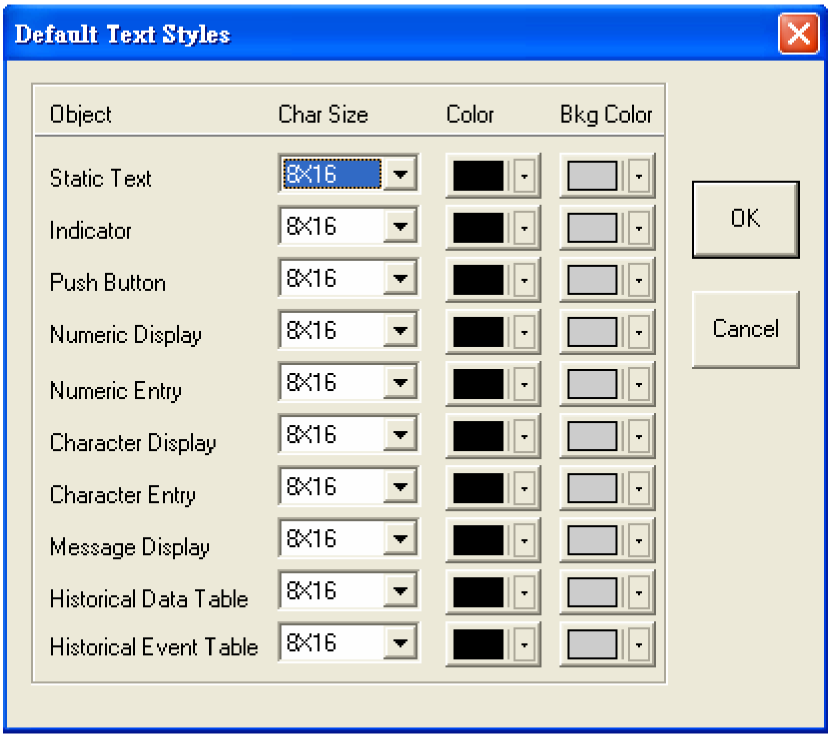
2.11.7. [Default Frame Style]

Select [Options]/[Default Frame Style], its dialog box will be as the following on the screen. A user can specify the different object types with their own Shape/Frame. Then those objects will display with specified Shape/Frame on the screen.



2.11.8. [Default Text Style]

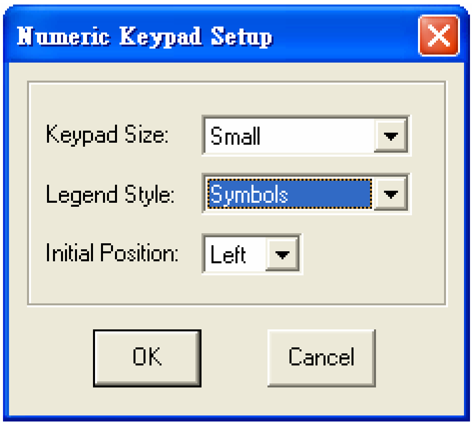
Select [Options]/[Default Text Style], a user can specify Char Size, Color, and Bkg. Color for each type of object. Those objects will display their setting on the screen.



2.11.9. [Numeric Keypad Setup]

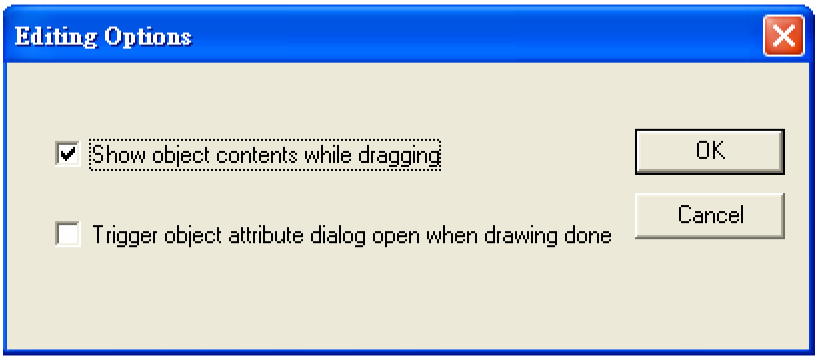
Select [Options]/[Numeric Keypad Setup], its dialog box will be as the following on the screen. A user can setup the numeric keypad on the screen. (ex. press [Numeric Entry] object to display the keypad.)

The keypad style as below：Small/Large; Symbols/Chinese Characters; Left/Right.



2.11.10. [Editing Options]

Select [Options]/[Editing Options], the dialog box will be as the following on the screen. A user can setup the edit environment here.



2.12. Window

There are [Cascode],[Tile],[Close All] options in [Window] menu and list all open screens.

[Tile] is used to copy and contrast with the screens.

[Close All] is to close all open sceens once; the screen will not be saved. The application is not closed.

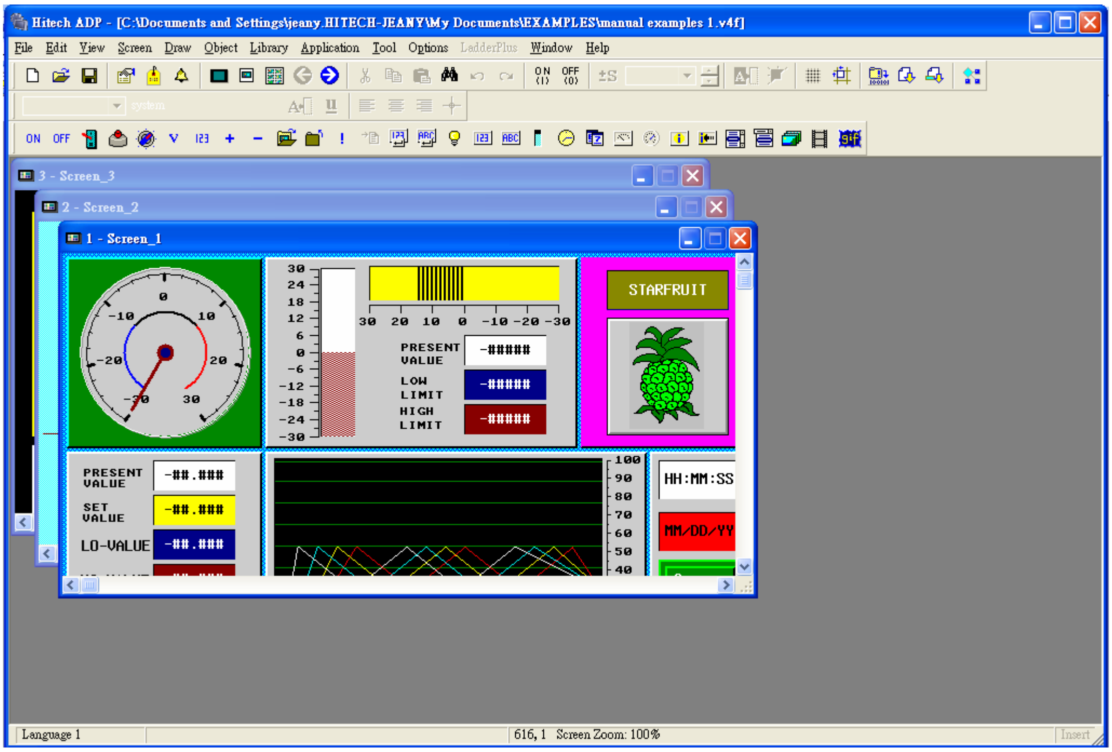


Figure 182. [Cascode]

2. Instructions

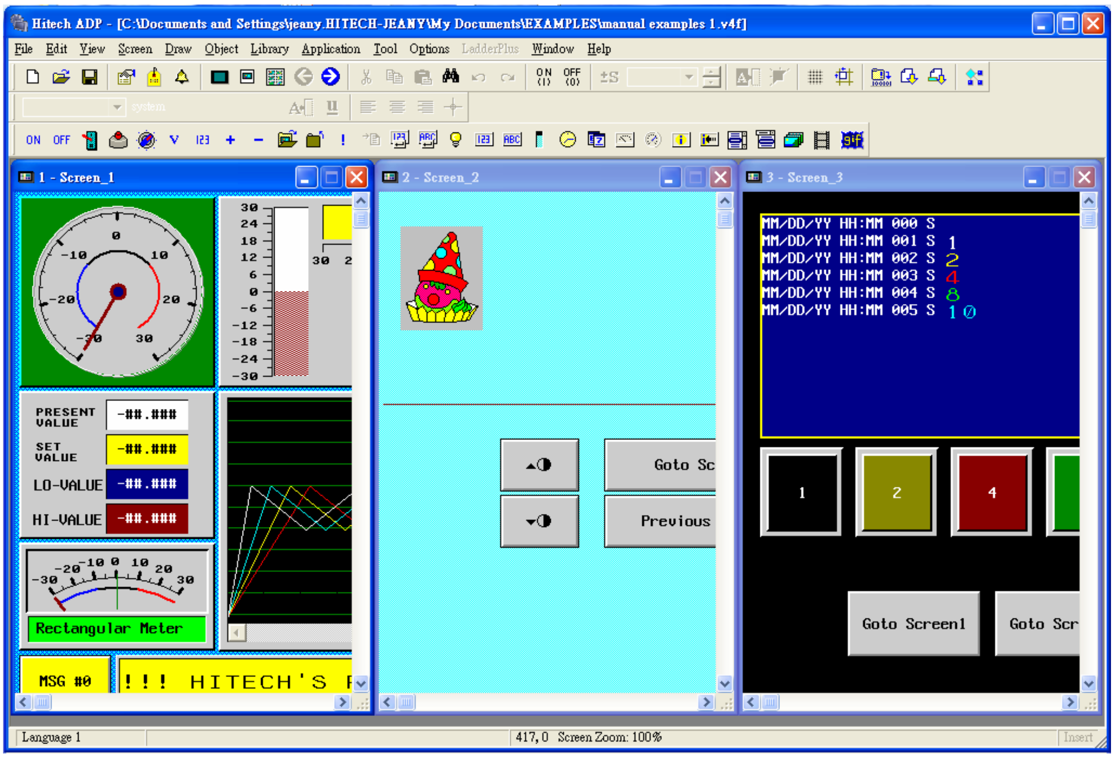


Figure 183. [Tile]

2.13. Help

[Help] offers users for the complete details and instruction about specific topics. There are [Macro],[Ladderplus] and [About] options in [Help] menu.

2.13.1. [Macro]

Select [Help]/[Macro], the dialog box will be as the following. See Figure 184. A user can consult macoro functions here.

Figure 184. Macros

2.13.2. [Ladderplus]

Select [Help]/[Ladderplus], the dialog box will be as the following. See Figure 185. A user can consult the ladder reference for functions and commands.

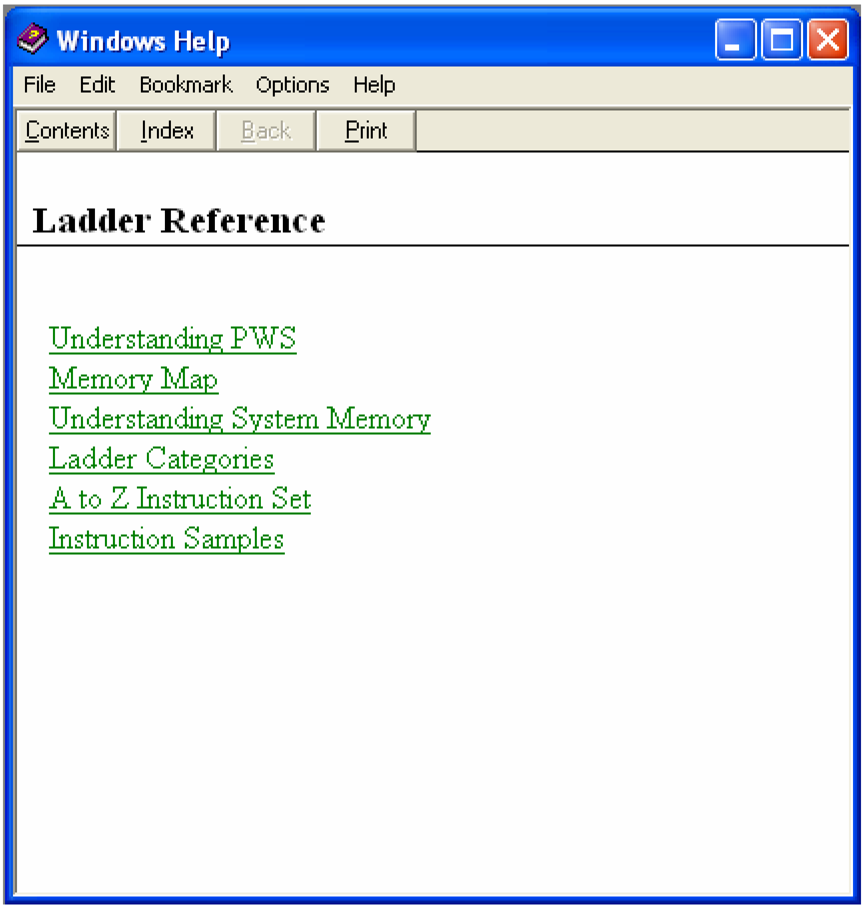
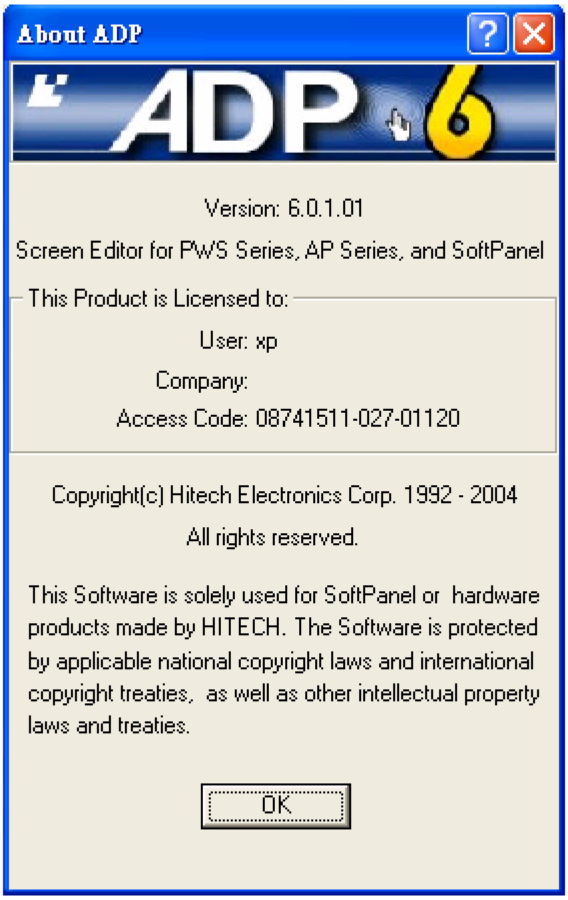


Figure 185. Ladder Reference

2.13.3. [About]

Select [Help]/[About], check the version of ADP. See below.


About ADP
ADP 6
Version: 6.0.1.01
Screen Editor for PWS Series, AP Series, and SoftPanel
This Product is Licensed to:
User: xp
Company:
Access Code: 08741511-027-01120
Copyright(c) Hitech Electronics Corp. 1992 - 2004
All rights reserved.
This Software is solely used for SoftPanel or hardware products made by HITECH. The Software is protected by applicable national copyright laws and international copyright treaties, as well as other intellectual property laws and treaties.
OK

3. Recipe

3.1. Recipe

Recipe is composed of a block of similiar systematic data. Because of the similarity, user can edit them as a group of receipe for sending conveniently. By using this way, user can send data efficiently and exactly. Recipe is not applicable on all models; please refer to Appendix A. - Table of the ADP 6.0 Features and HMI Models for the complete details.

The following coating equipment is used to spray paint on different parts. The paint colors are limited to white, red, blue, dark and mixed color (1 = spray, 0 = no spray). One can use recipe to present and save the data with more simplification and convenience.

Coating Equipment

Color	White	Red	Blue	Black	Time
Top	1	0	0	0	3
Button	0	1	0	0	2
Left	0	1	1	0	1
Right	0	0	0	1	1

This recipe data has five variables: White, Red, Blue, Dark and Time.

1st Recipe Part: Top, White, 3 min. ,

2nd Recipe Part: Button, Red, 2 min.,

3rd Recipe Part: Left, Purple, 1 min.,

4th Recipe Part: Right, Black, 1 min.,

A variable represents a word, the recipe size is 5 and the Number of recipe is 4.

3.2. Recipe Operation Steps

This section will illustrate the operation and application of recipe. Section 3.1 Coating Equipment will be took as example.

1. First, a user needs to define **Recipe Register**. Select [Application]/ [Workstation Setup], and enter the PLC address, [Recipe size] and [Number of recipes] on the [Miscellaneous] tab. In this example, [Data size] = 5, [Number of recipes] = 4. See Figure 186.

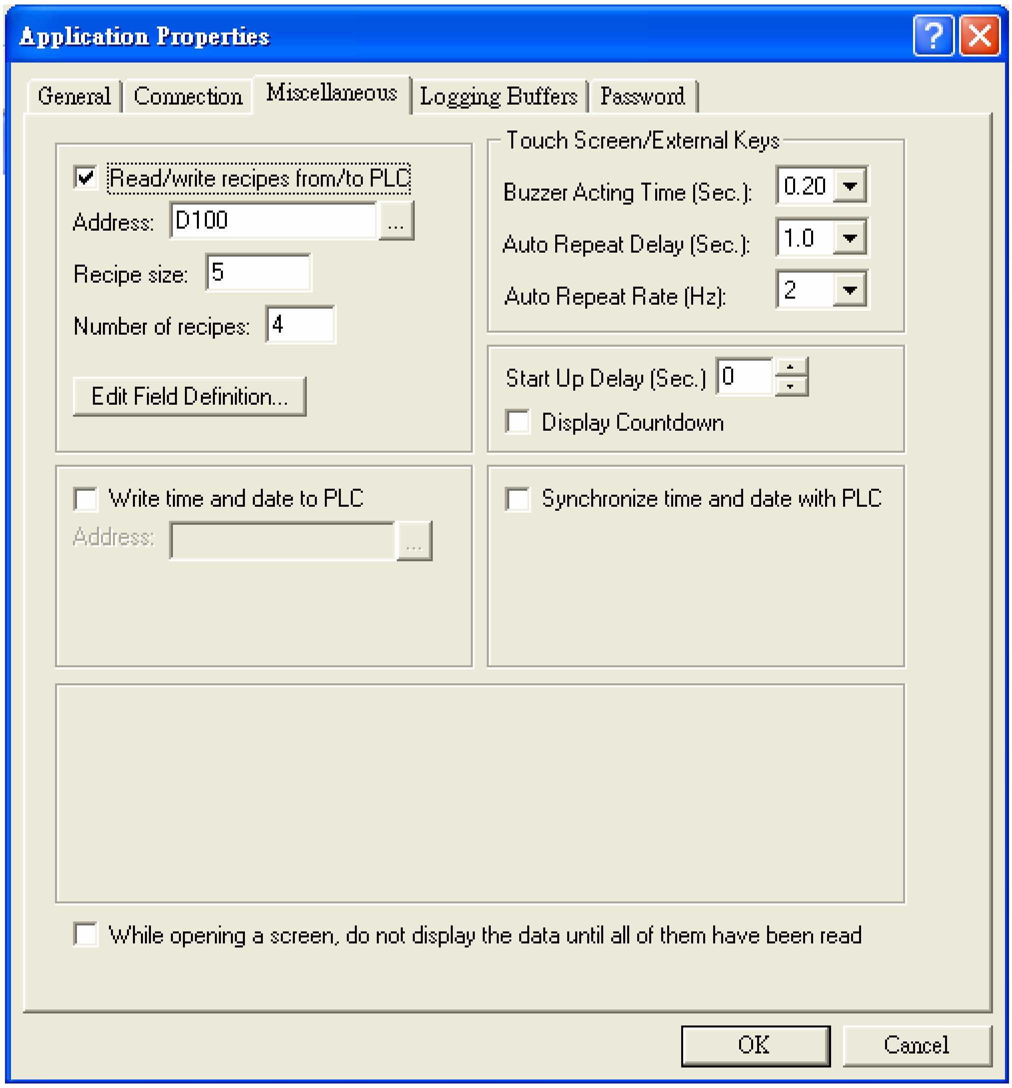


Figure 186. Setup [Recipe size] and [Number of recipes]

According to the above parameters setup, the starting address of PLC Recipe Register is D100, size is 5Words. The starting address of PWS Current Recipe is RCPW0, size is 5Words. The starting address of PWS RAM is RCPW5, size is 5*4Words.

If the Recipe Write Flag is ON, the HMI will write Current Recipe from PWS RCPW0~RCPW4 to PLC D100~D104. If the Recipe Read Flag is ON, the HMI write recipe from PLC D100~D104 to PWS RCPW0~RCPW4. If user wants the HMI to read/write the recipe data from/to the PLC, one needs to define RNR (Dn+5).

For the instructions of HMI recipe registers, please refer to the Section 4.3. Recipe Register.

2. Then, a user can edit its application and save as *.V6F. See Figure 187. In the example, [Numeric Entry] object is used to display the coating equipment data on HMI.

   RCPW5~RCPW9 represents 1st Top recipe data
   RCPW10~RCPW14 represents 2nd Button recipe data
   RCPW15~RCPW19 represents 3rd Left recipe data
   RCPW20~RCPW24 represents 4th Right recipe data

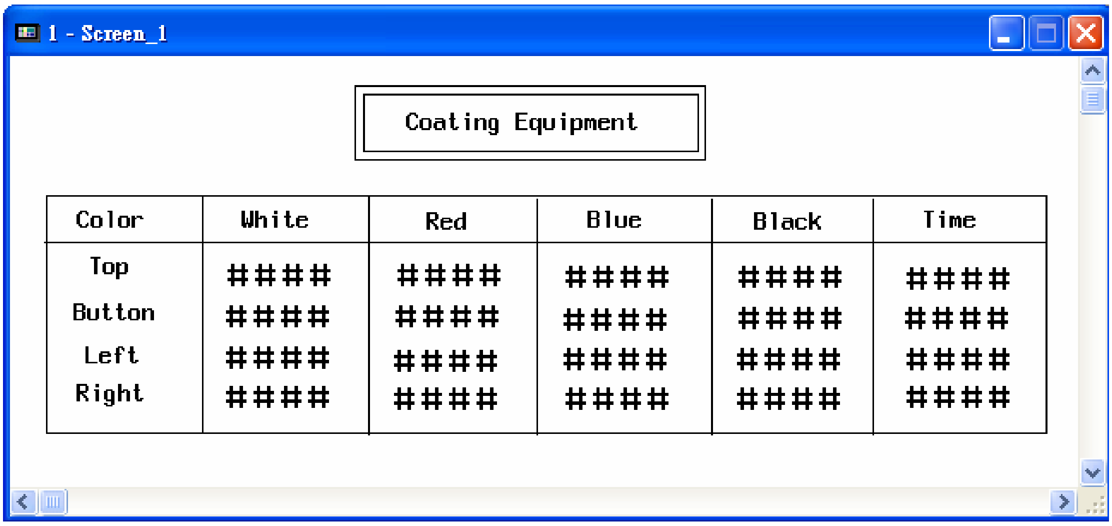


Figure 187. The Screen of Coating Equipment

3. Download the ADP file to HMI. First, select [Download Application] on HMI, then select [Application]/ [Download Firmware and Application] in ADP. The dialog box will be appeared as below in ADP. See Figure 188.

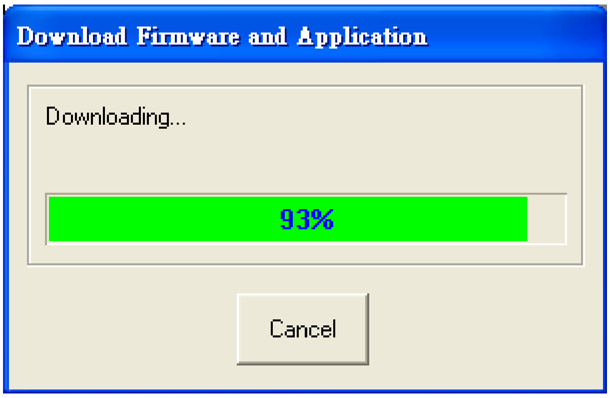


Figure 188. Download Firmware and Application

4. Then upload the recipe from HMI to ADP. Select [Upload Recipes] on HMI, then select [File]/[Upload Recipes] in ADP.

The recipe will be uploaded to ADP and saved as *.RCP. See Figure 189.

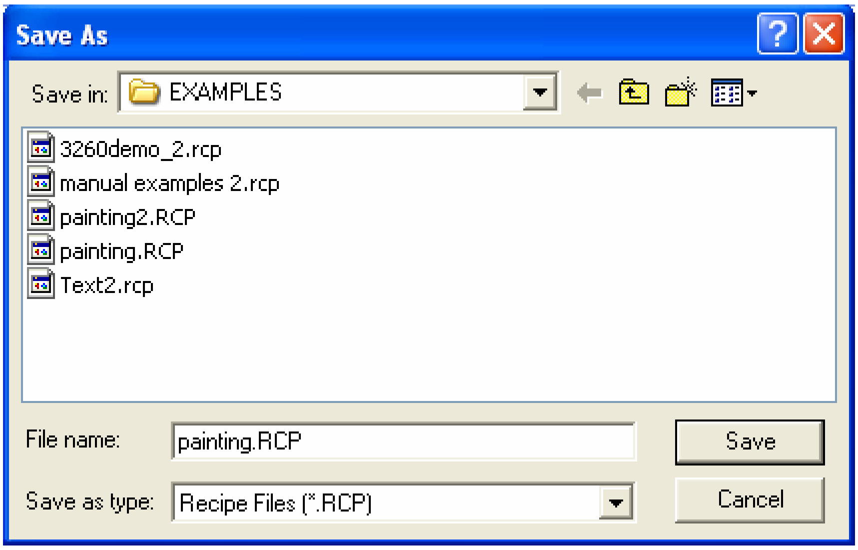


Figure 189. Save the Upload Recipe

5. After the above steps have completed, the recipe file can be open to edit. Select [Tool]/ [View/Edit], the ADP receipe edit dialog box should be appeared as Figure 190. Select [File]/ [Open] and select the desired recipe file (ex. "painting.RCP"). Note: Recipe files "*.RCP" must be uploaded and saved in HMI first, the recipe size and number of recipes can not be modified

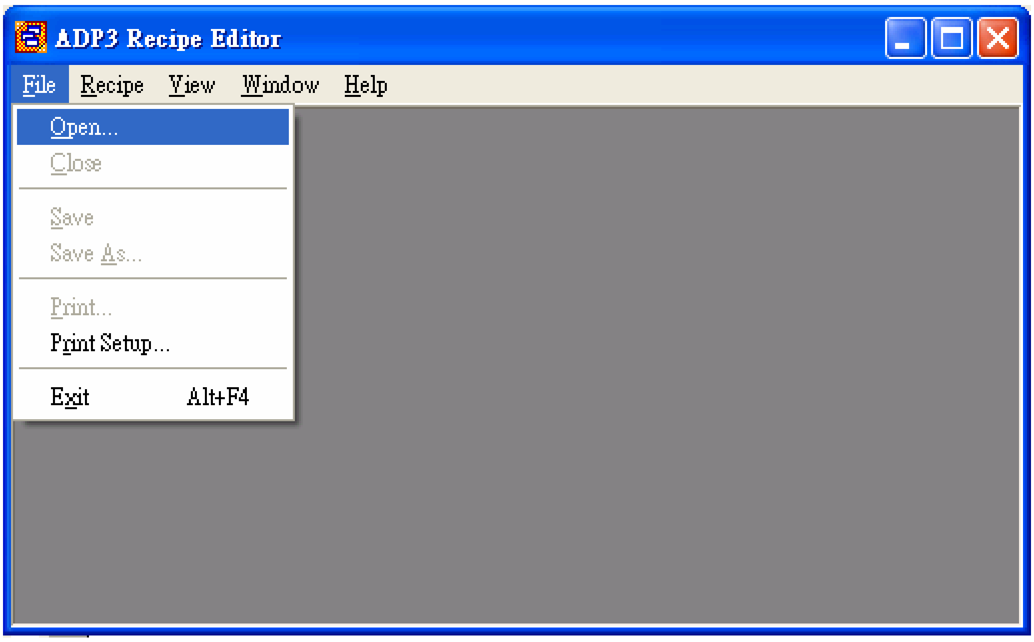


Figure 190. The ADP Recipe Editor Dialog Box

6. Select [Recipe]/[Open] to edit the recipe, enter the recipe number to open. See Figure 191. The examples of coating equipment are [Recipe Number] =1~4.

Figure 191. Specify Recipe Number

7. Its dialog box should be appeared on the screen. See Figure 192. A user can edit the data in the dialog box. Note that the count of editable data is data size. After edit, select [File]/[Save] to save the data. For example, Recipe #1 is (1,0,0,0,3), Recipe #2 is (0,1,0,0,2)…etc.

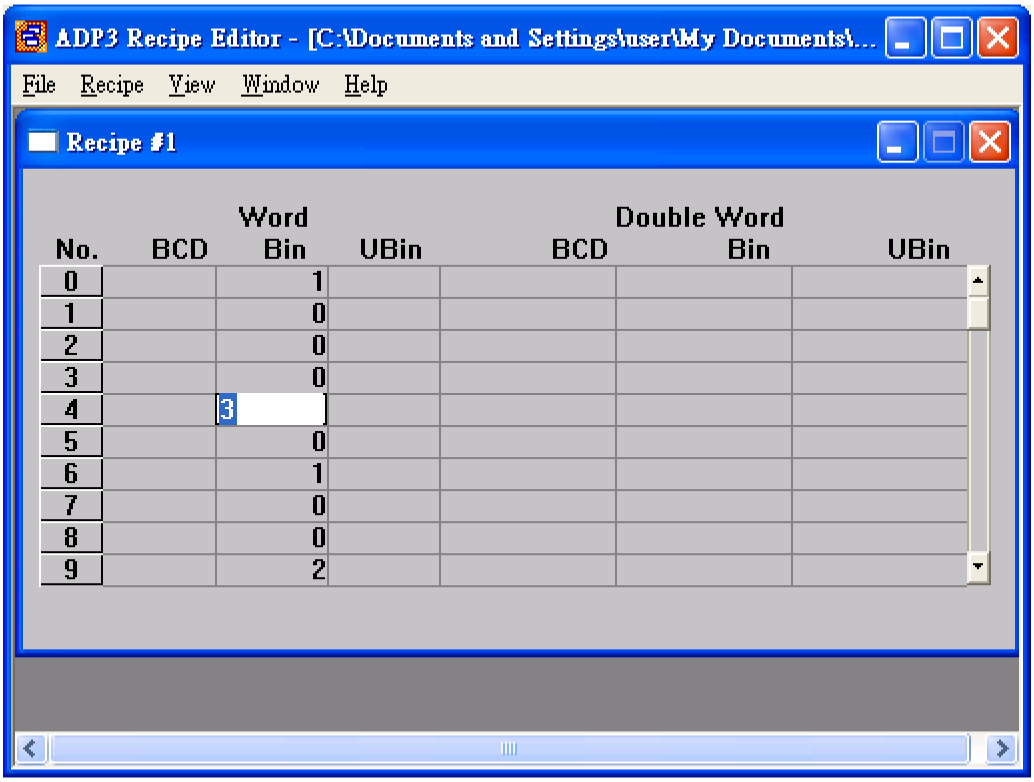


Figure 192. Edit the Recipe Data

8. Select [Download Recipes] on HMI, then select [File]/[Download Recipes] to download the recipe file. See Figure 193.Figure 193

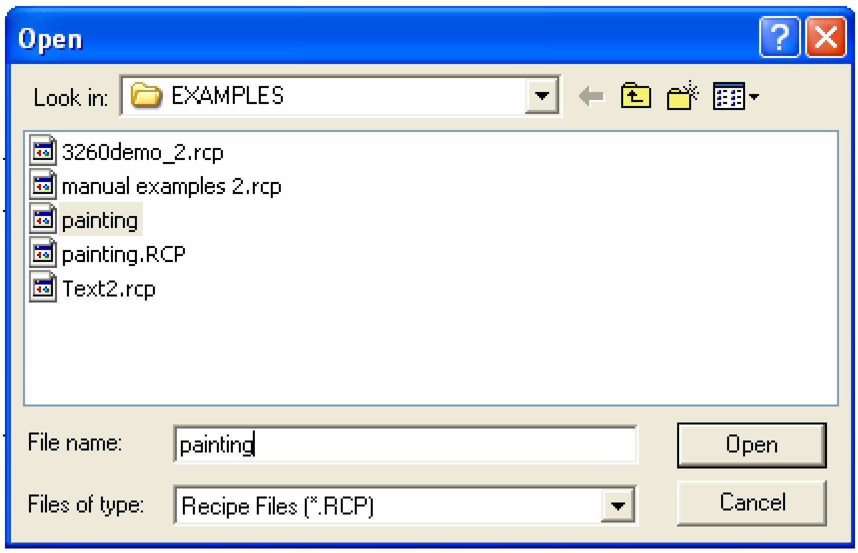


Figure 193. Open Download Recipe

9. Finally, select [Run] on HMI. The HMI will display the recipe filled with data as the screen displayed in ADP. The illustration of coating equipment includes painting methods and time. See Figure 194.

Coating Equipment

Color	White	Red	Blue	Black	Time
Top	1	0	0	0	3
Button	0	1	0	0	2
Left	0	1	1	0	1
Right	0	0	0	1	1

Figure 194. The Recipe Data on HMI

3.3. PLC Controls HMI Recipe

After the recipe is completed, a user can assign PLC to control the recipe through the communication between PLC and HMI. The PLC can read/write the recipe from/in HMI. This section will introduce the PLC setup and corresponding execution related to HMI. For the introduction of communication between PLC and HMI, please refer to Ch 4 Control and Status Block for the complete details.

The main steps to read recipe from PLC to HMI:

1. Set up continuous blocks, one is control block; the other is status block. Select [Application]/[Workstation Setup] in ADP, enter the PLC address and its size in [Control Block] and [Status Block] on the [General] tab. The minimize size is 6 Words for recipe in [Control Block].

2. Take coating equipment as example, the control block of PLC FX Series is D0-D5, size is 6; the status block is D10-D15. See Figure 195. For the properties which are not explained in this section, please refer to the Section 4.1. [Control Block] and the Section 4.2. [Status Block].

   (**Recipe Register** is defined the same as the Section 3.2. Recipe Operation Steps, the starting address is D100; Size is 5.

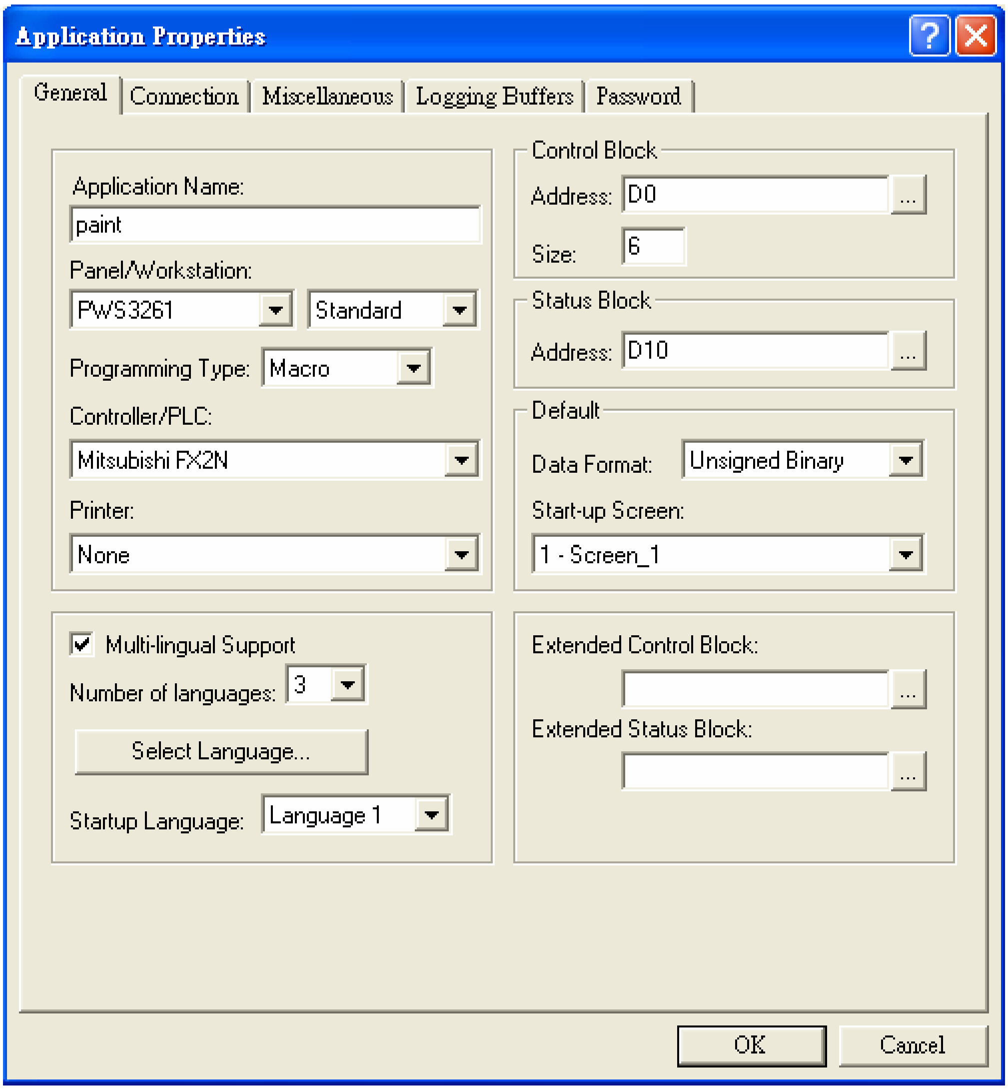


Figure 195. Setup [Control Block] and [Status Block]

The following are Words and its name in PLC. The Words related to read/write recipe displays with light blue background. Please refer to the Chapter 4. Control and Status Block for the complete details.

3. Recipe

PLC Internal Data Block

	Word	Bit	Member
Control Block	D0	0 1 2 ...... 13 14 15	SNR
	D1	**...... 4 5 6 ......**	**CFR**
	D2	.	LBCR#1
	D3	.	LBCR#2
	D4	.	LBCR#3
	D5	**0 1 2 ...... 13 14 15**	**RNR**
		. . .	
Status Block	D10	0 1 2 ...... 13 14 15	SSR
	D11	**...... 4 5 6 ......**	**GSR**
	D12	.	LBCR#1
	D13	.	LBCR#2
	D14	.	LBCR#3
	D15	**0 1 2 ...... 13 14 15**	**RIR**
		. . . . .	
Recipe Register	D100	1	1st Recipe, 1st Word
	D101	0	1st Recipe, 2nd Word
	D102	0	1st Recipe, 3rd Word
	D103	0	1st Recipe, 4th Word
	D104	3	1st Recipe, 5th Word
		. . .	

- CFR bit#4 is Recipe Write Flag; bit#5 is RCPNo Change Flag; bit#6 is Recipe Read Flag.

- GSR bit#4 is Recipe Write Status; bit#5 is RCPNo Change Status; bit#6 is Recipe Read Status.

3. Setup RNR to read recipe#N. The PLC D5 is assigned to read recipe#N from HMI. For example, 1st recipe N = 1.

4. Then set RCPNo Change Flag ON about 1sec. The HMI internal RCPNo and Current Recipe will be changed to read recipe#N. Remember to set RCPNo Change Flag OFF before re-trigger.

- **Status Block:** When the value of RCPNO is changed, the value of RIR (D15) will be changed as well. And the current recipe#N can be checked from PLC. Besides, if the RCPNo Change Flag sets ON, the GSR bit (D11 bit#5) will be set ON as well. The status bit will turn OFF automatically after the change of RCPNo.

For the steps of addressing recipe data, please refer to the Chapter 4. Addressing Recipe Data- For Enhanced HMI for the complete details.

HMI Data Register

Word	Recipe Data	Member
RCPW0	1	Current Recipe
RCPW1	0	
RCPW2	0	
RCPW3	0	
RCPW4	3	
RCPW5	1	Recipe #1
RCPW6	0	
.	0	
.	0	
RCPW9	3	
RCPW10	0	Recipe #2
RCPW11	1	
.	0	
.	0	
RCPW14	2	
.	.	.
.	.	.
.	.	.
.	.	.
RCPW20	0	Recipe #4
RCPW21	0	
.	0	
.	1	
RCPW24	1	
.	.	.
.	.	.
RCPNo	1	**Specified Recipe#N**
.	.	.
.	.	.

5. Finally, set Recipe Write Flag ON; then the HMI will write the Current Recipe in PLC. The recipe data will be saved in the designated **Recipe Register Block.** Remember to set the Recipe Write Flag OFF before re-trigger. In this example, set D1 bit#4 ON around 1 sec. Then the HMI will write the Current Recipe in PLC D100-D104.

- ♦ **Status Block:** When the HMI has written a recipe in, the GSR bit (D11 bit#4) will be set ON automatically. Simultaneously, if the Recipe Write Flag set OFF, the GSR bit will be set OFF as well.

After the above-mentioned steps have completed, the PLC can read one circle of a recipe from HMI. Remember to reset the flag OFF each time to trigger the flag.

Following the above-mentioned steps to set the RNR, RCPNo Change Flag and Recipe Read Flag and read a recipe from PLC to HMI .

3.4. The control of PLC recipe for HMI

The convenience of the HMI display can help user to control the PLC by the designed objects on HMI . The read or write action of the PLC receipe data can be controlled on HMI. Please refer to the Chapter 4. Control and Status Block.

This section takes coating equipment as example to control the PLC recipe data. The following is an illustration of coating equipment on HMI.

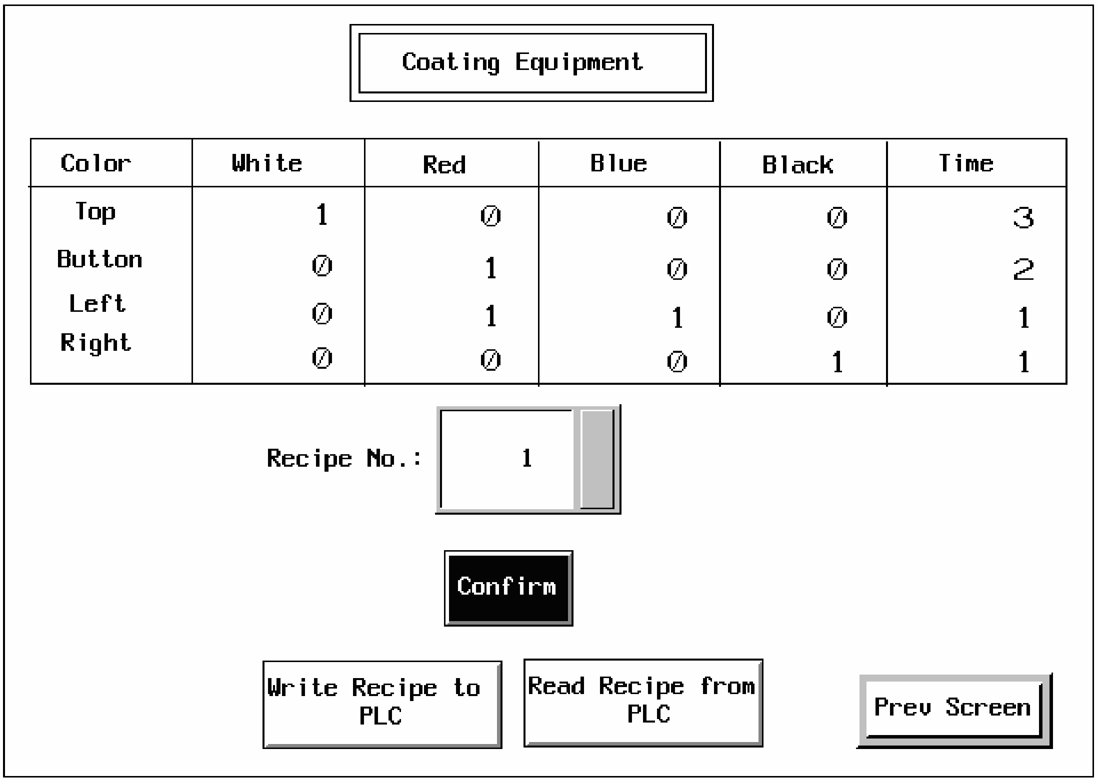


Figure 196. An Illustration of Coating Equipment on HMI

Steps to Object Design:

1. Design an object for user to enter the recipe N and write the recipe N in PLC RNR.

   In ADP, select [Object]/[Numeric Entry] and enter the address of RNR in [Write] box. See below. Take the coating equipment as example, the address of RNR is D5; so the PLC recipe N will write in D5.

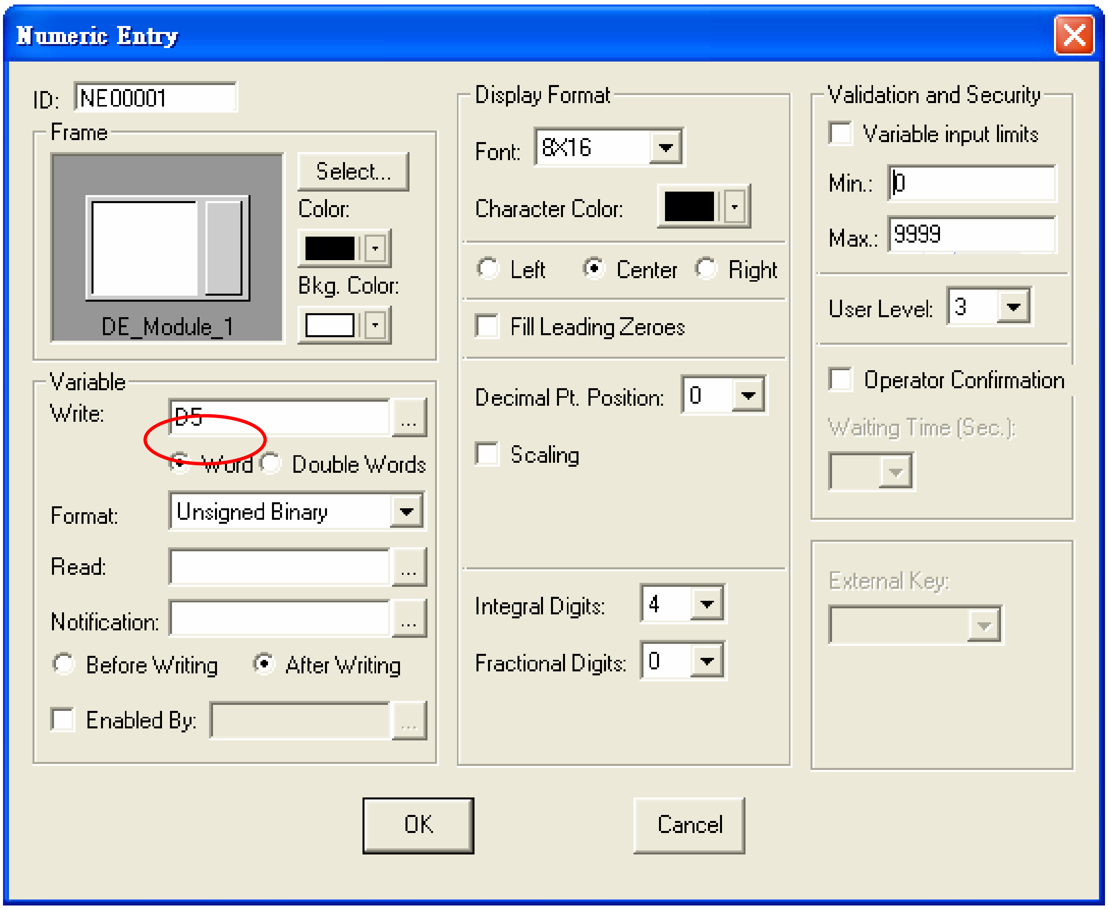


Figure 197. Setup the address to write recipe N in PLC RNR

2. Design an object which can confirm the designated recipe and write the commands to PLC CFR bit#5 RCPNo Change Flag; set the flag ON.

   In ADP, select [Object]/[[Push Button]/[Set Constant]. First, enter the address of CFR in [Write] box. Then enter the constant value in [Value] box to set its register bit. See below.

   Take coating equipment as example, the address of CFR is D1. RCPNo Change Flag is located in CFR bit#5. The constant is set "32" ($2^5 = 32$), so the RCPNo Change Flag will be set ON.

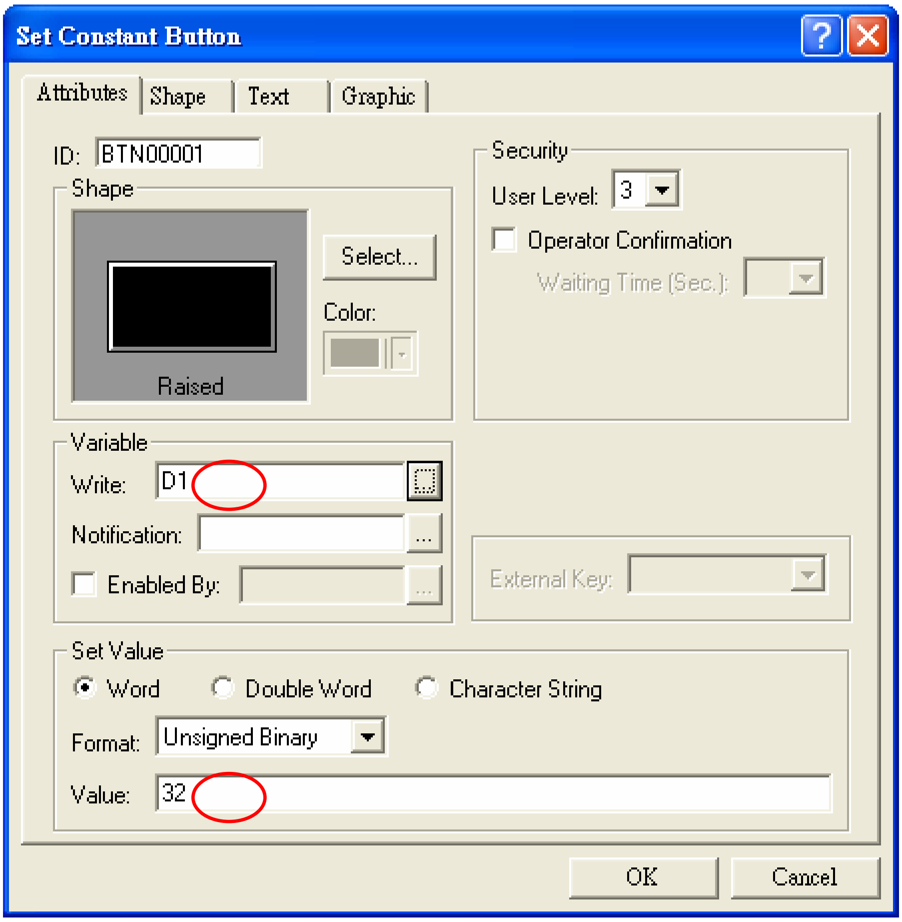


Figure 198. Set RCPNo Change Flag ON

3. Finally, design an object which can set CFR bit#4 Recipe Write Flag ON and write the Current Recipe in PLC.

4. Take coating equipment as example, the address of CFR is D1. The Recipe Write Flag is located in CFR bit#4, enter the value "16" ($2^4 = 16$). Then the Recipe Write Flag located in D1 bit#4 will set ON. See below.

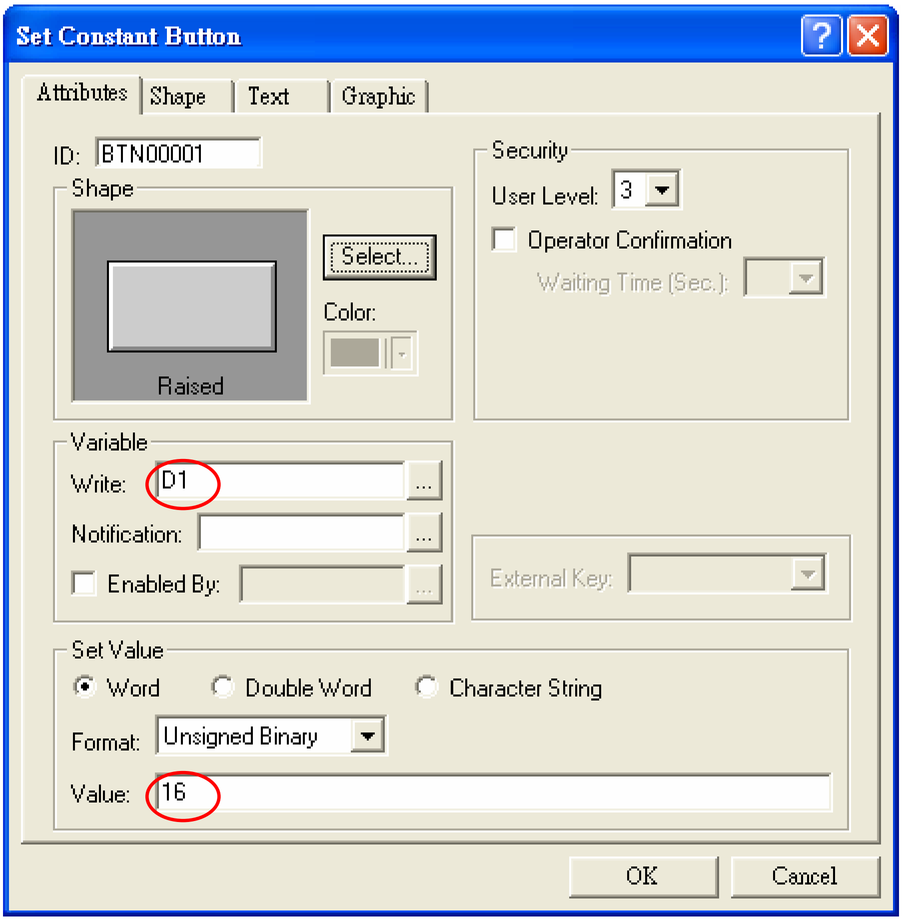


Figure 199. Setup Recipe Write Flag ON

5. If a user wants to read a recipe from PLC to HMI, the Recipe Read Flag located in CFR bit#6 must be set ON.

   Take the coating equipment as example, the address of CFR is D1.The Recipe Flag is located in CFR bit #6 ($2^{6}=$ 64). See below.

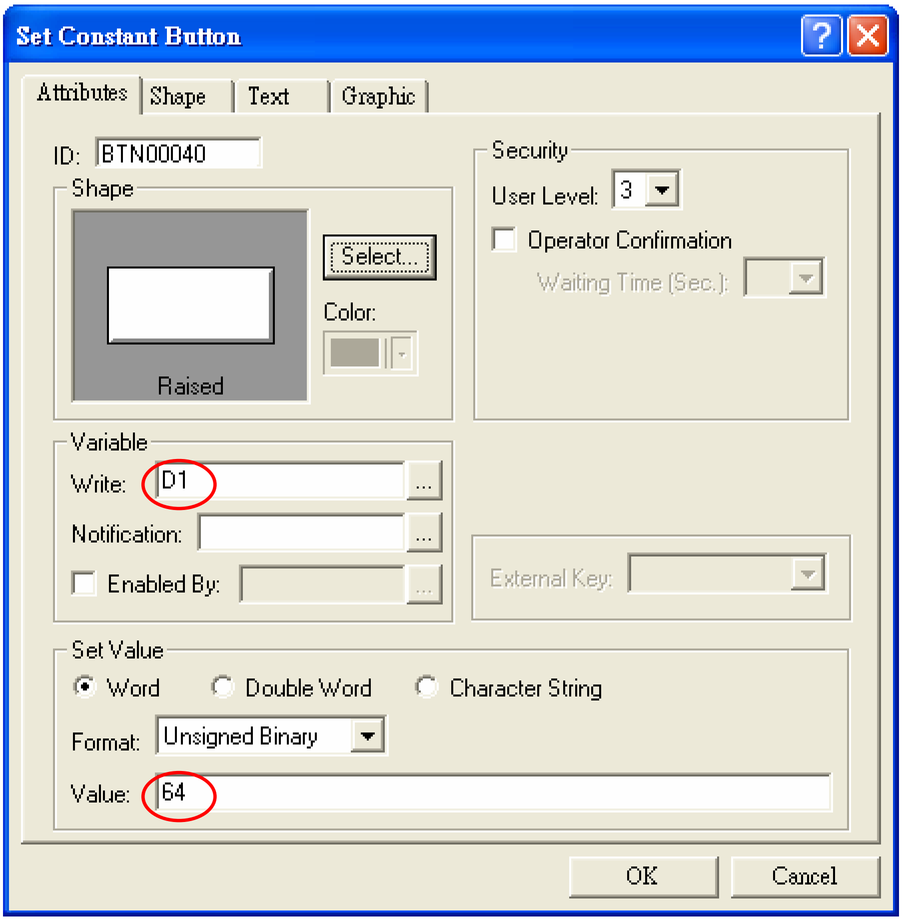


Figure 200. Setup Recipe Read Flag ON

After the above-mentioned steps of object design has completed, a user can execute the actions on HMI conveniently and directly. See Figure 200.

4. Control and Status Block

This chapter describes the general information that you need for programming your PLC to communicate with the Workstation. You can find detailed information for connecting specific PLCs' to the Work-station.

To set up the Control Block Address, Size and Status Block Address, se-lect [Application]/[Workstation Setup]. Enter the block address and size in the appropriate box shown as in Figure 179.

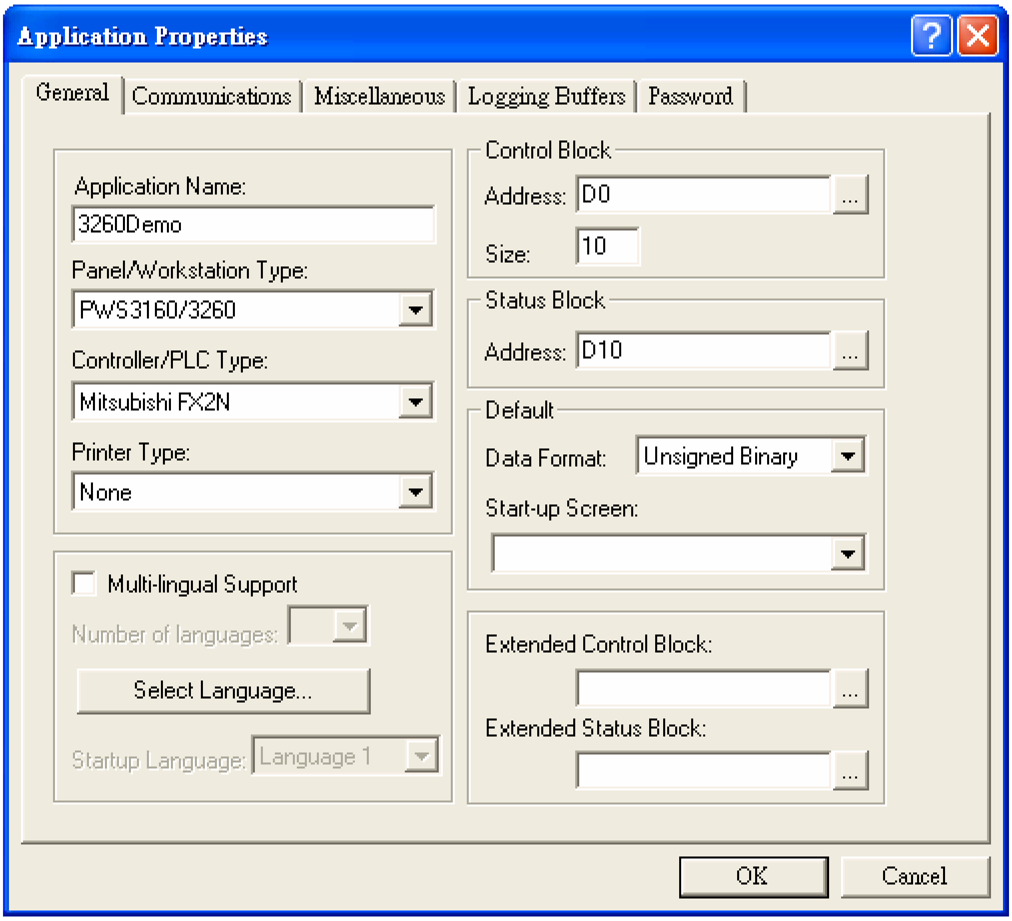


Figure 179. Workstation Parameters Setup

4.1. Control Block

Control Block is a block of contiguous registers in your PLC. The most important function in PWS is control block.

Control block enables the PLC to control actions on the Workstation through the PLC program. The minimum number of words used in the control block is 2. The maximum number of words used is 32 Words. The size of the control block varies according to the functionality required (if recipe functionality is used, then the minimum length is 6 Words). The members of Control Block are shown in the following table:

Word#	Member	Example: S7-200	Example: FX2
Dn	Screen Number Register (SNR)	VW0	D0
Dn+1	Command Flag Register (CFR)	VW2	D1
Dn+2	Logging Buffer Control Register #1	VW4	D2
Dn+3	Logging Buffer Control Register #2	VW6	D3
Dn+4	Logging Buffer Control Register #3	VW8	D4
Dn+5	RCPNo Number Register (RNR)	VW10	D5
Dn+6 and above	General User Area Register (GUAR) User's application registers CBn, n must not exceed 31.	VW12=cb6, VW14=cb7, … VW18=cb9, …	D6=cb6, D7=cb7, … D9=cb9, …

For example, if the starting address is D0 (the starting address can be specified, the member in the above table will shift according to the starting address); Size 10 represents the HMI can read data from D0~D9 (10 words) PLC registers and stored them in CB0~CB9 internal control block.

The functions of word Dn through Dn+m (word n+m) in Control Block will be discussed in the following sections.

4.1.1. Screen Number Register

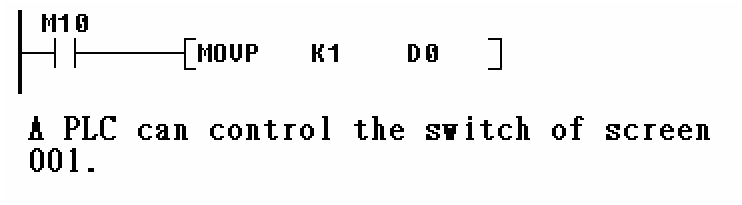
A PLC can request a Workstation to display a specific screen by setting its Screen Number Register (SNR) to the number of that screen.

SNR (Dn) enables PLC to control the HMI screen or print the screen. For example, A PLC can request a Workstation to display a specific screen by setting its SNR as the number of that screen.

The HMI can not clear the SNR (Dn) to 0 automatically. But HMI clears the SNR (Dn) to zero before change a screen. If the screen specified by the SNR does not exist, then the HMI does nothing but clears the SNR (Dn=0).

The value in SNR can be BCD or binary.

Example:



The value of data register SNR (Dn) and the functions (bit 0-bit 05) are as following:

Dn 16-Bit # (00-15)	Function
BIT 9-..BIT 0	The first 10bits will store the screen number to be changed to.
BIT 10	Reserve
Bit 13=off,12=off,11=off	No language was selected
Bit 13=off,12=off,11=on	Language1
Bit 13=off,12=on,11=off	Language 2
Bit 13=off,12=on,11=on	Language 3
Bit 13=on,12=off,11=off	Language 4
Bit 13=on,12=off,11=on	Language 5
Bit 13=on,12=on,11=off	Reserve
Bit 13=on,12=on,11=on	Reserve
Bit 14	Back light was turned off when set to 1
Bit 15	Back light was turned on when set to 1

The register (bit 0~9) to control the screen change and the other bits (bit 10~15) are not related. In other words, it is not necessary to control the back light or language when change the screen. Simultaneously, it is not necessary to assign to the screen number when set up the back light or select language.

4.1.2. Command Flag Register

The functions of the bits in CFR are summarized in the following table:

Dn+1 16-Bit# (00-15)	Function
Bit 0	Alarm History Buffer Clear Flag
1	Alarm Frequency Buffer Clear Flag
2	Print Change Paper Flag/Form Feed Flag
3	Hardcopy Flag
4	Recipe Write Flag - Data send from PWS to PLC
5	RCPNO Change Flag
6	Recipe Read Flag - Data send from PLC to PWS
7	Buzzer action control
8	Clear Flag #1
9	Clear Flag #2
10	Clear Flag #3
11	Clear Flag #4
12	Trigger Flag #1
13	Trigger Flag #2
14	Trigger Flag #3
15	Trigger Flag #4

The bits of CFR (Dn+1) will be introduced in the following.

Bit 0: Alarm History Buffer Clear Flag

The function of this PLC bit is to clear the data of alarm history buffer.

If bit 1 represents to clear the data of alarm history buffer; the HMI will clear its data when bit 0 sets to bit1.

PLC require reseting the bit if HMI is re-assigned to clear the data and it needs enough time for HMI detection; or use the "handshake" function to reset the bit as well. For “handshake” function, please refer to Section 4.2.2. General Status Register.

Bit 1: Alarm Frequency Buffer Clear Flag

The function of this PLC bit is to clear Alarm Frequency Buffer.

If bit 1 represents to clear the data of alarm frequency buffer, the HMI will clear its data when bit 0 sets to bit 1.

PLC requires reseting the bit if HMI is re-assigned to clear the data and it needs enough time for HMI detection; or use the "handshake" function to reset the bit as well. For "handshake" function, please refer to Section 4.2.2. General Status Register.

Bit 2: Print Change Paper Flag

The function of this PLC bit is to control the form feed of the printer connected with HMI.

Set the bit ON, the printer will change paper.

PLC requires reseting the bit if HMI is re-assigned to form feed and it needs enough time for HMI detection.

Bit 3: Hard Copy Flag

The function of this PLC bit is to control the hard copy of the printer connected with HMI.

Set the bit ON, the printer will print the current screen.

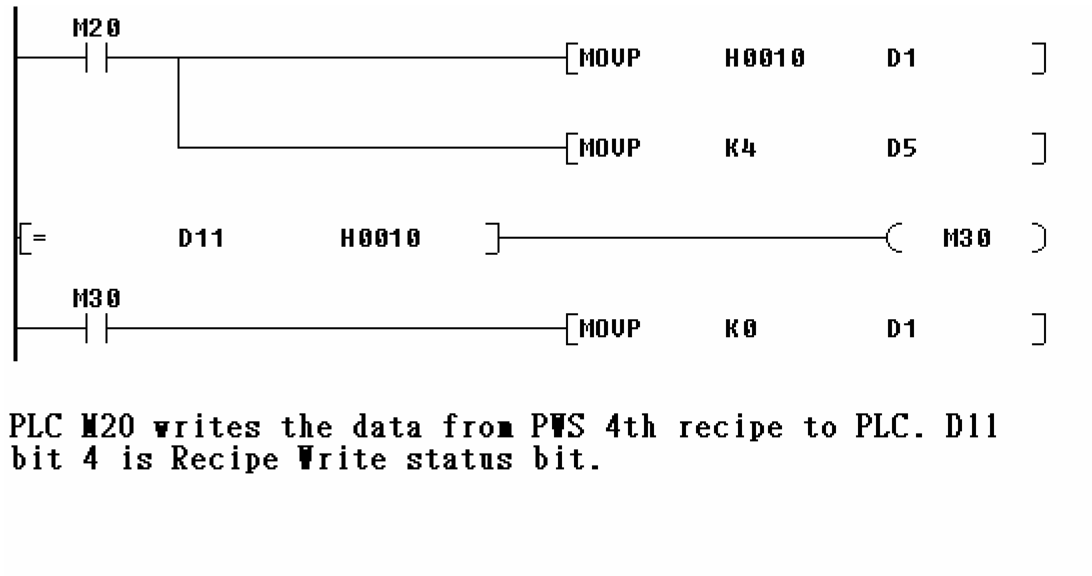
PLC requires reseting the bit if HMI is re-assigned to hard copy and it needs enough time for HMI detection.

Bit 4: Recipe Write Flag - from PWS to PLC

The function of this bit is to write the recipe from RAM to PLC. It only supports the HMIs with recipe function.

Set the RNR (Dn+5) to write the recipe in, then set the bit ON, the recipe will be written in PLC.

PLC requires reseting the bit if HMI is re-assigned to write another recipe in and it needs enough time for HMI detection.



Bit 5: RCPNo Change Flag

The function of this PLC bit is to change the content value of RCPNo. RCPNo is an internal HMI register used to control the recipe data. It only supports the HMIs with recipe function.

Set the RNR (Dn+5) to write the recipe in, then set the bit ON, RCPNo can be modified.

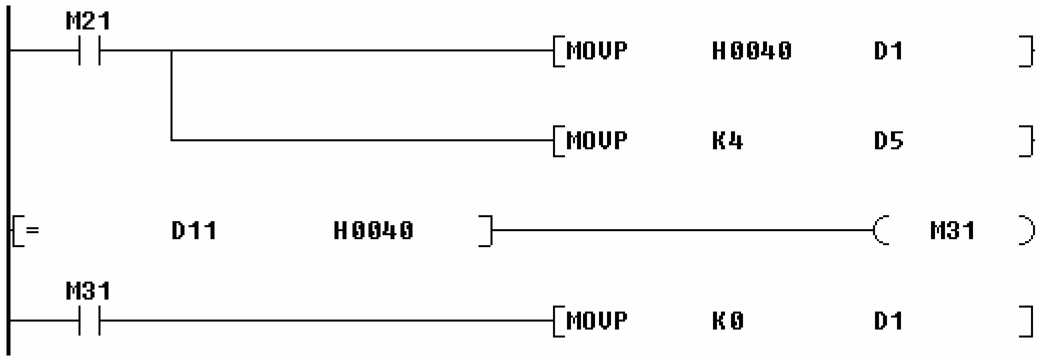
PLC requires reseting the bit if HMI is re-assigned to modify RCPNo. and it needs enough time for HMI detection.

Bit 6: Recipe Read Flag - from PLC to PWS

The function of this PLC bit is to read the recipe data from PLC to HMI and save it in RAM block.

Set the RNR (Dn+5) as the recipe number to be updated. Then set the bit ON, the HMI will update the corresponding recipe.

PLC requires reseting the bit if HMI is re-assigned to update and it needs enough time for HMI detection.



PLC M21 reads the data from PLC to the 4th recipe. D11 bit 6 is Recipe Read status bit.

Bit 7: Buzzer Flag

The function of the PLC bit is to control HMI's buzzer.

Set the bit ON (about 1 sec.) to start the buzzer.

PLC requires reseting the bit if HMI is re-assigned to start the buzzer.

Bit 8-11: Clear Flag #1-#4

The function of this PLC bit is to clear curves on HMI. There are four clear flags; a user can set up the corresponding signal to clear curves.

Set the bit ON/OFF once to clear the curves on trend graph or X-Y chart.

PLC requires reseting the bit if HMI is re-assigned to modify RCPNo. and it needs enough time for HMI detection.

Bit 12-15: Trigger Flag #1-#4

The function of this PLC bit is to sample the trend graph data, there are four trigger flags in all.

Once set the PLC bit ON/OFF, HMI will read the continuous data and covert it into a continuous curve which is displayed by trend graph or X-Y chart objects.

PLC requires reseting the bit if HMI is re-assigned to sample the data and it needs enough time for HMI detection.

4.1.3. Logging Buffer Control Registers: LBCRs

The other type of trend graphs in HMI is called the Historical Trend Graph. The HMI reads the data form the corresponding logging buffer according to the specific signal. Logging buffer is used to save the sampling data in battery backup RAM. Remember to specify the logging buffer to read from and its size.

In LBCRs, Trigger Bits are used to request Logging Buffers to sample the data from PLC. Clear Bits are used to clear Logging Buffers and Size Bits are used to determine the size of the data to be read. Therefore, user can use the LBCRs to clear Logging Buffers or to request the Logging Buffers to sample the data from the PLC.

There are twelve logging buffers here; HMI can be specified to sample the data at fixed period automatically; sample or clear the historical trend graph controlled by PLC either.

For the setup of logging buffers; See Figure 180.

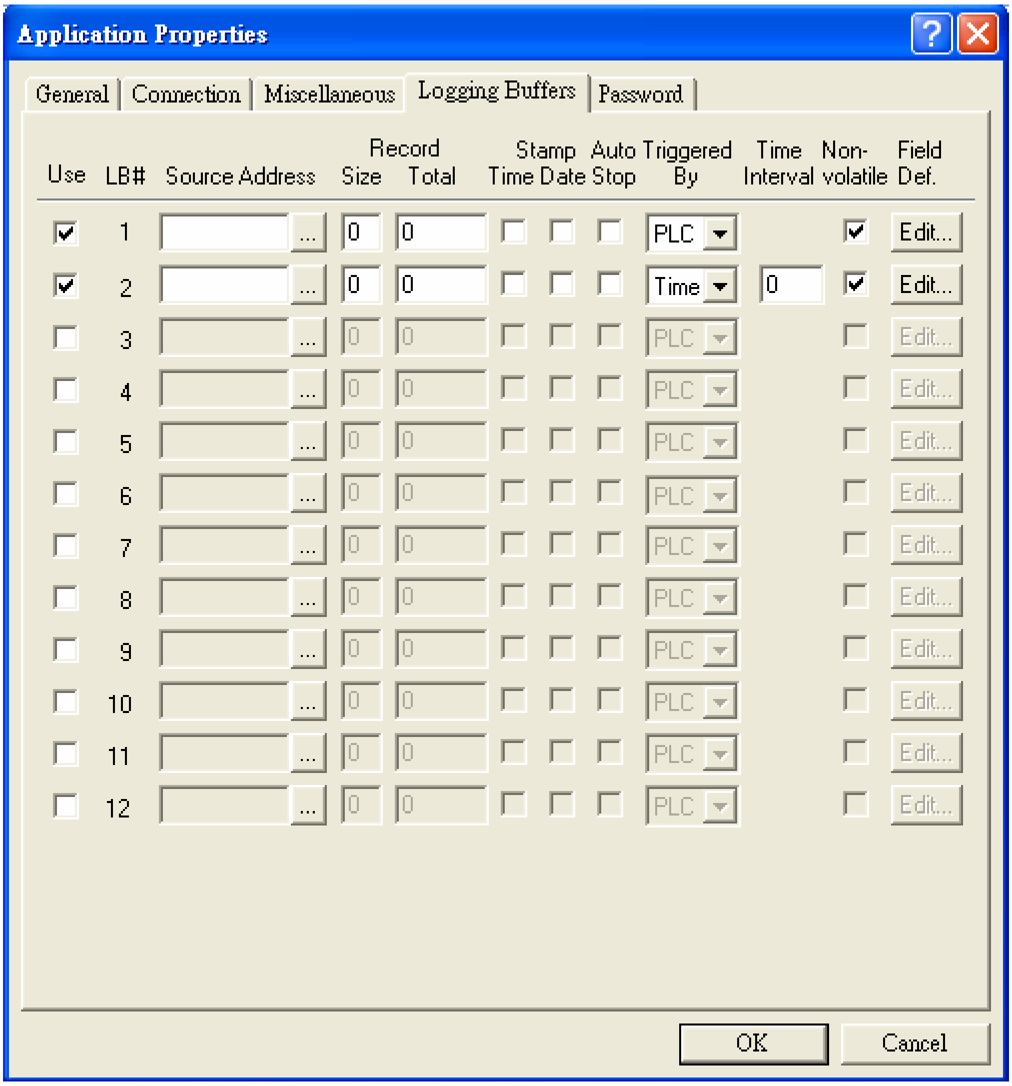


Figure 180. The Logging Buffer Setup

Note that LBCR1 controls Logging Buffer No. 1 through No. 4. LBCR2 controls Logging Buffer No. 5 through No. 8. LBCR3 controls Logging Buffer No. 9 through No. 12.

The positions of the Trigger Bit, Clear Bit, and Size Bit for each Logging Buffer are illustrated in the following table:

Bit #	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
VW4 LBCR1	0	SB4	CB4	TB4	0	SB3	CB3	TB3	0	SB2	CB2	TB2	0	SB1	CB1	TB1
Bit #	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
VW6 LBCR2	0	SB8	CB8	TB8	0	SB7	CB7	TB7	0	SB6	CB6	TB6	0	SB5	CB5	TB5
Bit #	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
VW8 LBCR3	0	SB12	CB12	TB12	0	SB11	CB11	TB11	0	SB10	CB10	TB10	0	SB9	CB9	TB9

SB: Size Bit; CB: Clear Bit; TB: Trigger Bit

LBCR1	Buffer # 4	Buffer # 3	Buffer # 2	Buffer #1
LBCR2	Buffer # 8	Buffer # 7	Buffer # 6	Buffer #5
LBCR3	Buffer #12	Buffer #11	Buffer #10	Buffer #9

Trigger Bit #1--#12：Sampling Control

The HMI not only can sample the historical trend graph in time interval but also sample the historical trend graph controlled by the trigger bit of PLC. Once trigger bit (TB#1—TB#12) sets ON/OFF (about 1 sec.), the HMI will execute sampling. Remember to set OFF before re-trigger.

Clear Bit #1--#12：Clear Control

By triggering the trend graph clear bit (CB#1--CB#12) ON/OFF one time(about 1 sec), the trend graph can be erased. The flag need to set OFF if need to trigger again.

Size Bit #1--#12：Multiple Sampling Control

By triggering the size bit (SB#--SB#12) ON, the HMI can sample one data, or multiple data. Once trigger bit (TB#1--TB#12) sets ON/OFF (about 1 sec.), the HMI will execute sampling.

Logging Buffer:

If need to setup the logging buffer, the first step is to specify the [Source Address] which is used to specify the PLC address to read the data from.

After the setup of [Source Address], the Size bit is OFF and the trigger bit is from 0 to 1. Then the logging buffer will read a data from the PLC.

To require logging buffer reading multiple data from PLC, a user set the [Size] of [Source Address] to read from. Then set the Size bit ON and the Trigger bit from 0 to 1. Note that the length of size cannot exceed 1,022 Words.

Set the Clear bit from 0 to 1 to clear the logging buffer.

To require logging buffer recording, PLC must reset the Trigger and Clear bit. It needs enough time for HMI detection

Example: FX2 PLC

Assumptions:

1. Control Block starts from D0 with the size of 6

2. Source Address of Logging Buffer #11 is D200

3. The record size of Logging Buffer#11 is 3 words

To request Logging Buffer #11 to read only one record of the data from the PLC, then first put the data to be read in D200-D202. Set the Size Bit 10 of D4 to be OFF and change the Trigger Bit 8 of D4 from 0 to 1. The HMI reads D200-D202 for Logging Buffer #11 after it detects the Trigger Bit 8 of LBCR3 changed from 0 to 1.

To request Logging Buffer #11 to read 50 records of the data from PLC, set D200 to be 150(=50x3). Put the data to be read in D201-D350. Set the Size Bit 10 of D4 to be ON and change the Trigger Bit 8 of D4 from 0 to 1. The HMI reads D200-D202 first to get the real size of the data to be read after it detects the Trigger Bit 8 of LBCR3 changed from 0 to 1. Then the HMI reads D200-D350 and stores in battery backup RAM.

To request Logging Buffer #11 to clear records, then change the clear bit of D4 from 0 to 1.

4.1.4. RCPNo Number Register : RNR

RCPNO is an internal register of the HMI that specifies the current recipe number. To change the RCPNO, the PLC first sets the RNR to the number of the recipe and then turns on the RCPNO Write Flag or Recipe Read Flag.

To change RCPNO by PLC, the PLC has to set RNR to the number of recipe and turn on the RCPNO Change Flag which is CFR 5 bit. If the RNR is zero or greater than the maximum recipe number, then the HMI would ignore the request.

To request HMI to change RCPNO, the PLC must reset the RCPNO Change Flag, or use the RCPNO Change Status which is GSR 5 bit Therefore, be sure to set this flag with enough time so the HMI is able to detect it.

4.1.5. General User Area Register

For high-speed display, the HMI reads the data from internal register only (cannot write in) when edit in ADP. (The maximum size is 32; the size relied on the length of control block) The format is shown in the following table:

Format	Description
CB n	n represents the Words data of the nth register , n is decimal number; n ≥ 0 but smaller than the specified size.
CBn b	n.b represents the bit data correspondent with nth word register, b is hexadecimal nth b = 0-f.

For example, if the address of the Control Block is D0, then user can select [Object], [Numeric Display] to display the Recipe Number Register by configuring it to display CB5 instead of displaying D5.

The internal buffer for the Control Block is read only. This means that, for example, one can configure a Numeric Display object to show the value of CB2, but you cannot configure the object to allow the operator to change the value of CB2.

For example, if user wants to achieve the effect of the RNR numeric display object by using ADP. He can specified D5 to read from (writeable) or CB5 to read from(unwriteable).

4.1.6. Determine the Size of Control Block

As every application needs a Screen Number Register (SNR) and a Control Flag Register (CFR), User can refer to the following rules to determine the size of Control Block:

1. If the HMI reads/writes a recipe from/to a PLC, then the minimum size is six.

2. If Item 1. is not true and the HMI uses LBCR3 to control Logging Buffer #9-12, then the minimum size is five.

3. If either Item 1. or Item 2. is not true and the Workstation uses LBCR2 to control Logging Buffer #5-8, then the minimum size is four.

4. If none of Item 1. through Item 3. is true and the Workstation uses LBCR1 to control Logging Buffer #1-4, then the minimum size is three.

5. If none of the above is true, then the minimum size is two.

6. The size of Control Block is the minimum size plus the size of the user area.

4.2. Status Block

Status Block is a block of contiguous registers in your PLC that display status information from the Workstation. For example, you can get the current screen number from the first word of the Status Block. The constituents of Status Block are shown in the following table:

Word#	Member	Example: S7-200	Example: FX2
Dm	Screen Status Register (SSR)	VW20	D10
Dm+1	General Status Register (GSR)	VW22	D11
Dm+2	Logging Buffer Status Register #1 (LBSR1)	VW24	D12
Dm+3	Logging Buffer Status Register #2 (LBSR2)	VW26	D13
Dm+4	Logging Buffer Status Register #3 (LBSR3)	VW28	D14
Dm+5	RCPNo Image Register (RIR)	VW30	D15
Dm+6	PWS700X Key Image Register	VW32	D16

For example, if the status block is D10 and the size is 6 Words; the HMI will write the status data of current screen in D10~D15. The size of Status Block is six words (seven words for 700X). Some words are not needed in application.

4.2.1. Screen Status Register

When a screen is changed on the HMI, the PLC sets its Screen Status Register (SSR) to the number of new screen. Therefore, the PLC can identify the current screen by reading the SSR.

The value of SSR can be in BCD or binary format.

4.2.2. General Status Register

The components of the General Status Register (GSR) are shown in the following (bit 0- bit 15):

D11 16-Bit **# (00-15)**	Member
Bit 0	Password Level Status (not available for applications configured to monitor alarms)
1	Password Level Status (not available for applications configured to monitor alarms)
Bit 0	Alarm History Buffer Clear Status
1	Alarm Frequency Buffer Clear Status
2	Form Feed Status
3	Hardcopy Status
4	Recipe Write Status
5	RCPNO Change Status
6	Recipe Read Status
7	Battery Status
8	Clear Status Flag #1
9	Clear Status Flag #2
10	Clear Status Flag #3
11	Clear Status Flag #4
12	Trigger Status Flag #1
13	Trigger Status Flag #2
14	Trigger Status Flag #3
15	Trigger Status Flag #4

Bit 0, 1: Password Level Status - (not available for applications configured to monitor alarms)

Once connected with HMI, the password level status bit 0 ~ bit 3 represent the current user level.

Level 0 ==>Bit 0 = off, Bit 1 = off
Level 1 ==>Bit 0 = on, Bit 1 = off
Level 2 ==>Bit 0 = off, Bit1 = on
Level 3 ==>Bit 0 = on, Bit1 = on
Level 4 ~ 9 ==>Bit 0 = on, Bit 1 = on

Bit 0: Alarm History Buffer Clear Status

The HMI will turn ON this status bit when it detects the Alarm History Buffer Clear Flag being turned ON. When the HMI finishes clearing the Alarm History Buffer, it will turn OFF this status bit.

Bit 1: Alarm Frequency Buffer Clear Status

The HMI will turn ON this status bit when it detects the Alarm Frequency Buffer Clear Flag being turned ON. When the Workstation finishes clearing the Alarm Frequency Buffer, it will turn OFF this status bit.

Bit 2: Form Feed Status

The HMI will turn ON this status bit when it detects the Form Feed Flag being turned ON. When the HMI finishes sending the Form Feed character to a printer, it will turn OFF this status bit.

Bit 3: Hardcopy Status

The HMI will turns ON this status bit when it detects the Hardcopy Flag being turned ON. When the Workstation finishes printing the current screen, it will turn OFF this status bit.

Bit 4: Recipe Write Status

The HMI will turns ON this status bit when it finishes sending a recipe from RAM block of HMI to PLC. The HMI will turn OFF this status bit as it detects the Recipe Write Flag being turned OFF. One can use this bit as a handshake signal to switch the Recipe Write Flag.

Note that this function only supports the HMI with recipe function.

Bit 5: RCPNo Change Status

The HMI will turns ON this status bit when it detects the RCPNO Change Flag being turned ON. When the Workstation finishes changing the RCPNO, it will turn OFF this status bit.

Bit 6: Recipe Read Status

The Workstation will turns ON this status bit when it finishes reading a recipe from PLC. The Workstation will turn OFF this status bit as it detects the Recipe Read Flag being turned OFF. One can use this bit as a handshake signal to switch the Recipe Read Flag.

Note that this function only supports the HMI with recipe function.

Bit 7: Battery Status

The HMI will turn ON the Battery Status if it detects battery low before running an application.

Bit 8-11: Clear Status Flag #1-#4

The HMI will turn ON one of the Clear Status Bits when it finishes the clearing task requested by the corresponding Clear Flag controlled by PLC. The HMI will turn OFF the same status bit as it detects the corresponding Clear Flag being turned OFF. One can use Clear Status Bits as handshake signals to switch the Clear Flags.

Bit 12-15: Trigger Status Flag #1-#4

The HMI will turn ON one of the Trigger Status Bits when it finishes the task triggered by the corresponding Trigger Flag. The HMI will turn OFF the same status bit as it detects the corresponding Trigger Flag being turned OFF. One can use Trigger Status Bits as handshake signals to switch the Trigger Flags.

4.2.3. Logging Buffer Status Registers (LBSRs)

LBSR1 saves the status of Logging Buffer No. 1 through No. 4. LBSR2 saves the status of Logging Buffer No. 5 through No. 8. LBSR3 saves the status of Logging Buffer No. 9 through No. 12.

The status bit's position for each of the Logging Buffers is illustrated in the following:

Bit #	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
VW24 LBSR1	AB4	FB4	CB4	TB4	AB3	FB3	CB3	TB3	AB2	FB2	CB2	TB2	AB1	FB1	CB1	TB1
Bit #	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
VW26 LBSR2	AB8	FB8	CB8	TB8	AB7	FB7	CB7	TB7	AB6	FB6	CB6	TB6	AB5	FB5	CB5	TB5
Bit #	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
VW28 LBSR3	AB12	FB12	CB12	TB12	AB11	FB11	CB11	TB11	AB10	FB10	CB10	TB10	AB9	FB9	CB9	TB9

AB: Almost Full Bit indicates the buffer is 90% or more full.
FB: Full Bit indicates the buffer is full.
CB: Clear Status Bit indicates the clear command was received.
TB: Trigger Status Bit indicates the trigger command was received.

LBSR1	Buffer # 4	Buffer # 3	Buffer # 2	Buffer #1
LBSR2	Buffer # 8	Buffer # 7	Buffer # 6	Buffer #5
LBSR3	Buffer #12	Buffer #11	Buffer #10	Buffer #9

The HMI will turn ON one of the Trigger Status Bits when it finishes collecting one record of the data for the Logging Buffer. The Workstation will turn OFF the same status bit as it detects the corresponding Trigger Flag being turned OFF. User can use the Trigger Status Bits as handshake signals to switch the Trigger Flag.

4.2.4. RCPNo Image Register

The HMI sets the RCPNO Image Register (RIR) to the new value of RCPNO as this internal register is changed by user or PLC. Therefore, the PLC is able to identify the current value of RCPNO. The HMI reports the value of RCPNO to the PLC by writing the value to the RCPNO Image Register. RCPNO Image Register is Word #5 of the Status Block and one can keep track of the current recipe by this register.

Recipe Register
Recipe block is located in PLC register. If user wants the HMI to read/write the recipe data from/to the PLC, one needs to define a Recipe Block of the application. Please refer to Chapter 3. Recipe for the complete details.

The maximum recipe memory block is 524,288 16-bit (word) for the HMI with recipe function. For the applied HMI models, please refer to Appendix A for the complete details.

4.2.5. Recipe Register Number- for enhanced HMI

In the application of HMI, the ADP provides internal recipe register number for use; the format is shown in the following:

Format	**Description**
RCPNo	Recipe Register Number (1~N) RCPNO is an internal register of the Workstation that specifies the current recipe number; No≥1.
RCPWnnnnn	Recipe Register #nnnnn is current recipe where nnnnn is a decimal number and n≥0.
RCPWnnnnn.b	Recipe Register Bit nnnnn is decimal number, n≥0; b is hexadecimal number, b=0-F

RCPNO is an internal register of HMI used to display the specified recipe on the screen. Therefore, the HMI changes the RCPNO number to display its corresponding recipe data.

There are two methods to change RCPNO number:

One way is a user can change RCPNO number through the numeric entry object directly.

The other way is the PLC changes RCPNO constant. To change RCPNO constant, a user must write the specified number N to RCPNO Number Register Dn+5; then set the RCPNO Change Flag Dn+1 bit 5 as ON(about 1 sec.). The HMI will change RCPNO constant to N and display the recipe data RCPW0~RCPWm correspondent with the Nth recipe.

4.2.6. Addressing Recipe Data – For enhanced HMI

Suppose that the number of recipe N=20, a recipe size m=100 Words.

To edit an addresss, one need to setup the **current recipe** N =RCPNO, the HMI will display the corresponding recipe data

1. Enter the recipe number N to RCPNO or change RCPNO by PLC. The HMI will display the corresponding recipe data.

For example, if RCONO N=5, RCPW0~RCPW99 displays the data correspondent with 5th recipe; if RCPNO N=7, RCPW0~RCPW99 displays the data correspondent with 7th recipe.

2. Another way to edit the corresponding data of recipe register is **absolute address**.

Suppose that an address is greater than RCPW100, the corresponding recipe address will display the Nth recipe data.

RCPW100~RCPW199 represents 1st recipe data.
RCPW200~RCPW299 represents 2nd recipe data.
`
`
RCPW2000~RCPW2099 represents 20th recipe data.

When the address greater than RCPW2099 is invalid.

So the RCP234 represents 2nd recipe data, 35th words and RPCW 34 in RCPNO =2.

4.3. Time Block

4.3.1. Time Block – The HMI writes to PLC

If user wants the HMI to write the current time and date to the PLC, then one needs to define the Time Block for the application. Time Block is a block of three words in the PLC and its format is BCD. The HMI updates the Time Block every minute with the time data. The format of time block is shown in the following:

Low byte of word 0 (07-00)	Minute BCD 00-59
High byte of word 0 (15-08)	Hour BCD 00-23
Low byte of word 1 (07-00)	Day BCD 00-31
High byte of word 1 (15-08)	Month BCD 01-12
Low byte of word 2 (07-00)	00-99
High byte of word 2 (15-08)	Day-of-week 1 = Sunday 2 = Monday 3 = Tuesday 4 = Wednesday 5 = Thursday 6 = Friday 7 = Saturday

The steps to set up the time block are shown in the following. Select [Application]/[Workstation Setup] in ADP, then a user can set up time block on the [Miscellaneous] tab. See Figure 181. The starting address is D240 and the size is 3 Words, so the data will save in D240, D241 and D242 16-bit registers. The HMI updates the Time Block every minute with the time data.

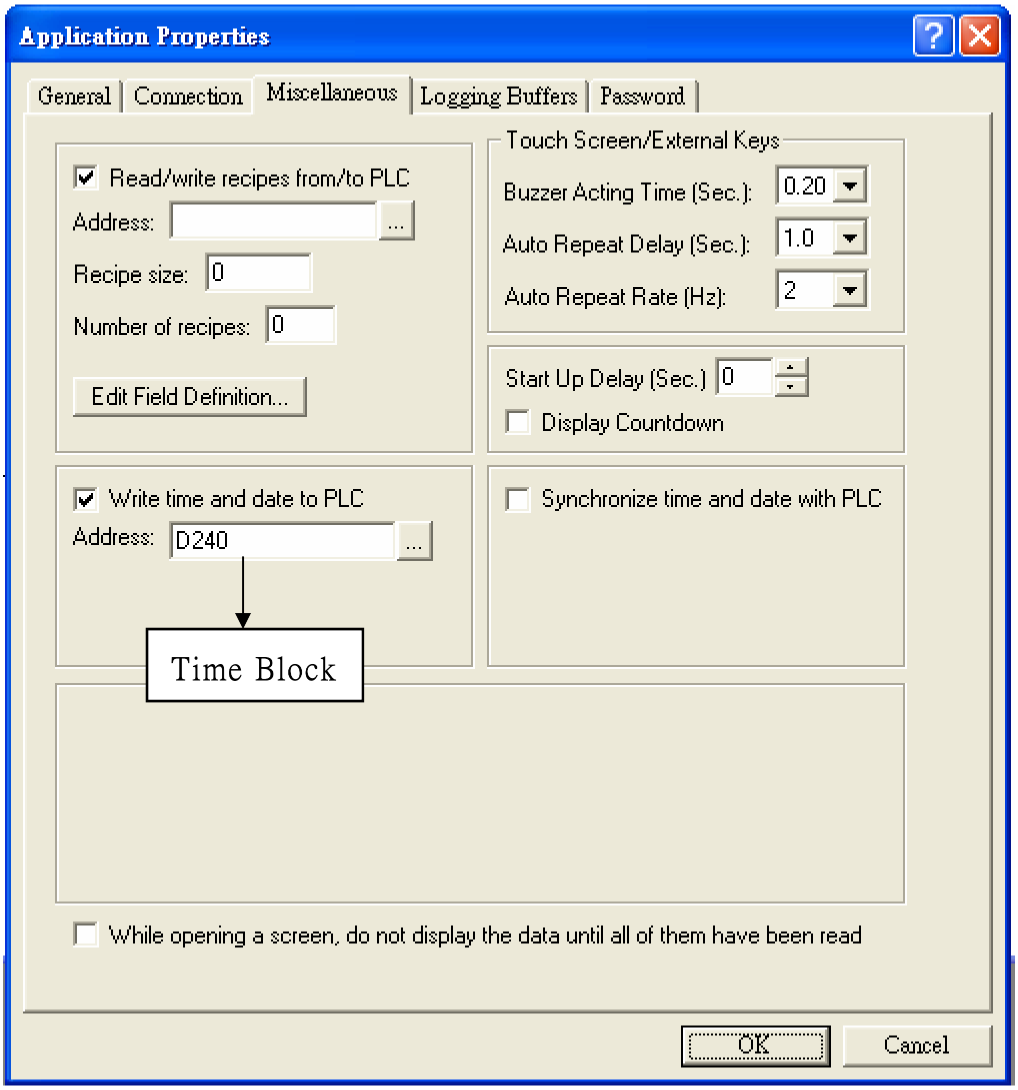


Figure 181. Setup Time Block

4.3.2. Time Block – PLC writes to HMI

The HMI can read time and date from the internal Real Time Clock of PLC. Then the HMI can modify the corresponding data for the time/date/week read from the RTC and display the content on HMI.

The HMI updates the Time Block every minute with the time data. See Figure 182

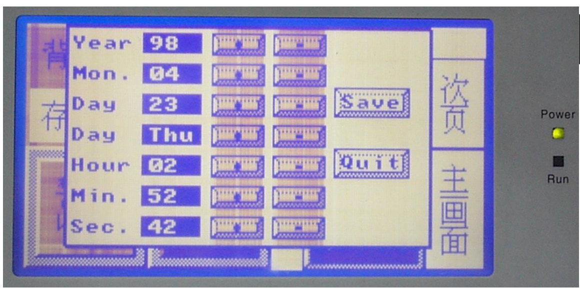


Figure 182. Setup Time/Date/Week on the HMI

4.4. Read Cycle

The HMI does the following steps to accomplish one read cycle and it will repeat these steps continuously. User needs to know this read cycle to configure a HMI so as to communicate with the PLC efficiently.

Steps of the cycle:

1. Reads control block of PLC.

2. Reads specified register blocks for the current screen.

3. Reads specified On/Off blocks for the current screen.

4. Reads specified the Alarm Register regularly (3-10 sec.).

5. Reads a number of PLC locations which: (1) are shown on the current screen; (2) do not appear in the current screen's register blocks or On/Off Blocks and have not been read recently.

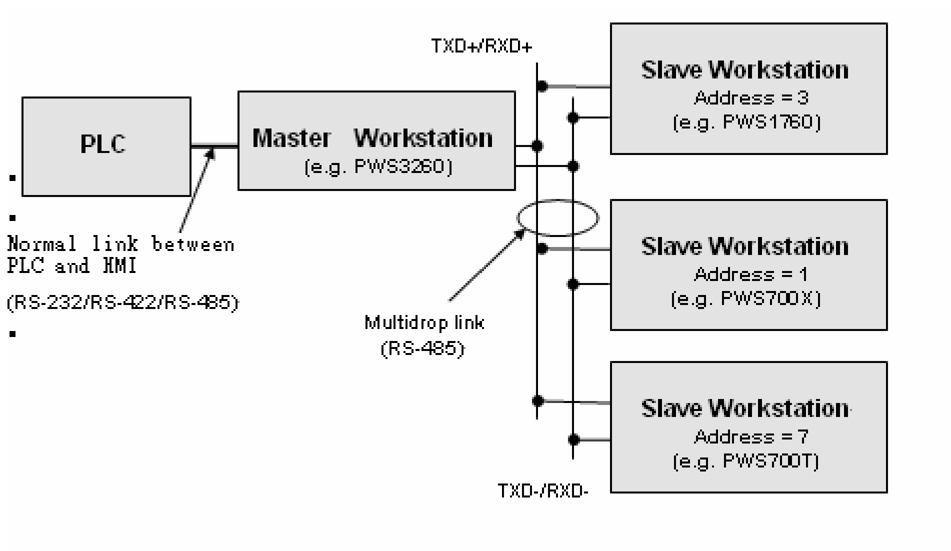
   The number of PLC locations to be read in this step is specified by the "number of individual reads per read cycle" of the current screen.

This read cycle is repeated continuously from Step 1. to Step 5.

5. Multi-link: Normal Connection Port

The multi-link provides users an economical and convenient way to link several HMIs and communicate with a single PLC connection port. User needs one master HMI and others are slaves. The **master** is the only HMI that is physically connected to a PLC and this HMI is responsible for the exchange of the data between the PLC and the slaves. Each of the **slaves** HMI must be assigned to an unique address so that the master HMI is able to identify which slave to send the data to.

The following picture shows the setup for four HMIs with one PLC. Note that the RS-485 cable must be used for the connection between the master and the slaves and each of the slaves must be assigned to an unique address.



The cable and the connection between the master and the PLC is the same as the normal 1-to-1 application. The RS-485 cable must be used for the connection between the master and the slaves. Additionally, each of the slaves must be assigned to an unique address. This multi-link function is only supported by version ADP 3.0 or later. Besides, all the PLC models in ADP 6.0 support this function.

Moreover, Multi-link can be connected through Ethernet. For the communication and application of Ethernet, please refer to Chapter 6. for the complete details.

5.1. Communication Parameters

The steps to set up communication parameters are shown in the following:

2. For setting up the Master - the HMI communicates with PLC：

(i) Select [Application]/[Workstation Setup], check the [This PWS is a multi-link master] box. Next enter the addresses and sizes in the [Common Register Block], [Common On/Off Block], [CRB Size] and [COB Size] box. See Figure 206.

For the function of CRB and COB, please refer to next chapter for the complete details.

(ii) Download the edited application to the master HMI.

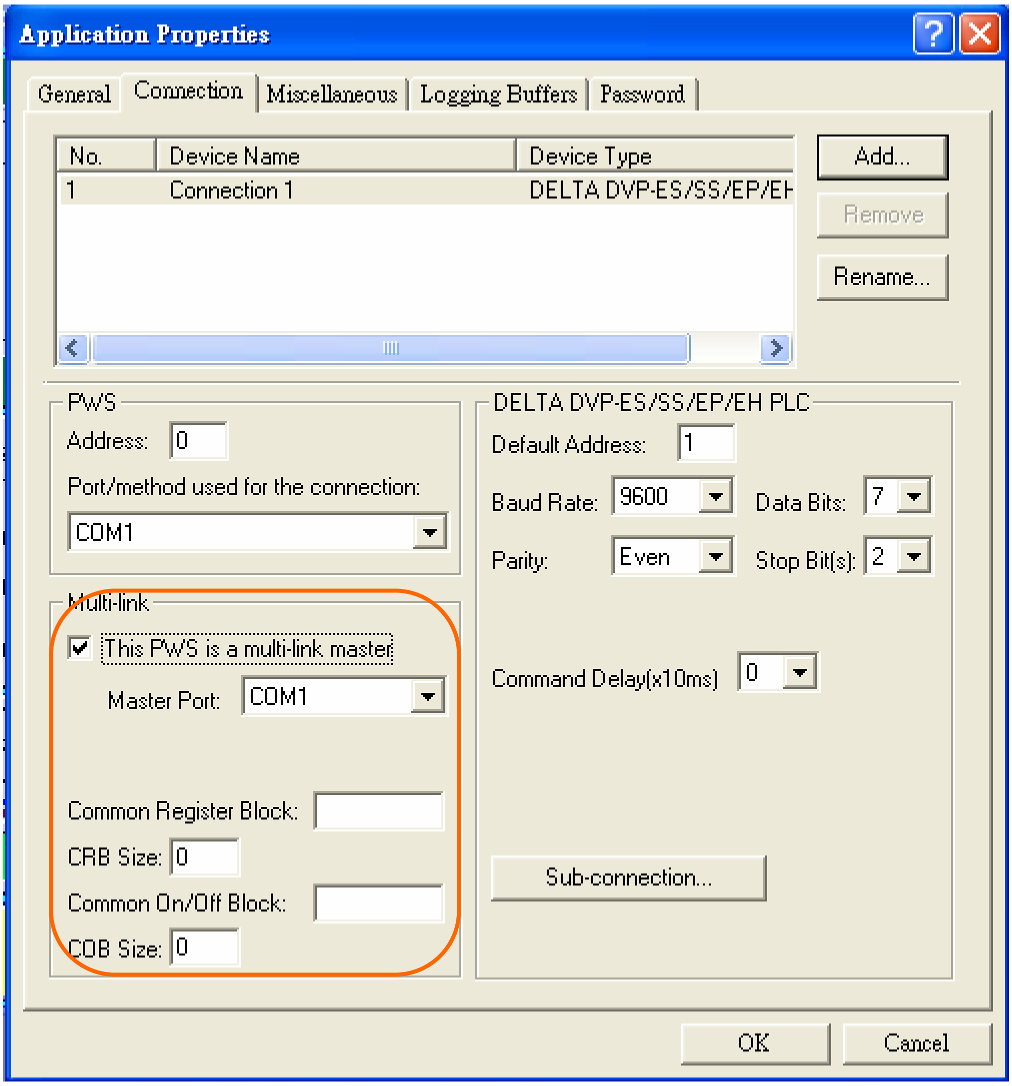


Figure 206. Set up the Parameters for the Master HMI

3. For setting up the Slave - the HMIs do not communicate with PLC:

   (i) Select [Application]/[Workstation Setup]. On the [Connection] tab, select [COM1] port used for the connection and enter the addresses and sizes in the [Common Register Block], [Common On/Off Block], [CRB Size] and [COB Size] box. See Figure 207.

   Note that the CRB, COB, data format, starting address and data size must be the same between master HMI and slave HMIs.

   (ii) Setup [Default Address]：

   If the slave HMI dip switch#5 set OFF, the HMI will read the communication parameters from ADP. A user must enter the unique address (2-10) in [Default Address]. See Figure 207. Remember to compile and download applications each time after making any changes to the address.

   If the slave HMI dip switch#5 set ON, the HMI will read the parameters from hardware. A user must set up the address (1-15) in Workstation Node Address.

   (iii) Download the edited application to the slave HMIs.

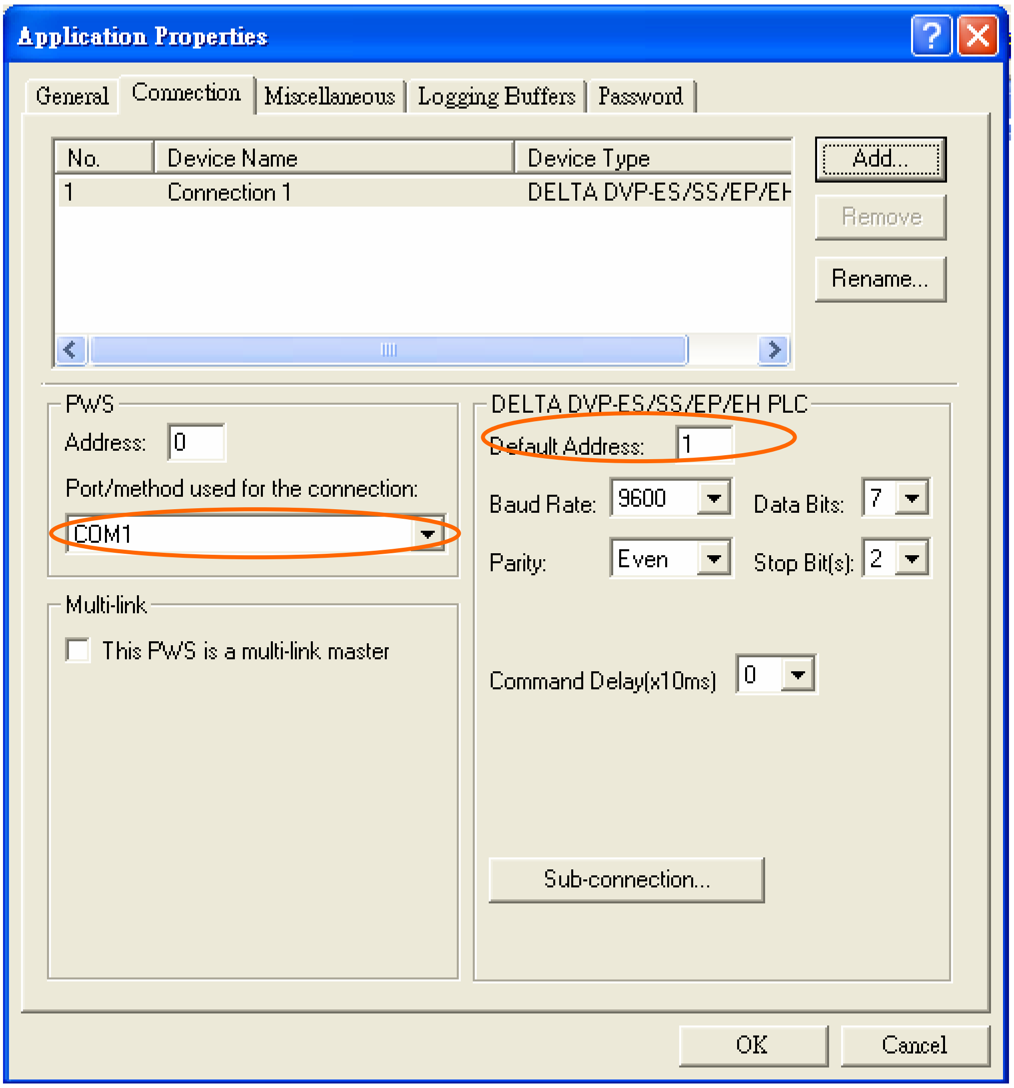


Figure 207. Set up the Parameters for the Slave HMIs

Please note that the address number of master HMI will not affect the communication with the slave HMI. Besides, it is not necessary to set up the baud rate or data type for the slave HMI. The point to set up the slave HMI is to make sure the connect port with the master HMI.

5.2. Communication Efficiency

In ADP, it allows you to specify **Common Register Block (CRB)** and **Common On/Off Block (COB)** for HMIs. CRB is a block of registers and COB is a block of On/Off locations in PLC. In every read cycle, the master Workstation reads the data from both CRB and COB. Then the master sends the data of the CRB and COB to all the slaves.

CRB and COB allow a user to set the maximum size up to 128 words and 256 words. In multi-link, user has to specify the CRB and COB with the same size and format for each of the HMIs. Hence, the slaves are not requested to read the data from CRB or COB directly. The slaves read the data from the buffer where the data sent by the master are saved. CRB and COB play an important role in terms of communication efficiency since they can reduce the traffic in the multi-link as well as the link between the master and the PLC

For instance, arranging Control Blocks of the HMI in CRB and COB is one of the most effective ways to improve the performance. Arranging the variables which are common to some of the Workstations in CRB or COB will also improve the performance. In doing so, one will be able to see a high refresh rate for the variables arranged in CRB and COB since the variables are refreshed in every read cycle.

In addition to CRB and COB, remember to make use of the register blocks and on/off blocks for screens since this will lessen the burden of the HMI by reducing the number of read commands.

Note that one is advised to specify CRB and COB with contiguous locations as designing a screen.

5.3. Important Notes

When used the Multi-link, please note the following points:

1. The RS-485 connection method is suggested for the multi-link. And the RS232 connection method is suggested for only one slave HMI.

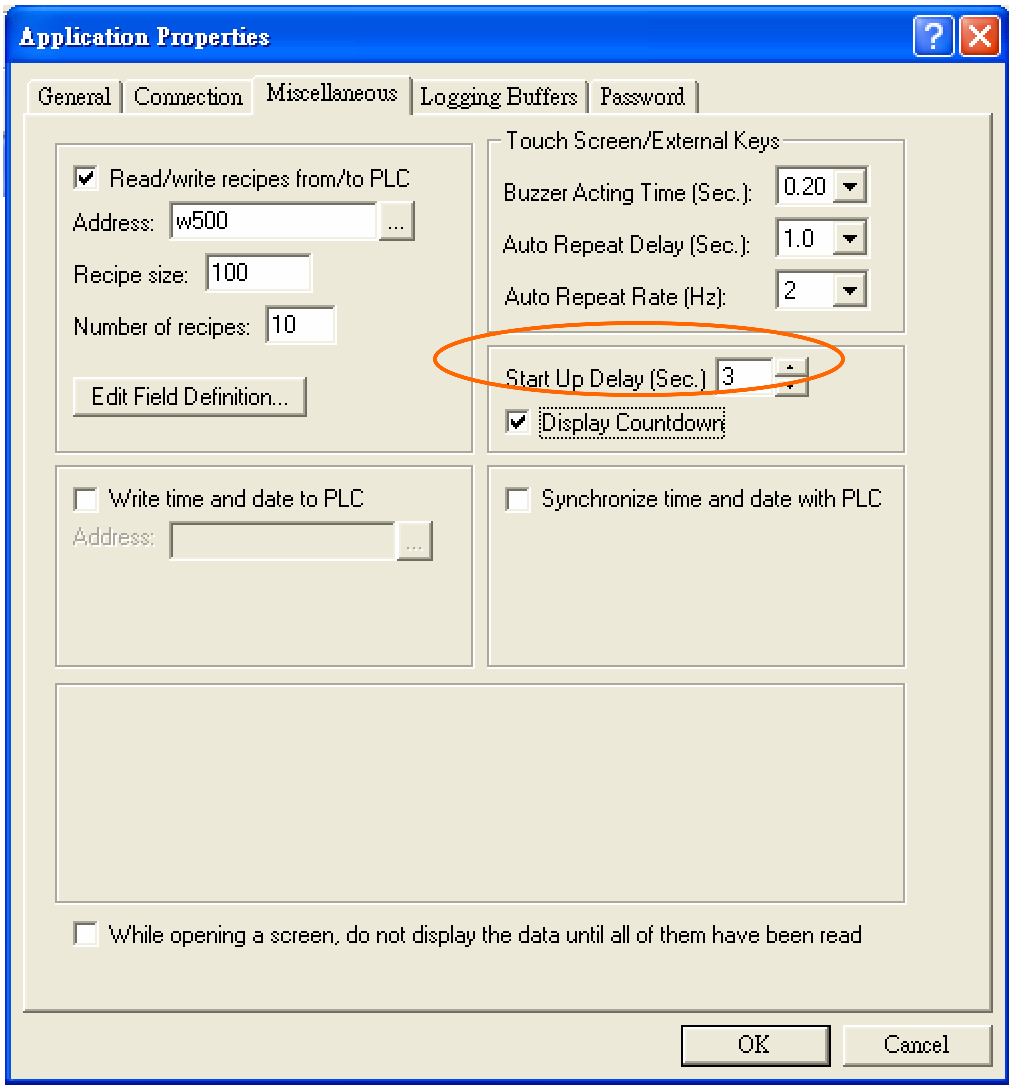
```
PWS-COM2 Port                               PWS- COM2 Port
   25-pin female---------CABLE---------25-pin female

 TXD+/RXD+ 14 ------------------------ 14   TXD+/RXD+
 TXD- /RXD- 15 ------------------------ 15   TXD-/RXD-
      GND      7-------------------------- 7        GND
```

2. Each slave must have its unique address.

3. The HMIs on the same multi-link must have the same CRB and COB.

4. The master HMI should only start after all the slaves have displayed their first screens. To delay the start-up of the master, select the [Miscellaneous] tab in the [Application Properties] dialog box. Then set the time from the [Start Up Delay (Sec.)] list. See below.

5. Multi-link: Normal Connection Port



6. Ethernet Communication and Application

To keep up with the rapid growth of technology, network communication is commonly applied to data collection, analysis, and remote supervisory and control in industry. HITECH has developed Ethernet-enabled HMI which can provide application upload/download over Ethernet, communication to other Ethernet-enabled PLCs and HMIs.

Note that this newly developed Ethernet-enabled HMI must also work with the Ethernet-enabled PLCs or HMIs. Also, one must also use ADP 6.0 or later to support these new features.

The following will introduce the communication setup, application upload/download, communication to Ethernet-enabled PLCs and HMIs related to Ethernet. There are two methods for Ethernet-enabled HMI to communicate with multi-HMI/PLC over Ethernet; one is Multi-link and the other is Cross-link. Besides, the SoftPanel can read or control the PLC over Ethernet.

Note that this feature is only applied in some models; please refer to Appendix A. - Table of the ADP 6.0 Features and the HMI models.

6.1. Link

There are two methods to set up the link. One can use RJ45 Straight Through Cable to set up the link, shown in 錯誤! 找不到參照來源。. Another way is to use RJ45 Crossover Cable to set up the link. See 錯誤! 找不到參照來源。. The RJ45 Crossover Cable requires HUB for connection.

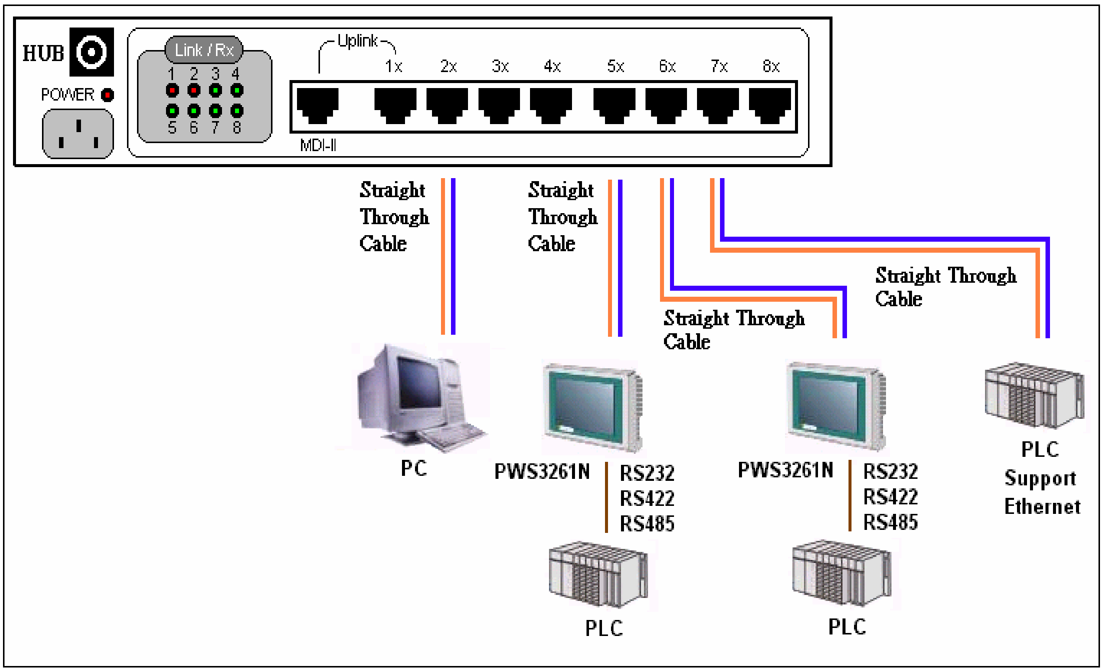


Figure 207. RJ45 Straight Through Cable

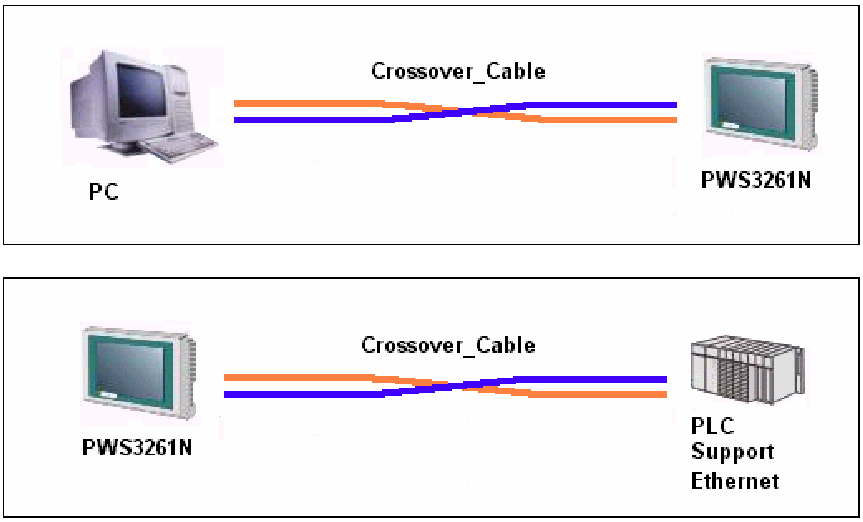


Figure 208.RJ45 Crossover Cable

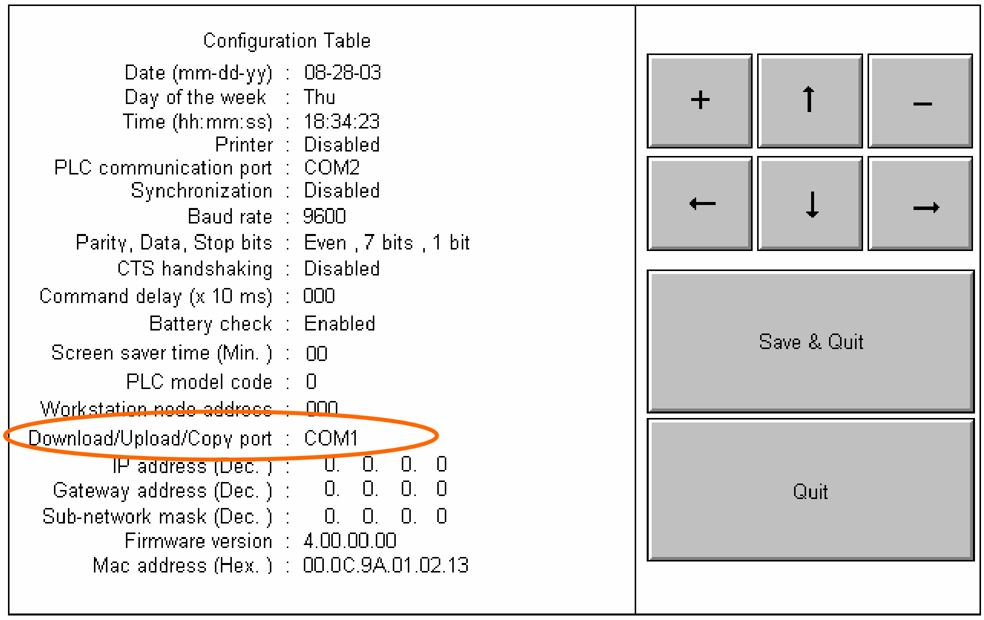
The choice between these two methods depends on one’s needs and available equipment. Users can refer to the following table for the differences between these two methods.

RJ45 **CrossOver Cable**	RJ45 **Straight Through Cable**
No HUB; link to HMI directly	HUB required
1-to-1 only	Multiple link

6.2. IP Address Setup

To read or send data from HMI over the Ethernet, user needs to set up the correct IP address.

A user can set up IP address in **[Configure]** of HMI system menu. The following figure is **[Configuration Table]** of network PWS3261.



1. If you upload/download over the Ethernet, please note that the first three segment of PC IP address must be the same as the first three segment of HMI IP address. For example, IP address of PC — 100.101.102.010 and IP address of HMI — 100.101.102.XXX. Please ask your MIS staff if there is any question.
2. Please note that the IP address of HMI should not be shared with others in the network.

6.3. Application Upload/Download over Ethernet

The Ethernet-enabled HMI with ADP 6.0 version or later offers user upload/download for application, firmware, recipes and source code. See Figure 209.

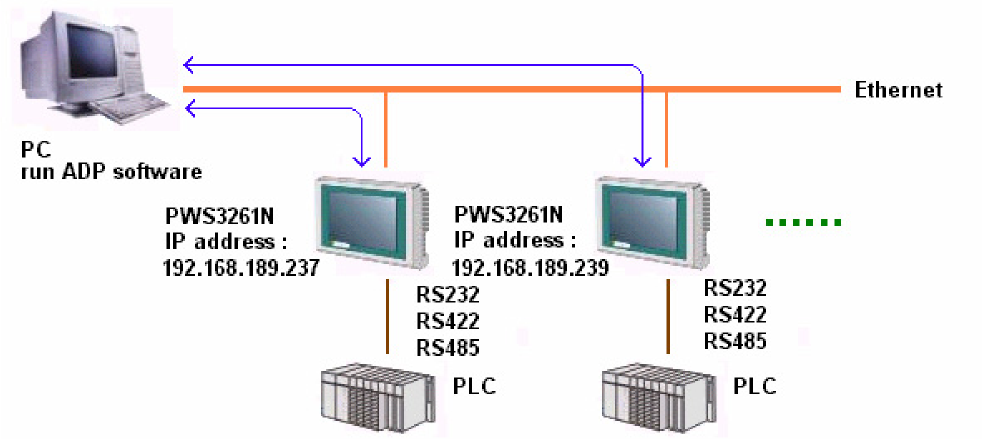


Figure 209. An Example of Upload/Download over the Ethernet

The steps to upload/download an ADP application over Ethernet:

1. First, set up IP address, Gateway address…etc in **[Configuration Table]**. Please refer to Section 6.2. IP address for complete details.

2. In ADP 6.0, select [Options]/[Transmission Setup] and select "Ethernet" from the [PC Port] list. See Figure 210.

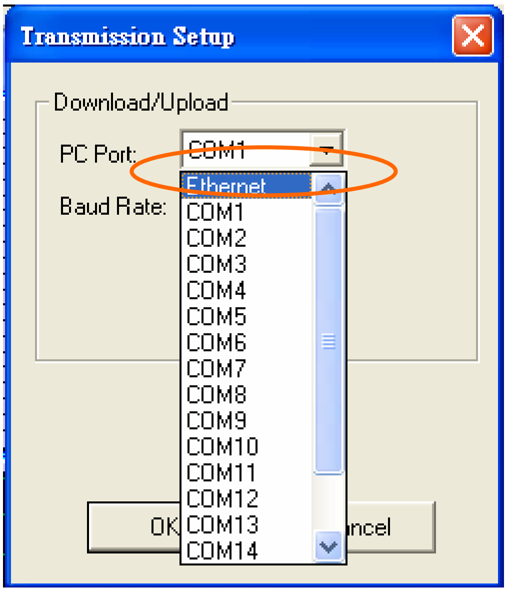


Figure 210. [Transmission Setup]`

3. Enter the address to [IP Address] or select from the drop-down list. See Figure 211.

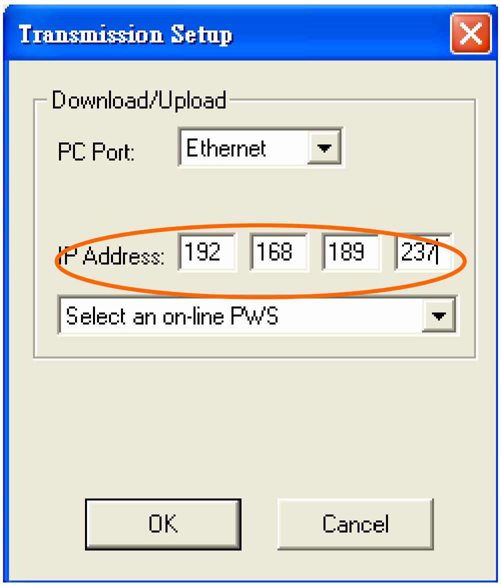


Figure 211. The [Transmission Setup] Dialog Box

4. Select [Application]/[Download Application] or [Download Firmware and Application] to download the application.

Follow the same steps, a user can use [Upload Application],[Upload Recipes],[Download Recipes],[Reconstruct Source] over Ethernet. For [Upload Application], the above-mention steps must be changed to select [File]/[Upload Application].

If the link is not set up properly, then ADP will show the error message. See below.

6.4. Communication to Ethernet-enabled PLCs

ADP 6.0 supports the HMI to communicate with Ethernet-enabled PLCs on Modbus TCP/IP. Therefore, the HMI can control or read the data from PLC. See below.

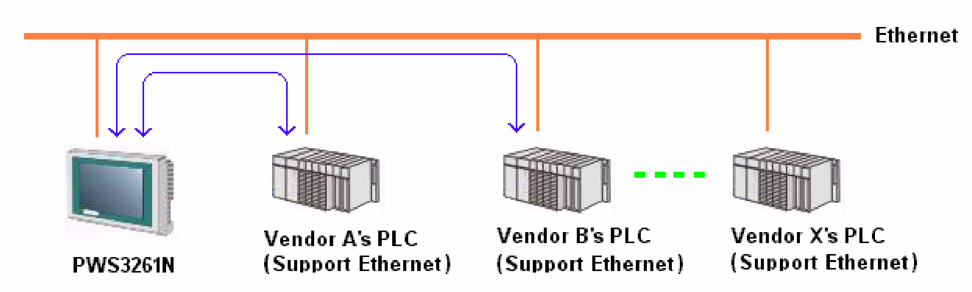
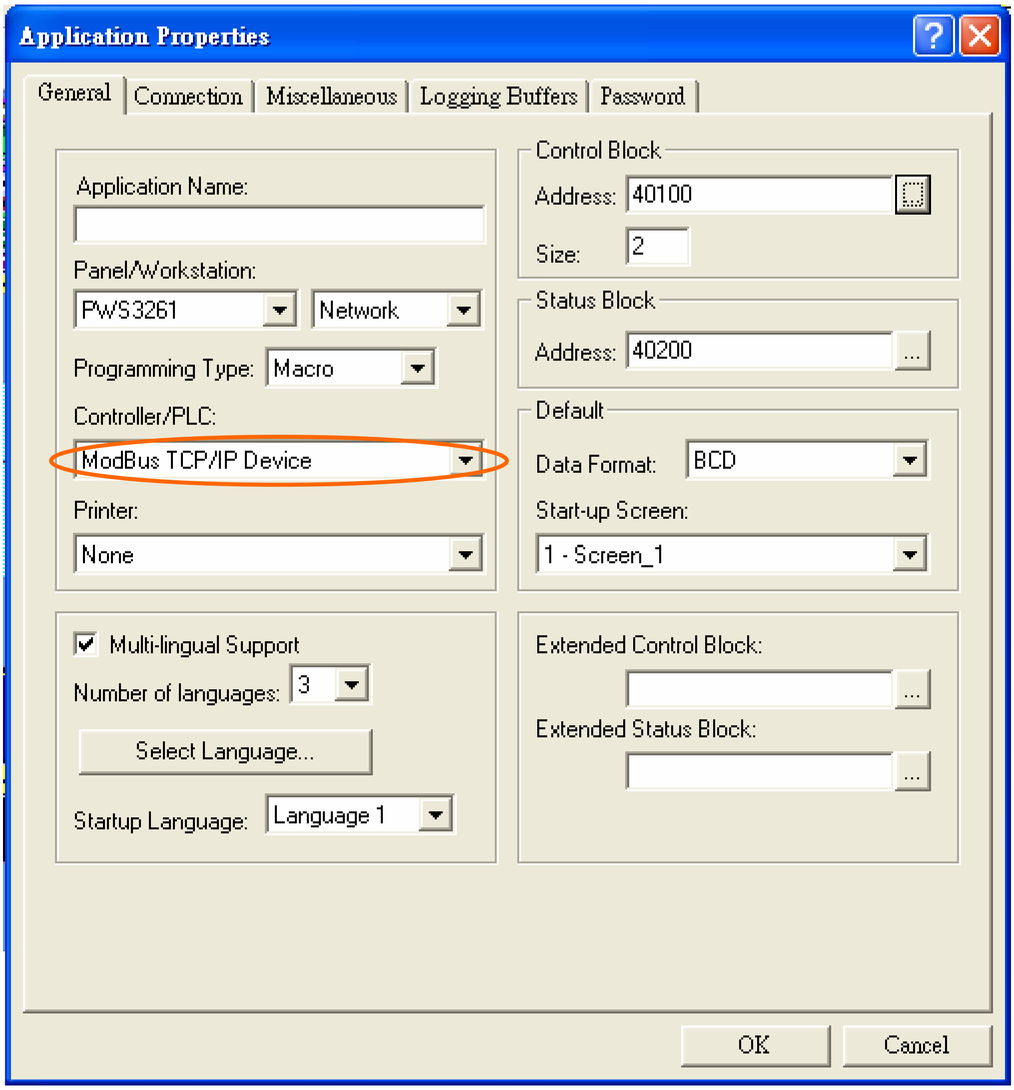


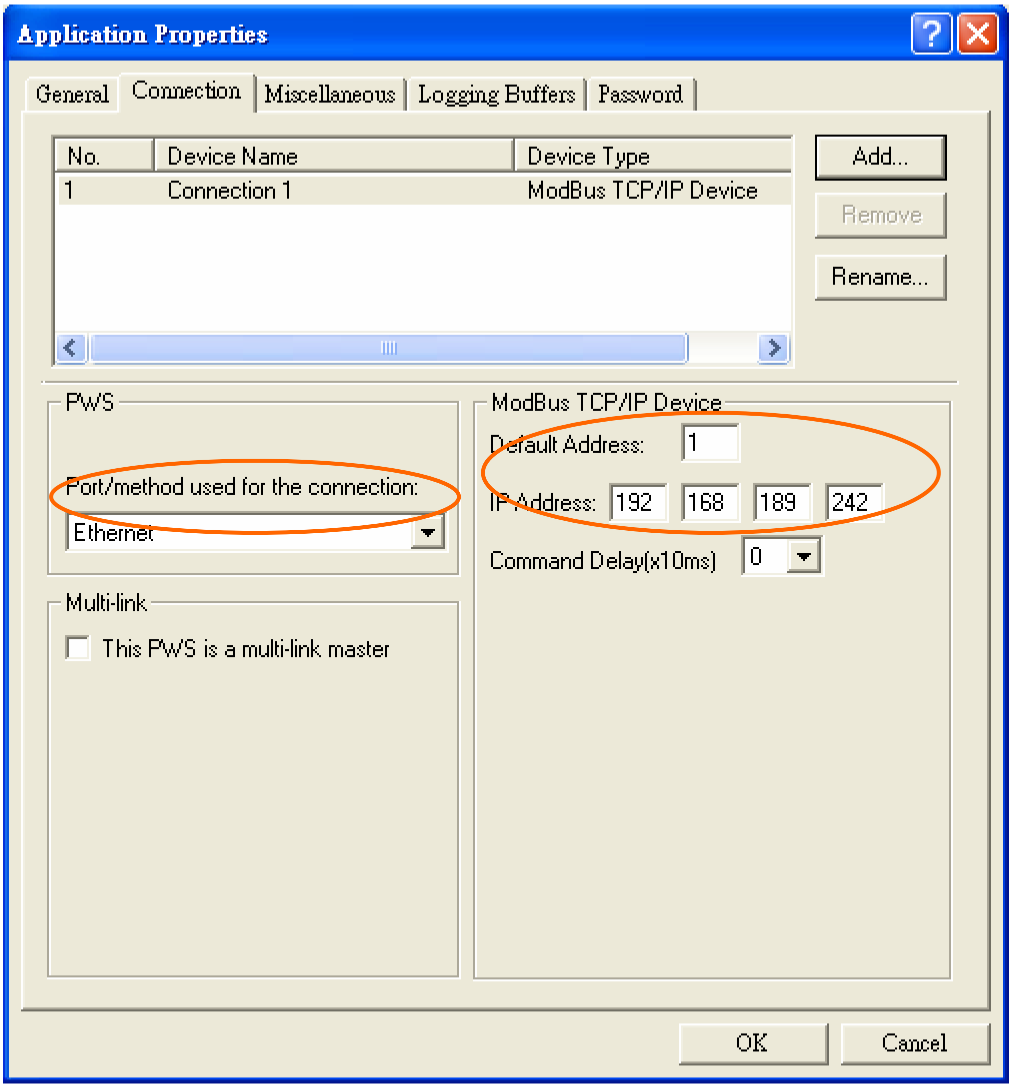
Figure 212. Connection to Ethernet-enabled PLCs

Steps to follow：

1. Select [Application]/[Workstation Setup], the [Application Properties] dialog box is displayed. On the [General] tab, select the type of PLC or Modbus TCP/IP from the [Controller/PLC] list. See below.



2. Select the [Connection] tab. On the [Connection] tab, select "Ethernet" from the [Port/method used for the connection] list. Key in the address in the [Default Address] and [IP Address] box. See below.錯誤! 找不到參照來源。



3. Download the ADP application file to the HMI and set up the link to connect.

6.5. Multi-link (One Master and Multiple Slaves)

In ADP 6.0, the Multi-Link over Ethernet function allows user to link several HMIs (one master and multiple slaves) and speeds up the communication between the HMIs.

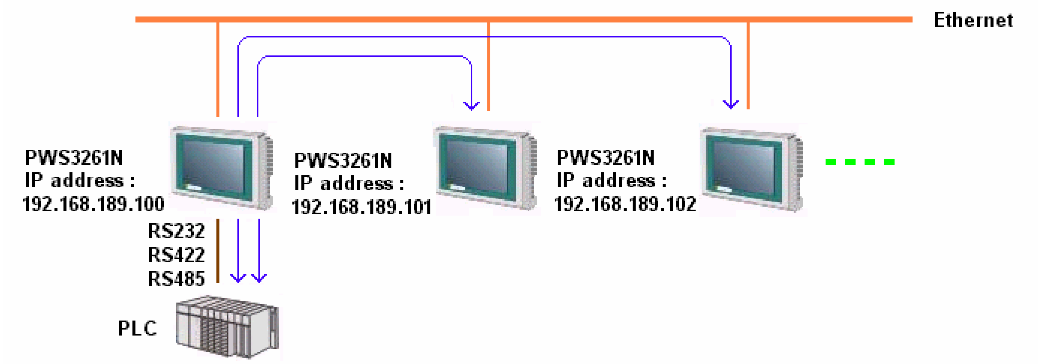
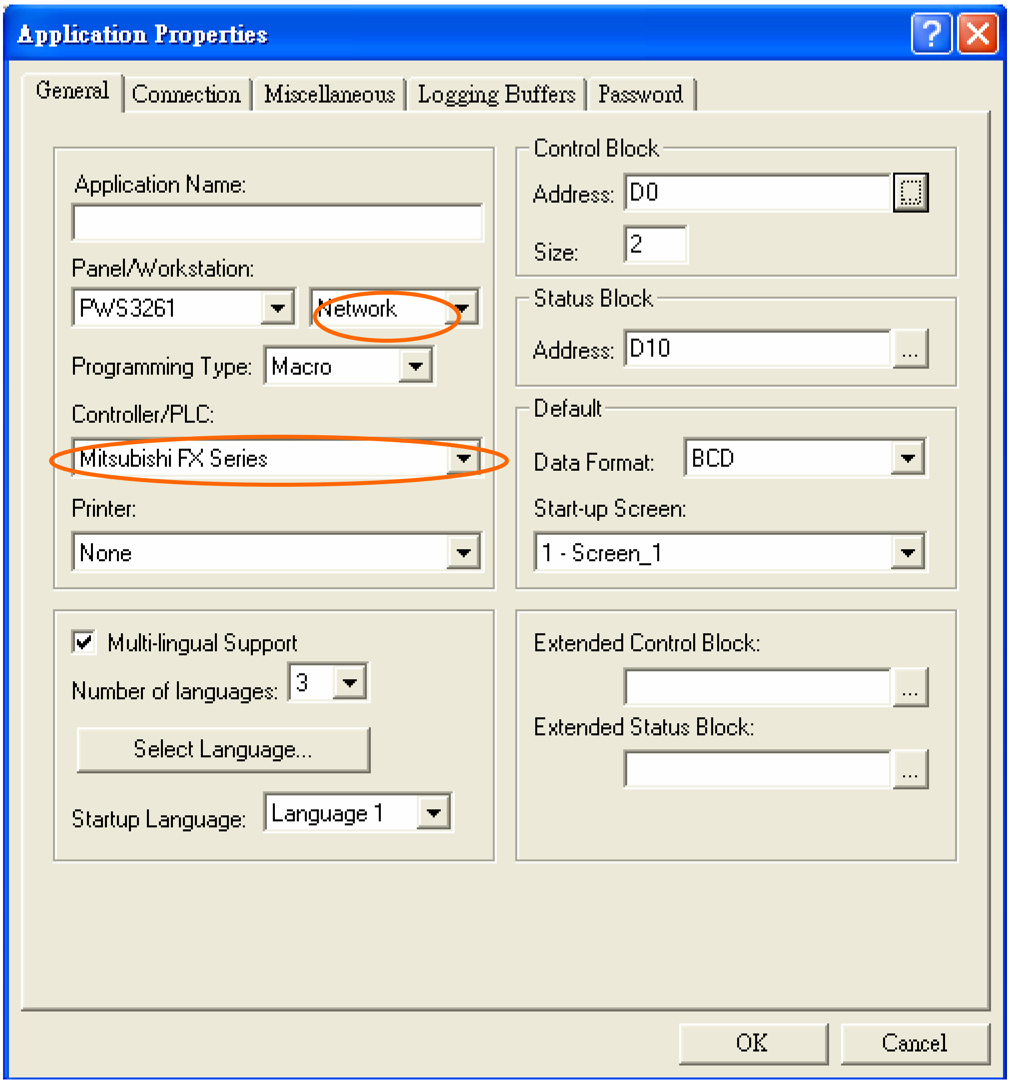


Figure 213. Multi-Link over Ethernet Function

Steps to follow：

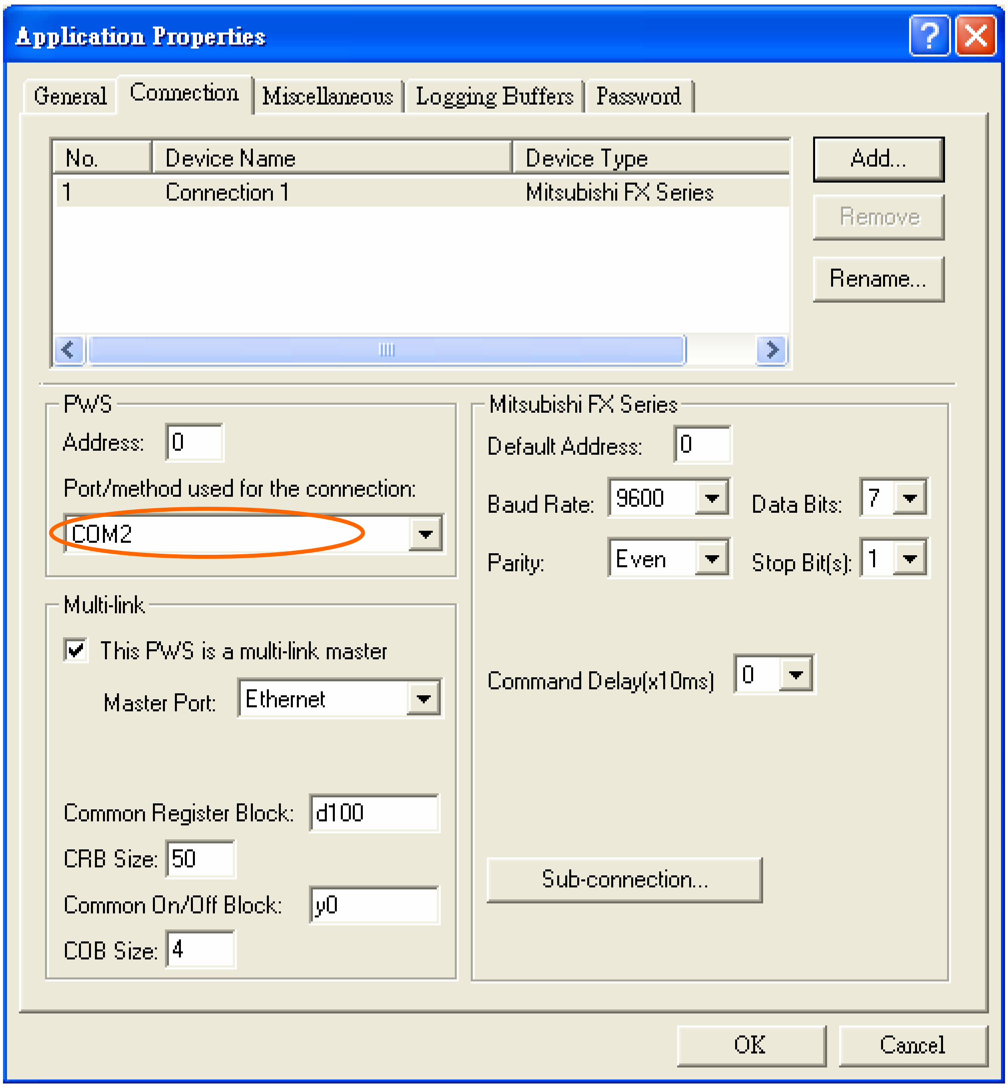
1. **Setup the Master** – HMI linked to PLC：

   (i) Select [Application]/[Workstation Setup]. One the [General] tab, select the model of HMI from the [Panel/Workstation] list and the type of PLC from the [Controller/PLC] list. See below.



(ii) Select the [Connection] tab. On the [Connection] tab, check the [Multi-link] box. Then select “Ethernet” from the [Master Port] list. Also, key in the block and address in the [Common Register Block], [CRB Size], [Common On/Off Block] and [COB Size] box. See 錯誤! 找不到參照來源。. Setup the Multi-link on the [Connection] tab. See below.

- Check the [This PWS is a multi-link master] box.
- Select “Ethernet” from the [Master Port] list.
- Key in the address and its size in the [Common Register Block],[CRB Size],[Common On/Off Block] and [COB Size] box.

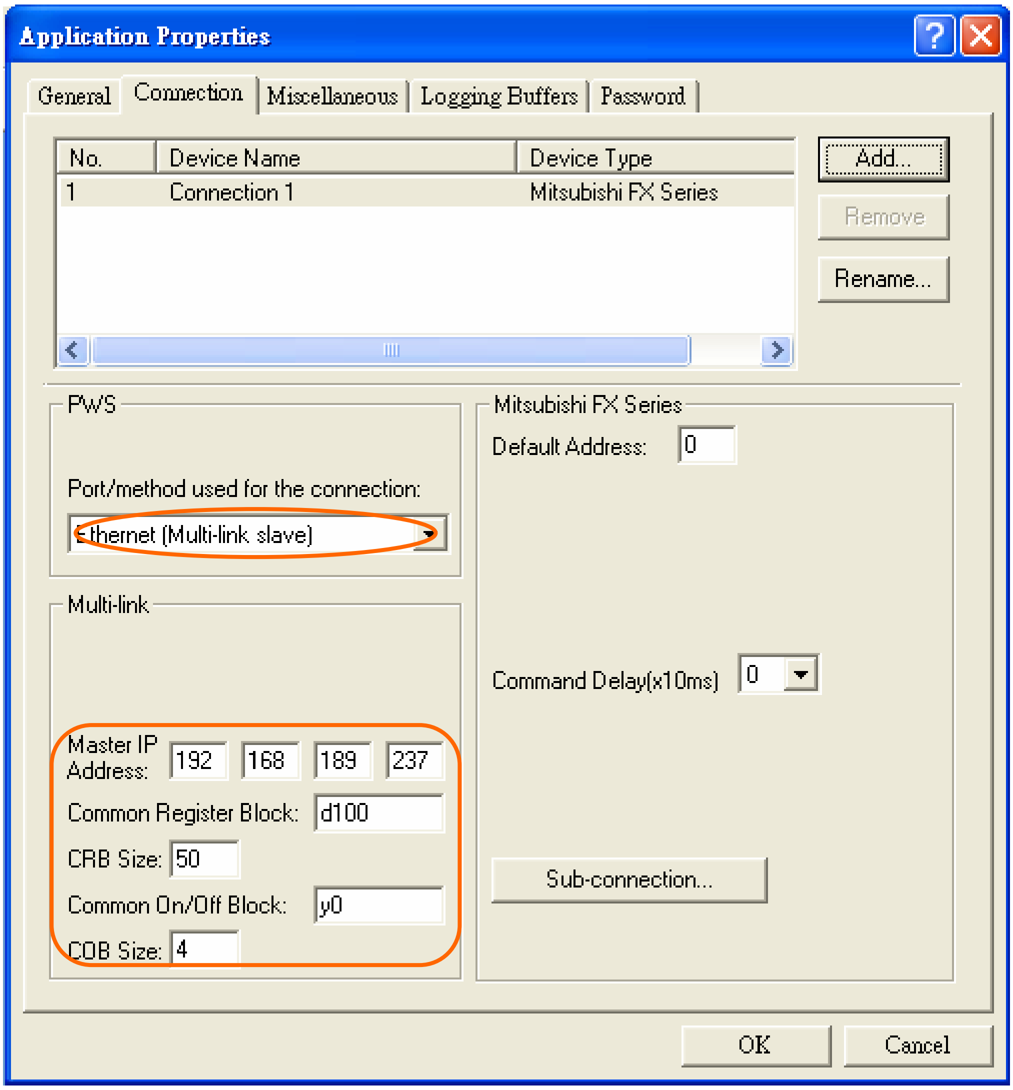


2. Download the ADP application to the Slave HMI.

3. **Set up Slave** – HMI not linked to PLC

   (i) Select [Application]/[Workstation Setup]. On the [Connection] tab, select "Ethernet (Multi-link slave)" from the [Port/method used for the connection] list.

   (ii) Set up [Master IP Address],[Common Register Block],[CRB Size],[Common On/Off Block] and [COB Size].



4. Download the ADP application to the Slave HMI with linked PLC.

6.6. Cross-link over Ethernet Function (share the data)

In ADP 6.0, the Cross-Link over Ethernet function allows user to link several HMIs and PLCs and share the data between these HMIs and PLCs. See Figure 214.

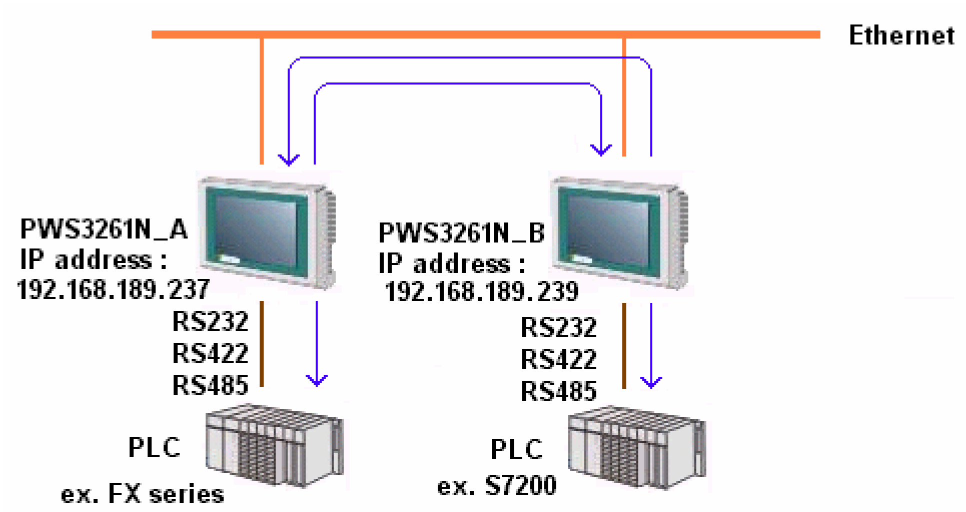


Figure 214. Cross-link Function

Use PWS3261N as an example in the following steps：

1. Setup PWS3261N_A：

   (i) First, select [Application]/[Workstation Setup]. On the [General] tab, select the model of HMI from the [Panel/Workstation] list and the type of PLC from the [Controller/PLC] list. See Figure 215.

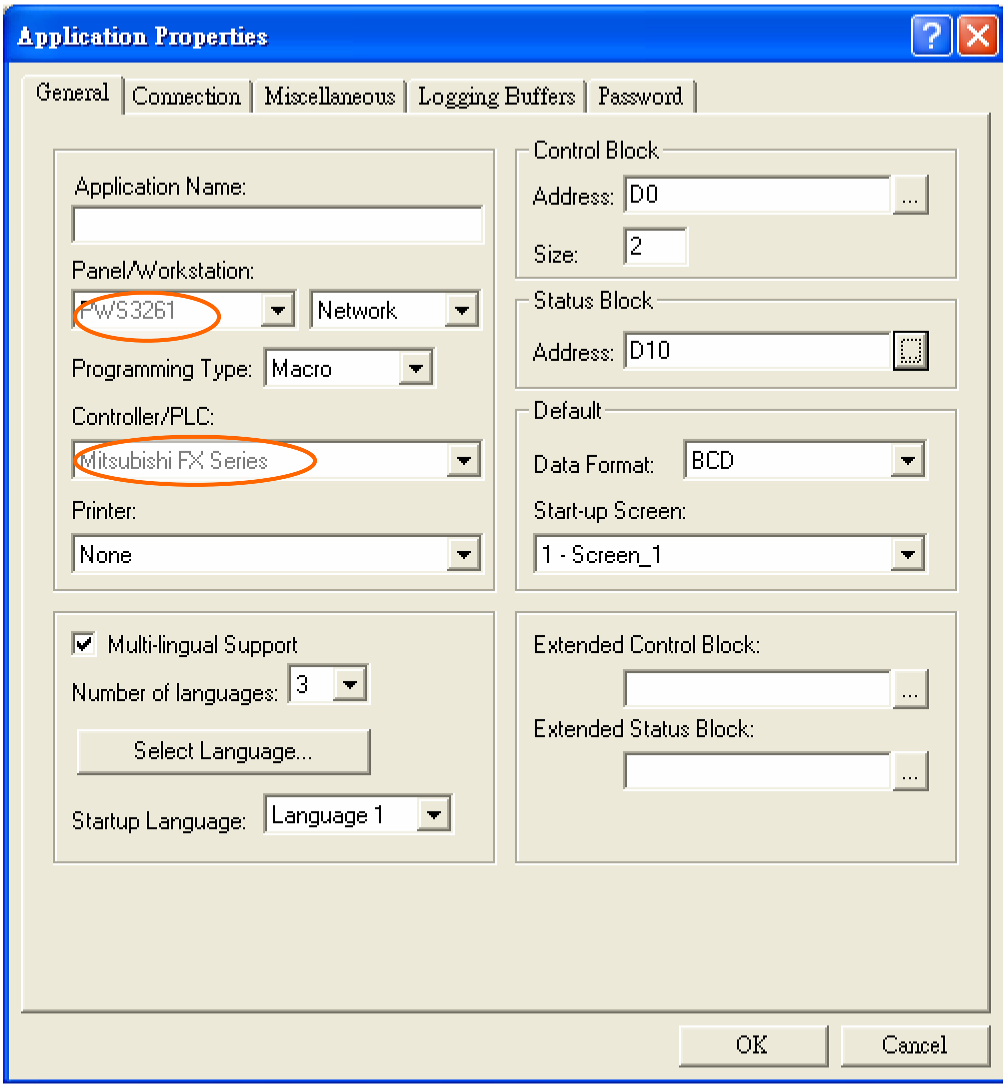


Figure 215. Set up PWS3261N_A

(ii) To set up Cross-link on the [Connection] tab; See Figure 216.

- Click [Add] to add Connection 2 for Cross-link.
- Select "Ethernet (Cross-link)" from the [Port/method used for the connection] list.
- Key in [Default Address],[IP Address] and [PWS Type] for the desired device.

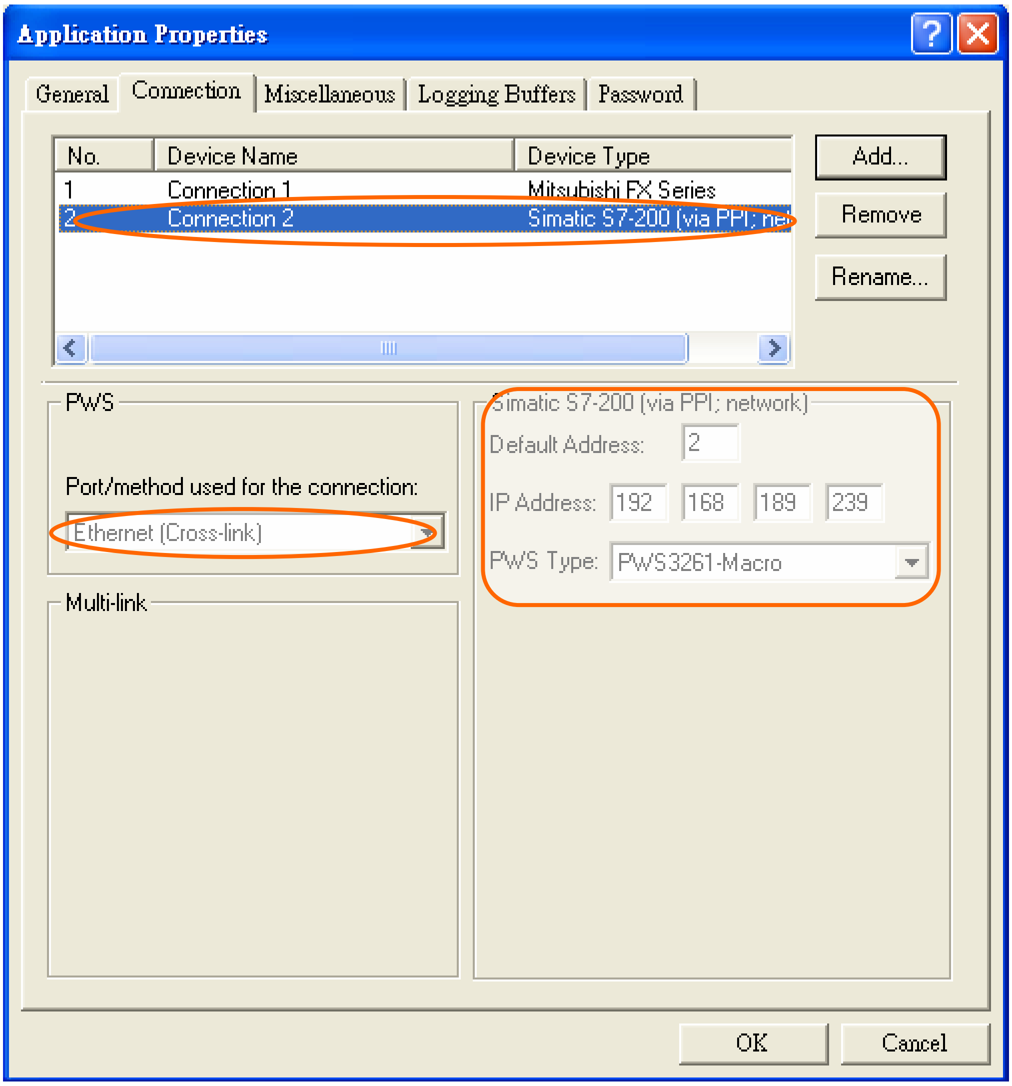


Figure 216. Add Cross-link Device

Note that Connection 1 linked to the PLC by Com Port and Connection 2 linked to the PLC by Cross-Link Ethernet.

(iii)If PWS3261N_A access the data from the PLC linked to PWS3261N_B, follow these steps:

- PLC register address setup：

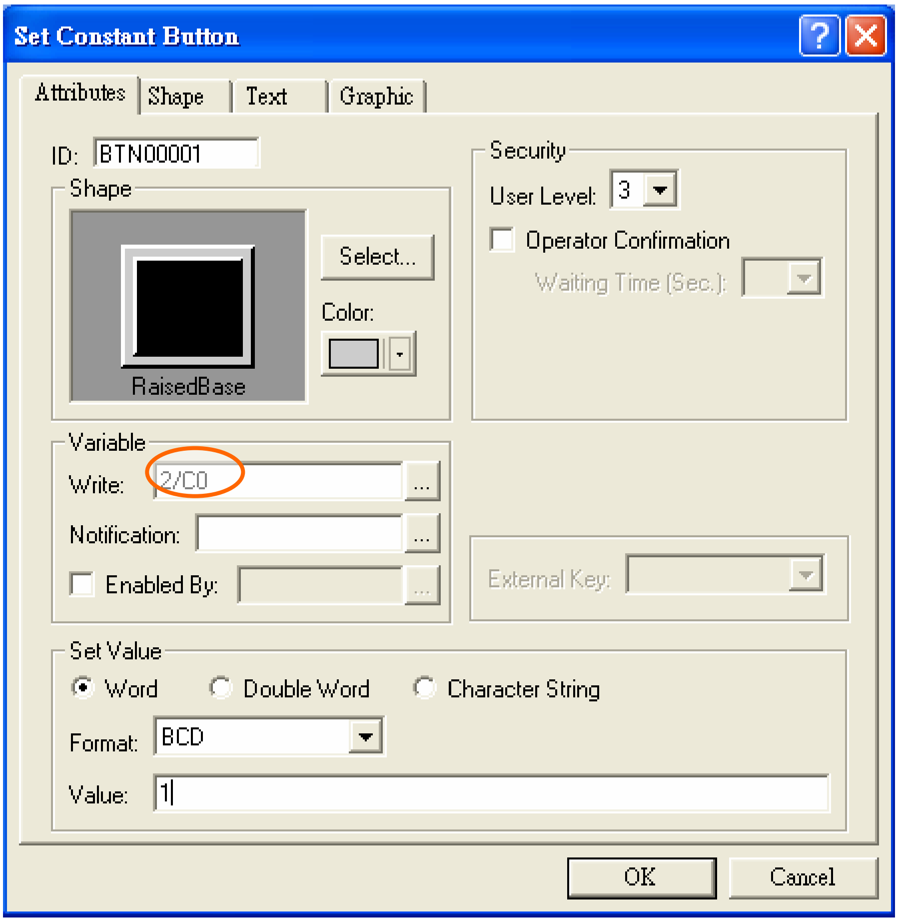
  Example: Specify the address of PLC register [2/C0] for Siemens S7-200.

  Note：PLC register [2/C0] refers to Connection No. 2 on the [Connection] tab. See Figure 216. [/] means the separation from register address.

  There are two ways to setup：

(a) Double-click on the object. Select the [Attributes] tab. In the [Variable] block, key in the location “2/Q0.0”. See 錯誤! 找不到參照來源。.

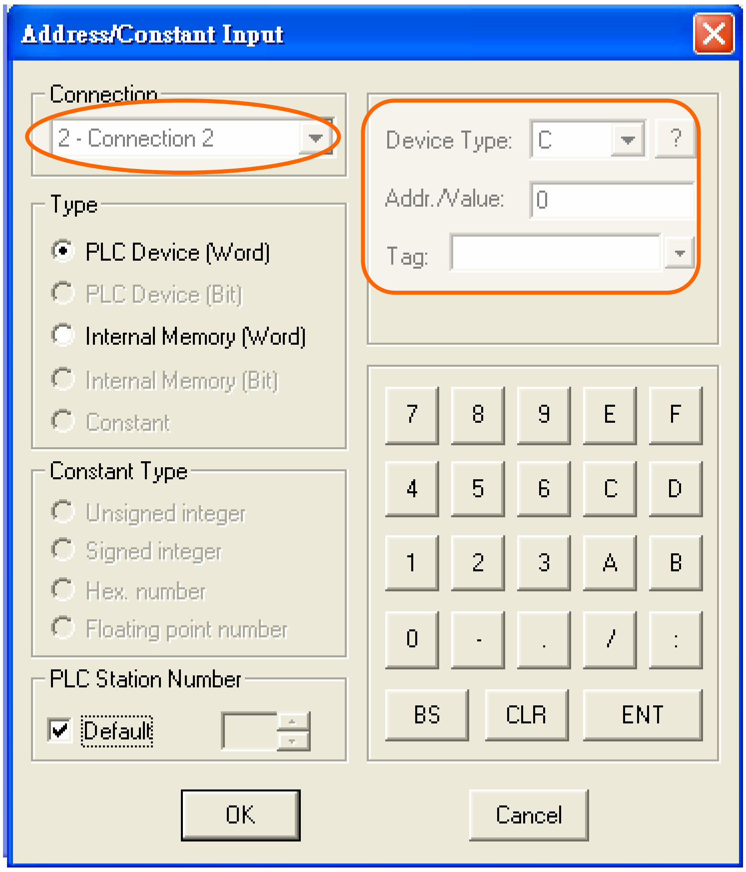
(b) Key in the address of PLC register in the object attributes dialog box. Here the address is “2/C0” , See below; or



(c) Press  ，the [Address/Constant Input] dialog box will be on the screen. See below.

Select “2-Connection 2” from the [Connection] list. Key in the address in the [Device Type] and [Add./Value] box. Here the address is C0.

Press [OK], “2/C0” will display in the object attribute dialog box.



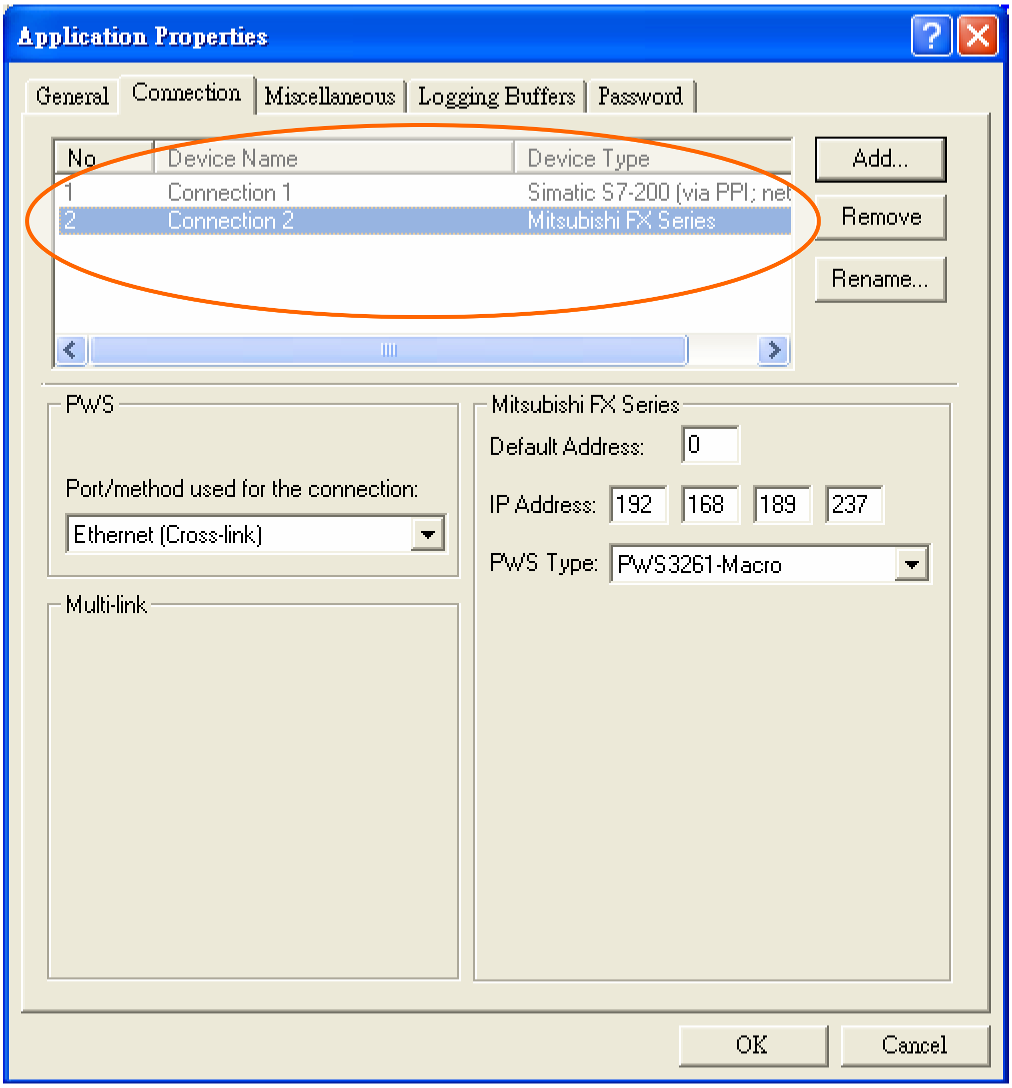
2. Download the edited application from PWS3261N_A to PWS3261N_A.

3. Setup PWS3261N_B：

   The setup steps are the same as PWS3261N_A, but the PLC device Connection 1 of PWS3261N_B is the PLC device Connection 2 of PWS3261N_A . See below.

   Note that the [Add./Value] of the PLC device Connection 2 must be changed.

   The steps are similar to those for PWS3261N_A.



4. Download the ADP application file of PWS3261N_B to PWS3261N_A. Connect the link to PLCs and network.

1. Note that there are two types of driver for Cross-Link: Dedicated driver and Shared driver.

2. One HMI can only have 3 types of driver, including COM1, COM2 and Ethernet (Dedicated driver). Therefore, one HMI can only have one Ethernet (Dedicated driver).

3. Use Ethernet (Shared driver) when 3 or more connections are needed.

4. Ethernet (Dedicated driver) is more efficient than Ethernet (Shared driver).

5. Ethernet (Shared driver) is up to 16.

6. Since UDP is used in Cross-Link, Cross-Link is only adoptable to local LAN.

6.7. Supervisory and Control over Ethernet by SoftPanel

ADP 6.0 or later supports Ethernet-enabled HMI models (ex. PWS3261 Network model), Ethernet-enabled PLCs or PLCs which are connected to HMI over Ethernet. See Figure 217.

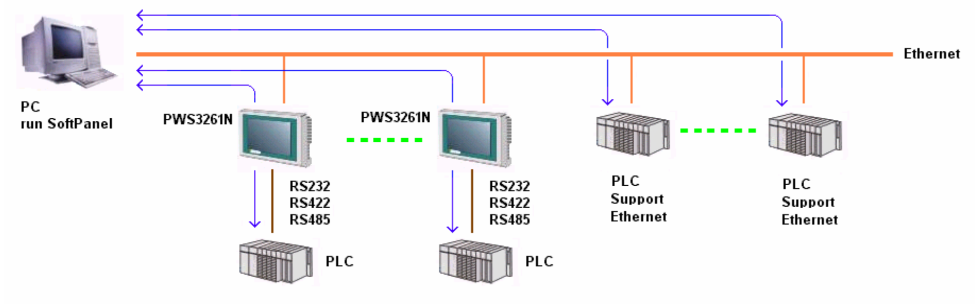


Figure 217. Control over Ethernet by SoftPanel software

For SoftPanel directly linked to PLCs, follow the steps as in Section 6.4. Communication to Ethernet-enabled PLCs.

To access the PLCs via the Ethernet-enabled HMIs (ex. PWS3261 Network model), follow these steps:

1. Select [Application]/[Workstation Setup]. On the [General] tab, select SoftPanel from the [Panel/Workstation] list. See Figure 218 .

2. Select the type of PLC from the [Controller/PLC] list. See Figure 218.

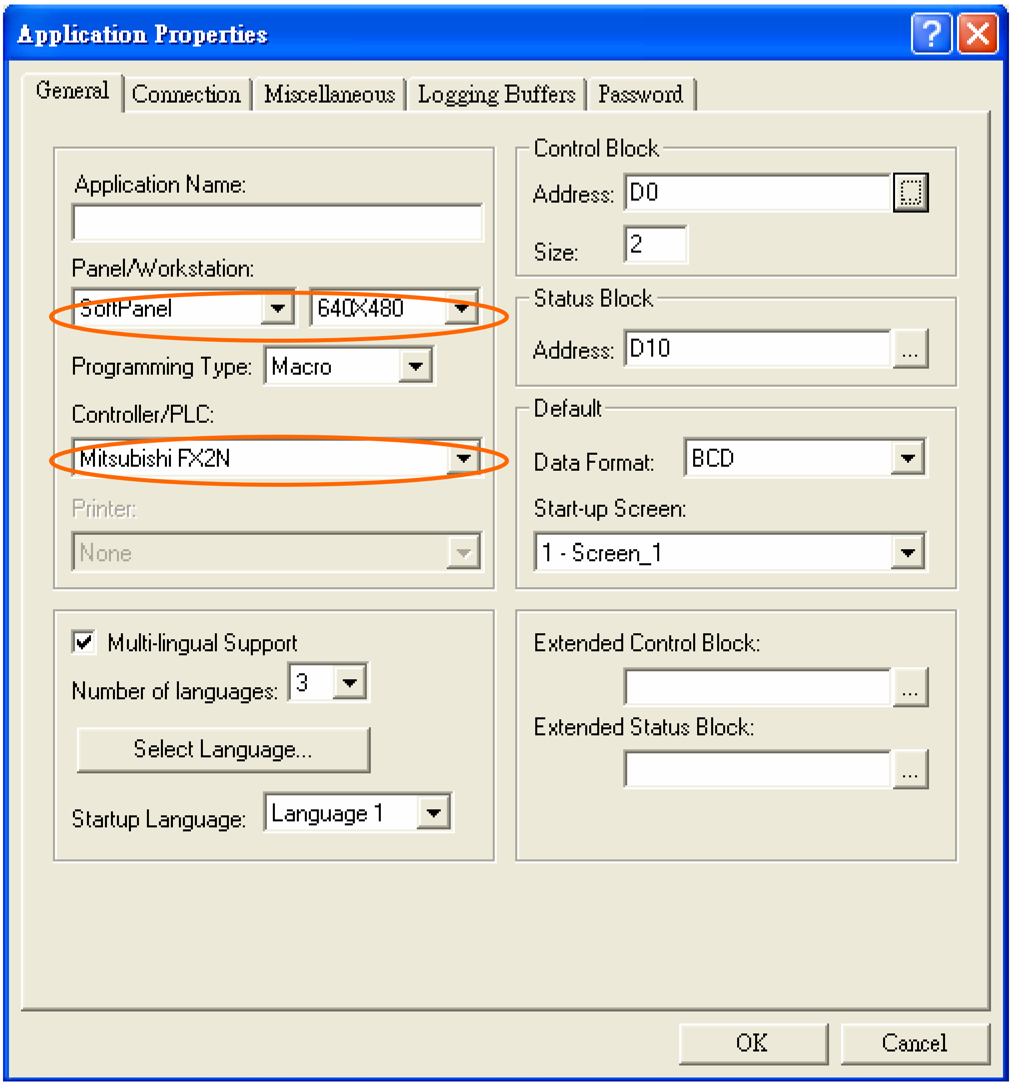


Figure 218. Select "SoftPanel" and the Type of PLC

3. Select the [Connection] tab. On the [Connection] tab, select "Ethernet (Cross-link)" from the [Port/method used for the connection] list. Then key in the default and IP address in the [Default Address] and [IP Address] box and select the [PWS Type]. See Figure 219.

4. Select type of HMI from the [PWS Type] list. See Figure 219.

5. Run the SoftPanel application and link with PLC.

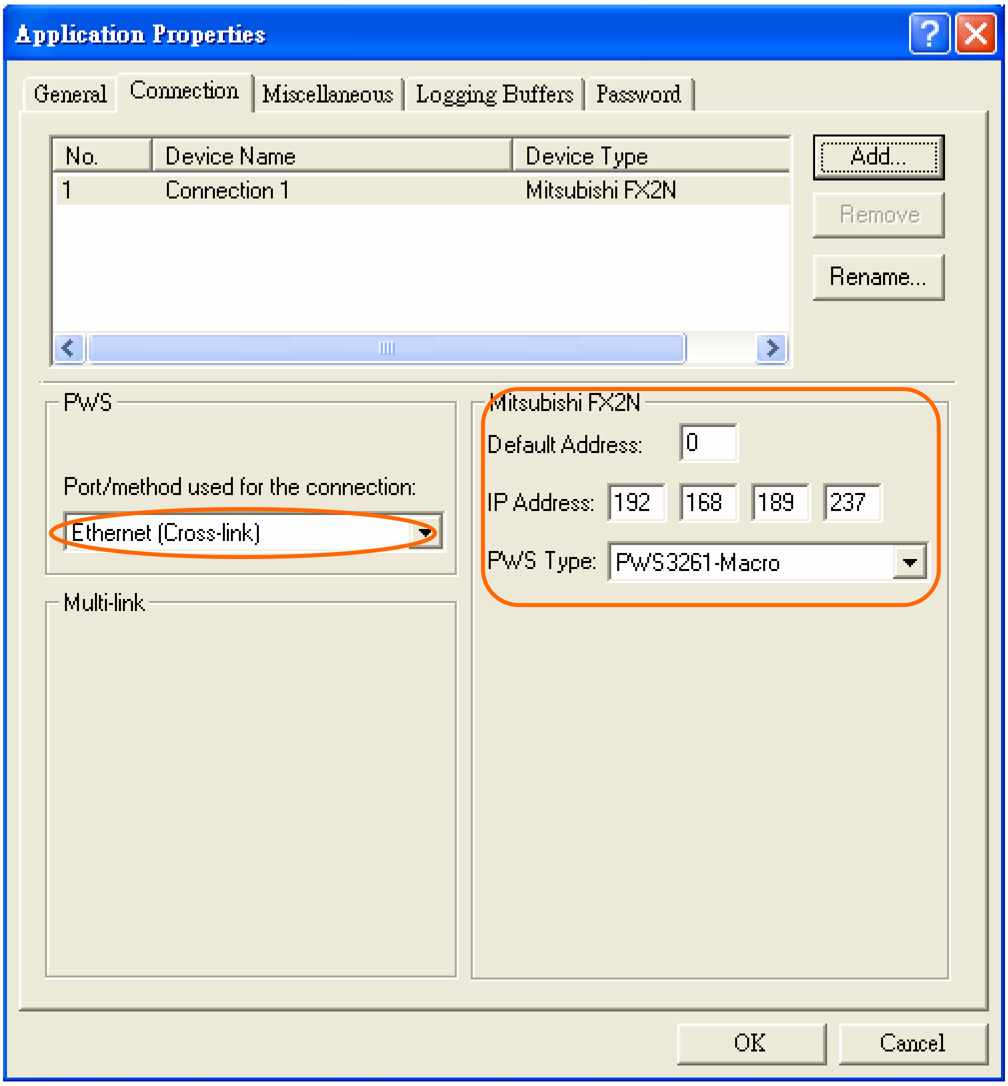


Figure 219. Key in the Address and Select PWS Type

7. Multi-Channel Communication

Since there are many different vendors and models of all kinds of equipments on the market, users often have a difficult time in data collection and integration. To solve this problem, HITECH develops a HMI model with 2 COM Ports and Ethernet to connect PLCs or other equipments (ex. temperature controller, server, inverter…etc) from different vendors so they are able to integrate and collect the data on HMI or PC.

Note that this feature is applicable on all HMI models; please refer to Appendix A. - Table of the ADP 6.0 Features and HMI Models.

7.1. Connection

User can use COM1, COM2 or Ethernet Port to link the **Multi-Channel Connection**.

One can use RS232, RS422 or RS485 to set up the link, but the method of connection is based on the needs and available equipments. For Ethernet, one has to use RJ45 to set up the link. Also the PLC must be Ethernet-enabled. See Figure 228. For the method of connection and setup, please refer to Chapter 9. Communication between PLC& PWS.

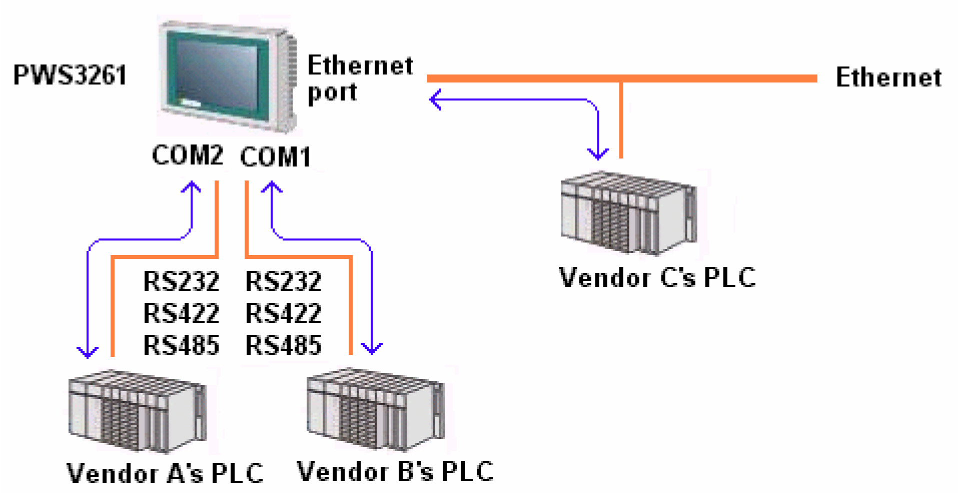


Figure 228. Multi-Channel Connection

7.2. Connection Setup

Multi-Channel connection setup includes the types of PLC and its parameters.

Follow the steps to set up:

1. In ADP, select [File]/[New]. The [New Application's Properties] dialog box is displayed. On the [General] tab, select the type of the **first** PLC from the [Controller/PLC] list, for example, "Mitsubishi FX Series." See Figure 229.

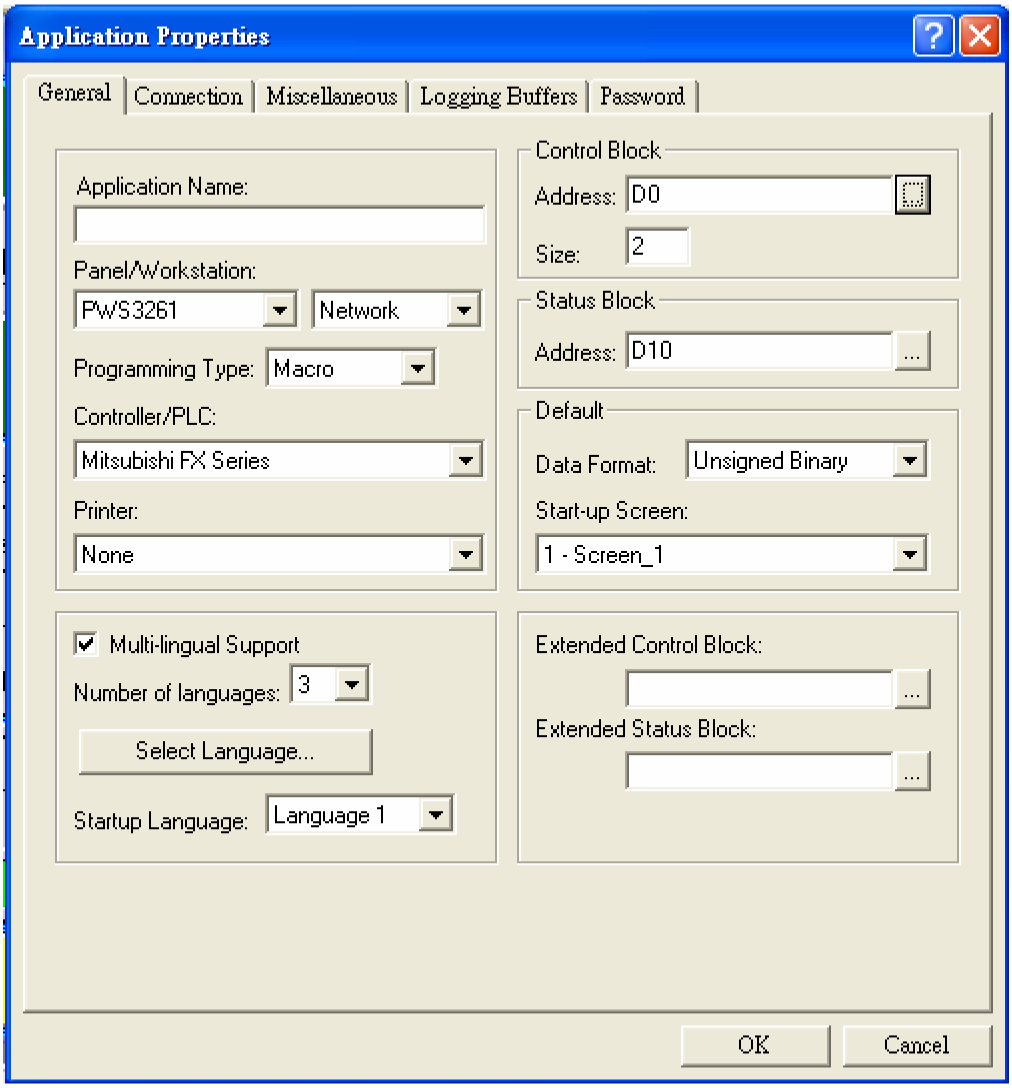


Figure 229. Select the Type of the First PLC

2. Select the [Connection] tab. On the [Connection] tab, select the method of connection for the **first** PLC from the [Port/method used for the connection] list. Next enter the addresses in the PWS's [Address] and PLC's [Default Address] box. Then make the selection from the [Baud Rate], [Data Bits], [Parity]

and [Stop Bits] list. See 錯誤! 找不到參照來源。. User can refer to Chapter 7 in the ADP User's Manual for details.

3. Then select the [Connection] tab, and set up the parameters for the first linked PLC including default address, baud rate, data bits, parity, stop bits…etc. See Figure 230. Please refer to Chapter 9. Communication between PLC & PWS.

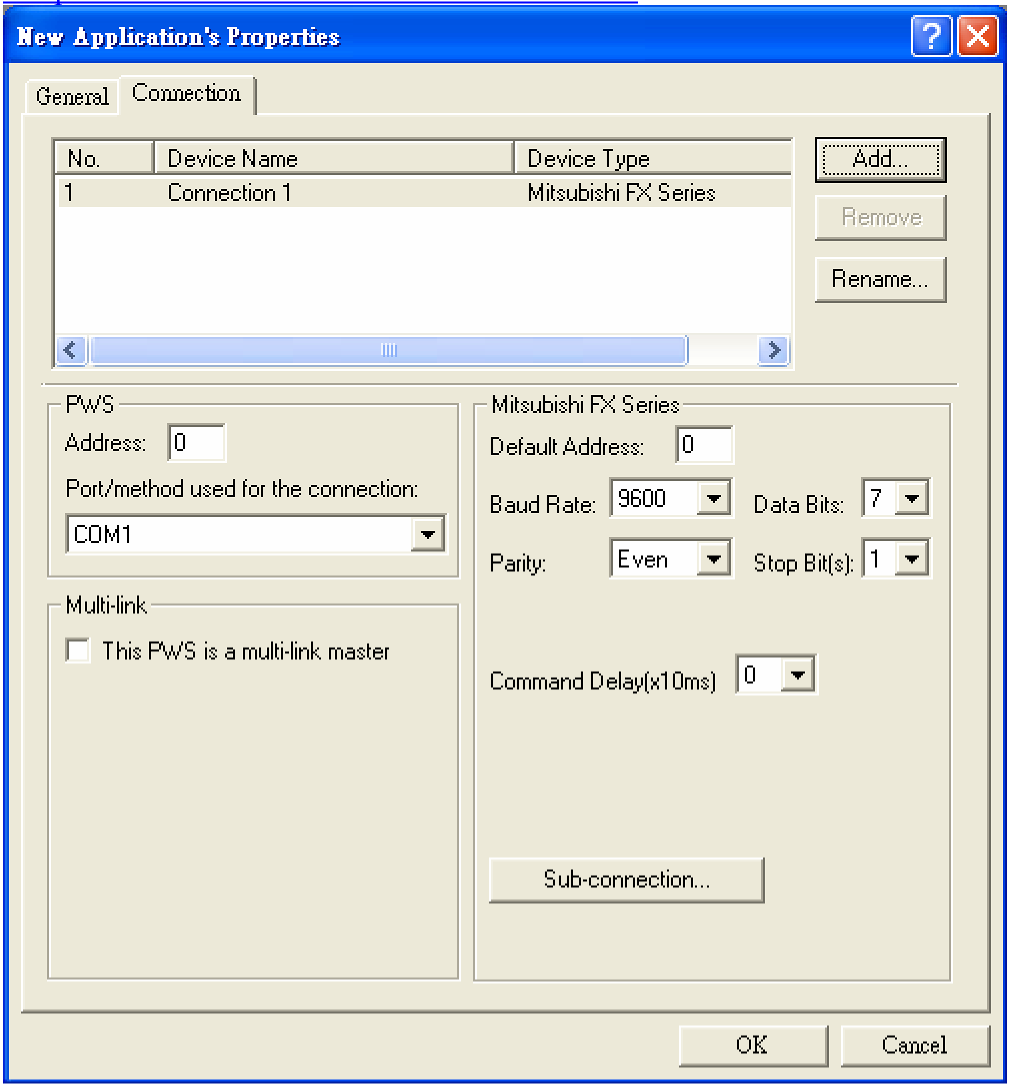


Figure 230. Setup the Connection with the first PLC

Note that if SW5 = ON, the parameters of the first linked PLC must be set up according to the Configuration Table in System Menu; If SW5 = OFF, the parameters of the first linked PLC must be set up according to the [Connection] tab in [Application]/[Workstation Setup]. See Figure 230.

4. To add a **second** PLC, click [Add] on the [Connection] tab, for example, "Simatic S7-200 [via PPI; 1-to-1]." See Figure 231 .

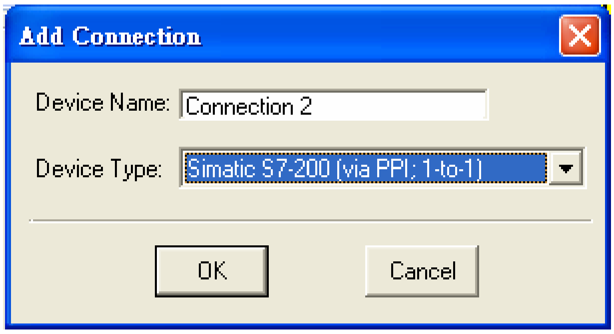


Figure 231. Add a second linked PLC

5. Follow the steps in 2. to set up the **second** PLC. Enter the addresses in the PWS's [Address] and PLC's [Default Address] box. Make the selection from the [Baud Rate], [Data Bits], [Parity] and [Stop Bits] list. See Figure 232. User can refer to Chapter 9. in the ADP User's Manual for details.

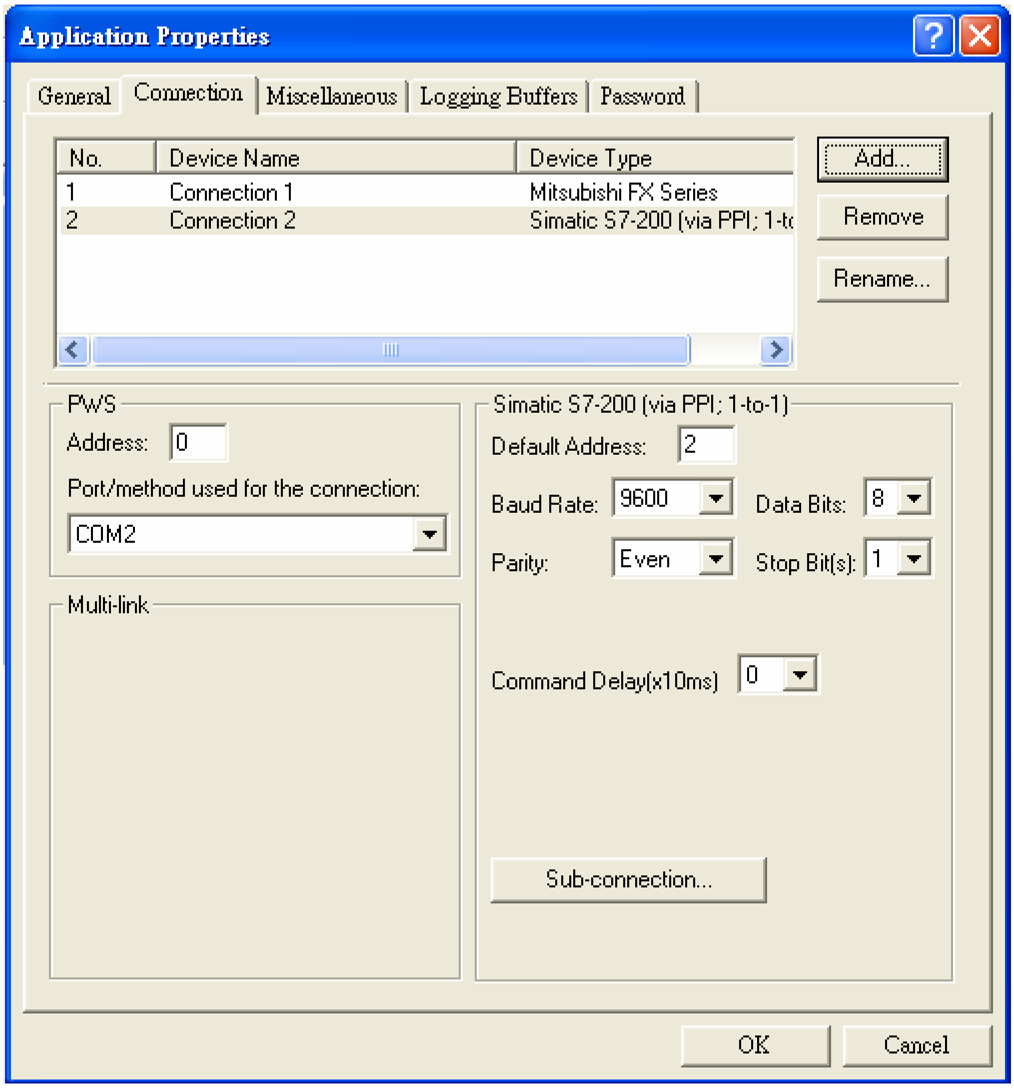


Figure 232. Set up the Connection with the second PLC

For the **second** PLC, one has to set up the parameters according to the [Connection] tab in [Application]/[Workstation Setup]. See Figure 230.

6. If the communication port is being used already, then the following error message will show up. See Figure 233.

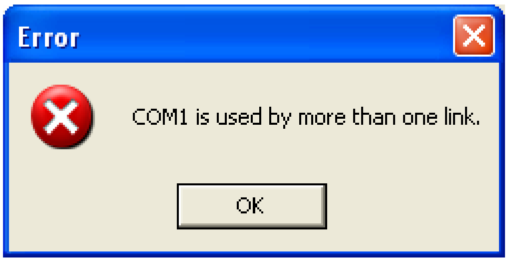


Figure 233. The Port is being Used Already

7. Next, to add an Ethernet-enabled PLC, click [Add] to add a **third** PLC, for example, “ModBus TCP/IP Device.” See Figure 234.

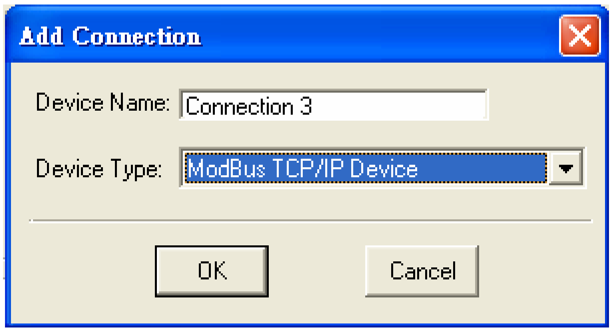


Figure 234. Add the third Ethernet-enabled PLC

8. To set up the **third** PLC (Ethernet-enabled), enter the address in [Default Address] and [IP Address] box. See Figure 235 錯誤! 找不到參照來源。. User can refer to Chapter 9 in the ADP User’s Manual for details.

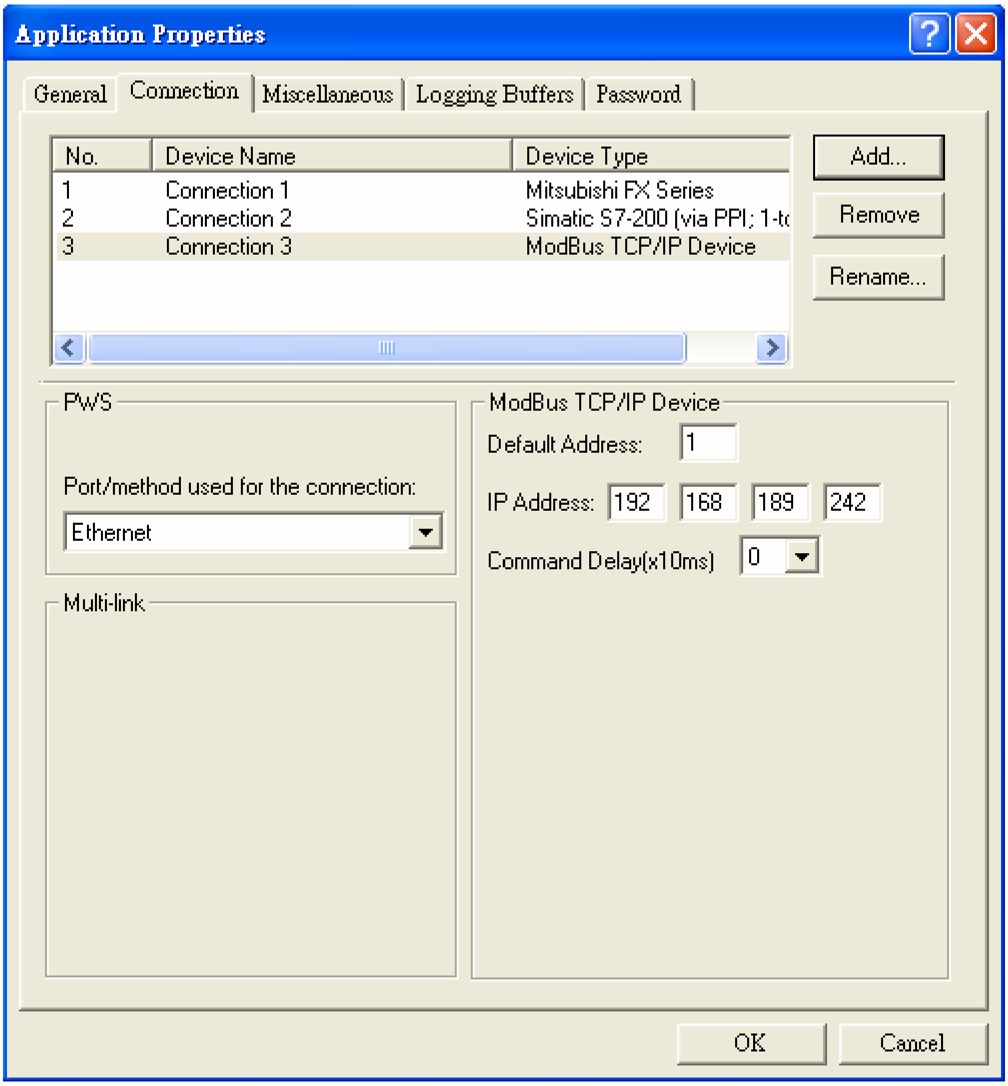
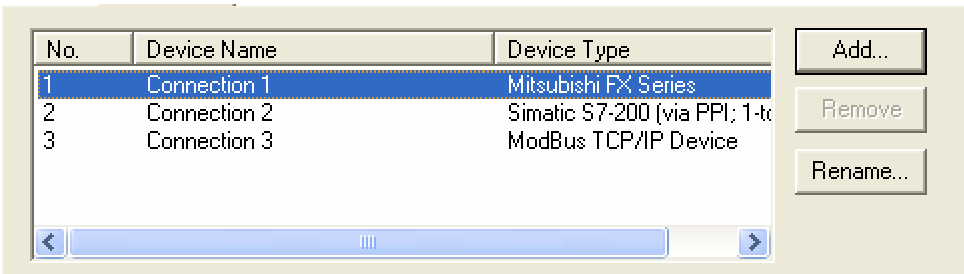


Figure 235. Set up the Connection with the third Ethernet-enabled PLC

9. Click [OK] to finish the setup. If user would like to change the setup later on, simply select [Application]/[Workstation Setup].

Note:



- [Add]： To add a new connection device. Here is to add another PLC.
- [Remove]： To delete a connection device. This function is not applicable to the first connection (i.e. Connection 1).
- [Rename]： To change the Device Name or the Device Type. For Connection 1, user is only able to change its Device Name. To change its Device Type, one has to change it from the [General] tab.
- [No.] column： Numbered by the order of addition of a device and it is not changeable.

7.3. Read/Write Address Setup

Since there is more than one type of PLCs, we need to assign a Read/Write Address for each PLC. Therefore, [/] denotes the separation from its register address.

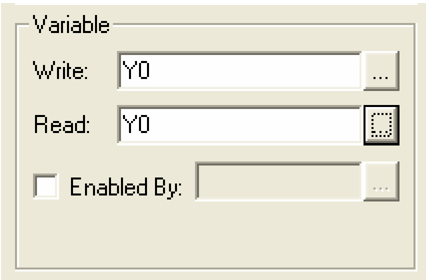
Note that this function is not applicable on all HMI models; please refer to Appendix A. - Table of the ADP 6.0 Features and HMI Models.

Example: The connection of Section 7.2. Connection Setup .

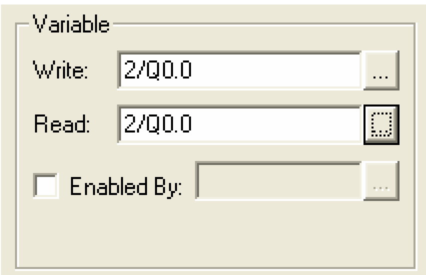
No.	Device Name	Device Type
1	Connection 1	Mitsubishi FX Series
2	Connection 2	Simatic S7-200 (via PPI ; 1 to 1)
3	Connection 3	Modbus TCP/IP Device

Follow the steps :

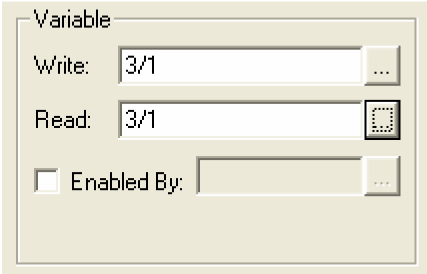
1. For Connection 1, in the [Write] and [Read] box, enter “1/Y1” for the bit address and “1/Y1D100” for the register address. “1” is [No.] column 1, it can be omitted and enter “Y1”.



2. For Connection 2, in the [Write] and [Read] box, enter “2/Q0.0” for the bit address. Notice that “2” refers to Connection No. 2 and “/” denotes the separation from its register address. See below.



3. For Connection 3, in the [Write] and [Read] box, enter “3/1” for the bit address. Notice that “3” refers to Connection No. 3 and “/” denotes the separation from its register address. We have to include “/” in the setup. See below.


Variable
Write:
3/1
...
Read:
3/1
Enabled By:
...

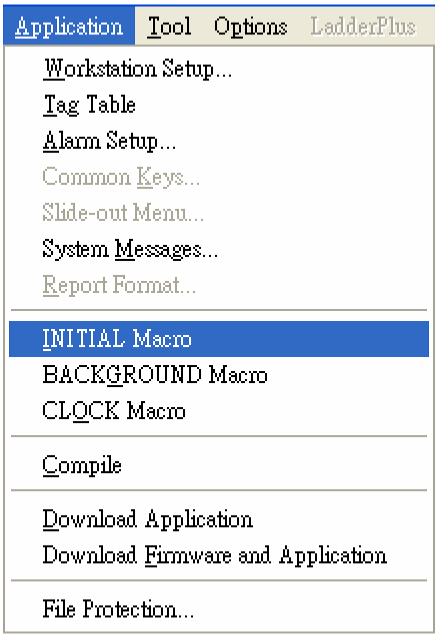
8. Macro

8.1. Macro Function

ADP offers user a convenient and powerful Macro application; Macro enables the Workstation to execute a number of tasks: Arithmetic, Logic, Flow Control, Data Transfer, Comparison, Conversion and system service instructions, etc. Using Macro can also significantly save the program size and optimize the efficiency in PLC. In Macro, not only can the Workstation communicate to the PLC but also connect to other devices. Thus Macro provides an efficient integration system as well as an economical structure in hardware application.

8.2. Classification in Macro

Macro offers user a number of functions in different situations and applications. A user can define the application according to the needs in the corresponding Marco window. PWS HMI will execute the macro commands according to the different modes. Macro is categorized into the following commands:



A. Application Macro commands：There are three types of macro commands in the [Application] menu.

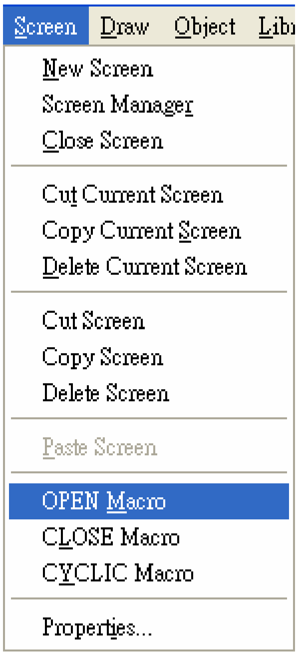
1. INITIAL Macro: The purposes of INITIAL Macro are data initialization and communication parameters declaration. This command is executed only once when an application is started and the start-up screen is not appeared until this command is executed. There is one INITIAL Macro in one application.

2. BACKGROUND Macro：When the HMI runs the application, the macro commands will execute cyclically. The maximum macro commands are 30 rows. The macro commands will execute whatever the current screen is. The common use for BACKGROUND Macro is communication control and PLC sampling data convert….etc.

3. CLOCK Macro：When the HMI runs this application, the entire macro commands will be executed every 500ms.

The common use for Clock Macro is display control, PLC bit monitor, timer control, data timer convert…etc.

B. Screen Macro Commands：There are three macro commands in the [Screen] menu.

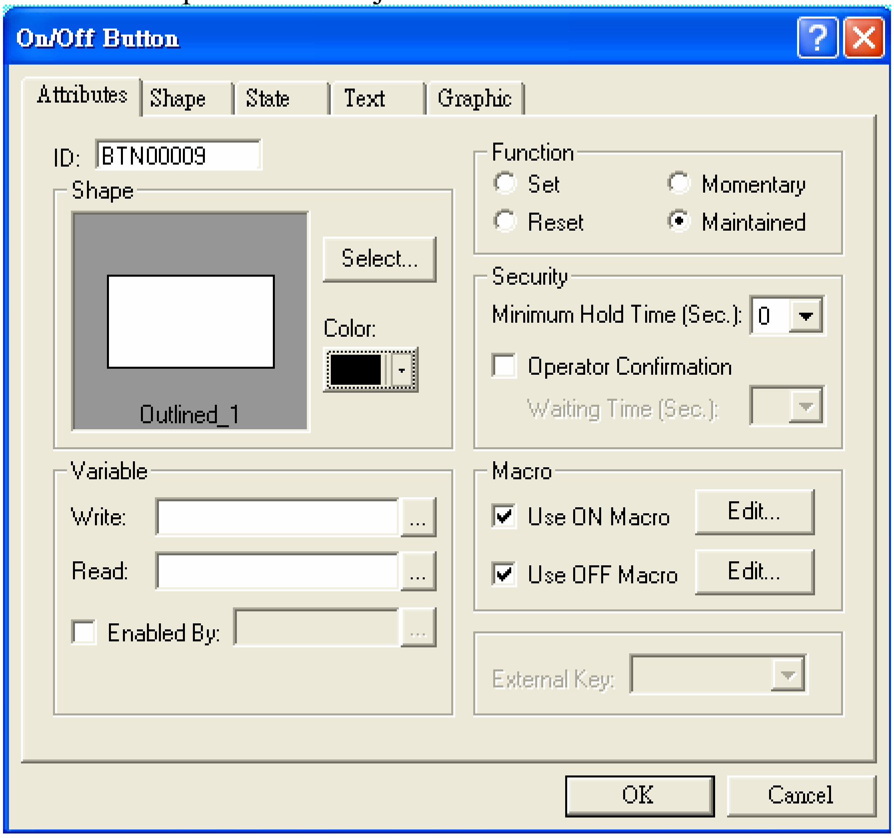


1. OPEN Macro：OPEN Macro is executed when the screen is commanded to be opened. The common use for OPEN Macro is screen initialization, display control, internal register or bit initialization.…etc.

2. CLOSE Macro：CLOSE Macro is executed when the screen is commanded to be closed. The CLOSE Macro will execute its command once.

3. CYCLIC Macro：CYCLIC Macro is executed cyclically when the screen is display. The HMI will execute the BACKGROUND Macro and CLOCK Macro periodically.

C. ON/OFF Macro Commands：There are two ON/OFF macro commands in push-button object.

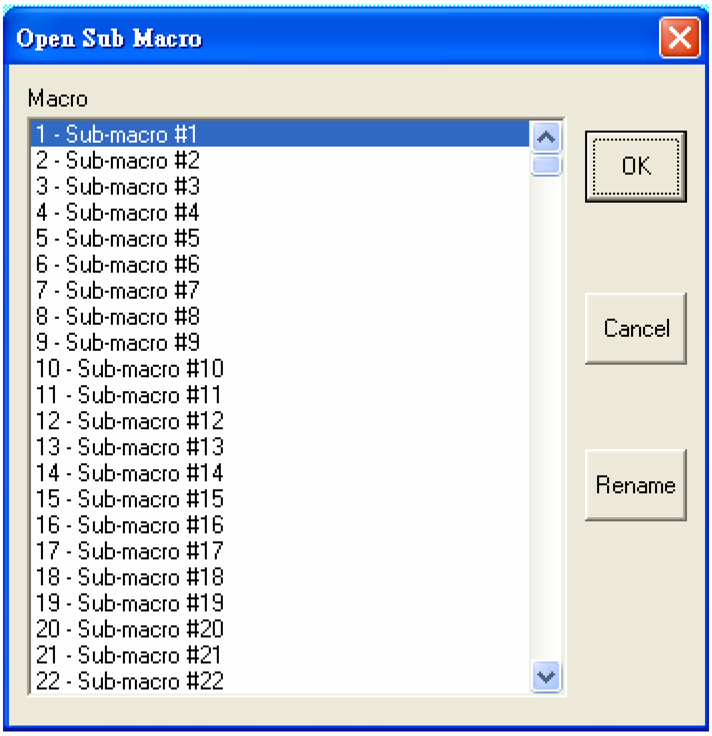


1. ON Macro：ON Macro is executed when the button is clicked and set a bit to be ON. The common use for ON Macro is the action of push-button, the control of chain process or the effect of displaying the initial screen and PLC register and bit initilialization…etc.

2. OFF Macro：OFF Macro is executed when the button is clicked and released a bit to be OFF. Then the HMI will execute the Macro commands once. The common use for HMI is the action of push-button, the control of sequence process, the effect of displaying the close screen…etc.

D. Sub-Macro Commands：A user can select [Sub-Macro] from the [Object] menu.

1. Sub-Macro：It is the sub-command of Macro. Sub-Macro is executed by the HMI with CALL command. The common use for Sub-Macro is to edit and save some basic functions or arithmetic commands for Macro.


Open Sub Macro
Macro
1 - Sub-macro #1
2 - Sub-macro #2
3 - Sub-macro #3
4 - Sub-macro #4
5 - Sub-macro #5
6 - Sub-macro #6
7 - Sub-macro #7
8 - Sub-macro #8
9 - Sub-macro #9
10 - Sub-macro #10
11 - Sub-macro #11
12 - Sub-macro #12
13 - Sub-macro #13
14 - Sub-macro #14
15 - Sub-macro #15
16 - Sub-macro #16
17 - Sub-macro #17
18 - Sub-macro #18
19 - Sub-macro #19
20 - Sub-macro #20
21 - Sub-macro #21
22 - Sub-macro #22
OK
Cancel
Rename

8.3. Macro Commands

The following details the macro commands and the formats. For the setup, please refer to the next section.

Operation	Format	A1*	A2*	A3*	Data Format	PLC Data
ADD	A1=ADD(A2,A3)	2	2,4	2,4	DW/Signed	X
SUB	A1=SUB(A2,A3)	2	2,4	2,4	DW/Signed	X
MUL	A1=MUL(A2,A3)	2	2,4	2,4	DW/Signed	X
DIV	A1=DIV(A2,A3)	2	2,4	2,4	DW/Signed	X
MOD	A1=MOD(A2,A3)	2	2,4	2,4	DW/Signed	X
OR	A1=A2 | A3	2	2,4	2,4	DW	X
AND	A1=A2&A3	2	2,4	2,4	DW	X
XOR	A1=A2^A3	2	2,4	2,4	DW	X
SHL	A1=A2<<A3	2	2,4	2,4	DW	X
SHR	A1=A2>>A3	2	2,4	2,4	DW	X
MOV	A1= A2	0,2	0,2,4	~	DW	O
BMOV	BMOV(A1,A2,A3)	0,2	0,2,	2,4		O
FILL	FILL(A1,A2,A3)	2	2,4	2,4		X
CHR	CHR(A1,"A2")	2	5	~		X
GETX	A1=@X	2,4				X
SETY	@Y=A1	2,4				X
X2Y	X2Y(A1,A2)	2,4	2,4			X
IF==	IF A1==A2 GOTOA3	2,4	2,4	4	DW/Signed	X
IF!=	IF A1!=A2 GOTOA3	2,4	2,4	4	DW/Signed	X
IF>	IF A1>A2 GOTOA3	2,4	2,4	4	DW/Signed	X
IF>=	IF A1>=A2 GOTOA3	2,4	2,4	4	DW/Signed	X
IF<	IF A1<A2 GOTOA3	2,4	2,4	4	DW/Signed	X
IF<=	IF A1<=A2 GOTOA3	2,4	2,4	4	DW/Signed	X
IF AND ==0	IF A1 AND A2==0 THEN GOTO A3	2,4	2,4	4	DW	X
IF AND !=0	IF A1 AND A2!=0 THEN GOTO A3	2,4	2,4	4	DW	X
IF==ON	IF A1=ON GOTO A2	3	4	~	Bit	X
IF==OFF	IF A1=OFFGOTO A2	3	4	~	Bit	X

* The useable range of memory will be indetified according to the commands. The number in the table represent :

0=PLC Device (Word), 1=PLC Device (Bit),
2=Internal Memory(Word), 3=Internal Memory(Bit),
4=Constant, 5=ASCII Character.

Operation	Format	A1*	A2*	A3*	Data Format	PLC Data
IF-THEN	IF condition ♦ THEN DO ENDIF	2,4	2,4	~	Condition♦	X

IF-THEN-ELSE	IF condition ♦ THEN DO
	ELSE DO
	ENDIF
		2,4	2,4	~	Condition♦	X

Nest IF-THEN-ELSE	IF condition ♦ THEN DO
	IF-THEN-ELSE
	ELSE DO
	IF-THEN-ELSE
	ENDIF
		2,4	2,4	~	Condition♦	X

ELIF	IF condition 1♦ THEN DO
	ELIF condition 2♦ THEN DO
	ELIF condition 3♦ THEN DO
	ENDIF
		2,4	2,4	~	Condition♦	X

GOTO	Goto label A1	4	~	~		X
LABEL	Label A1	4	~	~		X
CALL	Call A1	2,4	~	~		X
RET	Return	~	~	~		X
FOR	For A1	2,4	~	~		X
NEXT	Next	~	~	~		X
SETB	Bit setting A1	1,3	~	~	Bit	O
CLRB	Bit resetting A1	1,3	~	~	Bit	O
INVB	Bit inversion A1	1,3	~	~	Bit	O
BCD	A1=BCD(A2)	2	2	~	DW	X
BIN	A1=BIN(A2)	2	2	~	DW	X
W2D	A1=W2D(A2)	2	2	~	Signed	X
B2W	A1=B2W(A2,A3)	2	2	2,4		X
W2B	A1=W2B(A2,A3)	2	2	2,4		X
SWAP	SWAP(A1,A2)	2	2,4	~		X
MAX	A1=MAX(A2,A3)	2	2,4	2,4	DW/Signed	X
MIN	A1=MIN(A2,A3)	2	2,4	2,4	DW/Signed	X

* The useable range of memory will be indetified according to the commands. The number in the table represent :

0=PLC Device (Word), 1=PLC Device (Bit),
2=Internal Memory(Word), 3=Internal Memory(Bit),
4=Constant, 5=ASCII Character.

♦ Condition includes A1==A2, A1!=A2, A1>A2, A1>=A2, A1<A2, A1<=A2, (A1&A2)==0, (A1&A2)!=0, A1==ON或A1==OFF。A1 and A2 are only for internal memory and constant.

A2H	A1=A2H(A2)	2	2			X
H2A	A1=H2A(A2)	2	2			X
TIMETICK	A1= TIMETICK	2	~	~	DW	X
COMMENT	#A1="Chars"	5	~	~		X
SYS	SYS(A1,A2)					X
Operation	**Format**	**A1***	**A2***	**A3***	**Data Format**	**PLC Data**
	SYS(SET_TIMER,N)		4			X
	SYS(STOP_TIMER,N)		4			X
	SYS(SET_COUNTER,N)		4			X
	SYS(STOP_COUNTER,N)		4			X
	SYS(WAIT_TIMER,N)		4			X
	SYS(WAIT_COUNTER,N)		4			X
	SYS(INI_COM,N)		4			X
	SYS(GET_CHAR,N)		4			X
	SYS(GET_CHARS,N)		4			X
	SYS(PUT_CHAR,N)		4			X
	SYS(PUT_CHARS,N)		4			X
	SYS(READ_WORDS,N)		4			X
	SYS(READ_位元 S,N)		4			X
	SYS(WRITE_WORDS,N)		4			X
	SYS(WRITE_位元,N)		4			X
	SYS(SUM_ADD,N)		4			X
	SYS(SUM_XOR,N)		4			X

Arithmetic

[Notes]: Only internal memory can be used in these commands. The internal memory includes @, RCPW, CB, RCPNO and *@ (indirect internal memory). The data format is Word, Double-Word, Signed binary and Unsigned binary.
Format: A1 = A2 + A3

Description: Adds A2 and A3 and saves the result in A1.

♦ **ADD** → Format: A1 = A2+A3. Adds A2 and A3 and saves the result in A1.

---

* The useable range of memory will be indetified according to the commands. The number in the table represent :

0=PLC Device(Word), 1=PLC Device(Bit),
2=Internal Memory(Word), 3=Internal Memory(Bit),
4=Constant, 5=ASCII Character.

- **SUB** → Format: A1 = A2-A3. Subtracts A3 from A2 and saves the result in A1.
- **MUL** → Format: A1 = A2×A3.
- **DIV** → Format: A1 = A2/A3. A1 is quotient and A3 cannot be zero.
- **MOD** → Format: A1 = A2%A3. A1 is remainder and A3 cannot be zero.

Logical

Notes: Only internal memory can be used in these commands. The internal memory includes @, RCPW, CB, RCPNO and *@ (indirect internal memory). The data format is Word, Double-Word…etc. (no Signed binary, floating point number arithmetic).

A	B	F
0	0	0
0	1	1
1	0	1
1	1	1

OR → Format: A1=A2 | A3.。The truth table as left-side：
Performs the bit-wise "OR" operation of A2 (word) and A3 (word) and saves the result in A1 (word).

- Or the bit-wise "OR" operation of A2 (Dword) and A3 (Dword) and saves the result in A1 (Dword).

A	B	F
0	0	0
0	1	0
1	0	0
1	1	1

- AND → Format: A1 = A2& A3. The truth table as left-side：
  Performs the bit-wise "AND" operation of A2 (word) and A3 (word) and saves the result in A1 (word).
- Or performs the bit-wise "AND" operation of A2 (Dword) and A3 (Dword) and saves the result in A1 (Dword).
- **XOR** → Format: A1=A2 ^ A3. The truth table as left-side：
  Performs the bit-wise exclusive **OR** operation of A2 (word) and A3 (word) and saves the result in A1 (word).
- Or performs the bit-wise exclusive **OR** operation of A2 (Dword) and A3 (Dword) and saves the result in A1 (Dword).
- **SHL** → Format: A1=A2 << A3. Shifts A2 (word) left by A3 bits and saves the result in A1 (word). left shift command fills 0 into bit 0 and the last bit will shift out. If the displacement(A3) is greater than 16 ,then 16 will be the most shiftable amount.
- Or shift A2 (Dword) left by A3 bits and saves the result in A1 (Dword). Left shift command fills 0 into bit 0 and the last bit

will shift out. If the displacement(A3) is greater than 32 ,then 32 will be the most shiftable amount.

- **SHR** → Format: A1=A2 >> A3. Shifts A2 (word) right by A3 bits and saves the result in A1 (word). Right shift command fills 0 into bit 15 and the last bit will shift out. If the displacement(A3) is greater than 16 ,then 16 will be the most shiftable amount.

- Or shifts A2 (Dword) right by A3 bits and saves the result in A1 (Dword). Right shift command fills 0 into bit 31 and the last bit will shift out. If the displacement(A3) is greater than 32 ,then 32 will be the most shiftable amount.

Data transfer

[Notes]: Both MOV and BMOV command can be located in the PLC memory or internal memory. These include @, RCPW, CB, RCPNO and *@ (indirect internal memory). The data format of this command is Word.

- **MOV** →Format: A1 (Word) =A2 (Word), A1 (Dword) = A2 (Dword). The **MOV** command is to copy the value of A2 to A1 and the value of A2 is fixed. If A1 is located in PLC, it represents the A2 data in HMI internal register will write in PLC. If A2 is located in PLC, it represents the A2 data will be read and shift to HMI internal register A1.

- **BMOV** → Format: BMOV (A1, A2, A3).Copy a block of data starting at A2 to the memory block starting at A1. A3 specifies the number of Words to be copied. The data format is Word. The **BMOV** command is to copy a block of A3 starting at A2 to the A3 block starting at A1, and the A2 data is fixed. The number of A3 must be between 2 and 524. Format: BMOV (A1, A2, A3)

- **FILL** → Format: FILL (A1, A2, A3). Fill a block of memory starting at A1 with the value of A2. A3 specifies the number of words to be filled. The data format is Word. The **Fill** command is to fill A2 data into a block of A3 starting at A1, A2 data is fixed. The number of A3 must be between 2 and 524.

- **CHR** → Format: CHR (A1, “A2”). Copy the character string A2 to A1. The data of A1 is in ASCII format.

- **GETX** → Format: **A1 = @X**. Convert @X input signal to A1. The A1 data is numeric value. This command is only applicable on PWS520S model.

- **SETY** → Format: **@Y = A1**. Covert A1 to output signal. The A1 data is numeric value. This command is only applicable on PWS520S model.

- **X2Y** → Format: **X2Y (A1, A2)**. Convert input to output. This command is only applicable on PWS520S model.

If A2 value is not zero, the specified internal bit A1 is enabled. When A2 value is zero, the action of the specified internal bit A1 is disabled. There are eight internal bits (from 0 to 7) in PWS-520S. A internal bit can assign the corresponding input point and output point which the sensitive time needs to greater than 20 msec. When cancel the action internal point, the relative digital output point will be reset.

Comparison

[Notes]: Only internal memory can be used in these commands. The internal memory includes @, RCPW, CB, RCPNO and *@ (indirect internal memory).

- IF ==→ Format: IF A1 == A2 THEN GOTO LABEL A3. Goes to LABEL A3 if A1 is equal to A2.

- IF!= → Format: IF A1!=A2 THEN GOTO LABEL A3. Goes to LABEL A3 if A1 is not equal to A2.

- IF > → Format: IF A1>A2 THEN GOTO LABEL A3. Goes to LABEL A3 if A1 is greater than A2.

- IF >= → Format: IF A1>=A2 THEN GOTO LABEL A3. Goes to LABEL A3 if A1 is greater than or equal to A2.

- IF < → Format: IF A1<A2 THEN GOTO LABEL A3. Goes to LABEL A3 if A1 is less than A2.

- IF <= → Format: IF A1<=A2 THEN GOTO LABEL A3. Goes to LABEL A3 if A1 is less than or equal to A2.

- IF AND == 0 → Format: IF (A1&A2) == 0 THEN GOTO LABEL A3. Goes to LABEL A3 if the result of AND operation of A1 and A2 is 0.

- IF AND! = 0 → Format: IF (A1&A2)! = 0 THEN GOTO LABEL A3. Goes to LABEL A3 if the result of AND operation of A1 and A2 is not 0.
- IF == ON → Format: IF A1==ON THEN GOTO LABEL A2. If bit A1 is ON (1) then goes to LABEL A2.
- IF ==OFF → Format: IF A1==OFF THEN GOTO LABEL A2. If bit A1 is OFF (0) then goes to LABEL A2.
- IF condition THEN DO Macro ENDIF → If the condition is true, the HMI will execute the Macro. See below: :

1 IF @100 == 50 THEN DO 2 SETB Y0 3 SETB Y1 4 ENDIF 5 END	1. If @100 is equal to 50, then the following Macro will be executed. 2. Force PLC Output Y0 to be 1(ON). 3. Force PLC Output Y1 to be 1(ON). 4. End of the IF condition. 5. End of the Macro.

- IF condition THEN DO Macro-A ELSE DO Macro-B ENDIF → If the condition is true, the HMI will execute Macro-A. If the condition is not true, the HMI will execute Macro-B. See below:

1 IF @100 == 50 THEN DO 2 SETB Y0 3 SETB Y1 4 ELSE DO 5 CLRB Y0 6 CLRB Y1 7 ENDIF 8 END	1. If @100 is equal to 50, then the following Macro will be executed. 2. Force PLC Output Y0 to be 1(ON). 3. Force PLC Output Y1 to be 1(ON). 4. If @100 is not equal to 50, the following Macro will be executed. 5. Force PLC Output Y0 to be 0(OFF). 6. Force PLC Output Y1 to be 0(OFF). 7. End of the If condition. 8. End of the Macro.

- IF condition THEN DO

  IF-THEN-ELSE-A

  ELSE DO

No.	Macro	Description
1	IF @100 > 50 THEN DO	1. If @100 is greater than 50, then the following Macro will be executed.
2	IF @100 > 80 THEN DO	2. If @100 is greater than 50 and @100 is greater than 80, then the following Macro will be executed.
3	SETB Y3	3. Force PLC Output Y3 to be 1(ON).
4	CLRB Y0	4. Force PLC Output Y0 to be 0(OFF).
5	CLRB Y1	5. Force PLC OutputY1 to be 0(OFF).
6	CLRB Y2	6. Force PLC OutputY2 to be 0(OFF).
7	ELSE DO	7. If @100 is greater than 50 but @100 is less than 80, then the following Macro will be executed.
8	SETB Y2	8. Force PLC OutputY2 to be 1(ON).
9	CLRB Y0	9. Force PLC OutputY0 to be 0(OFF).
10	CLRB Y1	10.Force PLC OutputY1 to be 0(OFF).
11	CLRB Y3	11.Force PLC OutputY3 to be 0(OFF).
12	ENDIF	12.End of the No. 2 IF condition.
13	ELSE DO	13.If @100 is not greater than 50, then the following Macro will be executed.
14	IF @100 > 30 THEN DO	14.If @100 is not greater than 50 and @100 is less than 30, then the following Macro will be executed.
15	SETB Y1	15.Force PLC OutputY1 to be 1(ON).
16	CLRB Y0	16.Force PLC OutputY0 to be 0(OFF).
17	CLRB Y3	17.Force PLC OutputY3 to be 0(OFF).
18	CLRB Y2	18.Force PLC OutputY2 to be 0(OFF).
19	ELSE DO	19.If @100 is not greater than 50 and @100 is not greater than 30, then the following Macro will be executed.
20	SETB Y0	20.Force PLC OutputY0 to be 1(ON).
21	CLRB Y3	21.Force PLC OutputY3 to be 0(OFF).
22	CLRB Y1	22.Force PLC OutputY1 to be 0(OFF).
23	CLRB Y2	23.Force PLC OutputY2 to be 0(OFF).
24	ENDIF	24.End of No.14 IF condition.
25	ENDIF	25.End of No. 1 IF condition.
26	END	26.End of Macro.

條件成立，則執行另一個IF-THE
E

If N-ELSE-A is not true, IF-THEN-ELSE-B will be executed. See below:

♦ IF condition-1 THEN DO

Macro-A

ELIF condition-2 THEN DO

Macro-B

ELIF condition-3 THEN DO

Macro-C

ENDIF

→ If condition-1 is true, Macro-A will be executed; if condition-1 is not true but condition-2 is true, Macro-B will be executed; if condition-1 and condition-2 are not true but condition-3 is true, Macro-C will be executed. See below:

1	IF @100 > 10 THEN DO	1. If @100 is greater than 10, then the following Macro will be executed.
2	CALL 10	2. Call Sub-macro 10.
3	ELIF @100 > 5 THEN DO	3. If @100 is not greater than 10 but @100is greater than 5, the following Macro will be executed.
4	CALL 5	4. Call sub-Macro 5.
5	ELIF @100 > 1 THEN DO	5. If @100 is not greater than 10 but @100 is not greater than 5 and @100 is greater than 1, then the following Macro will be executed.
6	CALL 1	6. Call sub-Macro 1.
7	ENDIF	7. End of If condition.
8	END	8. End of Macro.

Flow Control

[Notes]: Only internal memory can be used in these commands.

- ♦ GOTO → Format: GOTO LABEL A1. Goes to LABLE A1 unconditionally. The GOTO command will cause a branch to the specified label (Label A1). And LABEL A1 must be in the Macro.

- ♦ LABEL → Format: LABEL A1. Note that no two labels are allowed to have the same number in one Macro but the same number in Macros is acceptable.

- ♦ CALL → Call Sub-macro. Format: CALL A1. Call command can assign the control to sub-macro. The common use of sub-macro is to execute some specific functions, passing the parameter table, complex instruction set…etc. Note that the specified sub-macro must exist and return by RET command where the end of the sub-macro. Then the next macro will be executed. The number of sub-macro is from 001 to 512, and allowed to name. Besides, sub-macro is assigned to CALL another sub-macro.

- ♦ RET → Return to Macro. RET command only exists in Sub-Macro but Call exist in Macro. Each RET command must have a corresponding CALL command.

- ♦ FOR..NEXT → Loop, “FOR” is the start of a loop and “NEXT” is the end of a loop. Note that the maximum number of FOR loop is 3, e.g. FOR A1. .NEXT. FOR loop is formed by the pair of FOR and NEXT commands, and executes the macro instructions within the FOR loop by A1 times. A1 can be variable and constant. When A1 is 0, the Macro will skip the FOR loop and execute the next line of code after the Next command. When A1 is greater than 0, the Macro will execute A1 continuously until the end of the FOR loop. And a user can change the A1 value within the FOR commands. Note that if A1 is too great, CPU will overload and malfunction.

- ♦ FOR/NEXT loop command can execute the program repeatedly. Each FOR command must have one corresponding NEXT command. One is allowed to have up 3 nested FOR loops, e.g. FOR @1…, FOR @2…, FOR@3...NEXT,NEXT,NEXT.

- ♦ END → End the Macro. END command represents the end of the Macro. The Macro will not execute the next line of code after the END command and start to the first line of code next time.

Note: END command represents the end of the MACRO, it is invalid in SUB-MACRO. SUN-MACRO must use RET command; otherwise, the program will cause errors.

Data Conversion

[Notes]: Only internal memory can be used in these commands. The internal memory includes @, RCPW, CB, RCPNO and *@ (indirect internal memory).

- BCD → Convert BIN to BCD. Format: A1 = BCD (A2). This command is used to convert A2 (Integer, Word or Dword) from a binary number to a BCD number and saves the result in A1. The valid integer of A2 is between 0 and 9999 (Word) or 0 and 99999999 (Dword).

- BIN → Convert BCD to BIN. Format: A1 = BIN (A2). This command is to convert A2 from a BCD number (Word or Dword) to a binary number and saves the result in A1 (Integer,Word or Dword). The valid BCD number is between 0 and 9999 (Word), or 0 and 99999999 (Dword).

- W2D → Convert WORD to DOUBLE WORD. Format: A1 = W2D (A2). The W2D command is to convert A2 from a WORD number (Integer) to a DOUBLE WORD (Integer) and saves the result in A1 (Dword, signed or unsigned). The valid integer of A2 is between 0 and 65535 (Word,unsigned) or -32768 and 32767 (Word,signed). This function can extend the size of 16 bits signed integer(Word) to 32 bits integer(DWord).

- B2W → Convert BYTE to WORD. Format: A1 = B2W (A2, A3). The byte array is starting at A2 with the size A3 and the result is saved in the memory starting at A1 (WORD). The high bytes of the word array are set to be 0.

- W2B → Convert WORD to BYTE. Format: A1 = W2B (A2, A3). The word array is starting at A2 with the size of A3. The result is saved in the memory starting at A1. The conversion will discard the high bytes of the A2 word array.

- SWAP → Swap the Bytes, Format: SWAP (A1, A2). The SWAP command is to swap the low byte and high byte of each word of a memory block starting at A1. A2 specifies the size of the memory block in word. After executing, the Al data will be changed.

- MAX → Maximum. Format: A1 = MAX (A2, A3). Sets A1 to the larger one in A2 and A3. (The data format can be in word, dword, signed binary or unsigned binary.)

- MIN → Minimum. Format: A1 = MAX (A2, A3). Sets A1 to the smaller one in A2 and A3. (The data format can be word, dword, signed binary or unsigned binary.)

- A2H → Convert 4-digit hex number in ASCII character form into a binary number. Format: A1 = A2H (A2). The character of the fourth digit is in word A2 and the characters of the other digits are in the words following A2 in sequence. The result will be saved in A1. For example, suppose A2 as @200 and the data in @210=9538H. After the conversion, the result will be saved in A1=@210 and it is @200=0039H, @201=0033H, @202=0035H and @203=0038H. (The data format is only in word.)

- H2A → Convert a 16-bit binary number into a 4-digit hex number in ASCII character form. Format: A1 = A2H (A2). The number to be converted is in A2. The character of the fourth digit will be saved in A1 and the characters of the other digits will be saved in the words following A1 in sequence. For example, suppose A2 as @100 and the data in @100=1234H. After the conversion, the result will be saved in A1=@110 and it is @110=0031H, @111=0032H, @112=0033H and @113=0034H. (The data format is only in word.)

Bit Setting

Both internal memory and PLC bit can be used including @nnn.b， RCPWnnn.b in these commands.

- SETB →Set bit to be ON. Format: SETB A1。

- CLRB →Set bit to be OFF. Format: CLRB A1。

- INVB →Inverse the bit state. Format: INVB A1.

Others

There are three special commands to use.

TIMETICK → Get the current system time tick (CPU internal clock time). Format: A1= TIMETICK (). The system time tick is increased by 1 in every 100 ms.

- COMMENT → This is a non-executable instruction and its purpose is to make comments in macro.

- SYS → There are a number of system services which can be used in **SYS** command. please refer to the complete detail in the following:

A) SET_TIMER →Specify the internal timer. Format: SYS(SET_TIMER,N) 。

@N : Time number. The number of N is between 0 and 7.

@N+1: Current Timer Value.

@N+2: Timer Limit.

@N+3: Time-up Flag.

@N+4: Type of Operation as below:

0 Timer will stop when reach the default setting, the flag will set to be 1.

1 Timer resets to be 0 automatically when the flag is changed to be 0 or 1. When the flag is 1, the timer resets to be 0 automatically. When the flag is 0, the timer resets to be 0 automatically.

2 (PWS-520S only) Does the operations in Type 0 and sets the corresponding digital output Yn, where n = 0~7.

3 (PWS-520S only) Does the operations in Type 1 and toggles the corresponding digital output Yn; where n=0~7.

B) STOP_TIMER →Stops the internal timer . Format: SYS (STOP_TIMER,N).

C) SET_COUNTER → Set the internal counter, it is only applicable on PWS520S.

@N: Counter number. The number of N is between 0 and 7.

@N+1: Current Counter Value .

@N+2: Counter Limit.

@N+3: Over-Limit Flag.

@N+4: Type of Operation as below:

0 Counter will stop when reach the default setting, the flag will set to be 1.

1 Counter resets to be 0 automatically when the flag is

changed to be 0 or 1. When the flag is 1, the counter resets to be 0 automatically. When the flag is 0, the counter resets to be 0 automatically.

2 (PWS-520S only) Does the operations in Type 0 and sets the corresponding digital output Yn, where n = 0~7.

3 (PWS-520S only) Does the operations in Type 1 and toggles the corresponding digital output Yn; where n=0~7.

D) STOP_COUNTER → Stop the internal counter. Format: SYS(STOP_COUNTER,N).

E) WAIT_TIMER→ Wait for the time-up event in the internal timer. Format: SYS (WAIT_TIMER,N). The macro instruction following this command will not be executed until the timer reaches to the Timer Limit. Remember that the corresponding timer must be activated by the SET_TIMER service before requesting this service.

F) WAIT_COUNTER→ Wait for the over-limit event in the internal counter, it is only allocable on PWS520S. Format: (WAIT_COUNTER,N). The macro instruction following this command will not be executed until the counter reaches to the Counter Limit. Remember that the corresponding counter must be activated by the SET_COUNTER service before requesting this service.

G) INIT_COM → Select and initialize a COM port. Format: SYS (INIT_COM,N). The word @n specifies the communication setting of the COM port. The format of the setting is shown in the following:

Bit 1,Bit 0 →DATA Bit S 10：7 Bit S,11：8 Bit S.

Bit 2 →STOP Bit S 0：1 位元,1：2 Bit S.

Bit 4, Bit 3 →PARITY.> 00：NONE, 01：ODD, 11：EVEN.

Bit 6, Bit 5 →COM PORT > 00：COM1, 01：COM2, 10：COM3, 11：COM4.

Bit 7 → Not used.

Bit11,Bit 10,Bit 9,Bit 8 →0001：115200, 0010：57600, 0011：38400, 0110：19200, 1100：9600, Others：4800.

Bit 15 → Computer Protocol Driver ; 0: Disable, 1: Enable (This command is only applicable on PWS1711-Macro, PWS1711-Color, PWS1760, PWS3260, PWS3760)

If this service is successful, then the word @n+1 will be set to be 1; otherwise, it will be set to be 0.

There are some models (e.g. PWS1711-Macro and PWS1711-Color) providing Computer Protocol slave driver for the second com port; This function provides the communication between PC/another PWS and PWS1711-Macro and PWS1711-Color in the second com port. The HMI can communicate with PLC over the first com port and the connection steps are the same as usual steps. The PC can read from the internal registers of PWS1711 @0-@639 over the second port (The data of W0-W639 is correspondent with @0-@639). For PWS1762, PWS3160, PWS3760, the PC can read from the internal registers @0-@2047 (The data of W0-W2047 is correspondent with @0-@2047). To communicate with SoftPanel or another PWS, the controller/PLC must be Computer (as slave) and the PLC station must set as the PWS station and the related format must be the same as the format of INIT_COM.

When use the Computer Protocol driver, this function is inapplicable on GET_CHAR, GET_CHARS, PUT_CHAR, and PUT_CHARS.

H) GET_CHAR → Gets a character from the COM port. Format: SYS (GETCHAR,N). The character will be saved in the low byte of the word @n. If there is no input, the word @n will be set to be -1(ffffH).

I)GET_CHARS → Gets a number of characters from the COM port. Format: SYS (GETCHARS,N). The word @n specifies the maximum number of characters to receive. The actual number of characters received is then saved in word @n+1. The characters received will be saved in the low bytes of the word @n+2, @n+3, @n+4 and so on.

J) PUT_CHAR → Sends a character in the low byte of word @n to the COM port. Format: SYS (PUTCHAR,N). If this service is successful, then the word @n+1 will be set to be 1; otherwise, it will be set to be other value.

K) PUT_CHARS →Sends the characters in the low bytes of the words starting from @n+2 to the COM port. Format: SYS (PUTCHARS,N). Also, the word @n specifies the number of characters to be sent and the actual number of characters sent is then saved in the word @n+1.

L) SUM_ADD → Calculates the sum of a block of words by normal arithmetic addition. Format: SYS (SUM_ADD,N). The output data will save in "@N+3", this feature offers more convenient application for Macro. For example, SYS (SUM_ADD,30) represents N = 30, this command will calculate the sum of @30,@31,@32,@33 internal registers.

@N=30 represents the pointer parameter, and the internal value of @30 must be 0.

@N+1(@31) represents the starting address of the block.

@N+2(@32) represents the size of WORDS block.

@N+3(@33) represents the initial value of the summand and the sum will save in this address automatically. A user must set the summand before execution. Most communication protocols regulate the initial value of summand = 00H or FFH, please refer to initial value assigned by vendor.

M) SUM_XOR → Calculate the sum of a block of words by the bit-wise logical exclusive-or operation and save the result in the specified address. Format: SYS(SUM_XOR,N). The output data will save in "@N+3", this feature is convenient for Macro communication application. For example, SYS(SUM_XOR,50) represents N = 50, this command will calculate the sum of @50,@51,@52,@53 internal registers. To execute this command requires the internal value of @50, @51, @52, and @53.

@N=50 represents PLC station number, and the internal value of @50must be 0 if no PLC station is required.

@N+1(@51) represents the starting address of the block.

@N+2(@52) represents the size of WORDS block.

@N+3(@53) represents the initial value of the summand and the sum will save in this address automatically. A user must set the summand before execution. Most communication protocols regulate the initial value of summand = 00H or FFH, please refer to initial value assigned by vendor.

N) READ_WORDS → Read a number of words from PLC word devices or internal memory and save the result in the specified address. Format: SYS (READ_WORDS,N). The data will save in "@+5". This command is powerful for the communication with the any PLC registers and can be used as PLC data setting and monitor. For example, SYS(READ_WORDS,80) represents N = 80. To execute this command requires the internal value of @80, @81, @82, @83, @84, @85, @86.

@N (@80) represents PLC station number, and the internal value of @80 must be 0 if no PLC station is required.

@N+1(@81) represents the device type setting. For the device type of PLC, please refer to Chapter 9. for the complete details.

@N+2(@82) represent the low word of the device address.

@N+3(@83) represent high word of the device address.

@N+4(@84) represent auxiliary address if required or set to be 0.

@N+5(@85) represent the address of the internal memory to receive the data and the size of data is specified by N+6(@86).

@N+6(@86) represent the number of words to be read.

O) READ_Bit → Read a PLC bit device or internal bit and save the data in the specified address. Format: SYS (READ_Bit,N). The data will save in "@+5". This command is powerful for the communication with the any PLC bit-state and can be used as PLC data setting and monitor. For example, SYS(READ_bit,80) represents N = 80. . To execute this command requires the internal value of @80, @81, @82, @83, @84, and @85.

@N(@80) represents PLC station number, and the internal value of @80 must be 0 if no PLC station is required.

@N+1(@81) represents the device type. For the device type of PLCs, please refer to Chapter 9. for the complete details.

@N+2(@82) represents low word of the device address.

@N+3(@83) represents high word of the device address.

@N+4(@84) represents auxiliary address if required or set 0.

@N+5(@85) represents the address of the internal memory to receive the data. N+5(@85) DATA = 1 if the bit is ON; DATA = 0 if the bit is OFF.

P) WRITE_WORDS → Writes a block of data in internal memory to PLC word devices or internal memory. Format: SYS(WRITE_WORDS,N). The data will save in "@N+5". This command is powerful for the random modification of the any PLC data and can be used as PLC data setting and monitor. For example, SYS(WRITE_WORDS,90) represents N = 90. To execute this command requires the internal value of @90, @91, @92, @93, @94, @95 and @96.

@N(@90) represents PLC station number, and the internal value of @90 must be 0 if no PLC station is required.

@N+1(@91) represents the device type. For the device type of PLCs, please refer to Chapter 9. for the complete details.

@N+2(@92) represents low word of the device address.

@N+3(@93) represents high word of the device address.

@N+4(@94) represents auxiliary address if required or set 0.

@N+5(@95) represents the source address and the size of a continuous block of data is assigned by N+6 (@96).

@N+6(@96) represents the number of words of the data.

Q) WRITE_Bit → Set a PLC bit device or internal bit to the state of an internal word. Format: SYS(WRITE_Bit,N). The source address is "@+5". This command is powerful for the random modification of the any PLC data and can be used as PLC data setting and monitor. For example, SYS(WRITE_Bit,90) represents N = 90. To execute this command requires the internal value of @90, @91, @92, @93, @94, and @95.

@N(@90) represents PLC station number, and the internal value of @90 must be 0 if no PLC station is required.

@N+1(@91) represents the device type. For the device type of PLCs, please refer to Chapter 9. for the complete details.

@N+2(@92) represents low word of the device address.

@N+3(@93) represents high word of the device address.

@N+4(@94) represents auxiliary address if required or set 0.

@N+5(@95) represents the address of the internal memory to receive the data. N+5(@95) DATA = 1 if the bit is ON; DATA = 0 if the bit is OFF.

8.4. Cautions

The last line of code must be RET command, otherwise it will cause error when COMPILE.

Except for Sub-Macro, the END Macro represents the end of the Macro.

CPU will execute other program after the execution of INITIAL MACRO, CLOCK MACRO, ON/OFF MACRO, OPEN MACRO, and CLOSE MACRO.

For BACKGROUND MACRO, CYCLIC MACRO, Sub-MACRO, CPU executes the 30 rows of command once; then the CPU will execute other program. The CPU will execute the 30 rows of command which follows the last executed command until the next cycle.

To use the Macro communication function, a user must define the related communication format for INICOM. This command is only used once, so it is usually edited in INITIAL MACRO.

8.5. Internal Memory

The HMI provides some internal registers for read/write. With these internal registers, a user can operate the Macro more efficiently and conveniently. The internal registers can not only enhance Macro with infinite functions but also hold a lot of arithmetic data source and result. Note that this system provides the internal registers divided into RAM and ROM.

We will details the four types of internal memory in the following:

WORDS	Device Type	Size	Address	Aux. Address	R/W
RCPNO	0x80	W	0 (only one word)	0	R/W
RCPWn	0x81	W	0-?	0	R/W
CBn	0x82	W	0-31	0	R
@n	0x85	W	0-10239 (for PWS3261)	0	R/W
@n	0x85	W	8191 (for PWS6000 series)	0	R/W

位元	Device Type	Address	Aux. Address	R/W
CBn.b (b=0-f)	0x83	0-31	0-15	R
RCPWn.b (b=0-f)	0x84	0-?	0-15	R/W
@n.b (b=0-f)	0x86	0-10239 (for PWS3261)	0-15	R/W
@n.b (b=0-f)	0x86	0-8191 (for PWS6000 series)	0-15	R/W

1. RCPNO.
2. The n value of RCPWn is based on the size of recipe and the maximum number. The data register can be used as bit.
3. The n value of CBn is based on the size of the control block. The current size is 2~32. This data register can be used as bit.
4. @n: Internal Register. The size of n is based on the HMI model. The size of PWS500S, PWS1711 is 640 WORDS (n=0~639), and the size of PWS1760, PWS3760, SoftPanel is 10240 WORDS(n=0~10239). This data register can be used by bit.

9. Communication with PLC and PWS

Note：『The Register and Range of Relay Numbers』 in this document refers to the range of the setup in ADP. In practice, please also make sure not to exceed the maximum of the range defined by the PLC-CPU in use. Otherwise, it will cause communication error.

This chapter provides the current information on the settings of the supported PLCs as of this writing. As PLC vendors continue to release new models, the data capacity, the data range and the drivers of the PLCs are also often changed. For the latest information, user can contact HITECH.

Communication Format: To properly communicate between PLC snd PWS, the setting of [Communication Format], [Station], [Baud Speed],[Data Format] must be consistence. Before connection, please adjust the settting of PWS'and PLC's communication parameters and dip-switch.

9.1. AB Micrologic 1000/1500

1. The data setting and range of PLC which ADP can access : Word Decive

Register Type	Format	Range with the Register	Device Type / Aux. ddress		Data Size R/W	
Output file	O:0.n	n=0-3	0	0	Word	✓
Input file	I:1.n	n=0-3	1	0	Word	✓
Status file	S2:nn	nn=0-65	2	2	Word	✓
Bit file	B3:nnn	nnn=0-254	3	3	Word	✓
Timer flag	T4:nnn	nnn=0-254	4	4	Word	✓
Timer Preset Value	T4:nnn.pre	nnn=0-254	5	4	Word	✓
Timer Accumulator Value	T4:nnn.acc	nnn=0-254	6	4	Word	✓
Counter flag	C5:nnn	nnn=0-254	7	5	Word	✓
Counter Preset Value	C5:nnn.pre	nnn=0-254	8	5	Word	✓
Counter Accumulator Value	C5:nnn.acc	nnn=0-254	9	5	Word	✓
Control file	R6:nnn	nnn=0-254	10	6	Word	✓
Control Size of 位元 Array	R6:nnn.len	nnn=0-254	11	6	Word	✓
Control Reserved file	R6:nnn.pos	nnn=0-254	12	6	Word	✓
Integer file	N7:nnn	nnn=0-254	13	7	Word	✓
Floating point number	F8:nnn	nnn=0-254	14	8	Word	✓

**The HMI does not support block read for the registers in TIMER, COUNTER AND CONTROL FILES.
** One should open the files in PLC which the HMI will access.

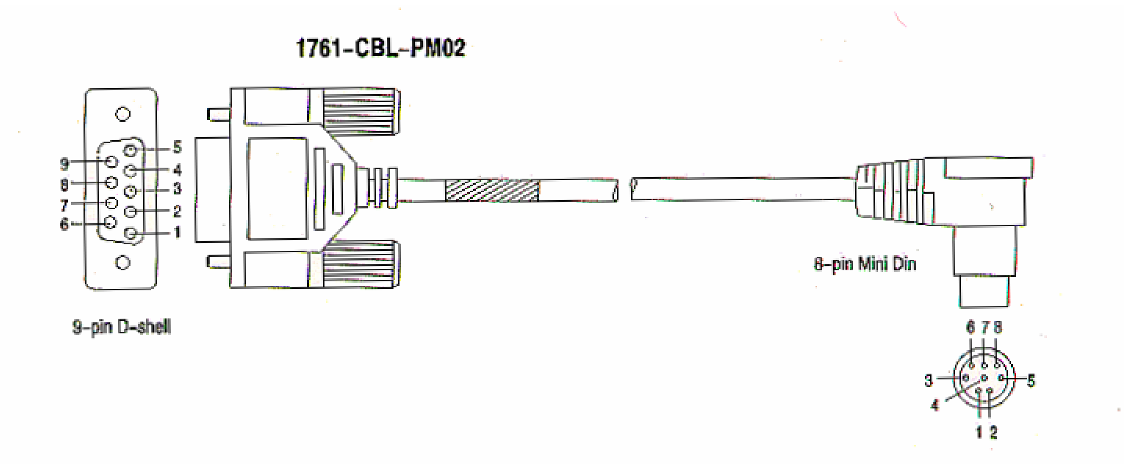
2. The data format and range of the PLC ON/OFF location which ADP can access : Dip Device.

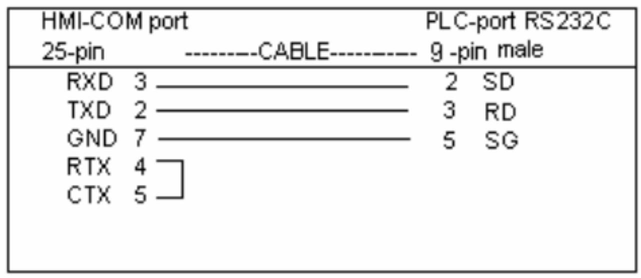
Relay Type	Format	Range with the Relay	Device Type / Aux. ddress		Data Size R/W	
Output	O:0.n/bb	n=0-3; bb=0-15	0xC0	0-15	Word	✓
Input	I:1.n/bb	n=0-3; bb=0-15	0xC1	0-15	Word	✓
Status	S2:nn/bb	nn=0-65; bb=0-15	0xC2	0-15	Word	✓
Bit	B3:nnn/bb	nnn=0-254; bb=0-15	0xC3	0-15	Word	✓

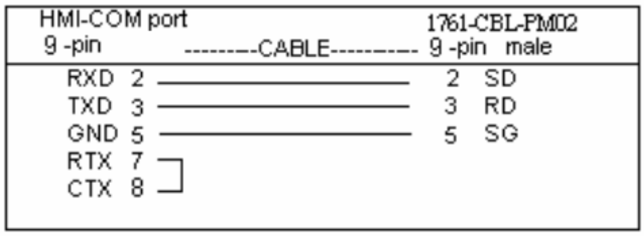
Relay Type	Format	Range with the Relay	Device Type / Aux. ddress		Data Size R/W	
Timer	T4:nnn/bb	nnn=0-254; bb=0-15	0xC4	0-15	Word	✓
Timer Preset Value	T4:nnn.pre/bb	nnn=0-254; bb=0-15	0xC5	0-15	Word	✓
Timer Accumulator Value	T4:nnn.acc/bb	nnn=0-254; bb=0-15	0xC6	0-15	Word	✓
Counter flag	C5:nnn/bb	nnn=0-254; bb=0-15	0xC7	0-15	Word	✓
Counter Preset Value	C5:nnn.pre/bb	nnn=0-254; bb=0-15	0xC8	0-15	Word	✓
Counter Accumulator Value	C5:nnn.acc/bb	nnn=0-254; bb=0-15	0xC9	0-15	Word	✓
Control	R6:nnn/bb	nnn=0-254; bb=0-15	0xCA	0-15	Word	✓
Control Size of Bit Array	R6:nnn.len/bb	nnn=0-254; bb=0-15	0xCB	0-15	Word	✓
Control Reserved	R6:nnn.pos/bb	nnn=0-254; bb=0-15	0xCC	0-15	Word	✓
Integer	N7:nnn/bb	nnn=0-254; bb=0-15	0xCD	0-15	Word	✓

** The Workstation does not support block read for the bits in TIMER, COUNTER and CONTROL FILES.

3. The illustration of the connection: PWS to RS232C of PLC 1761-CBL-PM02







4. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232C	COM2=RS232/422/485 1. When use for RS422, set Dip switch SW10=OFF. 2. When use for RS485, set switch SW10=ON 2.
b. Node Address		1.Set PLC Station No. N in ADP
c. Transmission Speed	19200 bps	1. If Dip switch SW5=OFF, set it up in ADP.
d. Transmission Format	1、Size：8-bit	2. If Dip switch SW5=ON, set it up in PWS.
	2、Parity：NONE	
	3、Stop bit：1-bit	
e. Com Port	FULL DUPLEX	
f. CRC ERROR Check	YES	

9.2. AB PLC-5

1. The data format and range of the PLC registers which the ADP can accress : Word Device.

Register Type	Format	Range With the Register	Data Size
Output file	O:nnn	nnn= 0-277	Word
Input file	I:nnn	nnn= 0-277	Word
Status file	S:nnn	nnn=0-127	Word
Bit file	Bfff:nnn B:nnn	fff= 3 or 9-999; default file is 3 if fff omitted; nnn=0-999	Word
Timer file	Tfff:nnn T:nnn Tfff:nnn.PRE T:nnn.PRE Tfff:nnn.ACC T:nnn.ACC	fff= 4 or 9-999; default file is 4 if fff omitted; nnn=0-999	Word
Counter file	Cfff:nnn C:nnn Cfff:nnn.PRE C:nnn.PRE Cfff:nnn.ACC C:nnn.ACC	fff=5 or 9-999; default file is 5 if fff omitted; nnn=0-999	Word
Control file	Rfff:nnn R:nnn Rfff:nnn.LEN R:nnn.LEN Rfff:nnn.POS R:nnn.POS	fff=6 or 9-999; default file is 6 if fff omitted; nnn=0-999	Word
Integer file	Nfff:nnn N:nnn	fff=7 or 9-999; default file is 7 if fff omitted; nnn=0-999	Word

** The HMI can read up to 30 words in one read command. The HMI does not support block read for the registers in TIMER, COUNTER AND CONTROL FILES. One should open the files in PLC which the HMI will access.

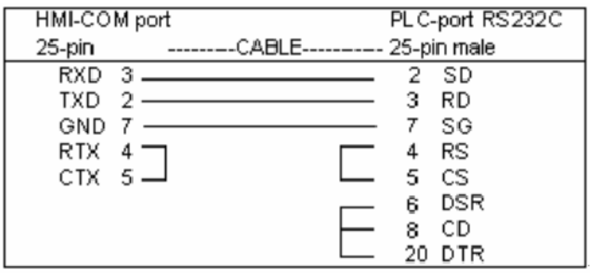
2. The data format and range of the PLC ON/OFF location which the ADP can accress : Bit Device.

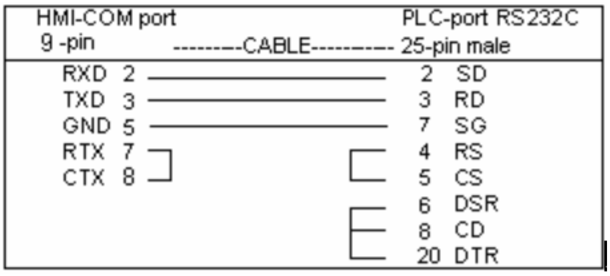
Relay Typ	Format	Range
Output file	O:nnn/bb	nnn= 0-277; bb= 0-17
Input file	I:nnn/bb	nnn= 0-277; bb= 0-17
Status file	S:nnn/bb	nnn= 0-127; bb= 0-15
Bit file	Bfff:nnn/bb	fff= 3 or 9-999; default file is 3 if fff omitted;

Relay Typ	Format	Range
		nnn=0-999; bb=0-15
Timer file	Tfff:nnn/bb Tfff:nnn.PRE/bb Tfff:nnn.ACC/bb Tfff:nnn/EN Tfff:nnn/TT Tfff:nnn/DN	fff= 4 or 9-999; default file is 4 if fff omitted; nnn=0-999; bb=0-15
Counter file	Cfff:nnn/bb Cfff:nnn.PRE/bb Cfff:nnn.ACC/bb Cfff:nnn/CC Cfff:nnn/CD Cfff:nnn/DN Cfff:nnn/OV Cfff:nnn/UN Cfff:nnn/UA	fff=5 or 9-999; default file is 5 if fff omitted; nnn=0-999; bb=0-15
Control file	Rfff:nnn/bb Rfff:nnn.LEN/bb Rfff:nnn.POS/bb Rfff:nnn/EN Rfff:nnn/EU Rfff:nnn/DN Rfff:nnn/EM Rfff:nnn/ER Rfff:nnn/UL Rfff:nnn/IN Rfff:nnn/FD	fff=6 or 9-999; default file is 6 if fff omitted; nnn=0-999; bb=0-15
Integer file	Nfff:nnn/bb	fff=7 or 9-999; default file is 7 if fff omitted; nnn=0-999; bb=0-15

** The HMI can read up to 480 bits in one read command. The HMI does not support block read for the bits in TIMER, COUNTER AND CONTROL FILES.

3. The illustration of the connection: PWS to RS232C of PLC PLC-5





4. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232C PLC-5	COM2=RS232/422/485 1. When use for RS422, set Dip switch SW10=OFF 2. When use for RS485, set switch SW10=ON
b. Node Address	N	1. Set PLC Station No. N in ADP
c. Transmission Speed	9600/19200 bps	
d. Transmission Format	1.Size 8-bit 2.Parity NONE 3.Stop bit 1-bit	
e. SLC-503/504	FULL DUPLEX	
f. BCC ERROR Check	YES	

9.3. AB SLC-503/504

1. The data format and range of the PLC registers which the ADP can accress : Word Device.

Register Type	Format	Range	Data Size
Output file	O:nn	nn= 0-30	Word
Input file	I:nn	nn= 0-30	Word
Status file	S:nn	nn=0-31	Word
Bit file	Bfff:nnn B:nnn	fff= 3 or 10-255; default file is 3 if fff omitted; nnn=0-254	Word
Timer file	Tfff:nnn T:nnn Tfff:nnn.PRE T:nnn.PRE Tfff:nnn.ACC T:nnn.ACC	fff= 4 or 10-255; default file is 4 if fff omitted; nnn=0-254	Word
Counter file	Cfff:nnn C:nnn Cfff:nnn.PRE C:nnn.PRE Cfff:nnn.ACC C:nnn.ACC	fff=5 or 10-255; default file is 5 if fff omitted; nnn=0-254	Word
Control file	Rfff:nnn R:nnn Rfff:nnn.LEN R:nnn.LEN Rfff:nnn.POS R:nnn.POS	fff=6 or 10-255; default file is 6 if fff omitted; nnn=0-254	Word
Integer file	Nfff:nnn N:nnn	fff=7 or 10-255; default file is 7 if fff omitted; nnn=0-254	Word

** The HMI can read up to 30 words in one read command.

** The HMI does not support block read for the registers in TIMER, COUNTER AND CONTROL FILES.

** One should open the files in PLC which the HMI will access.

2. The data format and range of the PLC ON/OFF location which the ADP can accress : Bit Device.

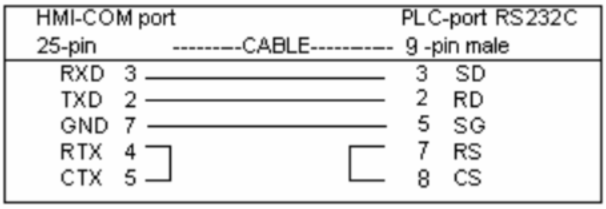
Relay Type	Format	Range
Output file	O:nn/bb	nn= 0-30; bb= 0-15
Input file	I:nn/bb	nn= 0-30; bb= 0-15
Status file	S:nn/bb	nn= 0-31; bb= 0-15

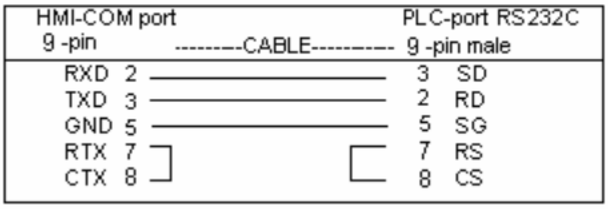
Relay Type	Format	Range
Bit file	Bfff:nnn/bb	fff= 3 or 10-255; default file is 3 if fff omitted; nnn=0-254; bb=0-15
Timer file	Tfff:nnn/bb Tfff:nnn.PRE/bb Tfff:nnn.ACC/bb Tfff:nnn/EN Tfff:nnn/TT Tfff:nnn/DN	fff= 4 or 10-255; default file is 4 if fff omitted; nnn=0-254; bb=0-15
Counter file	Cfff:nnn/bb Cfff:nnn.PRE/bb Cfff:nnn.ACC/bb Cfff:nnn/CU Cfff:nnn/CD Cfff:nnn/DN Cfff:nnn/OV Cfff:nnn/UN	fff=5 or 10-255; default file is 5 if fff omitted; nnn=0-254; bb=0-15
Control file	Rfff:nnn/bb Rfff:nnn.LEN/bb Rfff:nnn.POS/bb Rfff:nnn/EN Rfff:nnn/DN Rfff:nnn/ER Rfff:nnn/UL Rfff:nnn/IN Rfff:nnn/FD	fff=6 or 10-255; default file is 6 if fff omitted; nnn=0-254; bb=0-15
Integer file	Nfff:nnn/bb	fff=7 or 10-255; default file is 7 if fff omitted; nnn=0-254; bb=0-15

** The HMI can read up to 480 bits in one read command.

** The HMI does not support block read for the bits in TIMER, COUNTER AND CONTROL FILES.

3. The illustration of the connection: PWS to RS232C of PLC SLC-503/504





4. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232C SLC-503/504	COM2=RS232/422/485
		1. When use for RS422, set Dip switch SW10=OFF 1.
		2. When use for RS485, set switch SW10=ON
b. Node Address	N	1. Set PLC Station No. N in ADP
c.Transmission Speed	9600/19200 bps	
d. Transmission Format	1.Size：8-bit	
	2.Parity：NONE	
	3.Stop Bit：1-bit	
e. SLC-503/504	FULL DUPLEX	
f. BCC ERROR Check	YES	

9.4. AB IQ Master Servo Controller

1. The data format and range of the PLC registers which the ADP can accress :
   Word Device and Bit Device.

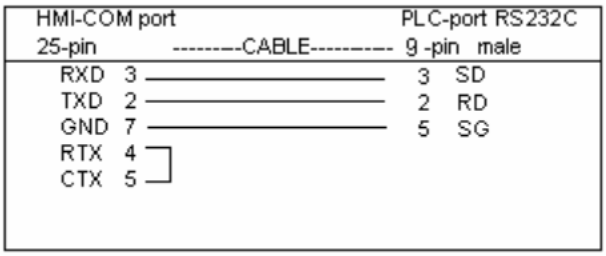
Register Type	Format	Range with the Register	Data Size
G type	Gnn	nn=1-64	Double Word(32 Bits)
V type	Vnn	nn=1-64	Double Word(32 Bits)
G type	WGnn	nn=1-64	Word(16 Bits)
V type	WVnn	nn=1-64	Word(16 Bits)

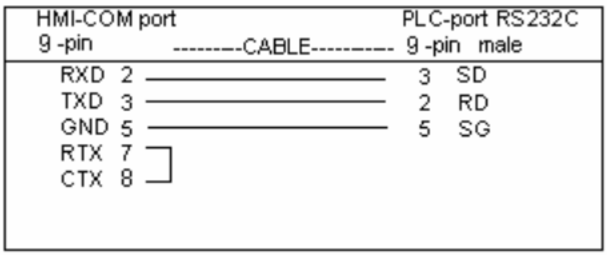
Relay Type	Format	Range With the Relay	Block
I type	Inn	nn=1-48	
O type	Onn	nn=1-24	
B type	Bn	n=1-8	
F type	Fnn	nn=1-64	

2. The illustration of the connection:

a. PWS-series to PLC

PWS-series to PLC RS232 PORT (9-pin male)





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232	COM1 or COM2=RS232

b.Station No	0	
c.Transmission Speed	9600 bps	
d. Transmission Format	8-bit, NONE, 1-bit	

9.5. ABB COMLI (SLAVE MODE)

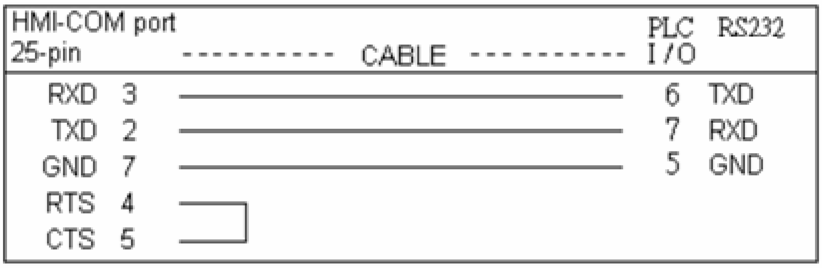
1. The data format and range of the PLC registers which the ADP can accress :
   Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
Word IO	MWnnnnn	nnnnn=0 – 37760(must be a multiple of 8)	Word(16 Bits)
Word Register	RWnnnn	nnnn=0 - 3071	Word(16 Bits)

Relay Type	Format	Range with the Relay
Bit IO	Mnnnnn	nnnnn=0-37777(8 Bits)

2. The illustration of the connection:

a. PWS-series to PLC RS232 PORT



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232	RS232
b.Station No	01(PLC sets 2-197)	
c.Transmission Speed	9600 bps	
d.Transmission Format	8-Bits, ODD , 1-Bit	

9.6. Computer(as master or as slave or V2 or Null)/Modbus master

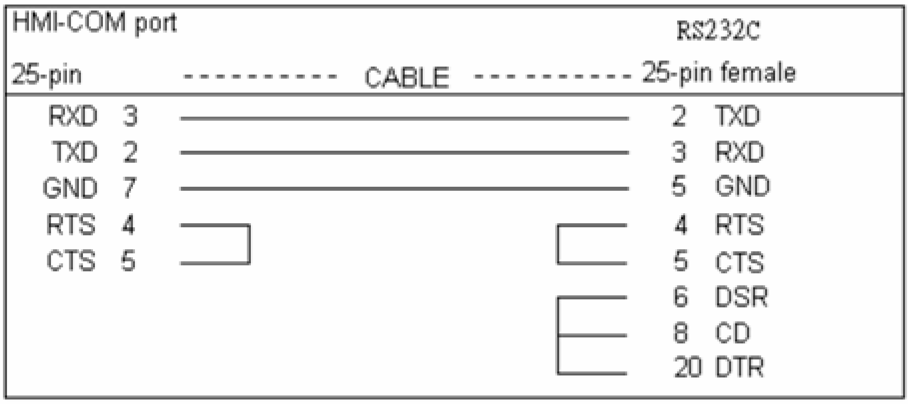
1. The data format and range of the PLC registers which the ADP can accress :Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
Data Register	Wnnnn	nnnn=0~2047	Word(16 Bits)

Relat Type	Format	Range with the Relay	Block
Bit Relay	Bnnnn	nnnn=0~1023	

2. The illustration of the connection:

a. IPWS-series to PLC RS232 PORT



[Note]: This figure is PC's simulation but the hook up method depends on the actual controller pin position.

3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232C(RS422/RS485)	RS232C(RS422/RS485)
b.Station No	NONE	
c.Transmission Speed	9600 bps	
d.Transmission Format	8-Bits, NONE , 1-Bit	

** COMPUTER(AS MASTER) V2 is not only including the fiction of COMPUTER(AS MASTER) but also can inform the slaves when the data is changed (e.g. value input). The Null function includes Macro,ladder and communication to controllers but communication to PLC.

9.7. DELTA DVP

1. The data format and range of the PLC registers which the ADP can accress :Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
S_Data	Snnnn	nnnn=0-1008(must be a multiple of 16)	Word(16 Bits)
X_Data	Xnnn	nnn= 0-360 (X0-X7, X10-X17, must be a multiple of 20)	Word(16 Bits)
Y_Data	Ynnn	nnn= 0-360 (Y0-Y7, Y10-Y17, must be a multiple of 20)	Word(16 Bits)
M_Data	Mnnnn	Nnnn=0-1264 (must be a multiple of 16)	Word(16 Bits)
T_Register	Tnnn	nnn= 0-255	Word(16 Bits)
C_Register	Cnnn	nnnn=0-127	Word(16 Bits)
D_Register	Dnnnn	nnnn=0-1279	Word(16 Bits)
C_Register	Cnnn	nnn= 232-255	Double Word

Relay Type	Format	Range with the Relay	Block
S_Data	Snnnn	nnn=0-1023	Multiple of 16
X_Data	Xnnn	nnn=0-377 (Oct. code)	Multiple of 16
Y_Data	Ynnn	nnn=0-377 (Oct. code)	Multiple of 16
M_Data	Mnnnn	nnnn=0-1279	Multiple of 16
T_Coil	Tnnn	nnn=0-254	Multiple of 16
C_Coil	Cnnn	nnn=0-254	Multiple of 16

[Note] X_Data and Y_Data are Oct.code such as X0~X7,X10~X17,X20~X27,X30~X37.

2. The illustration of the connection:

a. PWS-series to PLC RS232 PORT can use a DELTA with 8-pin male (PC ←→ DELTA DVP PLC).

3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232C	COM1 or COM2=RS232
b.Station No	01	1. Set PLC Station No.=01 in ADP
c.Transmission speed	9600 bps	PLC station=01

d.Transmission Format	7-Bits, EVEN , 2-Bits	

9.8. ERO TFS/THS/LFS

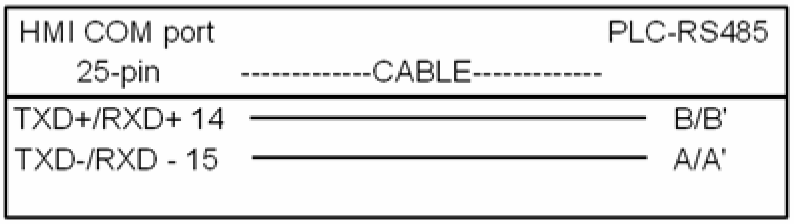
1. The data format and range of the PLC registers which the ADP can accress :

Register Type	Format	Range with the Register	Data Size
Word Register	mmm:Wnnn	mmm=0-255 ; nnn=0-529	Word(16 Bits)

Relay Type	Format	Range with the Relay
Relay	mmm:Bnnn	mmm=0-255 ; nnn=1-342

2. The illustration of the connection:

a. PWS-series to PLC RS485 PORT



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS485	RS485
b.Station No	None	
c.Transmission Speed	9600 bps	
d.Transmission Format	8-Bits, EVEN , 1-Bit	

9.9. FACON FB

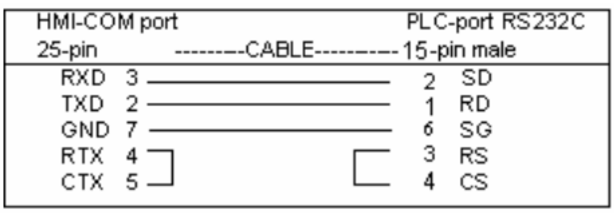
1. The data format and range of the PLC registers which the ADP can accress :
   Word Device and Bit Device.

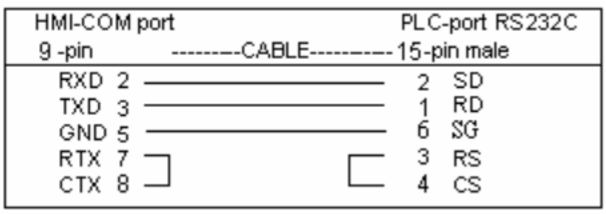
Register Type	Format	Range with the Register	Data Size
Input Relay	WXnnn	nnn=0-9984; (0 or Multiple of 8)	Word
Output Relay	WYnnn	nnn=0-9984; (0 or Multiple of 8)	Word
Internal Relay	WMnnnn	nnnn=0-9984; (0 or Multiple of 8)	Word
Special Relay	WMnnnn	nnnn=0-9984; (Multiple of 8)	Word
Step Relay	WSnnn	nnn=0-9984; (0 or Multiple of 8)	Word
Timer Present Value	RTnnnn	nnnn=0-9999	Word
Counter Present Value	RCnnnn	nnnn=0-9999	Word
Data Register	Rnnnnn	nnnn=0-65534	Word
32-bit Counter Present Value	DRCnnn	NNN=200-255	
Data Register	Dnnnnn	nnnn=0-65534	Word

** The HMI can read up to 32 words in one read command.

Relay Type	Format	Range of the Relay	Block
Input Relay	Xnnnn	nnn=0-9999	e.g. X32(0 or Multiple of 8)
Output Relay	Ynnnn	nnn=0-9999	e.g. Y8 (0 or Multiple of 8)
Internal Relay	Mnnnn	nnnn=0-9999	e.g. M0 (0 ot Multiple of 8)
Special Relay	Mnnnn	nnnn=0-9999	e.g. M0 (0 or Multiple of 8)
Step Relay	Snnnn	nnn=0-9999	e.g. S16 (0 or Multiple of 8)
Timer Flag	Tnnnn	nnn=0-9999	None
Counter Flag	Cnnnn	nnn=0-9999	None

2. The illustration of the connection: PWS to RS232C of FB-MC type





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232C	COM1 or COM2 ==> RS232
b.Station No	1	1. Set PLC station 01 in ADP
c.Transmission Speed	9600/19200 bps	1. Set SW5=OFF if parameters are set in ADP
d.Transmission Format	7-Bits, even,1-Bit	2. Parameters are set in PWS.

NOTE: Facon FB Series(RS232/RS485) for RS232 w/o RTS control (3-PIN cable) or RS485 Facon FB Series(RS232-RTS) for S232 with RTS control (5-PIN cable, RTS,CTS with connect), not for RS485

9.10. Festo FPC

1. The data format and range of the PLC registers which the ADP can accress :Word Device and Bit Device.

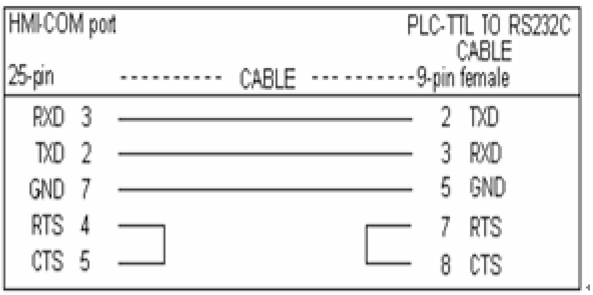
Register Type	Format	Range with the Register	Data Size
Input	IWnnn	nnn=0-255	Word(16 Bits)
Output	QWnnn	nnn=0-255	Word(16 Bits)
Flag	FWnnnn	nnnn=0-9999	Word(16 Bits)
Timer	TWnnn	nnn=0-255	Word(16 Bits)
Counter	CWnnn	nnn=0-255	Word(16 Bits)
Register	Rnnn	nnn=0-255	Word(16 Bits)
Timer_Preset	TPnnn	nnn=0-255	Word(16 Bits)
Counter_Preset	CPnnn	nnn=0-255	Word(16 Bits)

Relay Type	Format	Range with the Relay	Block
Input	Innn.bb	nnn=0-255; bb=0-15	b=0 e.g. I20.0
Output	Qnnn.bb	nnn=0-255; bb=0-15	b=0 e.g. Q20.0
Flag	Fnnnn.bb	nnnn=0-9999; bb=0-15	b=0 e.g. F20.0
Timer	Tnnn	nnn=0-255	None
Counter	Cnnn	nnn=0-255	None
Timer_on	TONnnn	nnn=0-255	None
Timer_off	TOFFnnn	nnn=0-255	None

2. The illustration of the connection:

a. PWS-series to (TTL to RS232C cable)

PWS-series need to use a FESTO to provide TTL to RS232C cable, a 6-pin telephone connector with PLC-port and a 9-pin male with 9-pin female as below.



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below.

Format	PLC Setting	PWS Setting
a.Communication Format	RS232	COM1 or COM2=RS232
b.Station No	None	
c.Transmission Speed	9600 bps	
d.Transmission Format	8-Bits, NONE, 1-Bit	

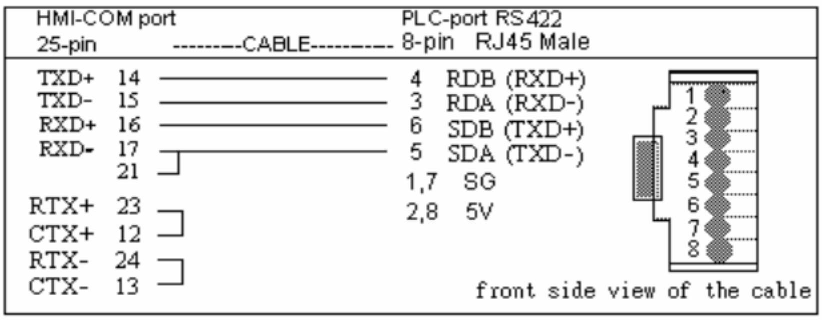
9.11. Fuji NB

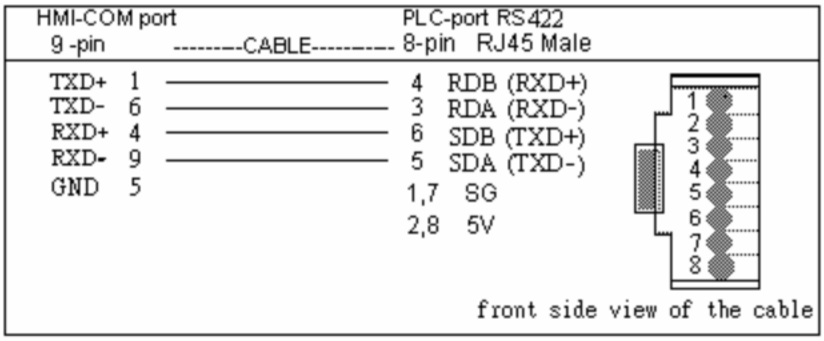
1. The data format and range of the PLC registers which the ADP can accress :
   Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
Data Register	Dnnn	nnn=hex number 0-3ff	Word
Special Register	Dnnnn	nnnn=hex number 8000-80ff	Word
Timer Current Value	TNnnn	nnn=hex number 0-1ff	Word
Counter Current Value	CNnn	nn=hex number 0-ff	Word
Input Relay	WXnn	nn=hex number 0-1f	Word
Output Relay	WYnn	nn=hex number 0-1f	Word
Internal Relay	WMnn	nn=hex number 0-3f	Word
Latch Relay	WLnn	nn=hex number 0-3f	Word
Special Relay	WMnnn	nnn=hex nuumber 800-81f	Word
Step Relay	WSnnn	nnn=hex number 0-3f	Word

Relay Type	Format	Range with the Relay	Block
Timer output	Tnnn	nnn=hex number 0-1ff	End with 0
Counter output	Cnn	nn=hex number 0-ff	End with 0
Input Relay	Xnnn	nnn=hex number 0-1ff	End with 0
Output Relay	Ynnn	nnn=hex number 0-1ff	End with 0
Internal Relay	Mnnn	nnn=hex number 0-3ff	End with 0
Latch Relay	Lnnn	nnn=hex number 0-3ff	End with 0
Special Relay	Mnnnn	nnnn=hex number 8000-81ff	End with 0
Step Relay	Snnn	nnn=hex number 0-3ff	End with 0

2. The illustration of the connection: PWS to RS422 of NB/NS/NJ-CPU port





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below.

Format	PLC Setting	PWS- Setting
a.Communication Format	RS422	COM= Dip-switch RS422
b.Station No	None	
c.Transmissiion Speed	19200 bps	
d.Transmission Format	8-Bits,ODD,1-Bit	
e.PLC password	none or 0000-9999	0000 or 9999= ****

9.12. GE Series 90 CCM

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
Discrete Input	%Innnnn	nnnnn=1-12288	Word(16 Bits)
Discrete Output	%Qnnnnn	nnnnn=1-12288	Word(16 Bits)
Register	%Rnnnnn	nnnnn=1-16384	Word(16 Bits)

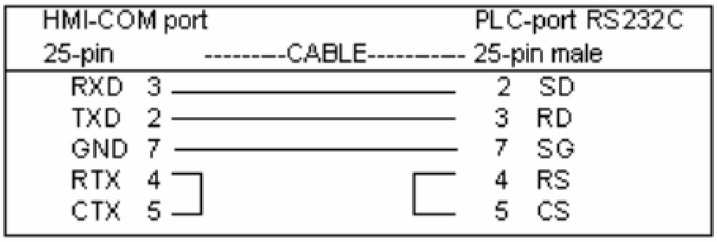
**Discrete Input (%Innnnn), Discrete Output (%Qnnnnn)
Address must be 1 or multiple of 16 +1.

Relay Type	Format	Range with the Relay	Block
Discrete Input	%Innnnn	nnnnn=1-12288	1 or multiple of 16 +1
Discrete Output	%Qnnnnn	nnnnn=1-12288	1 or multiple of 16 +1

2. The illustration of the connection:

a. PWS-series to PLC

PWS-series to PLC RS232 PORT



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below.

Format	PLC Setting	PWS Setting
a.Communication Format	RS232	COM1 or COM2=RS232
b.Station No	0	
c.Transmission Speed	19200 bps	
d.Transmission Format	8-Bits, NONE, 1-Bit	

9.13. GE-Fanuc 90-SNP

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

Register Type	Format	Range with the Ragister	Data Size
Discrete Inputs	%Innnnn	nnnnn=1-12288;1 or multiple of 16+1	Word
Discrete Outputs	%Qnnnnn	nnnnn=1-12288;1 or multiple of 16+1	Word
Discrete Temporaries	%Tnnn	nnn=1-256; 1 or multiple of 16+1	Word
Discrete Internals	%Mnnnnn	nnnnn=1-12288;1 or multiple of 16+1	Word
%SA Discretes	%SAnnn	nnn=1-128; 1 or multiple of 16+1	Word
%SB Discretes	%SBnnn	nnn=1-128; 1 or multiple of 16+1	Word
%SC Discretes	%SCnnn	nnn=1-128; 1 or multiple of 16+1	Word
%S Discretes	%Snnn	nnn=1-128; 1 or multiple of 16+1	Word
Genius Global Data	%Gnnnn	nnnn=1-7680; 1 or multiple of 16+1	Word
Registers	%Rnnnnn	nnnnn=2-16384	Word
Analog Inputs	%AInnnn	nnnn=1-8192	Word
Analog Outputs	%AQnnnn	nnnn=1-8192	Word

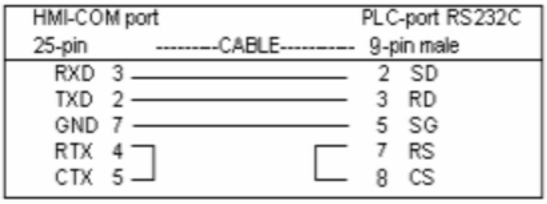
** The HMI can read up to 50 words in one read command.

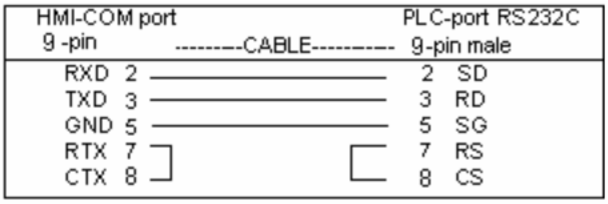
Relay Type	Format	Range with the Relay	Block
Discrete Inputs	%Innnnn	nnnnn=1-12288	1 or Multiple of 16+1
Discrete Outputs	%Qnnnnn	nnnnn=1-12288	1 or Multiple of 16+1
Discrete Temporaries	%Tnnn	nnn=1-256	1 or Multiple of 16+1
Discrete Internals	%Mnnnnn	nnnnn=1-12288	1 or Multiple of 16+1
%SA Discretes	%SAnnn	nnn=1-128	1 or Multiple of 16+1
%SB Discretes	%SBnnn	nnn=1-128	1 or Multiple of 16+1
%SC Discretes	%SCnnn	nnn=1-128	1 or Multiple of 16+1
%S Discretes	%Snnn	nnn=1-128	1 or Multiple of 16+1
Genius Global Data	%Gnnnn	nnnn=1-7680	1 or Multople of 16+1

** The HMI can read up to 800 bits in one read command.

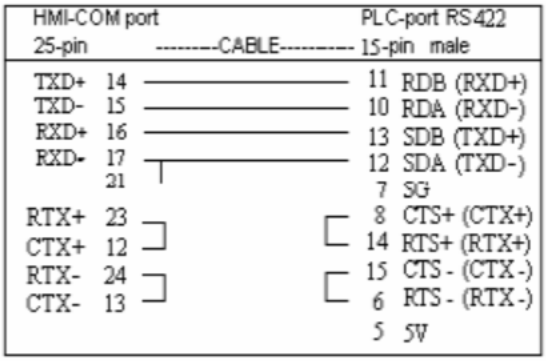
2. The illustration of the connection:

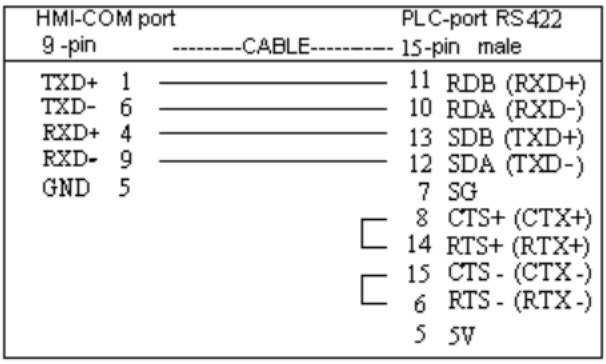
a. PWS and RS232 of PLC miniconverter kit





b. PWS and RS422 of PLC 9030 CPU port





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below.

Format	**PLC Setting**	**PWS Setting**
a.Communication Format	RS422 CPU PORT	COM2=RS232/422/485
	Or RS232C	1. RS422: Set SW10=OFF
b.Station No	None	
c.Transmission Speed	19200/9600 bps	
d.Transmission Format	8-Bits;none,1-Bit	
e.PLC ID	blanks	
f. PLC password	none or ********	00000000 or ********

9.14. Hitachi EC

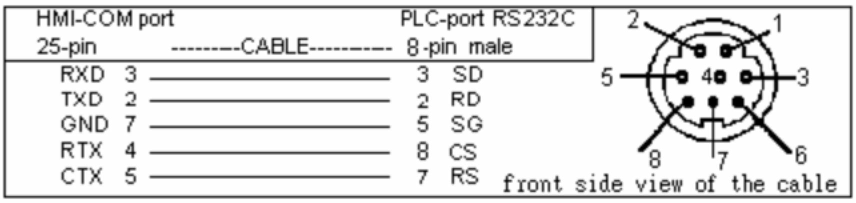
1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

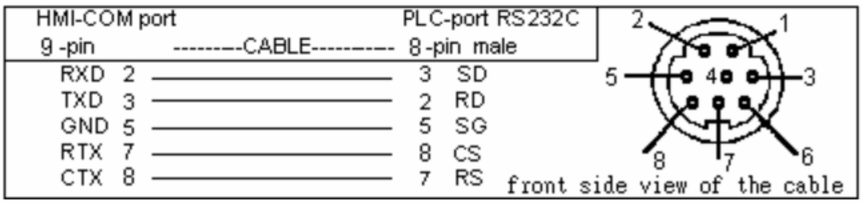
Register Type	Format	Range with the Register	Data Size
Internal Register	WMnnn	nnn=400, 402, 404, ···, 654	Word
Internal Register	WMnnn	nnn=700, 702, 704, ···, 954	Word
Internal Register	WMnnn	nnn=960, 962, 964, ···, 990	Word
Timer/Counter Register	TCnnn	nnn=100-195	Word
Timer/Counter Register	TCnnn	nnn=200-295	Word

** The HMI can read up to 60Words in one read command.

Relay Type	Format	Range with the Relay	Block
Input Relay	Xnnn	nnn=0-15, 20-35, 40-55, 60-75, , 180-195	X0,X20,X40 …
Output Relay	Ynnn	nnn=200-215, 220-235, 240-255, , 380-395	Y200,Y220…
Auxiliary Relay	Mnnn	nnn=400-655, 700-955, 960-991	M400,M420 …
Timer/Counter Relay	TCnn	nn=0-95	TC0,TC1TC80

2. The illustration of the connection: PWS-series to PLC Program Console Port





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below.

Format	PLC Setting	PWS設定
a.Communication Format	RS232C	COM1 or COM2 ==> RS232
b.Station No.	None	
c.Transmission Speed	9600 bps	1. Set SW5=OFF if parameters are set in the ADP

d.Transmission Format	7-Bits ,EVEN, 1- Bit	2. Set SW5=ON if parameters are set in the HMI
e. CTS Handshanking	Enabled	

** Using exclusive protocol must set PLC peripheral mode selector in COM2.

9.15. Hitachi H/EH1

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
Ext. Input	WXnnnn	nnnn=0-4ff9	Word(16 Bits)
Ext. Output	WYnnnn	nnnn=0-4ff9	Word(16 Bits)
Int. Output	WRnnnn	nnnn=0-c3ff	Word(16 Bits)
Int. Output	WRnnnn	nnnn=f0000-f1ff	Word(16 Bits)
Int. Output	WMnnn	nnn=0-3ff	Word(16 Bits)
CPU Link	WLnnn	nnn=0-3ff	Word(16 Bits)
CPU Link	WLnnnn	nnnn=1000-13ff	Word(16 Bits)
T/C CV	TCnnn	nnn=0-511	Word(16 Bits)

**Hitachi H/EH1 Series must use procedure 1 protocol to communicate.
Hitachi EH2 Series must use procedure 2 protocol to communicate.
Ext. Input (WXnnnn) and Ext. Output (WYnnnn) registers cannot access the "Read Block" function.

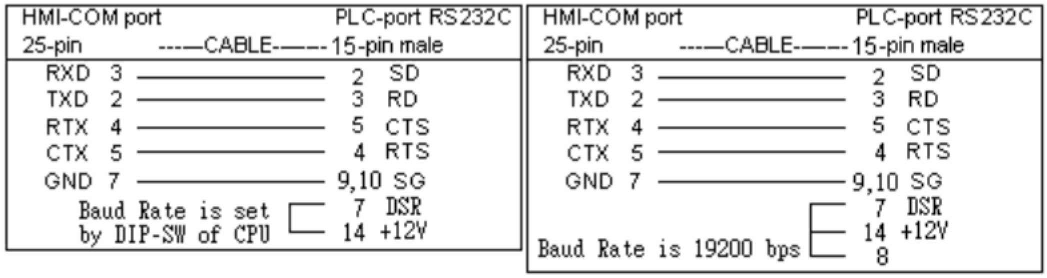
Relay Type	Format	Range with the Relay	Block
Ext. Input	Xmnnnn	m=0-4, nnnn=0-ff95	None
Ext. Output	Ymnnnn	m=0-4, nnnn=0-ff95	None
Int. Output	Rnnn	nnn=0-7ff	
Int. Output	Mnnnn	nnnn=0-3fff	
CPU Link	Lnnnn	nnnn=0-3fff	
CPU Link	Lnnnnn	nnnnn=10000-13fff	
On-delay timer bit	TDnnn	nnn=0-255	
Single-shot timer bit	SSnnn	nnn=0-255	
Up counter	CUnnn	nnn=0-511	
U/D counter up coil	CTUnnn	nnn=0-511	
U/D counter down coil	CTDnnn	nnn=0-511	
U/D counter contact	CTnnn	nnn=0-511	
T/C CV clear	CLnnn	nnn=0-511	
Rising edge	DIFnnn	nnn=0-511	
Fallling edge	DFNnnn	nnn=0-511	

**Ext. Input (WXnnnn) and Ext. Output (WYnnnn) cannot access the "Read Block" function.

2. The illustration of the connection:

a. PWS-series to PLC

PWS-series to PLC RS232 PORT



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below.

Format	PLC Setting	PWS Setting
a.Communication Format	RS232	COM1 or COM2=RS232
b.Statiion No.	None	
c.Transmission Speed	19200 bps	
d.Transmission Format	7-Bits, EVEN, 1-Bit	

9.16. HUST CNC Controller

1. The data format and range of the PLC registers which the ADP can accress :
   Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
16-bit Variable	Wnnnnn	nnnnn=0-65534	Word(16 Bits)
32-bit Variable	Dnnnnn	nnnnn=0-65534	Double Word(32 Bits)

**It is up to 28 Variable be read one time.
Only write a variable once, so the speed is low.
16-bit Variable (Wnnnnn) : Only used in word object.
Only used in Bit0-Bit15 of each variable.
If write, Bit16-Bit31 will clear as 0.
32-bit Variable (Dnnnnn) : Only used in double word object.
Only used in Bit0-Bit31 of each variable.

Relay Type	Format	Range with the Relay	Block
1-bit Variable	Bnnnnn.bb	nnnnn=0-65534, bb=0-31	bb must be 0
I - Bit Data	Innn	nnn=0-255	nnn must be 0 or multiple of 32.
O - Bit Data	Onnn	nnn=0-255	nnn must be 0 or multiple of 32.
C - Bit Data	Cnnn	nnn=0-255	nnn must be 0 or multiple of 32.
S - Bit Data	Snnn	nnn=0-255	nnn must be 0 or multiple of 32.
A - Bit Data	Annnn	nnn=0-1023	nnn must be 0 or multiple of 32.

**I - Bit Data, O - Bit Data, C - Bit Data, S - Bit Data, A - Bit Data are read only. If write, then the action will be invalid.(No error messages)

2. The illustration of the connection:

a. PWS-series to PLC
   PWS-series to PLC RS232 PORT (9-pin male)

HMI-COM port 25-pin		---------- CABLE ----------	PLC-port RS232C 9 -pin male	
RXD	3	————	2	TXD
TXD	2	————	3	RXD
GND	7	————	5	GND
RTS	4	————	7	CTS
CTS	5	————	8	RTS

3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below.

Format	**PLC** Setting	**PWS** Setting
a.Communication Format	RS232	COM1 or COM2=RS232
b.Station No.	None	
c.Transmission Speed	9600 (19200 /38400) bps	
d.Transmission Format	7-Bits, EVEN, 2-Bits	

9.17. IDEC MICRO-3

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

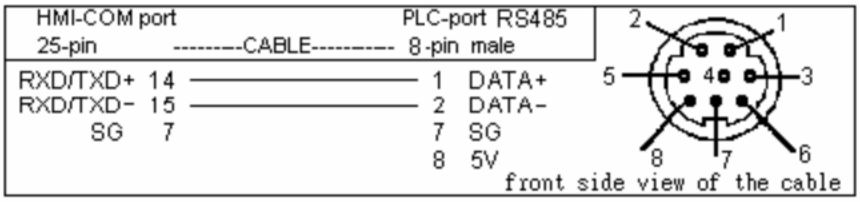
Register Type	Format	Range with the Register	Data Size
Input Relay	Xn	n=0-3	Byte
Output Relay	Yn	n=0-3	Byte
Internal Relay	Mnn	nn=0-31	Byte
Shift Register	Rnn	nn=0-48; must be 0 or multiple of 8	Bit
Timer Preset	TPnn	nn=0-31(read only)	Word
Timer Current	Tnn	nn=0-31	Word
Counter Preset	CPnn	nn=0-31(read only)	Word
Counter Current	Cnn	nn=0-31	Word
Data Register	Dnn	nn=0-99	Word
Calender/CLOCK	Wn	n=0-6	Word

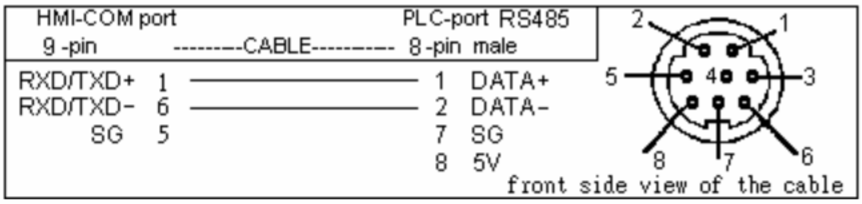
** The HMI can read up to 50Words in one read command.
**Timer Preset and Counter Preset are read only. If the value of TP,CP exists in Data Register,then the value of Data Register will be read.

Relay Type	Format	Range with the Relay	Block
Input Relay	Xnb	n=0-3; b=0-7	b=0 e.g. X10
Output Relay	Ynb	n=0-3; b=0-7	b=0 e.g. Y00
Internal Relay	Mnnb	nn=0-31; b=0-7	b=0 e.g. M10
Shift Register	Rnn	nn=0-63	must be 0 or multiple of 8
Timer Status	Tnn	nn=0-31 read only	must be 0 or multiple of 8
Counter Status	Cnn	nn=0-31 read only	Must be 0 or multiple of 8.

** The HMI can read up to 800 bits in one read command.

2. The illustration of the connection: PWS-to PLC PROGRAM Loader RS485 PORT(MICRO3-CPU PORT)





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below.

Format	PLC Setting	PWS Setting
a.Communication Format	RS485	COM2=RS232/422/485
		1. RS485: Set SW10=ON
b.Station No.	0-31；255	1. Set PLC Sation 255 in ADP
c.Transmission Speed	9600bps	
d.Transmission Format	7-Bits;EVEN; 1-Bit	
e.CTS Handshaking	Disabled	

**If only one PLC in background program, set the Station No. as 255 or sets as Network Station No.

9.18. JETTER NANO_B

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
User Register	Rnnnnn	nnnnn=0-32767	DWord(32 Bits)
User Register	WRnnnnn	nnnnn=0-32767	Word(16 Bits)

Relay Tupe	Format	Range with the Relay	Block
Input Relay	Innbb	nn=1-16,bb=01-08	bb=01
Out[ut Relay	Onnbb	nn=1-16,bb=01-08	bb=01
Flag Relay	Fnnnn	nnnn=0-2301	If nnn<256, must be 0 or multiple of 24. If nnn>255 and <2048, must be multiple of 24 +16. If nnn>2047, must be multiple of 24+8.

2. The illustration of the connection:

a. PWS-series to PLC RS232 PORT (15-pin male)

HMI-COM port 25-pin		---------- CABLE ----------	PLC-port RS232C 15 -pin male	
RXD	3	————	2	TXD
TXD	2	————	3	RXD
GND	7	————	7	GND

b. PWS-series to PLC RS232 PORT (9-pin male)

HMI-COM port 25-pin		---------- CABLE ----------	PLC-port RS232C 9-pin male	
RXD	3	————	2	TXD
TXD	2	————	3	RXD
GND	7	————	5	GND

3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below.

Format	PLC Setting	PWS Setting
a.Communication Format	RS232C	COM1 or COM2=RS232
b.Station No.	None	
c.Transmission Speed	9600 bps	

d.Transmission Format	8-Bits, EVEN , 1-Bit	

9.19. JETTER DELTA

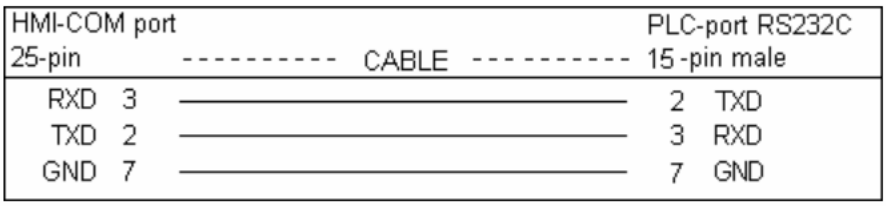
1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
User Register	Rnnnnn	nnnn=0-20479 21000-24999 31000-34999 41000-44999 50200-59999 61440-64999	DWord(32 Bits)
User Register	WRnnnnn	nnnn=0-20479 21000-24999 31000-34999 41000-44999 50200-59999 61440-64999	Word(16 Bits)

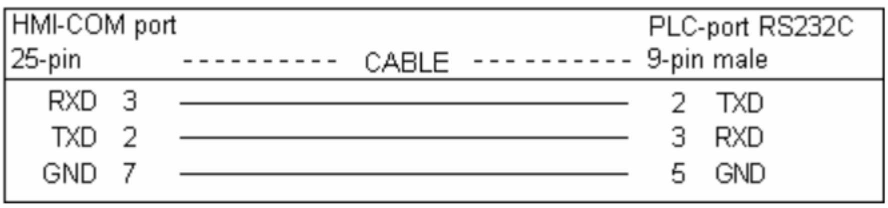
Relay Type	Format	Range with the Relay	Block
Input Relay	Inbb	n=1-8,bb=01-64	bb=01
Output Relay	Onbb	n=1-8,bb=01-64	bb=01
Flag Relay	Fnnnn	nnn=0-2047	must be >255, and multiple of 24+16.

2. The illustration of the connection:

a. PWS-series to PLC RS232 PORT (15-pin male)



b. PWS-series to PLC RS232 PORT (9-pin male)



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below.

Format	PLC Setting	PWS Setting
a.Communication Format	RS232C	COM1 or COM2=RS232
b.Station No.	None	
c.Transmission Speed	9600 bps	
d.Transmission Format	8-Bits, EVEN , 1-Bit	

9.20. Klockner Moeller PS

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

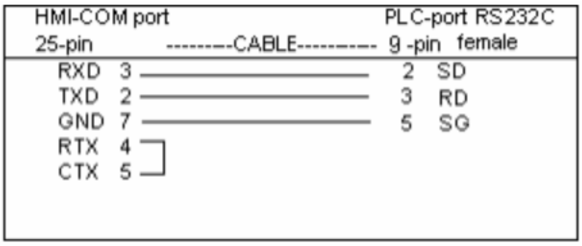
Register Type	Format	Range with the Register	Data Size
Word Marker	MWnnnnn	nnnnn=0-32766	Word

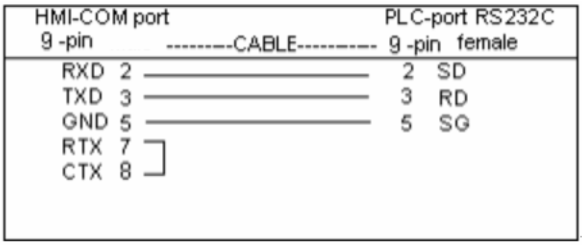
** The HMI can read up to 32Words in one read command.

Relay Type	Format	Range with the Relay	Block
Bit Marker0	Mnnnnn.b	nnnnn=0-32766；b=0-7	b=0 e.g. M10.0

** The HMI can read up to 512 Bits in one read command.

2. The illustration of the connection: PWS-series to PLC RS232 Programming PORT CPU ZB4-303-KB1





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below.

Format	PLC Setting	PWS Setting
a.Communication Format	RS232	COM1or COM2=RS232
b.Station No.	0=PS4-201	1. Set PLC Station 0/1 in ADP
	1=PS316	
c.Transmission Format	9600bps	1.Set SW5=OFF if parameters are set in ADP
d.Transmission Speed	1.Size 8-Bits	
	2.Parity None	2.Set SW5=ON if parameters are set in the HMI
	3.Stop bit 1-Bit	

9.21. KOYO SA/TI 325/330

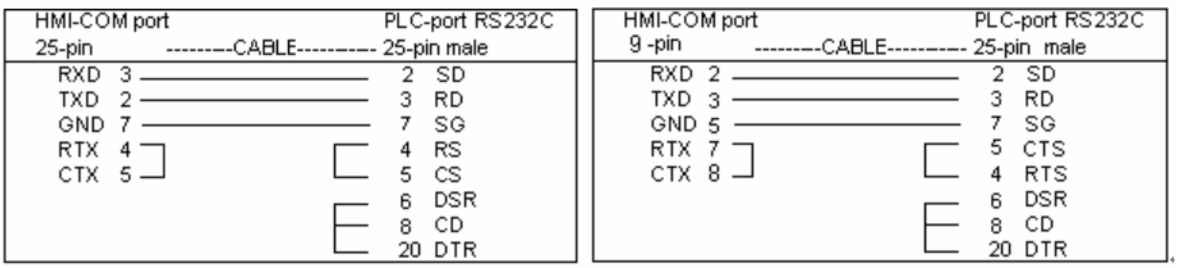
1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
TMR/CTR Accumulater	nnn	nnn=octal number 600-677	Word
Register Values	mmm	mmm=octal number 400-576; mmm must be a multiple of 2	Even Bytes

Relay Type	Format	Range with the Relay	Block
Input/Output Bits	Bnnn	nnn=octal number 0-157	End with 0
Input/Output Bits	Bnnn	nnn=octal number 700-767	End with 0
Internal Relay Bits	Bnnn	nnn=octal number 160-377	End with 0
Shift Register Bits	Bnnn	nnn=octal number 400-577	End with 0
TMR/CTR Bits	Bnnn	nnn=octal number 600-677	End with 0

**When HMI changes a relay's state, the HMI must read 1 byte (8 relays). After change the corresponging bit , then the HMI will write the byte in PLC. These actions will take more than one PLC scan. PLC ladder cannot control other bit(relay) of byte before the HMI compeleted "Change the Relay";otherwise, these bit(relay) will retrun to initial value. In other words, the control action of PLC will be resumed. For example,if the HMI wants to change B3's state, it will read B0-B7. After the corresponding bit B3 is cahnged, the HMI will write the Byte to PLC. The PLC ladder's command will be canceled after the HMI writes the changes in.

2. The illustration of the connection:PWS-series to PLC RS232C PORT of SA21



KOYO SA21 series E02-DM and TI305-02DM have the same wiring.

3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below.

Format	PLC Setting	PWS Setting
a.Communication Format	RS422 or RS232C	COM2=RS232/422/485
b.Station No.	None	
c.Tranmission Speed	9600/19200 bps	

d.Transmission Format	8-Bits, odd, 1-Bit	
e.Operation Mode	RUN Mode	
f.mm. Mode	ASCII mode.sw2-8=ON	

9.22. KOYO DIRECT DL /KOYO SU Series/TI435

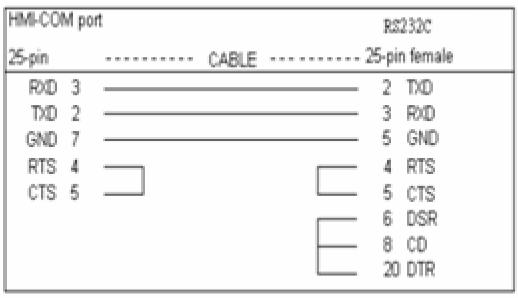
1. The data format and range of the PLC registers which the ADP can accress :
   Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
Timer Accumulated	Vnnn	nnn=octal number 0-177	Word
Counter Accumulated	Vnnnn	nnnn=octal number 1000-1177	Word
V Memory	Vnnnn	nnnn=octal number 1400-7777	Word
Link Relays	Vnnnnn	nnnnn=octal number40000-40037	Word
Input Status	Vnnnnn	nnnnn=octal number40400-40423	Word
Output Status	Vnnnnn	nnnnn=octal number40500-40523	Word
Control Relays	Vnnnnn	nnnnn=octal number40600-40635	Word
Stage	Vnnnnn	nnnnn=octal number41000-41027	Word
Timer Status	Vnnnnn	nnnnn=octal number41100-41107	Word
Counter Status	Vnnnnn	nnnnn=octal number41140-41147	Word
Spec. Relay 1	Vnnnnn	nnnnn=octal number41200-41205	Word
Spec. Relay 2	Vnnnnn	nnnnn=octal number41216-41230	Word

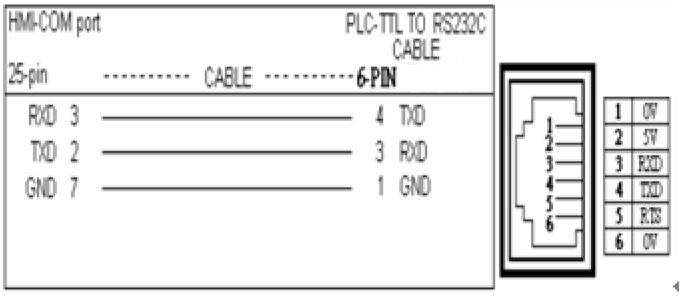
Relay Type	Format	Range with the Relay	Block
Input Status	Xnnn	nnn=octal number 0-477	End with 0
Outpuut Status	Ynnn	nnn=octal number 0-477	End with 0
Control Relays	Cnnn	nnn=octal number 0-737	End with 0
Stage	Snnn	nnn=octal number 0-577	End with 0
Timer Status	Tnnn	nnn=octal number 0-177	End with 0
Counter Status	CTnnn	nnn=octal number 0-177	End with 0
Spec. Relay 1	SPnnn	nnn=octal number 0-137	End with 0
Spec. Relay 2	SPnnn	nnn=octal number 320-617	End with 0
Linker Relays	GXnnn	nnn=octal number 0-777	End with 0

2. The illustration of the connection:PWS to PLC RS232C PORT

a. PWS to PLC RS232C PORT



b. PWS to PLC (cpu240) RS232C PORT



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below.

Format	PLC Setting	PWS Setting
a.Transmission Format	RS232C	COM2=RS232/422/485
b. Station No.	01	
c.Transmission Speed	9600 bps	
d.Transmission Format	1.Size：8-Bits	
	2.Parity：not none;ODD	
	3.Stop Bit：1-Bit	
e.Comm. Protocol Mode	HEX. (TISOFT AUX26)	

9.23. LG GLOFA GM6

1. The data format and range of the PLC registers which the ADP can accress :
   Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
Input Image	%IWn.m.b	n=0-1, m=0-7, b=0-3	Word(16 Bits)
Input Image	%IDn.m.b	n=0-1, m=0-7, b=0-1	Double Word(32 Bits)
Output Image	%QWn.m.b	n=0-1, m=0-7, b=0-3	Word(16 Bits)
Output Image	%QDn.m.b	n=0-1, m=0-7, b=0-1	Double Word(32 Bits)
Internal memory	%MWnnnn	nnnn=0-4095	Word(16 Bits)
Internal memory	%MDnnnn	nnnn=0-65534	Double Word(32 Bits)

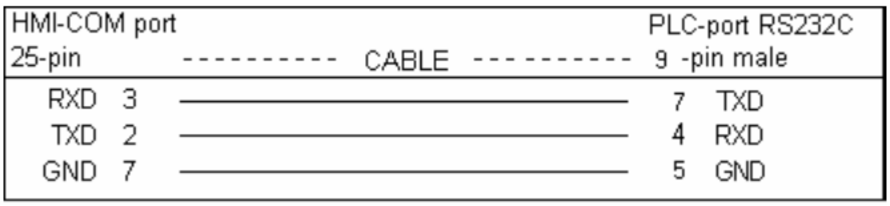
** The HMI can read up to 60 words(30 double words) in one read/write command and only support CPU module.

Relay Type	Format	Range with the Relay	Block
Input Image	%IXn.m.bb	n=0-1, m=0-7, bb=0-63	bb must be 0 or multiple of 16
Output Image	%QXn.m.bb	n=0-1, m=0-7, bb=0-63	bb must be 0 or multiple of 16
Internal memory	%MXnnnnn	nnnnn=0-2047	n. must be 0 or multiple of16

2. The illustration of the connection:

a. PWS-series to PLC

b. PWS-series to PLC RS232 PORT (9-pin male)



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232 (RS422/RS485)	COM1 or COM2=RS232 (RS422/RS485)
b.Station No.	0	
c.Transmission Speed	19200 (9600 /38400) bps	
d.Transmission Format	8-Bits, NONE, 1-Bit	

9.24. LG K10/60H/200H

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

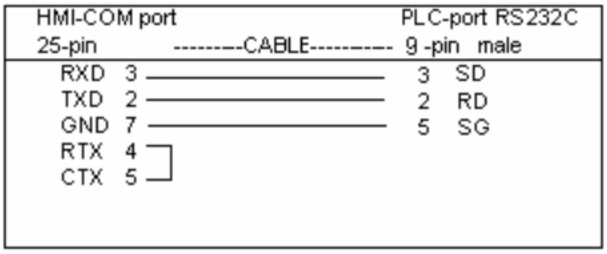
Register Type	Format	Range with the Register	Data Size
Auxiliary Relay	Mnn	nn=0-63	Word
Input/Output Relay	Pnn	nn=0-15	Word
Keep Relay	Knn	nn=0-31	Word
Link Relay	Lnn	nn=0-31	Word
Special Relay	Fnn	nn=0-15	Word
Timer Current Value	Tnnn	nnn=0-255	Word
Counter Current Value	Cnnn	nnn=0-255	Word
Timer Set Value	TSnnn	nnn=0-255	Word
Counter Set Value	CSnnn	nnn=0-255	Word
Data Register	Dnnnn	nnnn=0-1023	Word

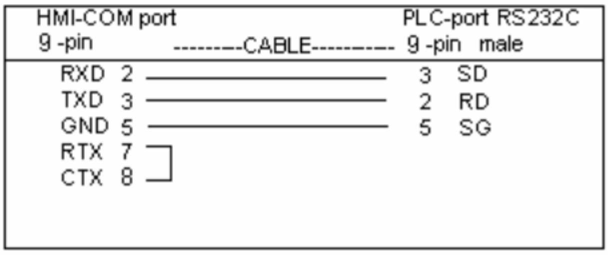
** The HMI can read up to 60 word in one read command

Relat Type	Format	Range with the Relay	Block
Auxiliary Relay	Mnnb	nn=0-63; b=hex number0-f	End with b=0
Input/Output Relay	Pnnb	nn=0-15; b=hex number0-f	End with b=0
Keep Relay	Knnb	nn=0-31; b=hex number0-f	End with b=0
Link Relay	Lnnb	nn=0-31; b=hex number0-f	End with b=0
Special Relay	Fnnb	nn=0-15; b=hex number0-f	End with b=0
Timer Relay	Tnnn	nnn=0-255	Must be 0 or multiple of 16.
Counter Relay	Cnnn	nnn=0-255	Must be 0 or multiple of 16.

2. The illustration of the connection:PWS-series to the RS-232 Port of K200H CPU

9. Communication with PLC and PWS





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	**PLC** Setting	**PWS** Setting
a.Communication Format	RS232C	COM1/COM2=RS232
b.Station No.	00	
c.Transmission Speed	9600 bps	1. Set the SW5=OFF if
		parameters are set in ADP
d.Transmission Format	8-Bits,NONE,1-Bit	2. Set the SW=ON if
		parameters are set in the HMI

9.25. LG K200S

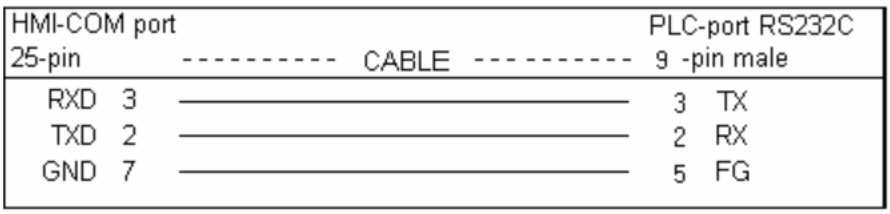
1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
I/O RELAY	PWnn	nn=0-15	Word(16 Bits)
AUX RELAY	MWnnn	nnn=0-191	Word(16 Bits)
Keep RELAY	KWnn	nn=0-31	Word(16 Bits)
Link RELAY	LWnn	nn=0-63	Word(16 Bits)
Special RELAY	FWnn	nn=0-63	Word(16 Bits)
Timer	TWnnn	nnn=0-255	Word(16 Bits)
Counter	CWnnn	nnn=0-255	Word(16 Bits)
Data Register	DWnnnn	nnnn=0-9999	Word(16 Bits)

Relay Type	Format	Range with the Relay	Block
I/O RELAY	Pnnb	nn=0-15, b=0-f	b must be 0
AUX RELAY	Mnnnb	nnn=0-191, b=0-f	b must be 0
Keep RELAY	Knnb	nn=0-31, b=0-f	b must be 0
Link RELAY	Lnnb	nn=0-63, b=0-f	b must be 0
Special RELAY	Fnnb	nn=0-63, b=0-f	b must be 0
Timer	Tnnn	nnn=0-255	None
Counter	Cnnn	nnn=0-255	None

2. The illustration of the connection:

PWS-series to PLC RS232 PORT (9-pin male)



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232	COM1 or COM2=RS232
b.Station No.	None	
c.Transmission Speed	38400 bps	
d.Transmission Format	8-Bits, NONE, 1-But	

9.26. LG K300S

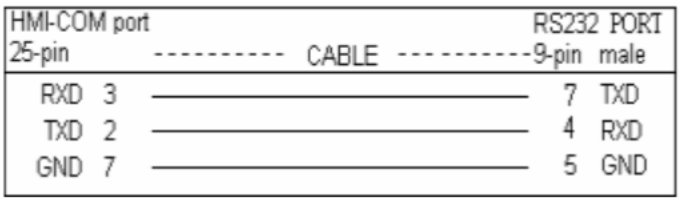
1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
I/O Relay	PWnn	nn= 0-31	Word(16 Bits)
AUX Relay	MWnnn	nnn = 0-191	Word(16 Bits)
Keep Relay	KWnn	nn = 0-31	Word(16 Bits)
Link Relay	LWnn	nn = 0-63	Word(16 Bits)
Special Relay	FWnn	nn = 0-63	Word(16 Bits)
Timer	TWnnn	nnn = 0-255	Word(16 Bits)
Counter	CWnnn	nnn = 0-255	Word(16 Bits)
Step controller	SWnnnn	nnnn = 0-9999	Word(16 Bits)
Data Register	DWnnnn	nnnn = 0-9999	Word(16 Bits)

Relay Type	Foramt	Range with the Relay	Block
I/O Relay	PWnnb	nn= 0-31 b=0-f	
AUX Relay	MWnnnb	nnn = 0-191 b=0-f	
Keep Relay	KWnnb	nn = 0-31 b=0-f	
Link Relay	LWnnb	nn = 0-63 b=0-f	
Special Relay	FWnnb	nn = 0-63 b=0-f	

2. The illustration of the connection:

PWS-series to PLC RS232 PORT



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Transmission Format	RS232C	
b.Station No.	RS232C=0	
c.Transmission Speed	RS232C=9600 bps	
d.Transmission Format	RS232C =8 Bits,none,1 Bit	

9.27. LG Master-K10S/K30S/60S/100S

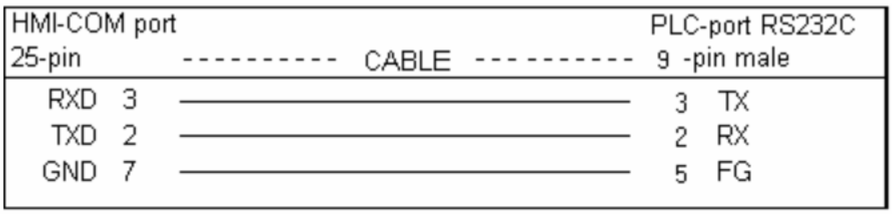
1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
I/O RELAY	PWn	n=0-5	Word(16 Bits)
AUX RELAY	MWnn	nn=0-31	Word(16 Bits)
Keep RELAY	KWnn	nn=0-15	Word(16 Bits)
Link RELAY	LWnn	nn=0-15	Word(16 Bits)
Special RELAY	FWnn	nn=0-15	Word(16 Bits)
Timer	TWnnn	nnn=0-127	Word(16 Bits)
Counter	CWnnn	nnn=0-127	Word(16 Bits)
Data Register	DWnnn	nnnn=0-255	Word(16 Bits)

Relay Type	Format	Range with the Relay	Block
I/O RELAY	Pnb	n=0-5, b=0-f	b must be 0
AUX RELAY	Mnnb	nn=0-31, b=0-f	b must be 0
Keep RELAY	Knnb	nn=0-15, b=0-f	b must be 0
Link RELAY	Lnnb	nn=0-15, b=0-f	b must be 0
Special RELAY	Fnnb	nn=0-15, b=0-f	b must be 0
Timer	Tnnn	nnn=0-127	n.. must be 0 or multiple of 16
Counter	Cnnn	nnn=0-127	n.. must be 0 or multiple of 16

2. The illustration of the connection:

PWS-series to PLC RS232 PORT (9-pin male)



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting

a.Transmission Format	RS232	COM1 or COM2=RS232
b.Station No.	None	
c.Transmission Speed	9600 bps	
d.Transmission Format	8-Bits, NONE, 1-Bit	

9.28. MATSUSHITA FP

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

Register Type	Format	Range with the Register	Device Type / Aux.Address		Block ead R/W	
Internal Relay	WRnn	nn=0-97(875)	0	0	Word	
Special Internal Relay	WRnnn	nnn=900-910	1	0	Word	
Link Relay	WLnnn	nnn=0-127(639)	2	0	Word	
External Input Relay	WXnnn	nnn=0-127(255)	3	0	Word	
External Output Relay	WYnnn	nnn=0-127(255)	4	0	Word	
Timer/Counter P.V.	EVnnn	nnn=0-254(2047)	5	0	Word	
Timer/Counter S.V.	SVnnn	nnn=0-254 (2047)	6	0	Word	
Data Register	DTnnnn	nnnn=0-2047 (32764)	7	0	Word	
Special Data Register	DTnnnn	nnnn=9000-9255	8	0	Word	
Link Data Register	LDnnn	nnn=0-127(8447)	9	0	Word	
File Register	FLnnnnn	nnnn=0-8191 (32764)**	10	0	Word	

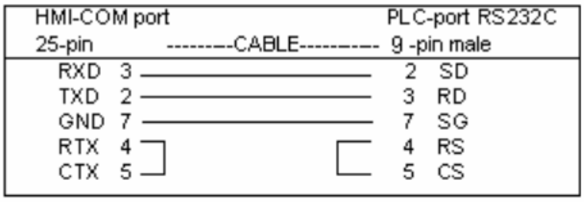
** The HMI can read up to 27 word in one read command.
**The Register setting range of FP10SH is nnnnn=0- 32764.

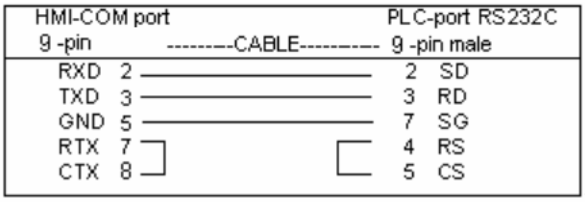
Relay Type	Format	Range with the Relay	Block
Internal Relay	Rnnnb	nn=0-97(875);b= 0-f	b=0 e.g. R1230
Special Internal Relay	Rnnnb	nnn=900-910;b= 0-f	b=0 e.g. R9100
Link Relay	Lnnnb	nnn=0-127(639);b=0-f	b=0 e.g.. L110
External Input Relay	Xnnnb	nnn=0-127(255);b=0-f	b=0 e.g. X00
External Output Relay	Ynnnb	nnn=0-127(255);b=0-f	b=0 e.g. Y00
Timer Flag Contact	Tnnn	nnn=0-254(2047)	must be 0 or multiple of16
Counter Flag Contact	Cnnn	nnn=0-254(2047)	must be 0 or multiplr of 16

** The HMI can read up to 432 bits in one read command.
**The Relay setting range of FP10SH is nnnn=0-2047.

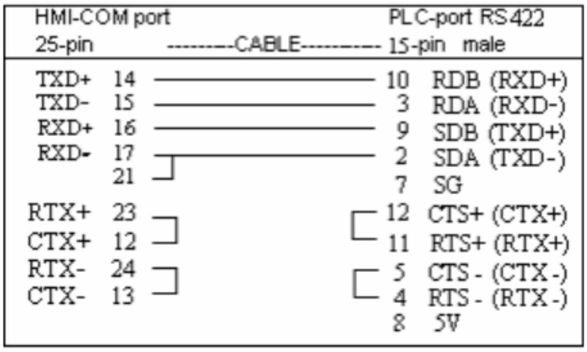
2. The illustration of the connection:

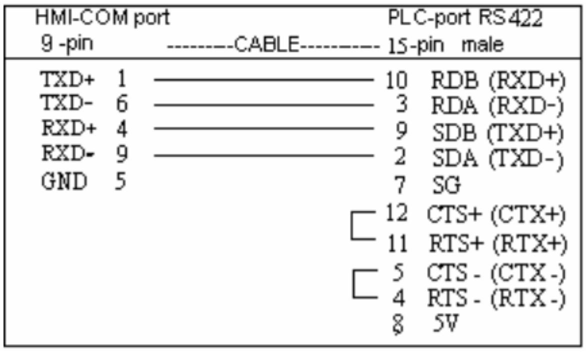
a. PWS-series to PLC RS232C LINK of FP3 CCU or FP1 LINK PORT





b. PWS-series to PLC RS422 of PROGRAM PORT (FP3 CPU PORT)





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS422 or RS232C	COM2=RS232/422/485
b.Station No.	02-27	1. Set PLC Station 01 in ADP, CPU
	FP CPU PORT =238	PORT 238
	FP1: Set computer link	
c.Transmission Speed	19200/9600 bps	1. Set SW5=OFF if parameters are
	FP10SH –CPU: Set115.2K bps	set in ADP
d.Transmission Format	Size 8-Bits,odd, 1-Bit	2. Set SW=ON if parameters are
		set in the HMI

9.29. MIRLE DX

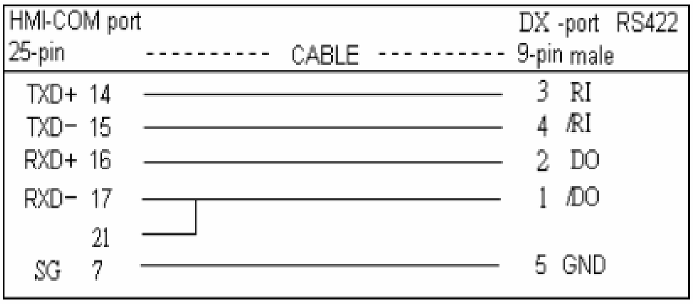
1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
IR area	IRnnn	nnn=0-111	Word
DM area	DMnnnn	nnnn=0-2367	Word

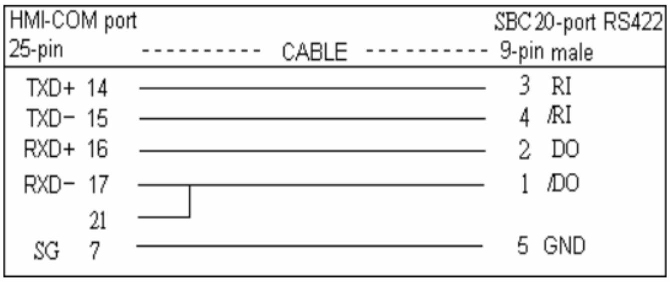
Relay Type	Format	Range with the Relay	Block
IR area	IRnnnbb	nnn=0-111,bb=00-15	bb=00

2. The illustration of the connection:

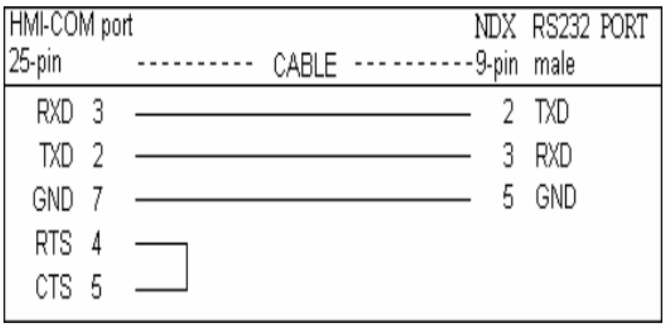
a. PWS to MIRLE DX RS422 PORT



b. PWS to MIRLE SBC 20 RS422 PORT



c. PWS to MIRLE NDX RS232



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232C/ RS422	COM2=RS232/422
b.Station No.	0	1. Set PLC Station 00 in ADP
c.Transmission Speed	9600 bps	
d.Transmission Format	1.DX,SBC20—8 Bits,ODD,1 Stop Bit	1 Set SW5=ON if parameters are set in the HMI
	2.NDX —8 Bits,NONE,1 Stop Bit	

9.30. Mitsubishi FX

1. The data format and range of the PLC registers which the ADP can accress :
   Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
Auxiliary Relay	Mnnnn	nnnn=0-3071; must be 0 or multiple of 8	Byte
Special Auxiliary Relay	Mnnnn	nnnn=8000-8255; must be 0 or multiple of 8	Byte
Status Relay	Snnn	nnn=0-999; must be 0 or multiple of 8	Byte
Input Relay	Xnnn	nnn=octal number 0-377; end with 0	Byte
Output Relay	Ynnn	nnn=octal number 0-377; end with 0	Byte
Timer PV	Tnnn	nnn=0-254	Word
16-位元 Counter PV	Cnnn	nnn=0-199	Word
32-位元 Counter PV	Cnnn	nnn=200-255	DWord
Data Register	Dnnn	nnn=0-1023(7999) D1000=FILE REGISTER	Word
Special Data Register	Dnnnn	nnnn=8000-8255	Word

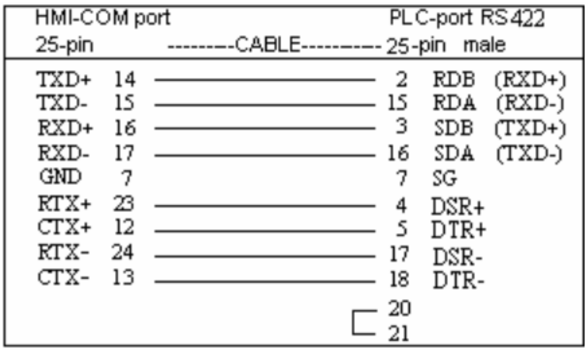
** The HMI can read up to 32Words in one read command.

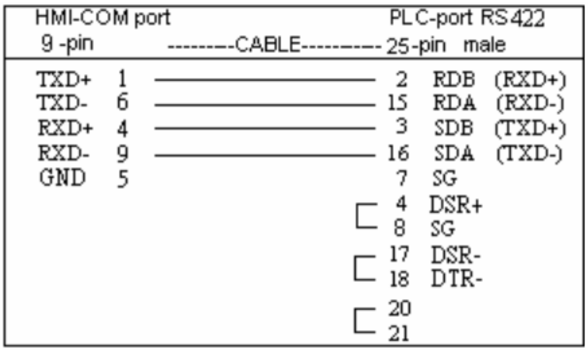
Relay Type	Format	Range with the Type	Block
Auxiliary Relay	Mnnnn	0-3071	Must be 0 or multiple of 8
Special Auxiliary Relay	Mnnnn	8000-8255	Must be 0 or multiple of 8
Status Relay	Snnn	0-999	Must be 0 or multiple of 8
Input Relay	Xnnn	Octal number 0-377	End with 0
Output Relay	Ynnn	Octal number 0-377	End with 0
Timer Flag	Tnnn	0-255	Must be 0 or multiple of 8
Counter Flag	Cnnn	0-255	Must be 0 or multiple of 8

** The HMI can read up to 512 bits in one read command.

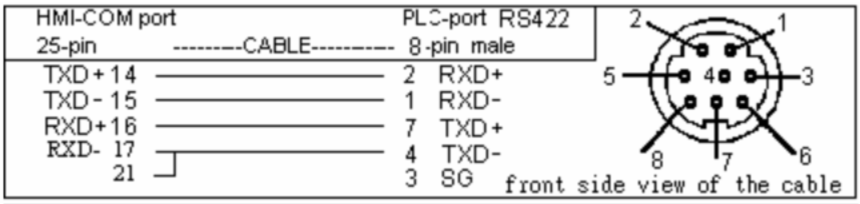
2. The illustration of the connection:

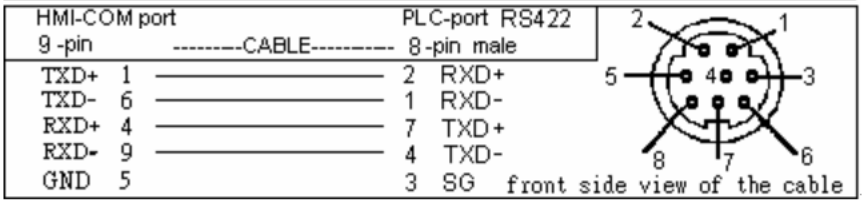
a. PWS to RS422 of PLC-FX2 CPU





b. PWS- to PLC PROGRAM Loader PORT (Mitsubishi FX2n/FX0n CPU PORT)





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS422	
b.Transmission Speed	9600 bps	
c.Transmission Format	7-Bits,EVEN,1-Bit	

9.31. Mitsubishi A

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
Input Relay	Xnnn	nnn=hex number 0-7ff; end with 0	Word
Output Relay	Ynnn	nnn=hex number 0-7ff; end with 0	Word
Link Relay	Bnnn	nnn=hex number 0-fff; end with 0	Word
Internal Relay	Mnnnn	nnnn=0-8191; must be 0 or multiple of 16	Word
Special Relay	Mnnnn	nnnn=9000-9255;-9000 must be multiple of 16	Word
Latch Relay	Lnnnn	nnnn=0-2047; must be 0 or multiple of 16	Word
Annunciator	Fnnnn	nnnn=0-2047; must be 0 or multiple of 16	Word
Timer PV	TNnnn	nnn=0-999	Word
Counter PV	CNnnn	nnn=0-999	Word
Data Register	Dnnnn	nnnn=0-8191	Word
Special Register	Dnnnn	nnnn=9000-9255	Word
File Register	Rnnnn	nnnn=0-8191	Word
Link Register	Wnnn	nnn=hex number 0-fff	Word
Peripherial Input Relay	PXnnn	nnn=0-7ff must be 0 or multiple of 16	Word

** The HMI can read up to 64Words in one read command.

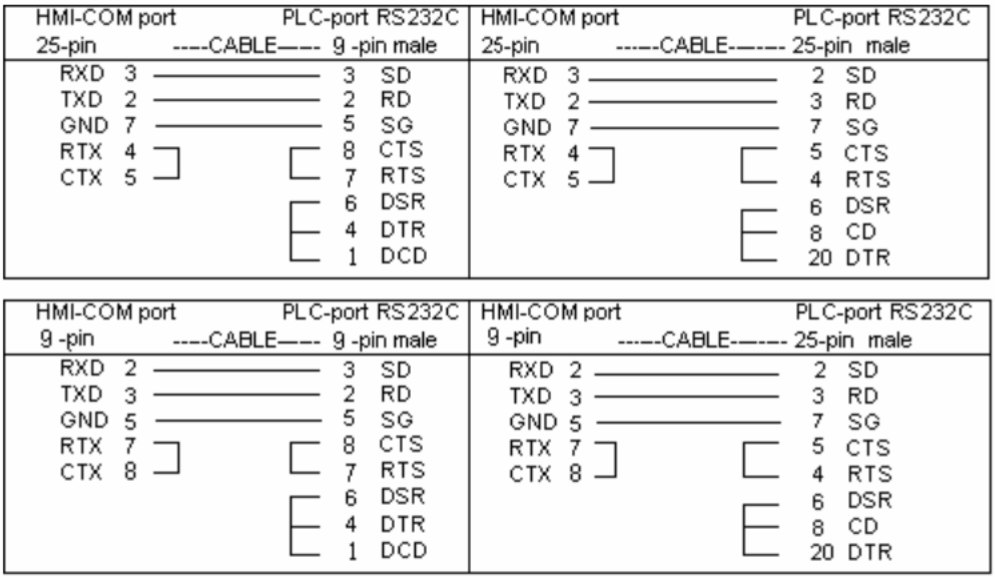
Relay Type	Format	Range with the Relay	Block
Input Relay	Xnnn	hex number 0-7ff	End with 0
Output Relay	Ynnn	hex number 0-7ff	End with 0
Link Relay	Bnnn	hex number 0-fff	End with 0
Internal Relay	Mnnnn	0-8191	Must be 0 or multiple of 16
Special Relay	Mnnnn	9000-9255	The last 3 digits must be multiple of 16.
Latch Relay	Lnnnn	0-2047	Must be 0 or multiple of 16.
Annunciator	Fnnnn	0-2047	Must be 0 or multiple of 16.
Timer Contact	TSnnn	0-999	Must be 0 or multiple of 16.
Timer Coil	TCnnn	0-999	Must be 0 or multiple of 16.

Counter Contact	CSnnn	0-999	Must be 0 or multiple of 16.
Counter Coil	CCnnn	0-999	Must be 0 ot multiple Of 16.
Peripherial Input Relay	PXnnn	0-7ff	Must be 0 or multiple of 16.

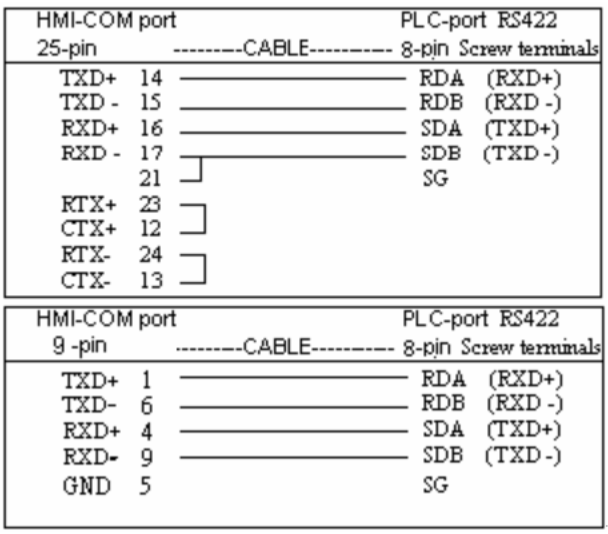
** The HMI can read up to512 bits in one read command.

2. The illustration of the connection:

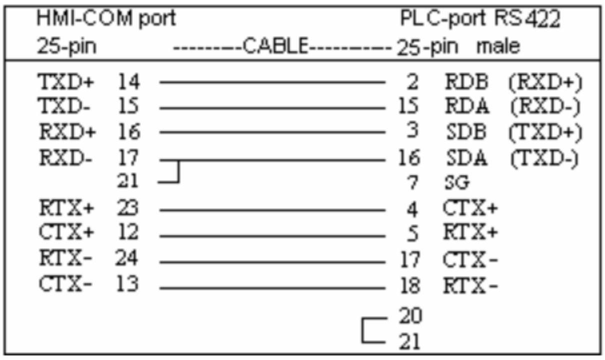
a. PWS and PLC AJ71UC24-R2/S8



b. PWS and PLC AJ71UC24 RS422



c. PWS,PLC AnA and AnA/AnS/AnU CPU port RS422



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS422 or RS232C	COM2=RS232/422/485
AJ71UC24 sw1=ON	RS422	1. RS422: Set SW10=OFF
sw1=Off	RS232	
b.Station No.	00(CPU PORT)	1. Set PLC station 00
	00(AISJ71C24-S3)	Set PWS station 255
	00-31(AJ71UC24)	
c.Transmission Speed	9600/19200 bps	
	CPU PORT=9600bps	
d.Transmission Format	8-Bits,ODD,1-Bit	
e.Comm. Protocol	Format 1;5;A	
f.Check Sum	YES	
g.Write during Run	Allowed	

**For AISJ71C24 or AJ71c24, set the HMI staion no. as 255 and PLC station no. as 0 and connect with PLC CPU port. To communicate in COM2, please set the DIP switch = off and communication parameters as 9600,8,0DD,1.

9.32. Mitsubishi QnA

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
Link Relay	Bn	n=hex number 0-1fff ; end with 0	Word
Counter Coil	CCn	n=0-1023; must be 0 and multiple of 16.	Word
Counter Current Value	CNn	n=0-1023	Word
Counter Contact	CSn	n=0-1023; must be 0 or multiple of 16.	Word
Data Register	Dn	n=0-12287	Word
Direct Input	DXn	n=hex number 0-1fff ; end with 0	Word
Direct Output	DYn	n=hex number 0-1fff ; end with 0	Word
Annunciator	Fn	n=0-2047; must be 0 or multiple of 16	Word
Latch Relay	Ln	n=0-8191; must be 0 or multiple of 16	Word
Internal Relay	Mn	n=0-8191; must be 0 or multiple of 16	Word
File Register	Rn	n=0-32767	Word
Step Relay	Sn	n=0-8191; must be 0 or multiple of 16	Word
Special Link Relay	SBn	n=hex number 0-7ff ; end with 0	Word
Retentive Timer Coil	SCn	n=0-2047; must be 0 or multiple of 16	Word
Special Register	SDn	n=0-2047	Word
Special Relay	SMn	n=0-2047; must be 0 or multiple of 16	Word
Retentive Timer Current Value	SNn	n=0-2047	Word
Retentive Timer Contact	SSn	n=0-2047; must be 0 or multiple of 16	Word
Special Link Register	SWn	n=hex number 0-7ff	Word
Timer Coil	TCn	n=0-2047; must be 0 or multiple of 16	Word
Timer Current Value	TNn	n=0-2047	Word
Timer Contact	TSn	n=0-2047; must be 0 or multiple of 16	Word
Edge Relay	Vn	n=0-2047; must be 0 or multiple of 16	Word
Link Register	Wn	n=hex number 0-1fff	Word
Input Relay	Xn	n=hex number 0-1fff ; end with 0	Word

Output Relay	Yn	n=hex number 0-1fff ; end with 0	Word
Index Register	Zn	n=0-15	Word
File Register	ZRn	n=hex number 0-fe7f	Word

Relay Type	Format	Range with the Relay	Block
Link Relay	Bn	hex number 0-1ffff	
Counter Coil	CCn	0-1023	
Counter Contact	CSn	0-1023	
Direct Input	DXn	n=hex number 0-1fff	
Direct Output	DYn	n=hex number 0-1fff	
Annunciator	Fn	0-2047	
Latch Relay	Ln	0-8191	
Internal Relay	Mn	0-8191	
Step Relay	Sn	0-8191	
Special Link Relay	SBn	n=hex number 0-7ff	
Retentive Timer Coil	SCn	0-2047	
Special Relay	SMn	0-2047	
Retentive Timer Contact	SSn	0-2047	
Timer Contact	TSn	0-2047	
Timer Coil	TCn	0-2047	
Edge Relay	Vn	0-2047	
Input Relay	Xn	hex number 0-1fff	
Output Relay	Yn	hex number 0-1fff	

2. The illustration of the connection:

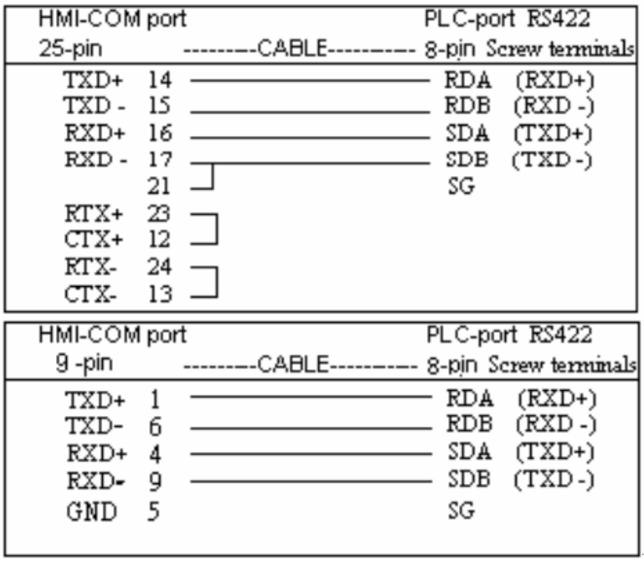
a. PWS and QnA CPU port (RS232)

HMI-COM port 25-pin		------CABLE------	PLC-port RS232C 6-pin	
RXD	3	———	2	TXD
TXD	2	———	1	RXD
GND	7	———	3	GND
RTX	4	———	5	CTS
CTX	5	———	6	RTS

b. PWS and Q Series C24 (RS232)

HMI-COM port 25-pin		------CABLE------	PLC-port RS232C 9-pin	
RXD	3	———	3	TXD
TXD	2	———	2	RXD
GND	7	———	5	GND
RTX	4	———	1	CD
CTX	5	———	4	DTR

c. PWS and Q Series C24 (RS422)



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS422 or RS232C	COM2=RS232/422/485
b.Station No.	00(CPU PORT)	
	00(Q Series C24)	Set PLC Station 00
c.Transmission Speed	19200 bps	
d.Transmission Format	8-Bits,ODD,1-Bit (CPU PORT)	
	7-Bits,EVEN,2-Bits (Q Series C24)	

9.33. Modbus slave

1. The data format and range of the PLC registers which the ADP can accress :
   Word Device and Bit Device.

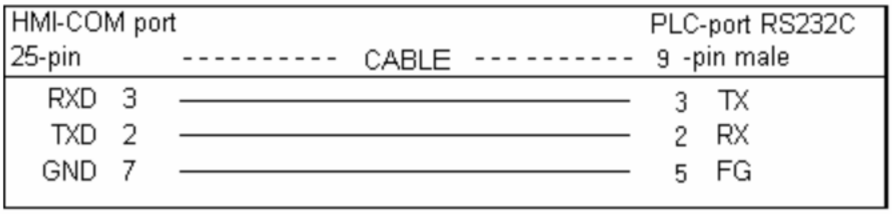
Register Type	Format	Range with the Register	Data Size
REGISTER	Wnnnnn	nnnnn=0-65535	Word(16 Bits)

Relay Type	Format	Range with the Relay	Block
RELAY	Bn	n=0-65535	

2. The illustration of the connection:

a. PWS-series to PLC

b. PWS-series to PLC RS232 PORT (9-pin male)



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	B. PWS Setting
a.Communication Format	RS232 (RS422/RS485)	COM1 or COM2=RS232 (RS422/RS485)
b.Station No.		
c.Transmission Speed	9600 bps (9600-115200)	
d.Transmission Format	8-bits, NONE, 1-bit	
	(7), (EVEN/NONE), (2)	

9.34. Modicon PC984 or Modbus(Ascii)or TSX Quantum

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

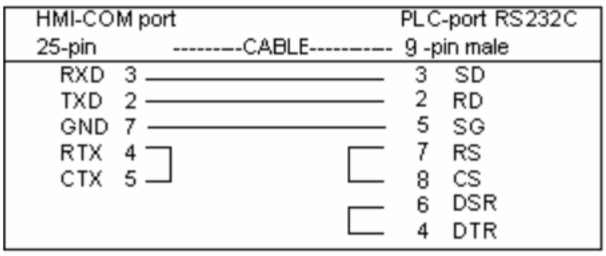
Register Type	Format	Range with the Register	Data Size
Input Registers (Modicon PC 984/Modbus (Ascii))	nnnnn	nnnnn=30001-39999(slave) 30001-31024(master)	Word
Output Registers (Modicon PC 984/Modbus (Ascii))	nnnnn	nnnnn=40001-49999(as slave) 40001-41024(as master)	Word
Input Registers (TSX Quantum)	nnnnnn	nnnnn=300001-365535	Word
Output Registers (TSX Quantum)	nnnnnn	nnnnn=400001-465535	Word

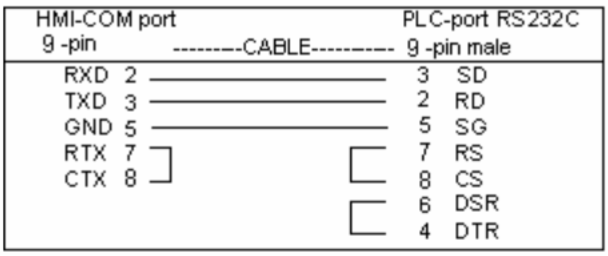
** The HMI can read up to 125Words in one read command.

Relay Type	Format	Range with the Relay
Discrete Outputs (Modicon PC 984/Modbus (Ascii))	Nnnnn	nnnnn=1-4999(slave) 1-1024(master)
Discrete Inputs (Modicon PC 984/Modbus (Ascii))	Nnnnn	nnnnn=10001-19999(slave) 10001-11024(master)
Discrete Outputs(TSX Quantum)	Nnnnn	nnnnn=000001-065535
Discrete Inputs (TSX Quantum)	Nnnnn	nnnnn=100001-165535

** The HMI can read up to 2000bits in one read command.
**Modubus (Ascii) master – V2 as Modubus (Ascii) master. In functional way,it will inform the connected controller automatically when the HMI data is changed.

2. The illustration of the connection:PWS series to RS232 of PLC CPU port





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

9. Communication with PLC and PWS

Format	PLC Setting	PWS Setting
a.Communication Format	RS232C	COM1/COM2=RS232
b.Station No.	1	1. Set PLC Station 01 in ADP
	01—247 (mem setup)	
c.Transmission Speed	19200/9600 bps	
d.Transmission Format	8, EVEN ,1	
	(7,O,1);(7,E,1);(7,E,2)	
RTU MODE	(8,E,1);(8,O,1);(8,N,1)	

9.35. OMRON C

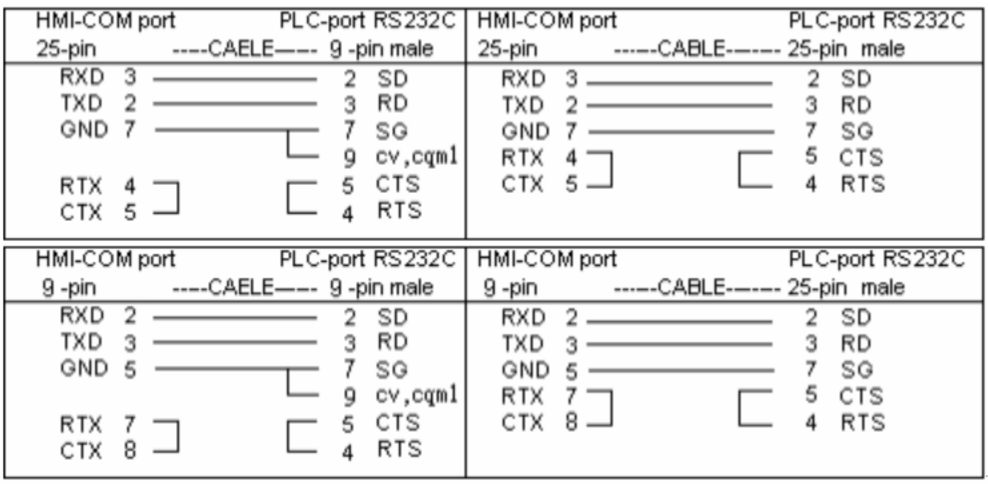
1. The data format and range of the PLC registers which the ADP can accress :
   Word Device and Bit Device.

Register Type	Format	Range with the Register	Block read	
IR area	IRnnn	nnn=0-511	Word(16 Bits)	Max. 28
HR area	HRnn	nn=0-99	Word(16 Bits)	Max. 28
AR area	ARnn	nn=0-27	Word(16 Bits)	Max. 28
LR area	LRnn	nn=0-63	Word(16 Bits)	Max. 28
TC area	TCnnn	nnn=0-511	Word(16 Bits)	Max. 28
DM area	DMnnnn	nnnn=0-6655	Word(16 Bits)	Max. 28

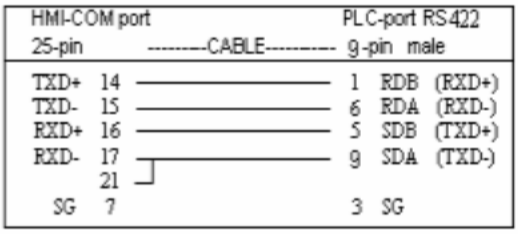
Relay Type	Format	Range with the Relay	Block
IR area	IRnnnbb	nnn=0-511; bb=00-15	bb=00 e.g. IR12300
HR area	HRnnbb	nn=0-99 ; bb=00-15	bb=00 e. g.HR2300
AR area	ARnnbb	nn=0-27 ; bb=00-15	bb=00 e.g. AR100
LR area	LRnnbb	nn=0-63 ; bb=00-15	bb=00 e.g. LR2300
TC area	TCnnn	nnn=0-511	Multiple of 16 e.g. TC16

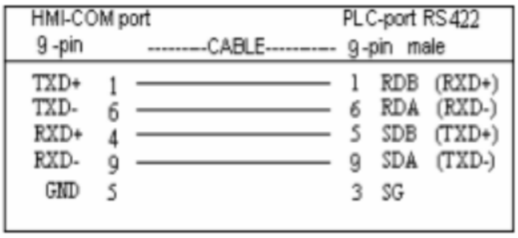
2. The illustration of the connection:

a. PWS-series to PLC RS232C HOST LINK of LK201/ C200HS/C28H/C40H/CQM1



b. PWS-series to PLC RS422 HOST LINK of C200H-LK202





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	**PLC Setting**	**PWS Setting**
a.Communication Format	RS232C/ RS422/ RS485	COM2=RS232/422/485
b.Station No.	00(00-31)	1. Set PLC station 00 in ADP
1.CQM1-CPU21	DM6648=0000	
c.Transmission Speed	19200/9600 bps	
1.CQM1-CPU21	DIP-sw5=OFF	
d.Tranmission Format	Initial value 7-bits, ENEN, 2	
e.Operation Mode	Monitor Mode	
f.PROTOCOL	Multiple-Link	

9.36. Omron CS1

1. The data format and range of the PLC registers which the ADP can accress :
   Word Device and Bit Device.

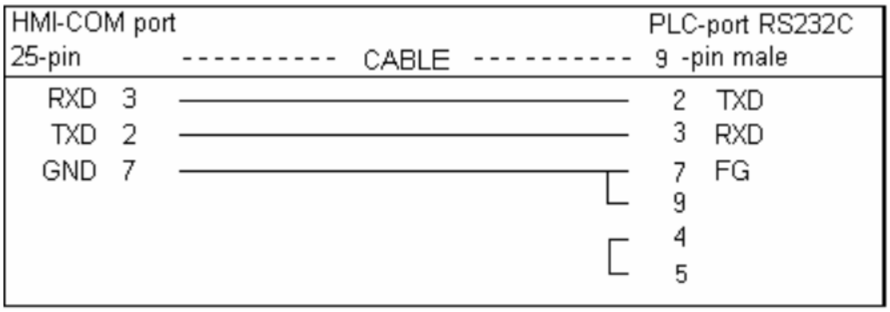
Register Type	Format	Range with the Register	Data Size
IR Area (CIO Area)	IRnnnn	nnnn=0-6143	Word(16 Bits)
HR Area	HRnnn	nnn=0-511	Word(16 Bits)
AR Area	ARnnn	nnn=0-959	Word(16 Bits)
LR Area	LRnnn	nnn=0-199	Word(16 Bits)
TC Area	TCnnnn	nnnn=0-4095	Word(16 Bits)
DM Area	DMnnnn	nnnn=0-9999	Word(16 Bits)
EM Area	EMm.nnnnn	m=0-c, nnnn=0-9999	Word(16 Bits)

Relay Type	Format	Range with the Relay	Block
IR Area (CIO Area)	IRnnnnb	nnnn=0-6143, b=00-15	bb must be 00
HR Area	HRnnnb	nnn=0-511, b=00-15	bb must be 00
LR Area	LRnnnb	nnn=0-199, b=00-15	bb must be 00
Timer Area	Tnnnn	nnnn=0-2047	
Counter Area	Cnnnn	nnnn=0-2047	

2. The illustration of the connection:

a. PWS-series to PLC

PWS-series to PLC RS232 PORT (9-pin male)



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Seting
a.Communication Format	RS232 (RS422/RS485)	COM1 or COM2=RS232 (RS422/RS485)
b.Station No.	0 (0-31)	
c.Transmission Speed	9600 bps	
d.Transmission Format	7-Bits, EVEN, 2-Bits	

9.37. Omron CV

1. The data format and range of the PLC registers which the ADP can accress :
   Word Device and Bit Device.

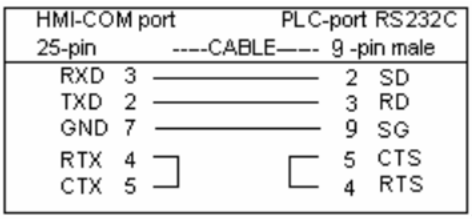
Register Type	Format	Range with the Register	Data Size
CIO Area	CIOnnnn	nnnn=0-2555	Word(16 Bits)
TC Area	TCnnnn	nnnn=0-1023	Word(16 Bits)
TC Area	TCnnnn	nnnn=2048-3071	Word(16 Bits)
AR Area	ARnnn	nnn=0-511	Word(16 Bits)
DM Area	DMnnnn	nnnn=0-9999	Word(16 Bits)

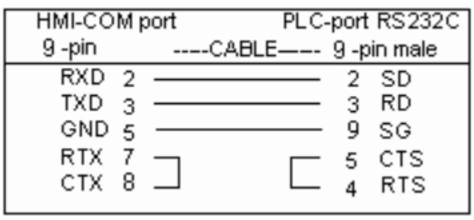
Relay Type	Format	Range with the Relay	Block
CIO Area	CIOnnnnbb	nnnn=0-2555, bb=00-15	bb must be 00
TC Area	TCnnnn	nnnn=0-1023	
TC Area	TCnnnn	nnnn=2048-3071	

2. The illustration of the connection:

a. PWS-series to PLC

PWS-series to PLC RS232 PORT





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	B. PWS Setting
a.Communication Format	RS232	COM1 or COM2=RS232
b.Station No.	0	
c.Transmission Speed	9600 bps	
d.Transmission Format	7-Bits, EVEN, 2-Bits	

9.38. Parker 6K

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

Register Type	Command	Format	Range with the Register	Data Size	Data Range
Input	!nTIN	In	n = 0 ~ 8	**Double Word**	
Output	!nTOUT	On	n = 0 ~ 8	Double Word	
Alarm Status	!INTHW	Asn	n = 1	Double Word	
Axis Status	!nTAS	AXSn	n = 1 ~ 8	Double Word	
System Status	!TSS	SYSn	n = 1	Double Word	
User Status	!TUS	USSn	n = 1	Word	
Binary	!VARBnnn	**VARBnnn**	nnn = 001~125	Double Word	
Numeric	!VARnnn	VARnnn	nnn = 001~225	Double Word	+-999,999,999
Integer	!VARInnn	VARInnn	nnn = 001~225	Double Word	+-2,147,483,647
String	!VARSnn	VARSnn	nn = 01 ~ 50	10 Words	0 ~ 20 Characters
Motor Position	!nTPC	MOPn	n = 1 ~ 8	**Double Word**	**+-2,147,483,647**
Motor Velocity	!nTVEL	MOVn	n = 1 ~ 8	Double Word	
Encoder Position	!nTPE	ENPn	n = 1 ~ 8	Double Word	
TIMER	!TTIM	Tn	n = 1	Double Word	0 ~ 999999999
Nnn	Run Program	Nnn	nn = 1 ~ 50	10 Words	0 ~ 20 Characters

**If Paker 6K still excute, it will cause communication Time Out .
**Parker 6K needs to write internal program in order to accept the command with initial code '!', or it may cause communication error.

Register Type	Command	Format	Range with the Register		Data Range
Input	!nTIN	In.bb	n = 0 ~ 8	bb =1~32	Bit
Output	!nTOUT	On.bb	n = 0 ~ 8	bb =1~32	Bit
Alarm Status	!INTHW	ASn.bb	n = 1	bb =1~32	Bit
Axis Status	!nTAS	AXSn.bb	n = 1 ~ 8	bb =1~32	Bit
System Status	!TSS	SYSn.bb	n = 1	bb =1~32	Bit
User Status	!TUS	USSn.bb	n = 1	bb =1~16	Bit
Binary	!VARBnnn	**VARBnnn.bb**	nnn = 001~125	bb =1~32	Bit

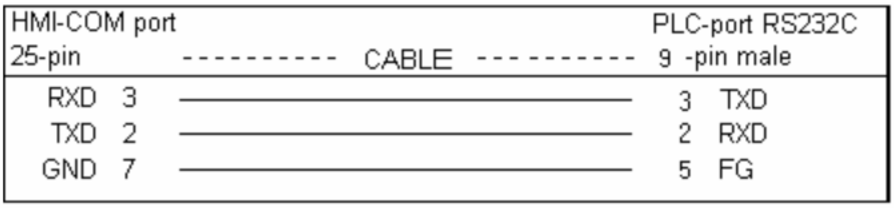
9. Communication with PLC and PWS

Register Type	Command	Format	Range with the Register		Data Range
Error Status	TERn.bb	TERn.bb	n = 1	bb =1~32	Bit
RUN	Run Program	RUNnn	nn = 1 ~50		Bit

2. The illustration of the connection:

a. PWS-series to PLC

PWS-series to PLC RS232 PORT



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232	COM1 or COM2=RS232
b.Station No.	None	
c.Transmission Speed	9600 bps	
d.Transmission Foramt	8-Bits, NONE, 1-Bit	

9.39. SIDE MIDA 20/20D

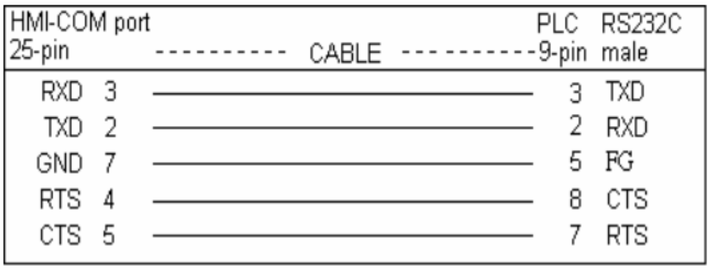
1. The data format and range of the PLC registers which the ADP can accress :
   Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
Register	Wnnnnn	nnnn= 0-10499	Word(16 Bits)
Display	Dispn	n=0-4	10 Words
Date	Daten	N=0-6	Word

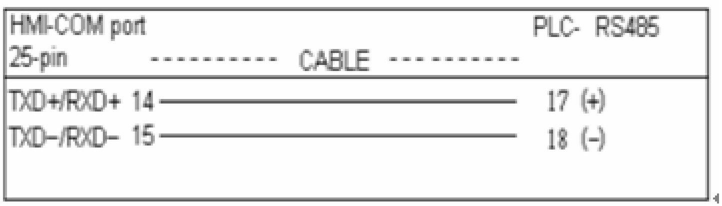
Relay Type	Format	Range with the Relay	Block
I/O Relay	Bnnn	nnn= 0-1599	Must be 0 or multiple of16
Hardware Reset	HardRn	n= 0	
Software Reset	SoftRn	n= 0	
Clear RAM,EEPROM	Clr0-n	n= 0	
Clear database	Clr1-n	n= 0	
Clear RAM,EEPROM, database	Clr2-n	n= 0	
Clear RAM,EEPROM, database and default setup	Clr3-n	n= 0	

2. The illustration of the connection:

a. PWS-series to PLC RS232 PORT



b. PWS-series to PLC RS485 PORT



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232C RS485	RS232C: use SIDE MIDA 20/20D driver RS485 :use MODBUS SLAVE driver
b.Station No.	RS232C=153 RS485=1	RS232C=153 RS485 =1
c.Transmission Speed	RS232C=9600 bps RS485 =9600 bps	
d.Transmission Format	RS232C =7 bits,none,1 bit RS485 =8 bits,even,1 bit	
e.Mode	RS232C=stop mode RS485 =running mode	

9.40. Simatic S5

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

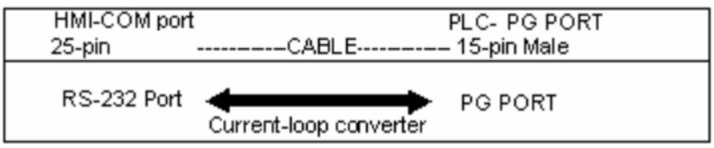
Register Type	Format	Range of the Register	Data Size	
Input Image	IBnnn	nnn=0-127	Byte	Max. 30
Output Image	QBnnn	nnn=0-127	Byte	Max. 30
Extended I/O	OBnnn	nnn=0-8191	Byte	Max. 30
Flag 位元s	FBnnn	nnn=0-8191	Byte	Max. 30
Peripheral I/O	PBnnn	nnn=0-8191	Byte	Max. 30
System Data Area	RSnnn	nnn=0-255	Word	Max. 30
System Data Area	RInnn	nnn=0-255	Word	Max. 30
System Data Area	RJnnn	nnn=0-255	Word	Max. 30
System Data Area	RTnnn	nnn=0-255	Word	Max. 30
Timer Current	Tnnn	nnn=0-255	Word	Max. 30
Counter Current	Cnnn	nnn=0-255	Word	Max. 30
Data Block	DBmmm/nnn DBnnn	mmm=0-255; mmm is Block number nnn=0-65535; nnn is the numbers which defines block. If the mmm not set the numbers, the numbers of mmm is 3= DB3/nnn		Max. 30
Data Block	DWmmm/nnn DWnnn	mmm=0-255; mmm is Block number nnn=0-32767; nnn is the numbers which defines block. If the mmm not set the numbers, the numbers of mmm is 3= DW3/nnn		Max. 30

** The HMI can read up to 30Words in one read command.

Relay Type	Format	Range of the Relay	Block
Input Image	IBnnn.b	nnn=0-127; b=0-7	b=0 e.g. IB30.0
Output Image	QBnnn.b	nnn=0-127; b=0-7	b=0 e.g. QB2.0
Extended I/O	OBnnn.b	nnn=0-255; b=0-7	b=0 e.g. OB0.0
Flag 位元s	FBnnn.b	nnn=0-255; b=0-7	b=0 e.g. FB23.0
Peripheral I/O	PBnnn.b	nnn=0-255; b=0-7	b=0 e.g. PB23.0

2. The illustration of connection: You must useRS-232/Current-loop convert cable.

PWS-30XX(OLD MODEL) provides 20mA current-loop to connect.PWS-12xx, PWS-17xx,PWS700, PWS-31xx and PWS-37Xx do not provide 20mA current-loop.



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	20mA CURRENT LOOP	PWS-30xx/PWS-21xx
	RS-232/Current-loop converter	COM1 or COM2=>RS232
b.Station No.	None	
c.Transmission Speed	9600 bps	PLC. MODE CODE 0: 90U 1: 95U 2:100U 3:102U 4:103U 5:115U 6:135U/921 7:135U/922 8:135U/928
d.Transmission Format	8-bits, EVEN ,1-bit	
e.PLC Mode Code	PLC’s Data Block n=3～255 must OPEN	
f. Command Delay		PWS Command Delay

9.41. Simatic S5 3964R

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

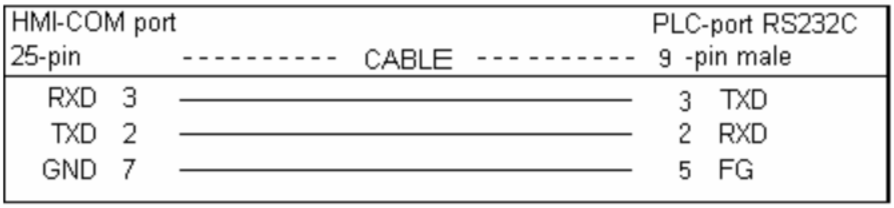
Register Type	Format	Range with the Register	Data Size
Register	nnn	nnn=0-255, data block: set 3	Word(16 Bits)
Register	mmm/nnn	mmm=0-255, nnn=0-255	Word(16 Bits)

Register Type	Format	Range with the Relay	Block
Relay	nnn.b	nnn=0-255, b=0-f, data block: set 3	b must be 0
Relay	mmm/nnn.b	mmm=0-255, nnn=0-255, b=0-f	b must be 0

2. The illustration of the connection:

a. PWS-series to PLC

PWS-series to PLC RS232 PORT



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232	COM1 or COM2=RS232
b.Station No.	None	
c.Transmission Speed	9600 bps	
d.Transmission Format	8-Bits, EVEN, 1-Bit	

9.42. Simatic S7-200 PPI

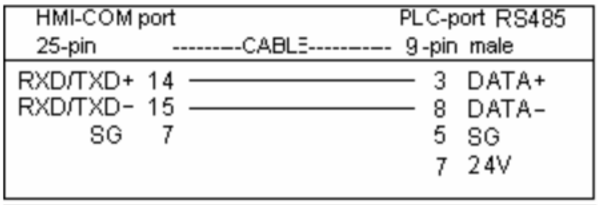
1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

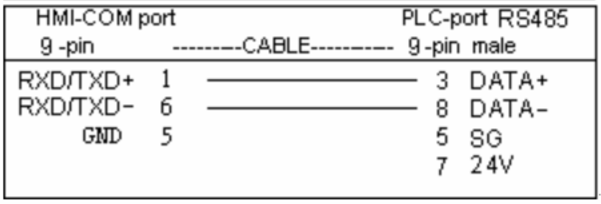
Register Type	Format	Range with the Register	Data Size
Input Image	IWn	n=0-14	Word
Input Image	IDn	n=0-12	Double Word
Output Image	QWn	n=0-14	Word
Output Image	QDn	n=0-12	Double Word
Internal Bits	MWnn	nn=0-99	Word
Internal Bits	MDnn	nn=0-97	Double Word
Timer	Tnnn	nnn=0-255	Word
Counter	Cnnn	nnn=0-255	Word
Special S	SWnn	nn=0-99	Word
Special S	SDnn	nn=0-97	Double Word
Special Bits	SMWnnn	nnn=0-27	Word* read only
Special Bits	SMWnnn	nnn=28-199	Word
Special Bits	SMDnnn	nnn=0-197	Double Word
Analog input word	AIWnn	nn=0-30	Word* read only
Analogoutputword	AQWnn	nn=0-30	Word* read only
Data Area	VWnnnn	nnnn=0-9998	Word
Data Area	VDnnnn	nnnn=0-9996	Double Word
Data Area	DBWnnnn	nnnn=0-9998	Word

**AQW; SW;SD can't used in CPU212,214

Relay Type	Format	Range with the Relay	Block
Input Image	In.b	n=0-15; b=0-7	b=0 e.g. I3.0
Output Image	Qn.b	n=0-15; b=0-7	b=0 e.g. Q2.0
Internal Bit	Mnn.b	nn=0-100;b=0-7	b=0 e.g. M0.0
Timer Bit	Tnnn	nnn=0-255	b=0 e.g.T0 *read only
Counter Bit	Cnnn	nnn=0-255	b=0 e.g.C0 *read only
Special Bit	SMnnn.b	nnn=0-200 ;b=0-7	b=0 e.g. SM23.0
Data Area Bit	Vnnnn.b	nnnn=0-999 ;b=0-7	b=0 e.g. V2323.0
Special M	Snn.b	nn=0-100; b=0-7	b=0 e.g. S25.0

2. The illustration of the connection:PWS-series to PLC PROGRAM PORT of (RS485 mode).





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	**PLC Setting**	**PWS Setting**
a.Communication Format	RS485	COM2=RS232/422/485
b.Station No.	02(02-27)	1. RS485: Sets SW10=ON
c.Transmission Speed	9600 /19200bps	
d.Transmission Format	8-Bits, EVEN, 1-Bit	
e.Command Delay		PWS Command Delay

**The communication mode of Simatic S7-200 Network is Token Ring structure and can exists in several majors. Under on-line,PC can download,upload to PLC.

9.43. Simatic S7-300 CP340

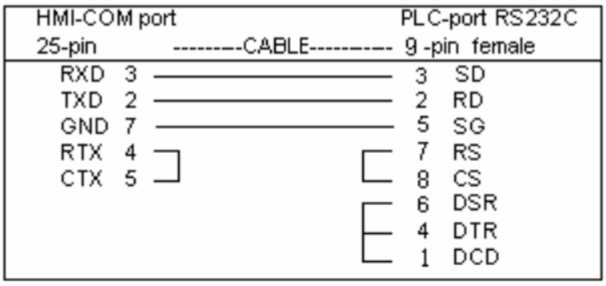
1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

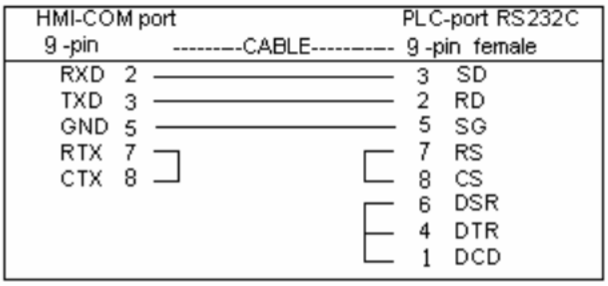
Register Type	Format	Range with the Register	Data Size
DBmmm.DBWnnnn	mmm=1-255 nnnn=0-8190	DBmmm.DBWnnnn is the address of a word locates at byte #nnnn and the byte following #nnnn of data block #3	Word
DBmmm.DBDnnnn	mmm=1-255 nnnn=0-8188	DBmmm.DBDnnnn is the address of a double-word locates at byte #nnnn and the three bytes following #nnnn of data block #mmm	Double Word

** The HMI can read up to 32Words in one read command.

Relay Type	Format	Range with the Relay	Block
DBmmm.DBXnnnn.b	mmm=1-255 nnnn=0-8191 b=0-7	DBmmm.DBXnnnn.b is the address of Bit #b of the word locates at byte #nnnn of data block #mmm	b=0

2. The illustration of the connection: a. PWS-series to PLC CP340 RS232C PORT





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232=CP340	COM2=RS232/RS422/RS485

	RS422=CP340	1. RS422: Set SW10=OFF
	RS485=CP340	2. RS485: Set SW10=ON
b.Station No.	None	1. Set SW5=OFF if parameters are
c.Transmission Speed	9600 /19200bps	set in ADP
d.Transmission Format	8-Bits, EVEN, 1-Bit	2. Set SW5=ON if parameters are
e.FUNCTION BLOCK	FB40,FB2,FB3,DB2,DB3 for CP	set in the HMI

9.44. Simatic S7-300 (via MPI port)

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

Register Type	Format	Range with the Register	Device Type /Aux. Address		Data Size R/W	
Input Image	IWnnnnn	nnnnn=0-65534	0	0	Word	✓
Input Image	IDnnnnn	nnnnn=0-65532	1	0	DWord	✓
Output Image	QWnnnnn	nnnnn=0-65534	2	0	Word	✓
Output Image	QDnnnnn	nnnnn=0-65532	3	0	DWord	✓
Bits	MWnnn	nnnnn=0-254	4	0	Word	✓
Bits	MDnnn	nnnnn=0-252	5	0	DWord	✓
Data Area (DB10)	VWnnnnn	nnnnn=0-65534	6	0	Word	✓
Data Area (DB10)	VDnnnnn	nnnnn=0-65532	7	0	DWord	✓
Data Area (DB10)	DBWnnnnn	nnnnn=0-65534; the Byte nnnnn & nnnnn+1 make DBWnnnnn	6	0	Word	✓
Data Area (DB10)	DBDnnnnn	nnnnn=0-65532; a double word address, the DBWnnnn & DBWnnnn+1 make DBDnnnn	7	0	DWord	✓
Data Area	DBmmm.DBWnnnnn	mmm=1-255 nnnnn=0-65534	8	0	Word	✓
Data Area	DBmmm.DBDnnnnn	mmm=1-255 nnnnn=0-65532	9	0	DWord	✓
Timer	Tnnnnn	nnnnn=0-65534	10	0	Word	✓
Counter	Cnnnnn	nnnnn=0-65534	11	0	Word	✓

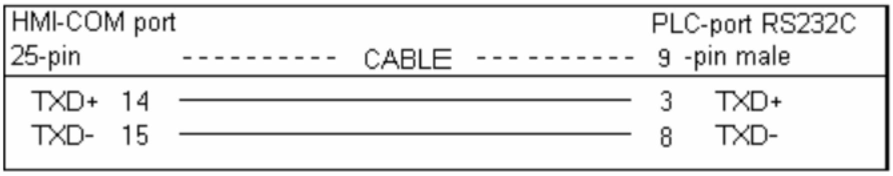
**Timer, Counter are read-only.

Relay Type	Foramt	Range with the Relay	Device Type /Aux.Address		BlockR/W	
Input Image	Innnnn.b	nnnnn=0-65535; b=0-7	0xC0	0-7	Bit	✓
Output Image	Qnnnnn.b	nnnnn=0-65535; b=0-7	0xC1	0-7	Bit	✓
Bit	Mnnn.b	nnn=0-255; b=0-7	0xC2	0-7	Bit	✓

Relay Type	Foramt	Range with the Relay	Device Type /Aux.Address		BlockR/W	
Data Area Bit (=DB10)	Vnnnnn.b	nnnn=0-65535; b=0-7	0xC3	0-7	Bit	✓
Data Area Bit (=DB10)	DBXnnnn.b	nnnnn=0-65535; b=0-7	0xC4	0-7	Bit	✓
	DB10.DBXnnnnn.b is a bit address, It is in #b bit of #nnnnn word with DB10					
Data Area Bit	DBmm.DBX nnnn.b	mm=1-31 nnnnn=0-65535; b=0-7	0xC5	0-7	Bit	✓

2. The illustration of the connection:

PWS-series to PLC MPI port (RS 485)



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS485	COM1 or COM2=RS485
b.Station No.	2	
c.Transmission Speed	19200 bps	
d.Transmission Format	8-Bits, EVEN, 1-Bis	

**Notes :

1. Cable is the same as Siemens S7 200 .
2. The HMI and PLC station are between 0 and 15. The HMI station is less than the PLC station.
3. When use the Macro, the SIZE of block move is limited within 10 words.
4. Because of the token ring protocol, there is no error message when remove the cable.

9.45. Simatic S7-300 MPI-Cable

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

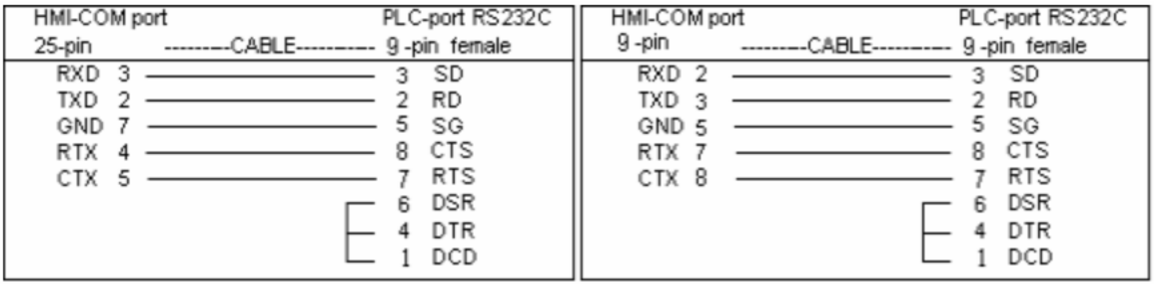
Register Type	Format	Range with the Register	Device Type /Aux. Address		Data Size R/W	
Input Image	IWnnnnn	nnnnn=0-65534	0	0	Word	✓
Input Image	IDnnnnn	nnnnn=0-65532	1	0	DWord	✓
Output Image	QWnnnnn	nnnnn=0-65534	2	0	Word	✓
Output Image	QDnnnnn	nnnnn=0-65532	3	0	DWord	✓
Bits	MWnnn	nnnnn=0-65534	4	0	Word	✓
Bits	MDnnn	nnnnn=0-65532	5	0	DWord	✓
Data Area (DB10)	VWnnnnn	nnnnn=0-65534	6	0	Word	✓
Data Area (DB10)	VDnnnnn	nnnnn=0-65532	7	0	DWord	✓
Data Area (DB10)	DBWnnnnn	nnnnn=0-65534; the Byte nnnnn & nnnnn+1 make DBWnnnnn	6	0	Word	✓
Data Area (DB10)	DBDnnnnn	nnnnn=0-65532; a double word address, the DBWnnnn & DBWnnnn+1 make DBDnnnn	7	0	DWord	✓
Data Area	DBmmm.DBWnnnnn	mmm=2-205 nnnnn=0-65534	8	0	Word	✓
Data Area	DBmmm.DBDnnnnn	mmm=2-205 nnnnn=0-65532	9	0	DWord	✓

Relay Type	Format	Range with the Register	Device Type /Aux. Address		Block R/W	
Input Image	Innnnn.b	nnnnn=0-65535; b=0-7	0xC0	0-7	Bit	✓
Output Image	Qnnnnn.b	nnnnn=0-65535; b=0-7	0xC1	0-7	Bit	✓
Bit	Mnnn.b	nnn=0-65535; b=0-7	0xC2	0-7	Bit	✓
Data Area Bit (=DB10)	Vnnnnn.b	nnnn=0-65535; b=0-7	0xC3	0-7	Bit	✓
Data Area Bit (=DB10)	DBXnnnn.b	nnnnn=0-65535; b=0-7	0xC4	0-7	Bit	✓

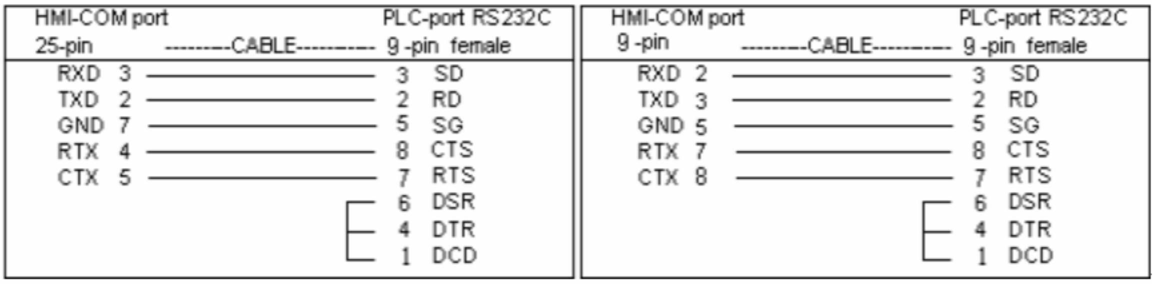
	DB10.DBXnnnnn.b is a bit address, It is in #b bit of #nnnnn word with DB10					
Data Area Bit	DBmm.DBX nnnn.b	mm=2-26 nnnnn=0-65535; b=0-7	0xC5	0-7	Bit	✓

2. The illustration of the connection:

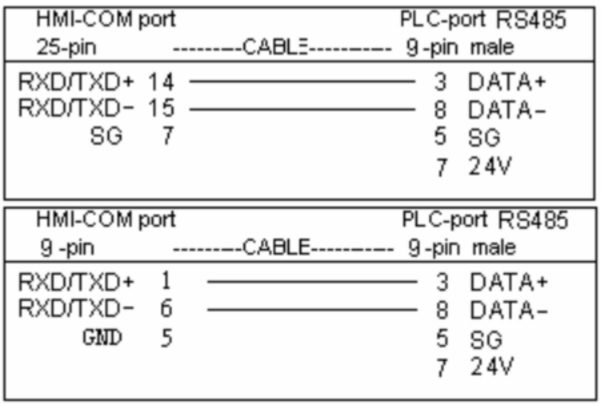
a. PWS-series to PLC MPI CABLE RS232C PORT MPI 6ES7-972-0CA21-0XA0



b. PWS-series to PLC MPI CABLE RS232C PORT HMI 6ES7-972-0CA10-0XA0



c. Example of the connections between PWS & S7-300/400 CPU MPI port:



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	MPI CABLE RS232	COM1 or COM2=RS232
b.Station No.	02	1. Set PLC Station = 02 in ADP
c.Tansmission Speed	19200/38400 bps	1. Set SW5 =OFF if parameters are set in
d.Tranmission Format	8-Bits, ODD, 1-Bit	ADP
e. Command Delay		2. Set SW5=ON if parameters are set in the
f. DATA BLOCK	DB10 for S7-300-CPU	HMI
		Set PWS Command Delay

9.46. Simatic S7-300 HMI-Cable

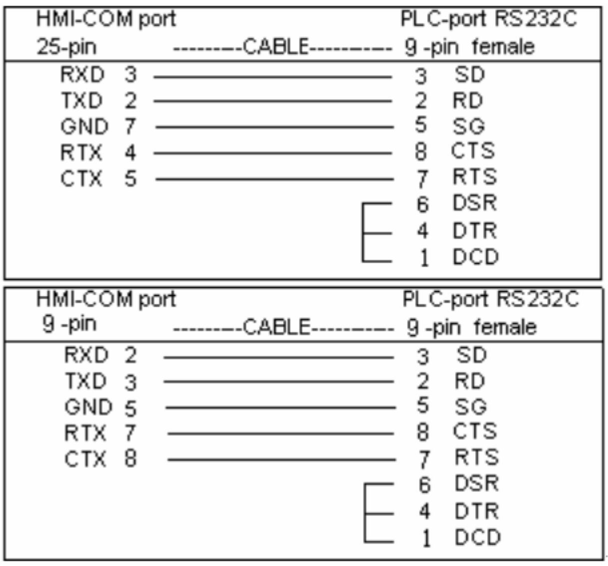
1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
Input Image	IWnnnnn	nnnnn=0-65534 length=2-523	Word
Input Image	IDnnnnn	nnnnn=0-65532 length=2-523	Double Word
Output Image	QWnnnnn	nnnnn=0-65534 length=2-523	Word
Output Image	QDnnnnn	nnnnn=0-65532 length=2-523	Double Word
Bits	MWnnn	nnnnn=0-65534 length=2-78	Word
Bits	MDnnn	nnnnn=0-65532 length=2-78	Double Word
Timer Image	Tnnnnn.10ms	nnnnn=0-65534 length=2-523	Word
Timer Image	Tnnnnn.100ms	nnnnn=0-65534 length=2-523	Word
Timer Image	Tnnnnn.1s	nnnnn=0-65534 length=2-523	Word
Timer Image	Tnnnnn.10s	nnnnn=0-65534 length=2-523	Word
Counter Image	Cnnnnn	nnnnn=0-65534 length=2-523	Word
DBmmm.DBWnnnnn	mmm=2-205 nnnn=0-65534	nnnn=0-65534; DBWnnnn is a word address, the Byte nnnn & nnnn+1 make DBWnnnn	Word
DBmmm.DBDnnnnn	mmm=2-205 nnnn=0-65532	nnnnn=0-65532;DBDnnnn is a double word address, the DBWnnnn & DBWnnnn+1 make DBDnnnn	Double Word
Data Area (DB10)	DBWnnnnn	nnnnn=0-65534; DBWnnnnn is a word address, the Byte nnnnn & nnnnn+1 make DBWnnnnn	Word
Data Area (DB10)	DBDnnnnn	nnnnn=0-65532; DBDnnnnn is a double word address, the DBWnnnn & DBWnnnn+1 make DBDnnnn	Double Word
Data Area (DB10)	VWnnnnn	nnnnn=0-65534; VWnnnnn is a word address, the Byte nnnnn & nnnnn+1 make DBWnnnnn	Word
Data Area (DB10)	VDnnnnnn	nnnnn=0-65532; VDnnnnn is a double word address, the DBWnnnn & DBWnnnn+1 make DBDnnnn	Double Word

Relay Type	Format	Range with the Relay	Block
Input Image	Innnnn.b	nnnnn=0-65535; b=0-7	b=0 e.g. I3.0
Output Image	Qnnnnn.b	nnnnn=0-65535; b=0-	b=0 e.g. Q2.0

Relay Type	Format	Range with the Relay	Block
		7	
Bit	Mnnnnn.b	nnnnn=0-65535; b=0-7	b=0 e.g. M0.0
Data Area Bit	DBmm.DBXnnnnn.b	mmm=2-26 nnnnn=0-65535 ;b=0-7	b=0 e.g. DB22.DBX20.0
Data Area Bit (=DB10)	DBXnnnnn.b	nnnnn=0-65535 ;b=0-7	b=0 e.g. DBX23.0 DBX23.0=DB10.DBX23.0
Data Area Bit	Vnnnnn.b	nnnnn=0-65535; b=0-7	b=0 e.g. V23.0
(=DB10)	DB10.DBXnnnnn.b is a Bit address, It is in #b Bit of #nnnnn word with DB10		V23.0=DB10.DBX23.0

2. The illustration of the connection: PWS and HMI 6ES7-972-0CA10-0XA0 RS232.



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	HMI CABLE RS232	COM2=RS232
b.Node Address	02	
c.Transmission Speed	9600/19200/38400 bps	
d.Transmission Format	8-Bits, ODD, 1-Bit	Set PWS Command Delay
e. OPEN DATA BLOCK	DB block for S7-300-CPU	

9.47. Taian TP01

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

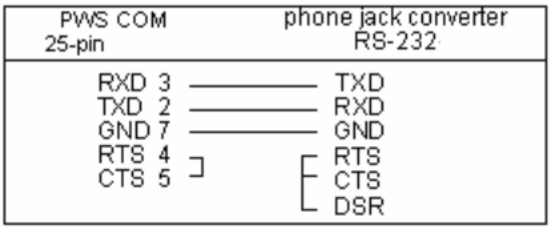
Register Type	Format	Range with the Register	Data Size
Input Register	WXnn	nn=1-24	Word(16 Bits)
Output Register	WYnn	nn=1-27	Word(16 Bits)
Special Register	WSnn	nn=1-40	Word(16 Bits)
Constant Register	WCnnn	nnn=1-512	Word(16 Bits)
Data Register	Vnnnn	nnnn=1-1024	Word(16 Bits)

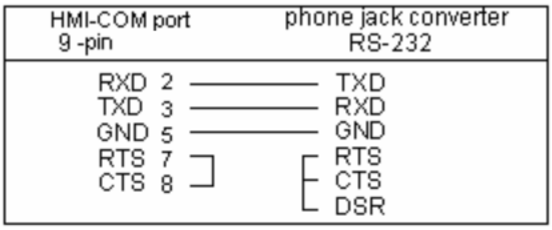
Relay Type	Format	Range with the Relay	Block
Input Relay	Xnnn	nnn=1-384	Must be multiple of16 +1
Output Relay	Ynnn	nnn=1-384	Must be multiple of 16+1
Auxiliary Relay	Cnnnn	nnnn=1-1024	Must be multiple of 16+1

2. The illustration of the connection:

a. PWS-series to PLC

PWS-series to PLC RS232 PORT





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232	COM1 or COM2=RS232
b.Station No.	0	
c.Transmission Speed	9600 bps	
d.Transmission Format	8-Bits, ODD, 1-Bit	

9.48. TAIAN TP02

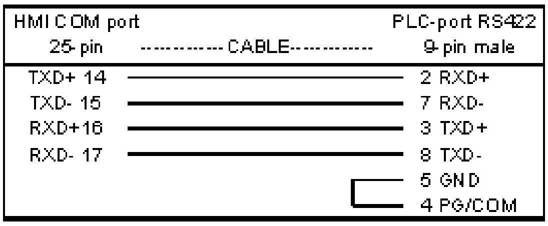
1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

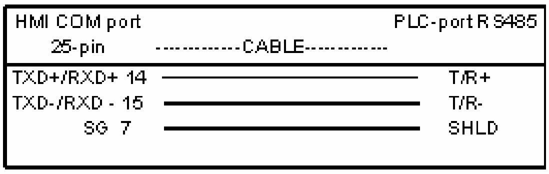
Register Type	Format	Range with the Register	Data Size
Input	Xnnn	nnn=1-369(must be 1 or multiple of 16+1)	Word
Output	Ynnn	nnn=1-369(must be 1 or multiple of 16+1)	Word
Auxiliary Register	Vnnnn	nnnn=1-1024	Word
Auxiliary Register	Dnnnn	nnnn=1-1024	Word
System Register	WSnnn	nnn=1-128	Word
Auxiliary Relay Register	Cnnnn	nnnn=1-2048(must be 1 or multiple of 16+1)	Word
Constant Register	WCnnn	nnn=1-912	Word

Relay Type	Format	Range with the Relay
Input	Xnnn	nnn=1-384
Output	Ynnn	nnn=1-384
Auxiliary Relay	Cnnnn	nnnn=1-2048
Special Relay	SCnnn	nnn=1-128

2. The illustration of the connection:

a. PWS-series to PLC RS422 PORT of TP02 b.PWS-series to PLC RS485 PORT of TP02





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS422/485	
b.Station No.	01	1. PLC Station =01
c.Transmission Speed	19200 bps	
d.Transmission Format	7-Bits, EVEN , 2-Bits	

[Note] : The above-mentioned “PLC Setting” is ADP default, please refer to PLC manul.
To set up WS041,WS042,WS044,WS045.
WS041---SET RS422 BAUD RATE,DATA bit，PARRITY,STOP bit

WS042---SET RS422 STATION NUMBER
WS044---SET RS485 BAUD RATE,DATA bit,PARRITY,STOP bit
WS045---SET RS485 STATION NUMBER

If TP02 PLC RS422 Port station no.=01→ WS042 sets 01(decimal), transmission speed (19200 bps) and tansmission format (7bits,EVEN,2 bits) → WS041 sets 0120(decimal).

9.49. TAIAN N2

1. The data format and range of the PLC registers which the ADP can accress :
   Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
Function	Fnnn	nnn = 0-125	Word(16 Bits)

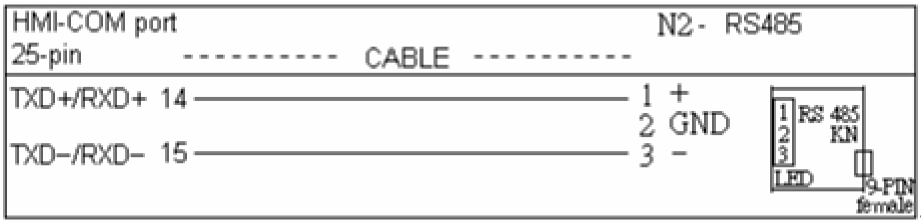
2. The illustration of the connection:

a. PWS-series to N2 (RS232)

Must use TAIAN's "**FA-RS-232-N2**" cable

b. PWS-series to N2 (RS485)

Must use TAIAN's "**FA-RS-485-KN**" canble ,and the connection as below.



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232C	
	RS485	
b.Station No.	RS232C=1	
	RS485=1	
c.Transmission Speed	RS232C=9600 bps	
d.Transmission Format	RS232C =7 Bits,odd,1 Bits	

4. Notes:

1. Must use unsigned binary object.
2. Even though the F125 can be choosed but it can't be used. (Display 33333)
3. F0， F21， F42， F63， F84， F105 are quick read/write start position.
   (BLOCK SIZE are 21, 21, 21, 21, 21, 23.)
4. " 33333 " represents the Function is reserve.
5. In Function table and the Format, the Function value with "*" can not be changed.
6. If edit a double word object, its value is composed of nearby two functions.(Don't use)

7. Please adjust the value of PWS : Command Delay (block read displays 0020 error message)
8. Object's integer,decimal,digit must correspond with practical conditionObject,integer,decimal,digit must correspond with reality(unsigned binary object)(refer to the user manual)

9.50. Telemecanique TSX MICRO

1. The data format and range of the PLC registers which the ADP can accress :
   Word Device and Bit Device.

Register Type	Format	Range with the Register	Data Size
Internal Word	Wnnnn	nnnn=0-9999	Word

** The HMI can read up to 60Words in one read command. PLC Denotation: %MWnnnn.

Relay Type	Format	Range with the Relay	Block
Bit of Internal Word	Wnnnn:bb	nnnn=0-9999; bb=0-15	bb=00 e.g. W0:0

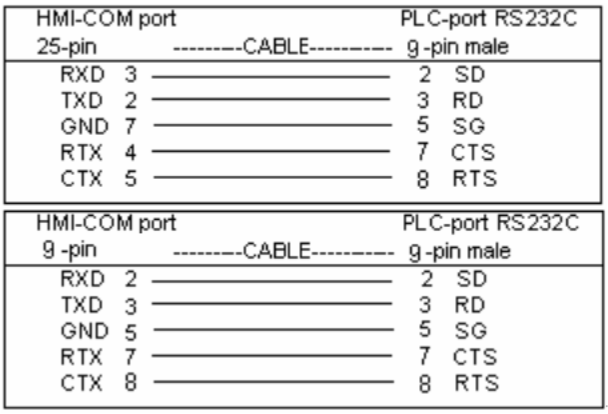
Note: The writing unit for single point bit is 16 bits.

Note: When HMI changes a relay's state, the HMI must read 1 word (16 bits). After change the corresponging bit , then the HMI will write the word in PLC. These actions will take more than one PLC scan. PLC ladder cannot control other bit(Word) before the HMI compeleted "Change the Relay";otherwise, these bit(word) will retrun to initial value. In other words, the control action of PLC will be resumed.

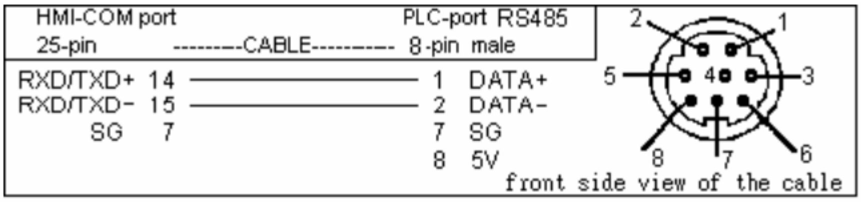
For example: When the HMI changes W1234:7,the HMI must read the word from W1234:0 toW1234:15. After cahne the bit7, then the HMI will write the word in PLC. If the HMI does not write in PLC, PLC ladder has changed W1234:0-W1234:6 or W1234:8-W1234-15. The HMI's write action will cause the control action of PLC resumed.

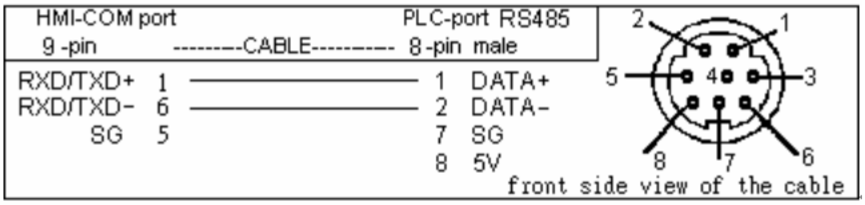
The illustration of the connection:
Ex :

a. COM Port to the RS-232 Port



b. COM Port to TER Port RS485





2. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232/ RS485	COM2=RS232/422/485
b.Station No.	0—8; MASTER	1. RS485:Set SW10=ON
c.Transmission Speed	9600bps/19200bps	1. Set PWS Station:1—8
d.Transmission Format	8-Bits,ODD,1-Bit	SLAVE in ADP

9.51. Toshiba M20/M40

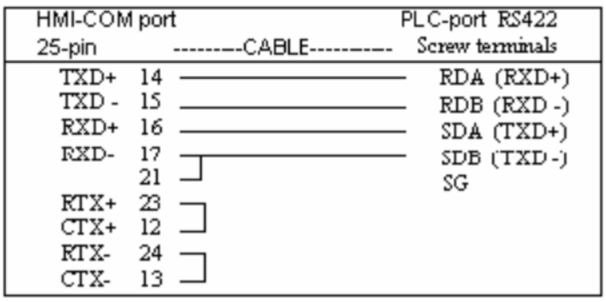
1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

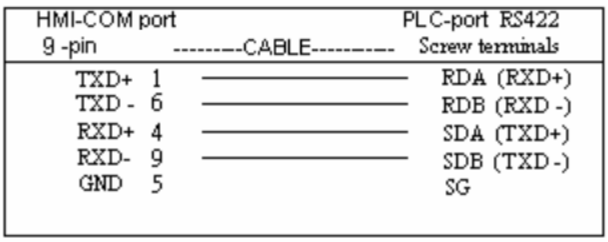
Register Type	Format	Range with the Register	Data Size
Input Relay Register	XWnn	nn=0-63	Word
Output Relay Register	YWnn	nn=0-63	Word
Internal Relay Register	RWnn	nn=0-63	Word
Link Register	ZWnn	nn=0-31	Word
Timer Register	Tnnn	nnn=0-127	Word
Counter Register	Cnn	nn=0-95	Word
Data Register	Dnnnn	nnnn=0-1535	Word

** The HMI can read up to 32Words in one read command.

Relay Type	Format	Range with the Relay	Block
Input Relay	Xnnb	nn=0-31；b=0-f	b=0 e.g. X10
Output Relay	Ynnb	nn=0-31；b=0-f	b=0 e.g. Y00
Internal Relay	Rnnb	nn=0-63；b=0-f	b=0 e.g. R100
Link Relay	Znnb	nn=0-31；b=0-f	b=0 e.g. Z310

2. The illustration of the connection: PWS-series to PLC RS422 Computer Link PORT





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format Programmer/computer link	RS422 Computer link can be used	COM2=RS232/422/485 1. RS422: Set SW10=OFF 2. RS485: Set SW10=ON
b.Station No.	0	
c.Transmission Speed	9600bps	
d.Transmission Format	(8,E,1);(8,O,1); (8,N,1)	

9.52. Toshiba T1/T2

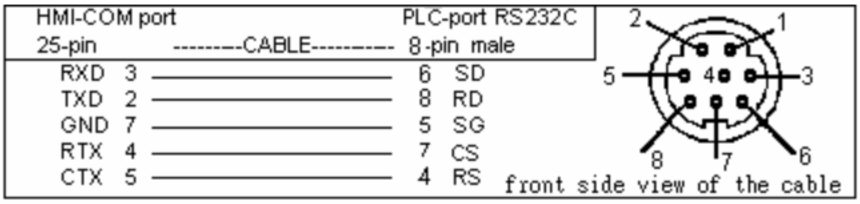
1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

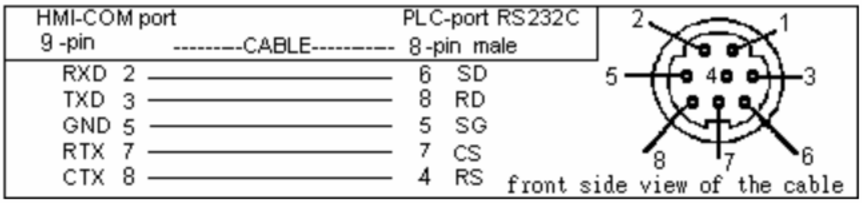
Register Type	Format	Range with the Register	Data Size
External input register	XWnn	nn=0-63	Word
Output relay register	YWnn	nn=0-63	Word
Direct input register	IWnn	nn=0-63	Word
Direct output register	OWnn	nn=0-63	Word
Auxiliary relay register	RWnnn	nnn=0-127	Word
Special register	SWnnn	nnn=0-255	Word
Timer register	Tnnn	nnn=0-255	Word
Counter register	Cnnn	nnn=0-255	Word
Data register	Dnnnn	nnnn=0-4095	Word
Link register	Wnnnn	nnnn=0-1023	Word
Link relay register	LWnnn	nnn=0-255	Word
File register	Fnnnn	nnnn=0-1023	Word

** The HMI can read up to 32Words in one read command.

Relay Type	Format	Range with the Relay	Block
External input device	Xnnb	nn=0-63; b= hex number 0-f	b=0 e.g. X10
External output device	Ynnb	nn=0-63; b= 0-f	b=0 e.g. Y00
Direct input device	Innb	nn=0-63; b= 0-f	b=0
Direct output device	Onnb	nn=0-63; b= 0-f	b=0
Auxiliary relay device	Rnnnb	nnn=0-127; b= 0-f	b=0 e.g. R100
Special device	Snnnb	nnn=0-255; b= 0-f	b=0 e.g. S230
Timer device	T.nnn	nnn=0-255	
Counter device	C.nnn	nnn=0-255	
Link device	Znnnb	nnn=0-511; b= 0-f	b=0 e.g. Z30
Link relay	Lnnnb	nnn=0-255; b= 0-f	b=0 e.g. L2550

2. The illustration of the connection:PWS COM Port to T1 CPU Serial Port





3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232	COM1/COM2=RS232
b.Station No.	0 ==T1	1. Set PLC station 00 in ADP
c.Transmission Speed	9600bps	1. Set SW5=OFF if parameters are
d.Tranmission Format	8-Bits,ODD,1-Bit	set in ADP
		2. Set SW5=ON if parameters are
		set in ADP

9.53. Unidriver UD70

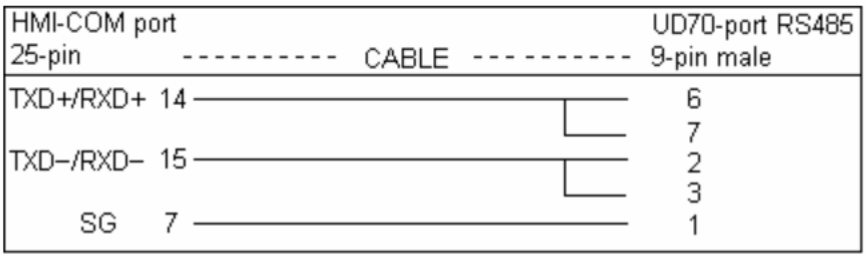
1. The data format and range of the PLC registers which the ADP can accress :
   Word Device and Bit Device

Register Type	Format	Range with the Register	Data Size
Data Register	#70.00~#70.99	W 0 ~ W 198	Word(32 Bits)
	#71.00~#71.99	W 200 ~ W 398	Word(32 Bits)
	#72.00~#72.99	W 400 ~ W 598	Word(32 Bits)
	#73.00~#73.99	W 600 ~ W 798	Word(32 Bits)
	#18.01~#18.30	W 800 ~ W 858	Word(32 Bits)
	#19.01~#19.30	W 860 ~ W 918	Word(32 Bits)
	#20.01~#20.50	W 920 ~ W1018	Word(32 Bits)
	#91.01~#91.10	W1020 ~ W1029	Word(16 Bits)

Relay Type	Fotrmat	Range with the Relay	Block
Bit Relay	#18.31~#18.50	B0 ~ B19	
	#19.31~#19.50	B20 ~ B39	

2. The illustration of the connection:

a. PWS-series to PLC RS232 PORT



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS485	RS485
b.Station No.	Set the parameter of	1. Set PLC Station =11 in ADP
	UD70 address#14.01 to 11	

c.Transmission Speed	9600 bps	
d.Transmission Format	7-Bits, Even , 1-Bit	
e.Mode	Set the parameter of	
	UD70 address#14.02 to 06	

9.54. VIGOR M

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

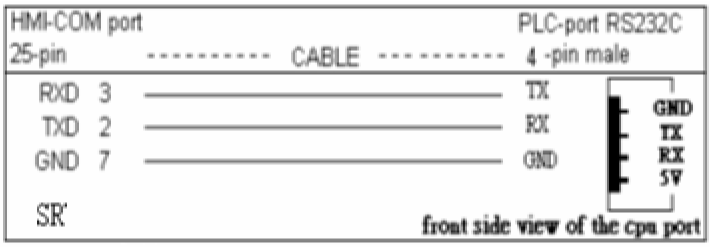
Register Type	Format	Range with the Register	Data Size
Input Relay	Xnnn	nnn=0-777,oct, 0 or multiple of 8	Byte
Output Relay	Ynnn	nnn=0-777,oct, 0 or multiple of 8	Byte
Auxiliary Relay	Mnnnn	nnnn=0-5119 0 or multiple of 8	Byte
Step Relay	Snnn	nnn=0-999 0 or multiple of 8	Byte
Special Relay	Mnnnn	Nnnn=9000-9255 0 or multiple of 8	Byte
Data	Dnnnn	nnn= 0-8191	Word(16 Bits)
Special Data	Dnnnn	nnnn= 9000-9255	Word(16 Bits)
Timer Register	Tnnn	nnn= 0-255	Word(16 Bits)
Counter Register	Cnnn	nnn= 0-199	Word(16 Bits)
Counter Register	Cnnn	nnn= 200-255	Word(32 Bits)

Relay Type	Format	Range with the Relay	Block
Input Relay	Xnnn	nnn= 0-777, Oct	Must be 0 or multiple of 8
Output Relay	Ynnn	nnn= 0-777, Oct	Must be 0 or multiple of 8
Auxiliary Relay	Mnnnn	nnnn=0-5119	Must be 0 or multiple of 8
ST1 Status	Snnn	nnn= 0-999	Must be 0 or multiple of 8
Special Relay	Mnnnn	nnnn=9000-9255	Must be 0 or multiple of 8
Timer Relay	Tnnn	nnn= 0-255	Must be 0 or multiple of 8
Counter Relay	Cnnn	nnnn=0-255	Must be 0 or multiple of 8
Timer Coil	TCnnn	nnn= 0-255	Must be 0 or multiple of 8
Counter Coil	CCnnn	nnn= 0-255	Must be 0 or multiple of 8

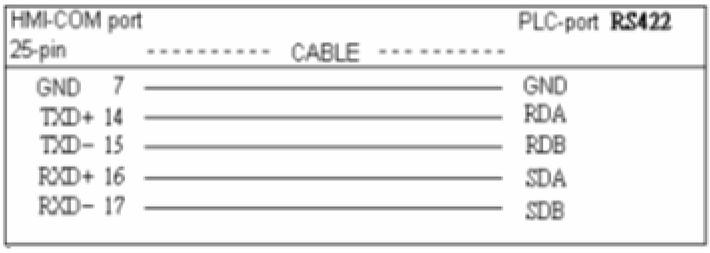
2. The illustration of the connection:

a. PWS-series to PLC RS422 PORT

Use a VIGOR with 4-pin male



b.PWS-series to PLC RS422 PORT



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232C,RS422	
b.Station No.	RS232C=0 RS422=1	RS232C=0 RS422=1
c.Transmission Speed	19200 bps	
d.Transmission Format	7-Bits, EVEN , 1-Bit	

9.55. YOKOGAWA FA-M3

1. The data format and range of the PLC registers which the ADP can accress : Word Device and Bit Device.

Register Type	Foramt	Range with the Register	Data Size	Example
Input Relay	Xnnnnn	nnnnn= 201-65499(not continue)	Word(16 Bits)	X00201
Output Relay	Ynnnnn	nnnnn= 201-65499(not continue)	Word(16 Bits)	Y00201
Intern Relay	Innnnn	nnnnn= 1-16384	Word(16 Bits)	I00001
Common Relay	Ennnn	nnnn= 1-4096	Word(16 Bits)	E0001
Link Relay	Lnnnnn	nnnnn= 1-65499(not continue)	Word(16 Bits)	L00001
Special Relay	Mnnnn	nnnn= 1-9984	Word(16 Bits)	M0001
Preset Timer	TPnnnn	nnnn= 1-3072	Word(16 Bits)	TP0001
Set Timer	TSnnnn	nnnn= 1-3072	Word(16 Bits)	TS0001
Preset Counter	CPnnnn	nnnn= 1-3072	Word(16 Bits)	CP0001
Set Counter	CSnnnn	nnnn= 1-3072	Word(16 Bits)	CS0001
Data Register	Dnnnn	nnnn= 1-8192	Word(16 Bits)	D0001
File Register	Bnnnnn	nnnnn= 1-32768	Word(16 Bits)	B00001
Link Register	Wnnnn	nnnnn= 1-65499(not continue)	Word(16 Bits)	W00001
Special Register	Znnn	nnn= 1-512	Word(16 Bits)	Z001
Index Register	Vnn	nn= 1-64	Word(16 Bits)	V01
Common Register	Rnnnn	nnnn= 1-4096	Word(16 Bits)	R0001

[Note 1] The last two digits of X and Y addresses must be multiple of 16 +1.
I,E,L,M addresses must be multiple of 16 +1.
[Note 2] One communication is up to READ/WRITE 60 words.

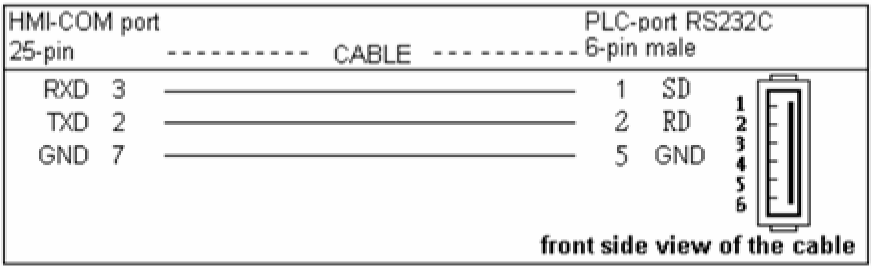
Relay Type	Foramt	Range with the Relay	Data Size
Iuput Relay	Xnnnnn	nnnnn= 201-65499(not continue)	Bit
Output Relay	Ynnnnn	nnnnn= 201-65499(not continue)	Bit
Intern RELAY	Innnnn	nnnn= 1-16384	Bit
Common RELAY	Ennnn	nnnn= 1-4096	Bit
Link RELAY	Lnnnnn	nnnn= 1-65499	Bit
Special RELAY	Mnnnn	nnnn= 1-9984	Bit
Timer	TUnnnn	nnnn= 1-3072	Bit

Counter	CUnnnn	nnnn= 1-3072	Bit

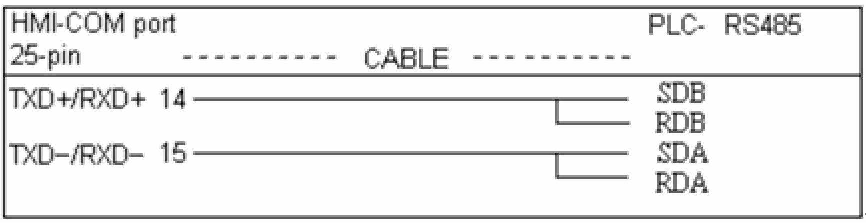
[Note 1] The last two digits of X,Y,L addresses must be multiple of 16 +1. I,E,M addresses must be multiple of 16 +1.

2. The illustration of the connection:

a. PWS-series to PLC RS232 PORT must use YOKOGAWA's CABLE. See below.



b. PWS-series to PLC RS485 communication mode



3. Communication Format: Before connection, please set up the communication parameters and the dip-switch as below:

Format	PLC Setting	PWS Setting
a.Communication Format	RS232C/ RS485	
b.Station No.	RS232C=1 RS485=1	RS232C=1(based on cpu slot 1-4) RS485 =1
c.Transmission Speed	RS232C=9600 bps	
d.Transmission Format	8 Bits,even,1 Bit	

[Note1] PWS station no. must match YOKOGAWA PLC CPU slot no. If CPU plugs in the 1st slot , the PWS station no. must set "1".

Appendix A. – Table of the ADP 6.0 Features and HMI Models

The following is the table of the ADP 6.0 features and HMI models. The functions which are not included represents applicable on all HMI models.

HMI Models / ADP Features	PWS3261		PWS6300	PWS6600[1]				SoftPanel[2]
	PWS3261	PWS3261N	PWS6300	PWS6600	PWS6600-Color	PWS6600N	PWS6600N-Color	SoftPanel
Ethernet	×	○	×	×	×	○	○	○
Printer	○	○	×	○	○	○	○	○
Upload Application	○	○	○	○	○	○	○	×
Upload/Download Recipes	○	○	×	○	○	○	○	×
Reconstruct Source	○	○	○	○	○	○	○	○
Auxiliary Keys	×	×	○	○	○	○	○	○
True Type	×	×	×	×	×	×	×	○
Contrast Adjustment	○	○	×	○	○	○	○	×
Turn off Backlight	○	○	×	○	○	○	○	×
Set Time & Date	○	○	×	○	○	○	○	×
Name/Select Recipe	×	×	×	×	×	×	×	○
Print Report	×	×	×	×	×	×	×	○
Run Application	×	×	×	×	×	×	×	○
State and Text Management	×	×	×	×	×	×	×	○
Character Entry	○	○	×	○	○	○	○	○
List and Drop-down List	○	○	×	○	○	○	○	○
Numeric Display	○	○	×	○	○	○	○	○
Time, Date and Date-of – week Display	○	○	○	○	○	○	○	○
Historical Display	○	○	×	○	○	○	○	○
Alarm Display	○	○	×	○	○	○	○	○
Macro	○	○	○	○	○	○	○	○
Ladder	○	○	○	○	○	○	○	×

---

[1] The Function of AP1600C and AP1600S are the same as PWS6600C and PWS6600S.

[2] SoftPanel includes 640×480、800×600 and 1024×768 .

Appendix A.

ADP Model / ADP Function	PWS3261		PWS6300	PWS6600[3]				SoftPanel[4]
	PWS3261	PWS3261N	PWS6300	PWS6600	PWS6600-Color	PWS6600N	PWS6600N-Color	SoftPanel
Multi-Link (One master, Slaves)	○	○	**Slave**	○	○	○	○	○
Cross-Link (Mutual Read)	×	○	×	×	×	○	○	○
Multi-Channel Communication	○	○	×	○	○	○	○	○
Logging Buffer	○	○	×	○	○	○	○	○
Common Key	×	×	○	○	○	○	○	○
Slide-out Menu	×	×	×	○	○	○	○	×
System Messages	○	○	○	○	○	○	○	○
Report Format	×	×	×	×	×	×	×	○
Off-line/On-line Simulation	○	○	○	○	○	○	○	○
View/Edit Recipes	○	○	×	○	○	○	○	○

[3] The function of AP1600C 、AP1600S are the same as PWS6600C and PWS6600S .

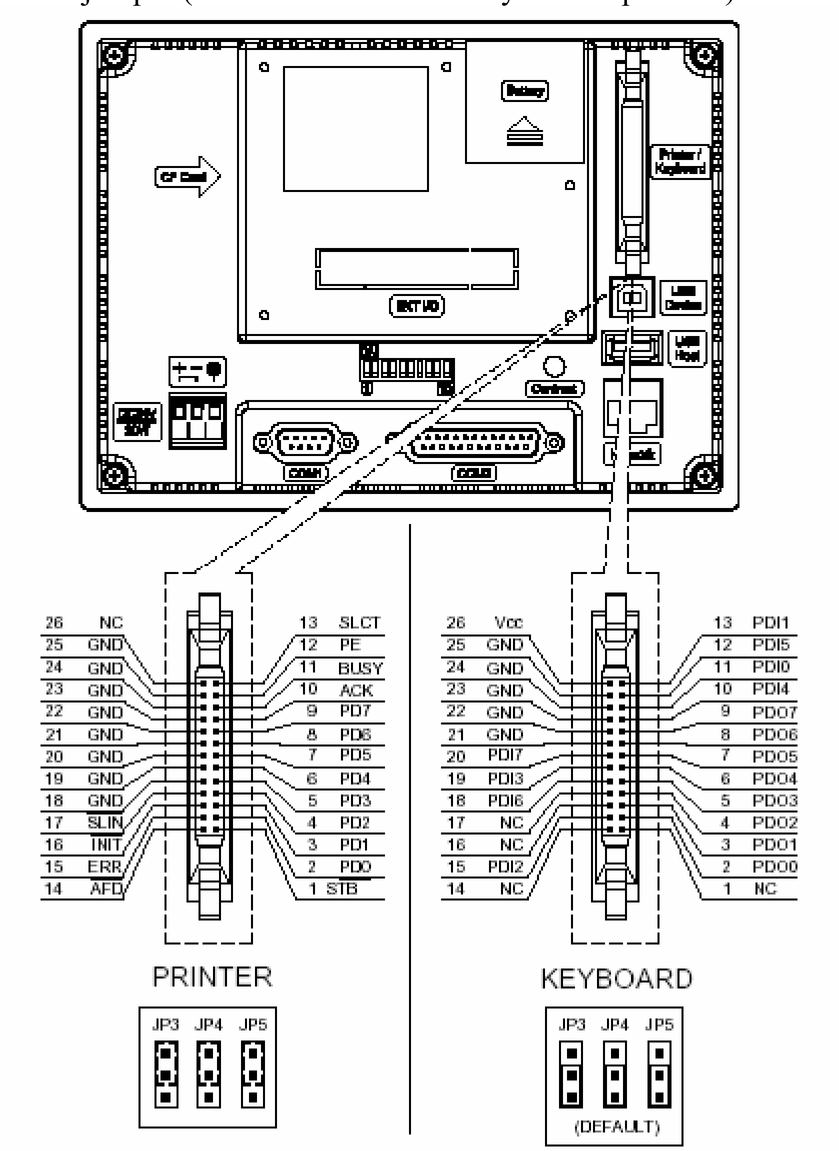
[4] SoftPanel includes 640×480、800×600 and 1024×768.

Appendix B. – PWS6600 External Key (Network and Enhanced model)

A user can operate PWS6600 (Network and Enhanced model) through external key and designs a customized control key panel based on the application required.

1. The illustration of wiring

PWS6600 (Network and Enhanced model) Printer/Keyboard connector can link with printer or external keyboard. See below. When the connector is linked to external keyboard, a user must notice the position of JP3,JP4 and JP5 jumper (must be set as the factory default position).



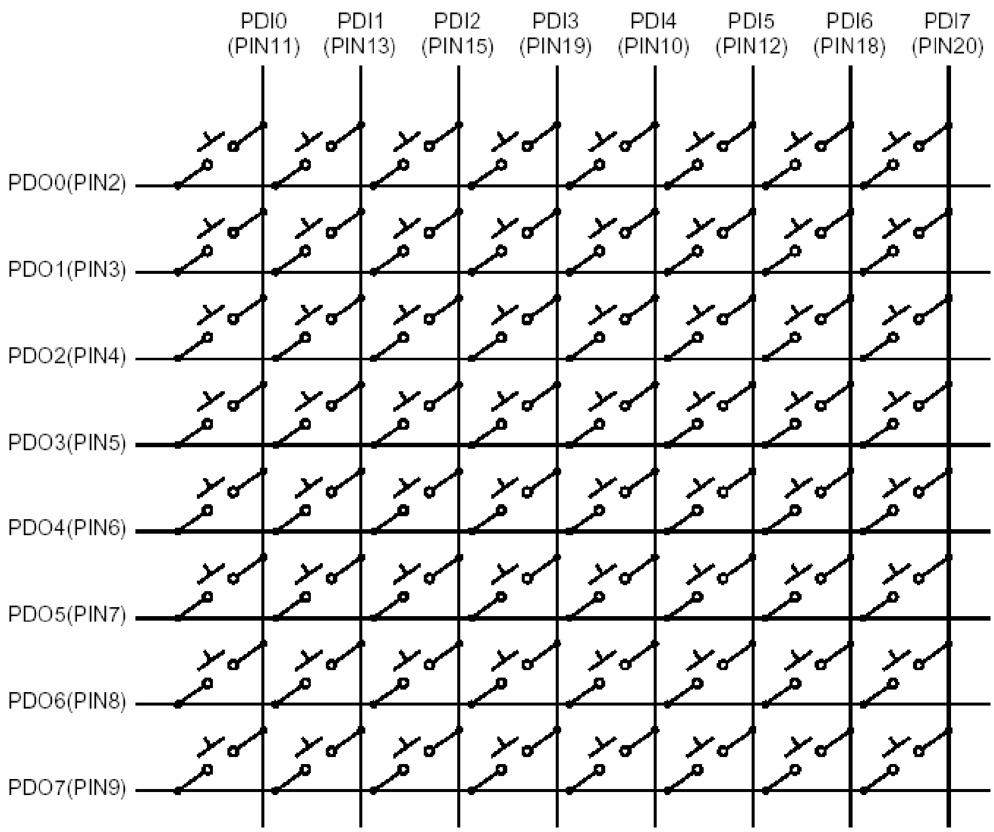
Appendix B. -Figure 1. The Illustration of PWS6600 Connection

When the connector is linked to the external keyboard, the position of JP3, JP4 and JP5 jumper must set as above Figure. Otherwise, the external keyboard can not work normally.

When the connector is linked to the printer (for most printers), the position of JP3, JP4 and JP5 jumper does not need to change. Besides, the connector must be linked to printer through the convert cable (included in package).

2. Wiring

The PWS6600 is up to 8×8=64 external keys. Please adjust the number of external key based on demands. The following Figure is the connection definition for external key.



Appendix B - Figure 2. The Illustration of PWS6600 Wiring

3. Definition

In ADP 6.0, K00-K77 keys are defined by the connection order. The following is the mapping table of Keyboard connector and ADP definition. K00-K31 can be defined by user in ADP. K32-K77 are specific functional keys reserved for system.

	PDI0	**PDI1**	**PDI2**	**PDI3**	**PDI4**	**PDI5**	**PDI6**	**PDI7**
PDO0	K00	K10	K20	K30	K40	K50	K60	K70
PDO1	K01	K11	K21	K31	K41	K51	K61	K71
PDO2	K02	K12	K22	K32	K42	K52	K62	K72
PDO3	K03	K13	K23	K33	K43	K53	K63	K73
PDO4	K03	K14	K24	K34	K44	K54	K64	K74
PDO5	K05	K15	K25	K35	K45	K55	K65	K75
PDO6	K06	K16	K26	K36	K46	K56	K66	K76
PDO7	K07	K17	K27	K37	K47	K57	K67	K77

Appendix B-Figure 3. The Definition of PWS6600′s External keys

* PDO0...PDO7 and PDI0...PDI7 are Keyboard connector.
* K00...K77 is defined in ADP.

PWS6600 (Network and Enhanced model) reads the commands from the external key by 8 x 8 matrix scan. Due to no protection with some PWS6600 electronic lines, please notice the instruments around .And PWS6600 PCB may be severely damaged by excess noise, static and leakage. Bedsides, please notice the length of wiring can not exceed 50 cm.

4. Reserved keys

In ADP6.0, some functional keys are reserved for system including numeric entry, alarm, historical data scrolling functions⋯etc. User can use those keys to easily design screen layout. Figure 4 is the definition of K32-K77

1. [Up], [Down], [Left], [Right]: Move the selected object.
2. [0]-[9], [A]-[F],[.],[-]: Numeric keys.
3. [BS]: Back Space ; [Esc]: Cancel
4. [V..Home], [V..PgUp], [V..Up], [V..Dn], [V..PgDn], [V..End],[H..Home],[H..End]:The scrolling function for alarm and historical object.
5. [CLR]: Clear the alarm and historical data.

	PDI3	**PDI4**	**PDI5**	**PDI6**	**PDI7**
PDO0		K40	K50	K60	K70

		7	8	9	V_Home
PDO1		K41	K51	K61	K71
		4	5	6	V_PgUp
PDO2	K32	K42	K52	K62	K72
	H_PgRt	1	2	3	V_Up
PDO3	K33	K43	K53	K63	K73
	H_Rt	.	0	-	V_Dn
PDO4	K34	K44	K54	K64	K74
	H_Lt	BS	↑	↵	V_PgDn
PDO5	K35	K45	K55	K65	K75
	H_PgLt	←	↓	→	V_End
PDO6	K36	K46	K56	K66	K76
	ESC	A	B	C	H_Home
PDO7	K37	K47	K57	K67	K77
	CLR	D	E	F	H_End

Appendix B-Figure 4. The Definition of PWS6600's Reserved Keys

5. Keyboard Design

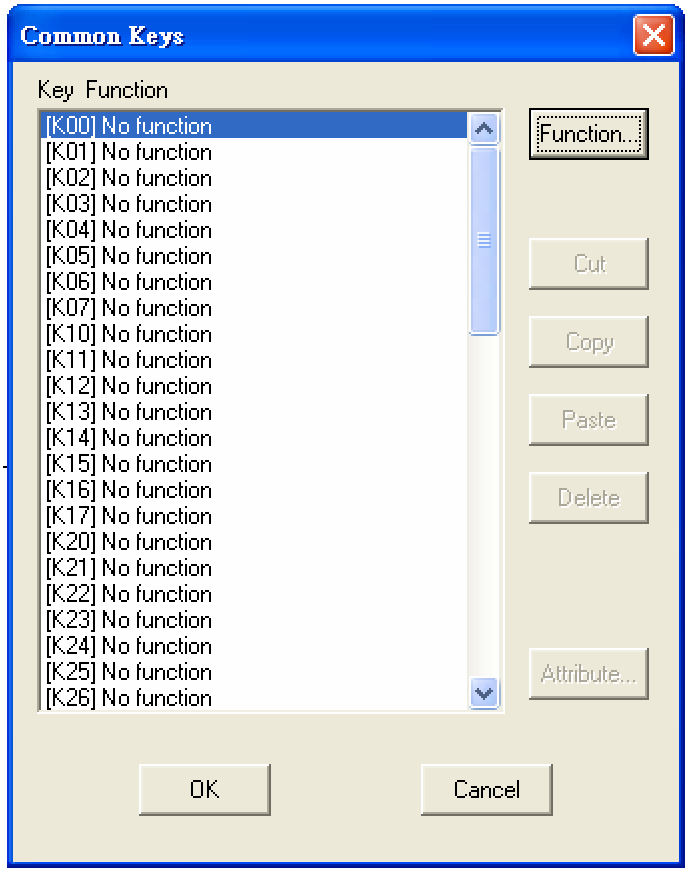
All the PWS6600 external keys can be edited in ADP 6.0. There are two types of external keys provided :

Note: If a key is defined repeatedly in the same screen, the first priority will be the definition of auxiliary keys .

(1) Common Keys

Common key has the same function on any screens (under auxiliary keys w/o setup condition). For example, set "K00" as go to the 1st screen; press "K00" on any screen will go to the 1st screen.

If the definition of external keys is common for the ADP application, a user can use [Common Keys] to define its function conveniently instead of repeated definition for each screen. Select [Application]/[Common Keys], the dialog box will offer the functions for the selected model (PWS6600). See below.

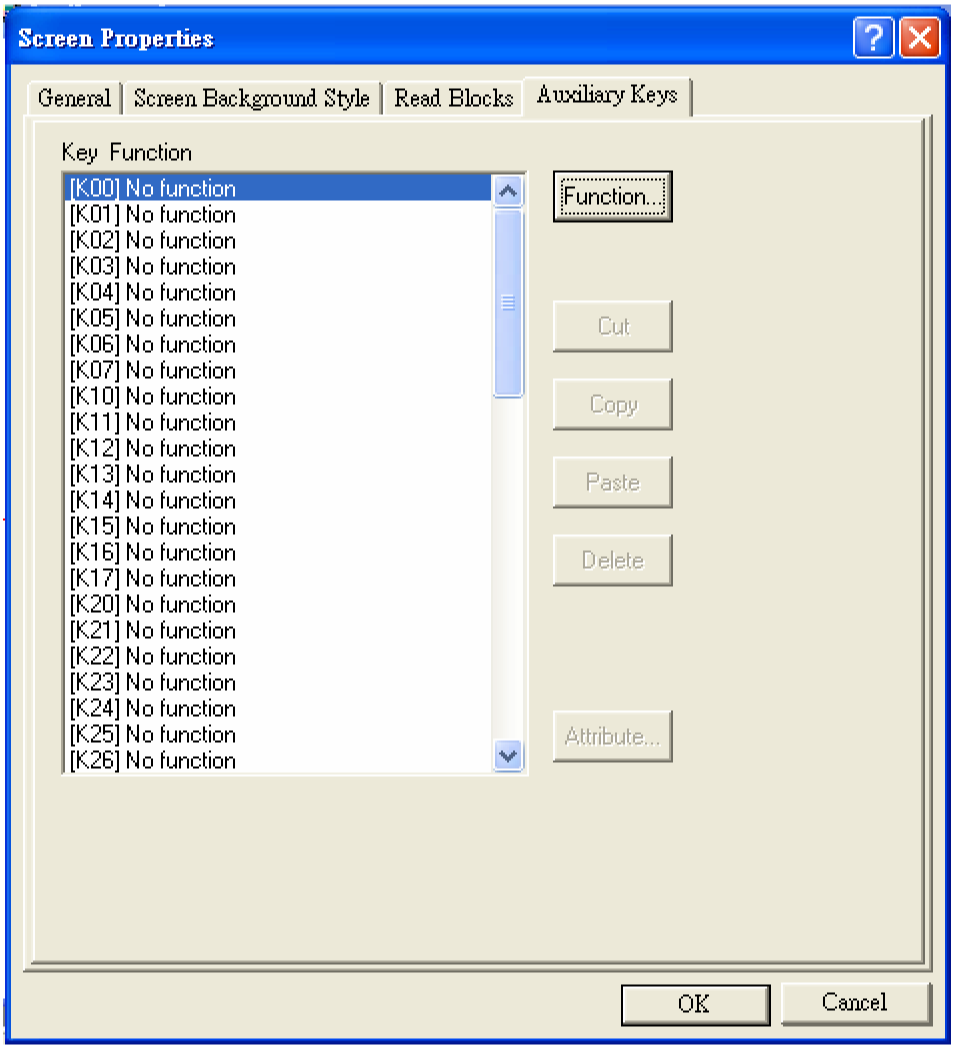


Appendix B-Figure 3. The [Common Keys] Dialog box (PWS6600)

(2) Auxiliary Keys

Auxiliary Key is only applicable on the current page. For example, if K00" is set to go to the page 1 on the page 5, It will go to page 1 by pressing "K00" on page 5 and not for other pages. Auxiliary Key is only applicable on the current screen.

To design external keys only applicable on the current screen, a user must use [Auxiliary Keys] on the screen. Select [Screen] /[Properties], it will offer the functions for the selected model (PWS6600) in the [Auxiliary Keys] tab. See below.



Appendix B-Figure 4. The [Auxiliary Keys] Dialog Box (PWS6600)