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1 General Information

1.1 Operation Environment Requirements

1.1.1 Operating System

Win95/98/Me/XP/Vista/Win7 or WinNT4.0,Win2000

1.1.2 Hardware Requirements

- Pentium 133 or faster CPU
- At least 256 MB of DRAM memory
- At least 30 MB disk space

1.2 Introduction to Functions and Characteristics

1.2.1 General Characteristics

- For use in a Windows operating environment, completely designed in accordance with Windows environment operation methods and habits, easy to learn and use, and allows users of all types, beginner or expert, to operate the software in a very efficient manner.
- We use a project oriented approach, presenting your software development content visually in a ladder diagram display, facilitating the clear and simple display of the content. All project content, be it for software development or for program maintenance, can be viewed and worked on in an intuitive and straight-forward manner.
- We provide a unique and specially designed keyboard and mouse that is specifically tailored to match and suit your specific office environment conditions, so that no matter what type of environment the user is in, they will always be able to program and test their software in a very efficient manner.
- We provide a diverse set of connection methods, including direct connection, modem connection, and internet connection, etc., and also allow the user to save their connection settings (such as transmission speed, telephone number, web address and IP, etc.) using a file name of their choice, so that next time they need to use the same connection, they only need to pick out the connection settings file from the saved files and will directly be able to proceed with the rest of the connection process.

1.2.2 Software Program Editing

- We provide a run time on-line software program editing feature, in which the user can immediately execute the program without having to re-download, significantly shortening the time needed for development and modifications.
- We provide a multi-window ladder diagram display, which allows the user to display program segments from different sections for comparison, reproduction, and editing.

- We provide a flexible ladder diagram program edit function which can execute high-end operations such as internet insertion, copying, pasting, and deletion, dramatically increasing program input speed.
- We provide a programming unit insertion function allowing users to categorize their overall development projects into several programming units (according to functionality or any other categorization method) that are capable of performing isolated annotation insertion and testing, providing a great help to the development process and subsequent management process of software programs.
- We provide independent mnemonic display windows, allowing the use to display equivalent mnemonic codes according to the location of their cursor in the network of ladder diagram programming windows.
- Diverse program search functions, allowing the user to search devices and registers, and also allowing the setting of filter criteria such as device type, etc., with the search results appearing in tabular form. If the user were to directly click on the search result of their choice, they would be able to call out and display the corresponding code in a ladder diagram window.
- We provide programming syntax checking functionality, which executes when the user decides they would like to perform a check, and also, when the user issues an operation order, the system will automatically execute the syntax check. After the completion of its execution, it will display a syntax check report window, with all the errors being listed out one by one. If the user were to click on one of the listed syntax errors, they could call out the corresponding section of code where the syntax error had occurred with the cursor placed exactly on top of the error. This function is a very significant development for discovering and correcting errors.

1.2.3 Program Testing

- We provide multiple status testing windows, allowing the user to specify which component and register information that they would like to have displayed, and also allowing them to specify their data display preferences. The settings for the status testing page will be stored inside the project files, and the next time the user needs to access these settings, they can simply open the previously saved files, making the monitoring and configuration of statuses much more convenient. During execution, the user can disable, enable, or forcefully set a switching device, and set register values.
- In addition to marking the various contact components that are closed using the color red directly on the component, the multi-window high-brightness ladder diagram display also displays the register value of each of its windows, which is a great help for program testers. Inside the window, the user can also directly click on a contact component and disable, enable, or forcefully set it, and the node and circuit of the disabled component will be displayed differently from the other normal components, which is very helpful for handling the status of different components.

1.2.4 Program Annotations and Printing

• We provide different degrees of annotation capabilities, namely, component, register, network, programming unit, and program annotations, and all except the last one can be displayed in the ladder diagram windows, which is very helpful for understanding the operation of ladder programs.

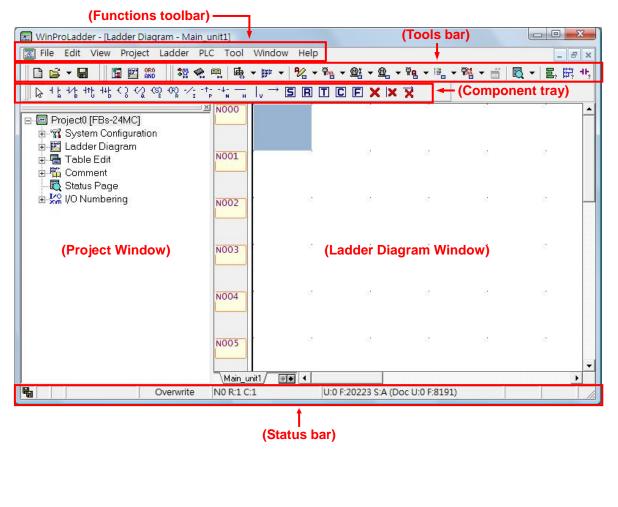
- Component and register annotations can be input through our software and can also be established using editing software that the user has learned to use, and then subsequently using the import function to import it into our software. There is also an export function that allows the user to convert the annotations of project components and registers into text files which are compatible with other applications software such as Excel, etc.
- We provide the following report document printing features
 - Ladder Program Printing:

The user can select the range of program and annotations that they wish to print and output the ladder diagram program from a printer.

- Using component cross reporting:

The user can print out the location of all components and function instructions used in the program.

1.3 Introduction to the operation desktop



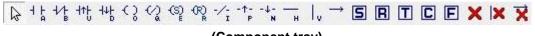
File Edit View Project Ladder PLC Tool Window Help (Functions toolbar)

The functions toolbar is the collection of functions included in the applications software, presented in different categories. When the user selects any of the categories in the above functions toolbar, a list of additional selectable functions will be displayed for the user to select.

🗅 😂 ▾ 🖬 📗 🛅 🕎 🍿 📲 🙀 ♥ 🖳 🖷 ▾ 🕅 ▾ 🕄 ▾ 🏙 ▾ 🕮 ▾ 🛍 ▾ 🛍 ▾ 🛗 ▼ 🚮 ▾ 🗐 🗮 ▾ 🗒 ♥

(Tools bar)

In the process of the design of a project, it is often convenient to provide a toolbar with the most commonly used functions included in it for the user to directly select, which can prove to be much faster and more convenient that having to find the function through the functions toolbar.



(Component tray)

We provide a component tray which allows the user to easily select the components and command functions that they need to use without having to search for what they want through the functions toolbar, which is faster and more convenient.

÷	Overwrite	N0 R:1 C:1	U:0 F:20223 S:A (Doc U:0 F:8191)
		(Status bar)	

The status bar displays information on the status of the current application, such as whether the application is connected, whether it is in execution or has been disconnected, and the current location of the cursor, etc., allowing the user to know the status of the current application at all times.

1.4 How the Manual is Arranged

- A cursor-selected function is expressed with its function name inside the brackets, and the order of execution procedures are expressed using arrows, for example: [File] → [New Project].
- Windows that appear after a functional item has been executed are also expressed in brackets, for example: [On-Line] window.
- The finish buttons that can be selected in dialog windows are expressed using quotation marks, for example: the "OK" button.
- The field names that appear in dialog windows are expressed in brackets, while input text is expressed in quotation marks, for example: input "Test example" in the [Project Name] field.

2 Operation Example

To give new users a clear and basic understanding of our software, this manual uses examples to introduce the basic functions that are used in the development process.

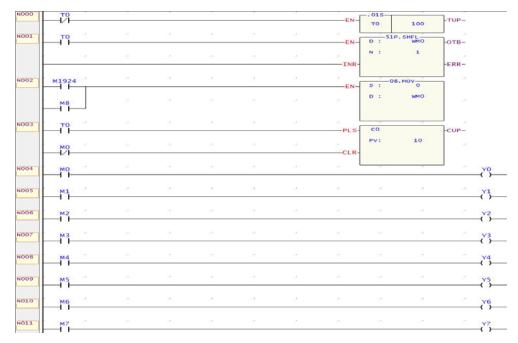
2.1 Description of Example Program

This example will demonstrate how to build a marquee control program in a FBs-PLC, and also test and modify it, finally producing a cascaded program table. In this example, the output points are Y0~Y7, Y0 is the first to light up, followed by Y1 one second later, followed by Y2 one second later, and so on ... After Y0~Y7 have all lit up, they will all go out for one second, and then repeat the same sequence all over again. The signals and annotations that will be used in this example are presented in the table below.

Number	Annotation
MO	Internal light number 1
M1	Internal light number 2
M2	Internal light number 3
M3	Internal light number 4
M4	Internal light number 5
M5	Internal light number 6
M6	Internal light number 7
M7	Internal light number 8
M8	Reset Signal
C0	Number of illuminated lights

Number	Annotation
Y0	Light number 1
Y1	Light number 2
Y2	Light number 3
Y3	Light number 4
Y4	Light number 5
Y5	Light number 6
Y6	Light number 7
Y7	Light number 8
M1924	First scan
TO	One second timer

Below is the actual ladder diagram program:



Below is the description of the development process presented in sequential sections.

2.2 Create a Project

Step 1: Execute the WinProlad.exe program.

Step 2: Select [File] → [New Project] from the function toolbar using your mouse, or press "Ctrl" + "N" on your keyboard, and the [New Project] window will appear, as is shown below:

Proiect Name	Project1		
Model Name	FBs-24MC	Edit	
2	letachable terminal block,RTC,1 0KHz HSC,2 120KHz +6 20KHz		
Description :			* +
			•
-Options	Calendar		

Step 3: Enter "Test example" into the [Project Name] field.

Step 4: Click on the Edit button to enter the PLC model type selection screen.

Proiect Name	Test example	
Model Name	FBs-24MC	Edit PLC Model
	ietachable terminal block,RTC,14 DC24V i 0KHz HSC,2 120KHz + 6 20KHz pulse out	
Options	N. Contraction of the second sec	F
	Calendar	

Step 5: Select the corresponding model type according to the actual testing machine.

Step 6: Click the **L** button, and the following screen will appear:

WinProLadder - [Ladder Diagram - Ma		Hale				1000
	e □ □ + + + + + + + + + + + + + + + + + +		0 - 70 - I	- 94 - =	- I I I I I I I I I I I I I I I I I I I	. 8 ×
<u> </u>	$ \begin{array}{c} \uparrow\uparrow_{P}^{-} \downarrow\downarrow_{H}^{-} \underset{H}{\longrightarrow} \left _{V} \end{array} \right. \qquad \qquad$		and the second			₩-33
E Test example [FBs-24MC] B -	N000 N001		ile.	10 10		-
民 Status Page 표냈ය I/O Numbering	N002	i (r	2	2		
	N003	•	2			
	N004					
	Main_unit1 (Sub_unit1 /					•
CVerwrite Overwrite	N0 R:1 C:1	U:0 F:20223	S:C (Doc U:0 F:819	1)		11

2.3 Input and Edit the Example Program

2.3.1 Using Your Mouse to Input and Edit the Example Program

- Step 1: Now you can begin to input the ladder diagram program, first move your cursor to the upper left hand corner of the ladder diagram window and click on it, you should then see a flashing blue square at that same location.
- Step 2: Move your cursor to where the component tray is, there should be an icon that looks like the following: $\boxed{\mathbb{R}} + \frac{1}{2} + \frac$

Step 3: Left click on the ¹/₁ button and a B normal close contact cursor should appear, move this cursor to the location of the blue square and perform a left click. The following dialog window should appear:

×
» ()

Step 4: Input "T0" and then press "Enter" to input T0 with a normal close contact.

Step 5: move your cursor to the II in the component tray and click on it, now a cursor in the shape of a T should appear. Left click on your mouse and the following dialog box window should appear.

□ 32 Bits(Alt+ <u>D</u>) 1	= Pulse(Alt+ <u>P</u>)	🗸 ОК
Т	,	Cance
т: 📊	>>	
PV:	»	

- Step 6: After you input "0", use your mouse or the "Down" arrow key to move the cursor to the [PV] field and input "100" and then press "Enter" or click on the "OK" button using your mouse, now you have completed the input of the T0 timer function.
- Step 7: Now input the T0 normal open contact $\begin{pmatrix} 1 & k \\ k \end{pmatrix}$ using the same method as the T0 normal close contact $\begin{pmatrix} 1 & k \\ k \end{pmatrix}$, except you click the function toolbar icon $\begin{pmatrix} 1 & k \\ k \end{pmatrix}$.
- Step 8: After inputting the T0 normal open contact you should then input SHFL (Fun51), use your mouse to click on E , then you should see a cursor in the shape of an F, move this cursor behind the T0 normal open contact and click it, then you should see the following window appear:

Function Name:	1				🗸 ок
Description:	Begin of ma	ister control lo	юр	_	X Cancel
Class	1	Name	[0]	_	
Basic Timer/Counter Output Operation Set/Reset SFC Arithmetic Logia Operation	E	MCE SKP SKPE DIFU DIFD BSHF	[1] [2] [3] [4] [5] [6]		
Logic Operation Compare Data Movement Shift/Rotate	-	UDCTR MOV MOV/	[7] [8] [9]	+	

Input "SHFL" or function code "51" in the Function Name field, if you are not familiar with function names or function codes, you can also move your cursor to the [Class] field and click on "Shift/Rotate", and all of the instructions related to this category will be listed, after you select "SHFL", it will appear in the [Function Name] field, now if you press the "Enter" key or click on the "OK" button, the following window will appear:

Function Name:	SHFL			🗸 ок
Description:	Data shift le	eft		X Cancel
Class	1	Name		
Arithmetic		BSHF	[6]	
Logic Operation Compare Data Movement Shift/Rotate	=	SHFR ROTL ROTR	[52] [53] [54]	
Code Convert Flow Control Temperature Con I/O Cumulative Timer				
Functio	n		W.	
	32 Bits(Alt+ <u>[</u> 51 . 3)) F Pulse SHFL		OK Cancel
			» ^	Jancer

Input "WM0" and "1" into the [D] and [N] fields, respectively, because most function block instructions have flexible pulse trigger and 32 bit operand can now be selected using a mouse or a keyboard. If you use your keyboard, use the "Alt" + "D" combination for [32 bits] ; use the "Alt" + "P" combination to control the [Pulse], the [Pulse] function must be selected for this example.

- Step 9: Move your mouse cursor to the in the component tray and click on it, a cursor with a horizontal short circuit icon should appear, move it at specified location and continue to fill in the horizontal short contact.
- Step 10: We are now intentionally skipping the MOV instruction network, and we will revisit the following portion later on.

2.3.2 Input and Edit the Example Program Using Your Keyboard

Below is a description of how to edit application program by using a keyboard:

Positioning and Control of the Cursor -Moving the cursor up, down, left, and right – The four arrow keys ($\uparrow \downarrow \leftarrow \rightarrow$) Move to top – Ctrl + Home Move to bottom – Ctrl + End Move to the left-most position – Home Move to the right-most position – End Move up one page – Page Up Move down one page – Page Down When inputting various contact components using a keyboard, different letters of the alphabet are used to represent different types of components. Normal open contact: **A**

Normal close contact: **B** Transition up contact: **U** Transition down contact: **D** Coil: **O** Inverting coil: **Q** Set coil: **E** Reset coil: **R** Invert the node status: **I** Transition up of node status: **P** Transition down of node status: **N** Horizontal short: **H** Vertical short: **V**

During input, first move your cursor to the location where you wish to make the input and then enter the component and reference number, the order of input is irrelevant, you can enter the component first or the reference number first, for example, an "AX1" or a "X1A" could be entered for a normal open contact whose reference number is X1. If only the reference number is entered, then the component of the previous operation will be assumed and used, if you simultaneously press "SHIFT" when you are entering the component, then you will enter a component with an unspecified reference number, in this case you can specify the reference number later.

Continuing the introduction of operation procedures of Section 2.3.1 Step 10:

- Step 11: Press the "Esc" key, and the icon that was previously by the cursor will disappear, then move the cursor to the network labeled N002 and click on the location of the first component.
- Step 12: Enter "T" using your keyboard, and the following window will be displayed, then key in "0" and press "Enter".

Element Edit		TO	
+ + ▼	> ©		

The input of application functions can be divided into two categories: the first is the category of frequently used functions, such as timing, counting, set, and reset; the rest are categorized as general functions.

Input of frequently used functions:

The same contact components are represented using the same letters, what's different is the "Shift" key should be pressed simultaneously:

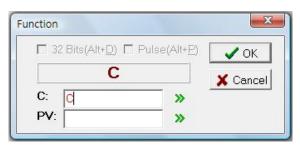
- 1. Timer function: Shift + T
- 2. Counter function: Shift + C

- 3. Set function: Shift + S
- 4. Reset function: Shift + R

Inputting general functions:

First enter "F", and the application function widow should appear, then use the mouse inputting method previously described.

Step 13: Enter the counter function, enter "Shift" + "C", the following window will appear, input [C] and [PV] using the same method as described in the above timer description.



Step 14: Use the "B" and "H" keys on your keyboard to sequentially enter the rest of the N002 network.

- Step 15: Sequentially enter "AM0" + "Enter" and "OY0" + "Enter", enter network N003.
- Step 16: Now enter the network N004 by using the Copy function, move the cursor to the location of the M0 contact A component, press and hold the left button on your mouse and select the entire N003 network, when the entire N003 network has been selected, enter "Ctrl" +"C", and then move the cursor to network N004 and enter "Ctrl" + "V", now the entire content of network N003 will appear in network N004.
- Step 17: Use the above described method to select networks N003 and N004 and copy them to networks N005 and N006.
- Step 18: Use the above method to select networks N003~N006 and copy them to networks N007~N010
- Step 19: Now we will edit networks N004~N010; first move the cursor to the contact A of network N004, directly input "M1" + "Enter", then use the down arrow to move the cursor to contact A of network N005 and repeat the above steps until the contact A of N010 has been changed to M7. Now move the cursor to the coil of network N004, and use the same method as above to edit the coils of N004~N010.
- Step 20: Now let's go back to the network that we previously intentionally left out and input it, first move your cursor to network N002 and right click your mouse, a popup menu should appear, select [Insert Network] → [Before This Network]; or press the "Shift" + "Ins" hotkey, and an empty N002 network will be inserted.

Step 21: Complete network N002 using the above method.

2.4 Annotating the Example Program

Step 1: Select [Project] → [Comments] → [Element Comment] in the functions toolbar; or select the

E The Comment from the expanded menu; or click on the tool bar, and the following

window will appear:

All .	Used	🗖 Unused	tmp		∎ ⁷ Export	₿ Refresh	🧟 Clear All	<u> </u> Clear Unused
👯 🗶 🛛 👯	Y 👯 M	<u>\$\$</u> S	₩ I	₽ <u>0</u>	R B			
Ref. No.	Comment		Desc	ription		.0 .0		
×0				20	-			0
×1								
×2								
K 3								
K4								
K5								
×6								
K7								
K8								
×9								
×10								
×11								
×12								

Click the Used button $\rightarrow \overset{\text{IIII}}{\longrightarrow} M$, and then respectively enter the example annotations, as shown

below:

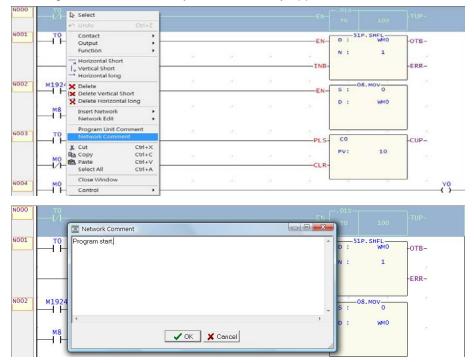
P All	Used	🗖 Unused	tmp		∎ Export	₿ Refresh	d Clear All	<u> </u> Clear Unused
₩ ⊻	₩ ¥ M M M	<u>⊪⊳</u> <u>S</u>	T 🎖	⊇ 55	📲 <u>B</u>	⁸⁸⁸ <u>D</u>		
Ref. No.	Comment		Desc	ription				
MO	Internal light 1							
M1	Internal light 2							
M2	Internal light 3							
M3	Internal light 4							
M4	Internal light 5							
M5	Internal light 6							
M6	Internal light 7							
M7	Internal light 8							
M8	Reset signal							
M9								
M10								
M11								
M12								

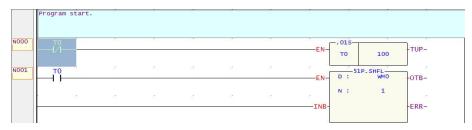
Click the Used button $\rightarrow \overset{\square}{\longrightarrow} \overset{\vee}{\rightarrow}$, and then respectively enter the example annotations, as shown below:

All	1	🗐 Used	🗖 Unused	ן Imp	∎ port	∎ [*] Export	₽ Refresh	<u> </u> Clear All	<u> </u> Clear Unused
₩ ×	₩ ⊻	Mo M	<u>₩ S</u>	₩ I	2 43	BB	• <u>D</u>		
Ref. No.	C	omment		Desc	ription				
YO	Light nur	nber 1			14-14 1				
Y1	Light nur	mber 2							
Y2	Light nur	nber 3							
Y3	Light nur	nber 4							
Y4	Light nur	mber 5							
Y5	Light nur	nber6							
Y6	Light nur	nber 7							
Y7	Light nur	nber 8							

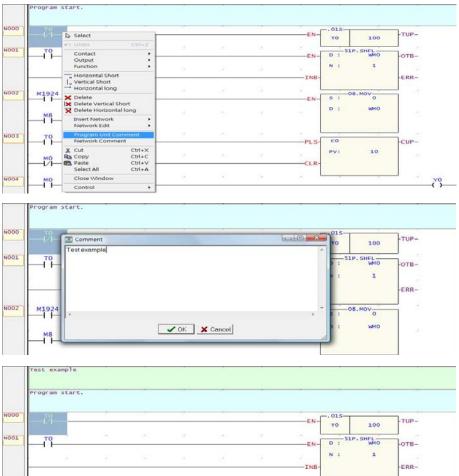
Fill in the annotations using this window respectively according to the previous definitions and descriptions in the fields of the tables. The [Description] field was not used in this example, and more detailed component descriptions may be entered into this field in actual applications.

Step 2: Now we will proceed with [Network Comment], use your mouse to move the cursor to the network that you wish to annotate, right click on the mouse to call out the popup function menu, then click on [Network Comment], and then a window for entering network annotations will appear. Once you have finished entering the annotations, they will immediately appear above the annotated network.





Step 3: Now we will proceed with [Program Unit Comment], use your mouse to move the cursor inside the program unit that you wish to annotate, right click on your mouse to bring out the popup function menu and then select [Program Unit Comment]; a window will appear for you to input through. Once you have finished inputting the program unit annotations, they will immediately appear above the annotated program unit.

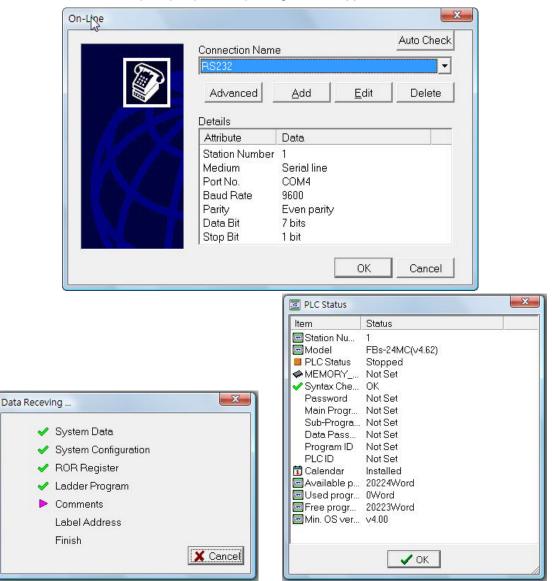


Step 4: Save the previous input content to project files. Use the [File] → [Save] in the function toolbar; or press "Ctrl" + "S". Because this is the first time you have saved a file, a [Save As] dialog box will appear, press "Enter" once you have input the file name and you are finished.

%Please refer to Chapter 6 Comment Information for detailed operation procedures.

2.5 Testing and Debugging

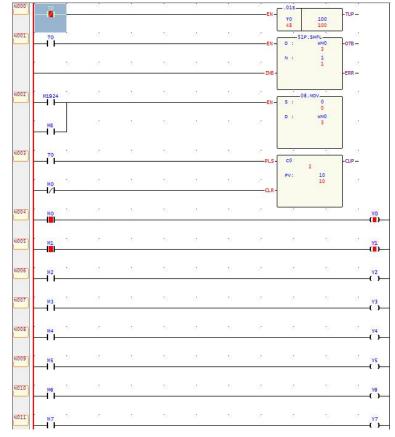
Step 1: First save the previously entered program code to the PLC, select [File] \rightarrow [Save As] \rightarrow [To PLC] from the function toolbar and [PLC] \rightarrow [On-Line] dialog box will appear, as shown below:



Now we can select a previous connection setting from the [Connection Name] and press "OK" to proceed with connecting to the PLC and bring out the [Data Receiving] window; if the connection is successful a [PLC Status] window will appear. If there is no applicable connection setting present, then you can connect through the "Edit" or "Add" processes. If the connections port does not correspond with the actual operations, you can select "Edit" and make modifications.

Step 2: After the previous step is completed, the content in the PLC will be the same as that in the project file, so that now you can take advantage of the [PLC] → [Run PLC] in the function toolbar; or enter the hotkey "F9" to give a command to the PLC to execute the program. You can also select [PLC] → [Stop PLC] in the function toolbar; or enter the "Ctrl" + "F9" hotkey to give a command to the PLC to stop execution of the program.

Step 3: When the PLC executes, the cascaded program window will be under the following condition:



All components that are represented with solid line boxes are connected and in an active state, and we can go and control the display of the ladder diagram program, making it possible for the program annotations and register values to also be displayed on screen.

You can choose whether or not to display the different categories of information by selecting or unselecting the following items in the ladder diagram window:

- Display program unit annotations
- Display network annotations
- Display component annotations
- Display register annotations
- Display font sizes

The more information you decide to display, the richer in information your screen will be, but the less program code you will be able to view in each screen because the additional information is taking up so much room.

To select which items to display, you can click on [View] in the function toolbar and a dropdown menu will appear; the above listed items will be listed in the dropdown menu, and you will be able to select them by checking their corresponding boxes. Items that have already been selected will show a check mark on the left side, if you click on it again then the check mark will disappear and the item will be unselected, the illustration below shows the effect of selecting [Element Comment] and [Register Content]:

3							PLS-	co	8	-CUP-
	MO	22	12	18	8 		CLR-	PV:	10 10	
4	Internal light 1 MO	1.02	2			10	.	- 50	ie.	YO
5	Internal light 1 M1		61.	č	5	20	2	1		Light number Y1
6	Internal light 2 M2	12	ä	12	87	6	20 <mark>-</mark>	11	10.	Light number Y2
17	Internal light 3 M3		8	a.				- 25	- 22	Light number Y3
8	Internal light 4 M4		2	×			80 -	-93	9. *	Light number Y4
9	Internal light 5 M5	• e	15.	l e	5	5		10	- 2	Light number Y5
.0	Internal light 6 M6	54	3	12				15	70.	Light number Y6
1	Internal light 7 M7	3	12	12	8	10	¥.	8	125	Light number Y7
	Internal light 8									Light number

Step 4: Coil enable/disable control, move your cursor to the coil location and right click on your mouse, a menu that looks like the one on the right will appear, using the [Disable] function, you can free the component from the control of the program. For example, when Y0 has been disabled, its state will not be affected by the state of M0, and now you can use [ON] and [OFF] to control its status, disabled components are displayed differently, the following are display symbols for [Disable] components:

Close Window	
Control	Enabled Disabled
	ON
	OFF



Step 5: Use the [Status Page] for testing, first open an empty status monitoring page by doing the following:
Select [Project] → [Status Page] → [New Page] from the function toolbar; or use your mouse to double-click on the Status Page icon in the project window; or use your mouse to select the icon in the function toolbar and then select to open a new monitoring page.

Once you have completed the above procedures, a dialog box will appear, please enter "StatusPage0" in the [Status Page Name] field, then press "OK" and the following window will appear:

Ref. No.	Status	Data	Ref. No.	Status	Data	
	1	-				
	-	-				

Now move your cursor to the first blank field in the [Ref. No.] field on the far left and input "Y0-Y7" and then press "OK", then move the cursor to the second reference number column and input "M0-M8" and then press "OK", finally, move the cursor to the third reference number column and input "C0" and press "OK", "T0" and press "OK", "R0" and then press "OK".

You will then see on the screen the reference numbers of Y0~Y7 and M0~M8, their respective enable/disable statuses and ON/OFF statuses, along with the status and values of timer T0 and counter C0. If you with to enable or disable a node or coil, simply move your cursor to the corresponding status field and double-click, then the enable/disable option will appear. If you wish to set their values, you can move your cursor to the corresponding data field and enter 0 or 1, or double-click your left mouse button to bring up the value input window.

The display format for registers can be controlled using the [Status] field. There are currently six distinct display formats: base 10, base 10 positive numbers, base 2, base 16, floating, and strings, etc. To use them, double-click your left mouse button on the status field. The [Ref. No.] field can be displayed using component reference number or component annotation; this can be done by bringing out the popup menu by right-clicking in the status monitoring page and selecting [View Element Comment].

2.6 Printing the Example Program

Step 1: Use your mouse to select [File] → [Print Content Setup] in the function toolbar ; or press "Ctrl" + "P", and the [Print] window will appear:

rint Items		Edit Network	Comment /Description	Table	Status Page	Syst 🛓
ype Ite	m	Program Uni	t]	Font		
		Туре	Item	[MS Sans	Serif - 81	- 0-
		👪 Ladder	. Main_unit1	ino oun	,	A ₽
		🗭 Ladder	. Sub_unit1	Print Item	s	
				F Pr	ogram Unit Comm	ient
				E Ne	etwork Comment	
Select All	Move Up			E E	ement Comment	
	more op			🗆 St	ep Number	
Remove	Move Down	Select	All Append			

[Edit Network] bookmark: lists all program units in the project in the [Program Unit] field. You can use this field to select one or more program units that you wish to print, and add them to the [Print Items] field on the left; or you can select [Font]; and the [Preview] button allows you to preview the print results.

[Comment / Description] bookmark: all annotations options for the project will be listed in the [Data Range] field. You can use this field to select one or more annotation items that you wish to print, and add them to the [Print Items] field on the left; or you can select [Font]; and the [Preview] button allows you to preview the print results.

[Table] bookmark: lists all the table items in the project in the [Table List] field. You can use this field to select one or more table items that you wish to print, and add them to the [Print Items] field on the left; or you can select [Font]; and the [Preview] button allows you to preview the print results.

[Status Page] bookmark: all monitoring page items for the project are listed in the [Status Page List] field. You can use this field to select one or more monitoring pages that you wish to print, and add them to the [Print Items] field on the left; or you can select [font]; and the [Preview] button allows you to preview the print results.

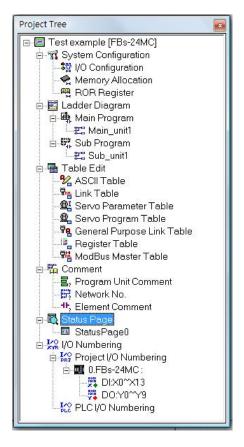
[System / Other] bookmark: project information items from the project will be listed in the [Other Item] field. You can use this field to select one or more project information items that you wish to print, and add them to the [Print Items] field on the left; or you can select [Font]; and the [Preview] button allows you to preview the print results.

[Format Setup] bookmark: can set page start/end and margin settings; and the [Format Preview] button lets you preview your print results. After you have finished entering the data, simply press "Print" and the printing will begin.

Please refer to Chapter 12 Tabular Output for detailed operation procedures.

3 Project (File) Management

WinProladder is a project oriented programming software, presenting the content of your application program development visually using a ladder diagram display method. As shown in the illustration below, this allows the user's work status to be viewed in a clear and intuitive fashion. This style of presentation allows program development and maintenance to be conducted in a very intuitive style and is also convenient for file management.



3.1 Establish New Project

From the functions toolbar, select [File] \rightarrow [New Project] using your mouse, or press "Ctrl" + "N" and the following [Project Information] window will appear as shown below:

Proiect Name	Test		
Model Name	FBs-24MC	Edit	
	20KHz HSC,2 120KHz + 6 20KH	,14 DC24V inputs,10 outputs,2_1 Hz pulse output,1 comm. port(car	
Description :	Temperature control settings.		*
	<		Þ.
Options	7 Calendar		

- 1. [Project Name]: Please input the name for this project for the convenience of subsequent file management.
- 2. [Model Name]: Select the correct model type according to the actual operation machine in the dropdown menu, the program will automatically display the specification description of the particular model type that was selected.
- 3. [Description]: Descriptive text for this project can be printed out.
- 4. [Calendar]: If the PLC has been built in the calendar, the RTC will always be able to provide the correct time and date, regardless of whether or not the PLC is being supplied power. The time and date information provided includes week, year, month, day, hour, minute, and seconds, a total of 7 pieces of information. With the installed calendar and clock feature, users can control their systems 24 hours-a-day all year long, allowing your automatic control system to work in accordance with your daily habits and routines, not only increasing the level of automated control, but also boosting efficiency. The application of this field depends on whether the PLC exists this equipment.

The window below will appear after you press "OK", which means that you have successfully opened a new project. You can begin setting the various settings for your project and engage in ladder diagram program design (Described in Section 4). Remember to save your work when finished.

							-
	🜪 🖳 🖣 🕶 🍺	• 光 • 🕯	<mark>n - @ặ - @</mark>	• 99 • II.	• 🎬 • 📑		
င်းရ စီးလို လို အီ မနီ မနီ မနီ မနီ မနီ မနီ မနီ မနီ မနီ မန		· S R T		××			
⊒- ा Test [FBs-24MC] ⊉- ऋ System Configuration	<u>1×</u> N000						
 ■ Zadder Diagram ■ Table Edit ■ Table Edit ■ Table Date 	NOO1		52	22	52	1	
	N002	20	12	18	10	22	_
		52	12	12	10	52	
	N004	50	52	52	58	52	
	N005	53	12	13	88	22	
	 _∖Main_unit1 (Sub_	unit1 /	•				•
Overwrit	property and a second s	and a second second second	:0 F:20223 S:A	(Doc U:0 F:81)	91)		-

3.2 Open File

There are two ways to open a file: opening a project and connecting to PLC, which are respectively described below.

3.2.1 Offline Operation

Select [File] \rightarrow [Open] \rightarrow [Open] from the functions toolbar, or click the \Box icon in the tool bar and select [Open] from the dropdown menu, or press "Ctrl" + "O", and an "Open File" dialog window will appear:

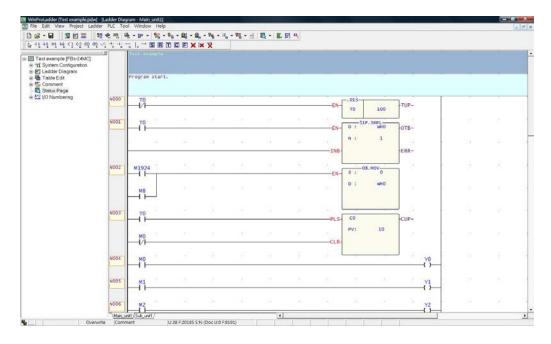
Open				? 🛃
Look jn: 🚺	winproladder	•	🗢 🔁	🕂 💷 •
ੴTest exam 할 Test.pdw	ple.pdw			
File <u>n</u> ame:	[<u>O</u> pen
Files of <u>type</u> :	Proladder File [*.pdw,*fld]		-	Cancel

And then select the file that you wish to open and press "Open" button.

Or you can quickly open the file that you previously opened by selecting one of the four latest files that you had opened provided in WinProladder. Select [File] \rightarrow [Open] \rightarrow from the functions toolbar using your mouse, as shown in the illustration below:

File Edit View Project Lade	der PLC Tool Window Help	
New Project Ctrl+N		
🕞 Open 🔹 🕨	🛱 Open	Ctrl+C
Save Ctrl+S	Connect To PLC	Ctrl+I
Save As	1 C:\Users\Y.C. Wang\Desktop\2\Test.pdw	
Close	2 C:\Users\Y.C. Wang\Desktop\2\Test example.pdw	

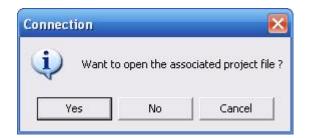
Select the project name that you wish to open. The above operations will open the selected file and display it in the ladder diagram window, as shown below:



When a file is opened under off line operational conditions, all modifications can be saved through the [Save] operations described in section 3.3, or can also be saved by performing the [Save As] \rightarrow [To PLC] procedures described in section 3.4.2, which reconnects the currently opened project contents with the PLC and saves it to the PLC.

3.2.2 Connection

Select [File] \rightarrow [Open] \rightarrow [Connect to PLC] from the functions toolbar using your mouse, or click the tool bar dropdown icon, and select [Connect to PLC], or press "Ctrl" + "L", and the confirmation window for whether to connect and open the corresponding project will appear.



1. Click the "Yes" button: which will open the project file and connect to the PLC. (The contents of this project must be exactly the same as the content of the PLC program to be connected with, or else the connection cannot be made.)

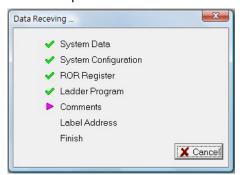
Open			? 🔀
Look jn: 🚺	winproladder	- 🗧 🔁	* 📰 •
약 Test exam 약 Test.pdw	ple.pdw		
File <u>n</u> ame:	[<u>O</u> pen
Files of <u>type</u> :	Proladder File (*.pdw,*fld)		Cancel

The window for the corresponding project will open, select the project file name that you wish to open, and press "Open" button, and then you should see the content of the project program code, and the PLC connection window will also appear:

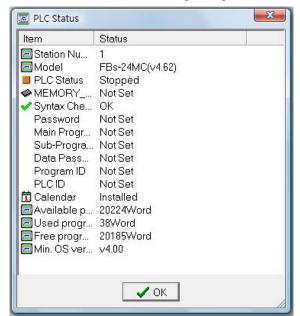
On-Line				×
	Connection Nam	e		Auto Check
	RS232			-
	Advanced	Add	<u>E</u> dit	Delete
100	Details			
	Attribute	Data		
I X T A	Station Number Medium Port No.	1 Serial line COM1		
	Baud Rate	9600		
	Parity	Even parity		
A CARE A	Data Bit Stop Bit	7 bits 1 bit		
		[OK	Cancel

(Please refer to section 9.1 Connecting to the PLC, for instructions on setting the connection name)

When the PLC connection dialog window appears, select the desired connection file name, and press "OK" button, and the PLC connection operation will proceed:



(After the connection has been made, information regarding this connection will be displayed)



(Press the "OK" button, and the PLC connection process will be completed)

Now, any modifications made to the project content of the opened project will be synchronously made to the PLC side as well, therefore there will be no need to perform the save to PLC operations described in Section 3.4.2. All you have to do is execute the Save Project operation described in Section 3.3 and save modifications to the storage disk, the project content on the storage disk will be exactly the same as the content on the PLC.

2. If you select "No" button: the corresponding project files will not be opened, and the connection to PLC dialog window will be displayed:

	Connection Nam	3		Auto Check
	Advanced	Add	<u>E</u> dit	Delete
100	Details			
A F B A	Attribute	Data		
KA	Station Number Medium Port No. Baud Rate Parity Data Bit Stop Bit	1 Serial line COM1 9600 Even parity 7 bits 1 bit		

(Please refer to Section 9.1 PLC Connection for the setting of connection names)

After the PLC connection dialog box appears, select the connection name and the connection process will begin:



(After the connection has been established, information on this connection will be displayed)

ltem	Status	
Station Nu	1	
Model 🔤	FBs-24MC(v4.62)	
PLC Status	Stopped	
MEMORY	Not Set	
Syntax Che	ОК	
Password	Not Set	
Main Progr	Not Set	
Sub-Progra	Not Set	
Data Pass		
Program ID	Not Set	
PLCID	Not Set	
📆 Calendar	Installed	
Available p	20224Word	
Used progr		
Free progr		
Min. OS ver	√4.00	

(Press confirm and the PLC connection will be completed)

The project content now displayed will be the content in the PLC, so if you make any modifications, the content in the PLC will also be modified. Therefore, you may want to use the [Save] operation described in Section 3.3 to call out the Save As New File dialog box, and save the PLC contents to a storage disk.

3.3 Save Project

Select [File] \rightarrow [Save] from the function toolbar using your mouse, or click the icon \square in the tool bar, or press "Ctrl" + "S" to save the project, which will save the project to your storage disk. This function can be used to save the modified project files to your storage disk.

3.4 Save As

When the content of the opened project has been modified, the modified content can be saved to a new file on the storage disk with a different file name through the steps described in section 3.4.1; and when opening a previous file by executing 3.2.1, the modified project can also be saved to the PLC by using the operations described in Section 3.4.2.

3.4.1 Save to Storage Disk

Select [File] \rightarrow [Save As] \rightarrow [Project File] from the function toolbar using your mouse. A save as dialog box will appear, as shown below:

Save As			? 🛃
Save in: 🚺	winproladder	🔹 🔶 🔁	r 📰 🕈
😰 Test examp 😰 Test.pdw	ole.pdw		
File name:	[Save
Save as type:	Proadder for Win [*.pdw]	-	Cancel

(Enter the new file name and press "Save" button and the save as new file operation will be completed)

3.4.2 Save to PLC

When the content of a project has been modified, the modified project content can be saved to the storage disk under a different project name using the operations described in Section 3.4.1; when executing 3.2.1 to open a previously saved file, modified project content can be saved to the PLC using the operations described in Section 3.4.2.

4 Program Input and Editing

We use a Windows operating system, and everything is designed in accordance with the Windows environment and operation style. This makes our software very easy to learn and use, and all users, from beginners to the very experienced, will all be able to operate our software with absolute efficiency. We also provide special hotkeys and mouse that are specifically designed to fit the particular characteristics of your office or working environment, making it easy for the user in all conditions and environments to efficiently input and test programs. Our flexible ladder diagram program editing feature supports high-efficiency operations such as network insertion, copying, pasting, and deleting, substantially speeding up the programming process. The following is a detailed description of each feature.

4.1 On-line and Off-line Editing

If you connect upon opening a new project (refer to Section 3.2.2), then you can use the on-line program editing function, and you can immediately execute the program after you have finished editing and do not need to re-download, substantially shortening the time needed for development and modification. On the other hand, if you open the project off-line (refer to Section 3.2.1), then you are using off line program editing, and you will have to save to the PLC after you are done editing (refer to Section 3.4.2). It also supports run time on-line editing feature for allowed non-stop application modification.

4.2 Input via Mouse and Hot Key Operation

When inputting program in the ladder diagram window area, you can use your mouse to select component types from the component tray, or you can input via hot keys, depending on the preference of the user.

4.2.1 Inputting Via Mouse

When editing, you can use your mouse to click on the component tray, and then select contact A:

🖂 WinP:	roLadder -	[Ladder Diagra	m - Main_u	uit1]				
File	Edit View	Project Ladder	PLC Tool	Window Help				
	- 🔒	📕 🖭 ORG AND	💱 🌪 🗉	1 🖷 • 🖶 •	1 🖌 - 🖬 -	<u> ፼</u> រ - ፼ ዋ <mark>8</mark> -	· 📴 🔹 🎆 🔹 👸	🛃 • 🖴 🖽 44,
1+	╡ィ┇╶┼╝	မ <i>ျ</i> လွတ္တူ	(R) -∕↑- R I P	$\downarrow + + + + + + + + + + + + + + + + $	SRTC			

Click on the position on which you would like to input the component in the ladder diagram window:

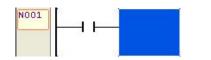
N000		ia iai
N001 E	Element Edit	×
	+ F → ×0	> Q

Then you will see a dialog box prompting you to enter the reference number for contact A, enter X0, and now you have completed the input of a contact component in the ladder diagram window:



4.2.2 Input via Hot Keys

Place the cursor at the location where you wish to input the component in the ladder diagram input window, press the hot key "A", and the dialog box prompting you to enter the reference number of contact A will appear. Enter X0, and now you have completed the inputting of a contact A component in the ladder diagram window. Or, you can directly input "AX0" or "X0A", which are also fast inputting methods. Or you can press the "Shift" + "A" Hot key, and then the following diagram will immediately appear in the ladder diagram program location:



Double-click, and follow the above described procedures.

WinProladder provides convenient hotkey operation features; please refer to Section 16.1[Hotkey Table].

4.3 Main Program and Sub Program Unit

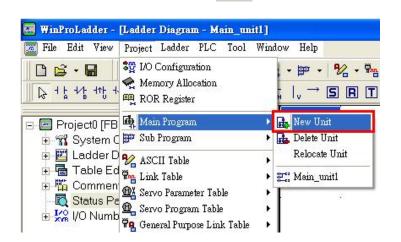
Operations

In the WinProladder adder diagram programming window, there are two areas- the main program area and the sub program area- which makes the programming process even more structured. The operation procedures in the two areas are identical. The following are instructions for performing operations with program units.

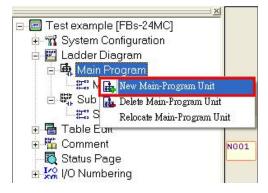
4.3.1 Establish a New Program Unit

You can devise a plan for categorizing your programming process into different programming segments, which will provide an additional degree of structure. Therefore, using the feature for establishing a new program unit, you can make your program even more easily understandable.

We can select [Project] \rightarrow [Main Program] \rightarrow [New Unit] in the function toolbar using our mouse, or select [New Unit] in the dropdown menu after clicking on the icon in the tool bar:



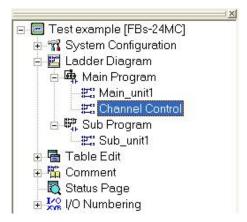
Or, in the project window, go to [Test example] \rightarrow [Ladder Diagram] \rightarrow [Main Program] right-click \rightarrow [New Main-Program Unit]:



After you select [New Main-Program Unit], a dialog box prompting you to enter the program unit will appear. As an example, you may enter something like "Channel Control":

New Program Unit	×
Program Unit Name	
Channel Control	_
🖌 OK 🕺 🗶 Cancel	

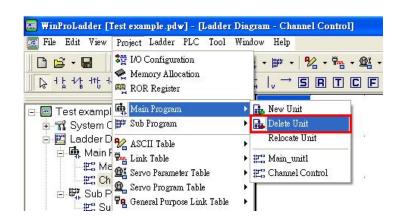
After you press "OK", you will find that a [Channel Control] program unit has been added to the [Main Program] in your project window:



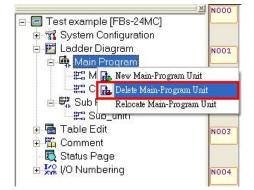
The procedures for the sub program area [New Program Unit] operation are the same as for the main program area; all you need to do is select the sub program operation.

4.3.2 Program Unit Deletion

When an established program unit is no longer needed, you can use the program unit deletion function to delete it. We can use our mouse to select [Project] \rightarrow [Main Program] \rightarrow [Delete Unit] in the function toolbar; or by clicking the icon in the tool bar and selecting [Delete Unit]:



Or select [Test example] \rightarrow [Ladder Diagram] \rightarrow [Main Program] right-click [Delete Main-Program Unit] from the project window:



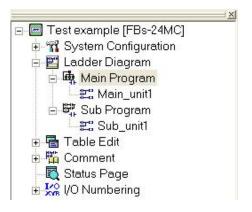
After you select [Delete Main-Program Unit], a delete program unit dialog box will appear. Select "Channel Control":



After pressing "OK", you will be prompted again to confirm whether or not to delete the selected program unit:



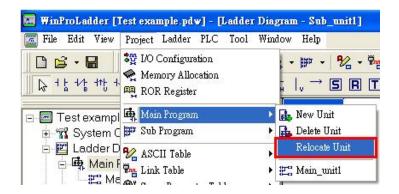
Click "Yes" and then you will find that the previous [Channel Control] program unit in the [Main Program] of the project window has been deleted:



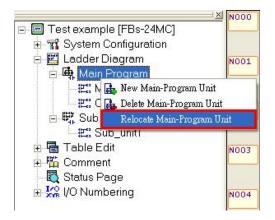
The procedure for [Delete Program Unit] for the sub program area is the same as for the main program area, with the exception of having to select the sub program operation.

4.3.3 Adjust the Order of the Program Units

If, after you have established many program units, you wish to adjust the order in which they reside in execution sequence, you can use the program unit order adjustment feature. We can use our mouse to select [Project] \rightarrow [Main Program] \rightarrow [Relocate Unit] from the function toolbar, or select the [Relocate Unit] option in the dropdown menu by clicking on the icon in the tool bar:



Or select [Test example] \rightarrow [Ladder Diagram] \rightarrow [Main Program Unit] right-click [Relocate Main-Program Unit] from the project window:



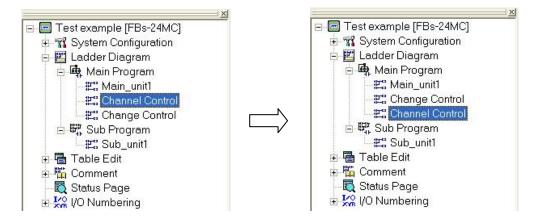
After selecting [Relocate Main-Program Unit], a dialog box for adjusting the order of program units will appear. Select "Channel Control", and if you wish to position it after "Change Control", Press "Move Down":



Then you will find that "Channel Control" has already been positioned behind "Change Control":



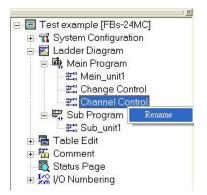
After you press "OK", the order of the program units in the project window will also be different:



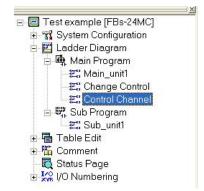
The [Relocate Program Unit] for the sub program area has the same procedures as that of the main program area, except you choose the sub program operation. Please notice that the program unit location of sub program area doesn't matter with the execution sequence.

4.3.4 Modify Program Unit Name

After the name of a program unit has been established, it can subsequently be modified by using your mouse to select [Test example] \rightarrow [Ladder Diagram] \rightarrow [Main Program] \rightarrow [Channel Control] right-click [Rename] from the project window:



After choosing [Rename], you can change the name of this program unit to [Control Channel]:



When you have completed the name modification, you will find that the name of the program unit in the project window and the page name in the cascaded graphical program window have changed.

4.3.5 Enter Program Unit Annotations

When there are a lot of program units, we will need to add annotations to the program units, so that future lookups and modifications can be performed more easily.

4.3.5.1 How to Input Annotations from the Dedicated Annotations Area

Use your mouse to select [Project] \rightarrow [Comment] \rightarrow [Program Unit Comment] from the function toolbar, or select icon from the tool bar; or go to [Test example] \rightarrow [Comment] \rightarrow [Program Unit Comment] from the project window and double-click on [Program Unit Comment] input area will appear:

Program Unit	Comment
Main_unit1	
in Insertion Co	
Change Contro	
Channel Contro	
Sub_unit1	

You will see a list of all program unit names. Double-click on the empty annotations area on the right-hand side of the "Coin Insertion Count" program unit:

Program Unit	Comment
Main_unit1	
in Insertion Co	· · · · · · · · · · · · · · · · · · ·
Change Contro	Count the Accumulated Number of Coin Insertions
Channel Contro	
Sub_unit1	
1	· · · · · · · · · · · · · · · · · · ·
	×
	VOK X Cancel

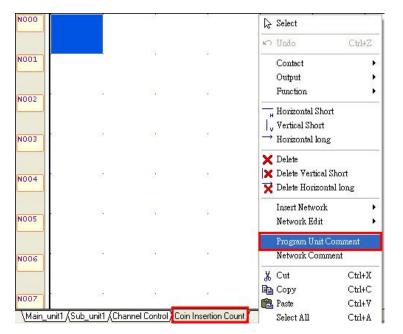
Enter the annotation "Count the Accumulated Number of Coin Insertions", press "OK", and the entered annotation will first appear at the [Coin Insertion Count] top of the ladder diagram program area of this page, as shown in the following illustration. If you confirm it to be correct then you can press "OK" in the program unit annotations dialog box. Now you have completed the annotation input for the [Coin Insertion Counting Program].

			41 - 42 - 42
-	Progra	am Unit Comment	
	Program	m Unit	Comment
	Main_	unit1	
-	in Insert	ion Co Count the Accu	mulated Number of Coin Inser
	Change	Contro	
	Channel	Contro	
1 23	Sub_u	unit1	

4.3.5.2 Method for Selecting a Single Program Unit and Directly Inputting

an Annotation

In the label page [Coin Insertion Count] in the ladder diagram program area, you can also choose to right-click on your mouse, and then select [Program Unit Comment] in the functions menu that appears:



Or, from the function toolbar [Edit] \rightarrow [Program Unit Comment]; then a program unit annotations input area representing [Coin Insertion Counting Program Unit] will appear:

Comment	
Count the Accumulated Number of Coin Insertions.	~
	220
<u> </u>	2
VOK K Cancel	

After pressing "OK" you will have completed the annotations input for the program unit:

Count	t the Accur	mulated Num	ber of Coi	n Insertion	15.	A3	38.		<i></i>
	<u>12</u>		4	-		2			- 22
000									
101	32		<u>.</u>	12	83	- 20	21	21	3
	12	12	2				81 -		
02									
03	14	10	68	đ	5	A 1	2	10	28
04	77.		3	-	er i	-2		55	
05	35	10		12	51	23	20	26	35
06	15	65	2	is.		3		53	
	iub_unit1 (Cha	nnel Control	oin Insertion Co	unt/					

4.4 Contact Components Operations

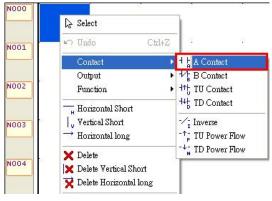
In the function toolbar [Ladder] \rightarrow A Contact to vertical component item, and the various contact components listed in the component tray, as shown in the below illustration:

₩ ₽	네가는 네무는	ର ଶ୍ୱ	-⁄P	-↓- <u>н</u>	$\ \ _{v}$
------------	---------	-------	-----	--------------	-------------

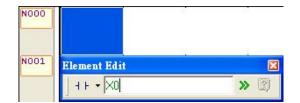
By simply selecting the contact component you wish to input, it will be expressed in the ladder diagram program area. The following are the procedures for doing this.

4.4.1 Input Contact Component

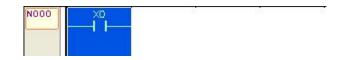
Use your mouse to select [Ladder] \rightarrow [A Contact]; or select the icon 4 which represents the A Contact in the components tray; or right-click on your mouse in the ladder diagram program area and the following popup functions menu will appear (as shown below), then select [Contact] \rightarrow [A Contact]:



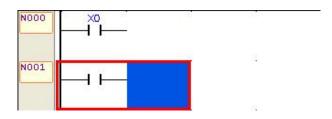
Then click on the location in the ladder diagram program area that you wish to perform the input at, and the reference number input dialog box will appear:



Enter "X0" and then press "ENTER", and the following screen will appear:



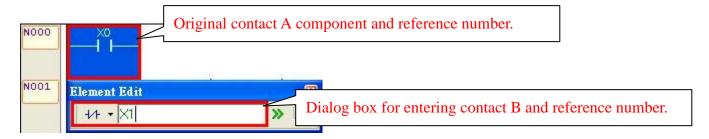
Or place the cursor at the location in the ladder diagram program area in which you would like to perform the input and directly input "AX0" or "X0A", and the above screen will also appear; or press "Shift" + "A", and only the A contact component will appear in the ladder diagram program area, and there will be no need to input the reference number for the component, as shown below:



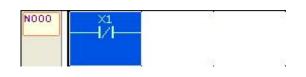
4.4.2 Change the Type or Reference Number of the Contact

Component

When you need to change the component type of a previously inputted contact component, first select the contact type that you wish to change to (its selection method is the same as that described in Section 4.4.1), then select it from the component tray, and click the contact component that you wish to make the modification for in the ladder diagram program area, and then the dialog box for inputting the contact component and reference number will appear. Or you could place the cursor on the component which you wish to modify, and directly enter "B", representing contact B, and the dialog box for inputting the reference number for the contact B component will also appear. If you only wish to modify in the program area, and directly enter the new reference number or press "SPACE" to bring up the editing window for entering the new reference number, as shown below:

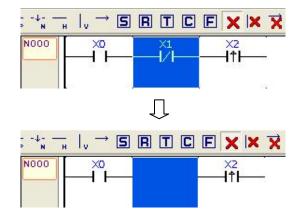


You can re-enter the reference number for contact B in the dialog box, for example X1, and the previous X0 for contact A will be changed to X1 of contact B.



4.4.3 Deleting Contact Components

You can select X the icon from the component tray, or right-click your mouse in the ladder diagram program area and select [Delete] from the popup menu, and the cursor will represent the delete operation; or directly click on the X1 component at contact B, and then press the "Delete" key, this will also delete the component:



4.5 Usage of Function Block Instructions

WinProladder also provides a convenient set of function block instructions. We can go to the function toolbar [Ladder] \rightarrow [Setting] [Reset] [Timer] [Counter] or [Function], and select any of the above functions that are needed; or we can also click on the following icon in the component tray, which also represents the function options:



4.5.1 Input Function Block Instructions

For example, if you wish to set a timer with fixed time duration, you will need to control when the timer starts, when it stops, and the accumulative value that it uses for its timing purposes etc., which are all described below.

Between the X1 contact A and Y0 output, to set a fixed period timer, you can perform the setting procedures by entering timer function:

You can select [Ladder] \rightarrow [Timer] from the function toolbar; or you can select the \square timer icon from the component tray; or use the hotkey "Shift"+"T"; Now the cursor has been set to the timer function, click once between X1 and Y0 in the ladder diagram program area, and the [Timer] function settings dialog box will appear:



Enter "T0" into the [T] field; enter "1000" into the [PV] field, and you have completed the settings for a set period timer:

N000	X1	da al	8 8	EN-	01S-	<i>8</i>		YO
				EN	то	1000	-10P	-, <i>)</i>
					2			

4.5.2 Editing Function Block Instruction

When you wish to modify existing function block instruction, if the cursor is not in the "Selection Cursor" state, then you should first set the cursor to the "Selection Cursor" state. You can select the icon from the component tray, right-click on your mouse in the ladder diagram program area and select "Selection Cursor" from the popup menu, and then double-click on the existing function block that you wish to modify, and the editing window will appear:

N000 ×		84	Ċ.	18) (1)	(d).	10		
N001	3	17. 17.	12	S.	2	W	TO 1000 Function	
NOOZ	0		3			x	T (0.010)	ОК
NOO3	22	122		10		80	T: 0 >> PV: 1000 >>	Cancel

Or select the function block that you wish to modify with the cursor, press "SPACE" and the dialog box for entering the new reference number will appear.

And now you can proceed with the editing of the function block. For detailed descriptions of the types and usage methods of the function blocks, please refer to FATEK Programmable Controller User Manual I & II.

4.5.3 Delete Function Block Component

Function block components are deleted in the same way contact components were deleted in Section 4.4.3.

4.6 Usage of Step Ladder Instructions

To give your program a higher degree of readability, to facilitate easy maintenance and updating, and to substantially increase the quality and reliability of your software, we place particular emphasis on the sequential control of mechanical operations, combining a wide range of existing ladder diagram programming languages with the support of step ladder instructions.

Select [Ladder] \rightarrow [Function] from the function toolbar; or click on the **F** icon in the component tray;

or right-click your mouse in the ladder diagram program area and select [Function] \rightarrow [Function] from the popup menu, then click on the location in the ladder diagram program area where you wish to input the step ladder instructions, and all function categories will appear, then select [SFC] under the category item, and then four step ladder instructions, which are [STP] [FROM] [TO] and [STPEND] respectively, will appear at the right hand side of the function name, as shown in the illustration below:

Function Name:	STP		🗸 ок
Description:	STEP instru	X Cancel	
Class	'	Name	
Basic Timer/Counter Output Operation Set/Reset SFC		STP STPEND TO FROM	
Arithmetic Logic Operation Compare Data Movement Shift/Botate	~		

The procedures are described below.

4.6.1 Input Step Ladder Stages (STP Instruction)

To set an initial step ladder stage S0 to serve as the initial stage after a system start, follow the instruction described below:

Select the contact A component in the component tray, click once on the ladder diagram network and input "M1924" into the reference number input field:



Click on the **F** icon in the component tray, click once behind the "M1924" contact instruction, and then the [Function Lookup] window should appear, select "SFC" under the [Class] option, select "TO" for the [Name], press the "OK" button, and the following window will appear:

N000	M1924		5Å	et is be	
N001		1 22	3	Function	
N002	8	12	12	□ 32 Bits(Alt+D) □ Pulse(Alt+P)	• ок
N003	1.	13	2	S: SO »	X Cancel

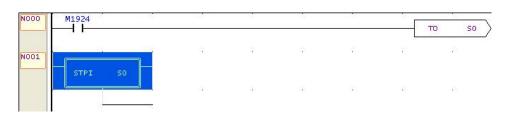
Enter "S0", press the "OK" button, repeat the "SFC", this time choose "STP" for [Name] and the following illustration will appear:

N000 M1924		ră 	8	13	<i>i</i> ta	ile .	то 9	50
N001	2 P.	12	10	121	2		20	
1002 Function					÷.		28	
1003	Bits(Alt+ <u>D</u>)		✔ OK K Cancel	22	8		93	
N004	50	»	7 Help	, s.	80	2	10	

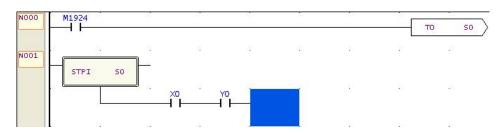
Enter "S0", press the "OK" button, and you have completed the setting of the S0 initial step ladder stage to serve as the initial stage after each system starts.



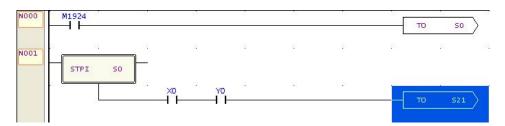
You can also add step shifting criteria to the initial step ladder stage. First select [Vertical Short] component from the component tray using your mouse, then click on "STPI S0"; or place the cursor on top of "STPI S0", and press the "V" hotkey.



After the branching line appears, add shift conditions, for example, we can add two shifting conditions "X0" and "Y0".



and then add the step that you wish to shift to when the shifting conditions are met, in our example, when the "X0" and "Y0" conditions are met (ON), we shift the step to "S21". Bring out the [SFC] categories, select [TO] for the function name; or press the ">" hotkey, and after the dialog box appears, enter "S21", and the following example is completed:



4.6.2 Input Convergence (From Instruction)

This instruction describes the source step from which the current stage was entered from, and also requires the meeting of conditions from stage Sxxx to continue to the next step ladder stage.

For detailed examples and an explanation of underlying principles, please refer to Chapter 8 Hardware & Basic Functions or User Manual I. Here, we only illustrate the steps and procedures for using the Winproladder ladder diagram program as an example:

4.6.2.1 Selective Convergence



If we wish to produce the above results, we could follow the instructions below:

We first bring out the [SFC] category according to the procedures described in Section 4.6, select [FROM] for the function name, press "OK", or place the cursor in the program area, and press the "<" hotkey, and the following window will appear:

Function		X
□ 32 Bits(Alt+ <u>D</u>) □ P	ulse(Alt+ <u>P</u>)	🗸 ОК
FROM		🗙 Cancel
S: S21	»	? Help

Enter "S21", component press the "OK" button, move your cursor to the [A Contact] component in the tray and click on behind it, and the following window will appear:

Element Edit	X
H F ▼ ×5	» 🕄

Input "X5", and press "ENTER", use the function block again, bring [FROM] for the function name, press "OK"; or press the "<" hotkey, and the following window will appear:

N003	FROM S21
N004	
N005	Function
N006	GK GX GX
N007	S: S22 » ? Help

Enter "S22", press the "OK" button, move your cursor to the [A Contact] component in the component tray and click on + behind it, and the following window will appear:

N003	FROM S21	×₅	
N004	FROM S22	→ →	673
N005	12	Element Edit	 ×
		J + F ▼ ×6	 » 3

Enter "X6", press "ENTER", and then move the cursor to the component tray and select [Vertical Short] component, and then single-click behind the X5 contact; or place the cursor on X5 and press the "V"

hotkey, and a vertical line will appear, as shown in the following illustration:



Now enter "X7", as shown in the following illustration:



Use the function block again, bring out the [SFC] category, choose the function name [TO] and press "OK", or place the cursor in the program area, and press the ">" hotkey, and the following window will also appear:

N003	FROM S21			×7 	
45	FROM S22			Function	
N004	10		а	☐ 32 Bits(Alt+D) ☐ Pulse(Alt+P)	🗸 ОК
N005		8	14	TO S: [S23] >	X Cancel

Enter "S23", press "OK", and you have completed the procedures for this selective convergence example.

4.6.2.2 Simultaneous Convergence



When we wish to produce the above results, we could follow the following procedures:

We first refer to the procedures in Section 4.6 and bring out the [SFC] category, choose the function [FROM], press "OK", or place the cursor in the program area, and press the "<" hotkey, and the following window will also appear:

N005		
N006	Function	
N007	☐ 32 Bits(Alt+ <u>D</u>) ☐ Pulse(Alt+ <u>P</u>) FROM	У ОК
N008	S: S21 >>	Cancel

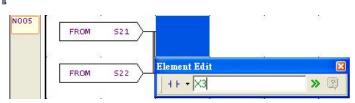
Enter "S21", press "OK", bring out the [SFC] category again, choose [FROM] for the function name, press "OK", or place the cursor in the program area, and press the "<" hotkey, and the following window will also appear:

N005	FROM S21	<u> </u>	1	地
N006		1	10	15
N007	Function			
N008	T 32 Bits(Alt+	D) F Pulse		✓ OK K Cancel
N009	S: [S22]		»	7 Help

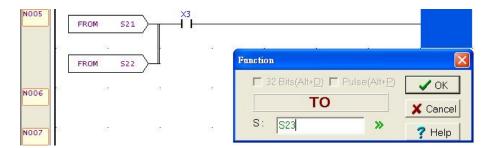
Enter "S22", press "OK", move the cursor over to the component tray and select [Vertical Short] component, and then single-click behind FROM 521>; or press the "V" hotkey, and you have completed the procedure for expressing simultaneous convergence in a ladder diagram program:



Select the I A Contact] component in the component tray using your cursor, and then single-click behind



Enter "X3", and press "ENTER". Use the function block again, bring up the [SFC] category, choose [TO] for the function name and press "OK", or place the cursor in the program area, press the ">" hotkey, and the following window will also appear:



Enter "S23", press "OK", and you have completed this example for simultaneous convergence. It should be especially noted that to complete a simultaneous convergence operation, [_____] [Vertical Short] component must be adjacent to the FROM S21 , if there is any space between the two, it will become a selective convergence operation, as shown in the following illustration:



4.6.3 Input Divergence (TO Instruction)

This function describes the step ladder stage to be shifted to. For detailed examples and explanations of the underlying principles, please refer to Chapter 8 Hardware & Basic Functions in User Manual I, here we only describe the steps and procedures for using the WinProladder ladder diagram program with an example.

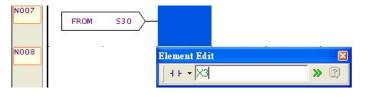
4.6.3.1 Selective Divergence



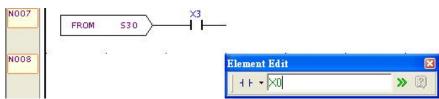
When we wish to produce the above results we could follow the following procedures: Place the cursor at the location where you wish to input in the program area, bring out the [SFC] category, select [FROM] for the function name; or press the "<" hotkey , and the following window will appear:



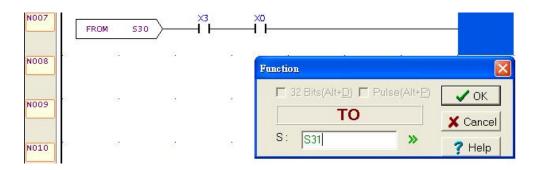
Enter "S30", press "OK", and the S30 component of the FROM function will appear in the program area. Single-click behind the contact A component, enter the reference number "X3"; or immediately input "AX3", as shown in the window below:



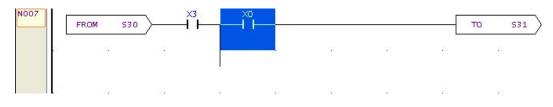
Now enter X0 right after X3:



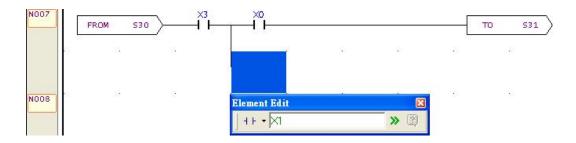
After X0, place the cursor at the location where you wish to make the input in the program area, and then bring up the [SFC] category, choose [TO] for the function name; or press the hotkey ">", and the following window will appear:



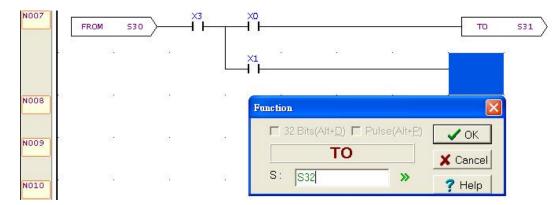
Enter "S31", press "OK", place the cursor at the X0 location, enter "V", add a vertical line, as shown below:



Now place the cursor under X0, enter "X1" or "X1A":



After inputting component X1, bring out the [SFC] category again, choose [TO] for the function name; or press the ">" hotkey, and the following window will appear:



Enter "S32", press "OK", and you have completed this selective divergence example.

4.6.3.2 Simultaneous Divergence



If we wish to produce the above results, we could follow the following procedures:

Place the cursor in the program area and at the location where you would like to make the input, bring up the [SFC] category, choose [FROM] for the function name; or press the "<" hotkey, and the following window will appear:



Enter "S30", press "OK", and the FROM function will appear. Use the cursor to select the contact A and single-click the point right behind it, enter the reference number "X3"; or directly enter "AX3" behind it, as shown in the following window:

N009	FROM S30	_	
N010		Element Edit	
		+ F - [X3]	» Ø

Place the cursor in the program area and at the location where you wish to make the input, bring out the [SFC] category again, choose [TO] for the function name; or press the ">" hotkey, and the following window will appear:

N009	FROM S3	⊃—í	3 		-8
N010	35	12	а 1	Function	
NO11	12		×	TO	🗸 ОК
N012	27	2	14	S: [531] >>	Cancel 7 Help

Enter "S31", press "OK", and the TO function will appear. Under the S31 location of the completed TO function, bring up the [SFC] category again, and choose [TO] for the function name; or press the ">" hotkey, and the following window will appear:

N009	FROM S3		3 				то	531
NOIO	35		2	12		2		
NOII	84	13	2	Function				
NO12	-			— 32 Bit	s(Alt+ <u>D)</u> Г I TO	Pulse(Alt+ <u>P</u>)	✓ OK X Cancel	
N013	12	- 22	2	S: S3	2	»	? Help	

Enter "S32" and press "OK". Select vertical line component with your mouse, and click on the icon in the program area; or press the "V" hotkey, and the following will appear:

N009	ROM S30) — ×	3 		 	- TO 531
40	32	10	3	12	21	то 532

Now you have completed an example of a simultaneous divergence operation.

4.7 Editing Mode

In the cascaded graphical program editor, we provide functions similar to the [Replace] and [Insert] modes of general word processors for your convenience, and below are their descriptions.

4.7.1 Replace Mode

When the status bar shows that the system is under [Replace] mode, the cursor display mode in the cascaded graphical program area will be as follows:

🔚 WinProLadder - [Ladder Diagram - Main	_unitl]		
🧱 File Edit View Project Ladder PLC T	ool Window Help		_ 8 ×
: :::::::::::::::::::::::::::::::::::	<u>⊉i - @ ¤a - ⊫ ¤a</u>	• 🗃 🔍 • 🖹 🕅	dŀ ₂
<u>▶</u> + <u>+</u> + <u>+</u> + <u>+</u> + + + + + + + + + +	$\begin{array}{c} \uparrow_{\overline{P}} & \neg \downarrow_{\overline{P}} & \longrightarrow \\ P & & H \end{array} \Big _{V} \longrightarrow \\ S & \mathbb{R} \end{array}$		
Project0 [FBs-24MC] T System Configuration T System Configuration T able Edit T Table Edit T Comment Status Page			
⊕ 🎇 I/O Numbering	N003	a a	a
	N004		n n
Overwrite	Main_unit1 (Sub_unit1 / N1 R:1 C:2	U:4 F:20219 S:N (Doc U:0 F	.8191)

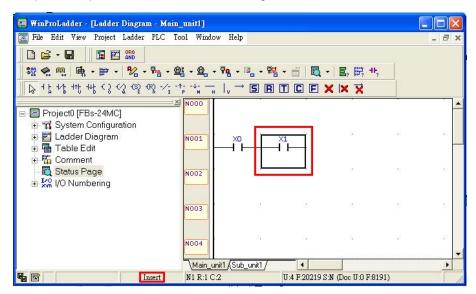
Place the cursor at the location X1, directly input "X2", then the following will appear:

💹 WinProLadder - [Ladder Diagram - Main	_unit1]			
📰 File Edit View Project Ladder PLC T	ool Window Help			- 🗗 🗙
	2x · 22 · 78 · 12 · 74	• 🗃 💐 • 🖹	₿; I ŀ,	
1 + + + + + + + + + + + + + + + + + + +			×	
	N000			
🗄 📆 System Configuration		63 (3		
🔃 📴 Ladder Diagram 🕂 🖶 Table Edit	N001 X0	X2		
E Table Lait		11		
- 🗓 Status Page	N002	_	5 B	A1
🗄 🎇 I/O Numbering				
		a 1	5 B	25
	N003			
	N004		· •	
	\Main_unit1 (Sub_unit1 /	-		
🖫 🗃 🛛	N1 R:1 C:3	U:4 F:20219 S:N (Doc	U:0 F:8191)	

X2 has replaced X1. This is the replacement mode of operation. If you press the "Insert" key again, you will switch back to the insertion mode.

4.7.2 Insertion Mode

When the cascaded graphical program is in replacement mode, press the "Insert" hotkey, and you will switch the system into insertion mode, where the status bar will display [Insert] mode, and the cursor in the program area will become square shaped, as shown in the following.



Now place the cursor on the X1 component, and directly enter "X2", and you have inserted a reference number X1 component between X0 and X1, as shown below:

🔀 WinProLadder - [Ladder Diagram - Main 👿 File Edit View Project Ladder PLC 1		- = ×
	& · • • · • • • • • • • • • • • • • • •	
	NO03	t el
	N004 Main_unit1 (Sub_unit1 / 4	
🖏 🖻 🛛 🔹 Inært	N1 R:1 C:3 U:5 F:20218 S:N (Doc U:0 F:8191)	

This is the insertion mode, and if you press "Insert" again you will switch to the replacement mode.

4.8 Changing of Components and Reference Numbers

You will often need to perform changing operations during component editing in the program area, in addition to the replacement mode described in Section 4.7.1, this can also be accomplished using the [change] function provided in the function toolbar, as described in the following:

Example: The procedures for changing X2 into X3 are described below:



First, in the program area, select the network number that the contact instruction you want to change resides in, as shown below:



Execute [Edit] \rightarrow [Replace] in the function toolbar; or press the "Ctrl"+"R" hotkey, and the following changing dialog will appear:

N000	
N001	Replace 🔀
N002	Find Ref. X2 Length: 1 Replace Ref. X3
N003	Range © Select © Current Unit © All
N004	Options V "Also replace the comment and desc
N006	V OK X Cancel

[Find Ref] is the reference number for the component that you wish to change, in this example, it is X2.

[Length] is the total length of the component which you wish to replace, in this example, it would be 1. If you were to enter 10, it would mean that X2~X11 would be changed, and the changing also proceeded in accordance with the reference number sequence, for example, if you were to enter X0 in "Find Ref", 10 in "Length", M0 in "Replace Ref", then X0~X10 would be changed into M0~M10.

[Replace Ref] is the reference number of the component which you wish to replace.

If [Range] is the "Select", then only all X2s will be changed into X3s in the selected network.

If [Range] is the "Current Unit", then every X2 in the program unit will be changed into X3.

If [Range] is the "All", then every X2 in all units of the project will be changed into X3.

For **[Options]** check "Also replace the comment and descriptions", and the annotations and descriptions for X2 are replaced by those for X3 as well, and after you press "OK", the total number of replacements will be displayed. In this example, we have completed the replacement of 1 reference number.



4.9 Searching for Components

Because of the structural design of the WinProladder software, there are also two ways to search for components, which are described in the following.

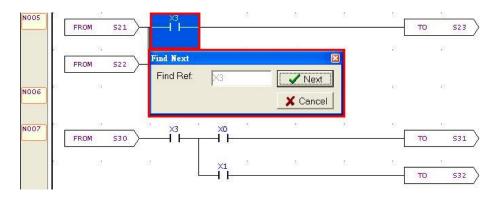
4.9.1 Search One at a Time in the Current Program Unit

If you want to search for an X3 component in the current program unit, please execute [Edit] \rightarrow [Find...] from the function toolbar; or press the hotkey "Ctrl" + "F", and the dialog box for setting up search criteria will appear:

Find		
Find Find In Project		
Find Ref. X3		
Contact	C Output	F Function
I A Contact I B Contact I TU Contact I TD Contact I TD Contact	I⊽ Coil I⊽ Inverse Coil	 ✓ Function Name ✓ Label ✓ Explicit Fun. Parameter ✓ Implicit Fun. Parameter ✓ Only Volatile Parameter
Range © All © Mark Area	Starting address C Insert Network C Cursor Position	C Up C Down
	🗸 ОК 🗙 Сал	ncel

4-26

Enter "X3" into the reference number field, you can also check the category of the component that you wish to search for in **[Type]**, and set the search range in **[Range]**, and set the start point for the component search in **[Starting address]**, and specify to either search upwards or downwards in **[Direction]**. Press "OK", when the program finds the first X3, the cursor will be placed at its location; if there are other X3 components in the program unit, a dialog box asking whether or not to continue searching will appear:



When you press the "Next" button, the program will search for the next X3, until the end of the program unit. When there are no more X3 components, a dialog box saying "Search not found" will appear:



If you press the "Cancel" button, the program will not search for the next X3, and the cursor will stop on the last X3 location. If you want to continue searching for the next X3, you can press the "F3" hotkey, which stands for [Find Next]. If you continue to press "F3", the program will continue to search for subsequent X3 components, all the way to the end of the program unit. When there are no more X3 components, you will see a "Search not found" notification dialog box.

4.9.2 Batch Searching in Projects

To perform a batch search for component X3, please execute [Edit] \rightarrow [Find in Project] from the function toolbar; or press the hotkey "Ctrl"+"F3", and the search criteria dialog box will appear:

Find			
Find	Find In Project		
Find F	1.1	0	
	Contact	C Output	Function
<u>र</u>	A Contact B Contact TU Contact TD Contact	I코 Coil I코 Inverse Coil	 ✓ Function Name ✓ Label ✓ Explicit Fun. Parameter ✓ Implicit Fun. Parameter ✓ Only Volatile Parameter
Rar	nge		
c	Opened Progra	m Unit	
C	Program Unit or	cursor	
		🗸 ок 🗶 с	ancel

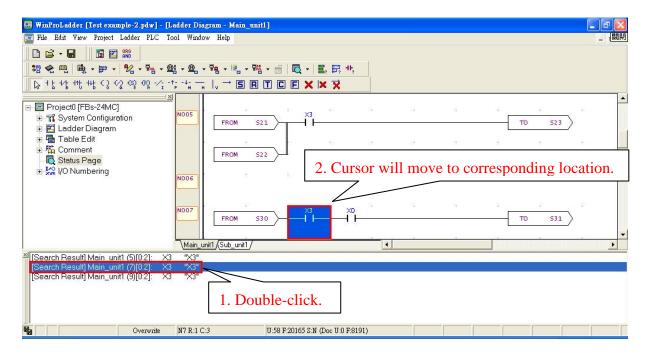
4-27

The [Find Ref] and [Type] are set in the same way as described in Section 4.9.1.

Set **[Range]** to "All", which specifies to search the entire project. If the [Range] is set to "Opened Program Unit", then only the currently opened program units will be searched. Press "OK" and all the search results will be displayed in a new window in the program area, as shown below:

🔀 WinProLadder [Test example-2.pdw] - [Ladder Diagram - Main_unit1]	_ 7 🗙
Z File Edit View Project Ladder PLC Tool Window Help	_ 8 ×
韓 � 晛 ட · 严 · 光 · 元 · 绝 · 绝 · 绝 · 毛 · 瑞 · 吉 艮 · 昌 時 北	
<mark>ୡ</mark> ୁ୳୳ଐୄ୴ୄୠୣୄ୰ୣୣୣୖୄୣୄୣୣୣୖୄୄଢ଼ୄୣ୶୵ଽୣୣୣଽୄୣ୷ୣୄୗ ୲ → S B T C F X X X	
Image: Second	-
a la Table Edit so	
Image x0 Y0 Image X0 Y0 Image Image TO	
N002	
N003 X5 X7 FROM 521 TO 523	•
Main_unit1 (Sub_unit1 /	
✓ [Search Result] Main_unit1 (5)[0.2]: X3 "X3" [Search Result] Main_unit1 (7)[0.2]: X3 "X3" [Search Result] Main_unit1 (9)[0.2]: X3 "X3"	
Overwrite N0 R:1 C:1 U:58 F:20165 S:N (Doc U:0 F:8191)	

Double-click on one of the search results in the [Search Result], and the cursor will move to the selected X3:



4.10 Network Operations

Networks are an important element for the ladder diagram program area, and there are many ways to

perform operations on them. The following is an introduction to methods for performing network operations.

4.10.1 Copy Single Network

Select the network that you wish to copy using your cursor, for example, network number N009, as shown below:

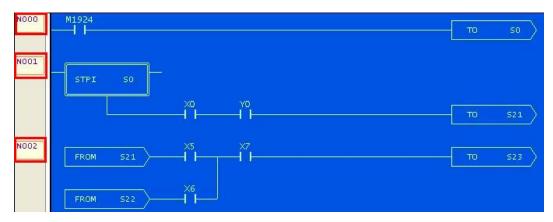


Right-click to bring up the popup menu, select [copy]; or press the "Ctrl"+"C" hotkey, and execute the copy operation, and right-click again to bring up the function menu, select [Paste]; or press the "Ctrl"+"V" hotkey, and execute the paste operation. Now you have completed the copying of a single network:

N009	FROM S30	×3 					то	531
	8	12	8	R.	80 <mark> </mark>		- 07	532
N010	FROM 530	×3 1	2	la.	3	s .	- то	531
					3	<u></u>	- TO	532

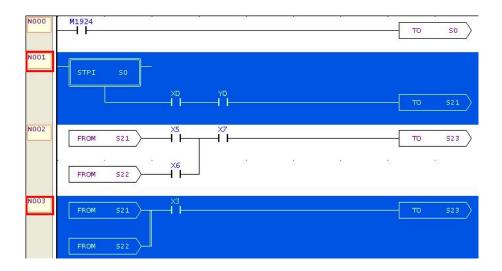
4.10.2 Copy Multiple Networks

To copy networks with adjacent numbers N000 through N002, you can select N000 through N002 via click-and-drag, or press and hold "Shift" while selecting N000 through N002, as shown below:



Then use the same copy and paste procedures as described in Section 4.10.1, and you have completed the procedures for copying multiple networks with adjacent numbers.

If you wish to copy networks N001 and N003, whose numbers are not adjacent to one another, first click and select network N001 with your mouse, then select networks N003 while holding down the "Ctrl" key, and you will obtain the following result:



Now you can perform the same copy and paste procedures as described in Section 4.10.1, and you will have completed the operation of copying multiple networks whose numbers are not adjacent.

4.10.3 Copying Networks from Different Projects

First, executing the WinProladder application software, and then open the first project file; now execute the WinProladder software again, and then open the second project file, so that you now have two WinProladder application software windows opened. Select network N001 in project one, and then right-click on your mouse to bring up the popup menu and select "Copy", or, press the hotkey "Ctrl" + "C" to copy it. Then place the cursor in Project 2 where you would like to paste it, and then right-click your mouse to bring up the popup menu and select "Ctrl" + "V" to paste it on. And now you have completed the procedure for copying networks between projects.

4.10.4 Deleting Networks

Select the number of the network that you wish to delete, and execute [Edit] \rightarrow [Delete] from the function toolbar; or press the hotkey "Delete", and a dialog box asking you whether or not to [Delete Network] will appear:



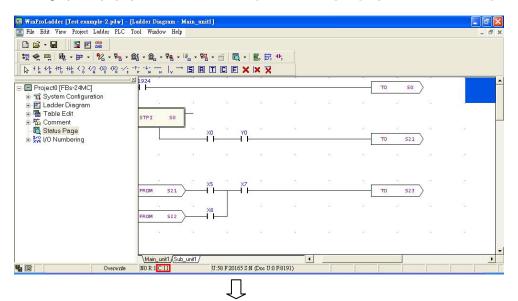
Press "Yes" button, and the network will be deleted.

4.10.5 Network Row and Column Editing

Ladder diagram program area is composed of many network with numbers, numbering the rows and columns of a network can make your program very organized and easy to maintain. The rows and columns of a network can also provide many functions, which can help make your programming process even more convenient and fast. The following is a description of how to use these features.

4.10.5.1 Expand to 22 Columns

When there are many contact components, the original 11 columns of a network may not be enough, and you can expand the network to 22 columns. Place the cursor on the network that you wish to expand to 22 columns, execute [Edit] \rightarrow [Network Edit] \rightarrow [Expand to 22 Column] from the function toolbar; or right-click on your mouse to bring up the popup menu and execute [Network Edit] \rightarrow [Expand to 22 Column].



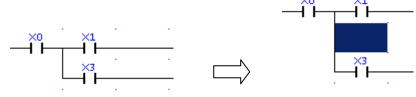
🔄 WinProLadder [Test example-2.pdw] - [it1]								FX
File Edit View Project Ladder PLC	Tool Window I	Help									- 8 ×
🤯 😪 🍕 🖷 - 📂 - 🐕 - 🟪 - :	<u> 연</u> - 연 - 79	- 🖳 - 🏹	• 🖞 🗖	- 5, 6,	нь,						
P + F + 1 + + + + + + + + + + + + + + + +	-++	→ S R	TCF	XXX							
	<u>최</u>					61			~	-	-
Project0 [FBs-24MC]								ro so			
 ■ Bystelli Connigration ■ ■ El Ladder Diagram ■ ■ Table Edit ■ ■ ■	33.		12	9	Ċ.	8	22	11			
🗉 🌃 Comment											
	<u>e</u>		2		× -		0 1	•	10		
	27		16	đ	5	5 1	20	N	11		
	1		13	4	1			.0	778	N.	
	3	12	8	L.		81		35	L	12	
	Main_unit1	Sub_unit1/		000000000000000000000000000000000000000		•	000000000000				
🖷 🖻 🛛 Overwrite	NO R:1 C:22		U:59 F:20164	S:N (Doc U:C) F:8191)						1

4.10.5.2 Shrink to 11 Columns

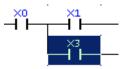
Place the cursor on the network that you wish to shrink from 22 columns to 11 columns, execute [Edit] \rightarrow [Network Edit] \rightarrow [Compress to 11 Column] from the function toolbar; or right-click on your mouse to bring up the popup menu and execute [Network Edit] \rightarrow [Compress to 11 Column].

4.10.5.3 Vertical Expansion

If you wish to increase the vertical space between upper and lower rows X1 and X3, as shown in the following illustration: $\times 0 \times 1$



Then select X3 with your cursor :



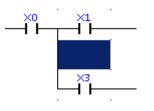
Execute [Edit] \rightarrow [Network Edit] \rightarrow [Vertical Expand] from the function toolbar; or right-click on your mouse to bring up the popup menu and execute [Network Edit] \rightarrow [Vertical Expand] and you will have completed your vertical expansion.

4.10.5.4 Vertical Compression

If you wish to save the vertical space between the upper row X1 and the lower row X3, as illustrated below:



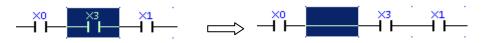
Then use your mouse to select the blank space between X1and X3 that you wish to compress:



Execute [Edit] \rightarrow [Network Edit] \rightarrow [Vertical Compress] from the function toolbar; or right-click on your mouse to bring up the popup menu and execute [Network Edit] \rightarrow [Vertical Compress] and you will have completed the vertical compression.

4.10.5.5 Horizontal Expansion

If you wish to increase the space between X0 and X3:



Execute [Edit] \rightarrow [Network Edit] \rightarrow [Horizontal Expand] from the function toolbar; right-click on your mouse to bring up the popup menu and execute [Network Edit] \rightarrow [Horizontal Expand] and you will have completed the horizontal expansion.

4.10.5.6 Horizontal Compression

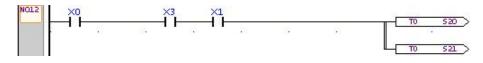
If you wish to shrink the space between X0 and X3:

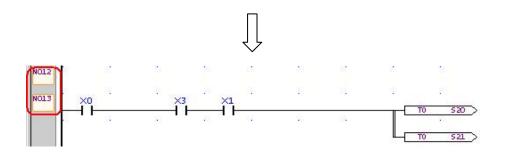


Execute [Edit] \rightarrow [Network Edit] \rightarrow [Horizontal Compress] from the function toolbar; or right-click on your mouse to bring up the popup menu and execute [Network Edit] \rightarrow [Horizontal Compress] and you will have completed the horizontal shrinkage.

4.10.6 Insert Blank Network

If you wish to insert a blank network above network number N012, you can proceed as follows: Right-click on your mouse on any component in the N012 network in the cascaded program area and bring up the popup menu. Then execute [Insert Network] \rightarrow [Before This Network]; or right-click on the network number N012 and bring up the popup menu. Then execute [Insert Network] \rightarrow [Before This Network]; or press the hotkey "Shift"+"Insert", and then network N012 will be a blank network, and the network content that was previously numbered N012 will become network N013.





4.10.7 Insert Network Annotations

For example, if you wish to input annotations for network N012, you could place the cursor on the number N012 or any component in it, and execute [Edit] \rightarrow [Network Comment] from the function menu; or you can right-click to bring up the popup menu and execute [Network Comment], and the network annotations inputting area will appear:

🛤 Network Comment	
Annotations for Solution Network N005	~
	V
<u><</u>	2
✓ OK X Cancel	

Enter "Annotations for Solution Network N005", press "OK", and you will see the annotation in the row above network serial number N005:

2	Annotation	ns for Solutio	n Network NO	005					
N005	FROM	521	×3 -		¥.	÷		то	523
6	FROM	522			81	3	61		5)

Or you can double-click on [Test Example] \rightarrow [Comments] \rightarrow [Network Comment] in the project window, and all the network serial numbers will appear. Find network N005 and double-click in the blank annotations area, and the blank network annotations input area will appear:

Network Com	nent 🛛 🗙
Main_unit1 Sub	o_unit1
Ladder No.	Comment
N0003	
N0004	
N0005	
N0006	Annotations for Solution Network N005
	· · · · · · · · · · · · · · · · · · ·
	·
	<u>×</u>
	VOK X Cancel

Enter "Annotations for Solution Network N005", press "OK" button:

Main_unit1 Sul	o_unit1	
Ladder No.	Comment	^
N0003		
N0004		
N0005	Annotations for Solution Network N005	
N0006		~
	У ОК	

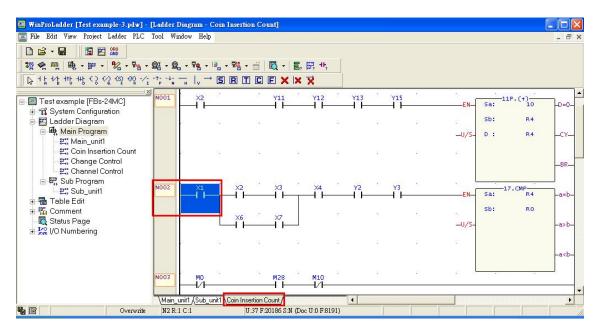
Press the "OK" button again, and you will have completed the network annotations inputting procedure.

4.10.8 Network Searching

If you wish to search for network N001 in the [Coin Insertion Count] program unit, you can execute [Edit] \rightarrow [Goto...] from the function toolbar; or press the hotkey "Ctrl" + "G", and the following window will appear:

Got	to	×
	Program Units Main_unit1 Coin Insertion Count Channel Control Change Control Sub_unit1	
1	Network Number 2 VOK Kancel	

Select "Coin Insertion Count" in the [Program Units], and enter "2" to represent N002 in the [Network Number]. Press "Confirm" button, and the cursor will move to the position of the network you are looking for:



4.11 Ladder Program Syntax Check

4.11.1 Execute Syntax Check

After you have completed the input of your application program, you can run a syntax check, which will help you find errors in the program. We can execute [Tool] \rightarrow [Syntax Check] from the function toolbar; or press the "F8" hotkey, and the statistical syntax error table will appear:

Error Count :	11
Warning Count:	5

After you press the "OK" button, if there are errors, the errors will be listed under the program area, and if you double-click on one of the error items, then the erroneous component segment will be displayed in the program area, as shown below:

🗷 WinProLadder [Test example.pdw] - [Ladder Diagram - Main_unitl]	
File Edit View Project Ladder PLC Tool Window Help	- 🗗 ×
韓 ≪ 唄 噢 - 餅 - № - 略 - 壑 - 龜 - 鸭 - 팀 - 階 - 首 艮 - 昌, 開 +,	
િ મં મં મં મં \ુ જુ	
Image: System Configuration N014 X5 X7 Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image: System Configuration Image:	TO 523
R Photos Dana	e to the erroneous component segment.
N016 X3 X0 FROM \$30 \$30 \$10 Main_unit1 Sub_unit1 1	TO 531
[Step error] E75 STP S0 75.The STP(S0-S7) and STPEND does not match [Step error] E66 TO S21 66.TO# without a corresponding STP#	
Step error] E66 TO S21 66.TO# without a corresponding STP#	
[Step error] E69 FROM S21 69.Duplicated FROM Sx instruction	
[Step error] E69 FROM S22 69.Duplicated FROM Sx:instruction [Step error] E66 TO S23 66.TO# without a corresponding STP# 1. Double-click. [Step error] E66 TO S31 66.TO# without a corresponding STP# 1. Double-click.	
N14 R:1 C.8 U.94 F:20129 S:A (Doc U.0 F:8191)	

Please refer to User Manual I — Hardware & Basic Functions description for the syntax rules of the FBs series PLC, and also refer to the syntax error codes table. The display segment of the error list contains two types of messages: one is the syntax inspection results error table; the other is the results for the project contact component reference number search; right-click on your mouse and three options will appear in a popup menu:

- 1. Clear results for syntax check: the execution of this item will clear error messages resulting from the [Syntax Check].
- 2. Clear results for data search: the execution of this item will clear results from the [Search in Project] command.
- 3. Save Messages: this will save the error messages from the error table in the display area to a text file.

4.11.2 Syntax Check Setting Options

In addition to the user being able to perform a syntax check at any stage of program editing, before executing (RUN), the system will also automatically perform a syntax check to ensure safety. The user can specify the items to be checked for both the user initiated syntax check and the automatic system initiated syntax check. Execute "Project" \rightarrow "Options" or press the Ctrl+F8 hotkey, and the following screen will appear:

tions	
Syntax Check	
Ignored Messages	
🔲 Duplicated Coil	MCE Before Matched MC
Duplicted SET/RST	🔲 SKPE Before Matched SKP
🔲 Duplicated Timer	🔲 CALLJMP Target Not Exist
Duplicated Counter	🔲 Subroutine Without RTS
🔲 DSW Function Multiple Usage	🔲 Subroutine Without RTI
PLSO Function Multiple Usage	🔲 Contact without Reference Number
FWM Function Multiple Usage	🥅 Open Contact
Can't Find Matched MC Function	Function Incompeleted
Can't Find Matched MCE Function	🗖 STEP[Warming]
Can't Find Matched SKP Function	🗖 Others
Can't Find Matched SKPE Function	
Ignored Syntax	
Stop Condition	
Stop Error Message Counts : 25	[1 50]
Stop Warning Message Counts : 25	[1 50]

In this options page, the user can specify the item that they do or do not want to check, and when the conditions for stopping the check have been met (when the number of error or warning messages has reached the specified limit), the system will cease the syntax check.

5 Table Entry and Editing

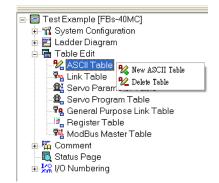
To give users a familiar interface for producing tables, communications parameters, and command table settings, the Winproladder application provides tabular entry features. The following is an introduction to the various tabular operations.

5.1 ASCII Table

For text table usage and internal representative meanings, please refer to Chapter 14 Advanced Functions in User manual II: Application of ASCII output files.

5.1.1 New ASCII Table:

Select[Project] \rightarrow [ASCII Table] \rightarrow [New ASCII Table]from the function toolbar; or select [New ASCII Table]from the dropdown menu by clicking on the $22 \rightarrow$ icon in the tool bar; or, in the project window, right-click and select [New ASCII Table]from [Test Example] \rightarrow [Table Edit] \rightarrow [ASCII Table]:



and the table edit window will appear:

🗣 Table Edit	X		
-Table Properties			
Table Type:	ASCII Table		
Table Name:	Substrate Division Production Sta		
Table starting address:	RO		
Table Capacity: Dynamic Allocation 			
C Fixed Length			
Load Table From PLC			
Load Table From ROR			
Description			
Substrate Division Production Statistics Table			
	>		
	OK X Cancel		

Input "Substrate Division Production Statistics Table" in the [Table Name] field, and define "R0" as the [Table Starting address], choose "Dynamic Allocation" for the [Table Capacity], and input any descriptive text that you would like to specify in the [Description] field :

😢 ASCII Table -	[Substrate Divis	ion Production S	itatistics Table]		_ 🗆 🖂
1	∎^	III		B	
Import Text([)	Export Text(<u>E</u>)	Calculator(<u>C</u>)	Setup(<u>S</u>)	Output Pre∨iew	
ASCII Editor					
					<u>_</u>
					~
<					>
Allow: 3840 words(A	Auto) Used	: 0 words		Cursor	position: R0[L]:
−Output Preview-					
					^
<					<u> </u>
		🗸 ОК	🗙 Cancel		

The text for the table that you would like to output can be input in the [ASCII Editor] field, and when you are inputting, you can preview your output in the [Output Preview] field below. Or you can click the Button, and select a text file that you would like to import, cutting down on the time needed for input:

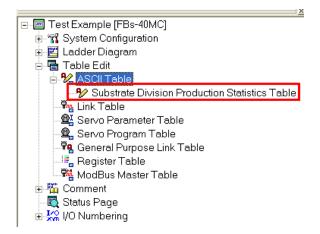
Open			2 🔀
Look in: 🚺	winproladder	- 🗢 🗈	📸 🎟 •
0701.txt Notest.txt			
M COSCIENC			
File name:	0701.txt		Open
Files of type:	Text File [*.txt]	•	Cancel

After you finish inputting, you may also click the $ExportText(\underline{E})$ icon and save to a new text file, so that you will be able to open and reuse the file at a later time.

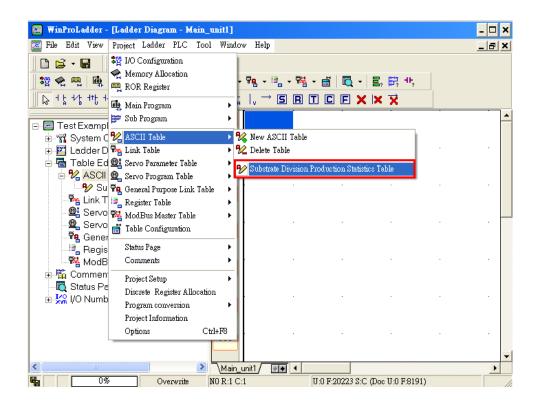
∎″

When you click the icon, you will enter the same window as when you select [New Table] and Setup(S)

enter the [Table Name] initial settings windows..., where you can perform additional renaming and description modifications. After you have finished editing the text table, press the "OK" button, and you will have completed the creation of the new text table, and you will see that a new item called [Substrate Division Production Statistics Table] has appeared in the [Project Window], as shown below:

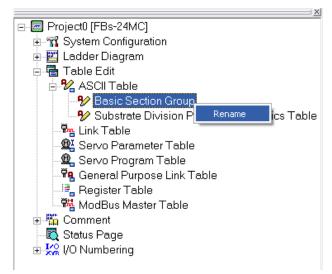


Also, under [Project] \rightarrow [ASCII Table] in the function menu, the new item [Substrate Division Production Statistics Table]will have also been created, as shown below:



5.1.2 Modify ASCII Table Name

In the project window, select the text table with the name [Basic Section Group], right-click on your mouse and select [Rename] from the popup menu that appears, and then you will be able to modify the name:

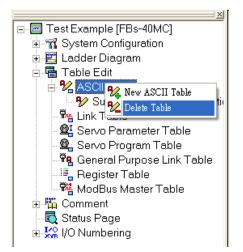


Or, you can double-click on the name of the [Basic Section Group] ASCII table, and select [Setup] in the ASCII table input window that appears, and you will also be able to modify the name.

📲 Table Edit	X
-Table Properties	
Table Type:	ASCII Table
Table Name:	Basic Section Group
Table starting address:	R1
Edit Length:	0
	,
Table Capacity: 💿 Dyna	amic Allocation
C Fixed	d Length
Load Table From PL	
Load Table From RC	JR.
Description	
2	<u> </u>
	OK 🗙 Cancel

5.1.3 Delete ASCII Table

Select [Project] \rightarrow [ASCII Table] \rightarrow [Delete Table] from the function toolbar; or click on the \mathcal{C} icon in the tool bar and select [Delete Table] from the dropdown menu; or, in the project window, in [Text Example] \rightarrow [Table Edit] \rightarrow [ASCII Table] right-click and select [Delete Table]:



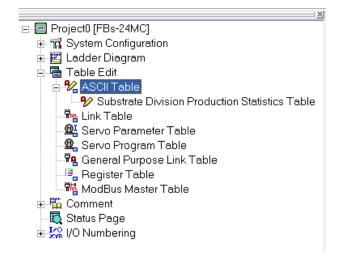
and the deleted text table window will appear:

Delete ASCII Table 🛛 🔀
Basic Section Group Substrate Division Production Statistics Table
✓ OK X Cancel

Use your cursor to select the "Substrate Division" ASCII table item, and press "OK", and you will see a deletion confirmation window:



Press "Yes", and the "Substrate Division" item under [ASCII Table] will have disappeared.

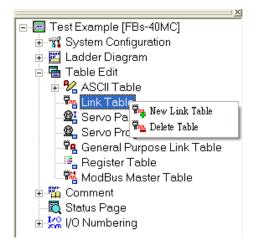


5.2 Link Table

5.2.1 General CPU LINK Communication Table

5.2.1.1 Create a New General CPU LINK Communication Table:

If you wish to create a new "General CPU LINK Communications Table", please execute [Project)]→ [Link Table]→[New Link Table] from the function toolbar; or click the icon in the tool bar and select [New Link Table] from the dropdown menu; or select [Test Example]→[Table Edit]→[Link Table]→[New Link Table] from the project window, as shown below:



An [Table Edit] window will appear, select "Normal Link Table" from the dropdown menu in [Table Type], input "General CPU LINK Communications Table" in [Table Name], and then set the [Table start address] and enter the necessary descriptive text:

🔹 Table Edit	\mathbf{X}					
-Table Properties						
Table Type:	Normal Link Table					
Table Name:	General CPU LINK Communicatic					
Table starting address:	RO					
Table Capacity: 💿 Dyn						
O Fixe	ed Length					
🗖 Load Table From Pl						
🗖 Load Table From R	OR					
Description						
General CPU LINK Comm	nunications Table					
V OK X Cancel						

The **[Table Capacity]** allows the user to choose whether to allow the system to automatically and dynamically set the editable length and size of the table, or to manually set a fixed length range and not let the table exceed this length. For example, if the user chooses a fixed table content length of 30:

📲 Table Edit	×					
-Table Properties						
Table Type:	Normal Link Table					
Table Name:	General CPU LINK Communicatic					
Table starting address:	RO					
Table Capacit <mark>y: O Dyna</mark>	amic Allocation					
Fixed Length 30 (Unit:WORD)						
Load Table From PLC						
🗖 Load Table From RO	R					
Description						
General CPU LINK Comm	unications Table					
<u>۲</u>						
OK X Cancel						

When adding a new communications item, the total length must not exceed 30.

🖏 Norm	al Link Table - [General C	PU LINK Co	ommunia	ations Tab	le]	🛛
🖬 Calcula		<u>s</u>) M	onitor(<u>M</u>)				
Link Co	mmand						l
Seq.	Command	Slave	Master		Slave	Dat	Add
0	Read	1	R200	< -	R200	20	
1	Read	1	R100	<-	R100	20	Insert
2	Write	1	D100	->	D100	20	Edit
3	Write	1	DO	->	D0	20	
							Delete
If th	he length of the	e next ite	em will ex	cceed 3	0,		
	will not be ab	le to cre	ate a new	comm	unication	s item	Move Up
<u></u>				comm	unication	s item.	
		\checkmark					Move Down
Allow: 30 v	words	Used: 2	9 words		Position: RC)-R28	
V OK X Cancel							

After you have finished specifying the settings, press "OK", and you will be able to begin editing the necessary [Link Command]:

🖬 Norm	al Link Table - [General CPU LINK	Communications Table]	_ 🗆 🔀				
Calcula	Calculator(C) Setup(S) Monitor(M)							
-Link Co	mmand							
Seq.	Command	Slave Master.	Slave Dat	Add				
				Insert				
				Edit				
				Delete				
				Move Up				
				Move Down				
Allow: 30	words	Used: 1 words	Position: R0-R0					
		v 0	K X Cancel					

[Calculator] field: brings up the simple calculator included in Windows, as shown below:

📓 Calcu	lator						
Edit View	v Help						
							0.
OHex	⊙Dec ○Oct ○	Bin	 Degrees 	🔘 Radia	ans	🔘 Grade	s)
🗌 Inv	Нур		Bac	kspace	CE		С
Sta	F-E ()	MC	7	3 9	/	Mod	And
Ave	dms Exp In	MR	4 5	5 6	×	Or	Xor
Sum	sin x^y log	MS		2 3	•	Lsh	Not
s	cos x^3 n!	M+	0+	ŀ .	+	=	Int
Dat	tan x^2 1/x	pi	AE	в с	D	E	F

[Setup] field: brings up the edit table window. The user can rename the editable window, or modify the initialization point, as shown below:

💀 Table Edit	X	
-Table Properties		Can rename
Table Type:	Normal Link Table	
Table Name:	General CPU LINK Communicatic	
Table starting address:	RO	
Edit Length:	1	
Table Capacity: • Dyna C Fixed		
🗖 Load Table From PL	Can modify Start ac	ldress
🗖 Load Table From RC	R	
Description		
General CPU LINK Comm	unications Table	
	<u>></u>	
 ✓ 	OK X Cancel	

[Monitor] field: can randomly monitor whether communication commands are successful or not, but you must be careful of one thing: the monitor feature can only be used with the "Z" hotkey (refer to Section 5.7 for details), which calls up the table, and cannot be executed from the communication commands table in the project management window.

🖏 Nom	🏪 Normal Link Table - [General CPU LINK Communications Table]							
Calcula -Link Co	-	🚀 Setup(<u>S)</u>	Konitor(<u>M</u>)				1
Seq. 0 1	Comma Read Write	und	Sla∨ 1 1	e Master. R0 R0	 <- ->	Slave . R0 D0	Dat 20 20	Add Insert
Result								
Туре		Value	De	escription				Delete
Seque Station	Result Code 00H Transaction Sucess Move Up Sequence No. 37H Move Up Station Number 00H Move Down Command Co 45H Block write slave discrete status							
Allow: 3840 words(Auto) Used: 15 words Position: R0-R14								
Allow: 5640 words(Auto) Used: 15 words Postbon: R0-R14								

If you wish to create a new communication command item, first press the "Add" button, and the following window will appear:

🐂 Link Command [Normal Speed]						
Slave Station:	1					
Command :	Read 💌					
Data Length :	1					
Master Data Start Address:	×0					
Slave Data Start Address :	×0					
🗸 ОК 🛛 🗶	Cancel					

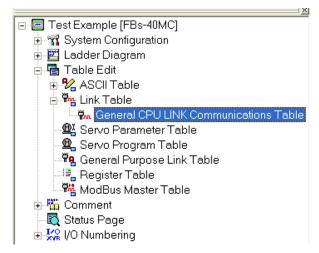
fill the relative master and slave communications settings, press "OK" and the newly specified data item will be created in [Normal Link Table]:

🖏 Norm	al Link Table - [G	eneral CP	J LINK Cor	nmunicat	ions Table	J	
Calculator(C) Setup(S) Monitor(M)							
Seq.	Command	Slave	Master		Slave	Dat	Add
0	Read	1	×O	<-	XO	1	Insert Edit Delete Move Up
Allow: 384	40 words(Auto)	Used: 8	words		Position: R	0-R7	Move Down

On the right side of the "Add" function button, there is also:

- Insert: inserts an item between 0 and 1 of the original items list, choose item 1, and then press the "Insert" button, and the same settings screen that appears when you press the "Add" button will appear, and now you can insert a data item, as shown below:
- 2. Edit: select the item that you would like to edit and press the "Edit" button, and the same settings screen as when you press the "Add" button will appear, and you can proceed the modification of the original data settings.
- **3. Delete:** select the item that you would like to delete, press the "Delete" button, and it will be deleted.
- 4. Move up: select item number 1, and press the "Move up" button, and you will move up one item number.
- 5. Move down: exactly the opposite as the move up button.

After the necessary [Link Command]have all been set, press the "OK" button, and you will have completed the creation of a [Link Table], and you will find a newly created table under the [Link Table]category in the [Project Window], as shown below:



5.2.1.2 Modify General CPU LINK Communication Table Names:

Follow the procedures described in [Modify ASCII Table Name] of Section 5.1.2, or, in the table edit window, click the "Settings" button.

5.2.1.3 Delete General CPU LINK Communication Table:

Follow the procedures described in [Delete ASCII Table]in Section 5.1.3.

5.2.2 High-speed CPU LINK Communication Table

5.2.2.1 Create New High-Speed CPU LINK Communication Table:

Follow the same procedures as in [create new general CPU LINK communication table] in Section 5.2.1. The only difference is, in the [Table Edit] window that is brought up, you must select "High Speed Link Table" from the dropdown menu in [Table Type], as shown below, the rest is exactly the same:

📲 Table Edit	X						
-Table Properties							
Table Type:	High Speed Link Table						
Table Name:	general CPU LINK communicati						
Table starting address:	RO						
Table Capacity: Dynamic Allocation 							
C Fixed Length							
Load Table From PL	c						
Load Table From RC)R						
Description	(mm)						
general CPU LINK commu	inication table 🔄 🔄						
	<u>></u>						
V OK X Cancel							

After you press the "OK" button, a [High Speed Link Table] window will appear, press "Add" and a [Link Command] window will appear, as shown below:

🐂 High Speed Link Table - [general CPU LINK communication table] 📃 🔲 🔀								
፼ Calculator(<u>C</u>) S	High Stranger	Speed]						
Link Command Seq. Command	Broadcaster Station:	1	. Add					
	Command :	H_Link 💌	Insert					
	Data Length :	10	Edit					
	Data Start Address:	R100	Delete					
			Move Up					
Allow: 3840 words(Auto)	🗸 ок	🗙 Cancel	Move Down					
	🗸 ок	🗙 Cancel	-					

Enter "1" into the [Broadcaster Station] field, set the [Data Length] and [Data Start Address], press the "OK" button, and you have completed a high speed Link communication command, as shown below:

🐂 High	🏧 High Speed Link Table - [general CPU LINK communication table] 📃 🗖 🔀						
Calculator(C) Setup(S) Monitor(M)							
Seq.	Command	Broad	Data		All Stat	Dat	Add
0	H_Link	1	R100	->	R100	10	Insert Edit Delete Move Up
Allow: 38	40 words(Auto)	Used: 8	words		Position: R	0-R7	Move Down
			🗸 ОК	🗙 Can	cel		/

You can also use the "Insert" button to insert a communication command; or select the communication command that you would like to modify, and press the "Edit" button, and you will be able to modify it; press the "Delete" button and you will be able to delete the communication command. Use the "Move Upward" and "Move Downward" buttons to change the order and sequence of the various communication commands.

5.2.2.2 Modify the High-Speed CPU LINK Communication Table Name:

Follow the same procedures and in [Modify ASCII Table Name]in Section 5.1.2, or, click the "Setup" button during table editing.

5.2.2.3 Delete a High-Speed CPU LINK Communication Table:

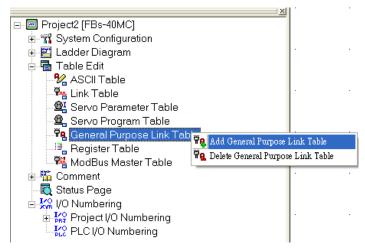
Follow the same procedures as described in [Delete ASCII Table] of Section 5.1.3.

5.2.3 General Purpose Link Table (Mode1,2)

5.2.3.1 Create New General purpose Link Table (Mode1,2) :

Execute [Project]→[General Purpose Link Table]→[Add General Purpose Link Table] from the

function toolbar; or, click the \square icon and select [New General Purpose Link Table] from the dropdown menu; or, in the project window, select [Text Example] \rightarrow [Table Edit] \rightarrow [General Purpose Link Table] right-click and select [Add General Purpose Link Table], as shown below:



Use the same settings as in [Create New ASCII Table] to specify the settings for the name and other items in [General Purpose Link Table] below:

📲 Table Edit	
-Table Properties	
Table Type:	General Purpose Link Table 💌
Table Name:	Create New Generic Communic
Table starting address:	RØ
Table Capacity: 💿 Dyna	amic Allocation
C Fixed	d Length
Load Table From PL	c.
Load Table From BC	
 Description Create New Generic Com 	munication Table
Credie New Generic Com	
<	>
✓ (DK 🗙 Cancel

Press the "OK" button, and you will enter the [Communication Parameter Settings] screen:

📲 General	Purpose Link Table	- [Create New Generic	Communication Table]				
🚟 Calculator	*** (<u>C</u>) Setup(<u>S</u>)	Monitor(<u>M</u>)					
-Comm. Pa	rameters Setting						
Mode:	0:Transmit only or	Receive only	•				
0:Transmit only or Receive only							
	1:Transmit then re	ceive or Receive then	ı transmit				

[Communication Mode] 0: only transmit messages/only receive messages.

1: receive message after transmission of message/transmit message after

receiving of message.

[Start Code]: set Start code of receiving.

[End Code]: set End code of receiving.

📲 General Purpo	se Link Table - [(Create New Generic	Communication Table	ı 💶 🛛
Calculator(<u>C</u>) -Comm. Parame Mode: 0:Tra	Setup(<u>S</u>) ters Setting ansmit only or Re		_	Start Code: 0 End Code: 0
Command Edit 99, AAh, 'AB''				
Allow: 3840 words(A	Auto) Used:	9 words	Position: R0-R8	
Data Preview	1	1		
Ref	Decimal	Hexadecimal	String	
RO	0	0000H	1.1	
R1	0	0000H	1.1	
R2	6	0006H	1.1	
R3	99	0063H	' c'	
R4	170	00AAH	1.1	
R5	65	0041H	'A'	
R6	66	0042H	'B'	
R7	39	0027H	1.00	
R8	99	0063H	' c'	
Length: 4	Checksum(BYTE) =	90 CRC16 =	8E 21	
		🗸 ОК 🔰	🕻 Cancel	

[Command Edit]: when in the middle of editing, you can preview in the [Data Preview] section below.

[Data Preview]: you can use your mouse to drag and drop ranges, and the calculated checksum and CRC16 values will be displayed below in the status bar. Press the "OK" button, and you will have completed the creation of a new General Purpose Link Table.

5.2.3.2 Modify General Purpose Link Table (Mode1,2)Name:

You can follow the procedures described in [Modify ASCII Table Name]in Section 5.1.2, or, during table editing, click on the "Setup" button.

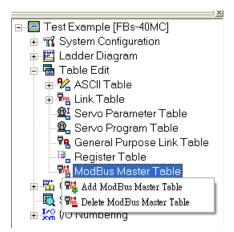
5.2.3.3 Delete General Purpose Link Table (Mode1,2):

Follow the procedures described in [Delete ASCII Table] in Section 5.1.3.

5.2.4 ModBus Master Communication Table

5.2.4.1 Create ModBus Master Communication Table:

Execute [Project]→[ModBus Master Table]→[Add ModBus Master Table] from the function toolbar; or, click on the roject window, select [Text Example]→[Table Edit]→[ModBus Master Table] right-click and select [Add ModBus Master Table] as shown below:



As before, in the [Table Edit] window that appears, enter the [Table Name] and whatever other additional items:

📲 Table Edit	X					
-Table Properties						
Table Type:	ModBus Master Table					
Table Name:	ModBus Master Table					
Table starting address:	RO					
Table Capacity: Dyna 						
C Fixed Length						
Load Table From PL	с					
🗖 Load Table From RC)R					
Description						
ModBus Master Table						
	~					
<u><</u>	>					
	OK X Cancel					

press the "OK" button and the following will appear:

ModBus	Master Table -	ModBus Mast	er Table]				
Calculator(C) Setup(S) Monitor(M)							
Seq.	Command	Slave	Master Data	Slave Data	Data S	Add	
	Insert						
						Edit	
Allaun 2040 m		Used: 3 word	. T	osition: R0-R2		Delete	
Allow: 3840 w	/0103(A010)	Jusea: 3 Wora		Cancel		· · · · · · · · · · · · · · · · · · ·	
				Cuncer			

The following procedures are the same as in [Create General CPU LINK Communication Table] in 5.2.1, with features such as "Add", "Insert", "Edit", "Delete", "Move Up", "Move Down", etc. Create three new communication commands, as shown below:

📲 ModBus Master Table - [ModBus Master Table]							
	Calculator(C) Setup(S) Monitor(M)						
Seq.	Command	Slave	Master Data		Slave Data	Data S	6.44
0	Read	1	MO	<-	000001	10	Add
1 2	Read Write	1 1	R0 R100	<- ->	400001 400101	2 1	Insert
							Edit
<							Delete
Allow: 3840 words(Auto) Used: 24 words Position: R0-R23							
			🗸 ОК 🛛 🗶	Cano	cel		

Press the "OK" button, and you will have completed the creation of the new ModBus master table.

5.2.4.2 Modify ModBus Master Table Name:

You can follow the procedures described in [Modify ASCII Table Name] of Section 5.1.2, or, during table editing, click the "Setup" button.

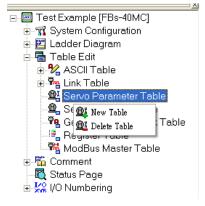
5.2.4.3 Delete ModBus Master Table:

Follow the same procedures as in [Delete ASCII Table] in Section 5.1.3.

5.3 Servo Parameter Table

5.3.1 Create New Servo Parameter Table

Execute [Project] \rightarrow [Servo Parameter Table] \rightarrow [New Table] from the function toolbar; or, click on the icon in the tool bar and select [New Table]from the dropdown menu; or, in the project window, select [Test Example] \rightarrow [Edit Table] \rightarrow [Servo Parameter Table] right-click on your mouse and select [New Table], as shown below:



As before, enter the [Table Name] items in the [Table Edit] window that appears:

📲 Table Edit	X
Table Properties	
Table Type:	Servo Parameter Table 💌
Table Name:	Create New Server Parameter
Table starting address:	R5200
Table Capacity: 💿 Dyna	amic Allocation
C Fixed	d Length 24 (Unit:WORD
Load Table From PL	С
🗖 Load Table From RC)R
Description	
Create New Server Param	neter Table
	<u>~</u>
	>
	DK X Cancel

After you press the "OK" button, the following window will appear, enter the appropriate values according to the proper order and item fields:

Servo Рага л	Servo Parameter Table - [Create New Server Parameter Table]						
Calculator(<u>C</u>)	ም ያ Setup <u>(S)</u>						
R5200	0.Unit :	1:Pulse	R5213	10.+ Movement Compensation :	0 Ps		
R5201	1.Pulse/Rev.(16Bit):	0:Mechanical 1:Pulse	R5214	11 Movement Compensation :	0 Ps		
DR5202	2.Distance/Rev. :	2:Compound	R5215	12.Dec. Time :	0 mS		
R5204	3.Min. Unit :	2 🔹	R5216	13.Interpolation Time Constant:	500 mS		
DR5205	4.Max. Speed :	512000	DR5217	14.Pulse/Rev.(32Bit):	0		
DR5207	5.Start/End Speed :	141	R5219_LB	15_0.DOG Input:	Not Used 💌		
R5209	6.Creep Speed:	1000	R5219_HB	15_1.Stroke Input:	Not Used 💌		
R5210	7.Backlash Compensation :	0 P:	s R5220_LB	15_2.PG0 Input:	Not Used 💌		
R5211	8.Acc./Dec. Time :	5000 m	s R5220_HB	15_3.CLR Output:	Not Used 💌		
R5212_LB	9_0.Direction Control :	0:Up 💌	DR5221	16.Machine Zero Point:	0 Ps		
R5212_HB	9_1.Zero Return Direction:	1:Down(Left) 💌	R5223	17.PG0 Count:	1		
Allow: 2872 words(Auto) Used: 24 words Position: R5200-R5223							
Reset To Default V OK X Cancel							

[Unit]: you can choose either "Mechanical", "Pulse", or "Hybrid" in the dropdown menu.

[Direction Control]: you can select either "UP" or "DOWN" in the dropdown menu.

Press the "OK" button, and you have completed the creation of a new Servo parameter table.

5.3.2 Modify Servo Parameter Table Name:

You can follow the procedures described in [Modify ASCII Table Name] in Section 5.1.2, or, during table

editing, you can click the "Setup" button.

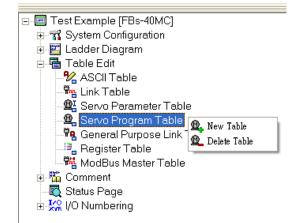
5.3.3 Delete Servo Parameter Table:

Follow the procedures described in [Delete ASCII Table] in Section 5.1.3.

5.4 Servo Program Table

5.4.1 Create New Servo Program Table:

Execute [Project]→[Servo Program Table]→[New Table] from the function toolbar; or, click on the icon and select [New Table] from the dropdown menu; or, in the project window, select [Test Example]→[Table Edit]→[Servo Program Table] right-click and select [New Table], as shown below:



As before, enter the [Table Name] items in the [Table Edit] window that appears:

📭 Table Edit	X			
-Table Properties				
Table Type:	Servo Program Table			
Table Name:	Create New Server Command			
Table starting address:	R155			
Table Capacity: 🖲 Dyna	amic Allocation			
C Fixed	d Length			
Load Table From PL	c			
🗖 Load Table From RC	R			
Description				
Create New Server Comm	and Table 🗾 🗾			
	✓			
<u> </u>				
OK X Cancel				

press the "OK" button and the following will appear:

🖳 Сегис) Program Tab	le - [Create New Server	Command Ta	ible]	
-Servo (Command				
Step.	Speed	Movement Action	Wait	Go To	Add
					Insert
					Edit
					Delete
					Move Up
Allow: 36	85 words(Auto)	Used: 2 words	Po	sition: R155-R156	Move Down
		🗸 ОК	🗙 Cance	el	

press the "Add" button, and select the required items and values in the proper order:

Motion Com	nand Item 🛛 🔀
Speed	D 1 000
	R1000
Movement:	
Wait:	WAIT TIME 100
Go To :	NEXT
	🗸 OK 🗶 Cancel

- The [Operation] field: the "DRV" command is used to operate the motor, while the "ABS" setting uses the absolute coordinates to represent distance of movement, and the "ADR" setting represents the distance of movement in relative coordinates. For example, if the current location was 100mm, and you wish to move to 300mm, then you would want to set the positioning commands to the following:
- 1. Expressing the movement distance using absolute coordinates:

Motion Com	nand Item 🛛 🔀
Speed :	R1000
Mo∨ement:	DRV • ABS • 300 Ut •
Wait :	WAIT TIME 100
Go To :	NEXT
	VOK X Cancel

2. Expressing the movement distance in relative coordinates:

Motion Comman	ıd Item 🛛 🔀
Speed: R	1000
Movement: D	RV • ADR • + • 200 Ut •
Wait: 🛛 🕅	
Go To : 🛛 🕅	EXT
	V OK X Cancel

After you press the "OK" button, the following window will appear, and as before, you can select the [Servo Program] that you have already created, and click on the "Insert", "Edit", "Delete", "Move Up", and "Move Down" functions on the right:

💁 Serve	Program Tab	le - [Crea	te New Server	Command T	able]	
🖬 Calcula		71 tup(<u>S</u>)	Monitor(<u>M</u>)			
-Servo (Command					l
Step.	Speed	Movem	ent Action	Wait	Go To	Add
1	SPD R10	DRV A	DR,+, 200,Ut	WAIT TI	GOTO NEXT	Insert
						Edit
						Delete
						Move Up
Allow: 36	85 words(Auto)	U	sed: 11 words	Po	sition: R155-R165	Move Down
			🗸 ОК	🗙 Cance	el	

Press the "OK" button, and you have completed the created new Servo command table operation.

5.4.2 Modify Servo Program Table Name

Follow the procedures described in [Modify Text Table Name] in Section 5.1.2, or, during table editing, click on the "Setup" button.

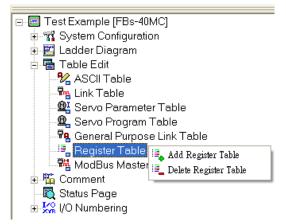
5.4.3 Delete Servo Program Table:

Follow the procedures described in [Delete Text Table] in Section 5.1.3.

5.5 Register Table

5.5.1 Create New Register Table:

Execute [Project]→[Register Table]→[Add Register Table] from the function toolbar; or, click on the icon in the tool bar and select [Add Register Table] from the dropdown menu; or, in the project window, select [Text Example] \rightarrow [Table Edit] \rightarrow [Register Table] right-click and select [Add Register Table], as shown below:



As before, in the [Table Edit] window that appears, enter the [Table Name] items:

📲 Table Edit	
-Table Properties	
Table Type:	Register Table
Table Name:	New Register Table
Table starting address:	RO
Table Capacity: 🖲 Dyna	amic Allocation
C Fixed	d Length
Load Table From PL	c
Load Table From RC	
Description	
New Register Table	<u>^</u>
	~
<	>
√ (DK X Cancel

After you press the "OK" button, the following will appear:

📲 Register	Table - [New R	egister Table]		
🖼 Calculator(∑) Setup(S	9		
-Register D]
Ref	Data Type	Data	Description	Add
				Insert
				Edit
477 - 2040	1 (1			Delete
Allow: 3840 w	ords(Auto)	Used: 0 words]
		🗸 ОК	🗙 Cancel	

After you press the "Add" button, the following window will appear:

Data width: you will have a choice of either a "Word (16-bit)" or "Double Word (32-bit)".

📲 Register Date	. 🔀
Ref.:	R0
Data Type:	WORD(16Bits)
Data:	0
Description:	
	<
	🗸 OK 🛛 🗶 Cancel

After you press the "OK" button, the following window will appear:

As before, you can also select the [Servo Program] that you have already created, and select the "Insert(", "Edit", "Delete", "Move Up", and "Move Down" functions on the right:

😫 Register Table - [New Register Table]	
Calculator(<u>C</u>) Setup(<u>S</u>) Register Data	
Ref Data Type Data Description R0 WORD(16Bits0	Add
	Insert
	Edit
Allow: 3840 words(Auto) Used: 1 words Position: R0-R0	Delete
VOK X Cancel	

Press the "OK" button, and you have completed the operation for creating a new register table.

5.5.2 Modify Register Table Name:

Follow the procedures described in [Modify Text Table Name] in Section 5.1.2, or, during table editing, click the "Settings" button.

5.5.3 Delete Register Table:

Follow the procedures described in[Delete Text Table]in Section 5.1.3.

5.6 Table Configuration

Execute [Project]→[Table Configuration]from the function toolbar; or, click the icon from the tool bar, and the following settings window will appear:

🚾 Table Setup				×
-Table List				
Name	Start Ad	End Ad	Allocated	Setting
፼ motion_0 ¶m New Connecti	R5000 R100	R5001 R100	Dynamic Dynamic	Edit
				Delete
				Update to PLC
				Range Check
		🗸 ок]	

You can first click on any table name under the [Table List], and then select one of the following buttons on the right-hand side:

- 1. [Settings]: re-set the [Table Name], [Start Address], or descriptions settings for the chosen table.
- 2. [Edit]: re-modify the content and commands in the chosen table.
- 3. [Delete]: deletes the chosen table.
- 4. [Update to PLC]: when there has been an adjustment of settings or modification of contents, you can press this button to update the changes to the PLC.
- 5. [Range Check]: the system will automatically check the table settings, and will list the results under [Message] item, as shown below:

🕅 Table Setup				X
Table List				
Name	Start Ad	End Ad	Allocated	Setting
%[New Text Ta motion_0	R106 R5000	R112 R5001	Dynamic Dynamic	Edit
🐘 New Connecti	R100	R107	Dynamic	Delete
				Update to PLC
				Range Check
Message				
Table [New Connections Table] and [[New Text Table] overlap				
🗸 ок				

Therefore, when you are setting and adjusting your tables, you can directly click the "Range Check" button, and you will be able to modify the various tables according to the messages listed under the [Message] item.

5.7 Creating and Bringing Up Tables in the Ladder Diagram Using Hotkeys

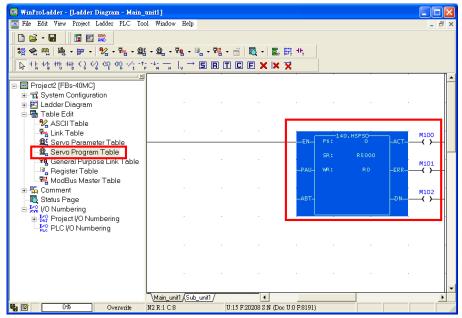
Zooming: rapidly create or bring up tables stored in the PLC with the hotkey "Z", which can be applied to any function instruction that has table contents, such as communication instruction (FUN151), the high-speed pulse output instruction (FUN140) for NC position control, the parameter setting instruction (FUN141) for NC positioning...etc

Bring Up Table:

With the procedures described in Sections 5.1 through 5.6, we can create and modify tables, and we can also obtain information on all tables in a project via the project window, but there is no way of knowing where tables are used in the ladder diagram program, therefore, if a instruction in the ladder diagram program area uses a table output, we could select this function instruction using our mouse, and press the "Z" button, and the settings window for this table will appear, to provide you with a quick and convenient channel for modification and editing.

Create New Table:

If, when opening the existing file, you opened the program data in the PLC by executing [File] \rightarrow [Open] \rightarrow [Connect to PLC] and choosing not to open the corresponding program, then the project program in the PLC will be brought up and displayed on the screen, and there will be function instruction in the ladder diagram program area, as shown below:



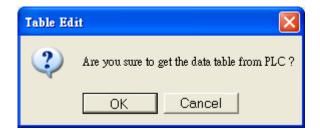
Place the cursor on the above location, and press "Z", then the following confirmation dialog box will appear:

Table Ed	it 🛛 🛛
2	No matched table were found, create a new one?
	Yes No

Because Zooming reflects the table content in the PLC program, and not the table content stored in the project in the PC therefore, select "Yes" in this confirmation dialog box, and the following window will appear, and you can create a new Servo command table for the project displayed on the screen:

📲 Table Edit	X
-Table Properties	
Table Type:	Servo Program Table
Table Name:	motion_0
Table starting address:	R5000
Table Capacity: 🖲 Dyni	amic Allocation
C Fixe	d Length
Load Table From PL	с
🗖 Load Table From RC	DR
Description	
	<u>></u>
	OK X Cancel

The frame in the above window is checked and unchecked here, and the created new Servo command table in Section 5.4 cannot select this. Therefore, whenever you enter "Motion_0" into the [Table Name] and press the "OK" button, the following confirmation dialog box will appear, confirming whether or not to load the table data from the PLC. It should be noted that only when connected to the PLC can you load data from the PLC.



Press the "OK" button, and the function instruction table selected on the screen will be copied from the table in the project in the PLC and displayed in the project on the screen, and after you have completed the creation process, you will find that a "motino_0" item has been added to the [Servo Program Table] in the [Project Window] in the project on the screen, as shown below:

📰 WinProLadder - [Ladder Diagram - d	lain_unit1]			
[File Edit View Project Ladder PLC	Tool Window He	lp		_ 8 ×
월 �� 및 ll♣ + jpr + 1 ℃ - 1%	- <u>@1</u> - @ # 9 -	· 📃 • 🎘 • 🚔	🐻 🗃 🗐 📖 🖽	
ိုး ၊ ၊ ၊ ၊ ၊ ၊ ၊ ၊ ၊ ၊ ၊ ၊ ၊ ၊ ၊ ၊ ၊ ၊ ၊				-
	тірім нім			
⊡				<u> </u>
🗉 🧱 Ladder Diagram		ENPs:	40.HSPSO	M100
🖻 🖶 Table Edit			0	
📲 🕺 ASCII Table		SR:	R5000 -23206	M101
- The Link Table		-PAU- WR:	RO -ERR	
E 🖳 Servo Program Table			1	
				M102
General Purpose Link T		-ABT-	-DN-	
Register Table				
📲 ModBus Master Table				
🕀 🎬 Comment				
🔂 Status Page	1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -	1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -	1. Sec. 1. Sec	• ·
E LO Numbering E LO Numbering				
	· · · · · · · · · · · · · · · · · · ·			· •
				•
😋 🔜 📕 Overwrit	e N13 R:1 C:9	U:15 F:2	0208 S:N (Doc U:0 F:819)	l) //

And now you have completed the procedure for creating a new table in the project displayed on the screen by using the contents of a table stored in a project in the PLC.

6 Comments Information

Like other program editors, WinProladder provides an annotations feature. Annotations can be made for components, networks, or program units. Annotations can be hidden or displayed, allowing easy maintenance, and increasing program readability.

6.1 Program Unit Comment

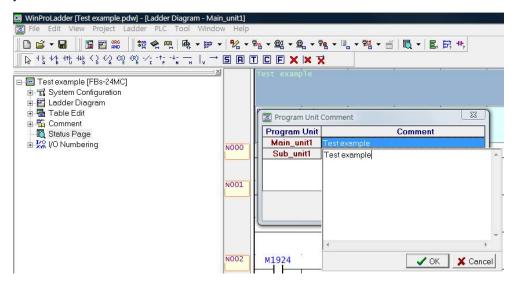
When there are many program units, we will need to add annotations for the program units, so that future checking and modifications can be performed with more convenience.

Enter Program Unit Comment:

Please refer to the procedures described in [Enter Program Unit Comment] in Section 4.3.5.

Modify Program Unit Comment:

You can modify annotations by using the same method that you used in inputting the original annotations, or, you can double-click on the annotations display area in the cascaded graphical program area, and you will be able to modify the annotations:



Delete Program Unit Comment:

You can take advantage of the program unit description annotations modification procedures to clear all descriptive text; or, click on the annotations in the ladder diagram program area with your mouse, and press the "Delete" hotkey, which will delete directly.

6.2 Network Comment

In a program unit, there will have many networks of program, and each has its unique function, therefore, if we can annotate each network according to its function, future maintenance of the program can be performed much more conveniently.

6.2.1 Enter Network Comment Mode of Operation

With your mouse, select [Project] \rightarrow [Comment] \rightarrow [Network Comment] from the function toolbar, or click the icon in the tool bar; or in the project window, select [Text example] \rightarrow [Comment] \rightarrow [Network Comment] and double-click, and the [Network Comment] inputting area will appear:

dain_unit1 Sub_unit		
Ladder No.	Comment	-
N0000		
N0001		
N0002		
N0003		-

The annotations input procedures are as described in [Enter Program Unit Comment] in Section 4.3.5. After you finish inputting:

Main_unit1 Sub	_unit1	
Ladder No.	Comment	-
N0000	Program start.	
N0001		
N0002		
N0003		
	О К	

Press the "OK" button, and you will have completed the annotations for the solution network:

🖼 WinProLadder [Test example.pdw] - [Ladder Diagram - Mair	n_unit1]				
File Edit View Project Ladder PLC Tool Window	w Help				
🗅 🚔 🖌 📕 🛱 🔤 🕮 🧤 😪 🖳 🏟 🕶 🖛	1 1/2 -	₩ <u>+</u> • <u>@</u> ; • <u>@</u> , •	98 - II 9	🐫 - 🗃 🛛 🔯	- E, E, 4,
$\blacksquare \textcircled{\begin{tabular}{ c c c c c } \hline & & & & & & & & & & & & & & & & & & $	SR		X		
Image: System Configuration Image: Status Page Image: Status Page Image: Status Page	N000	Test example Program start TO TO TO			

6.2.2 Choose Single Network Comment Mode of Operation

You can also click the network labeled N000 or its components in the ladder diagram program area, and then right-click and select [Network Comment] from the popup menu that appears, then the input area for [Network Comment] will appear:

Program start.	
	-
*	1 E

Press the "OK" button, and you will have completed the network annotation procedures.

Modifying Network Comment:

Please refer to the procedures described in [Modify Program Unit Comment] in Section 6.1.

Delete Network Comment:

Please refer to the procedures described in [Delete Program Unit Comment] in Section 6.1.

6.3 Element Comment

A program unit is composed of many networks of program, while the networks are composed of various components, therefore, considering the vast number of components in a program unit, there is even greater need to provide annotations for the various components.

Enter Element Comment Mode of Operation:

With your mouse, select [Project] \rightarrow [Comment] \rightarrow [Element Comment] from the function toolbar, or click on the the icon in the tool bar; or in the project window, double-click on [Test example] \rightarrow [Comment] \rightarrow [Element Comment] and the [Element Comment] input area will appear:

🔟 Element Co	omment							
P All	🗖 Used	🗖 Unused	<mark>ا</mark> Imp		∎ [®] Export	₿ Refresh	d Clear All	<u> </u> Clear Unused
₩ X	Y Mo M	₩ <u>S</u>	T 6T	₽0	<mark>⊪</mark> <u>B</u>	⁸⁸⁸ <u>D</u>		
Ref. No.	Comment		Desc	ription				*
XO								
X1								
X2								
X3								
X4								
×5 ×6								
×0 X7								
X8		_						
X9					-			
X10								
X11								
X12								-
U:0 F:8191		Shift+Sp	ace:Toggl	e store to l	adder or Pro	ject		

Select [All] combined with option [Y], and the total amount of used and unused Y coil components will be listed in the annotations input area, and there will be a check mark beside the used coil reference numbers:

Element Co	omment						
P All	Contraction Used	C Unused	tan Import	∎ ″ Export	€ Refresh	d Clear All	<u> </u> Clear Unused
XX X	Y 💑 M	<u>sp</u> <u>S</u>	10 T 🐺 C	B B			
Ref. No.	Comment		Description				*
Y0 🗹							
Y1 🖌							
Y2 🕜							
Y3 🖌							
Y4 🖌 Y5 🗸							
15 ♥ Y6 ♥		-		-			
Y7 🗸							
Y8							
Y9							
Y10							
Y11							
Y12							*
U:0 F:8191		Shift+Spa	ce:Toggle store to	Ladder or Pro	ject		11
			Y			ed Unused	

Select [Used] combined with option [Y], and then all used Y coil components will be listed in the annotations input area:

P All	Used	🗖 Unused	imp		∎ ⁷ Export	₽ Refresh	d Clear All	<u> </u>
¥X [Y M M	<u> </u>	T 😽	2 🦉	B B			
Ref. No.	Comment		Desc	ription				
/0				- 28				
/1								
/2								
/3								
/4								
/5								
′ 6								
(7								

Select [Unused] combined with option [Y], and all unused Y coil components will be listed in the annotations area; select [Export], and the following screen will appear:

All	🛅 Used	Conused	ै≣ Import	∎ Export	₽ Refresh	<u> </u> Clear All	<u> </u> Clear Unused
👯 🛛 🛛 🏹	Y Comn	nent Import	11 MUNI	i nan i		_X_)	
Ref. No. Y8 Y9 Y10	Con File	e ile Name:				B	Ċ
Y11 Y12 Y13 Y14 Y15 Y16 Y17		Id Comments Description	[] 전 되 [] 전 되	nput Points] Dutput Relays] nternal Relays] Step Relays]	₽ <u>R</u> [Registe	r]	
Y18 Y19 Y20			🗸 ок	🗙 Cancel			

Set the export file name, select the items and data ranges that you wish to export, and then press the "OK"

button. The exported file will be a text file. You can use this file if you decide to import it one day by selecting the [Import] option, where its settings are the same as the [Export] option. Component annotations can be integrated with other software applications via the export and input functions.

The [Refresh] button:

When you open the component annotations window, and, at the same time, create a new unused X5 component in the cascaded graphical program area, then the original X5 in the component annotations window will be an unused component, but if you press the [Refresh] button, the status of X5 will be changed to a used component.

Ali	Used	C Unused	tmport	Export	₽ Refresh	d Clear All	d Clear Unuse	ed
	* Y M M		I BC	B				
Ref. No. KO	Comment		Description					<u>^</u>
K1 (🔟 Element Comr	nent						
K2 K3 K4	Ali	Used	Dunused	<mark>™</mark> ≣ Import	∎ [®] Export	€ Refresh	d Clear All	d Clear Unused
K5	👯 🗶 🛛 👯 Y	. Mo M	<u>s s</u>	I 📴 C	R B	вав <u>D</u>		
K6 K7	Ref. No.	Comment	C	escription)				
<8	X0 ✓ X1							6
K9	X2							
K10 K11	X3							
(12	X4							
0 F:8191	×5							
0 F.8191	×6 ×7							
	×7 ×8							
	X9							
	×10							
x	X11							

The [Clear All] button:

It can clear all [Comment] and [Description], as shown below:



After you confirm the clear all operation, all descriptions and annotations in the project files will be deleted from the storage disk, and if you are connected to the PLC, then the following screen will appear, which represents that the annotations and descriptions in the PLC will also be deleted:



The [Relocation] button:

Because component annotation and descriptive texts are stored dynamically, therefore the [Relocation] button can re-organize memory allocation and release even more comment space.

Enter Description Mode of Operation:

Double-click on the blank space in the [Comment] area on the right of X0 and enter the annotation "Switch", double-click on the [Description] field and enter "Contact A":

All	Used	🗖 Unused	ື∎ Import	∎ ⁷ Export	₿ Refresh	d Clear All	<u> </u> Clear Unused	Relocation
👯 🕹 🛛 👯 🕻	Y 🐘 М	<mark>罪</mark> S	2 🖏 I 🐻	🚏 B	📅 <u>D</u>			
Ref. No.	Comment		Description					
🗙 🖌 🖌 Xwit	ch	Contact	A					1
X1								
X2								
X3								
X4								
X5								
×6								
X7								
×8								
×9								
×10								
X11								
X12								

After you have completed the component annotations input, click on the upper right-hand corner and close this window, and you will find that the previously entered annotation text has appeared under the X0 component in program unit one, and that when you place the cursor over X0, a small frame containing the entered descriptive text will appear:

🥅 WinProLadder - [Ladder Diagram - Main_unit1]					
🔤 File Edit View Project Ladder PLC Tool Windo	w Help				
📙 🖻 🖌 📓 📓 🧱 📰 🎇 🍕 🖳 🖷 🕶 🕶	• 😪 • 🖬	• <u>@i</u> • <u>@</u> • 98	• 18 <u>.</u> • 9 <u>M</u>	• 🝵 🛛 🟹 •	吕, 曰, 바,
$\fbox{} \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow \downarrow$	SRT	C E X X X			
≥ Project0 [FBs-24MC] ⊕ 17 System Configuration ⊕ 12 Ladder Diagram ⊕ 13 Table Edit ⊕ 16 Comment	N000	X0 Switch Contact A		21 I	2 1 2

And now you have completed the input of component description annotations.

Modify Element Comment:

Please refer to the procedures described in [Modify Program Unit Comment] in Section 6.1.

Delete Element Comment:

Please refer to the procedures described in [Delete Program Unit Comment] in Section 6.1.

6.4 Show Comments

Please refer to the procedures described in [Control of Ladder Diagram Display] in Section 7.2.

7 Manipulating the Display of the Ladder

Diagram

The most important aspect of this application is that of cascaded program input, therefore, we naturally provide a complete display of information in display windows. The procedure for operation of this display is described in the following.

7.1 Usage of the Windows

We provide multiple window displays for ladder programs, where the user can simultaneously display different segments of the program, and perform convenient operations such as comparing, copying, and editing.

7.1.1 Create Multiple Ladder Diagram Display Windows

A project is divided into the main program area and sub program areas, and they can each create new program pages, as shown in the illustration below. The user can switch between various program areas by clicking the various "Page Label" buttons:

Represents that the current window opened is ladder diagram display 1 – M,ain_unit 1

to switch between pages

WinProLadder [Test example.pdw] - [La] File Edit View Project Ladder	•								
				7					
鑽 📌 唄 툨 ▾ 脚 ▾ 🐕 ▾ 🐂				in the second					
ଜ + ¦ + ଧୁ + ଅକ୍				X					1
Project0 [FBs-24MC]	<u>⊐</u> ≚ N000								-
🗄 📆 System Configuration 🖻 🕎 Ladder Diagram									
🖻 👼 Main Program	N001		20	21		20			
ﷺ Main_unit1 ﷺ Switch Control									
- 2: Channel Control	N002	10			2	25		\$1.	
上記 Change Control 日間、Sub Program									
El-or, Sub Program El El Sub_unit1			20	20	20	20	12		-
🖻 🖶 Table Edit 🗊 🌇 Comment	N003								
🛛 🛃 Status Page									
🗄 🔀 I/O Numbering	N004		20	11	1	10			
	N005	10	10	46		45		(d)	
			20		21	20			
	N006			10	-10	200			
		ub_unit1 / Switch C			Control /				ľ
Overwrite	N0 R:1 C:1	U:0 F	:20223 S:A (Do	c U:0 F:81					

We first place the cursor on the program window "Main_unit1", then execute [View] \rightarrow [New Window] from the function toolbar, and the system will open a ladder diagram display 2 window, which includes the program label page for "Main_unit1", whose content is the same as the content in the "Main_unit1" label page for the original ladder diagram display 1, as shown in the illustration below:

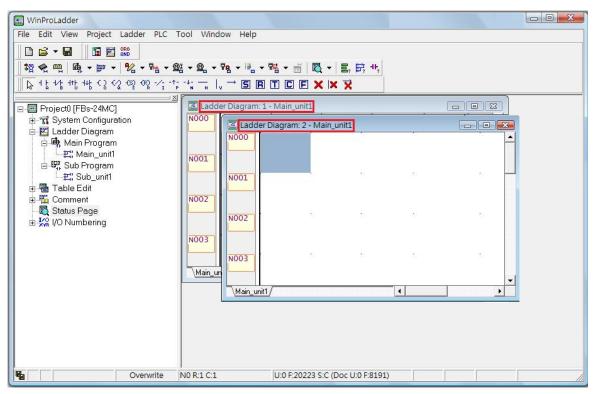
) WinProLadder - [Ladder Diagram: 2 - Mai] File Edit View Project Ladder PL □ □ □ ▼ ■ 面 凹 跳 *☆ •☆ ጫ • 파 + *2 + *** + *	.C Tool Wind	ow Help						X
		ow Help						
	81 - 19 - 70							- 8 ×
************************************	<u> 81 - 9 - 70</u>							
Provide the second s								
[b] + b + b + b + b + b + b + b + b + b +		S R T C		X				
Project0 [FBs-24MC]	실 N000							-
E - 🙀 System Configuration								
🗄 🕎 Ladder Diagram 🗄 🖶 Table Edit	N001		XI.	20	20		11) 1	81
⊕ ∰ Comment 								
E 👷 I/O Numbering	N002			2	25			
				20	20		20	-
	N003							
	N004	*5	×:	*	*5	×5.	•	*5
	N005	1		20	20			¥3
	N006		20	20	20	10	20	x:
		<u> </u>				-		-
Overwrite	Main_unit1	al	-20223 S:C (Do	c U:0 F:8191)		•		•
			20 0.0 (00					

The advantage of this operation is that the ladder programs for "Main_unit1" and "Coin Insertion Count" can be displayed on the screen simultaneously, so that comparisons and copy operations can be performed conveniently between the different sections of the ladder diagram program areas.

7.1.2 The Order of Display for Ladder Diagram Display Windows

Displaying Order for Multiple Ladder Diagram Displays:

Execute [Window]→[Cascade] from the function toolbar:



Displaying Method for Windows that are displayed Side by Side Horizontally:

Execute [Window]→[Tile Horizontal] from the function toolbar:

WinProLadder					
File Edit View Project Ladder PLC	Tool Window Help				
			1		
:::::::::::::::::::::::::::::::::::::	200 000 000 000 000 000 000 000 000 000				
<u>▶</u> + <u>+</u> + <u>+</u> + <u>+</u> + <u>+</u> + + + + + + +	[↓] - H _v → S F		××		
E Project0 [FBs-24MC]	Ladder Diagram:	2 - Main_unit1			
🛓 📆 System Configuration	N000				<u> </u>
🖻 📴 Ladder Diagram 🖻 🛱 Main Program					
لللله 🖾 🕮 Main_unit1	N001		к — ж	1	2
ia ₩ Sub Program E Sub_unit1					
⊡ 🖶 🖶 Table Edit					
⊕ 🎬 Comment — 🔂 Status Page	N002			20	-1
E I/O Numbering	Main_unit1/		•		•
5575	Ladder Diagram:	1 - Main unit1			
	N000		8 8 -		
	NOOL		и	3	
	N002	21	6 - B		1
	Main_unit1 (Sub_unit	1/	•		<u>}</u>
Cverwrite	N0 R:1 C:1	U:0 F:20223 S:C	(Doc U:0 F:8191)		

Simultaneous Display of Multiple Windows Ordered Vertically:

Execute [Window]→[Tile Vertical] :

) WinProLadder ile Edit View Project Ladder PL	.C Tool Window	Help								~
					201					
證 🛫 🖳 டி 🕶 🖮 🕶 🐕 🕶	• <u>@i</u> • <u>@</u> , • ? g •	• 🖳 • 🖬 • 🗄	j 🛛 🗖 🔹	昌, 武, 北,						
17 + 1 + 1 + + + C C @ @ 0 - /	$\left[\begin{array}{ccc} -\uparrow - \downarrow - \downarrow - & - \\ P & N & H \end{array}\right]_{V} \rightarrow$	SRTC	EXX	X						
- C Project0 [FBs-24MC]	Ladder Dia	igram: 2 - Main_u	unit1		E	Ladder Diag	gram: 1 - Main_	unit1		e
🗄 🞢 System Configuration	NOOO			20	▲ NO	00	ć.	1		
🖻 📴 Ladder Diagram 🖻 👼 Main Program										
E Main_unit1	N001	1	В	100	NO	01	8	80 80	18	
」□□■職 Sub Program □□■記 Sub_unit1										
🗉 🖶 Table Edit 🖻 🌇 Comment	NOO2	8	8	50	NO	02	4	4		
🛃 Status Page	NOOZ									
🗄 🞇 I/O Numbering				1.000			× .		1.0	
	N003				NO	03				
	N004	2	8	1.5	NO	04	<i>A</i> .	<i>.</i>	10	
	NO05	10	8	1.00	NO	05	10	181	18	
	Main_unit1/		•		× \	lain_unit1 (Su	b_unit1/	4		
	•				1	.m.		100		
Overwrite	• N0 R:1 C:1	U:0 F:2	0223 S:C (E	Ooc U:0 F:81	91)					

7.2 Manipulation of the Annotations Display in

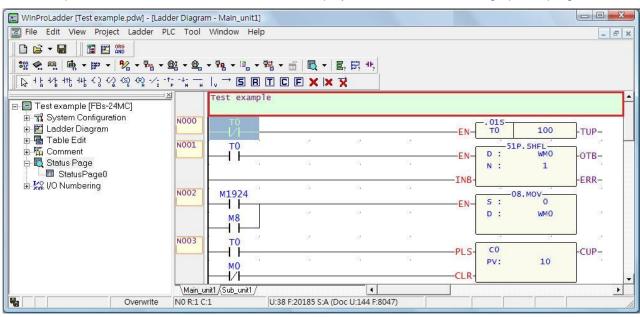
Ladder Diagram Display Windows

The ladder diagram program area provides unit annotations, network annotations, and component annotations. The following describes how to display or hide these annotations.

7.2.1 Manipulation of Program Unit Annotations Displays

Execute [View] \rightarrow [Program Unit Comment] from the function toolbar. If the option on the left of the text is not checked, then the annotations will not be displayed at the top of the ladder diagram program area. After you perform this operation, there will be a check mark in the option on the left of the text:

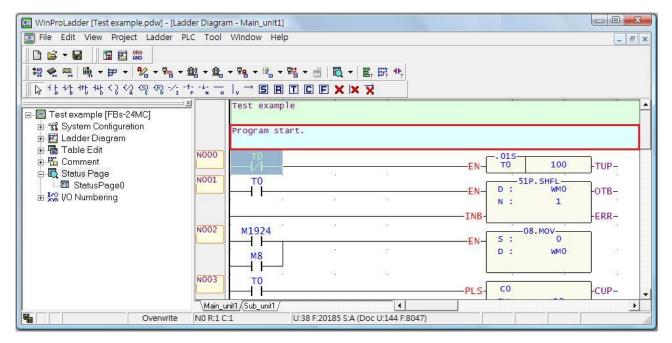
🚾 WinProLadder - [Ladder Diagram - N	lain_unit1	🔜 WinProLadd	ler - [Ladder Diagram - Ma	in_unit1
File Edit View Project Ladde	r PLC T	File Edit	View Project Ladder	PLC T
Image: Image			Project Tree Ladder Diagram	
Program Unit Comm Project0 Project0 Project0 Project0 Register Content	F11	E-E Project0 E-₩ Syste E-₩ Lado	 Element Comment Register Content 	nt F11
🗄 🖥 Tabl 🛛 Tool Bar	•	🕀 🖶 Tabl	Tool Bar	×
		⊡ ∰ Com	NewMindow	•



and this represents that the annotations text will be displayed above the cascaded graphical program area:

7.2.2 Manipulation of the Network Annotations Display

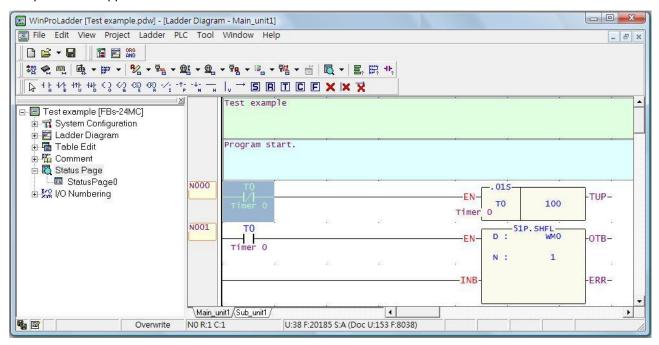
Execute [View] \rightarrow [Network Comment] from the function toolbar, and a check mark will appear to the left of the text option, which means that the annotations text will be displayed above the network of ladder diagram area:



7.2.3 Manipulation of Element Annotations Displays

Execute [View]→[Element Comment] from the functions toolbar, and a check mark will appear on the left of the options text, and the annotations will be displayed below the component in the ladder diagram program

area. If you place your cursor on top of the component, a small frame containing the description of the component will appear:



7.3 Manipulation of the Display of Register Data

Execute [View] \rightarrow [Register Content] from the function toolbar; or press the "F11" hotkey, and the register data will be displayed in the program area:

🔄 WinProLadder [Test example.pdw] - [La										
File Edit View Project Ladder	PLC Tool	Window Help								- 8
□ □	-↑↓			and the second se						
E Status Page E Loss StatusPage0 E X VO Numbering	N000 N001	TO Timer O TO Timer O	28 28				26	EN-015- Timer 0 	100 1P. SHFL WMO 1	-TUP- -OTB-
	and an and a second sec	nit1/Sub_unit1/	2		20			-INB-		-ERR-
Overwrite	N0 R:1 C	1 U:38	F:20185 S:A (E	Doc U:153 F:803	(8)					
Before the F1	1 hotl	key has be	en pr	essed	the re	egiste	r data i	⊐ s not displ	ayed	

WinProLadder [Test example.pdw] - [Ladder Diagram - Main_unit1] File Edit View Project Ladder PLC Tool Window Help	
В I I I I I I I I I I I I I I I I I I I	
Image: Status Page N000 To test example Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page Image: Status Page	-TUP- -OTB- -ERR-
Main_unit1/Sub_unit1/ Overwrite N0 R:1 C:1 U:38 F:20185 S:A (Doc U:153 F:8038)	

After the F11 hotkey is pressed, the register content values are displayed

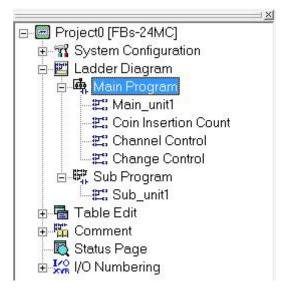
If the [View] \rightarrow [Element Comment] option had already been selected, then after executing [Register Content], the element comment will be hidden, and the register data will be displayed. If [View] \rightarrow [Register Content] had originally been selected, then after executing [Element Comment], the register data will disappear, and the component annotations will be displayed.

7.4 Direct Display of Specific Program Points

The ladder diagram area is composed of program unit categories, and the various program units are composed of many components, therefore we provide a cascaded method of display in the project window, so that the relative program units, program labels, and steps can all be displayed, allowing the user to be able to quickly display specific program points through the positioning scheme.

7.4.1 Locating Elements through Program Units

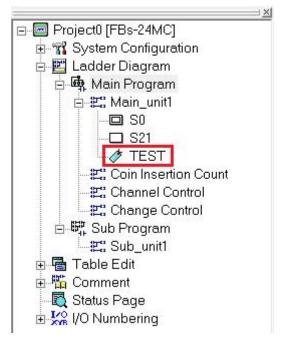
In the project window, in the [Main Program Area] and [Sub Program Area] under [Test Examples]→[Ladder Diagram] in the project window, there is a list of the respective program units, as shown in the illustration below:



Double-click on "Main_unit1", and the program for this unit will immediately be displayed, and the cursor will point to the first line in the ladder diagram program area of "Main_unit1".

7.4.2 Locating via Program Labels

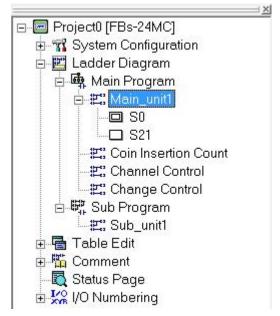
The various [Label] names are listed under the program units of the [Main Program Area] and [Sub Program Area] under [Text Examples]→[Ladder Diagram] in the project window, as shown below:



Double-click on "TEST", then the program segment of that particular Label will immediately be displayed, and the cursor will point to that Label.

7.4.3 Locating via Steps

In the [Main Program Area] and [Sub Program Area] under [Test Examples]→[Ladder Diagram] in the project window, there are the respective lists of program units. Double-click on "Main_unit1", and the steps in this program unit will appear, as illustrated in the following illustration:



Double-click on "S0", and the corresponding step program will be immediately displayed, and the cursor will point to the "S0" step.

7.5 Select Display fonts

Execute [View] \rightarrow [Fonts] from the function toolbar, and there will be five options: "Largest", "Large", "Medium", "Small", and "Smallest".

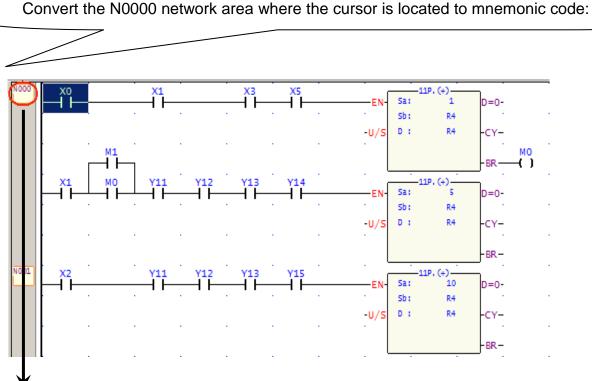
7.6 Mnemonic Code Display Control

Place the cursor at the location of the program that you would like to see the mnemonic code for, execute $[View] \rightarrow [Mnemonic Code]$ from the function toolbar; or, select the icon from the tool bar, and the mnemonic code window for the solution network at the location of the cursor will be displayed:

00000M ORG NOT TO 00001M TO .01 100	Mnem	onic	l	- O X
00001M TO .01 100	M00000	ORG	NOT	т0
	00001M	то	.01	100

Independent mnemonic code windows can at any time display the network mnemonic code programs for the network corresponding to the location of the cursor, and can be used for educational and debugging purposes, where "00000M" represents the place of order in which the instruction is located; "ORG" is a simplified instruction; "X1" is the reference number of the component.

Click the close X icon on the upper right corner to close the mnemonic window.



8 Testing of Application Programs

Prior to the completion of program's development, the final application program must be downloaded to the PLC and tested. Through the resultant component conduction status, register value display, and status display of status monitoring page, we can judge whether the application program is complete or not.

8.1 On-Line Testing

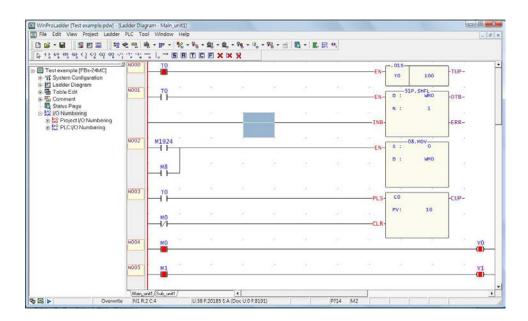
If you open the file via the off-line method in Section 3.2.1, then execute $[PLC] \rightarrow [On-Line]$ from the function toolbar; or connect via the "F12" hotkey. After you connect, you can execute $[PLC] \rightarrow [Run PLC]$ from the function toolbar; or test the program results using the "F9" hotkey. If you open the file on-line via the method described in Section 3.2.2, and you connect successfully, then you can execute $[PLC] \rightarrow [Run PLC]$ from the function toolbar; or test the program results online by pressing the "F9" hotkey.

8.2 Run Time Status Display

When using on-line PLC testing to test the application program, we can use the bright display of conductive components, register value displays, and component enable/disable displays to check the correctness of the program.

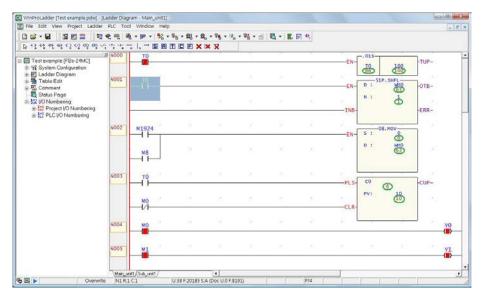
8.2.1 Bright Display of Conductive Components

During on-line testing, conductive components are displayed in bright red color:



8.2.2 Current Register Value Display

When on-line, execute [View] \rightarrow [Register Content] from the function toolbar; or press the "F11" hotkey, and the result will be:



8.2.3 Component Enable/Disable Status Display

When on-line, the display of components that are enabled and ON as shown in the illustration below:

File Edit View Project Ladder	PLC Tool Wi	ndow He	elp								_ 6
🗅 🖬 📲 📲 📲 📲	金通 章 - 1	P - %	- 🎭 - 🕮 - :	B 78 - 1	 91 - di	💐 • 🔳	E. 4.				
P+1 +1 +1 +1 +1 (3 (3 (3 (3 (3 (3)))))	合ちもっし	- IS (X X							
Project0 [FBs-24MC]	A 1000	xO	X1	X2							Y0 •
YI System Configuration				-							
🗄 🛃 Ladder Diagram	N001										
Table Edit Comment											- 1
Status Page											- 1
K? VO Numbering Project I/O Numbering	N002										- 1
C PLC VO Numbering											- 1
	N003					82	5.±	85	82	55	- 1
	1003										
	Main_unit1 (Su	b_unit1/				4					•

In the function toolbar, [Ladder] \rightarrow [Control] \rightarrow [Disable]; or select the X2 component and right-click and select "Disable", and the following window will be produced:

WinProLadder - [Ladder Diagram - File Edit View Project Ladd		Window H	elp									_ C _ 6
	r 👷 🖳 🛱 🕶	P • 🖗	• 🔤 • 🖭 •	<u>@</u> • 98 • 13	• 🙀 • 🗇	🔯 🕶 🚉	F; 11;					
စ္ မန္ မန္ မန္ မန္ လွ လွ လူ လူ	-/	, → S (XXX								
Project0 [FBs-24MC]	<u>의적</u> N000	X0	X1	112 -			ġ.	đ				¥0
 	N001	a.					đ.	¢	đ		3	-
 I/O Numbering I/O Project I/O Numbering I/O PLC I/O Numbering 	N002	8	3	3	8	a.	8	3	15	2	2	
	N003	1	ű	1	1	ŝ.	ű	1	¢.	ű.	3	
Overw	Main_unit1/	(Sub_unit1/				4						•

Then select the "OFF" option and you will see the following illustration:

File Edit View Project Lade	der PLC Tool Wir	ndow Help										_ 0
🗅 🚅 • 🖬 🛛 🛱 🔛 🎎 📗	🐮 🌪 🖳 🖷 🔹 🖩	• • 1 🗞 • 1	ang - <u>@</u> g - <u>@</u> g	- 98 - 10	• 🖬 • 🗂	Q - 2,	B, 45,					
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Project0 [FBs-24MC]		KO		2 E				3	3	3		Y0 ▲
 E Ladder Diagram E Table Edit E Comment 	NOOL	8						ii.		đ	8	
Status Page Status Page ₩ VO Numbering ₩ W Project VO Numbering ₩ W PLC VO Numbering	N002	8			ci.			Ċ.			1	
	N003				8							

8.3 Usage of the Status Monitor Page

The status monitor page can be used to monitor and configure PLC contact statuses and register data. If the monitor point is a contact component, the conduction status and its enable/disable status will also be displayed. You can control the enable/disable status of the contact component and force the contact status to ON or OFF. If the monitor point is a register, then its content value will be displayed and you can modify its value according to your needs. The status monitor page combined with the ladder diagram program display screen is the best tool and companion for your program testing and debugging needs.

8.3.1 Status Monitor Page Management

Status monitor page management operations include creating new status monitor pages, deleting unneeded status monitor pages, and renaming status monitor pages and calling them up. Their operation procedures are described as follows.

8.3.1.1 Creating a New Status Monitoring Page

Execute [Project] \rightarrow [Status Page] \rightarrow [New Page] from the function toolbar; or from the project window [Text example] \rightarrow [Status Page] right-click and select [New Page]; or click the $\boxed{\mathbb{Q}}$ icon in the tool bar and select [New Page] from the dropdown menu and the following window will appear:

Status Page	Name	
-		
StatusPage0		

After entering the name for the newly created monitor page, press the "OK" button, and the status monitor table will appear:

Ref. No.	Status	Data	Ref. No.	Status	Data	

8.3.1.2 Deleting Status Monitor Pages

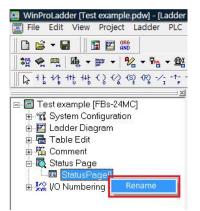
Execute [Project] \rightarrow [Status Page] \rightarrow [Delete Page] from the function toolbar; or in the project window [Text example] \rightarrow [Status Page] right-click and select [Delete Page]; or click the \mathbb{Q} icon in the tool bar and select [Delete Page] from the dropdown menu and the following window will appear:

StatusPage0	Cancel

Use your cursor to select "StatusPage0", and it will be deleted.

8.3.1.3 Rename Status Monitor Pages

Select the status page that you wish to rename from the project window, right-click and select [Rename], and the following will appear:



And you can proceed with the renaming.

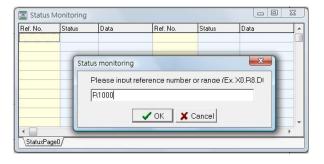
8.3.1.4 Call out Specific Status Monitor Pages

From the function toolbar [Project] \rightarrow [Status Page] \rightarrow and all status page name will be listed, and then you can simply select the monitor page that you wish to open; or in the project window, all page name will be listed under [Test example] \rightarrow [Status Page], and you can double-click on the status page name that you wish to open; or click on the \mathbb{R} icon in the tool bar, and all status page name will be listed, and you can simply select the monitor page that you wish to open.

8.3.2 Defining and Deletion of Monitor Points

Defining Monitor Points:

You can enter a reference number for the monitor point, for example R1000, meaning that the monitor point is R1000; or enter a range, for example D0-D4, meaning that the ranges of D0 through D4 are to be monitored.



Deletion of Monitor Points:

Using your cursor, select the reference number of the monitor point that you wish to delete and press the "Delete" button, and only the specific reference number will be deleted. If you wish to delete all of them, you can right-click in the status monitor page and select [Clear All] from the popup menu.

8.3.3 Monitor Point Status Display Format Control

Right-click in the monitor page and a popup menu will appear, and shown in the illustration below:

Ref. No.	Status	Data	Ref. No.	Status	Data	
R1000	Decimal	1234				
	Unsigne	d Decimal Nur	mber			
	View Re	ference Numb	er			
	View Ele	ment Commei	nt			
	Refresh					
	All Binar	y		Ctrl+B		
	All Decir	nal		Ctrl+D		
•	All Unsig	ned Decimal I	Number Dis <mark>play</mark>	Ctrl+U		۰.
\ <u>Status</u> F	All Hexd	ecimal		Ctrl+H	-	
	Clear All				_	

Select "View Element Comment", then the monitor page display status will shift into the "Comment" display mode, as shown below:

		Comment	Status	Data	1.42
ecimal	1234				
	_				
			- 20		
	Jecimal	Jecimal 1234	Jecimal 1234	Jecimal 1234 Image: Imag	Vecimal 1234

Select "All Binary" then all [Status] fields in the monitor page will be displayed binary:

Ref. No.	Status	Data		Ref. No.	Status	Data	
R1000	Decimal	1234					[
< StatusPa			Uns Hex Strir Viev	imal igned Decim decimal ng v Reference v Element Co	Number		
				linary			Ctrl+B
	•		All D	Decimal			Ctrl+D
			All U	Unsigned De	cimal Number Di	splay	Ctrl+U
			All H	lexdecimal			Ctrl+H
			Clea	ar All			

Û

Ref. No.	Status	Data	Ref. No.	Status	Data	
R1000	Binary	0000010011010010B				
R500	Binary	0000001000101011B				
	_					
				-		
			1			
						+

Select "All Hexadecimal", then all [Status] fields in the monitor page will be displayed hexadecimal:

Ref. No.	Status	Data	Ref. No.	Status	Data	
R1000	Hexdecimal	04D2H				3
R500	Hexdecimal	022BH				
					_	
	1			-		

Select "All Unsigned Decimal Number", then all "Status" fields in the monitor page will be changed to unsigned decimal number:

B1000 Unsigned Decimal number 1234 R500 Unsigned Decimal number 555	
R500 Unsigned Decimal number 555 State Sta	

Data Modification:

If you wish to modify the data in reference number R1000, you can double-click on the "1234" data field, and then enter "6789":

Please in:	out value	
6789		

And you will see the data in reference number R1000 has been changed to "6789":

Ref. No.	Status	Data	Ref. No.	Status	Data	
R1000	Decimal	6789				
R500	Decimal	555				
			-			
			1			
•			10			Þ

Double-click on the status field "Enable" of reference number X0, and you will be able to choose either

"Enable" or "Disable":

Ref. No.	Status	Data	Ref. No.	Status	Data	
R1000	Decimal	6789				
R500	Decimal	555				
XO	Enable	ON				
	Disable					
	Enable					
						1.53
•						+
 ✓ □ \StatusPay 	ge0/					P T
< □ \StatusPa	ge0/					•
< □ \StatusPa	ge0/					
< □ \StatusPa	ge0/		Ĵ			•
			Ũ			•
	ge0/		Ũ			•
Status		Data	Ref. No.	Status	Data	•
	Monitoring	Data 6789	Ref. No.	Status		•

Disable

×0

✓ □
 \StatusPage0/

ON

Or, right-click to bring up the popup menu shown below, and you will be able to perform the "ON" and "OFF" modification for the X0 status:

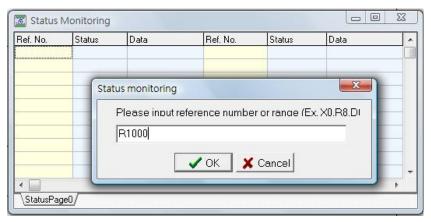
.

Ref. No.	Status	Data Re	ef. No.	Status	Data	
R1000	Decimal	6789				
R500	Decimal	555				
×0 <u> StatusPa</u>	Enabled Disabled ON OFF Unsigne View Re					
	All Binar	у		Ctrl+B		
	All Decir	nal		Ctrl+D		
3	All Unsig	ned Decimal Number	Display	Ctrl+U		36
	All Hexd	lecimal		Ctrl+H		
	Clear All					

8.3.4 Entering the Monitor Point Status

Ref. No.	Status	Data	Ref. No.	Status	Data	A
	1					

Double-click on the blank space in the [Status Monitoring] window, and the status monitor input window will appear, and you can input desired monitor reference numbers:



Press the "OK" button:

Ref. No.	Status	Data	Ref. No.	Status	Data	
R1000	Decimal	0				
					_	
	- 74			_	_	

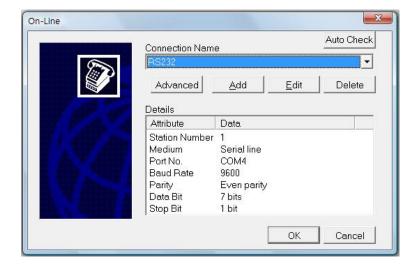
And you will have completed status monitor point input.

9 Operation of the PLC

Our goal is to operate the PLC through the WinProladder programming software, therefore we describe connection to the PLC, disconnection, activation, and stop execution of PLC's operation procedures in the following.

9.1 PLC On-Line

When connecting to the PLC, the following connection settings will appear:



Including the Advanced, Add, Edit and Delete settings for the Connection Name, and detailed display settings for the connection name. PLC connection can be facilitated through Serial line (RS232/485), Modem, or the Internet, and communications settings files can be established through each of these three connection methods, and then used for subsequent connection operations.

9.1.1 Direct Usage of Existing Connection Settings Files

Select the file that you would like to use for your connection from the [Connection Name] dropdown menu and proceed with the connection operation.

9.1.2 Modify Existing Connection Settings Files

Select the connections settings filename that you would like to modify from the [Connection Name] dropdown menu, then press the "Edit" button and the following settings window will appear:

On-Line	Connection Setup	×	
	Station Number : 1		Auto Check
	Port No. :	COM4	Ţ
	Baud Rate : 9	600 💌	dit Delete
		ven parity 💌	
		bits 💌	
	Stop Bit 1	bit 💌	
	_ ✓ Ok	X Cancel)K Cancel

9.1.3 Create a New Connection Settings File

In the [Connection] window, press the "Add" button:

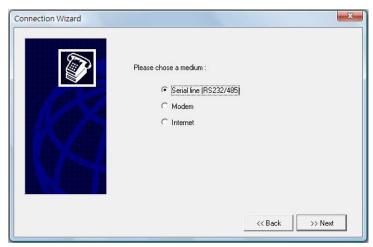
	Connection Name	9		Auto Check
6	RS232			-
	_Advanced	Add	<u>E</u> dit	Delete
	Attribute	Data		
KQ.	Station Number Medium Port No. Baud Rate Parity Data Bit Stop Bit	1 Serial line COM4 9600 Even parity 7 bits 1 bit		

Step 1: Enter the desired name "Connection 1" for the connections settings file , and press the "Next" button:

	Please Input The Con	nection Name :	
E.	Connection1		

Step 2: Select the hardware to perform the connection through. There are three option types: Serial line (RS232/485), Modem, or the Internet. For [Connection Hardware] settings, please refer to User Manual II –

Advanced Applications Chapter 11 FBs-PLC Communications, where FBs-PLC communications related hardware are described in detail.



1. Serial line (RS232/485):

Press the "Next" button, and the communications parameter settings window will appear:

Connection Wizard				X
	Station Number : Port No. :	[1 [СОМ1	K< Advanced Setup	10
	Baud Rate :	9600	•	
	Parity:	Even parity	•	
	Data Bit :	7 bits	•	
	Stop Bit	1 bit	•	
			<< Back Finish	

For details on settings editing, refer to User Manual II – Advanced Applications Chapter 11 Communications Parameter Settings.

2. Modem:

Press the "Next" button:



Set the PLC station number and select the modem model, set three dial modes, which are described in the

following:

Using the active dial-up mode:

Enter "035314991" into the [Phone number] field, and try to connect to the modem of the remote party through the telecommunication system, as shown below:

Connection Wizard	Station Number : 1	
	Modem Modal	Parameters Setting
R	AS PPPoE Line0000 RAS VPN Line 0 WAN Minipot (L2TP) SSTP Using the passive receive moo	_▼ le
	Phone number : 035314991	
		<< Back Finish

Using the passive listening mode:

Check the [Using the passive receive mode] option, then the modem will be set to listening mode, and will wait for the remote modem to dial in, as shown below:

	Station Number : 1		
	Modem Modal	Paran	neters Setting
			•
	RAS PPPoE Line0000 RAS VPN Line 0 WAN Miniport (L2TP) SSTP		
AVANT	🔽 Using the passive receive mode		

Using the call back mode:

Check the [Using the call back mode], input the call out telephone number in the [Phone number] field, and enter the call back telephone number in the [Call back number] field. This means that the WinProladder will dial up the telephone number "035314991" first, and then the remote party will call back the telephone number "035457385" if it has successful connection before. The settings shown as below:

	Station Number : 1	Parameters Setting
R	RAS PPPoE Line0000 RAS VPN Line 0 WAN Minipot (L2TP) SSTP Using the passive receive moo	 le
A V Alter	Phone number : 035314991	
	Call back number: 035457385	

For a further description of the above three MODEM dialing modes , please refer to FATEK programmable controller User Manual II – Advanced Applications Chapter 11.

3. Internet:



Press the "Next" button:

Connection Wizard	Protocol © UDP	
R	C TCP Station Number: 1 IP: 192.168.1.1 Port Number: 500	x
	<< Baci	k Finish

For [Protocol], select UDP or TCP, set the [Station Number], [IP] and [Port Number].

Step 3: Press the "Finish" button, and you will have completed the procedure for creating a new connection settings file.

Select a connection name and press "Delete", and you can delete the selected connection name.

On-Line		23
	Connection Name	Auto Check
	Connection1	•
	Advanced Add Edit	Delete
Connection Wizard		
Please co setup	onfirm if want to delete the [Connection1] co	onnection
	ОК	Cancel
	OK	Cancel

9.2 PLC Off-Line

When connected to the PLC, simply execute [PLC] \rightarrow [Off-Line] from the function toolbar.

9.3 Run PLC

When connected to the PLC, simply execute [PLC] \rightarrow [Run PLC] from the function toolbar; or press the "F9" hotkey.

9.4 Stop PLC

When the PLC is in operation, you can execute [PLC] \rightarrow [Stop PLC] from the function toolbar; or press the "Ctrl"+"F9" hotkey to stop PLC operation.

9.5 Clear PLC

When connected, execute [PLC] \rightarrow [Clear PLC] from the function toolbar, and the following data clearing options will appear:

Clear Operations	
Clear All (Initialization)	
Only Ladder Program	
Only Registers	
Only Coils	

Select one of the four options- Clear all (Initialization), Only Ladder Program, Only Register and Only Coil according to the portion of the program that needs to be cleared, and press the "OK" button.

9.6 PLC Setting

When connected with the PLC, you can set the PLC ID, station number, communications parameters, and communications protocol settings for the PLC. The procedures are described as follows:

9.6.1 Setting-PLC ID

Execute [PLC] \rightarrow [Setting] \rightarrow [PLC ID] from the functions toolbar, and the following illustration will appear, enter the PLC ID which is identical to the program ID:

Change PLC ID	×
Old Password :	
New Password :	×
Confirm Password :	
🗸 ок	X Cancel

9.6.2 Setting-Station Number

When connected, execute [PLC] \rightarrow [Setting] \rightarrow [Station Number] from the function toolbar, and the following settings window will appear:

Station Number
Station Number
🗖 Save To Program
\square Before writing into, Check the station number
OK X Cancel

9.6.3 Setting-Port Parameters

When connected, execute [PLC] \rightarrow [Setting] \rightarrow [Port0 Parameters] from the function toolbar, and the following [Comm. Parameters Setting - Port0] settings window will appear:

Comm. Paramet	ers Setting - Port0
Baud Rate:	9600 🔹
Parity:	Even parity
Data Bit :	7 bits
Stop Bit:	1 bit 🔹
I This port i	s used for current programming.
Reply delay	time: 3 mS
Transmissior	n Delay: x10mS
Receive Tim	e-out interval time: x10mS
☐ Without ch Protocol:	ecking of station number
	OK Cancel

It can set the communication parameters for needs: Port0 ~ Port4.

9.6.4 Setting-Protocol

When on-line, execute [PLC] \rightarrow [Setting] \rightarrow [Protocol] from the function toolbar, and the following settings window will appear:

Protocol	x	Protocol	
Port1:	Fatek Communication Pro 💌	Port1:	Fatek Communication Pro
Port2:	Fatek Communication Pro	Port2:	Fatek Communication Protoc: ModBus RTU(Slave) ModBus ASCII(Slave)
Port3:	Fatek Communication Prot 🗸	Port3:	Fatek Communication Prot 💌
Port4:	Fatek Communication Prot 🗸	Port4:	Fatek Communication Prot
	✓ OK		✓ OK X Cancel

9.6.5 Setting-Calendar

When the PLC is in [On-Line] status and is in [Run PLC], execute [PLC] \rightarrow [Setting] \rightarrow [Calendar], and the following window will appear, and you can set the time for the PLC's built-in calendar:

1
01

[PLC current time] is the current time taken from the PLC under connected conditions, in the [Setup] field, check "Apply PC time", then the PC time will be displayed in the next field, then click the "Update PLC time" button, and the [PLC current time] will be changed to the current time in the PC; if the "Apply PC time" is unchecked, then the [Date] and [Time] settings in the next fields can be modified, then press the "Update PLC time" button, and the [PLC current time] will be changed to the currently set time.

9.6.6 Setting-Phone Number

When connected, execute [PLC] \rightarrow [Setting] \rightarrow [Phone Number] from the function toolbar, and the following settings window will appear:

Setup the PLC's phor	ne #:
Setup the phone #:	,,021234567,#12*
Description:	
Example: 021234567.#12*	
Description :	
Wait 4 seconds tl 02021234567	hen dail the phone number

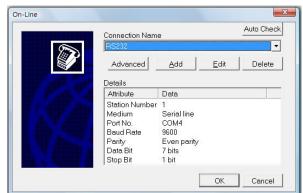
9.7 Quick Control

WinProladder versions 2.0 and earlier had to wait long periods of time (in large programs) before being able to obtain any information from the PLC. This became a large and unnecessary overhead if all you wanted to do was obtain the status of the PLC or initialize the PLC. Therefore, in versions 2.0 and later, we added "Quick Control" feature, allowing users to quickly read the status of the "PLC" and initialize the PLC without having to connect to the PLC:

🖼 WinProLadder - [Ladder Diagram - Ma					
□ □	Run PLC Stop PLC	F9 Ctrl+F9	- @ ⊽g - X X X	• 🖳 • 🎇	• 🗂 🗖
Project0 [FBs-24MC]	Editing Under Running Editing block save to P Abandon the editing b	9 PLC Ctrl+W			
B I Ladder Diagram B B Table Edit B B Comment Status Page B 1 VO Numbering B 1 VO Numbering B 1 VO Numbering B 1 VO Numbering	Save Ladder program	to Flash		8	8
	Off-Line Clear PLC		<u>81</u>	8	21
	Setting Project Status	•			
	Quick Control	•	Get Syster Initialize P	n Status of PL LC	.c
	NOC	04	Run PLC Stop PLC		
			MEMORY	PACK opera	tions

9.7.1 Get System Status of PLC

When off-line, select [PLC] \rightarrow [Quick Control] \rightarrow [Get System Status of PLC] from the function toolbar and you will be able to read PLC information.



And Press "OK" button.

ltem	Status
Station Nu	1
🔤 Model	FBs-24MC(v4.62)
PLC Status	Stopped
MEMORY	NotSet
Syntax Che	Check error or not check yet
Password	NotSet
Main Progr	Not Set
Sub-Progra	Not Set
Data Pass	Not Set
Program ID	Not Set
PLCID	Not Set
📆 Calendar	Installed
Available p	20224Word
Used progr	0Word
Free progr	20223Word
Min. OS ver	√4.00

9.7.2 Initialize PLC

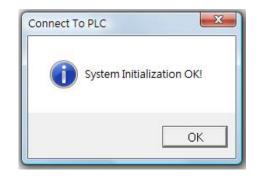
When off-line, select [PLC] \rightarrow [Quick Control] \rightarrow [Initialize PLC] from the function toolbar, and you will be able to initialize the PLC if successful connection:

Conne	ection Name		Auto Check
	vanced Add	<u>E</u> dit	Delete
Detail Attrib			1
Medi Port I Bauc Parity Data	No. COM4 Rate 9600 y Even parity	,	

And Press "OK" button.



Then Press "YES" button.



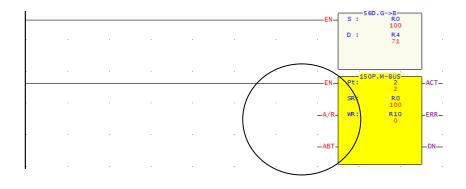
10 Ladder Program Simulation

10.1. Features

- Can simulate the FATEK PLC ladder program execution without PLC connection.
- With providing single/multiple/continuous scan mode, the execution result at each scan end can be easily checked.
- With providing program address breakpoint and data breakpoint, it is convenient to check any intermediate execution result and to identify any data changed.
- Provides communication interface allows external program or device (For example, graphic panel or HMI) to modify or monitor the variable value during the simulation.
- With run time editing feature, during the simulation process the program can be modified without stop the execution.

10.2. Limitation of Program Simulation

Besides the I/O operation, most of the instructions can be simulated. When the ladder program contains the unsupported instruction, the operation of unsupported instruction will be ignored and will be shown with yellow background color as following.



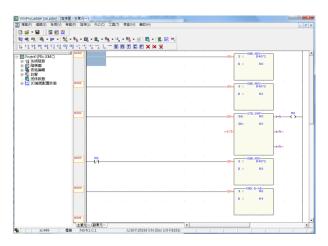
10.3. Operation of Program Simulation

The following is an example of "ssi.pdw" project. With this project to explain the related operations for program simulation.

10.3.1 Open Ladder Program

Follow the following main menu operation to open the "ssi.pdw" project file.

File > Open project > Open file > select ssi.pdw. After select the project, the screen will display as below:



10.3.2 Enter Simulation Mode

Main Menu: PLC > Simulation

It will enter into the simulation mode after execution.

10.3.3 Start Execution of Program Simulation

Main Menu: PLC > Run

After execution, the color of power line of ladder program will become to red color as the screen shown as below:

WinProLadder (ssi.pdw) - [陽音									and the second se		G G X
「檀葉(F) 編輯(E) 始後(V) 1	NAL(P) SHOE	(U) PLC(C) .	上與(1) 包括(1)) B(50(P()							- 6 >
·····································	- 9 5	u - 9, - 79	- 16 - 75 -	- 📶 🔯 -	E. 57 **,						
P 11 11 11 11 12 () () ()	02 -/; -1;	1 - L -	* (S) (R) (T) (XX						
	21 NO30					1	1.1		040.90		1
■ Project0 (FBs-20MC) ※一式 未統組織	_							-IN-	1	072	
· · · · · · · · · · · · · · · · · · ·									0.1	00	
◎ 🍓 表格编辑 ◎ 🌇 註解											
- 第一元件状態											
B 10 編成配置状態	N001							EN-	S : DAD	072	
	-								1	00	
								- KL	01 1	200	
	1.000	15									
	M002							IN	5a1 17D.CH		M0
										00 L2	
		<u>t</u>		-				1	1	00	
								-0/5-		-a>b=	
										-a-b-	
		100 10						I			
	N003	NO						EN-	S 1 040.MOV		
									1	00	
		- E						÷.	0: 1	00	
	N004	12									
	M004							EN-	5 : 560.6->	00	
		12						12		4	
										12	
	NODS										
• sc33		-/2019/0-/		F 20193 S:A		4					,

During the execution, there is a blinking red dot at the left side of status bar. On the right of the red dot has SC:xx, xx means the number of time have been scanned. During simulation, can use the status page to monitor or modify the value of register or discrete point.

10.3.4 Pause of Program Simulation

Main Menu: **PLC > Pause Simulation** or the easiest way is to click the space bar At this point, the blinking red dot stop blinking and it will become pink color.

10.3.5 Proceed to Program Simulation

Main Menu: **PLC > Resume Simulation** or the easiest way is to click the space bar At this point, the dot becomes blinking again and the program continues the operation.

10.3.6 Control Scanning

The above pause/Resume program simulation is operated by manual way of controlling the program execution, which will pause the program execution at the next scan end point right after you issue the command. But if you would like to control the exact times of scan execution after pause, you can use set scan mode to control.

10.3.6.1 Single Scan

Main Menu: PLC > Setup Simulation choose "single scan"

💹 Simul	ation Set	up	
Scan	Comm	unication	
	ild Start		
Scan	Mode:	Single Scan	•
		🗸 ОК	

After set this mode, you can use space bar or

Main menu: PLC >Resume Simulation to start a new scanning work.

10.3.6.2 Multiple Scan

Main menu: PLC > Setup Simulation choose "multiple scan"

After selecting the mode, you can set number of scans to be performed in the number of scanning field.

🧾 Simulation Setu	ip	
Scan Commu	nication	
Scan Mode: Scan Times:	Multiple Scan 2	•
	🗸 ОК	

After that, press space bar or

Main menu: **PLC > Resume Simulation** to start up next scanning work. When the scan has reached the set number, it will pause the scanning.

10.3.6.3 Continuous Scan

Main menu: **PLC > Setup Simulation** choose "continuous scan" This is the default scan mode after enter the simulation.

10.3.7 Set Address Breakpoint of Program Execution

In addition to the above methods to make the program paused at the scan end point, can also using the following method to pause the program at the point before a specific network number.

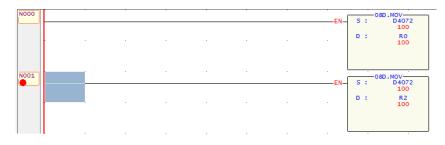
Please first select the network to be set break point and then execute the

main menu: PLC > Add/Remove address breakpoint

or in the ladder program window, on the "Network Display" region click the right button of the mouse and popup the menu.

Popup Menu: Add/Remove address breakpoint

The network with breakpoint set will display a red dot, which is as shown in the picture below:



The above picture indicates N001 has been set to an address breakpoint. When every time right before execution of this network, it will pause the program execution. The user can press space bar for continuing the program execution. The address breakpoint can be set up to 16 points at same time.

10.3.8 View Address Breakpoint List

When there are many address breakpoints have been set, can use this feature to quickly remove,

pause or enable the setting of address breakpoints.

Main menu: PLC > view address breakpoints

After execution, it will display the following window:

Addres	s Breakpoint List	l		x
No.	Program Unit	Net. No.	Enabled	
1	main1	N001	 ✓ 	
				Ŧ

This window will show all the existed address breakpoints. The checked mark in the enabled field

means corresponding address breakpoints are in effective. You may use right click to call the pop-up menu shown in below:

Enabled
Disabled
Erase
Erase All

- Enabled: Activate the breakpoint.
- Disabled: Inactivate the breakpoint. When disabled, the red dot of the corresponding network will become a gray dot.
- Removed: clear the breakpoint.
- Removed all: remove all breakpoints.

If you double click the breakpoint in the list, it will display the corresponding breakpoint in the ladder program window.

10.3.9 Setup Data Breakpoint

Use this feature will make the program pause when the value of a specific contact or register changed or change into a certain values.

Main menu: PLC > Setup Data Breakpoint

After operation, it will display the window as shown in below

The left screen will be shown when the "Enable" field is not checked while the right screen is checked.

💹 Data Break Setup	🔤 Data Break Setup
🗖 Enabled	✓ Enabled
	Ref. No: Data:
	Condition
	Change to
	C Change not to
	C Change to any
Cancel X Cancel	✓ OK X Cancel

When check the "Enabled" checkbox, the setup fields will appear. Description is as follows:

- > Ref. No.: Register (Word or Double word) or contact reference number.
- Data: Conditions of match value
- Condition: three options

- Change to When value of Ref. No. (Monitoring variable) is changed to the "Data" value, the execution will be paused.
- Change not to –When value of Ref. No. (Monitoring variable) is changed to a value not equal to "Data" value, the execution will be paused.
- Changed –Whenever the value of Ref. No. (Monitoring variable) is changed, the execution will be paused.

This feature can easily be used to identify the source of any changes of monitored variables.

10.3.10 Stop Simulation

Simulate the PLC "stop" operation, when next time execution (RUN), it will simulate the initial operation.

Main menu: PLC > Stop

10.3.11 End Simulation

Exit the simulation mode. Main menu: **PLC > End simulation**

10.4. Communicate with Simulation Program

When perform the simulation, besides "Winproladder" software, other devices or software can also monitor or modify the status of variables, though serial port or TCP/IP network interface by using the Fatek communication protocol. The most common practice is to combine the HMI and ladder simulation to perform the integrated test.

There should be noted that, this feature only provides Fatek PLC slave communication capability. The function block FUN 150, 151 and real I/O related functions are not supported in simulation.

10.4.1 Communication Function Setup

You may choose serial ports or TCP network. The setup method is as follow:

Main menu: **PLC > Setup Simulation** After that please select "communication Setup" tab. In this page, please check "Enabled" checkbox and then it will display the following window.

🧱 Simula	ation Setup			X	
Scan	Communic	ation			
⊡ En	abled				
🖲 Se	rial	Attribute	Data	•	
о то		Station Number Medium Port No. Baud Bate	1 Serial line COM1 9600	ш	
Edit Baud Rate 9600					
		ОК			

10.4.1.1 Serial Port Communication Setup

After select 232, press "Edit". Fill in the simulated communication parameters. In addition, the "Port Number" means the port number on PC.

Connection Setup	X
Station Number :	1
Port No. :	COM1 -
Baud Rate : Parity: Data Bit : Stop Bit	9600 ▼ Even parity▼ 7 bits ▼ 1 bit ▼
•	k Cancel

10.4.1.2 Internet Communication Setup

After select TCP, press "Edit". Fill in the simulated communication parameters as desire.

Connection Setup	
Station Number : 1	
Protocol	
© TCP	
Port Numbe 500	
✓ Ok Cancel	

10-8	

11 Constructing Projects

When constructing a project, to ensure that the project has been well designed with intellectual protection and for long term maintenance and easy modification, it needs to provide detailed information regarding project information, program security settings, and system configurations. The following is a description of the settings related to construct a project.

11.1 Modifying Project Information

Execute [Project] \rightarrow [Project Information] from the function toolbar, and the project information window will appear, and you can proceed with the modifications:

Project In	formation	X					
Proiect Name	Test example						
Model Name	FBs-24MC Edit						
Detachable terminal block,RTC,14DC24V inputs(2120KHz + 1420KHz),10 outputs(2120KHz + 620KHz),1 comm. port(can expand up to 5).							
Description :							
		_					
	4	•					
Options [Calendar						
✓ OK X Cancel							

Please refer to [Create New Project] in Section 3.1 for a description of how to conduct the settings process.

11.2 Program Security Settings

Most systems adopt a password approach for intellectual property protection. With FBs-PLC, in addition to passwords, we also provide security measures such as program ID and PLC ID, providing an additional layer of security to help protect the results produced through the user's painstaking research and development.

11.2.1 Set the Program Password

Execute [Project] \rightarrow [Project Setup] \rightarrow [Password] from the function toolbar, and the following window will appear:

Change Password	X
Old Password :	
New Password :	×××
Confirm Password :	××4
Protect Sub-Prog	ram Only
🗸 ОК	X Cancel

After you have entered the password, all subsequent access to the project will require inputting this password to protect the program.

When the program designer only wishes to open the main program area for public access, and does not wish to allow public access to the sub program area, then the "Protect Sub-Program Only" option can be selected, and the sub program area will be protected.

×
××××
××××
ram Only
🗙 Cancel

11.2.2 Set the Program ID

The program password can prevent illegal copying of the program, which can provide a certain degree of protection, but it cannot help against preventing program hardcopies (If ROM Pack being used, it is easy to take out and install on some other PLC main unit for working), in these circumstances, the password will not be able to protect the program. In this situation, setting a program ID that must be identical to the PLC ID can prevent hardcopies, thereby providing a further degree of security.

Execute [Project] \rightarrow [Project Setup] \rightarrow [Program ID] from the function toolbar, and the following window will appear:

Change	e Program II		X
Old Pa	ssword :		
New P	assword :	×	
Confirm	n Password :	\bowtie	
	🗸 ОК	🗙 Cancel	
	🗸 ОК	X Cancel	

Now you can set the program ID; if a program has the program ID setting, then the PLC that wishes to

execute this program must have a PLC ID set to be same with program ID, otherwise the PLC will not be able to operate.

11.3 Program Conversion

Execute [Project] \rightarrow [Program Conversion] \rightarrow [8K \rightarrow 13K] from the function toolbar, and you can expand the program conversion from 8K to 13K; or, execute [Project] \rightarrow [Program Conversion] \rightarrow [13K \rightarrow 8K] from the function toolbar, and you can shrink the program conversion from 13K to 8K. In addition, in versions 2.00 and newer, we have also added FBe(8K/13K) \rightarrow FBs(20K).

11.4 Set System Configurations

System configurations include I/O settings, memory allocation, and read-only register settings.

11.4.1 Set I/O Configuration

Execute [Project] \rightarrow [I/O Configuration] from the function toolbar; or click the icon in the tool bar; or in the project window, click [Text example] \rightarrow [System Configuration] \rightarrow [I/O Configuration] twice, and the I/O configuration window will appear:

국만

Utilization)		Timer/Counter Interrupt Setup Output Setup Input Setup Temp. Configuration	4
1/0 No. X0 X1 X2 X3 X4 X5 X6 X7 X8 X9 X10 X11 X12 X13 X14 X15 Y0 Y2	Function Undefined Undefin	E	HSC0 HSC1 HSC2 HSC3 HSC4 HSC5 HSC6 HSC7 Timer Configuration Counter Type: Hardware Counter Counting Mode: Not used HSC Polarity Mask signal: Normal Clear signal: Normal Counter signal: Normal Counter signal: Normal HSC's Data Length HSC's Data Length	•
Y3 Y4 Y5 Y6 Y7	Undefined Undefined Undefined Undefined Undefined			

11.4.1.1 Configure the Counter/Timer Settings

As shown in the illustration below, configure the [Counter] page, the FB-PLC has 4 HHSC(Hardware High-Speed Counter), and 4 SHSC(Software High-Speed Counter) in which the 4 HHSC(HSC0~HSC3) have 8 counting modes, which can be selected in the [Counting Mode] dropdown menu in the illustration below; and the 4 SHSC(HSC4~HSC7) have 3 counting modes, which can be selected in the [Counting Mode]

dropdown menu shown in the illustration below.

Utilization			Timer/Counter	Interrupt Setup	Output Setup	Input Setup	Temp. Configuration	4
1/0 No. X0 X1 X2 X3 X4 X5 X6 X7 X12 X13 X12 X13 X15 Y0 Y1 Y2 Y4 Y5 Y7 Y7 Y7 Y7 Y7 Y7 Y7 Y7 Y7 Y7	Function Undefined	E E	HSC0 HSC1 — Timer Configurati Counter Type: Counting Mode:	11	Counter	HSC5 HSC HSC Polarity Mask signal: Clear signal: Counter signal: HSC's Data Le 32-Bit Hardwa	Normal Normal Normal	-

For the HHSC, because A/B inputs must be used in pairs, if you select the "A/B" [Counting Mode], and select "X0" for the [A-Phase] field, then "X1" will automatically be chosen for the [B-Phase] field, and you will not be allowed to modify this. As shown below:

Utilization		Timer/Counter Interrupt Setup Output Setup Input Setup Temp. Configuration
I/D No. Function X0 HSC0A Ph X1 HSC0A Ph X2 Undefined X3 Undefined X4 Undefined X5 Undefined X6 Undefined X6 Undefined X7 Undefined X8 HSC2A Ph X10 Undefined X11 Undefined X12 Undefined X13 Undefined X14 Undefined X15 Undefined X15 Undefined Y0 Undefined Y1 Undefined Y2 Undefined Y3 Undefined Y4 Undefined Y4 Undefined Y6 Undefined	8	HSC0 HSC1 HSC2 HSC3 HSC4 HSC5 HSC6 HSC7 Timer Configuration Image: Counter Type: Hardware Counter Image:

If "K/R" or "U/D" is chosen for the [Counting Mode], then the inputs can be entered separately. To achieve optimal results, the input point distribution is as follows:

нн	SC0	HH	SC1	нн	SC2	нн	SC3
Clk	Dir	Clk	Dir	Clk	Dir	Clk	Dir
Up	Down	Up	Down	Up	Down	Up	Down
X0	X1	X1	X5	X4	X9	X5	X13
		X4		X5		X12	
				X8			

The meaning of the points that appear repeatedly is, for example, you can just set one point for HHSC0, and save X1 for HHSC1 to use, therefore, the I/O point settings for FBs will be more flexible than those for the previous FBe series, and if you use the distribution method described below, a 14-point main unit will be able

to complete 4 sets of hardware high-speed counters (without considering the directions):

нн	SC0	нн	SC1	нн	SC2	нн	SC3
Clk	Dir	Clk	Dir	Clk	Dir	Clk	Dir
Up	Down	Up	Down	Up	Down	Up	Down
X0		X1		X4		X5	

The 8 counter modes for the HHSC are: U/D $, U/D^{*2} , K/R , K/R^{*2} , A/B , A/B^{*2} , A/B^{*3} , A/B^{*4}$. The 3 counter modes for the SHSC are: U/D , K/R , A/B.

(For descriptions of the above counter modes, please refer to Chapter 10 Advanced Applications of User Manual II.)

Jtilization	Timer/Counter Interrupt Setup Output Setup Input Setup Temp	o. Configuration 🔰 🖡
VD No. Function K0 HSC0.UP K1 HSC0.NN K2 HSC0.MSK K3 HSC0.MSK K4 Undefined K5 Undefined K6 Undefined K7 Undefined K8 HSC2.A Ph K9 HSC2.A Ph K10 Undefined K11 Undefined K12 Undefined K13 Undefined K14 Undefined K15 Undefined K14 Undefined K15 Undefined K14 Undefined K13 Undefined K14 Undefined K12 Undefined K13 Undefined K14 Undefined	HSC0 HSC1 HSC2 HSC3 HSC4 HSC5 HSC6 I Timer Configuration Counter Type: Hardware Counter ▼ Counting Mode: U/D ▼ Clear signat	HSC7
/6 Undefined /7 Undefined ▼		

Select the [HSC0] counter setting, choose "Hardware Counter" for [Counter Type], select "U/D" for [Counting Mode], representing that single-phase independent upward/downward high-speed counters have two independent upward (U) and downward (D) pulse inputs, and these two are independent and unrelated. Therefore, the following will appear after you have chosen "U/D":

[Up (UP)]:	if "X0" is chosen for this field, then the current counting value will increment by 1 at the rising-edge of the X0 pulse input.
[Down (DN)]:	if "X1" is chosen for this field, then the current counting value will decrease by 1 at the rising-edge of the X1 pulse input.
[Mask (MSK)]:	if "X2" is chosen for this field, then when the X2 signal is a 1, the HSC counter pulse will be masked and will not count, while the internal states of the HSC will be fully preserved. When X2 goes back to 0, HSC will go back to normal operation.
[Clear (CLR)]:	if "X3" is chosen for this field, then when the X3 signal is a 1, the internal CV register of the HSC will be cleared to a 0, and cannot count, and only when X3 goes back to 0, will HSC begin counting from 0. After completing the settings, the "not specified" content of the X0~X3 status in the [Interface

	Usage Status] window on the left will be changed to the settings contents.
[Mask signal] field:	can choose to reverse or non-reverse the Mask input signal.
[Clear signal] field:	can choose to reverse or non-reverse the Clear input signal.
[Counter signal] field:	can choose to reverse or non-reverse the Count input signal.
[HSC's Data Length] field:	Function reserved.

11.4.1.2 Configure the Interrupt Signal Settings

Select the [Interrupt Setup] page:

Utilization		Timer/Counter Int	errupt Setup Output Setup	etup Input Setup	Temp. Configuration
X0 HSC X1 HSC X2 HSC X3 HSC X3 HSC X4 INT. X5 Und X6 Und X7 Und X8 HSC X10 Und X12 Und X13 Und X14 Und Y1 Und Y2 Und Y3 Und Y4 Und Y5 Und	Ction CUP 20.UP 20.DN 20.DN 20.DN 20.DN 20.CLR 4,Pos. e efined	Interrupt Setup Use INT0 (X0) Use INT1 (X1) Use INT2 (X2) Use INT3 (X3) Use INT4 (X4) Use INT5 (X5) Use INT6 (X6) Use INT7 (X7)	Positive Edge * Positive Edge *	Use INT8 (X8) Use INT9 (X9) Use INT10 (X10) Use INT11 (X11) Use INT12 (X12) Use INT13 (X13) Use INT14 (X14)	Positive Edge

Interrupt refers to a signal sent to the CPU requesting immediate service, during the routine sequential execution of cycles and scanning; when the CPU receives an interrupt request, it immediately discontinues the scanning operation that it is executing, and proceeds with the "Service Requested by Interrupt" first; and the CPU will return to the interrupted scanning operation after the service is complete.

The service specified by the interrupt request, i.e. the "Interrupt Service Program", must have a one and only "Interrupt Label Name". For the interrupt label names and interrupt priorities of the 49 FBs-PLC interrupts, please refer to Section 9.3 [interrupt components for FBs-PLC, and label names and order of priority] in Chapter 9 Advanced Applications in User Manual II.

The rising and falling edge settings for $X0 \sim X15$ in the [Input Setup] represent the interrupt occurrence conditions for the interrupt priority 18 ~ 49 "Interrupt label names".

11.4.1.3 Configure the Output Signal Settings

Select the [Output Setup] page:

Utilization	Timer/Counter Interrupt Setup	Output Setup Input S	etup Temp. Configuration	4 >
1/0 No. Function ▲ X0 HSC0,UP X1 HSC0,DN X2 HSC0,DR X3 HSC0,CLR X4 INT4,Pos. e X5 Undefined X6 Undefined X7 Undefined X8 HSC2,A Ph X9 HSC2,B Ph X10 Undefined X112 Undefined X13 Undefined X14 Undefined X15 Undefined Y1 Undefined Y2 Undefined Y1 Undefined Y2 Undefined Y3 Undefined Y4 Undefined Y5 Undefined Y6 Undefined	Petentive Output Coil Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y8 Y9 Y10 Y11 Y12 Y13 Y14 Y15 Y16 Y17 Y18 Y10	HSPS0 PS00 (Y0-Y1): PS01 (Y2-Y3): PS02 (Y4-Y5): PS03 (Y6-Y7): Output Polarity Y0-Y1 Output: Y2-Y3 Output: Y4-Y5 Output: Y6-Y7 Output:	Not used ▼ Y0=PLS:Y1=DIR Y0=PLS Y0=PLS Not used	

[Retentive Output Coil]: when Yn is selected, the Yn output will be preserved in the case of a power-off.

[HSPSO]: FBs-PLCs can provide 20KHz~920KHz high-speed pulse output depending on model type. With regard to the pulse frequency, three series of model types are provided: the (FBs-xxMA-T) series can provide 20KHz (single-end) output, the (FBs-xxMC-T) series can provide 20KHz / 200KHz (single-end) output, and the (FBs-xxMN) series can provide up to 920KHz high-speed differential output.

High-speed pulse output circuits share the FBs-PLC external output points Y0~Y7. When the HSPSO function is not utilized (the PSO function has not been configured), the Y0~Y7 external output points of the FB-PLC are mapped to the internal statuses Y0~Y7 of the PLC. But when the HSPSO has been configured, then the external output points Y0~Y7 will directly switch to the HSPSO output circuits internal to the ASIC, and will have nothing to do with the Y0~Y7 status in the PLC.

The following is a table showing the signal descriptions of the output points of the various axles of the main unit and the selectable output modes, the [High-Speed Pulse Output] settings can be set according to the following table:

	External		Output mode		
Axle number	output	U/D output	CK/DIR output	A/B output	Single-point CK output
PSO0	Y0	Y0=U	Y0=CLK	Y0=A	Y0=CLK
	Y1	Y1=D	Y1=DIR	Y1=B	
PSO1	Y2	Y2=U	Y2=CLK	Y2=A	Y2=CLK
F301	Y3	Y3=D	Y3=DIR	Y3=B	12=0LN
PSO2	Y4	Y4=U	Y4=CLK	Y4=A	Y4=CLK
	Y5	Y5=D	Y5=DIR	Y5=B	
PSO3	Y6	Y6=U	Y6=CLK	Y6=A	Y6=CLK
	Y7	Y7=D	Y7=DIRR	Y7=B	

In the table, the "Single-Point CK Output)" mode provides users with a mono-direction high-speed pulse output, and can therefore save output points for designers that only need one high-speed output point, which can be very useful.

[Output Polarity] field: select inverted or non-inverted for pulse output.

11.4.1.4 Configure the Input Signal Settings

Select the [Input Setup] page:

Utilization		Timer/Counter Interrupt Setup Output Setup Input Setup Temp. Configuration 🕢
X0 H X1 H X2 H X3 H X3 H X5 U X7 U X5 U X7 U X12 U X12 U X12 U X12 U X13 U	unction A SCO.UP SCO.DN SCO.MSK SCO.CLR IT4.Pos.e ndefined ndefined ndefined ndefined mdefined mdefined mdefined	Captured Input Configuration Set All Reset All X0 X4 X8 X12 X16 Reset All X1 X5 X9 X13 X17 X21 X25 X29 X33 X2 X6 X10 X14 X18 X22 X26 X30 X34 X3 X7 X11 X15 X19 X23 X27 X31 X35 Digital Filter Configuration X01mS X12**X15: Time: \$0.1mS Hz \$\$\$\$\$ Freq: 460K Hz X4**X7: Time: \$
Y0 U Y1 U Y2 U Y3 U Y4 U Y5 U Y6 U	ndefined ndefined ndefined ndefined ndefined ndefined ndefined ndefined	

Captured Input Configuration:

[Set AII]: set all X0~X35 inputs to captured Input.

[Reset All]: cancel all X0~X35 captured Inputs.

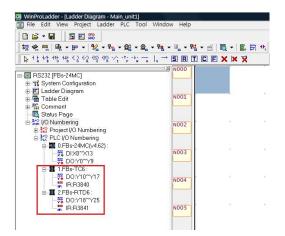
[Digital Filter Configuration]: divide X0~X35 into 6 groups.

1	X0~X3	4	X12~X15
2	X4~X7	5	X16~X23
3	X8~X11	6	X24~X35

For descriptions of captured Inputs and digital filtering, please refer to Section 9.7 of FBs User Manual II - Advanced Applications

11.4.1.5 Configure Temperature Module Settings

If the PLC system exists the temperature expansion module, it will automatically detect and distribute the I/O reference address to it. For details, please refer to Section 13.6 (I/O Reference Number Allocation statuses).



The example in the above illustration shows the FBs-24MC main unit has two expanded temperature modules TC6 and RTD6. To configure the expansion modules, click [Temp. Configuration] and shown as below:

Utilization	onfiguration MG	C v4	x Timer/Counter	Interrupt Setup	Output Setup	Input Setup	Temp. Configuration	
1/20 №. ×0 ×10 ×2 ×3 ×4 ×5 ×6 ×7 ×8 ×9 ×10 ×11 ×12 ×13 ×14 ×15 Y0 Y1 Y2	Undefined Undefined Undefined Undefined Undefined Undefined Undefined Undefined Undefined Undefined Undefined	- m	Starting Addres	1	Table: Register: ster: Sensor Type K	R1000 R0 R500 Unit of Temp. Times of Aver Scan Rate:	(R1000~R1005) (R0~R11) (R500~R511) : Celsius	•
Y3 Y4 Y5 Y6 Y7	Undefined Undefined Undefined Undefined Undefined	•		V Ok	🗶 Cancel			

[Starting Address of Configuration Table]: the registers of table store configuration information regarding the temperature modules. For detailed descriptions, please refer to FBs User Manual II (Chapter 21 FBs-PLC Temperature Measurement and Temperature PID Control).

[Starting Address of Temperature Register]: sets the beginning register address for the current reading values of temperature measurement; each channel is mapped to a register. In the example, one TC6 module and one RTD6 module, adds up to a total of 12 channels, and therefore needs 12 registers.

[Starting Address of Working Register]: these registers are needed for the internal operation of the PLC system for temperature module's working. For detailed descriptions, please refer to FBs User Manual II (Chapter 21 FBs-PLC Temperature Measurement and Temperature PID Control).

[Sensor Type]: FBs temperature module comes in two main categories: TCXX and RTDXX. The types and ranges of selectable temperature sensors are listed in the following table:

(1). TCXX	J(-200 ~ 1200°C) K(-190 ~ 1300°C)	E(-190 ~ 1000°C) T(-190 ~ 380°C)
	R(0 ~ 1800°C)	B(350 ~ 1800°C)
	S(0 ~ 1700°C)	N(-200 ~ 1000°C)

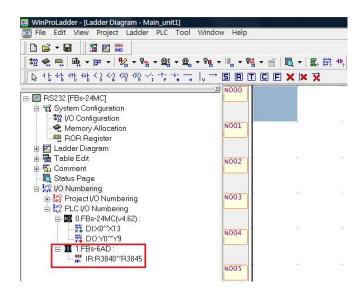
	Triple-wire type JIS or DIN
(2). RTDXX	Pt-100(-200 ~ 850°C)
	Pt-1000(-200 ~ 600°C)

[Unit of Temp.]: the user can select either Celsius or Fahrenheit temperature representations.

- [Times of Average]: you can calculate the averaged value of the measured temperatures. The selectable options are: "No", "2", "4", and "8".
- [Scan Rate]: select the "Normal" (With 0.1° resolution) or the "Fast" (With 1° resolution) refresh rate for temperature measurement.

11.4.1.6 Configure the Al Module Settings

If the PLC system exists the analog input expansion modules, it will detect and distribute the I/O reference address for access. For detailed descriptions, please refer to Section 13.6 (I/O Reference Number Allocation Statuses).



The above illustrated example shows a FBs-24MC main unit has a 6AD expansion module, and this module occupies six analog input registers R3840~R3845 as the reference address for access. To configure this module, click [AI Configuration], it will show the screen:

Utilization			Interrupt Setup 0	utput Setup	Input Setup	Temp. C	onfiguration	Al Configuration
1/0 No.	Function							19
×0 ×1 ×2	Undefined Undefined Undefined		Al Data Format :	(€ 12-bit	Format	с	14-bit Forma	t
X3	Undefined		Al Modules		TA	Al Setup		
×4	Undefined		Position Module N	ame Start A	ddress			T . (1
×5	Undefined		1 FBs-6AD	R3840		Address	Valid bit	Times of Average
×6	Undefined		I POSTORD	13040	·			
X7	Undefined							
×8	Undefined							
X9	Undefined							
X10	Undefined	E						
X11	Undefined	=						
X12	Undefined							
×13 ×14	Undefined							
X14 X15	Undefined Undefined							
~10	Undenned							
YO	Undefined							
Ýĩ	Undefined							
Y2	Undefined							
Y3	Undefined							
Y4	Undefined							
Y5	Undefined							
Y6	Undefined							
Y7	Undefined	*						
17	Underined			🖌 Ok	🗙 Cancel	1		

[Al Data Format]: It can be 12-bit or 14-bit format for representation

Jtilizatior	1	10	Interrupt Setup	Output Setup	Input Setup	Temp. C	onfiguration	Al Configuration	4
1/0 No.	Function	•							1
<0 <1 <2	Undefined Undefined Undefined		Al Data Forma	t: 🕡 12-bit l	Format	с	14-bit Format		
<3	Undefined		Al Modules		Al	Setup			
<4	Undefined		Position Modu	le Name Start A	ddress	Address	Valid bit	Times of Average	
<5	Undefined		1 FBs-6	AD R3840					
<6	Undefined				chu	R3840	12-bit 💌	I.	
<7 <8	Undefined Undefined				ch1	R3841	12-bit 💌	1	
<9	Undefined								
(10	Undefined				ch2	R3842	12-bit 💌	I.	
(11	Undefined	E			ch3	R3843	12-bit 💌	1	
<12	Undefined								
<13	Undefined				ch4	R3844	12-bit 💌	I.	
<14	Undefined				ch5	R3845	12-bit 💌	1	
<15	Undefined		1				,	0.	
/0	Undefined								
/1	Undefined								
12	Undefined								
/3	Undefined								
74	Undefined								
/5	Undefined								
/6	Undefined								
ŕ 7	Undefined	T							

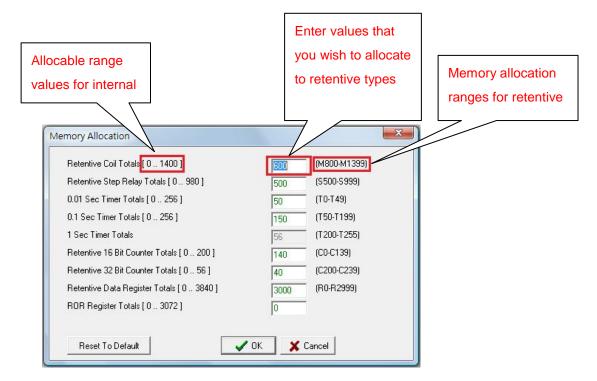
[Valid Bits]: if the analog input format is set to 12-bit, then the effective number of bits will be set at 12 and cannot be changed. If the analog input format is set at 14-bit, then the effective bits setting can be set to either 12-bit or 14-bit, and the AI reading values are all in 14-bit representation.

Utilization	n.		Interrupt Setup Output Setup Input Set	etup Temp. Configuration Al Configuration
1/0 No. X0 X1 X2 X3 X4 X5 X6 X7 X8	Function Undefined Undefined Undefined Undefined Undefined Undefined Undefined		Al Data Format : C 12-bit Format Al Modules Position Module Name Start Address 1 FBs-6AD R3840	Al Setup Address Valid bit Times o Average ch0 R3840 12-bit 1 ch1 R3841 14-bit
X9 X10 X11 X12 X13 X14 X15	Undefined Undefined Undefined Undefined Undefined Undefined Undefined	ш		ch2 R3842 12-bit ▼1 ch3 R3843 12-bit ▼1 ch4 R3844 12-bit ▼1 ch5 R3845 12-bit ▼1
Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7	Undefined Undefined Undefined Undefined Undefined Undefined Undefined Undefined			

[Times of Average]: it can give the number of average for reading value calculation, which can be at least 1 time (No average), and at most 16 times. But it should note that the higher the average value, the more times it will take to refresh the reading value.

11.4.2 Configure the Memory Allocation Settings

Execute [Project] \rightarrow [Memory Allocation] from the function toolbar; or click on the \checkmark icon in the tool bar; or in the project window, select [Test example] \rightarrow [System Configuration] \rightarrow [Memory Allocation] and double-click, and the memory allocation settings window will appear:



When the PLC main units are manufactured (They are set to factory defaults), the system construction settings, such as for (Retentive) and (Non Retentive) coils, or for the specified allocation of registers, read-only register ranges, have all been planned and set to appropriate values. We refer to this configuration as the Default Configuration. Under most circumstances, the user does not need to change the default configurations. Only in various more complex or specialized applications, does the user need to modify the default configurations, and this feature is meant to provide a means to do so with the FBs series PLCs. By pressing the "Reset to Default" button, you can set the system settings back to the initial default settings. After pressing the "OK" button, you will have completed the memory allocations setting procedure:

Туре	Item	Range	Amount
X	Input Contact	×0-×255	256
Y	Output Relay	Y0 - Y255	256
M	Retent. Internal Relay	M800 - M1399	600
M	Internal Relay	M0 - M799	800
M	Internal Relay	M1400 - M1911	512
M	Spacical Relay	M1912 - M2001	90
S	Retent. Step Relay	S500 - S999	500
S	Step Relay	S0 - S499	500
T	0.01 Sec Timer	T0-T49	50
TOT	0.1 Sec Timer	T50-T199	150
TOT	1 Sec Timer	T200 - T255	56
C	Retent. 16 bit Counter	C0 - C139	140
C IS C	16 bit Counter	C140-C199	60
	Retent. 32 bit Counter	C200 - C239	40
C C	32 bit Counter	C240 - C255	16
HB R	Retent. Data Register	R0 - R2999	3000
HB R	Data Register	R3000 - R3839	840
B R	Input Register	R3840 - R3903	64
BR R	Output Register	R3904 - R3967	64
BR R	Special Register	R3968 - R4167	200
BAR R	ROR Register		0
BAR R	Data Register	R5000 - R8071	3072
	Retent. Data Register	D0 - D4095	4096
FB F	File Register	F0 - F8071	8072

The value of non-retentive type relays and registers will be cleared to 0 after a power-up or a PLC STOP →

RUN operation, while the retentive types will still be set to the value prior to the power-down or STOP. The following is a description of their various characteristics.

11.4.2.1 Set the Number of Internal Coils in the Retentive-Type

The settable range for the internal coil quantity of retentive-types is 0~1400. If you enter "600", you will distribute a quantity of 600 to the internal coil of retentive-types, and therefore you will first allocate range M0~M799 (a total of 800 in quantity) to non-retentive type internal coils, thereby setting the range for retentive-type internal coils to M800~M1399 (a total of 600 in quantity). Internal coils can be modified, please refer to the description in Section 2.2 of User Manual I—Hardware & Basic Functions.

11.4.2.2 Set Retentive-Type Step Coil Quantities

The settings range for retentive-type step coil quantities is 0~980. If you enter "500", you will allocate 500 in quantity to retentive-type step coils, while steps S0~S19 will always be non-retentive and cannot be changed, therefore the step coil range is 0~999, therefore the system will first allocate the range S0~S499 (a total of 500 in quantity) to the non-retentive type step coils, and therefore the step coil allocation range for retentive-type will be S500~S999 (a total of 500 in quantity). The step coils can be modified, please refer to the description in Section 2.2 of User Manual I—Hardware & Basic Functions.

11.4.2.3 Set Timer Time Base Amount Allocation

The settings range for timer quantities is 0~256, and timer timing bases are divided into 0.01 second, 0.1 second, and 1 second timing methods. Therefore, if you enter "50" in the 0.01 second field, you will allocate 50 quantities to the 0.01 second timer, and therefore the T0~T49 (a total of 50 quantities) range will first be allocated to the 0.01 second timer; and then enter "150" in the 0.1 second field, which represents that 150 quantities will be allocated to the 0.1 second timer. Therefore range T50~T199 (a total of 150 quantities) will be allocated to the 0.1 second timer; and therefore the remaining 56 quantities will be allocated to the 1 second timer, and therefore the T200~T255 (a total of 56 quantities). Timers can be modified, please refer to the description in Section 2.2 of User Manual I—Hardware & Basic Functions.

11.4.2.4 Set the Quantity of Retentive-Type 16-bit Counters

Retentive 16-bit counter quantities have range settings of 0~200. If you enter "140", you will have set the quantity of retentive 16-bit counters to 140, therefore retentive 16-bit counters have allocation ranges of C0~C139 (a total of 140). Retentive-type 16-bit counters can be modified, please refer to the description in Section 2.2 of User Manual I—Hardware & Basic Functions.

11.4.2.5 Set the Quantity of Retentive-Type 32-bit Counters

Retentive 32-bit counter quantities have range settings of 0~56. If you enter "40", you will have set the quantity of retentive 32-bit counters to 40, therefore retentive 32-bit counters will have allocation ranges of C200~C239 (a total of 40). Retentive-type 32-bit counters can be modified, please refer to the description in Section 2.2 of User Manual I – Hardware & Basic Functions.

11.4.2.6 Set the Quantity of Retentive-Type Data Registers

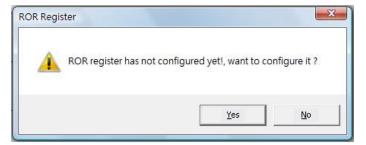
The quantity settings range for retentive-type data registers is 0~3840. If you enter "3000", you will have allocated 3000 retentive-type data registers, and therefore the allocation range of retentive-type data registers will be R0~R2999 (for a total of 3000). Retentive-type data registers can be modified, please refer to the description in Section 2.2 of User Manual I—Hardware & Basic Functions.

11.4.2.7 Set the Amount of Read-Only Registers

The settings range for read-only registers is 0~3072. If you enter "0", you will have allocated 0 to read-only registers, and therefore read-only registers will not have an allocation range. Read-only registers can be modified, for a description of settings ranges, please refer to User Manual I – Hardware & Basic Functions page 2-2.

11.4.3 Configure Read-Only Register Content

Execute [Project] \rightarrow [ROR Register] from the function toolbar; or click the \square icon from the tool bar; or in the project window, select [Test example] \rightarrow [System Configuration] \rightarrow [ROR Register] and double-click. Continuing with the un-configured read-only register range in Section 11.4.2, the following window will first appear:



The allocable range for read-only registers is R5000~R8071 (a total of 3072 quantities), and if no range is allocated to read-only registers, then R5000~R8071 can be used as general registers of the retentive type. Press the "Yes" button, and re-set the quantity of read-only registers, enter "200", and the allocation range for

read-only registers will be R5000~R5199 (for a total of 200):

etentive Coil Totals [0 1400]	600	(M800-M1399)
Retentive Step Relay Totals [0 980]	500	(\$500-\$999)
).01 Sec Timer Totals [0 256]	50	(TO-T49)
0.1 Sec Timer Totals [0 256]	150	(T50-T199)
Sec Timer Totals	56	T200-T255)
Retentive 16 Bit Counter Totals [0 200]	140	(C0-C139)
Retentive 32 Bit Counter Totals [0 56]	40	(C200-C239)
Retentive Data Register Totals [0 3840]	3000	(R0-R2999)
ROR Register Totals [0 3072]	200	(R5000-R5199)

Press the "OK" button, and the read-only memory data, annotations, and description input areas for R5000~R5199 will be listed:

Item	Range	Amount
Input Contact	×0-×255	256
Output Relay	Y0 - Y255	256
Retent. Internal Relay	M800 - M1399	600
Internal Relay	M0 - M799	800
Internal Relay	M1400 - M1911	512
		90
Retent. Step Relay	S500 - S999	500
		500
0.01 Sec Timer	T0-T49	50
0.1 Sec Timer	T50 - T199	150
1 Sec Timer	T200 - T255	56
Retent. 16 bit Counter	C0 - C139	140
16 bit Counter	C140 - C199	60
Retent. 32 bit Counter	C200 - C239	40
32 bit Counter	C240 - C255	16
Retent. Data Register	R0 - R2999	3000
Data Register	R3000 - R3839	840
Input Register	R3840 - R3903	64
Output Register	R3904 - R3967	64
Special Register	R3968 - R4167	200
ROR Register	R5000 - R5199	200
Data Register	R5200 - R8071	2872
Retent. Data Register	D0 - D4095	4096
File Register	F0 - F8071	8072
	Output Relay Retent. Internal Relay Internal Relay Internal Relay Spacical Relay Retent. Step Relay 0.01 Sec Timer 0.1 Sec Timer 1 Sec Timer Retent. 16 bit Counter 16 bit Counter Retent. 25 bit Counter Retent. 25 bit Counter Retent. 25 bit Counter Data Register Data Register Output Register Special Register Roter, 25 pecial Register Data Register Data Register Data Register Data Register Data Register Data Register Data Register	Output Relay Y0 - Y255 Retent. Internal Relay M800 - M1399 Internal Relay M400 - M1393 Internal Relay M1400 - M1911 Spacical Relay M1912 - M2001 Retent. Step Relay S500 - S999 Step Relay S0 - S499 0.01 Sec Timer T0 - T49 0.1 Sec Timer T200 - T125 Retent. 16 bit Counter C1 - C139 16 bit Counter C200 - C239 32 bit Counter C200 - C239 Data Register R3600 - R3839 Input Register R3600 - R3839 Input Register R3600 - R3839 Dutput Register R3600 - R3639 Dutput Register R3600 - R3679 Decial Register R3600 - R5199 Data Register R3600 - R5199 Data Register R3600 - R3679 Decial Register R3600 - R3679 Decial Register R3600 - R5199 Data Register R3600 - R5199 Data Register R5000 - R5199

<mark>اھ</mark> Impi		∎ [*] Export	Restore Read F	PLC Reg. ROR<-Reg. P	OR->PLC Reg
Ref. No.	Status	Data	Comment	Description	Reg. Value
R5000	Decimal	-1			0
R5001	Decimal	-1			0
R5002	Decimal	-1			0
R5003	Decimal	-1			0
R5004	Decimal	-1			0
R5005	Decimal	-1			0
R5006	Decimal	-1			0
R5007	Decimal	-1			0
R5008	Decimal	-1			0
R5009	Decimal	-1			0
R5010	Decimal	-1			0
R5011	Decimal	-1			0
R5012	Decimal	-1			0
R5013	Decimal	-1			0
R5014	Decimal	-1			0
R5015	Decimal	-1			0
R5016	Decimal	-1			0

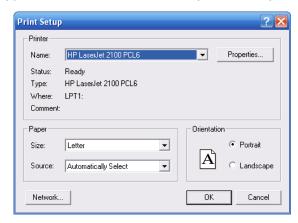
The advantage of setting read-only registers is that the content of the registers will be saved along with the project files, therefore, when you save the project to the PLC, if you have specified read-only registers in the project, then these read-only registers will carry the values that you specified even at the very beginning of system initialization.

12 Tabular Outputs

After the program is completed, naturally you would want to print some relative descriptions of the program or annotations, but before you do, you will need to configure the printer, or select the settings for the items to be printed. The operation procedures are described in the following:

12.1 Printer Settings

Execute [File] \rightarrow [Printer Setup] from the function toolbar, and perform the printer configuration:

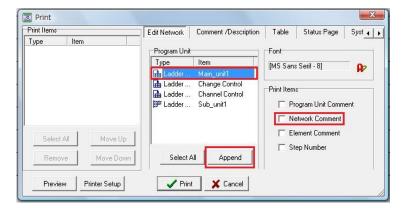


12.2 Printing Settings

Execute [File] \rightarrow [Print Content Setup] from the function toolbar; or use the hotkey "Ctrl"+"P". Perform the print settings for the program content, as described below:

12.2.1 Select the Ladder Program thatyou would like to Print

In the [Print] window, select the [Edit Network] page:



For the [Program Unit] field, select the first program unit item "Main_unit1", and then press the "Append" button, then the program unit "Main_unit1" will be listed under [Print Items] to the left; the "Select All" button can be used to select all of the program units listed under [Program Unit], press the "Append" button again, and all the program units will be listed under [Print Items] on the left to be prepared for printing. If you check "Network Comment" for [Print Items], then the network annotations for the program unit will be printed:

int Items		Edit Network	Comment /Description	Table	Status Page	Syst 🗸
ype Ite s Ladder Ma	m ain_unit1	⊢ Program Uni		Font		
Elauuer Ma		Туре	Item	1000333000	Serif, 91	
		👪 Ladder Change Control		[MS Sans Serif - 8]		AP
1	1	di Ladder		I⊽ Ne	s ogram Unit Comm stwork Comment sment Comment	ient
Select All	Move Up			E St	ep Number	
Remove	Move Down	Select	All Append		op Humbol	
Preview	Printer Setup	- Prin	t 🗙 Cancel			

If you press the "Print Setup" button, you will go to the [Printer Settings] screen in Section 12.1, and will be able to re-configure the printer; if you press the "Preview" button, you will be able to preview the screen that you wish to print:

Print Items : Main_unit1		
Printed Item: Ladder Diagram - Main_unit1	Network Comment	
	EN- 100 TUP- EN- D: N: 1 OTB- N: 1	
M1924	ERR- EN- EN- D: WMD	
		-
		-(*)

Press the "Print Setup" button and you will go to the [Printer Settings] screen in Section 12.1, and you will be able to re-configure your printer; press the "Print" button and printing will begin; if there is more than one page, you can press the up and down buttons; press the "Magnify" and "De-Magnify" buttons to adjust the preview image; use the "Close" button to go back to the print window.

12.2.2 Select the Descriptions and Annotations that you wish to

Print

In the [Print] window, select the [Comment / Description] page:

Print Items	Edit Network	Comment /Description	Table	Status Page	Syst 🖌
Type Item			1		-
👪 Ladder Main_unit1	Data Range		Font		
	Туре	Item 🔺	[MS Sans	s Serif - 81	R
	E, Comment	Comment	In o carr		W
	Comment	Main_unit1	Print Item	~	
	Comment				
	Comment	See State and the second second	🔽 El	ement Description	
	Comment		🔽 Be	egister Data	
	H, Comment	Input Contact			
Select All Move Up	1				
Remove Move Down	Select	All Append			

[Data Range] will list the following three categories: program unit annotations, network annotations, and component annotations. For example, if you select the annotations for the first program unit, and press the "Append" button, then you will also list this item under the print items on the left:

rint Items		Edit Network	Comment /Description	Table	Status Page	Syst 🗸
ype I	tem	1		1	9	
a Ladder N	Main unit1	Data Range		Font		
Eg Comment Comment		Туре	ltem 🔺	IMS Sans	Serif - 81	- 02
		H, Comment	Comment Change Control		[MS Sans Serif - 8] Print Items ↓ Element Description ↓ Register Data	
Select All Remove	Move Up	Select A				

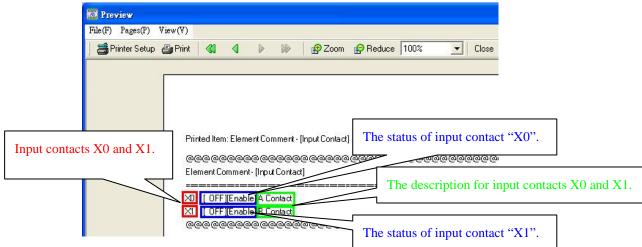
Press the [Preview] button and all of the program unit annotations will be printed on the second page in the preview screen, as illustrated below:

Printed Item: Prog	ram UnitComment		•	7
<u>ଭ</u> ଭଭଭଭଭଭ	෧෧෧෧෧෧෧෧෧	Blue frames represent program ur	nt names.	
Program Unit Com	nment			
Testexample	it Comment - <mark>[Main_unit1]</mark>			
00000000	Red frames rep	present program unit annotations.	0000000	୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦୦

If you select the "Coin Insertion Count" item under [Data Range], then the [Network Comment] for the "Coin Insertion Count" program unit will be printed; if you press the "Append" button, and add the [Print Items] listed on the left, then the " network annotations in coin insertion count program unit " will be printed.

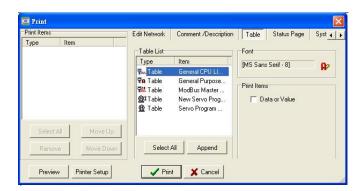
Marchiew 🔤	
File(F) Pages(P)	View(V)
📙 📸 Printer Setup	o 🚑 Print 🛛 📢 🌒 🥬 🎒 Zoom 😰 Reduce 100% 💽 Close
	Blue frames represent program unit names.
	Printed Item: Network Comment - [Coin Insertion Count]
	<u>ଭରଉରେଭରେଭରେଭରିବିହିନ୍ତି କରି</u> ଭର୍ଭରେଭରିଭର୍ଭରେଭରିଭର୍ଭରେଭର୍ଭର
	Network Comment - [Coin Insertion Count]
	N0000 Coin Insertion Count's retwork comment
	for the coin insertion count program unit.

If you select the "Input Contact" item in [Data Range], and check the "Element Comment" option in the [Print Options] on the right, then the text of the [Comment / Description] will be printed; if you check the "Register Data" option in [Print Options] then the data or values in the registers of the component will be printed; press the "Append" button, and add the [Print Items] listed on the left, and the following will be printed: the component description of the input connection point, descriptions, and register data and values. The following is the preview screen for an "Input Contact" item:

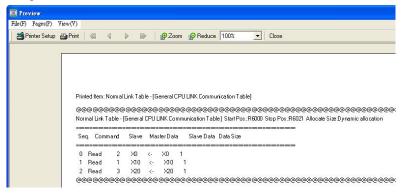


12.2.3 Select the Table that you wish to Print

In the [Print] window, select the [Table] page:



All of the tables you created will be listed under [Tables List]. For example, if you select "General CPU LINK Communication Table", and press "Preview", the settings content for the table will be printed. There are three data items in the following table:



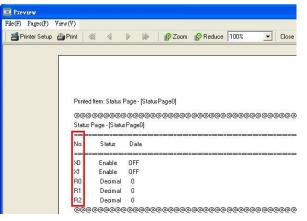
If you check the "Data or Values" option in [Print Options], then the data and values for R6000~R6021 will be printed during print preview.

12.2.4 Select the Status Monitoring Page that you wish to Print

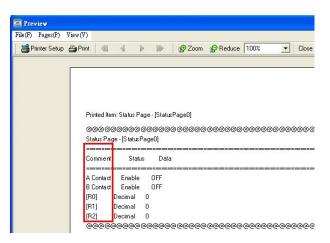
In the [Print] window, select the [Status Page] page:

Print Items		Edit Network	Comment /Description	Table	Status Page	Syst 🗸
Type Selec	t All Move Up	C Status P.	List Item StatusPage0 StatusPage1 StatusPage2			P
	ve Move Dow	Select	All Append			

Under the [Status Page List] category, you will find a list of all the monitoring pages that you created, choose the first item "Status Page 0", and add it to the print item on the left; check the "Printing Reference number" option under [Print Options], then the print preview screen will be as follows, displayed according to "No." :



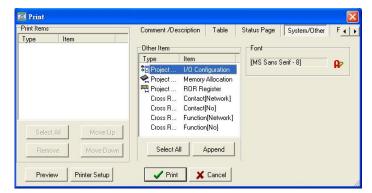
Check "Print Comment" in [Print Options], and the preview screen will be as follows, displayed according to "Comment":



12.2.5 Select the Project Information or Configuration that you

wish to Print

In the [Print] window, select the [System / Other] page:



The following three system configurations of project will be listed under [Other Items]:

- 1. [I/O Configuration]: will be printed according to the [Set I/O Configuration] settings made in Section 10.4.1.
- 2. [Memory Allocation] : will be printed according to the [Set Memory Allocation] settings made in Section 10.4.2.
- 3. [ROR Registers] : will be printed according to the [Set Read-Only Register Content] settings made in Section 10.4.3.

12.2.6 Set Print Format

In the [Print] window, select the [Format Setup] page:

rint Items		Table	Status Page	System/Other	Format 9	Setup	4
fype Iter	n	Format Pr	eview		ber Size 10.0mm * 29	7.0mm	
				Up Lov	nt margin Sel per margin: ver margin: t margin:	20 8	
Select All Remove	Move Up Move Down	<u> </u>	eading /Page Tail	Rig	ht margin:	8	€ mm

[Printing margin Setup]: set the upper, lower, left, and right margins in units of mm. The status and changes in the margin settings will immediately be shown in [Preview].

[Paper Size]: the width and height of the paper will be displayed according to the paper size settings specified in the printing settings.

[Page Heading / Page Tail Setup]: press this button and the following settings page for the title at the top of the page and the page number at the end of the page will appear, as shown below:

🚾 Page Heading / Page Tail Setup	×
Page Heading	
Print Header Print Test	
Font	
I I Printed File Name	
✓ Date of Print	
Page Tail	
🔽 Print Page Numl	
Alignment:	
Page Number Format:	
Format Description: '#'Current Page, '\$'Total Page	
OK X Cancel	

Page Heading

[Print Header]: enter the "Print Test" title into the text area, you can also make changes to the font type using the "Font" button, and then check print title, and then this title will be printed.
[Print File Name]: if selected, the project file path will be printed.
[Date of Print]: if selected, the print date will be printed.

Page Tail

[Print Page Number]: if selected, page numbers will be printed. The following settings will only have meaning when this setting is selected.

[Alignment]: you can choose to position the page number by either aligning to the left, aligning to the right, or placing in the center.

[Page Number Format]: page number format settings, # represents the current page number, \$ represents the total number of pages.

12.3 Print Preview

You can preview the result of all of your settings in the printing settings window via the "Preview" button. Only when you are satisfied with the settings should you "Print". We have already shown the [Preview] screens for the settings in Sections 12.2.1 through 12.2.5, the following is the [Preview] screen for the settings described in Section 12.2.6:

🛤 Preview				
File(F) Pages(P) View(V)				
📄 🗃 Printer Setup 🚑 Print 🛛 🐗 🔹 🕨	P Zoom P Reduce 100%	✓ Close		
Set title at t	he top of the page.	Set file name a	at the top of the	page for printing.
Print Test File Name: C:Vocuments and	5 ettings \user \Winproladder_ENU-OKI(041	3)\4\Testexample.pdw		-
Print Date: 2011/4/1 Printed Item: Ladder Diagram	Main_unit1 Set date at	the top of the page	for printing.	l.
		EN- TO	100 TUP-	
		EN-D: 519.	WMD OTB-	
		INB-	ERR	

12.4 Printing

After you have completed the settings in the [Print] window, you can press the "Print" button to print; or in the print preview screen, you can execute [File] \rightarrow [Print Content Setup], and click the "Print" button in the tool bar to print.

13 Auxiliary Functions

The WinProladder software also provides auxiliary functions, like the CRC16/Checksum calculator which allows the user to enter data for calculation and produce values for checking; the contact and register usage information features provide overall usage tables for the various contact components and registers; also provided are register content backup, register content backup recovery, and four different ROM Pack operation modes, which are described in detail below.

13.1 CRC16/Checksum Calculator

Execute [Tool] \rightarrow [CRC16 Generator] from the function toolbar, and the following window will appear:

🗋 🚔 🖬 🚺 New Open Save Clos		
1 12 44 50 66 21 Example: 00 0A I	e care	

Enter the code that you wish to check; this function will display the number of bytes (Len) currently entered; the checksum is automatically calculated; and the CRC16 value is automatically calculated. After you have finished inputting you can press the "Save" button, and save it as a text file of the txt type file extension, and can call out the file next time by pressing the "Open" button, and will not have to input it again. The "New" button will clear the input area, and allow you to begin inputting from scratch. Click the X icon on the upper right-hand corner or the "Close" button, and you can close the CRC16 calculator window.

13.2 Contact and Register Usage Information

Execute [Tool] \rightarrow [Element Statistics] from the function toolbar, and the [Element Statistics] window will appear:

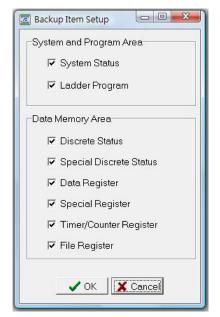
All L	Jsed Unuse	ad Doubiou	ls Refresh				
X 7	Y 👪 M	<u>₩</u> S	T 😽	27 S	^{₿₿₿} <u>B</u>	₿₿₿ <u>D</u>	
Ref. No. Cont	act Coil Du	plic Function '	WiFuncFun	ctiT able sta	rtin <u>c</u> Table I	1/0 Configu	170 Implie
Y0 🧹							
Y1 🖌	v						
Y2 🖌	 Image: A second s						
Y3 🖌	v						
Y4 🖌	1						
Y5 🖌	v						
Y6 🖌	1						
Y7 🖌	v						
Y8							
Y9							

The main intention for this feature is to allow the user to view the usage statuses of the various components in the project: used or unused. Select the "All" button, and then select the "X" component button, and all X components will be displayed, and all used components will have a check mark on the right-hand side of their reference numbers, as shown in the red frame in the illustration above. When this X component only appears in contact instruction, the "Contact" field on the right will display a check icon in it, as shown in the blue frame in the above illustrations. If you select the "Y" button, and the Y component appears in contact and coil instructions, then a check icon will appear under the "Contact" and "Coil" fields on the right. Therefore, the "Contact", "Coil", and "Function" fields are used to show whether the selected component reference number appears in the relative instructions; the "Duplicate" field shows whether or not the selected component is repeatedly used; the "Function Implied" field shows whether this component is used in function block instruction, as shown below:

All	Usec		_	? ₪ bious Refresh		
X ×	🛛 👯 Y	888 M 60	M	<u>s</u> 🐺 I	2 🖏	B B
Ref. No.	Contact	Coil	Duplicate	Function Write	Function	Function Implied
DO			1	 Image: A set of the set of the	V	
D1				v		v
D2				1		1
D3				v		v
D4				v		1
D5				1		~
D6				v		1
D10			v	~	1	
D11				1		v
B40				-		

13.3 System Backup

This feature can backup or recover the content of the PLC system in a very fast manner. This operation resembles that of saving the PLC contents to a file and therefore can be used as a PLC copy application. To use this feature, execute [Tool] \rightarrow [System Backup] from the function toolbar when connected to the PLC:



When the above window appears, the user can choose the items they wish to backup. After pressing the "OK"

button, if the project has a password, then the user will be prompted to enter the password.



After the password has been confirmed, the system will request the protective options for backup and recovery, as shown below :

Protection Type
No Protection
C Node Locked Protection
C Password Protection

- 1. No Protection: When using this file for recovery, you will not need to enter a password.
- 2. Node Locked Protection: If this type of protection is chosen, when the user wishes to recover using this file, they will not need to enter a password, but will only be allowed to recover the current computer, and will not be allowed to recovery other computers. This feature is usually used in factory production conditions.
- 3. Password Protection: A password will be required to perform a recovery using this file.

Protection Setup
Protection Type
C No Protection
C Node Locked Protection
Password Protection
V OK X Cancel

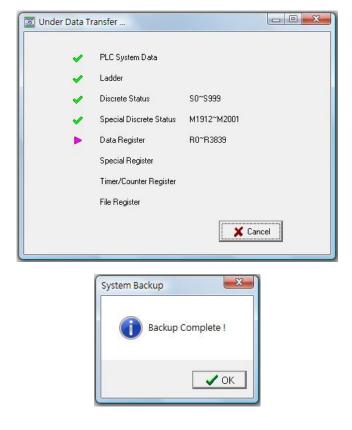
After you have chosen the recovery protection options, press the "OK" button and the following dialogue box will appear :

Save System	Backup File		? 🛛
Savejn: 📘	winproladder	▼ 🗢 🔁	≝ .
File <u>n</u> ame:			<u>S</u> ave
Save as <u>t</u> ype:	System File (*.fsb)	•	Cancel

After you enter the file name, press the "Save" button, and the following dialogue box will appear, and you can add notes to your backup file.

	*
4	+

Press the "OK" button and the backup will begin.



13.4 System Restore

When the PLC is connected, execute [Tool] \rightarrow [System Restore] from the function toolbar.

Open Syste	m Backup File	? 🔀
Look in: 🚺	winproladder	- 🖬 🎦 🖛
File name:		Open
Files of type:	System File [*.fsb,*.frd]	▼ Cancel

Choose the files with the fsb or frd file extensions and you can perform system recovery, and the following illustration will appear.

	File Description:
*	
÷	4

If you have added notes to your backup file, this file description can be used for verification, and after you decide to use this backup file for recovery, press the "OK" button, and a password confirmation dialogue box will appear.

Password Authent	ication	
Password Type-		
Cadder Passwork	rđ	
C Encrypted Pass	word	
Password :		
Encryption Key:	9C7CF	°C
V (ж 🗙 с	Cancel

- Ladder Password: enter the program password for the original protected program and you will be able to recover, but if the designer is unwilling to provide this password, you can choose to use an encryption password for user recoveries.
- 2. Encrypted Passwords: the encryption password randomly produces an encryption key, and Winproladder will produce an encryption password according to this random value and the program password. Because Winproladder produces a different encryption key each time, therefore only those who know the program password can calculate an encryption password and perform file recovery. The advantage of this scheme is that backup file recovery can be performed without having to let the user know the program password, and because the random encryption key is different each time, each recovery encryption password is also used only once, which provides a further degree of protection for the intellectual property rights of the program designer.

Password Aut	inenticatio		
Password Ty	/pe		
C Ladder Pa	assword		
Encrypted	d Password		
Password :	Γ		
Encryption K	ev: R	FE9E8	1
	- 0		
[r		X Canc	al
L	V UN	🔥 Cano	

If an encryption password is used, then the user that wishes to perform the recovery must give the encryption key shown in the window to a protector who knows the program password. The protector have to open a new WinProladder, then executes [Tools] \rightarrow [Encrypted Password Generation] :

File Edit View Project Ladder PLC	Tool Window Help
	Syntax Check F8
₩ 🐀 🖷 🖷 + III + 192 + 94 +	Element Statistics F7
┃ ▷ + ト + ト + + + + + · · · · · · · · · · ·	System Backup System Restore
	Encrypted Password Generation
	MEMORY_PACK operations CRC16 Generator Check power supply capacity

Enter the program password and the randomly produced encryption key into the dialogue box shown below :

Encrypted Password	Generation
Ladder Password :	×××
Encryption Key:	BFE9E8
🖌 ок	X Cancel

Press the "OK" button to produce the encryption password.

Single P	000100		
00A45	i3		
			_
		🗸 ок	

The protector will then give this encryption password to the user that wishes to perform the recovery to enter into the password confirmation dialogue box, and the recovery operation can be proceeded with. The user must not close the password confirmation dialogue box before inputting has been completed or the encryption key will be different the next time it is opened.

Password Authent	ication
Password Type C Ladder Passwor	d
Encrypted Pass	word
Password :	00A453
Encryption Key:	BFE9E8
	K X Cancel

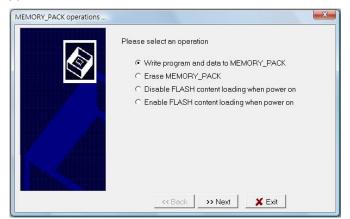
Press the "OK" button and the restore will begin.

🔟 Under Data T	ransfer	
	PLC System Data	
u 🖌	Ladder	Vector Address
U 😺	Discrete Status	M0~M1911
V 🖌	Special Discrete Status	M1912~M2001
U 😺	Data Register	D3072~D4095
 ✓ 	Special Register	R3840~R4167
•	Timer/Counter Register	T0~T255
	File Register	
		Cancel



13.5 ROM Pack Operation

When connected with the PLC, execute [Tool] \rightarrow [MEMORY_PACK operations] from the function toolbar, and the following window will appear:



- 1. Write program and data to MEMORY_PACK: to execute the writing of program and data to ROM Pack.
- 2. Erase MEMORY_PACK: clears all program and data originally being written to the ROM Pack.
- 3. Disable FLASH content loading when power on: if you select this setting, then the program and data stored in ROM Pack will not be read during power-up.
- 4. Enable FLASH content loading when power on: if you select the normal mode settings, the program and data stored in ROM Pack will be read during power-up.

Four Operation Modes:

1. Write the program and registers to the ROM Pack, press next and the following screen will appear:

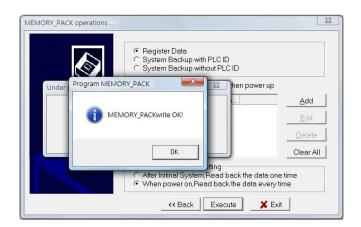
C Syster	ter Data m Backup w m Backup w	ith PLC ID ithout PLC ID	
Assign the c	lata to be re	ad back when power	up
Starting	Ending	Data len	Add
			Edit
			Delete
			Clear All
	<< Back	Execute X	Exit

Press the "Next" button. If you need to retrieve the register data from the ROM Pack during each power-up, then you will need to define the initial and termination addresses. Press the "Add" button:

	 Register Data System Backup with PLC ID System Backup without PLC ID 	
	Assign the data to be read back when power u	qu
	Starting Ending Data len	Add
	Data assigment	Edit
	Starting address: R1000 - R1199	Delete
V All	Data Length : 200	Clear All
	OK X Cancel	

After creation, you may also click the "Edit" button to modify, or you can also "Clear All" and then define a new one. After defining, press the "Execute" button and the writing will begin.

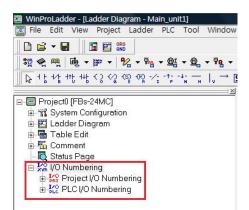
 Gegister Data C System Backup with PLC ID C System Backup without PLC ID 	
Assign the data to be read back when powe	er up
Starting Ending Data len	Add
R1000 R1199 200	Edit
	Delete
	Clear All
The Data Read Back Setting	



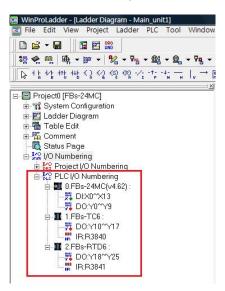
13.6 I/O Reference Number Allocation Statuses

WinProladder takes an automatic I/O address calculation for PLC main unit and expansion modules. After WinProladder connects with the PLC main unit, it will read the I/O installation status of the PLC main unit and the expansion modules, at the same time automatically allocating the I/O reference address for access. The user can view how many expansion modules are connected to the PLC main unit, and what the I/O addresses

are used by the expansion modules in the project management window.



After you expand it, you will see the information for the expansion modules being installed:



The illustration above shows a FBs-24MC main unit has two expansion modules, which are TC6, RTD6, respectively, in which the I/O addresses used by TC6, RTD6 are as shown in the following table:

Used system resources Expansion device model	DO	IR	
TC6	Y10~Y17	R3840	
RTD6	Y18~Y25	R3841	

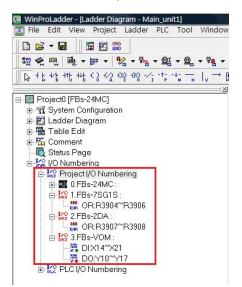
Besides obtaining the I/O address of expansion modules through the on-line method, WinProladder also provides users with a method of editing expansion module information off-line, which is described in the illustration below:

🖼 WinProLadder - [Ladde	r Diagram	- Main_ur	iit1]	
File Edit View Pro	oject Lad	der PLC	Tool	Window
	AND ORG			
📲 😪 🖳 🖷 🖛 🖛	- 1% -	ም - 🙊	- 🖳	• 🖷 •
┣ + ┟ +/ +/ +/ +/ </th <th><i>ଦୁ</i> ଦ୍ୱୁ ଜ</th> <th>) -/↑- R I P</th> <th>-↓- <u>н</u></th> <th>$_{v} \rightarrow [$</th>	<i>ଦୁ</i> ଦ୍ୱୁ ଜ) -/↑- R I P	-↓- <u>н</u>	$ _{v} \rightarrow [$
	uration m Jumberind Add Mo Erase Mr Adjust M	odule Iodule Po:	sition	
	Load for	m PLC		

Right-click on [I/O Numbering], and select the "Add Module" option:

Add Module		Σ [
Position:	1	
Select Module:		•
	FBs-B2A1D	
OK	FBs-B2DA	H
	FBs-B4AD FBs-16EA	
	FBs-16EY	
	FBs-1LC	
	FBs-20EX	
20	FBs-24EA	

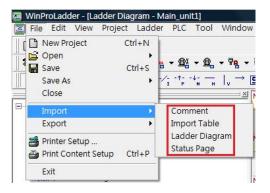
Location 1 represents that the connected expansion module is module number 1, which also means it is the first expansion module, and location 2 represents the second expansion module, and so on.... Now, select the model types of the modules that you wish to install, add 7SG1S, 2DA and VOM for example. Using this method, you can pre-edit the expansion modules that you wish to install during off-line.



The WinProladder software also displays the real installed expansion modules and manual edited modules.

14 Import and Export Project Contents

Project contents that can be imported and exported include four types: [Comment], [Import Table], [Ladder Diagram], and [Status Page].



Annotations descriptions: execute $[File] \rightarrow [Export] \rightarrow [Comment]$ from the function toolbar, and the [Comment Export] window will appear. The exported file will be a text file, with txt file extension.

Comment Export		×				
File File Name: C\Documen	ts and Settings\DIGIT\De	:sktop\0701.bt 🕞				
Field	Range					
Comments	✓ [Input Points]	🗆 <u>T</u> [Timer]				
Description	☑ ⊻ [Output Relays]	☑ C [Counter]				
	🗹 <u>M</u> [Internal Relays]	Relays] 🔽 <u>R</u> [Register]				
	🗹 S [Step Relays]	🗹 <u>D</u> [Data Register]				
	User Define					
Cancel						

For the exported annotations text files you can further execute $[File] \rightarrow [Import] \rightarrow [Comment]$ from the function toolbar, and the [Comment Import] window will appear; select a text file and proceed with the import operation:

Comment Import		×
File File Name: C:\Docum	ents and Settings\DIGIT\E	lesktop\0701.txt 🛱
Field I Comments I Description	Range ▼ ⊻ [Input Points] ▼ ⊻ [Output Relays] ▼ <u>M</u> [Internal Relays] ▼ <u>S</u> [Step Relays]	 ✓ I [Timer] ✓ C [Counter] ✓ R [Register] ✓ D [Data Register]
	✔ OK	

Please refer to Section 6.3 [Element Comment], where there is also a detailed description of these procedures.

 Table Export
 Image: Cancel

 Table List
 Name
 Start Addr...
 Allocated Size

 Image: Start Addr...
 End Addr...
 Allocated Size

 Image: Start Addr...
 R0
 Dynamic all...

 Image: Start Addr...
 Export
 Image: Start Addr...

Export Table: execute [File]→[Export]→[Export Table] from the function toolbar, and the [Table Export] window will appear:

Under the [Table List] option, select the table that you wish to export (for example, you may select "modbus ") and then press the "Export" button, and save it as a file with a tab file extension, and you will have completed the table export procedure.

Execute [File] \rightarrow [Import] \rightarrow [Import Table] from the function toolbar, and the [Table Import] window will appear:

🚾 Table Imp	ort				- 🔀
File					
File Name:	C:\Docun	nents and S	ettings\DIGIT\	Deskti	à
-Table List					
Name	Start Ad	End Ad	Allocated		
🖬 modbus	RO	RO	Dynamic		
	 I 	mport 🗙	Cancel		

Select the filename that you wish to import, and press the "Import" button, and you will have completed the import operation.

Ladder diagram: if we wanted to copy network N001 from project one and paste it into project two, we could proceed as follows.

First, open project one, and select network N001, as shown in the following

illustration:



Execute [File] \rightarrow [Export] \rightarrow [Ladder Diagram] from the function toolbar, and a save as... dialogue box will be produced:

Save As						? 🔀
Save jn: 📃	Desktop	•	+		Č	
Hy Docume My Comput My Networ	er					
File <u>n</u> ame:	sample					<u>S</u> ave
Save as <u>t</u> ype:	Ladder Resource [*.ldr]		•	•		Cancel

Enter the file name [sample] and then press "Save", and an "Export Complete!" message will appear:



After you press the "OK" button, execute [File] \rightarrow [Close Project] from the function toolbar, and close project one; then, open project two (to open the project, refer to the description on how to open existing files in Section 3.2), move your cursor to the position where you would like insert the network, and execute [File] \rightarrow [Import] \rightarrow [Ladder Diagram]from the function toolbar:

Open					? 🔀
Look in: 📃	Desktop	•	+	Ċ	.
🕒 My Docume					
₩ My Networ Sample.ldr					
File name:	sample.ldr				Open
Files of type:	Ladder Resource [*.ldr]		•		Cancel

In the open file dialogue box, select the [sample.ldr] filename that you previously entered, and then press "Open", and an "Import Completed!" message window will appear, and you have now completed a copy network operation between two different projects:

lmoprt	×
(į)	Import Complete !
	ОК

Status Page: execute [File]→[Export]→[Status Page] from the function toolbar, and the [Status Page Export] window will appear. Select "StatusPage0" in [Status Page List], and then press the "Export" button, and it will be saved as a file with the spf file extension, and now you have completed the status page export operations.

Status Page Export		X
-Status Page List		
Name	Item Count	
🌉 StatusPage0	1	
✓	Export 🗙 Cance	1

execute [File] \rightarrow [Import] \rightarrow [Status Page] from the function toolbar, and the [Status Page Import] window will appear:

📕 Status Page Import	
File	
File Name: C:\Doc	uments and Settings\DIGIT\Desk 🛛 🔓
Name	Item co
🛱 StatusPage0	1
 ✓ 	Import 🗙 Cancel

Select the status page filename that you would like to import, and then select the status page with new filename under the table list, press the "Import" button, and you will have completed the import operation. Open the [Status Page] window of this project, and you will find that this status page has been created.

15 Managing the Desktop

The Winproladder programming software has an easy-to-use Window interface, and there is an easy way to manage every aspect of the software, including the tool bar, project window, status monitor, and ladder diagram windows, etc., allowing even easier operations, and even neater displays.

15.1 Tool Bar Management

Execute [View] \rightarrow [Tool Bar] \rightarrow [File] from the function toolbar, and the file toolbar icons will be displayed. If you execute this again, the file tool bar will be hidden:



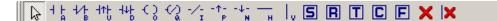
Execute [View] \rightarrow [Tool Bar] \rightarrow [View] from the function toolbar, and the view toolbar will be displayed; execute it again and the view tool bar will be hidden:



Execute [View] \rightarrow [Tool Bar] \rightarrow [Project] from the function toolbar, and the project toolbar icons will be displayed; execute this again and they will be hidden:



Execute [View] \rightarrow [Tool Bar] \rightarrow [Ladder] from the function toolbar, and the component tray toolbar icon will be displayed; execute this again and it will be hidden.



Use your cursor to drag open the portion of the tool bar encircled in red below and the toolbar icons will be brought out in an independent window, you can close this window by clicking on the X icon in the upper right-hand corner:





Similarly, if you drag the front portion of the tool bar, you can re-arrange all of the displayed tool bar icons:





15.2 Management of the Project Window

Execute [View]→[Project Tree] from the project window, and [Project Tree] will be displayed in the left-hand window in the WinProladder programming software, as shown in the illustration below. You can close this project management window by pressing the X icon in the upper right-hand corner:

	×
E Project0 [FBs-24MC]	
🗄 📲 System Configuration	
🗄 🚾 Ladder Diagram	
🗄 🖶 Table Edit	
🗄 🎬 Comment	
- 🗓 Status Page	

Similarly, by dragging on the portion marked in red in the above illustration, you can also create an independent project window, as shown in the illustration below, and you can close this window by clicking on the X icon in the upper right-hand corner:



15.3 Management of the Status Monitor Page

Execute [Project] \rightarrow [Status Page] from the function toolbar, and select the already existing monitor page name "StatusPage0"; or, in the project window [Test example] \rightarrow [Status Page] and select the already existing status page name "StatusPage0", and the [Status Monitoring] window will appear, and all existing status page names will be listed in the monitoring window. You can bring out page contents by clicking on the various page labels, and you can close the [Status Monitoring] window by clicking on the X icon in the upper right-hand corner.

Ref. No	Status_	Data	Ref. No.	Status	Data	Ref. No.	Status	Data	
TO	OFF	0	MO	Enable	OFF	YO	Enable	OFF	
			M1	Enable	OFF	Y1	Enable	OFF	-
M1924	Enable	OFF	M2	Enable	OFF	Y2	Enable	OFF	
			M3	Enable	OFF	Y3	Enable	OFF	
			M4	Enable	OFF	Y4	Enable	OFF	
			M5	Enable	OFF	Y5	Enable	OFF	
			M6	Enable	OFF	Y6	Enable	OFF	
			M7	Enable	OFF	Y7	Enable	OFF	
			M8	Enable	OFF				
•									

15.4 Management of Ladder Diagram Windows

Please refer to [Order of Ladder Diagram Windows] in Section 7.1.2 for detailed operation procedures.

16 Common Q&A's (FAQ)

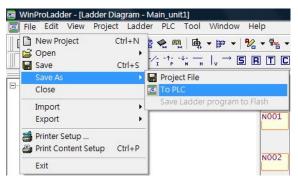
Question one: Why can't I connect with the PLC?

ANS: Please make sure that the set station number and communication parameters are correct, an error in any of them will result in failure to connect. If you are not sure whether or not the station number is correct, you can try the universal station number "255", and then change it back to the station number you wish to use after you have successfully connected.

On-Line				22
	Connection Name	e	2	Auto Check
	RS232			-
	Advanced	Add	<u>E</u> dit	Delete
Connection Setup	Details			
	Attribute	Data		
Station Number: 255	Station Number			
Port No.: COM4	Medium Port No	Serial line COM4		
Port No.: COM4 💌	Baud Rate	9600		
Baud Rate : genn	Parity	E∨en parity		
	Data Bit	7 bits		
Parity: Even parity.	Stop Bit	1 bit		
Data Bit : 7 bits 💌			ок	Cancel
Stop Bit 1 bit 💌				
			10	12
V Ok X Cancel				
			12	12

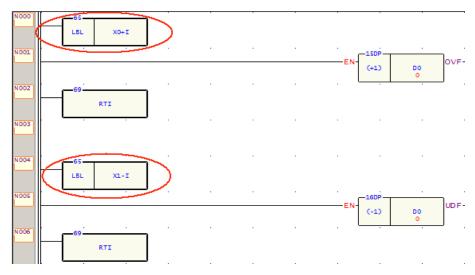
Question two: Why is it that even though I have finished writing the program, I cannot perform on-line operations with the PLC, and a "Project Information Does Not Match" warning window keeps appearing?

ANS: When the PLC is manufactured, its internal program areas are empty. If you try to open a project under this condition and execute connection items, WinProladder will compare your project program with the PLC internal program, and will only connect if the two programs are identical. Of course, if your PLC just came out of the factory, its contents must be empty, and no project will be able to connect to it, therefore, you should execute the "Save As" → "To PLC" option, instead of executing the "On-Line" option.



Question three: Why can't I send an interrupt event inside the program, and how come when there is an interrupt, the interrupt service routine is not executed?

ANS: The reason for this is that although the interrupt label has been entered into the ladder program area, the interrupt input signal has not been defined in the I/O configuration settings page in the system configurations. Therefore, the way to solve this problem is to go to the I/O configuration settings page and define it, as shown below:



1. Enter the interrupt label and service routine in the sub ladder program area (the LBL frame will be highlighted in bold).

Utilization 1/0 No.	Function		Timer/Counter	Inter	rupt Setup	Output S	ietup	Input Setup	Temp. Configuration	4
X0 X1 X2	INT0,Pos. e INT1,Neg. e Undefined		🔽 Use INTO (>	(0)	Positive Ec	lge 🔻		Use INT8 (X8)	Positive Edge	v
X3	Undefined		🔽 Use INT1 (>	(1)	Negative E	dge 💌		Use INT9 (X9)	Positive Edge	w
×4 ×5	Undefined Undefined		Use INT2 (>	(2)	Positive Ec	lge 💌		Use INT10 (×10	Positive Edge	*
×6 ×7	Undefined Undefined		🔲 Use INT3 (>	(3)	Positive Ec	lge 💌		Use INT11 (×11	Positive Edge	*
×8	Undefined		🔲 Use INT4 (>	(4)	Positive Ec	lge 💌		Use INT12 (X12	Positive Edge	*
X9 X10	Undefined Undefined		🖵 Use INT5 (>	(5)	Positive Ec	lge 💌	- _	Use INT13 (×13) Positive Edge	*
X11 X12	Undefined Undefined	E	🔲 Use INT6 (>	(6)	Positive Ec	lge 💌	- _	Use INT14 (×14) Positive Edge	*
×13 ×14 ×15	Undefined Undefined Undefined		🔲 Use INT7 (X	(7)	Positive Ec	lge 💌] _	Use INT15 (X15	Positive Edge	*
 Y0 Y1 Y2	Undefined Undefined Undefined									
Y3 Y4	Undefined Undefined									
Y5 Y6	Undefined Undefined									
Y7	Undefined									

2. You will need to define the interrupt input in the I/O cofiguration page.

Question four: How come I used a high-speed pulse output function (FUN140) in the program, but there is no high-speed pulse output?

ANS: Some instructions in the FATEK PLC main unit must be executed through FATEK self-developed ASIC, and therefore you need to tell the ASIC which jobs you want it to execute for you through the system configuration settings. So, please enter the I/O configuration setting page and make the required definitions, as shown below:

lization	Timer/Counter Interrupt Setup	Output Setup Input S	Setup Temp. Configuration
D No. Function Undefined Undefined 1 Undefined 2 Undefined 3 Undefined 4 Undefined 5 Undefined 8 Undefined 9 S00.PLS PS00.DIR PS01.UP PS01.DN PS02.A	Retentive Dutput Coil Y0 Y1 Y2 Y3 Y4 Y5 Y6 Y7 Y7 Y8 Y9 Y9	HSPS0 PS00 (Y0-Y1): PS01 (Y2-Y3): PS02 (Y4-Y5): PS03 (Y6-Y7): Output Polarity Y0-Y1 Output: Y2-Y3 Output: Y4-Y5 Output: Y6-Y7 Output:	Y0=PLS;Y1=DIR Y2=UP;Y3=DN Y4=A;Y5=B Y0=PLS Y0=PLS Normal Normal Normal
PS02,B PS03,PLS Undefined			

Question five: Why do the LED indicators light on immediately after the PLC executes, even when the corresponding output status should be 0?

ANS: You have probably accidentally set the output to an inverted state, making output coil that originally should not have conducted to invert, and therefore making the output indicators light up. Therefore, you should go to the I/O configuration setting page and select the correct output polarity.

I/U No. Function 00 Undefined 10 Undefined 12 Undefined 13 Undefined 14 Undefined 15 Undefined 17 Undefined 10 Y1 11 Y1 12 Y3 14 Y4 17 Y4 10 Y6 10 Y6 10 Y8 10 Undefined 11 Undefined 12 Undefined 13 Undefined 14 Undefined 15 Undefined 16 Y11 17 Y12 18 Y14 19 Y13 111 Y14 111 Y15 12 Undefined 13 Undefined 14 Undefined 15 Undefined 14 Undefined 17 Y16 <td< th=""><th>Jtilization</th><th></th><th>Timer/Counter</th><th>Interrupt Setup</th><th>Output Setup</th><th>Input Setup</th><th>Temp. Configuration</th><th>1</th></td<>	Jtilization		Timer/Counter	Interrupt Setup	Output Setup	Input Setup	Temp. Configuration	1
Y5 Undefined	K0 Undefined K1 Undefined K2 Undefined K3 Undefined K4 Undefined K5 Undefined K6 Undefined K7 Undefined K8 Undefined K9 Undefined K10 Undefined K11 Undefined K12 Undefined K13 Undefined K14 Undefined K15 Undefined K14 Undefined K15 Undefined K14 Un	E	Petentive Outpr Y0 Y1 Y2 Y4 Y5 Y6 Y7 Y8 Y10 Y11 Y12 Y14 Y15 Y16 Y17 Y17 Y17 Y18	at Coll	HSPS0 PS00 (Y0Y1 PS01 (Y2Y3 PS02 (Y4Y5 PS03 (Y6Y7 Output Polarity Y0Y1 Outpu Y2Y3 Outpu Y4Y5 Outpu): Not u i): Not u i): Not u t: Not u t: Norm t: Norm	sed sed sed sed sed sed sed sed	

Question six: In the I/O configuration setting page, I defined a high-speed hardware counter (HHSC0~HHSC3), but cannot see the corresponding registers (DR4096~DR4110) beginning to count?

ANS: If you want to use the hardware high-speed counter, besides doing the I/O configuration, you must also use the function instructions (FUN92, FUN93) to read and write the internal data from/to the ASIC. For details, please refer to Chapter 10 FBs-PLC High-Speed Counter and Timer of User Manual II - Advanced Application.

Question seven: Can previous FBe series programs be executed on FBs series?

- **ANS:** Yes! But it must go through code conversion. There are two methods for code converting, please refer to the following description:
 - (1). Modify Program Capacity: through the modification of program capacity, FBe series programs can be converted and saved to FBs series.

"Project" \rightarrow "Program conversion" \rightarrow "FBe" to "FBs".

- (2). Modify Project Information: or you can perform code conversion by directly modifying project information.
- In addition, after the program has undergone code conversion, some function instruction icons will also

change. For example, +, -, *, / ..., will all have signed/unsigned input options, and the original communication instructions (FUN96, FUN97) will convert to the new communication instruction FUN151. As for the FBe instructions that the FBs does not support, an error message dialogue box will appear after the code conversion has been completed. After code conversion, previous files cannot be changed by means of overwriting, please use the save as new file method. The following is the FBs and FBe function instructions comparison table, which can serve as a reference for code conversion:

FBs New Ir	nstructions
1.1.1	FUN55 (B→G): Binary code to Gray code
1.1.2	FUN56 ($G \rightarrow B$): Gray code to Binary code
1.1.3	FUN114 (Zone Write): Zone write
1.1.4	FUN139 (HSPWM): Hardware High-Speed PWM Output
1.1.5	FUN160 (RW↔FR): File register Read/Write
FBs Cance	led Instructions
1.2.1	FUN96 (LINK2): Port 2 communication convenient instruction
1.2.2	FUN97 (LINK1): Port 1 communication convenient instruction
1.2.4	FUN72 (TP4): Multiplexing temperature module FB-2AJ(K/H/T)4 temperature
	measurement instruction
1.2.5	FUN73 (TSTC): Temperature module FB-2AJ(K/H/T)4 temperature measurement+
	PID temperature control
1.2.6	FUN85 (TPSNS): Multiplexing temperature module FB-4AJ(K)XX temperature
	measurement instruction
FBs Modifie	ed Instructions
1.3.1	FUN11 (+) : Addition operation, with signed \angle unsigned calculation option
1.3.2	FUN12 ($-$) : Subtraction operation, with signed \checkmark unsigned calculation option
1.3.3	FUN13 (x) : Multiplication operation, with signed \angle unsigned calculation option
1.3.4	FUN14 (\div) : Division operation, with signed \checkmark unsigned calculation option
1.3.5	FUN17 (CMP) : Comparison, with signed / unsigned calculation option
1.3.6	FUN23 (DIV48): 48-bit division operation, with signed / unsigned calculation option
1.3.7	FUN77 (HKEY): 16 key multiplexing input, increase working register
1.3.8	FUN78 (DSW): Thumb wheel switch input, increase working register
1.3.9	FUN79 (7SGDL): 7-segment display scan output, increase working register
1.3.10	FUN80 (MUXI): multiplexing contact input, increase working register
1.3.11	FUN84 (TDSP): 7-segment and alphanumeric display convenient instruction
1.3.12	FUN86 (TPCTL): PID temperature control instruction
1.3.13	FUN87 (T.01S) : 0.01 second accumulative timer, can be up to 32 bits
1.3.14	FUN88 (T.1S) : 0.1 second accumulative timer, can be up to 32 bits

1.3.15	FUN89 (T1S) : 1 second accumulative timer, can be up to 32 bits
1.3.16	FUN93 (HSCTW): Hardware High-Speed Counter / Timer settings or writing of current
	value and preset value
1.3.17	FUN141 (MPARA): NC positioning parameter settings instruction, adjustment of
	parameter item

Question eight: How do I download projects into the PLC?

ANS: Please follow the following steps.

Step 1: Use your mouse to select [File] \rightarrow [Open] \rightarrow [Open] or click the \square dropdown icon in the tool bar, and select [Open], or press the "Ctrl"+"O" key, and the "Open" dialogue box will appear:

Open			? 🔀
Look in: 🚺	winproladder	▼ ← 🛍	≝ .
ିଙ୍ଗୁ Test exam ଙ୍କୁ Test.pdw	ple.pdw		
File <u>n</u> ame:			<u>O</u> pen
Files of <u>t</u> ype:	Proladder File [*.pdw,*fld]	•	Cancel

Then choose the file that you wish to open and press the "Open" button.

Or, select one of the four recently opened files provided by WinProladder, and you can quickly open one of the files you last opened. Use your mouse to select [File] \rightarrow [Open] from the function toolbar (as shown in the illustration below:)

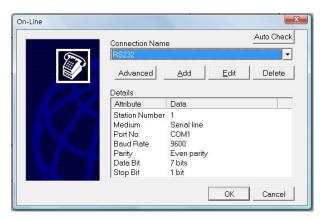
New Project Ctrl+N		
🖁 Open 🔹 🕨	😅 Open	Ctrl+C
Save Ctrl+S	Connect To PLC	Ctrl+L
Save As	1 C:\Users\Y.C. Wang\Desktop\2\Test example.pd	lw
Close	2 C:\Users\Y.C. Wang\Desktop\pdw文件夾\My-se	and the state of the second second
Import •	3 C:\Users\Y.C. Wang\Desktop\pdw文件夾\examp	
Export •	4 C:\Users\Y.C. Wang\Desktop\pdw文件夾\station	103.pdw
Printer Setup Print Content Setup Ctrl+P	NOO1	

Select the project that you wish to open. Follow the above steps to open existing file and display it in the ladder diagram window, as shown below:

le Edit View Project Ladder PLC	Tool Window Help											- 4
* m + · p · % · % · %												
さるまたのののシュー	: =: I, = S B		×									
Test example (FBs-24MC)		Test example										
M Ladder Diagram Table Edit Gomment		Program start.										
K Status Page	NODO	T0							015-		7	
		-1/1						EN	TO	100	-TUP-	
	N001	то	¥2	39	÷.	24	¥1	EN	D : 51	N. SHIFL	отв-	
									NI	1		
				1.5				INB-			-ERR-	
	N002	M1924						-	5 : 0	5. MOV		
			0	0	12	02	0	EN-	D :	WNO		
		M8						· ·				
	N003	то										
		-ii						PLS	C0		-CUP-	
		MO						CLR	PV:	10	- 68	
		-1/1		- 51	- 25	12	15	CLA				
	N004										Č,	
	N005	MI			83						·	
		-0										
	Main	nit/Sub_unit/	10	14	-	-	1	14	-	12	- · - · ·	-

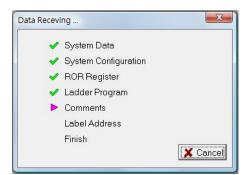
(The program in the current ladder diagram window is only the program in the PC disk, and is not connected with the PLC)

- Step 2: We can first save the program to the project files in the PC disk, please execute [File] → [Save] from the function toolbar, which means that the original project files will be saved; or, execute [File]→[Save As] → [Project File] from the function toolbar, and save the modified project program to a new project file. You can keep the original project.
- Step 3: Since, in the beginning, an opened existing file is not connected to the PLC, therefore we need to connect to the PLC, and save the test program to the PLC, to be able to proceed with program testing. First execute [File]→[Save As] → [To PLC] from the function toolbar, and the [On-Line] window will appear:



(Select the desired [Connection Name], and then press the "OK" button, and the connection process will

begin)



(After the connection has been established, the following illustration will appear)

ltem	Status	
Station Nu	1	
- Model	FBs-24MC(v4.62)	
PLC Status	Stopped	
MEMORY	Not Set	
Syntax Che	OK	
Password	Not Set	
Main Progr	Not Set	
Sub-Progra	NotSet	
Data Pass	Not Set	
Program ID	NotSet	
PLC ID	NotSet	
📆 Calendar	Installed	
Available p	20224Word	
Used progr		
Free progr	20185Word	
Min. OS ver	√4.00	

(And now you can proceed with PLC connected tests)

17 Appendix

This appendix contains the hotkey table and import/export format descriptions.

17.1 Hotkey Table

Component input

Input component	Keys and descriptions
Contact A	A or Shift + A, if you simultaneously press the shift button you will only need to enter the component and will not need to enter the reference number
Contact B	B or Shift + B, if you simultaneously press the shift button you will only need to enter the component and will not need to enter the reference number
Transition Up Contact	U or Shift + U, if you simultaneously press the shift button you will only need to enter the component and will not need to enter the reference number
Transition Down Contact	D or Shift + D, if you simultaneously press the shift button you will only need to enter the component and will not need to enter the reference number
Output Coil	O or Shift + O, if you simultaneously press the shift button you will only need to enter the component and will not need to enter the reference number
Inverted Output Coil	Q or Shift + Q, if you simultaneously press the shift button you will only need to enter the component and will not need to enter the reference number
Set Coil	E or Shift + E, if you simultaneously press the shift button you will only need to enter the component and will not need to enter the reference number
Reset Coil	R or Shift + R, if you simultaneously press the shift button you will only need to enter the component and will not need to enter the reference number
Note: When entering the above components, you can first enter the reference numbers (X,Y,M,S,T,C) and then enter the component keys (A,B,U,D,O,Q,E,R), or you can first enter the component keys and then enter the reference number.	
Inversion of node status	1
Transition Up of node status	Р
Transition Down of node status	Ν
Horizontal Short	Н
Continuous Horizontal Short	Shift + H
Vertical Short	V

Function Block	F
SET Function	Shift + S
RESET Function	Shift + R
Timer Function	Shift + T
Counter Function	Shift + C
Label Input	Shift + L
Repeat Last Input	Shift + F

Component Editing

Function	Keys and Descriptions	
Modify contact reference number	Directly input new reference number, or press the "SPACE" key to	
	bring up the editing window and then enter the new number.	
Modify reference number in the	Press the "SPACE" key to bring up the editing window and then	
function instruction	enter the new reference number.	
Delete component or function	Dense the Delete law on the Declarge a law	
instruction	Press the Delete key or the Backspace key.	

Network Editing

Function	Keys and descriptions
Insert blank network	Insert above – Shift + Insert
Inselt blank network	Insert below – Ctrl + Insert
Delete single network	Ctrl + Delete
Select networks in all program units	Ctrl + A
Copy network	Ctrl + C
Paste network	Ctrl + V
Delete network	Delete
Cut network	Ctrl + X
Note: Before performing the above four operations, you must first mark the network with your mouse.	

Cursor Movement

Function	Keys and description
Up, down, right, left movement	The up, down, right, and left keys
Jump to first column	Home

Jump to last column	End
Jump to next row	Shift + Enter
Jump to next network	Enter
Jump to first network	Ctrl + Home
Jump to last network	Ctrl + End
Jump to a specific network	Ctrl + G

Project Operations

Function	Keys and descriptions
Open new project	Ctrl + N
Open project file	Ctrl + O
Connect and open project	Ctrl + L
Save project	Ctrl + S
Print	Ctrl + P

PLC Operation

Function	Keys and descriptions
Stop PLC Operation	Ctrl + F9
PLC execution	F9

Component Search

Function	Keys and descriptions
Search for component	Ctrl +F
Search for next component	F3

Miscellaneous Operations

Function	Keys and descriptions
Set project options	Ctrl + F8
Syntax check	F8
Display register data	F11

Step Ladder

Function	Keys and descriptions
STP	? (irrelevant to Caps Lock)
FROM	< (irrelevant to Caps Lock)
то	> (irrelevant to Caps Lock)
STPEND	Shift + Z

17.2 Export/Import File Format

There are four types of project contents that can be exported and imported: [Comment], [Import Table], [Ladder Diagram], and [Status Page].

1. [Comment]	The import/export file format is a text file with a txt file extension.
2. [Import Table]	Import and export operations are performed in tab file extension format.
3. [Ladder Diagram]	Import and export operations are performed in ldr file extension format.
4. [Status Page]	Import and export operations are performed in spf file extension format.

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File E	dit Format	View	Help			
REF X0 X1 X2 X3 X4 X80 Y0 Y1 Y1 Y2 Y3 S21 S22	COMME Start LS1 LS2 LS3 LS4 TURN A+ A- B+ B- PROGF PROGF	ON RAM1	ESCR)	IPTION		~
<					>	

The following is a description of the text file contents:

"REF": list component name fields.

"COMMENT": text annotations for the corresponding components.

"DESCRIPTION": text descriptions for corresponding components.