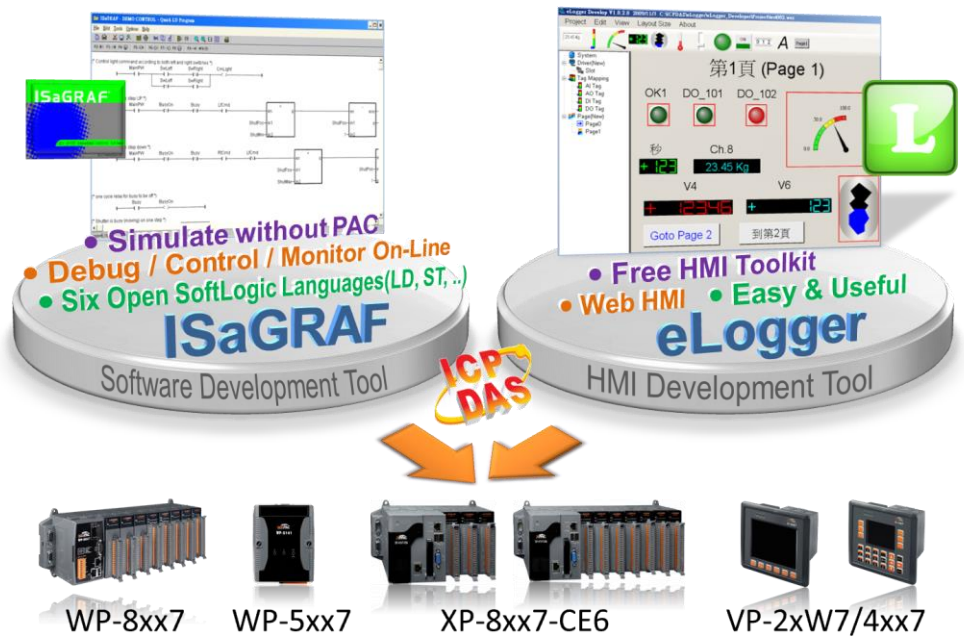
How do I use ISaGRAF SoftLogic and the eLogger HMI with an ISaGRAF WinCE-based PAC?

Download FAQ-115 Demo

The “eLogger” is an HMI development tool developed by ICP DAS that features an easy-to-use graphical user interface (GUI). The tool can be used to design both Local HMI and Web HMI pages, and allows easy integration with ISaGRAF SoftLogic software installed on an ISaGRAF WinCE-based PAC (e.g., WP-8x37/8x47, WP-5147/5147-DO, VP-2xW7/4137, and XP-8x37-CE6).

Users can log in to the created Web HMI pages to remotely monitor and control the ISaGRAF system using a standard web browser on a smart phone.



This document and all demo programs (faq115_demo.zip) can be obtained from:
http://www.icpdas.com/web/product/download/software/development_tool/isagraf/document/faq/faq115_demo.zip

Visit the ISaGRAF FAQ web Page for more information about how to use the ISaGRAF.
http://www.icpdas.com/en/faq/index.php?kind=280#751

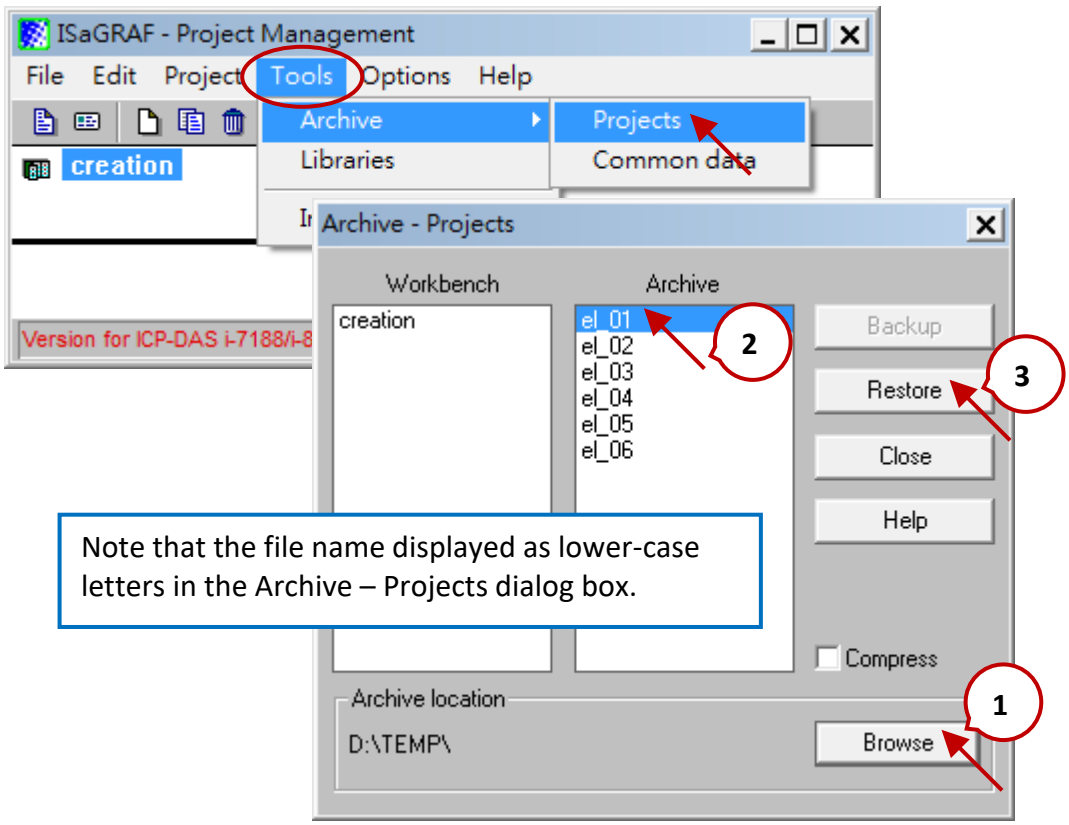
ISaGRAF web page: (Software/Manual)
http://www.icpdas.com/en/product/guide+Software+Development__Tools+ISaGRAF

eLogger web page: (Software/Manual)
http://www.icpdas.com/en/product/guide+Software+eLogger+eLogger

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Chapter 1. Building an ISaGRAF SoftLogic Project

The ISaGRAF project file “eL01.zip” for the examples used in this chapter found in the “faq115_demo.zip” file can download from http://www.icpdas.com/web/product/download/software/development_tool/isagraf/document/faq/faq115_demo.zip. For users who are familiar with the ISaGRAF software, simply locate the folder where you stored the example files and archive these files to the PC/ ISaGRAF, and then upload the “eL01” project to the ISaGRAF PAC. Then, refer to Chapter 2 of this document for details of how to create HMI pages using eLogger.

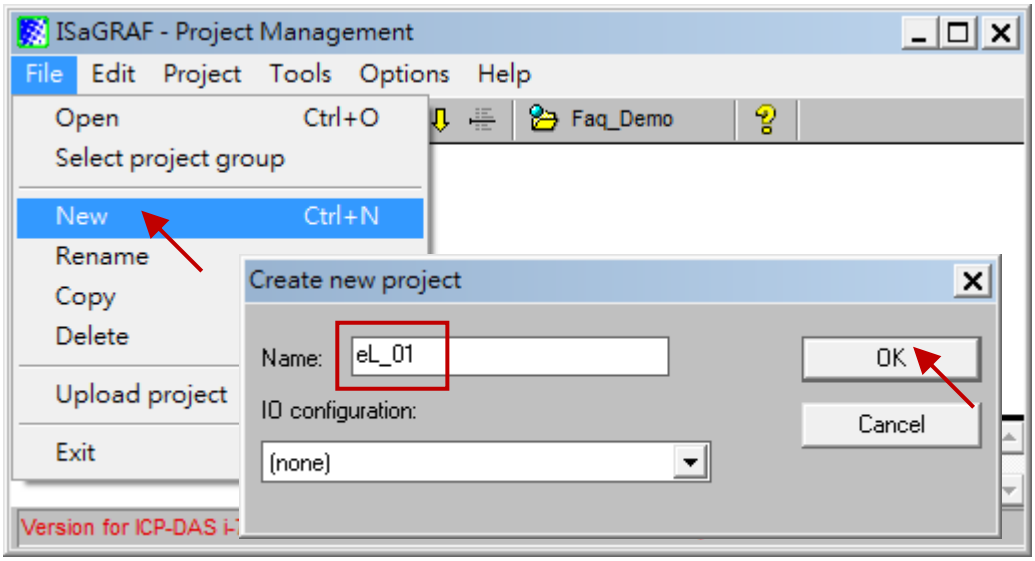


For those users who are not familiar with ISaGRAF, read Chapters 1 and 2 of the ISaGRAF User Manual for more details relating to the use of the software. The manual can download from below linkage:
http://www.icpdas.com/en/download/show.php?num=333&nation=US&kind1=&model=&kw=isagraf
At least one of each the ISaGRAF-256 or the ISaGRAF-32 software must be installed. Check the “Ordering Information” section of the ISaGRAF web page for details of how to order the software.
http://www.icpdas.com/en/product/guide+Software+Development__Tools+ISaGRAF#443
If the ISaGRAF software is not installed on your PC, first read Section 1.1 of the ISaGRAF User Manual for details of how to install it, and then read Section 1.2 of the ISaGRAF User Manual for details of how to install the “ICP DAS utilities for ISaGRAF” application.

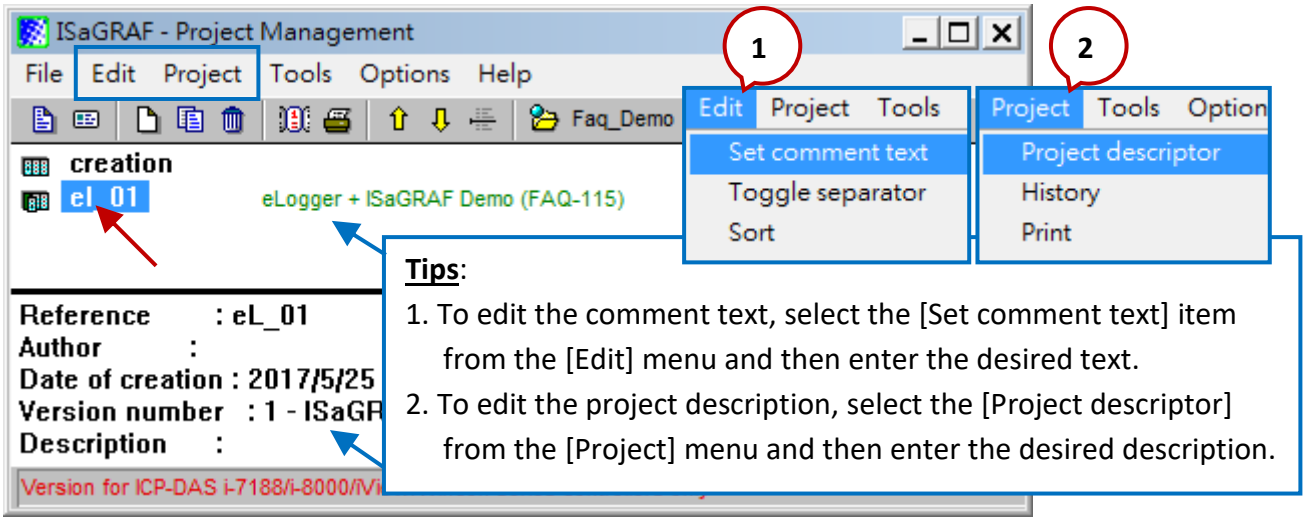
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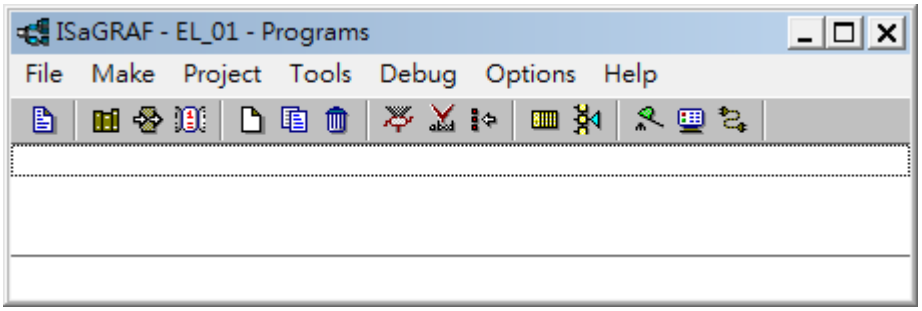
1.1. Creating a New Project

Launch ISaGRAF and create a new project by clicking the "**New**" item from the "**File**" menu, or pressing **Ctrl + N**. In the "**Create new project**" dialog box, add a name for the new project by entering "**eL_01**" in the "**Name**" field, then click the "**OK**" button to create the project.



Double-click the name of the project to open the Programs window for the project.





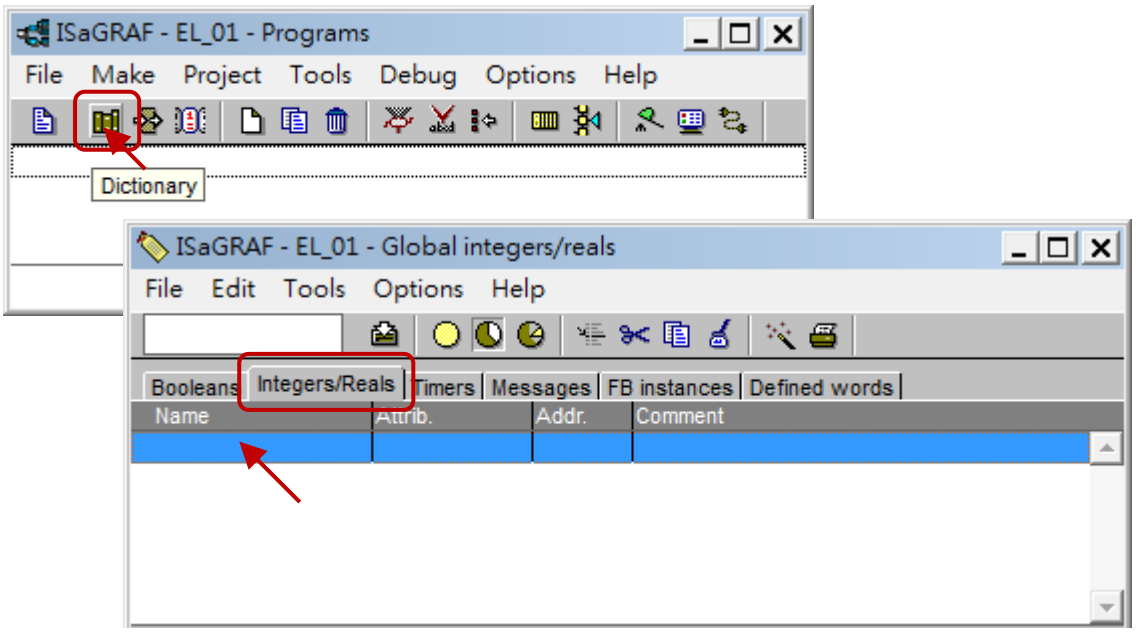
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1.2. Declaring the ISaGRAF Project Variables

Before we can begin creating our project, we must first declare the required project variables. In this example, we will use the following ISaGRAF variables.

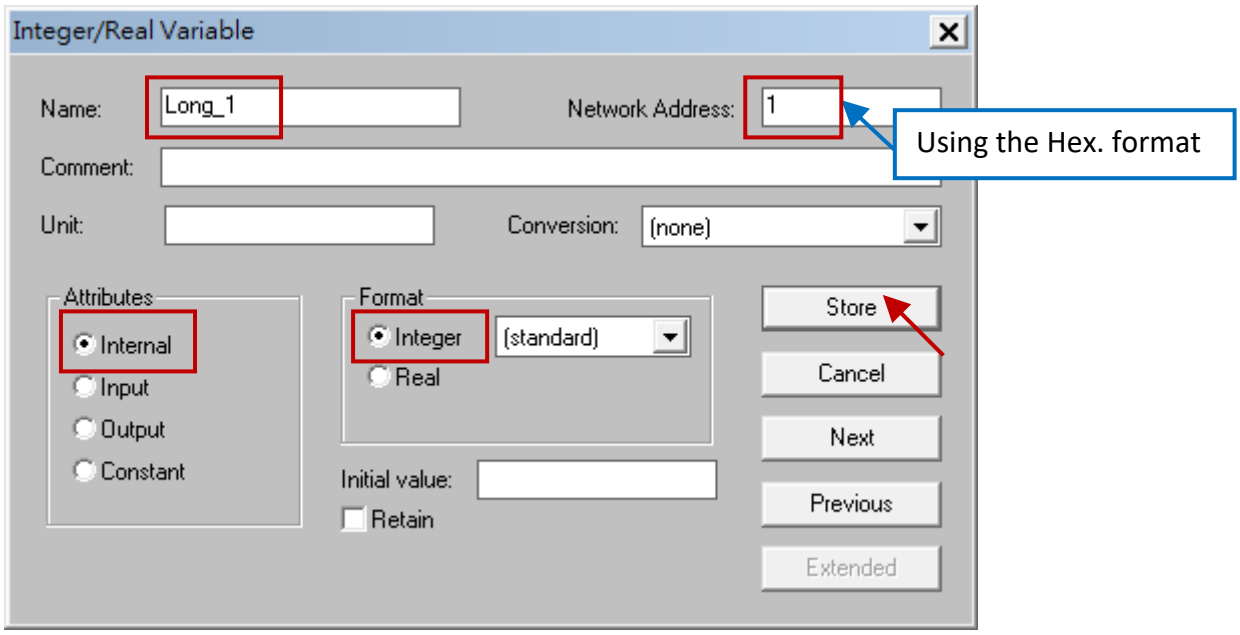
Name	Format	Attributes	Network Address	Description
Long_1	Integer	Internal	1	Enables access to the 32-bit eLogger Long tag
Word_3	Integer	Internal	3	Enables access to the 16-bit eLogger Integer tag
Word_4	Integer	Internal	4	Enables access to the 16-bit eLogger Integer tag
Float_5	Real	Internal	5	Enables access to the 32-bit eLogger Float tag
OUT_101	Boolean	Output	101	Linking to the DO0 of X304 board on the slot0 See Section 1.5 for more details
OUT_102	Boolean	Output	102	Linking to the DO1 of X304 board on the slot0 See Section 1.5 for more details
M1	Boolean	Internal	-	For use with ST1 programs See Section 1.4 for more details
DIR	Boolean	Internal	-	For use with ST1 programs that were declared with an initial value of “True”, see Section 1.4

Click the “Dictionary” button to display the Global Integers/Reals dialog box. Once the dialog opens, click the “Integers/Reals” tab and double-click the “Name” field in the blank row to open the “Integer/Real Variable” dialog box.



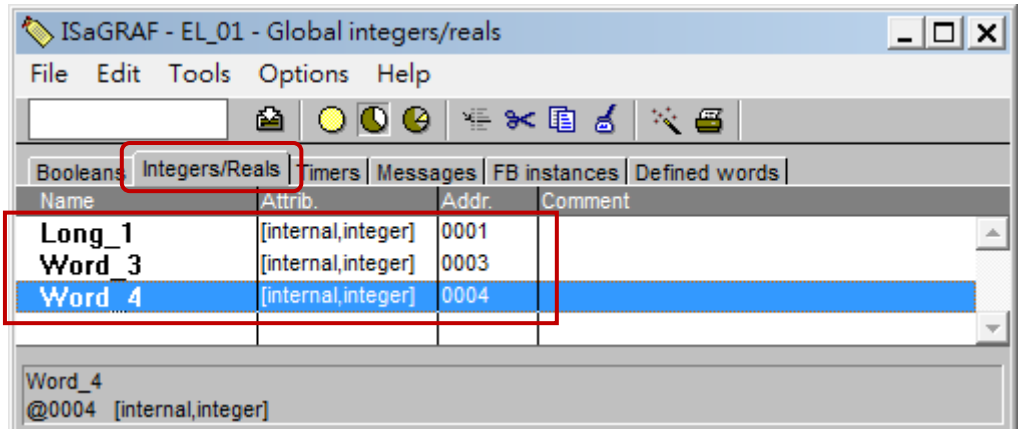
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In the Integer/Real Variable dialog box enter the name “Long_1” in the Name field, and enter a Hex value of “1” in the “Network Address” field. Ensure that the “Attributes” option is set to ”Internal”, and that the “Format” option is set to “Integer”, and then click the “Store” button to save the new variable.



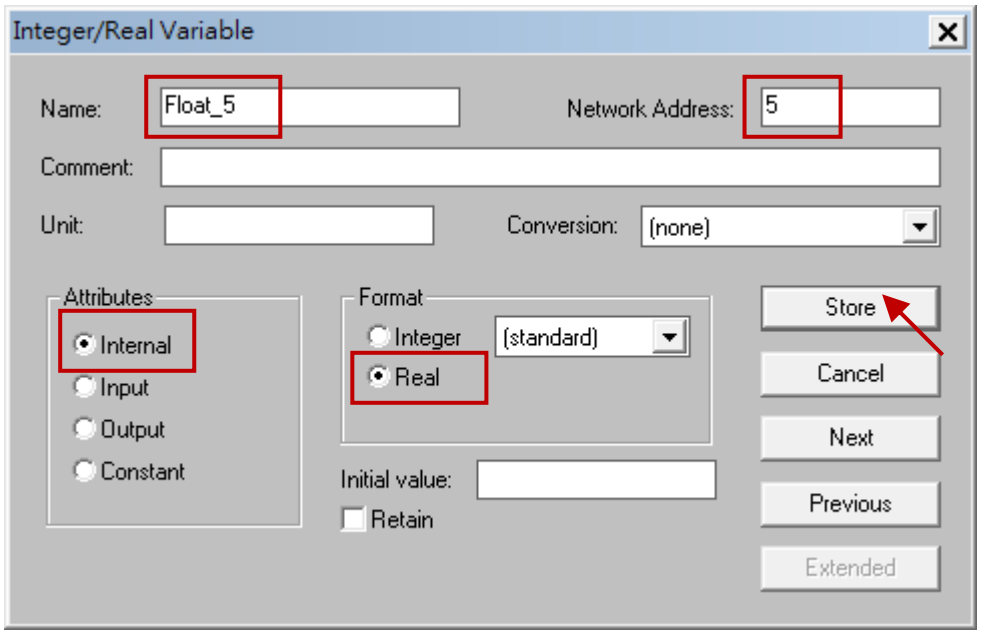
Once the variable has been stored, it will show up in the “Integers/Reals” tab in the Global Integers/Reals dialog box. Using the same method, create the variables for "Word_3" and "Word_4" by double-clicking on a blank row, and then entering the relevant names and setting the Network Addresses to “3” and “4”, respectively.

After creating these variables, the table under the “Integers/Reals” tab in the Global Integers/Reals dialog box should be the same as that shown in the figure below.

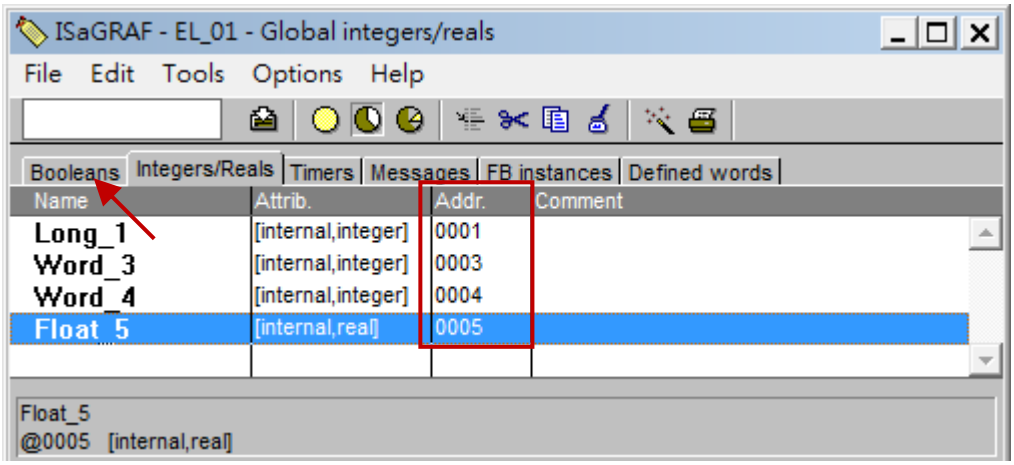


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Repeat the process described above to declare the "Float_5" variable, and set the Network Address to “5”. However, in this case, the “Format” option should be set to “Real”.

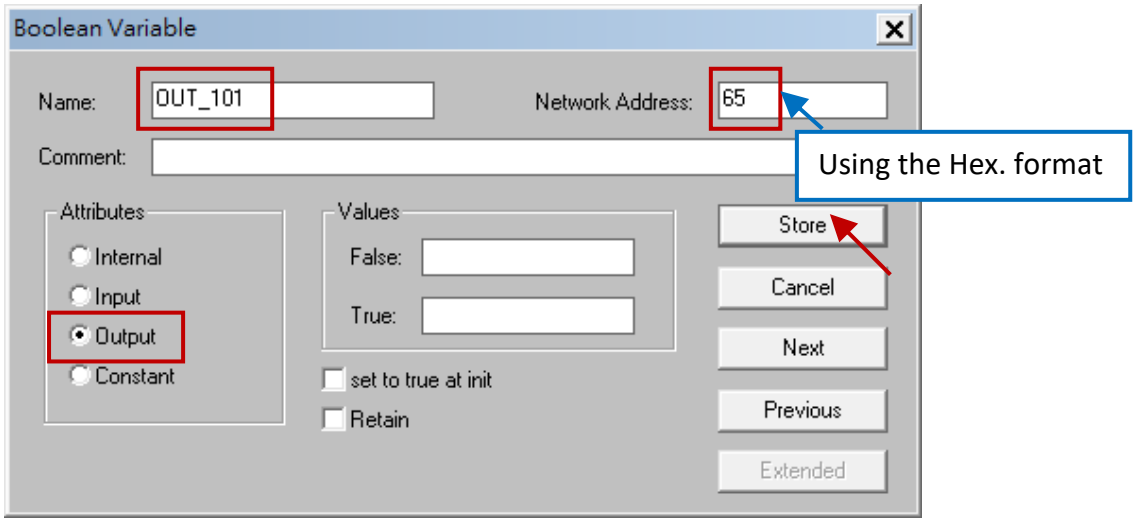


The table under the “Integers/Reals” tab in the Global Integers/Reals dialog box should now be the same as that shown in the figure below.

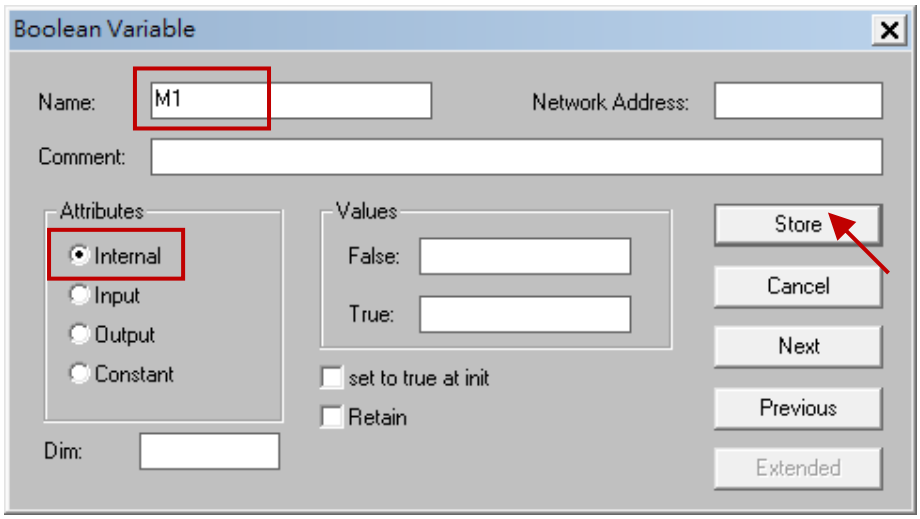


Next, click the “Booleans” tab to begin creating the Boolean variables. The process for creating Boolean variables is the same as previously described for Integers/Real variables. Using this method, declare the Booleans variables OUT_101, OUT_102, and M1. Note, however, that the “Attributes” option for the OUT_101 and OUT_102 variables should be set to “Output”, and the “Network Addresses” for these should be set to “65” and “66”, respectively, (i.e., $101_{(10)}$ and $102_{(10)}$), as illustrated in the figure below.

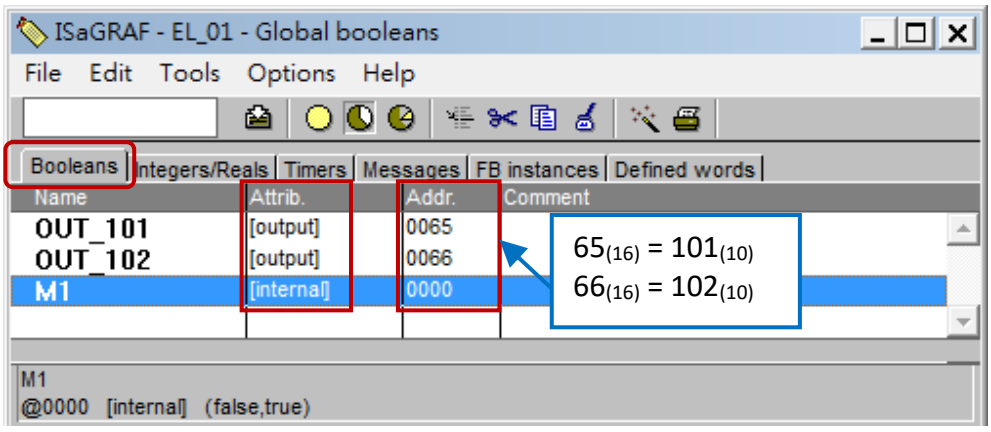
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For the M1 variable, the “Attributes” option should be set to “Internal”.

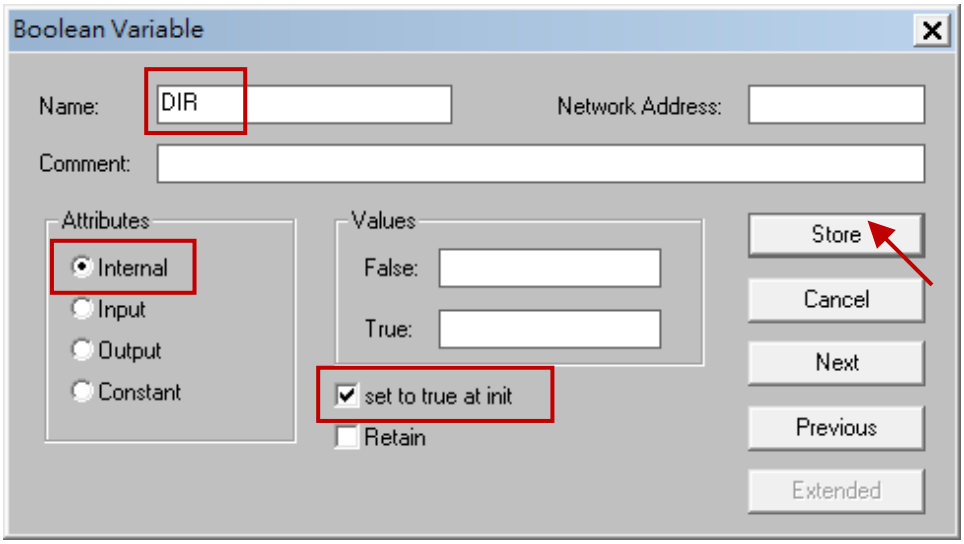


Once the Boolean variables created, the table found in the “Booleans” tab of the Global Booleans dialog box should now be the same as that shown in the figure below.

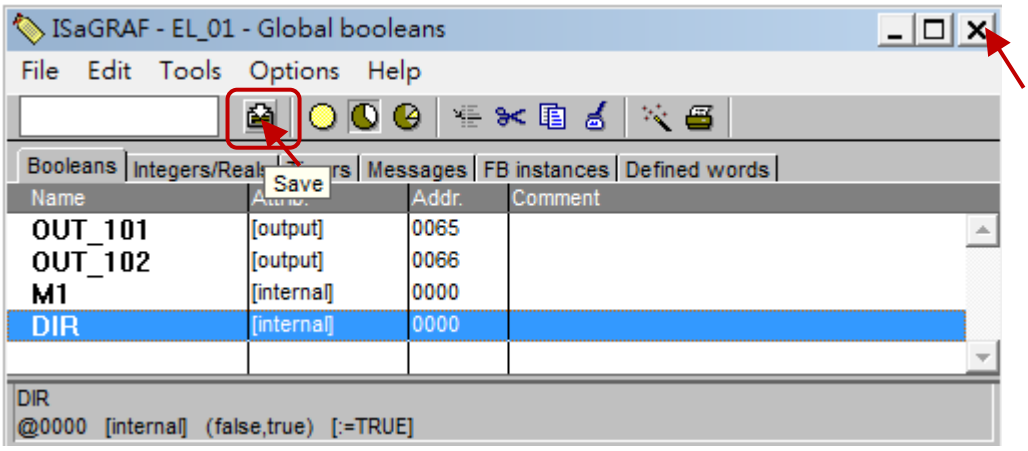


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Finally, repeat the process described previously to create the "DIR" variable, and set the “Attributes” option to “Internal”, and check the “Set to true at init” checkbox.



After creating all the variables, click the “Save” button to save the settings and exit the dialog.

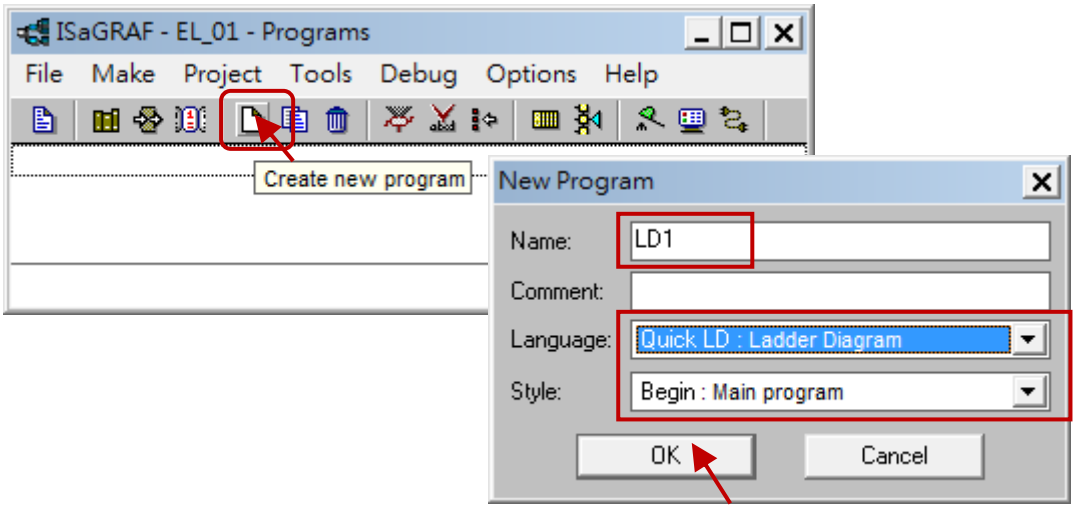


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1.3. Creating an LD Program (LD1)

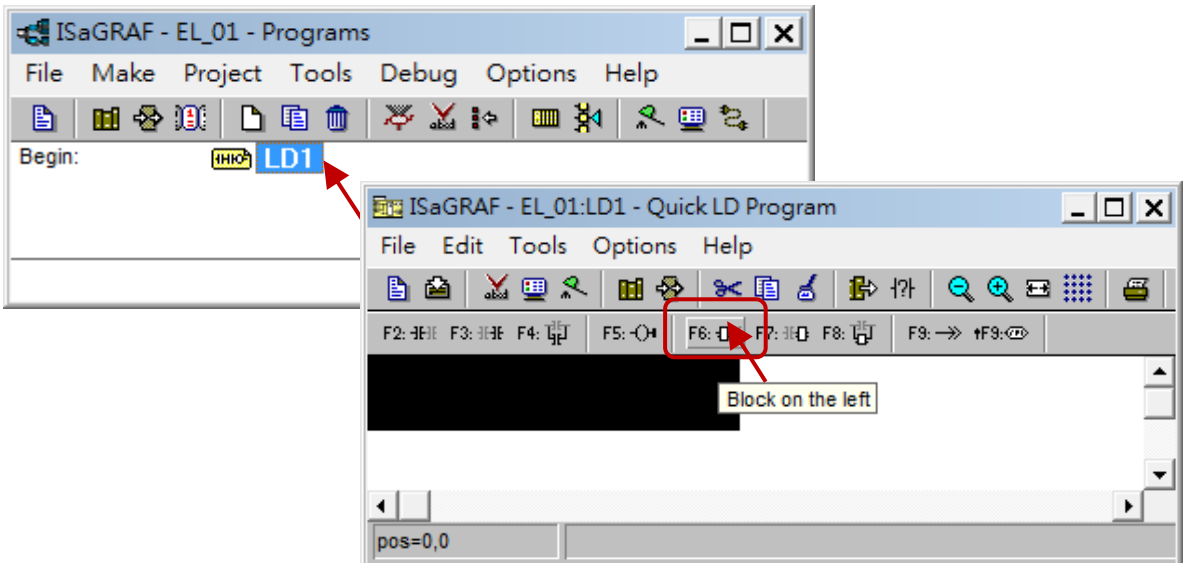
In this section, we create an LD program to read the system time of the PAC, and generate a pulse "True" signal once every second for the M1 variable.

Click the “Create new program” button to open the “New Program” dialog box and create an LD program named “LD1”. From the Language drop-down menu, select the “Quick LD: Ladder Diagram” option, and select the “Begin: Main program” option from the Style drop-down menu, as illustrated in the diagram below, and then click the OK button to save the new program.



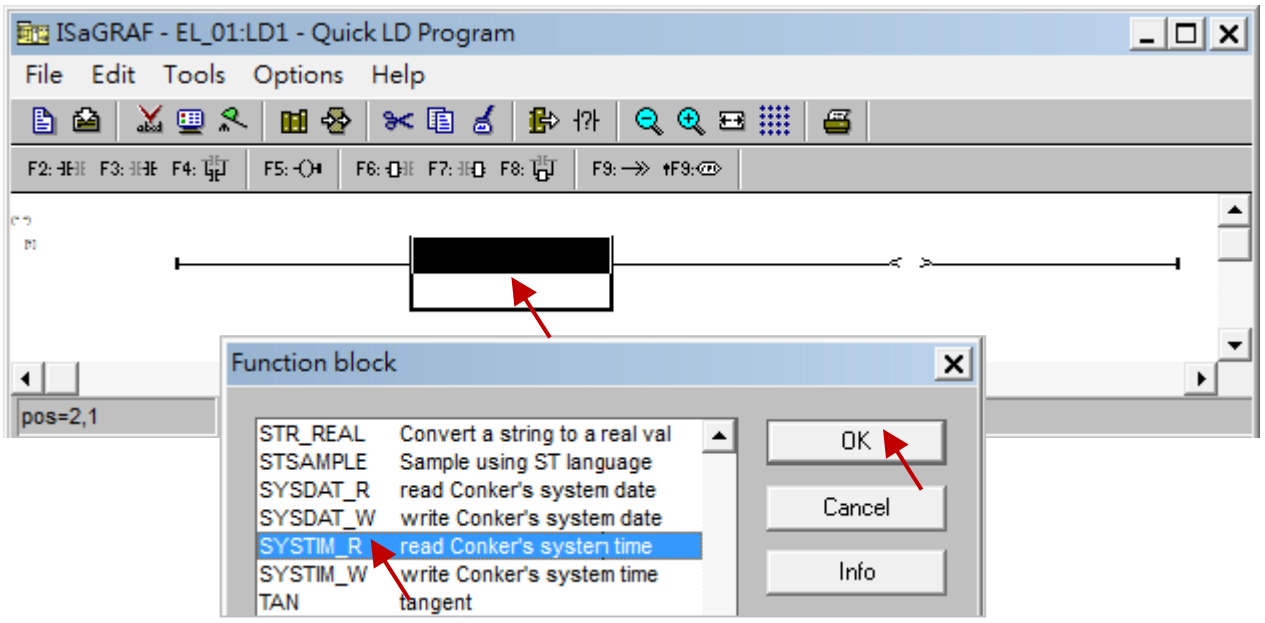
After creating the new program, a new icon for the program displays in the main “Programs” window, as illustrated in the figure below. Double-click the “LD1” icon to begin creating the LD program.

The first thing that we need to do is add a “SYSTIM_R” function block so that we can retrieve the current PAC time. In the Quick LD Program window, click the “Block on the left” button to create the function block, or press the F6 key.

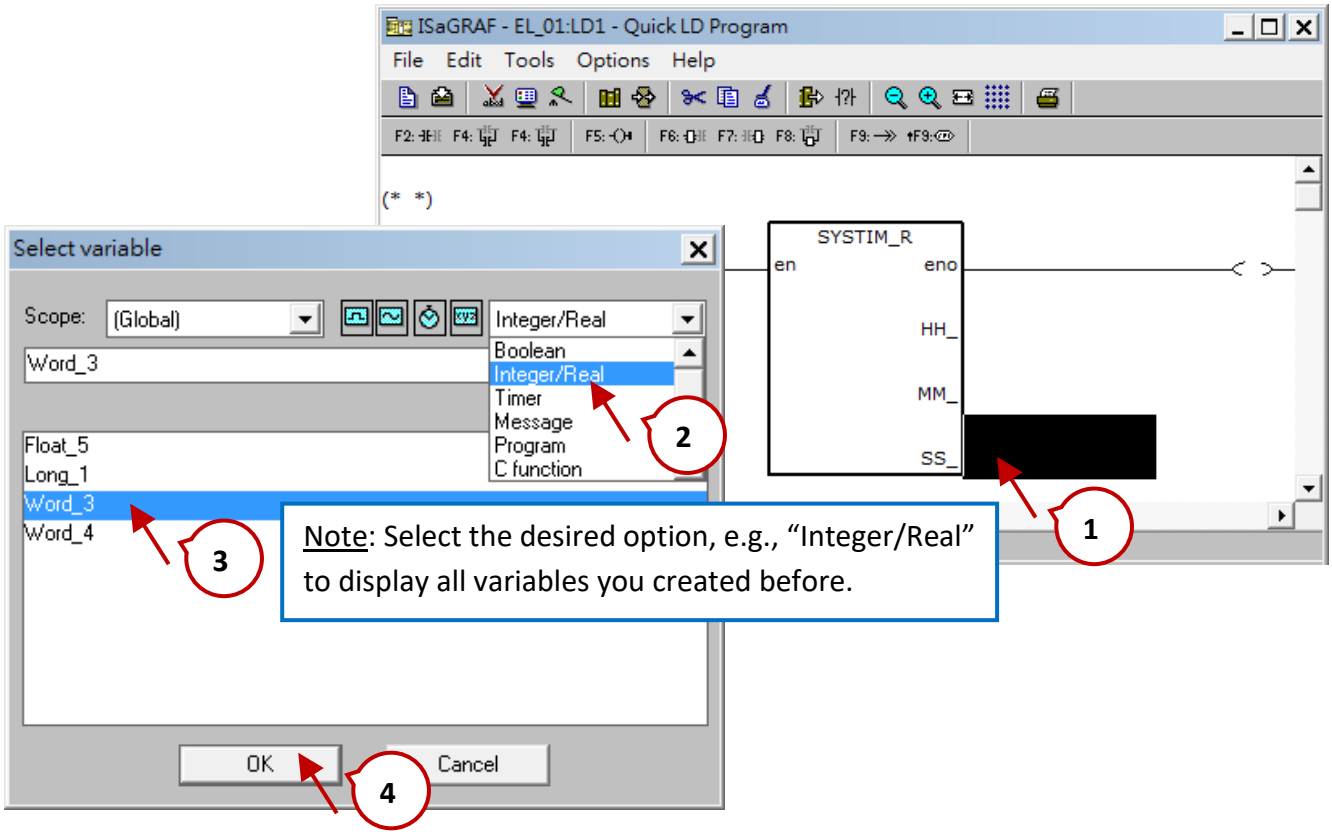


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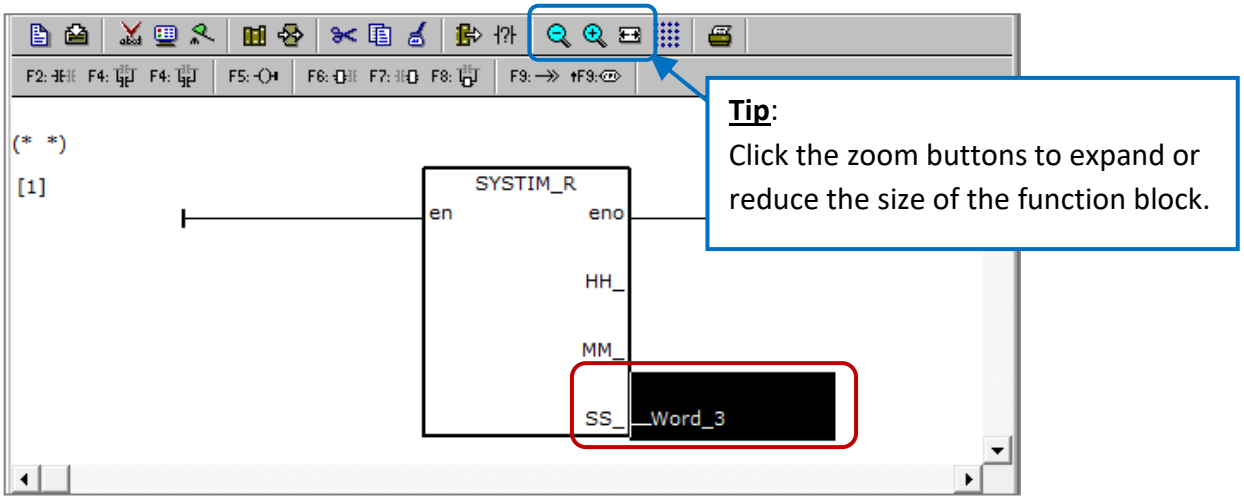
Double-click the newly created function block to open the Function Block dialog box. Click the "SYSTIM_R" option to select it, and then click the OK button to close the dialog box.



In the Quick LD Program window, double-click the area to the right of the "SS_" parameter to open the Select Variable dialog box. First, select the "Integer/Real" option and click the "Word_3" option to assign the variable. Click the OK button to save the new variable.

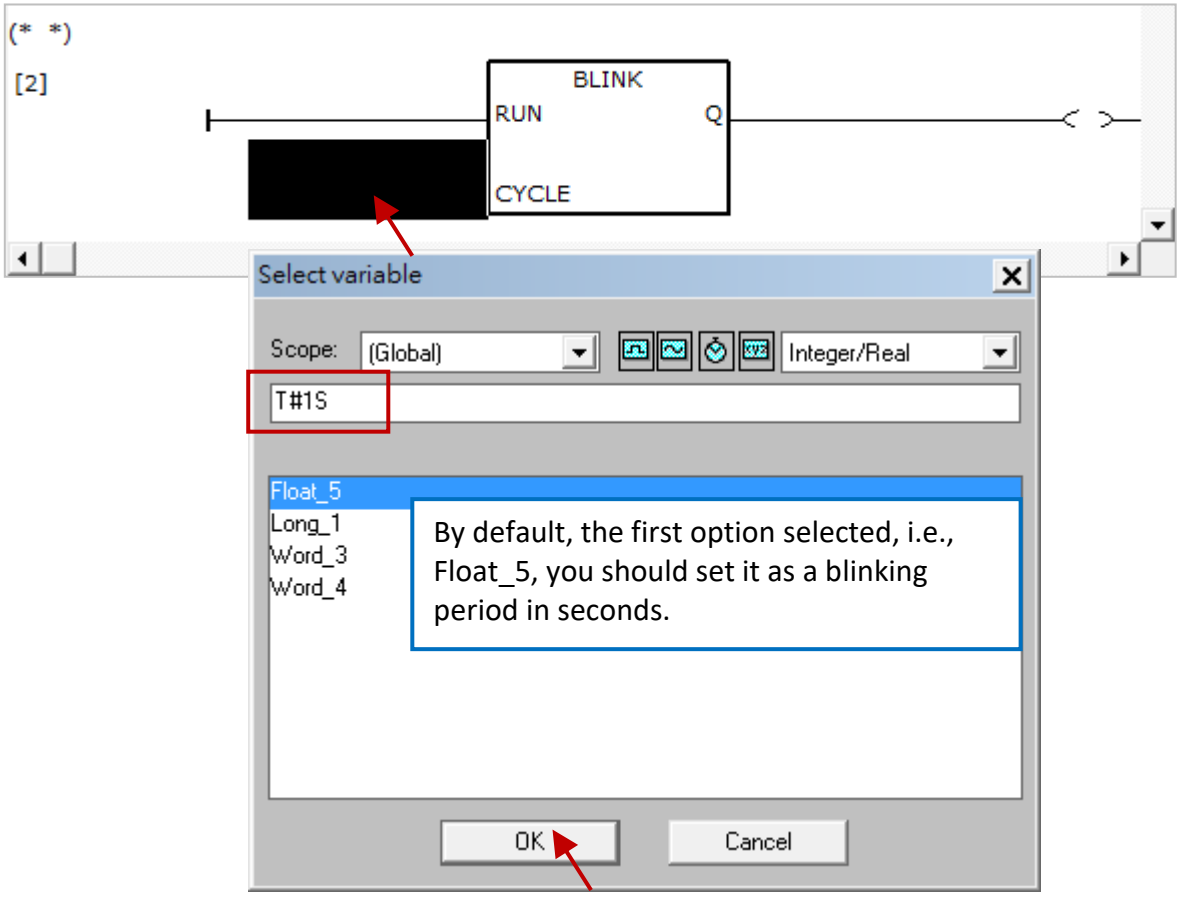


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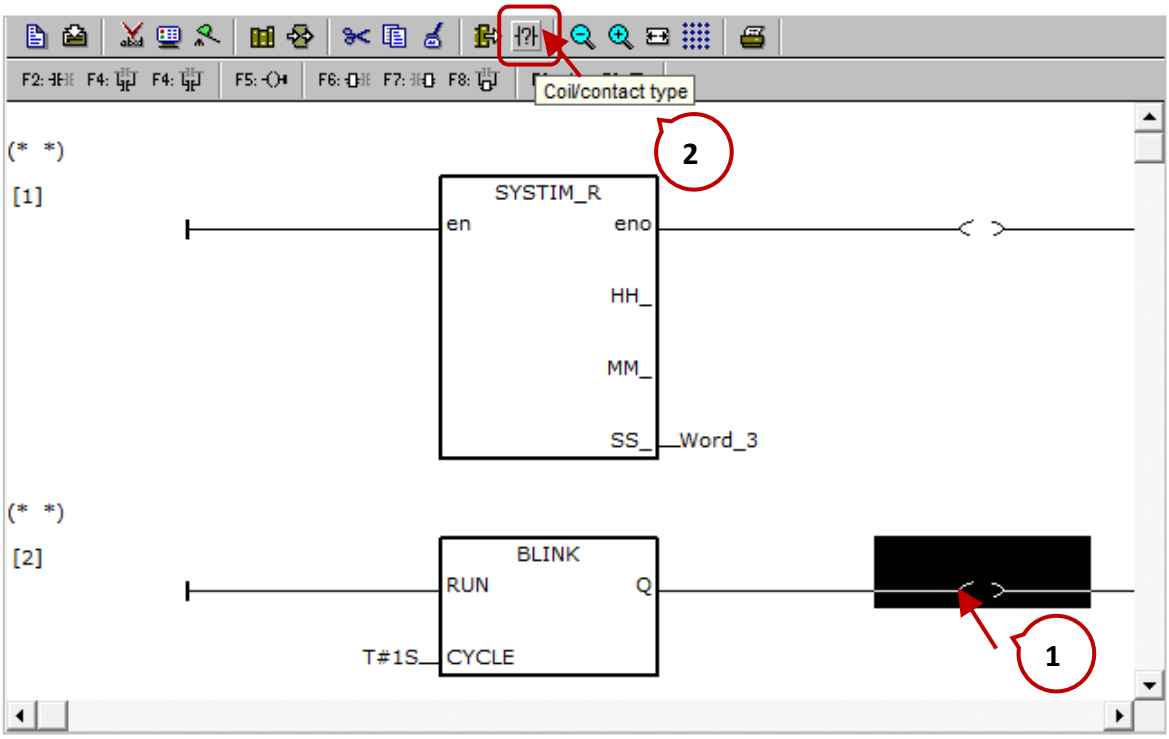
Under the “SYSTIM_R” function block, repeat the process described before to add a BLINK function block so that we can generate a pulse that will set a Boolean variable “M1” to True once every second.

As illustrated below, double-click the area to the left of the “CYCLE” parameter to open the Select Variable dialog box. Enter "T#1S" in the text field and then click the OK button to save the new variable.

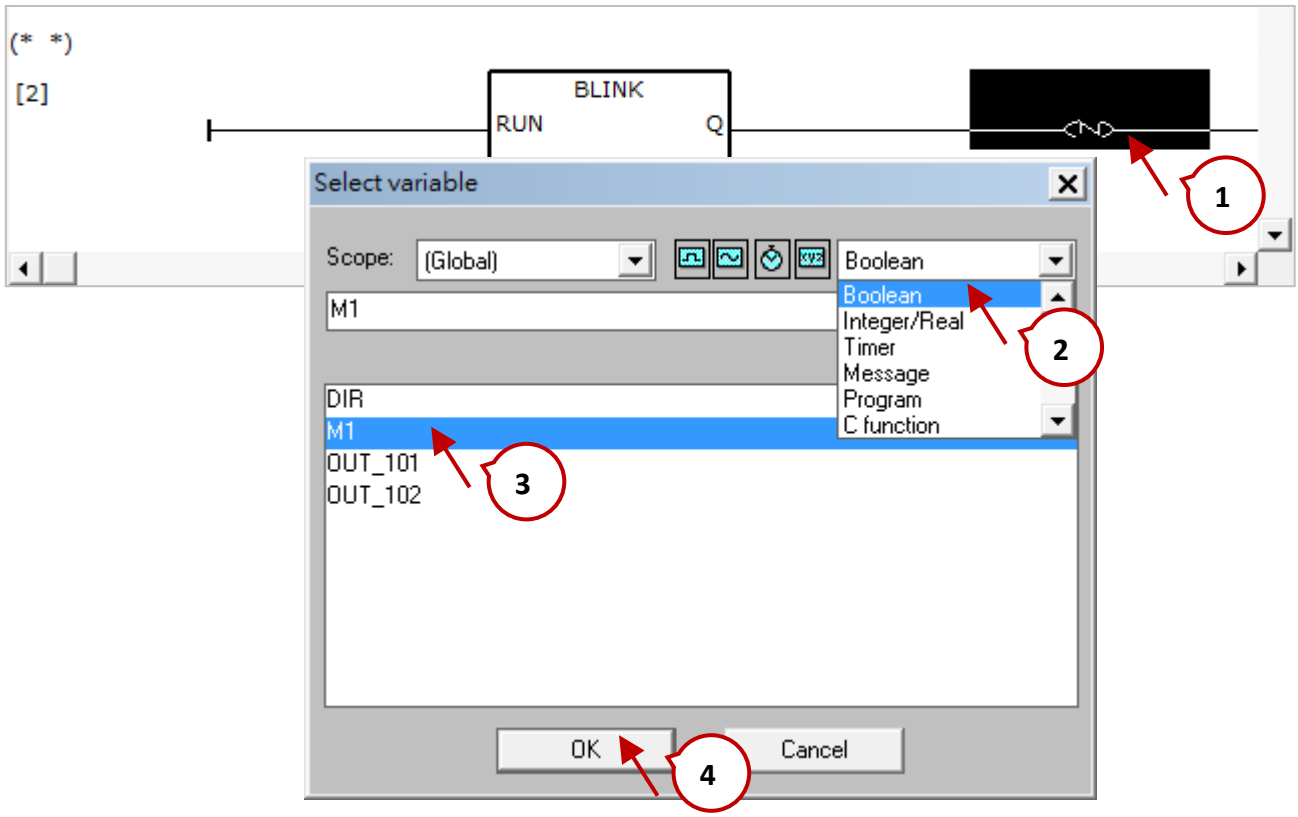


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In the Quick LD Program window, click the coil icon to the right of the BLINK function block, as illustrated below, and then click the “Coil/Contact type” button several times until the “N” coil type selected.

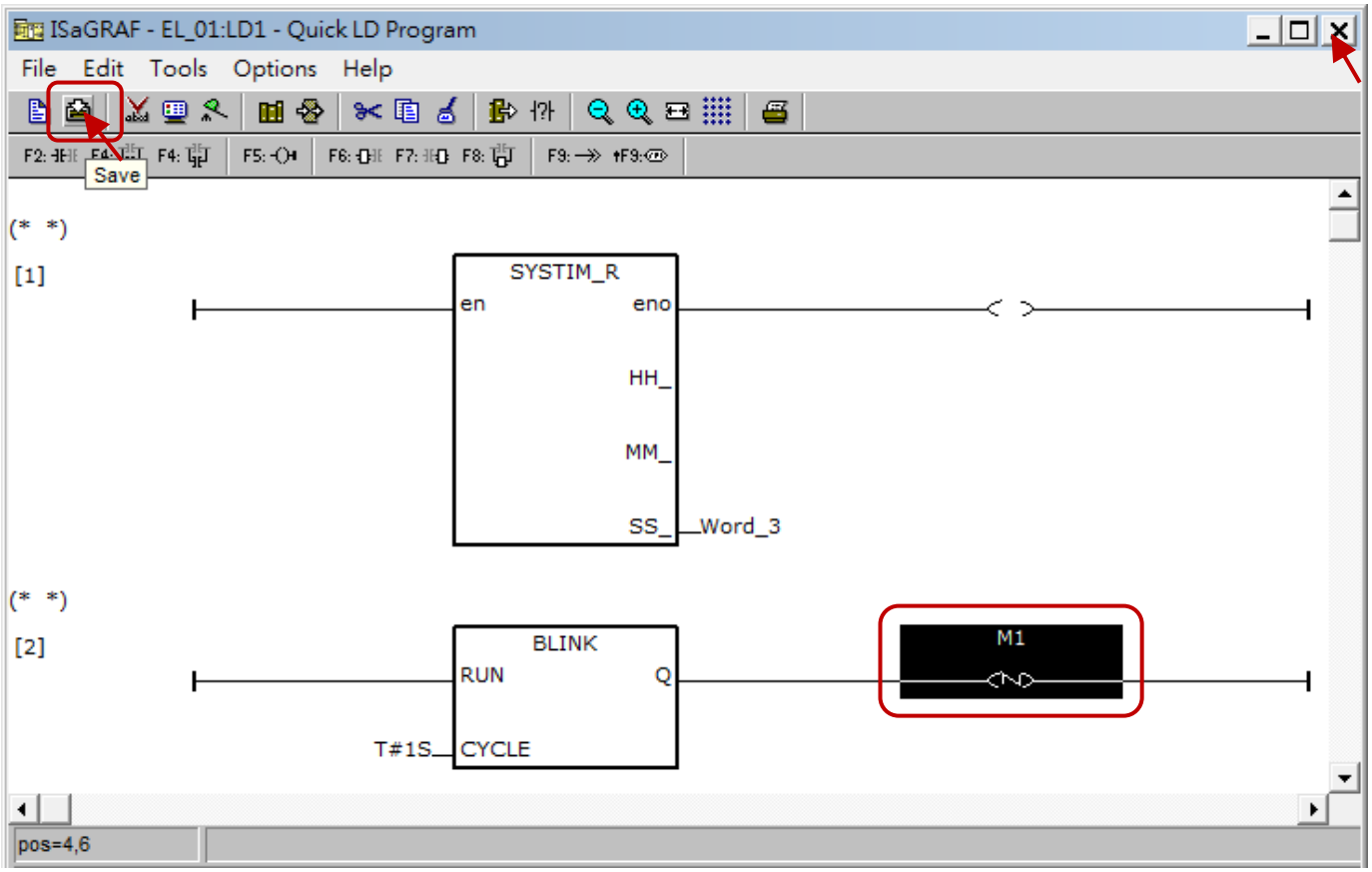


Double-click the “N” coil icon to open the Select Variable dialog box. First, select the “Boolean” option and click the “M1” option to assign the variable. Click the OK button to save the new variable.



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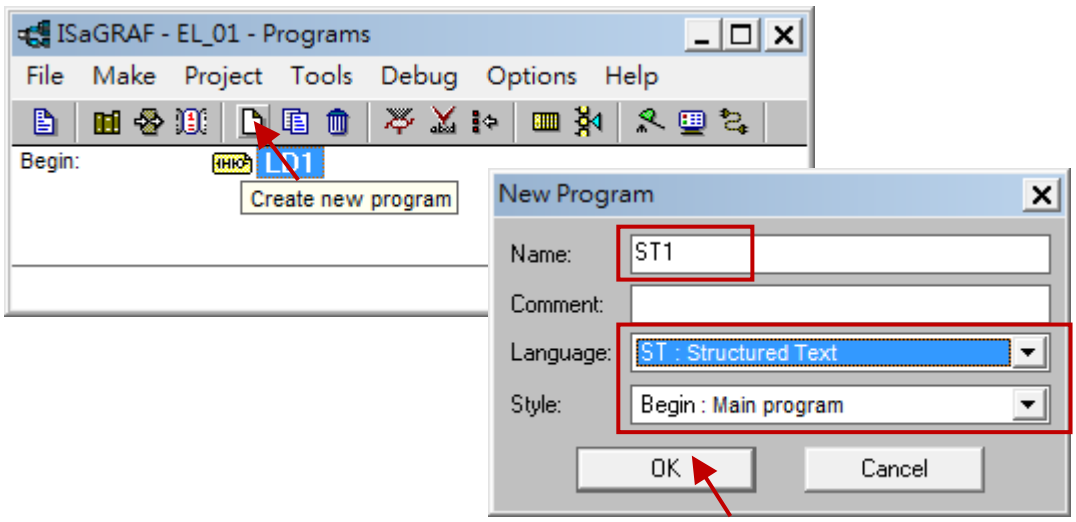
The creation of the LD1 program is now been complete. Click the Save button to save the new program and then exit the window.



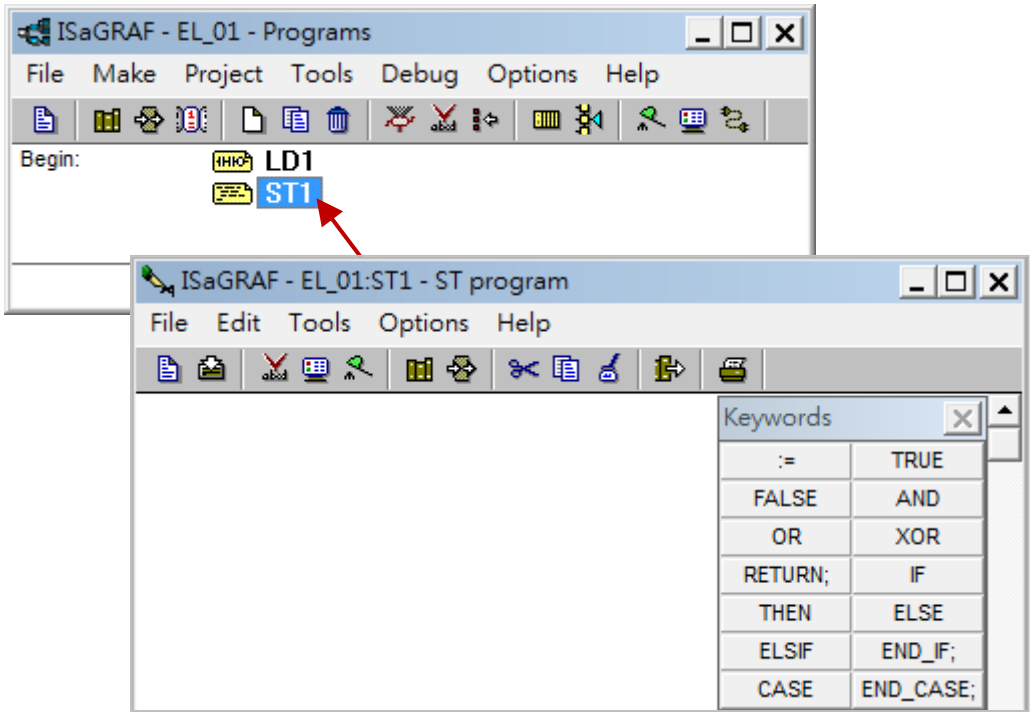
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1.4. Creating an ST Program (ST1)

To begin creating an ST program, click the “New Program” button in the main “Programs” window to open the “New Program” dialog box and create a ST program named “ST1”. From the Language drop-down menu, select the “ST: Structured Text” option, and select the “Begin: Main program” option from the Style drop-down menu, as illustrated in the diagram below, and then click the OK button to save the new program.



After creating the new program, a new icon for the program displays in the main Programs window, as illustrated in the figure below. Double-click the “ST1” icon to begin writing the code for the ST program.



In the ST Program window, enter the following code:

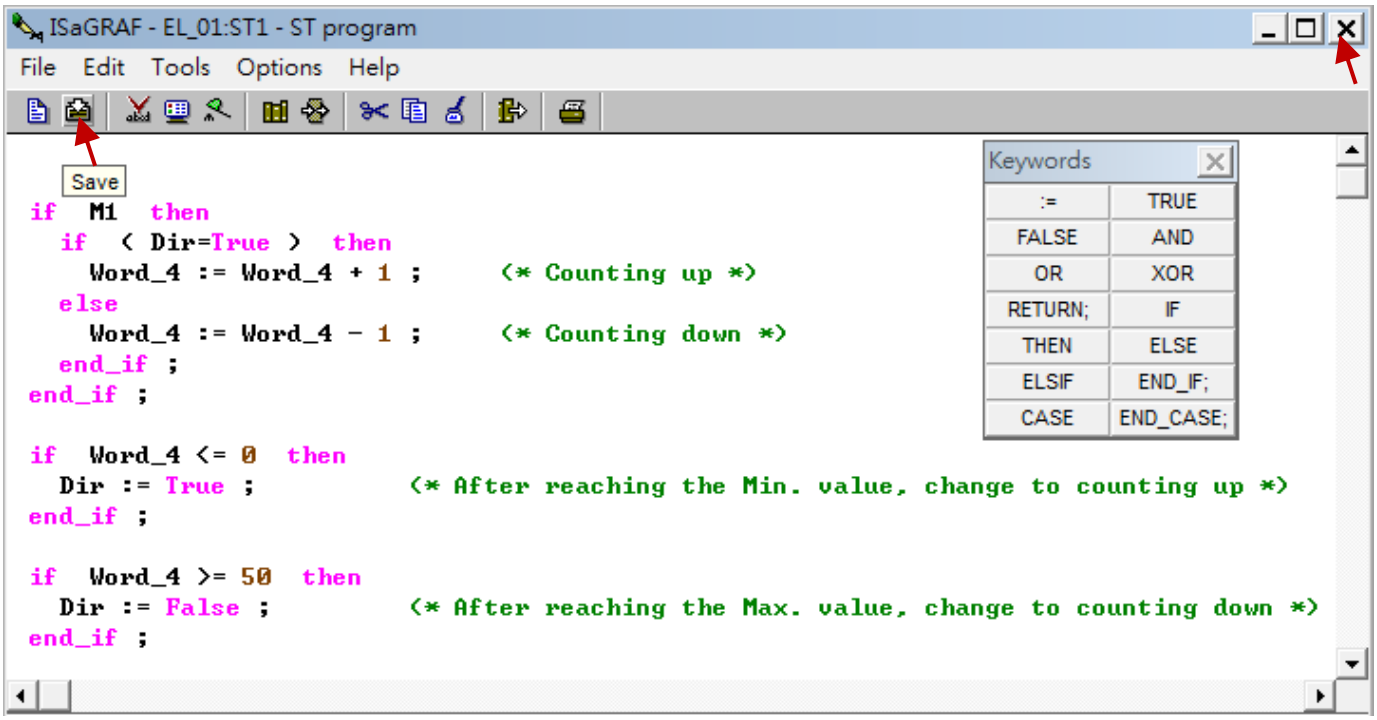
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```
if M1 then
   if ( Dir=True ) then
      Word_4 := Word_4 + 1 ;       (* Counting up *)
   else
      Word_4 := Word_4 - 1 ;       (* Counting down *)
   end_if ;
end_if ;

if Word_4 <= 0    then
   Dir := True ;                   (* After reaching the Min. value, change to counting up *)
end_if ;

if Word_4 >= 50    then
   Dir := False ;                  (* After reaching the Max. value, change to counting down *)
end_if ;
```

Once the code is completed, the ST Program window should look like the figure shown below. Click the Save button to save the new program and then exit the window.

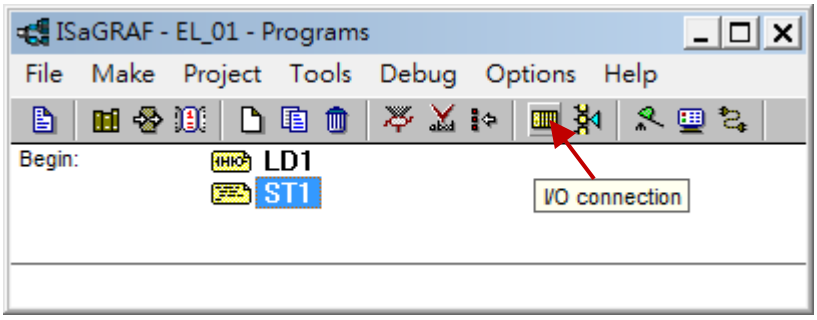


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1.5. Connecting the I/O

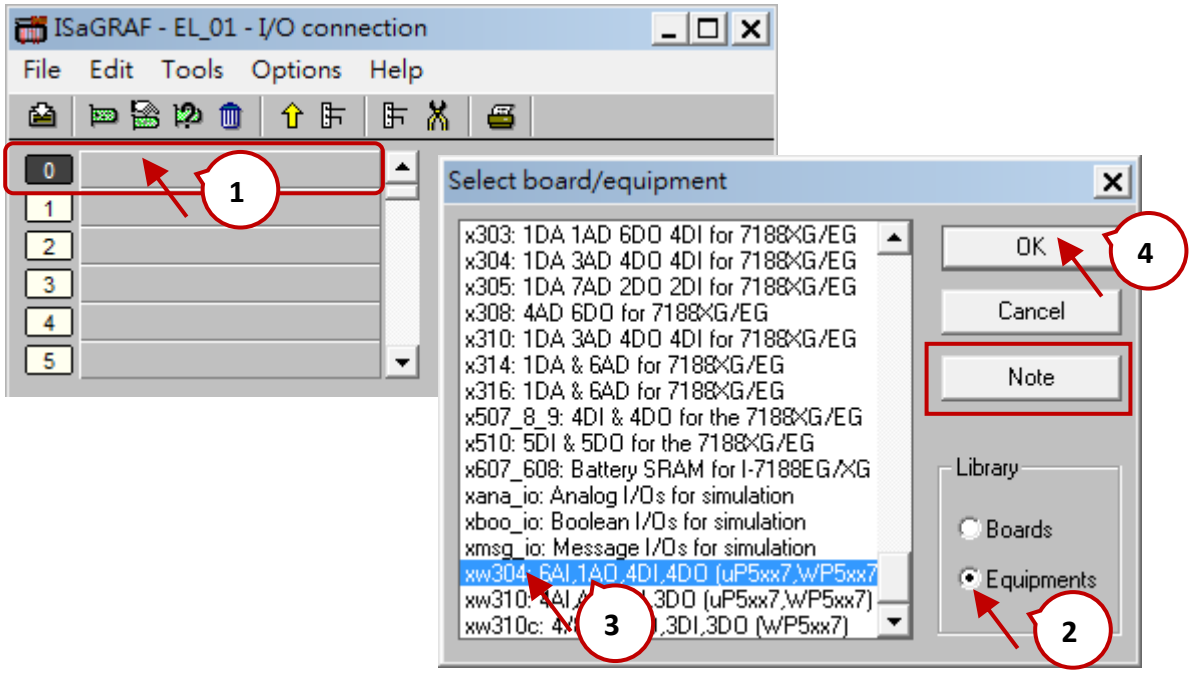
In this example, we need to install an internal XW304 expansion board (6 AI, 1 AO, 4 DI and 4 DO channels) in the WP-5147-OD PAC in order to control the DO0 and DO1 channels. Therefore, we need to add an I/O connection to the ISaGRAF program to connect to the physical I/O board in the PAC.

To do this, click the "I/O connection" button in the main “Programs” window to open the I/O Connection dialog box, as illustrated in the diagram below, and begin creating an I/O connection.

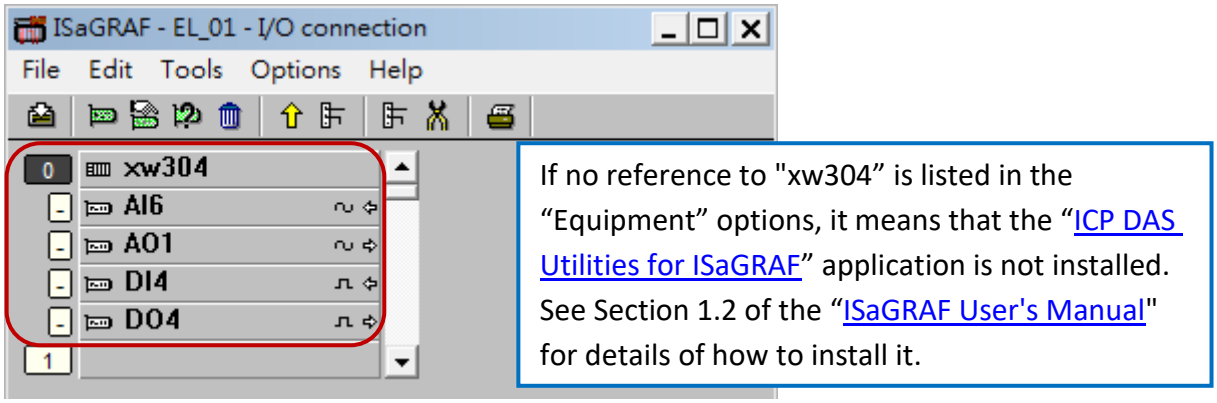


In the I/O Connection dialog box, double-click the field for "Slot 0" to open the “Select board/ Equipment“dialog box. Click the “Equipment” option in the “Library” section and then choose the “xw304” item from the list of equipment. Click the OK button to confirm your selection. The XW304 expansion board and its respective I/O channels list in the I/O Connection dialog box.

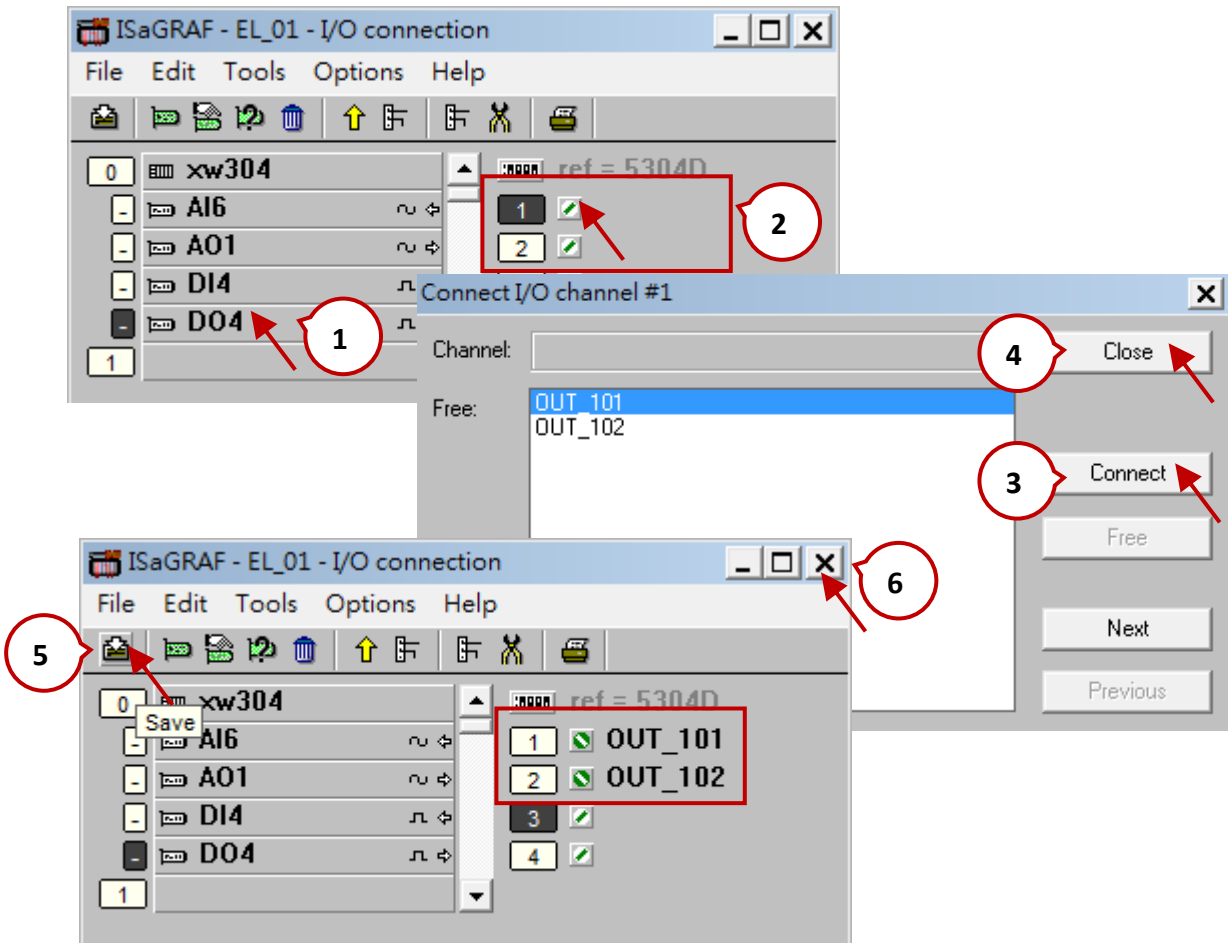
Note that you can also click the Note button for more details about the use of the XW304 expansion board.



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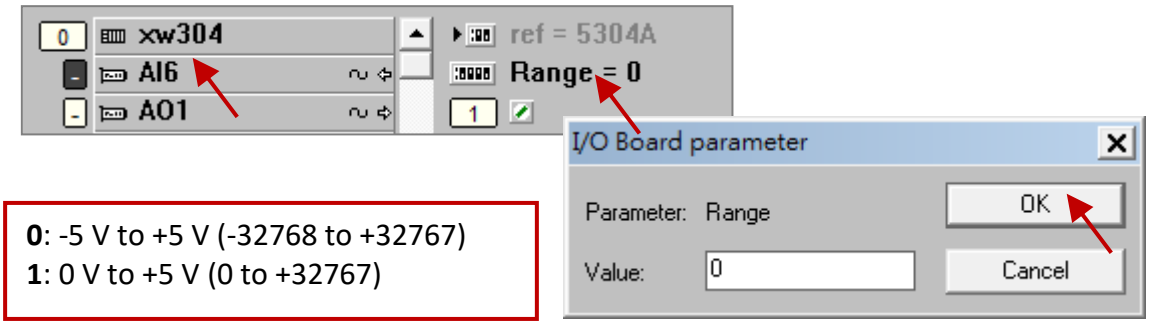
In this example, we will assign two Boolean variables named "OUT_101" and "OUT_102", which be declared as the Digital Output attributes. To assign the "OUT_101" variable, click the icon for the "DO4" item to select it, and then double-click the icon for the channel 1 item in the right-hand side of the panel to open the "Connect I/O channel" dialog box. Click the "Connect" button to automatically assign the "OUT_101" variable to channel 1 and the "OUT_102" variable to channel 1, and then click the "Close" button to close the dialog box. After that, click the Save button in the I/O Connection dialog box and close the dialog box.



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Note:

To set the measurement range, click the icon for “AI6” in the I/O Connection dialog and then double-click the “Range” item on the right hand side of the panel to open the I/O Board parameters dialog box, which allows you to modify the value (0 or 1). In addition, remember to adjust the jumper on the XW-board.



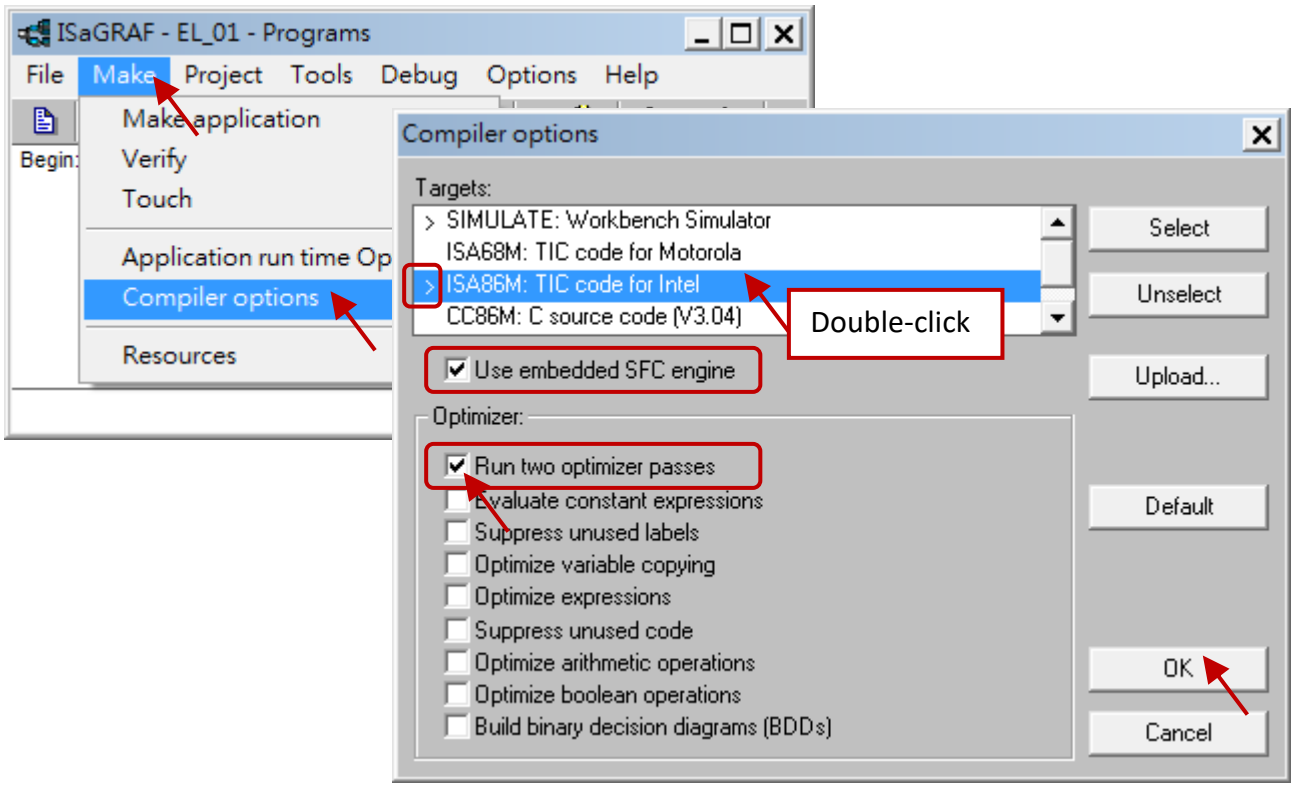
0: -5 V to +5 V (-32768 to +32767)
1: 0 V to +5 V (0 to +32767)

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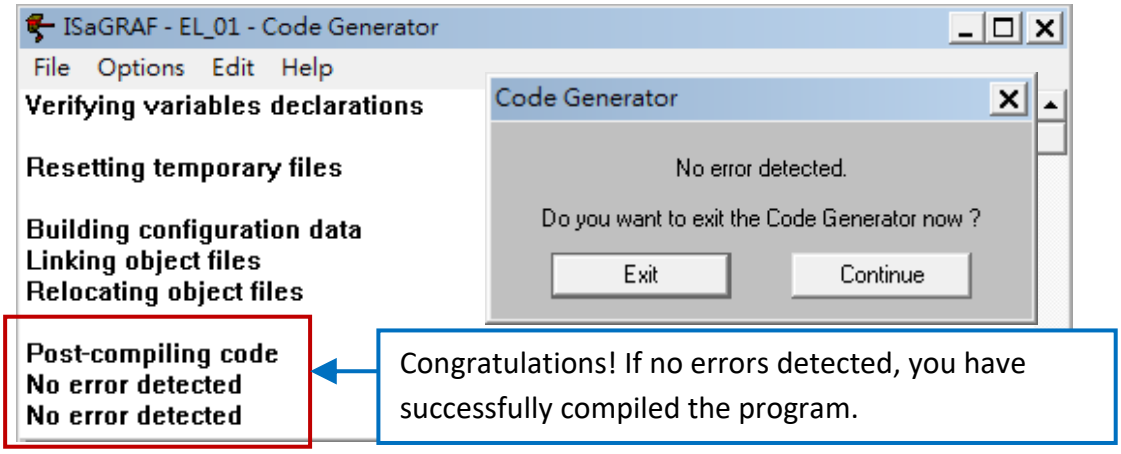
1.6. Compiling the ISaGRAF Project

Before compiling the project, the following compiler options **MUST** select.

To change the compiler options, first select the “Compiler options” item from the “Make” menu to open the “Compiler options” dialog box. In the “Compiler options” dialog box, ensure that the “ISA86M: TIC code for Intel” item from the “Targets” section is selected, if not, double-click the item to select it and then check the checkbox for the “Use embedded SFC engine” item. In the “Optimizer” section, simply check the first item and click the OK button to save your changes.



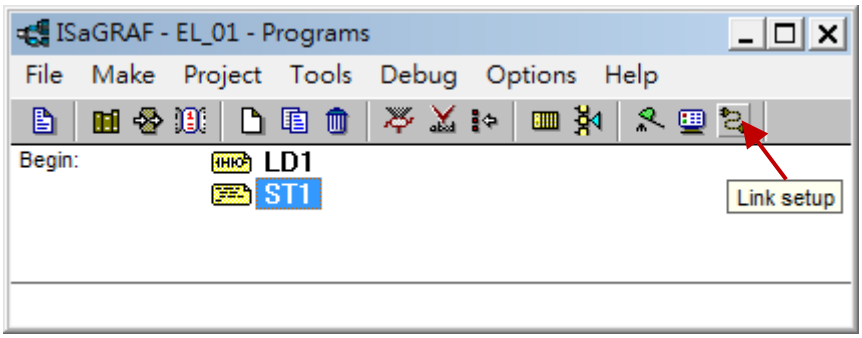
Once you have completed the previous process, click the “Make application” item from the “Make” menu to compile the program.



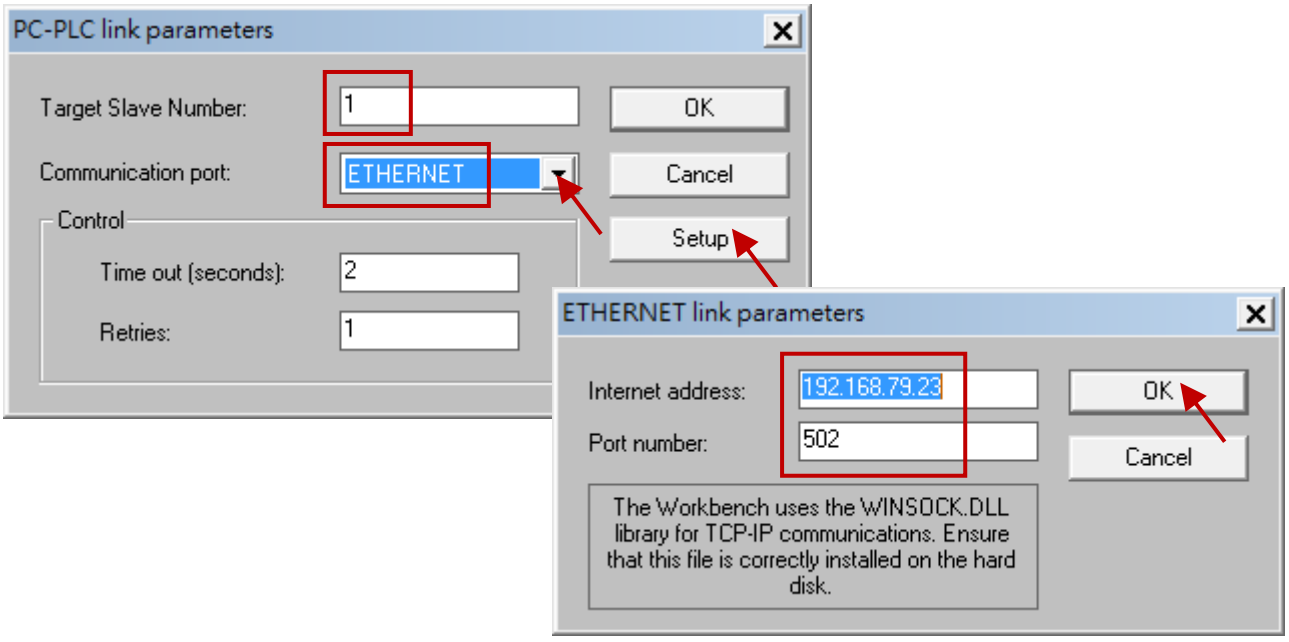
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1.7. Uploading the ISaGRAF Project to the WP-5147-OD PAC

Before uploading the project to the device, the communication parameters MUST configure. First, click the “Link setup” button in the main “Programs” window to open the “PC-PLC link parameters” dialog box.



To upload the project via an Ethernet connection, select the “ETHERNET” option from the “Communication port” drop-down menu, and then click the “Setup” button to open the “ETHERNET link parameters” dialog box. In the “ETHERNET link parameters” dialog box, enter the IP address of the PAC in the “Internet address” field. Note that the Port number **MUST** be “502”. Click the “OK” button to save your changes and close the dialog box, and then click the “OK” button again to save the settings for the link and close the “PC-PLC link parameters” dialog box.

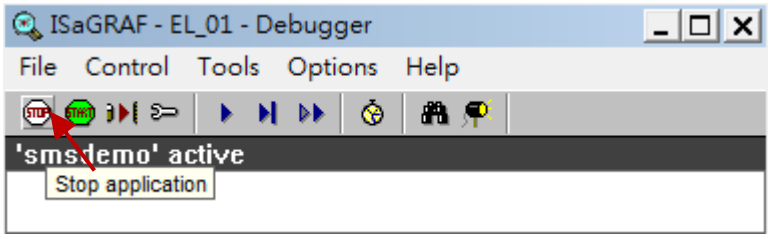


Next, click the “Debug” button in the main “Programs” window to open the “Debugger” panel.

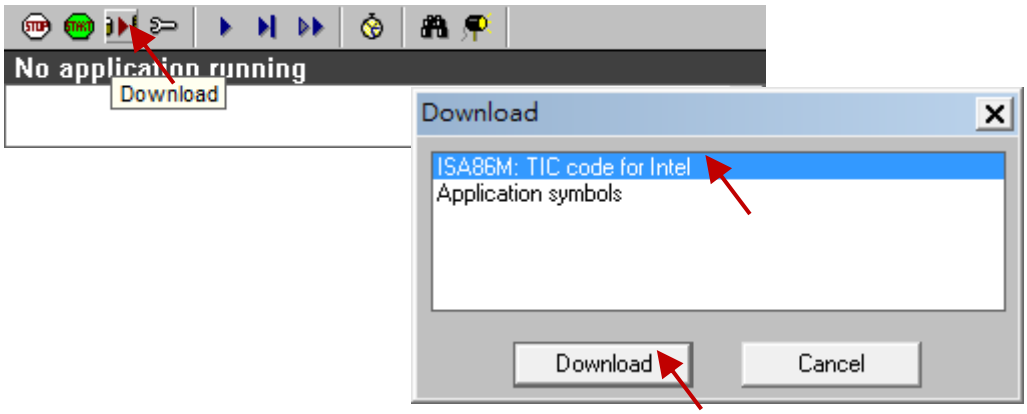


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If the PAC is connected and another program is currently in use (indicated as “active” in the main window), click the “Stop application” button in the “Debugger” panel.to stop the active program.



Click the “Download” to open the “Download” dialog box, and then ensure that the “ISA86M: TIC code for Intel” option is selected. Click the “Download” button to transfer the project to the PAC device.



Congratulations, you have now successfully completed the process of writing, compiling, and uploading an ISaGRAF project.

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Chapter 2. Designing an eLogger HMI Page

The free and easy-to-use eLogger software from ICP DAS can be used to implement HMI and data logger programs that allow simple I/O monitoring and system control on ISaGRAF PACs based on Windows CE 5.0 (e.g., the WinPAC and ViewPAC series from ICP DAS), and Windows CE 6.0 (e.g., the XPAC-8000 series from ICP DAS). In this case, we use the WP-5147-OD PAC.

The eLogger application can develop projects quickly and easily. This requires flexible I/O configuration, a flexible interface, or shared memory, and can integrate with ISaGRAF programs.

There are two versions of the eLogger software: **eLogger Developer** and **eLogger Runtime.**

1. **eLogger Developer** is installed on a host PC, and is used to design HMI pages and configure graphics components.
2. **eLogger Runtime** is installed on a PAC device, MUST be launched in order to process an eLogger project.

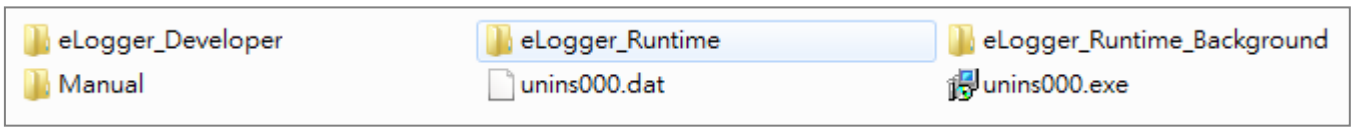
Note: When using an XPAC or a WinPAC device, a VGA monitor must be connected the device in order to view the PAC/HMI screen. If an error occurs while the eLogger Runtime component is in operation, see Section 2.8 “Troubleshooting for eLogger Runtime operations” for details of how to resolve any problems.

2.1. Installing the eLogger software

2.1.1. Installing the eLogger Developer on the Host PC

If the **eLogger Developer** software (version 1.6.2.0 or later) has never been installed on the Host PC, you can download the latest version at
http://www.icpdas.com/en/product/guide+Software+eLogger+eLogger#1086

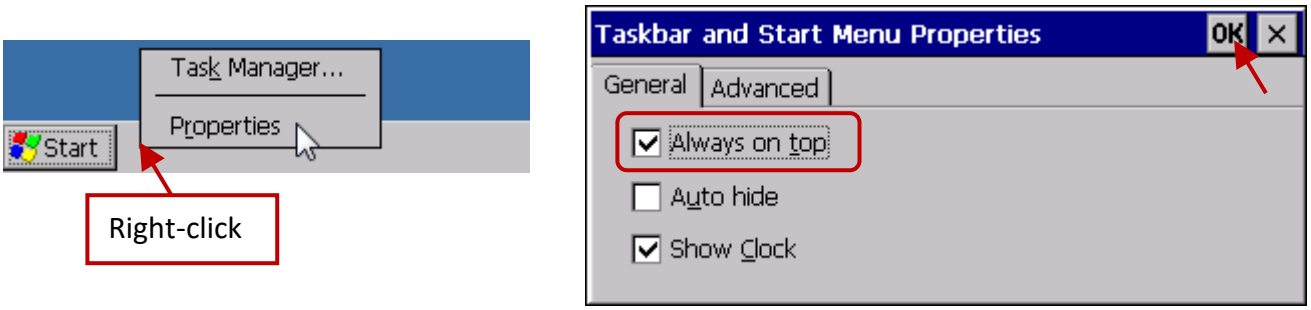
After downloading the program, install it on the Host PC. For more details regarding how to install the eLogger Developer software, see the eLogger User Manual, which is at
http://www.icpdas.com/en/download/index.php?nation=US&kind1=&model=&kw=elogger+



Note:
It is recommended that the Taskbar is displayed on PAC desktop because makes it more convenient when operating the PAC while designing the application. To do this, first connect a VGA monitor to the

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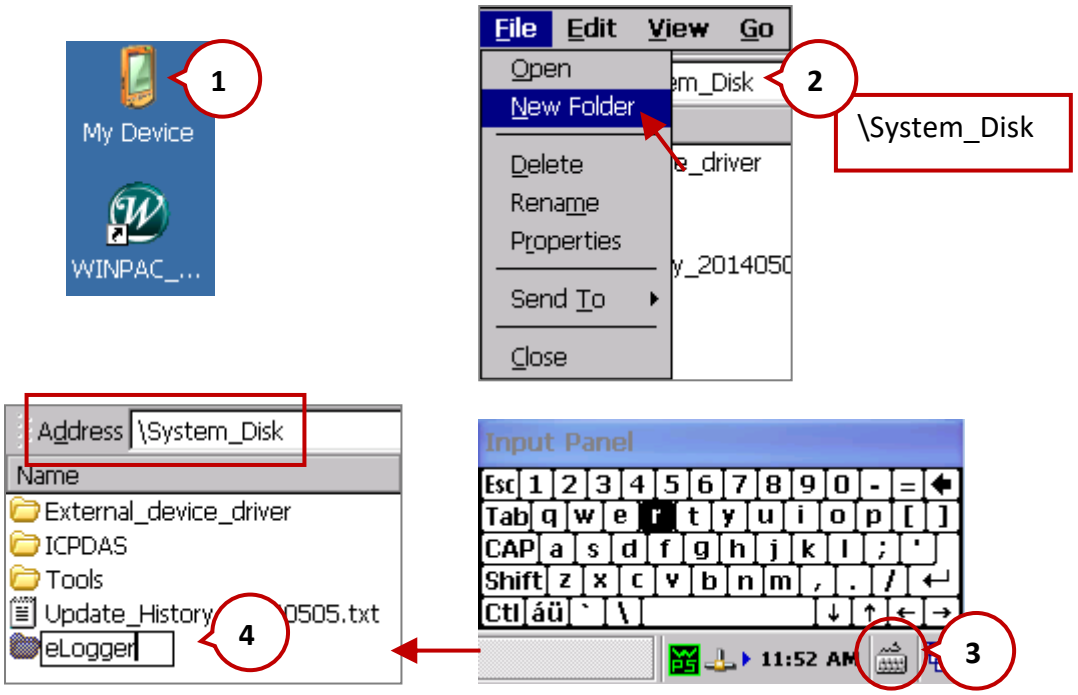
VGA port on the WP-5147-OD device, and then connect a mouse to the USB port.
Right-click the Taskbar for the device and select “Properties” from the menu to open the “Taskbar and Start Menu Properties” Property Sheet. In the “General” tab, make sure that the “Always on top” option for the Taskbar is checked, and that the **“Auto hide”** option is **unchecked. Click te “OK” button to save the settings.**



2.1.2. Installing the eLogger Runtime on the PAC

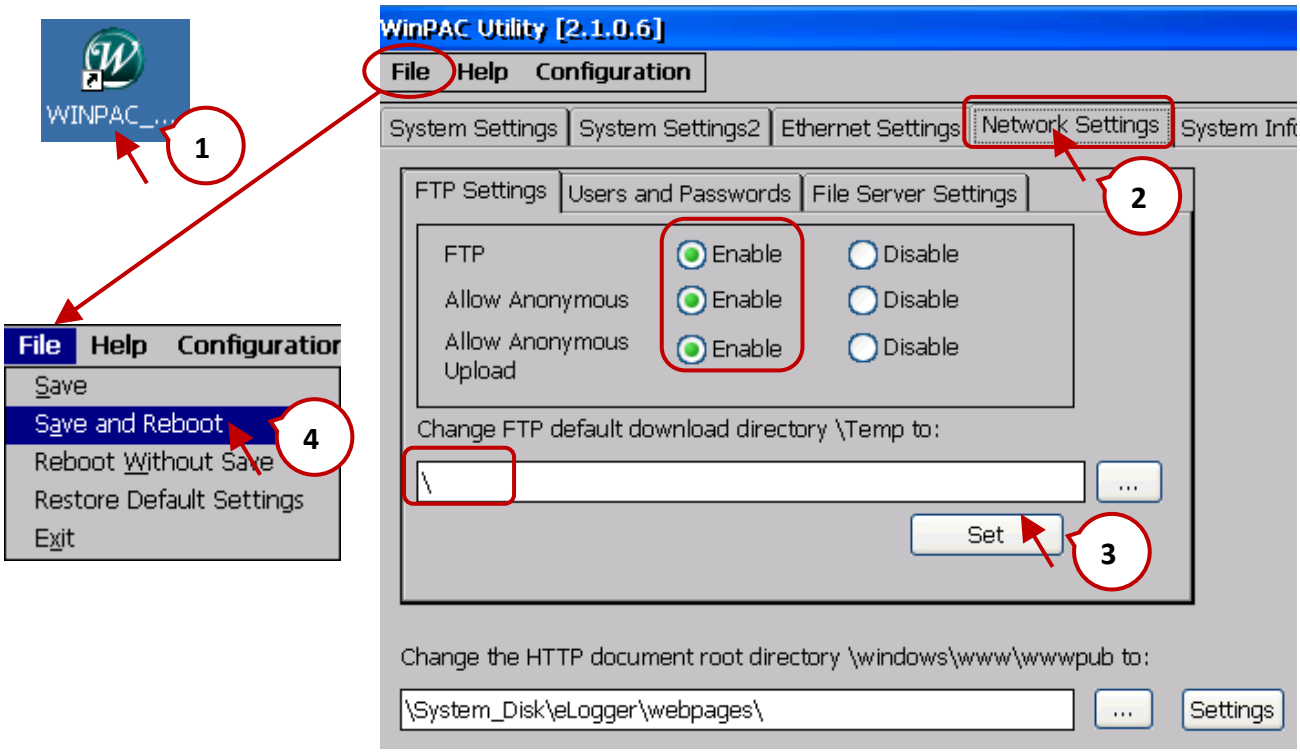
If the **eLogger Runtime** environment (version 1.6.2.0 or later) has never been installed on the PAC, the relevant installation files can be found in the installation folder for the eLogger Developer, which can be found at C:\ICPDAS\eLogger eLogger_Runtime\For_WinPAC if the eLogger Developer was installed in the default location.

To begin installing the **eLogger Runtime**, first, double-click the “My Device” icon on the PAC desktop and then open the \System_Disk directory. Select the “New Folder” item from the “File” menu and create a new folder called “eLogger”.

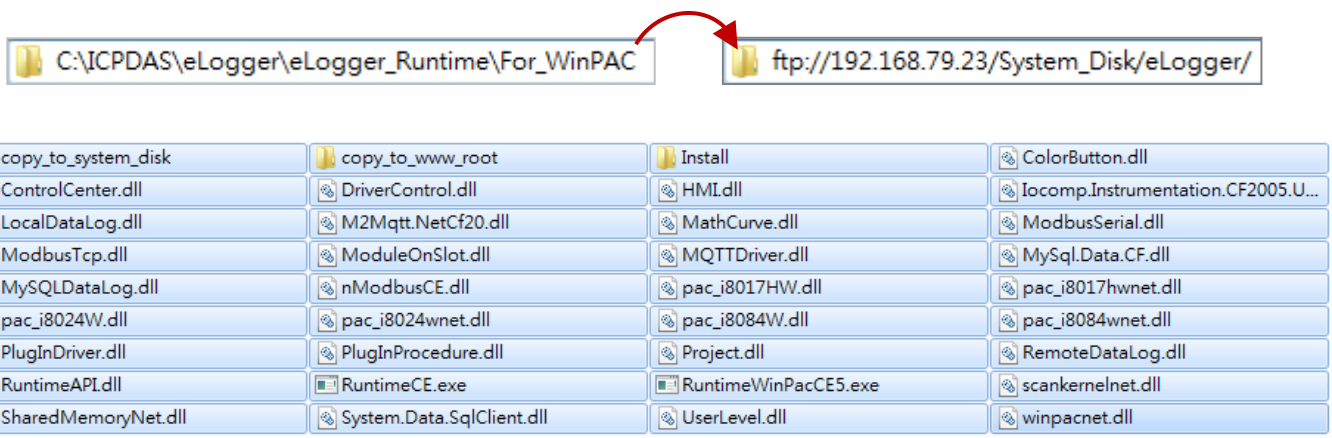


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Note that before attempting to install the **eLogger Runtime** via FTP, you should open the WinPAC Utility and ensure that the FTP function enabled and the download directory is set to "****" in the Network Settings tab. If this is not the case, change the settings where necessary and then click the "Set" button to save the changes. Click the "Save and Reboot" item in the "File" menu to save the settings and restart the PAC.

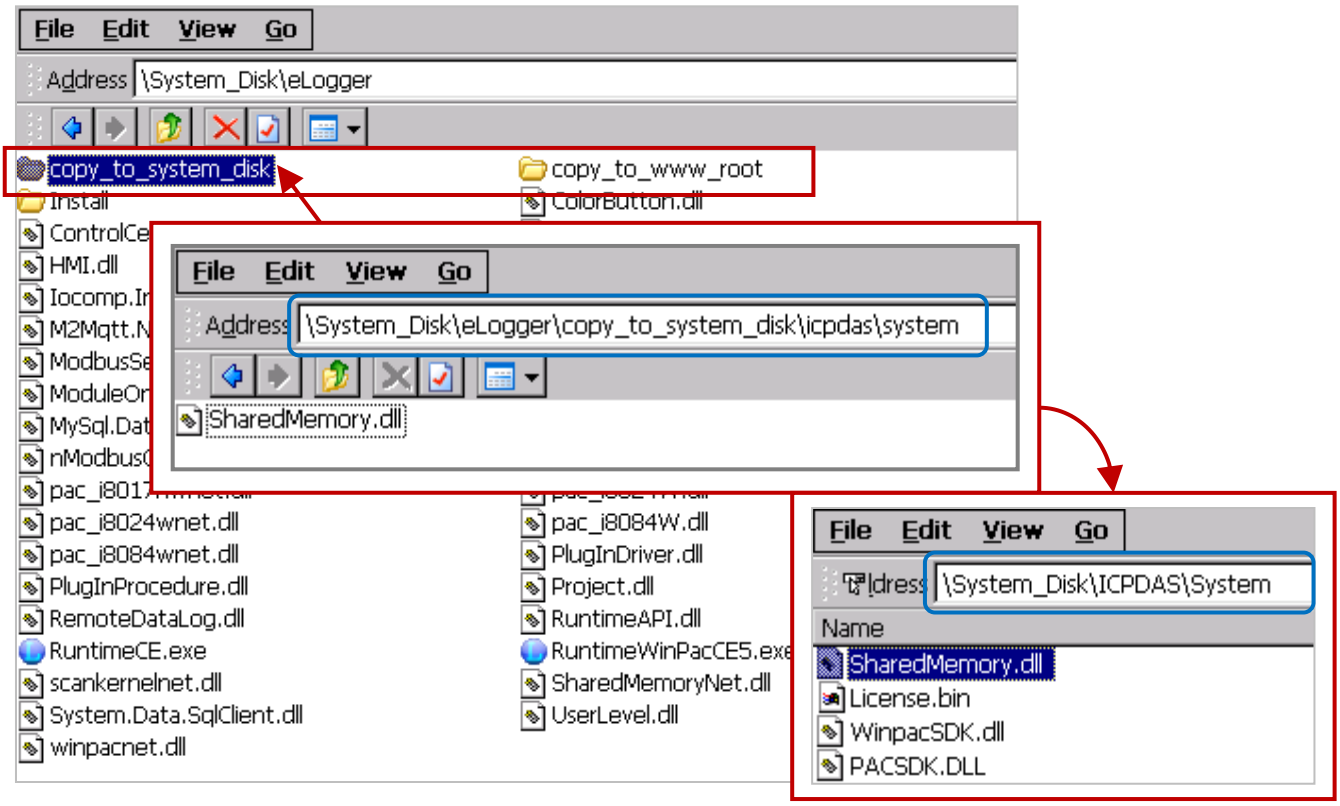


In this example, the **eLogger Runtime** installed on a **WP**-5147-OD PAC. To install the **eLogger Runtime**, copy all the files contains in the C:\ICPDAS\eLogger\eLogger_Runtime**For_WinPAC** folder on the Host PC to the newly created \System_Disk\eLogger folder on the PAC via FTP (e.g., ftp://192.168.79.23/System_Disk/eLogger/).

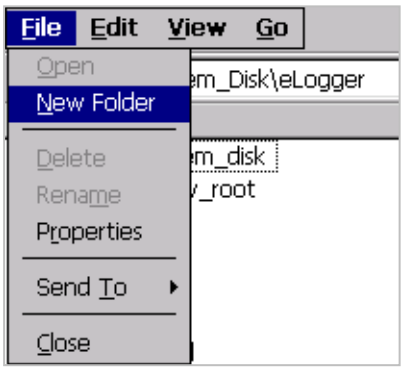


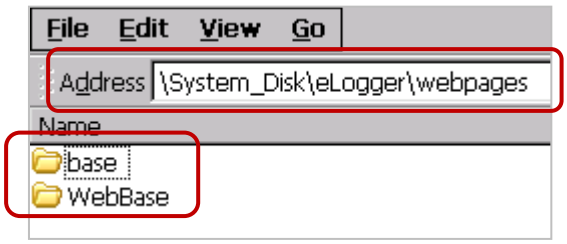
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Next, copy the “SharedMemory.dll” file that is found in the **\System_Disk\eLogger\copy_to_system_disk\icpdas\system** folder on the PAC to the **\System_Disk\ICPDAS\System** folder.



Select the “New Folder” item from the “File” menu and create a new folder called “webpages” in the \System_Disk\eLogger\. Then, copy the “base” and the “WebBase” folders that found in the “copy_to_www_root” folder to the webpages “webpages” folder.





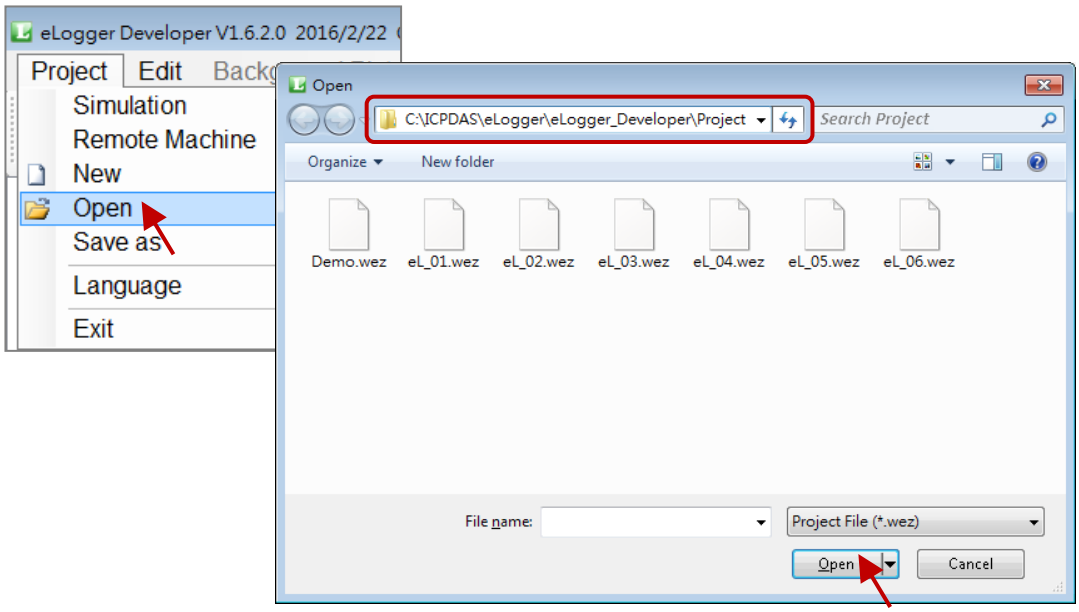
Note: When uploading the project that contains web pages, the “webpages” folder automatically creates in the same folder where “RuntimeCE.exe” is located, e.g., \System_Disk\eLogger\. But you still need to copy the “base” and the “WebBase” folders to the “webpages” folder manually.

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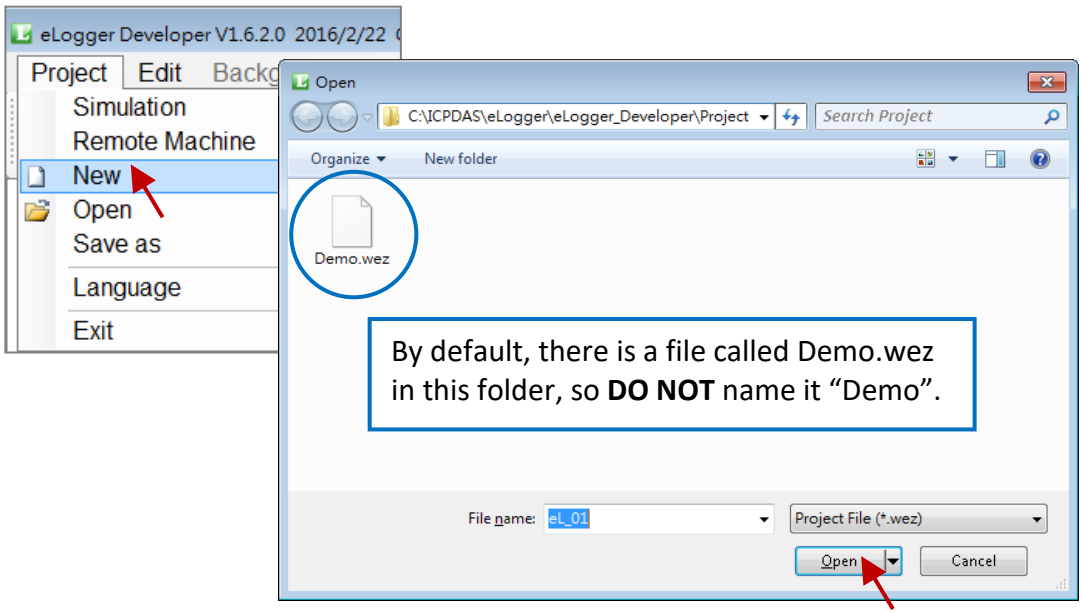
2.2. Creating an eLogger Project

ICP DAS provides an example project named “eL_01.wez” that can be used for reference. The files for this project can obtain from http://www.icpdas.com/web/product/download/software/development_tool/isagraf/document/faq/faq115_demo.zip .

Unzip the demo file and copy the files eL_01.wez to eL_06.wez to the **C:\ICPDAS\eLogger\ eLogger_Developer\Project** folder on the Host PC. Launch the eLogger Developer software, and then click the “Open” item in the “Project” menu to open an existing project.

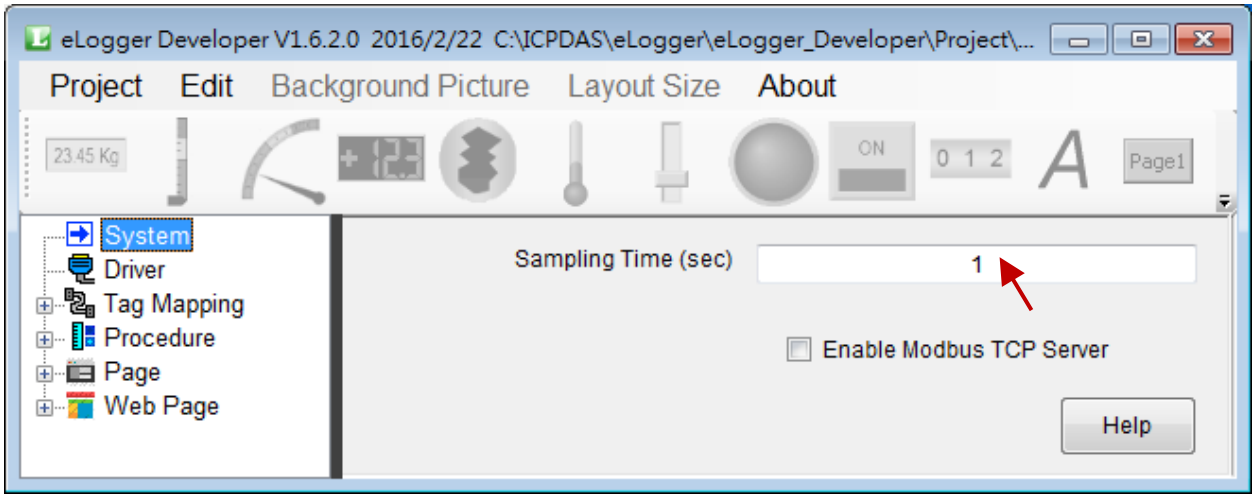


Alternatively, to create a new project, click the “New” item in the “Project” menu and give the new project the name “eL_01”. Note that you should avoid giving this project the existing name “Demo”.



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It is recommend that you set the eLogger Sampling Time to 1 second. To do this, enter 1 in the Samping Time (sec) field.

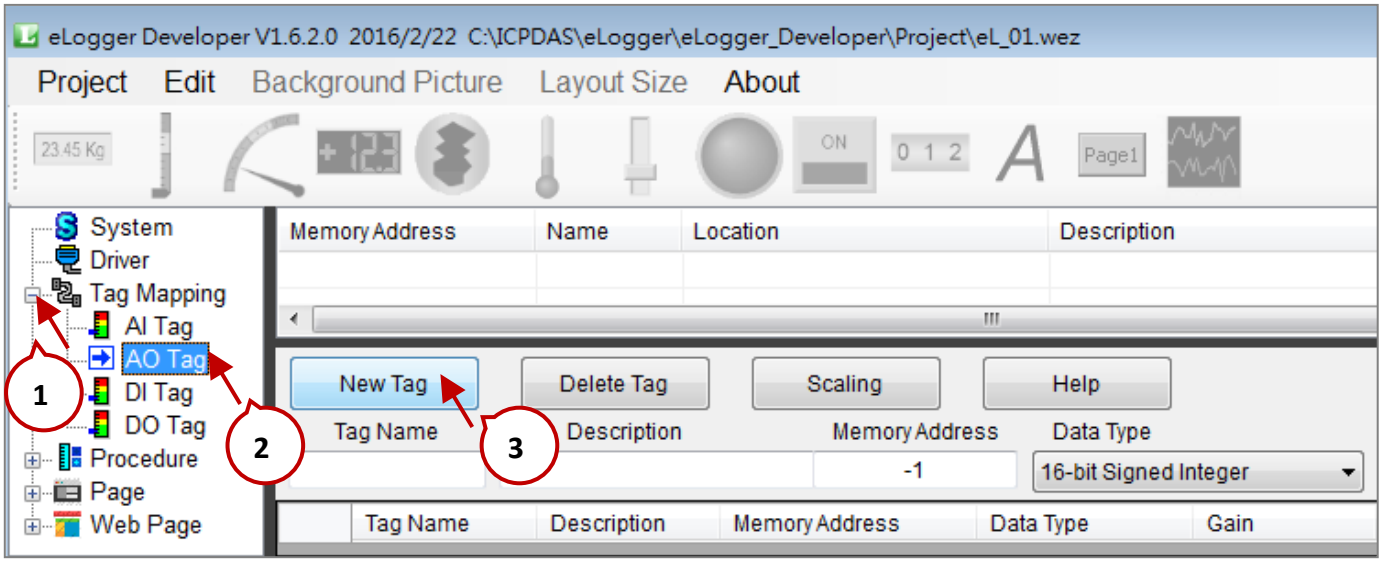


Note that you **CAN NOT** enable the Driver, or add the Device and Register, when operating the eLogger HMI and ISaGRAF SoftLogic on the same PAC.

2.3. Declaring the eLogger Tag

Tags used in eLogger in order to share data with ISaGRAF variables. However, only **AO** and **DO tags** can choose. Note that eLogger AI and DI tags cannot use to share data with ISaGRAF variables.

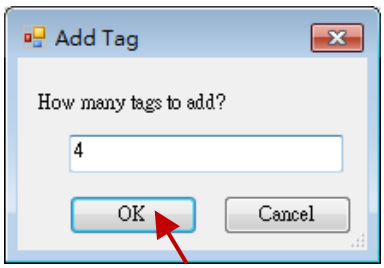
AO tags can be used to share eLogger data with Integer, REAL, Timer, AI, and AO variables in ISaGRAF, while DO tags can share eLogger data with Boolean, DI, and DO variables in ISaGRAF.



In the navigation pane, expand the “Tag Mapping” section and click the “AO Tag” item to display the specific configuration screen, and then click the “New Tag” button, as illustrated in the figure above.

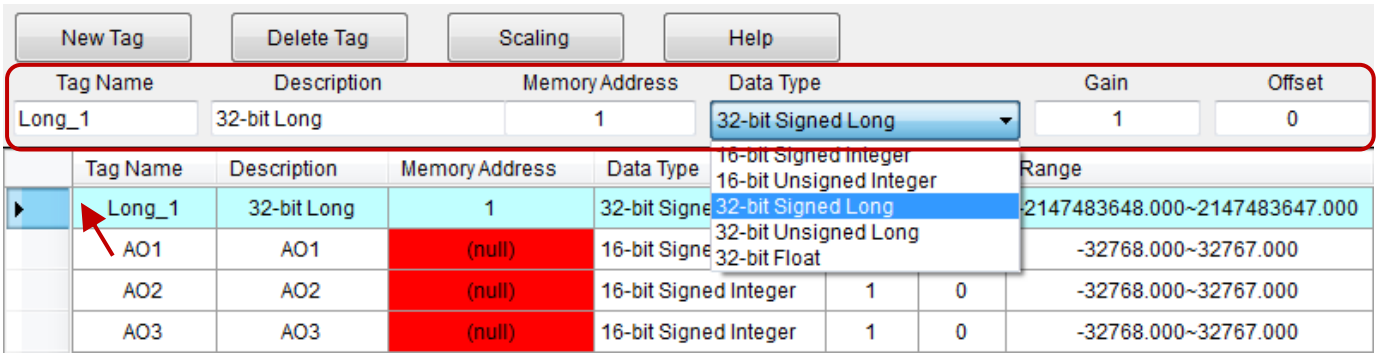
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In this example, we need to use four AO tags. In the “Add Tag” dialog box, enter “4” in the “How many tags to add?” field and then click the “OK” button to add four data rows. The following table list the address and the data type for all tags that we will create later.



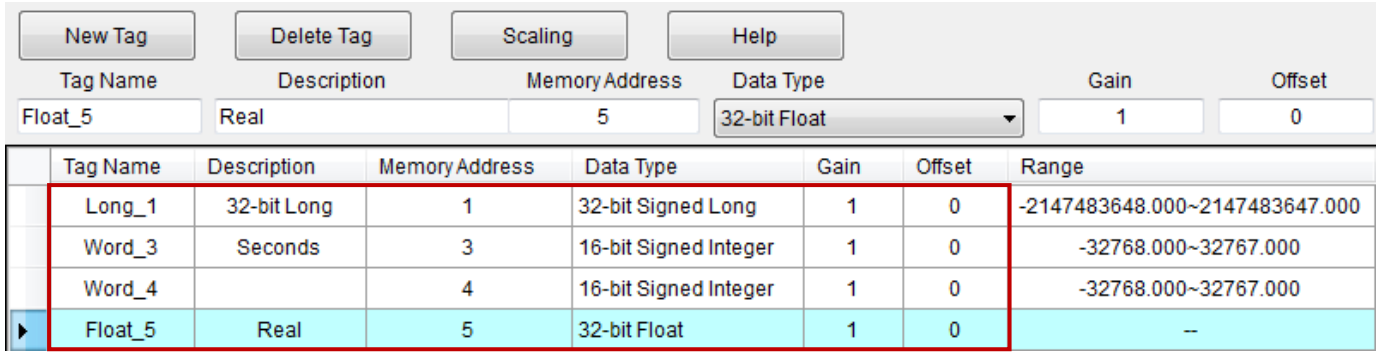
Tag Name	Address	Data Type
Long_1	1	32-bit Signed Long
Word_3	3	16-bit Signed Integer
Word_4	4	16-bit Signed Integer
Float_5	5	32-bit Float

In the configuration screen of the AO Tag, select the first row of data and enter the name “Long_1” in the Tag Name field, set the Memory Address to “1”, select the “32-bit Signed Long” option from the Data Type drop-down menu. By default, the Gain is “1”, and the Offset is “0”, as illustrated in the figure below.



However, according to the definition for ISaGRAF data types, a 32-bit Integer or a REAL must occupy two Modbus addresses. In this example, the address for the “Long_1” tag is set to 1, so the address number 2 cannot be assigned to other tags.

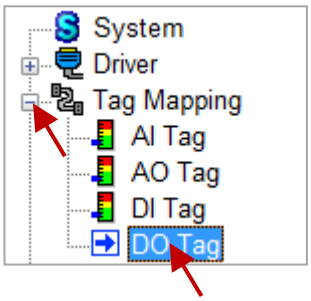
After entering all the relevant information for the first tag, repeat the process to create AO tags 2 to 4 using the information illustrated in the figure below.



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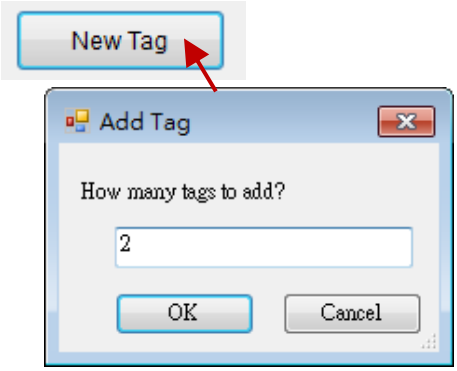
Note: The name of the eLogger tag can be different to that of the ISaGRAF variable because they share data with each other by using the memory address (called the Network Address in ISaGRAF) rather than the individual names.

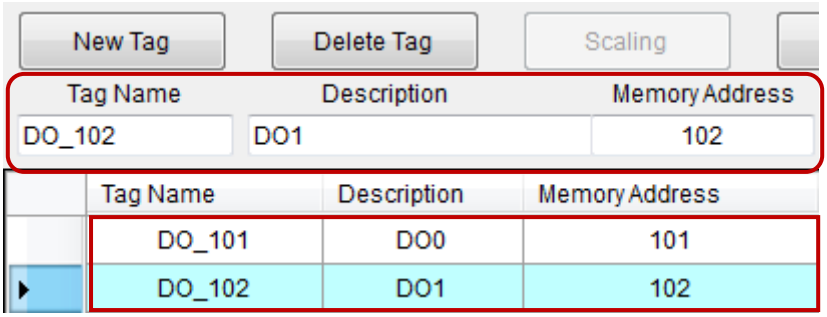
In this example, we also need to add two DO tags. This achieve in a similar manner as the process for adding the AO tags. In the navigation pane, expand the “Tag Mapping” section and click the “DO Tag” item. The following table list the address of DO tags that we will create later.



Tag Name	Address
DO_101	0
DO_102	1

Add two new DO tags by following the process described for the AO tags above. Once complete, the screen should be the same as that illustrated below.



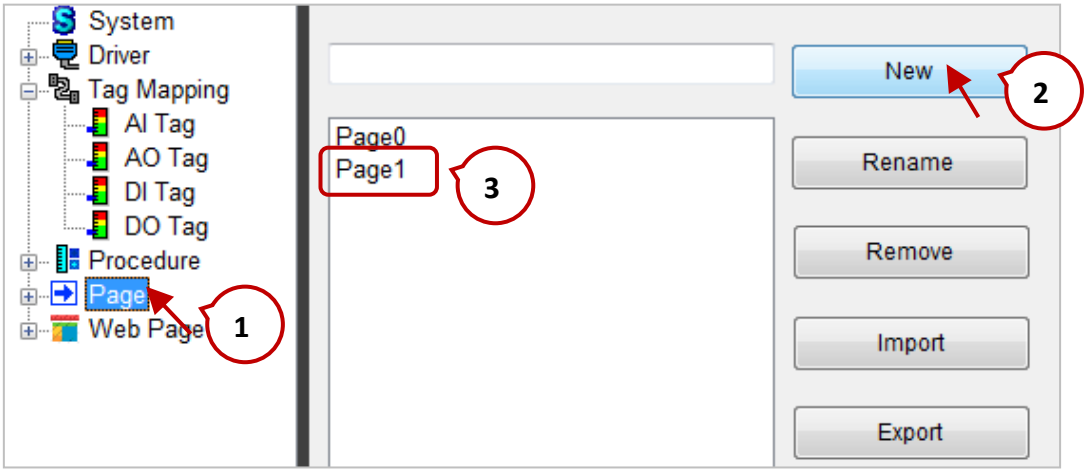


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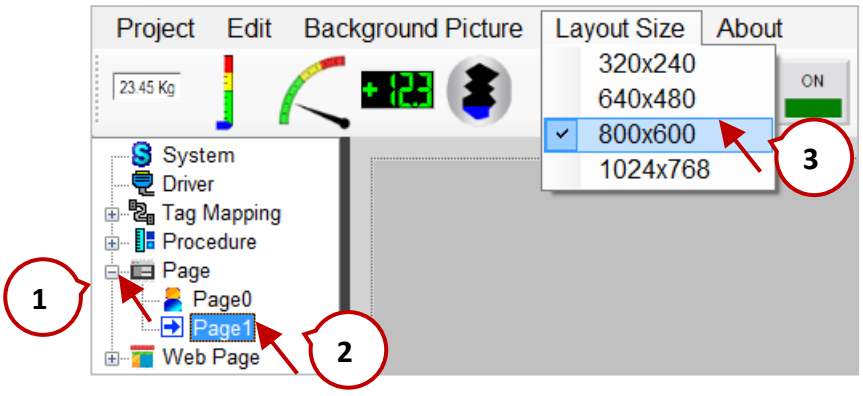
2.4. Creating and editing an eLogger Page

When the eLogger Runtime (RuntimeCE.exe) activate on the PAC, the name “Page0” initially displayed. Note that this can rename to a preferred name if necessary at any time.

In this example, we will use two pages called Page0 and Page1 to create our HMI interface. To add a new page, Page1 in this case, click the “Page” item in the navigation pane to select it, and then click the “New” button to create the new page. The name “Page1” will display in the navigation pane. Note that this new page can rename at any time, or you can choose not to change it if desired.



Expand the “Page” label in the navigation pane and click the “Page 1” item to display the new page. Select the desired VGA resolution for the ISaGRAF PAC from the Layout Size drop-down menu to set all pages as the same resolution.



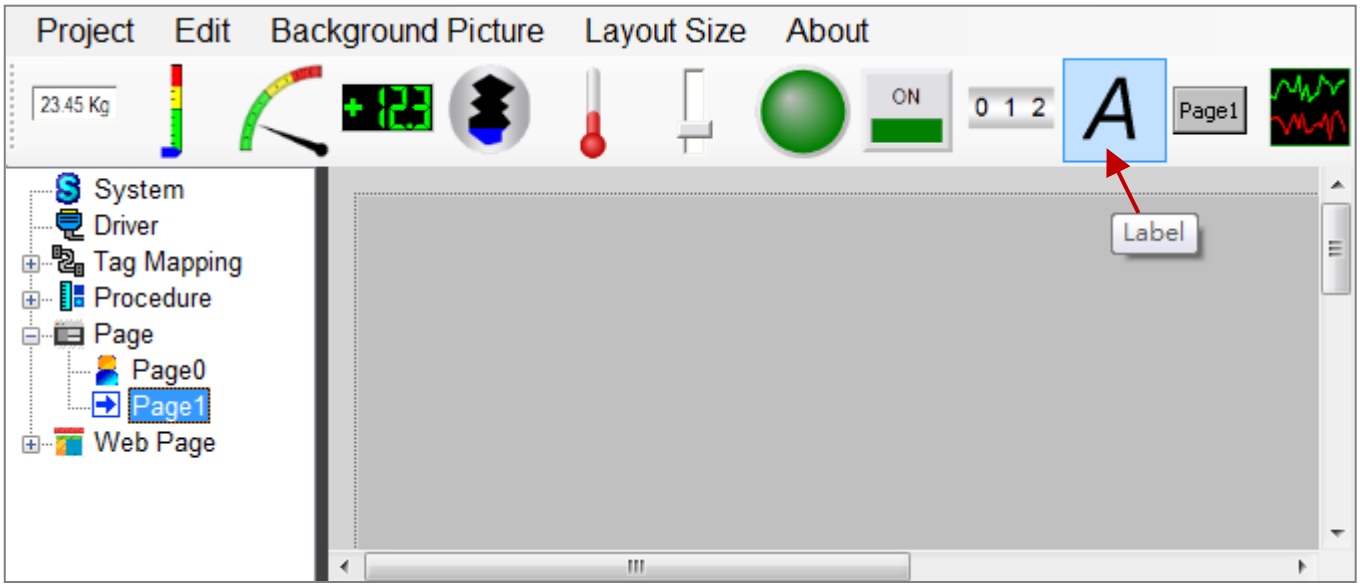
The following is an overview of the maximum VGA resolution that can select for the various ISaGRAF PAC models:

Model	Resolution
XP-8x37-CE6 and WP-8x37	1024 x 768
WP-8x47, WP-5147/5147-OD and **VP**-4137 (with TouchPad)	800 x 600
VP-25W7 (with TouchPad)	640 x 480
VP-23W7	320 x 240

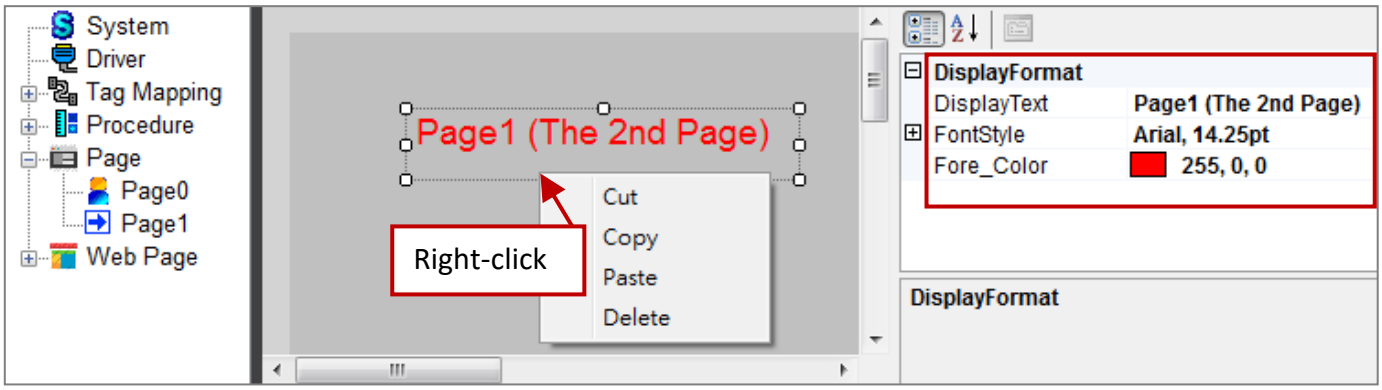
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2.4.1. Add a Label Component

The first thing we need to do is give the page a title. We do this by adding a Label component. From the toolbar in the Project window, click the “Label” item and click on the screen to add a Label component to Page1.



Place the Label component in the desired position on the screen and drag the handles to resize it to a suitable size. The attributes for the component, such as the display text, the font size, and the color, can configure in the property window, as illustrated in the diagram below.

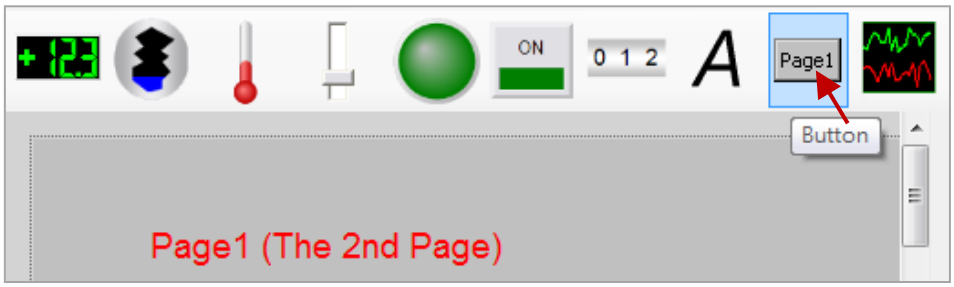


Note: You can click the component to display the property window for the component. In addition, you can also right-click on a component to cut, copy, paste or delete it.

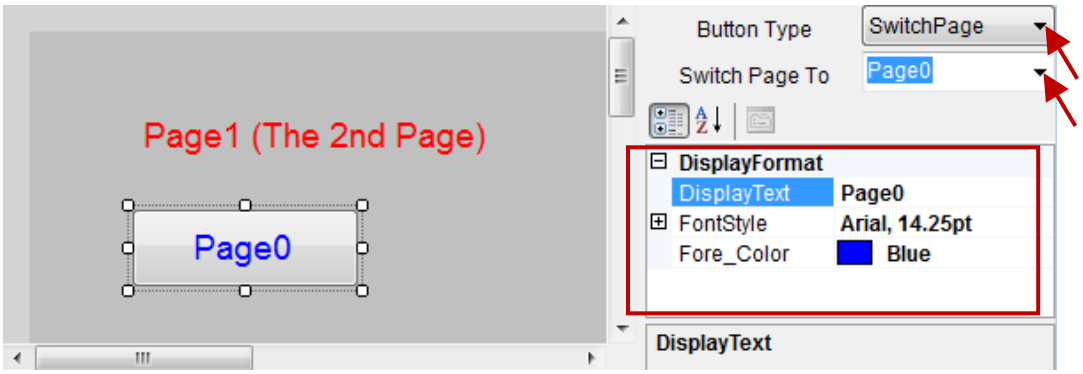
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2.4.2. Add a SwitchPage Component

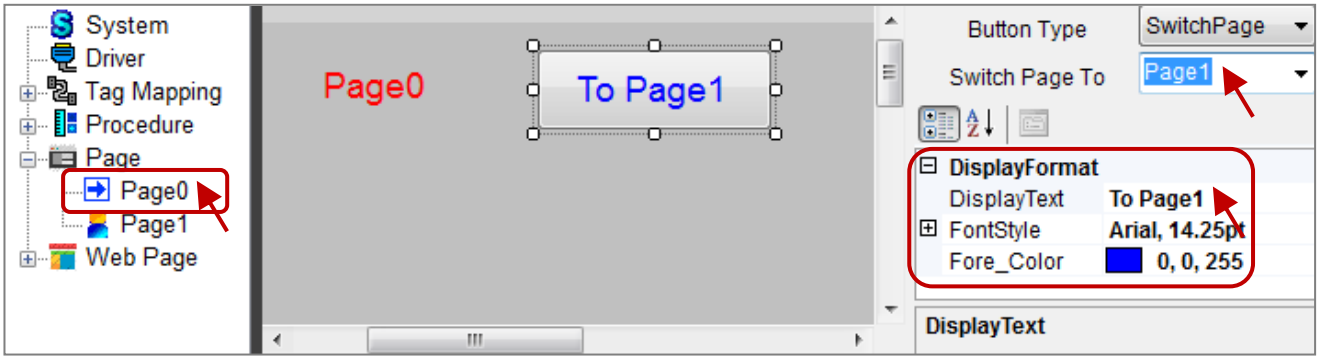
To allow us to navigate between different pages, we need to add a “SwitchPage” button. We do this by adding a Button component. From the toolbar in the project window, click the “Button” item and click on the screen to add a Button component to Page1.



Place the Button component in the desired position on the screen and drag the handles to resize it to a suitable size. Select the “SwitchPage” option from the “Button Type” drop-down menu, and select “Page0” from the “Switch Page to” drop-down menu. Configure the desired attributes for the component in the property window, such as the display text, the font size, and the color, as illustrated in the diagram below.



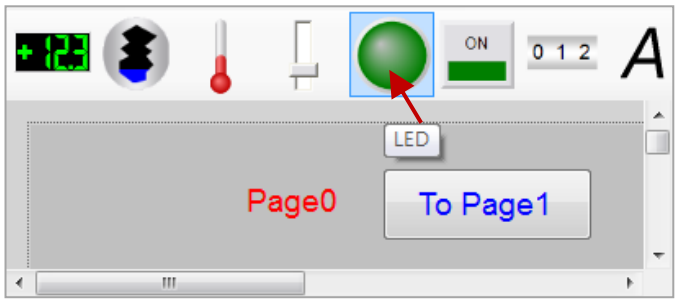
We now need to add Label and SwitchPage Button components to Page0. To do this, first expand the “Page” label in the navigation pane and click the “Page0” item to display the page. Next, follow the same process described above to add a Label component and a SwitchPage Button component to Page1, and then adjust the attribute settings so that they are the same as those illustrated in the figure below.



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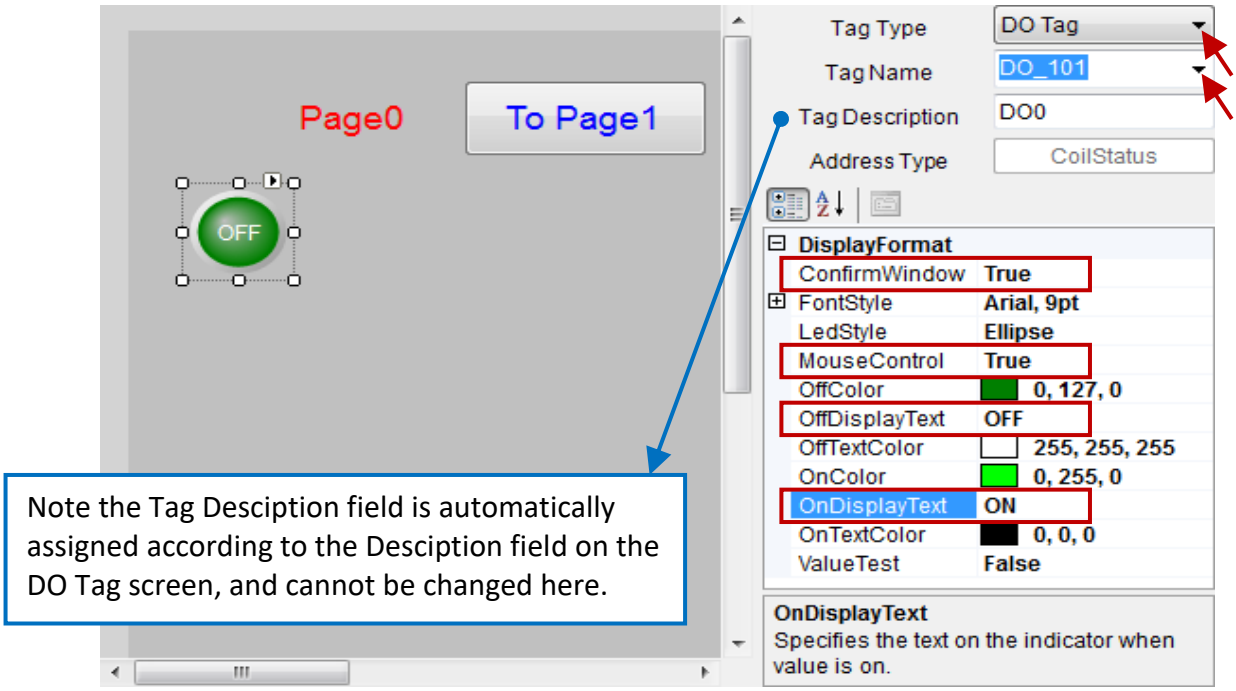
2.4.3. Add an LED Component

We need to add a component that will allow us to turn the lamp on and off via a DO variable OUT_101, and its corresponding eLogger DO tag, DO_101. This can achieve by adding an LED component. From the toolbar in the project window, click the “LED” item and click on the screen to add an LED component to Page0.



Place the LED component in the desired position on the screen and drag the handles to resize it to a suitable size. Select the “DO Tag” option from the “Tag Type” drop-down menu, and select “DO_101” from the “Tag Name” options. In the “Display Format” section of the property window. Ensure that the “ConfirmWindow” option is set to “True”, which specifies that tag data can be output after user confirmation.

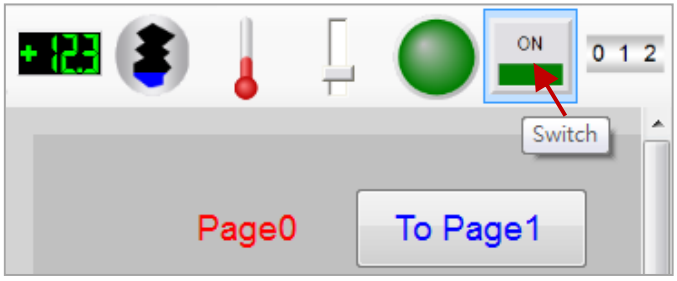
Next, set the “MouseControl” option to “True”. This means that data can be allow to write. If this attribute is set to "False", it means that data can be only to read. Then, configure the desired attributes for the component, such as the text style and color, etc., as illustrated in the diagram below.



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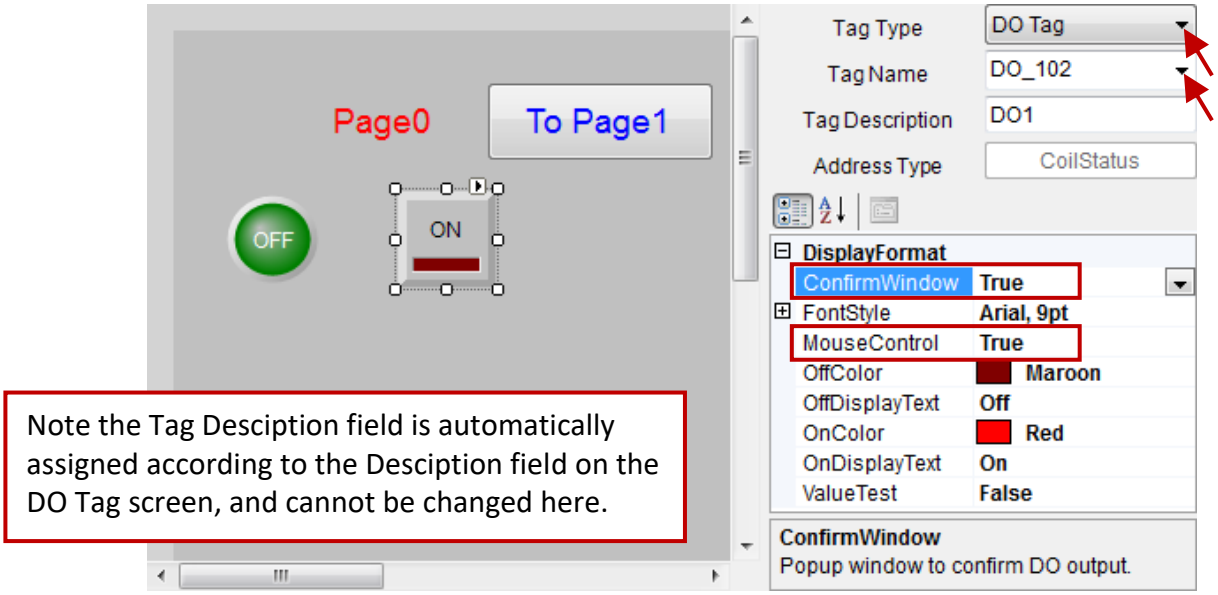
2.4.4. Add a Switch Component

We also need to add a component that will allow us to turn the switch on and off via a DO variable. This can achieve by adding a Switch component. From the toolbar in the project window, click the “Switch” item and click on the screen to add a Switch component to Page0.

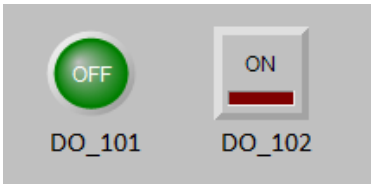


Place the Switch component in the desired position on the screen and drag the handles to resize it to a suitable size. Select the “DO Tag” option from the “Tag Type” drop-down menu, and select “DO_102” from the “Tag Name” options. Ensure that the “ConfirmWindow” option is set to “True” which specifies that tag data can be output after user confirmation.

Next, set the “MouseControl” option to “True”. This means that data can be allow to write. If this attribute is set to “False”, it means that data can only be to read. Then, configure the desired attributes for the component, such as the text style and color for the ON and OFF states, etc., as illustrated in the diagram below.



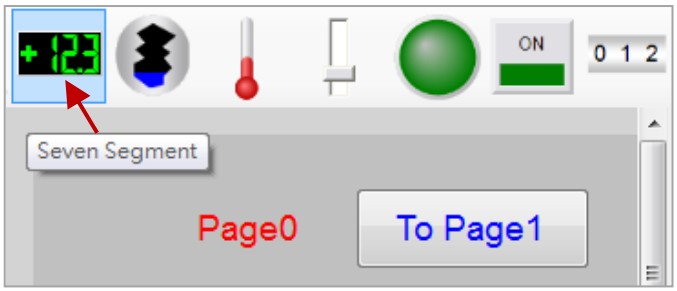
Optionally, you can add two additional Label components to describe the purpose of the LED and Switch components.



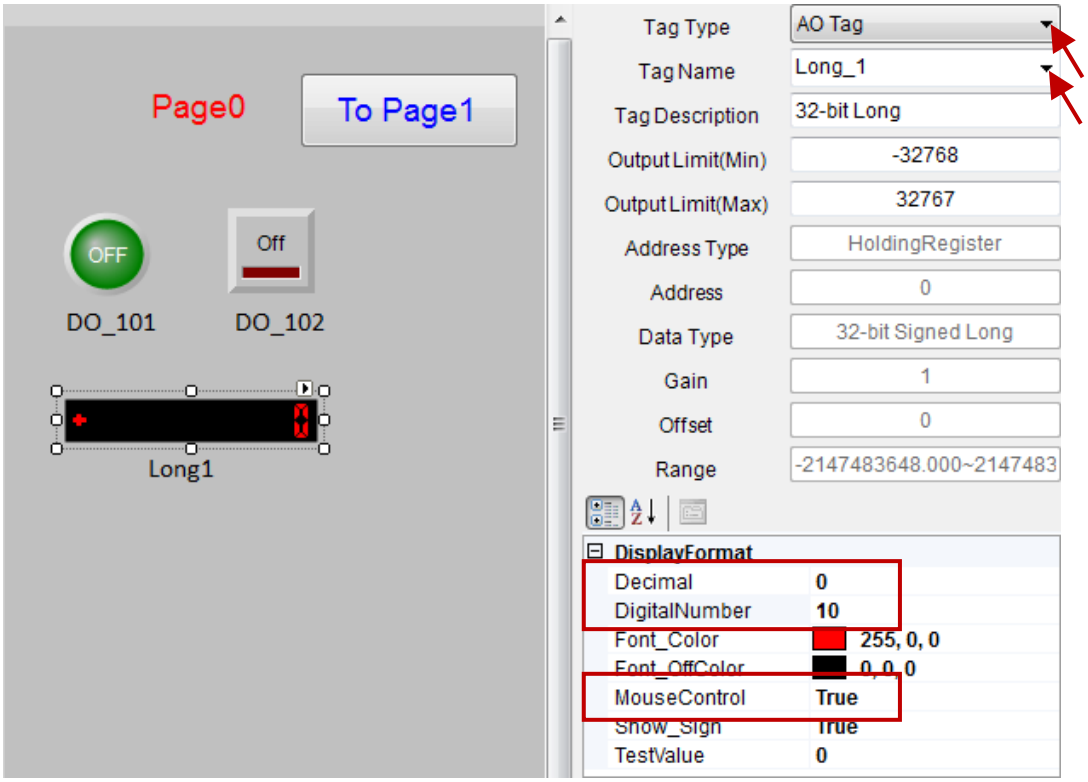
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2.4.5. Add a Seven Segment Component

So that we can monitor the AO values, we need to add a 7-segment numerical component. From the toolbar in the project window, click the “Seven Segment” item and click on the screen to add a 7-segment numerical component to Page0.



Place the 7-segment numerical component in the desired position on the screen and drag the handles to resize it to a suitable size. Select the “AO Tag” option from the “Tag Type” drop-down menu, and select “Long_1” from the “Tag Name” options.



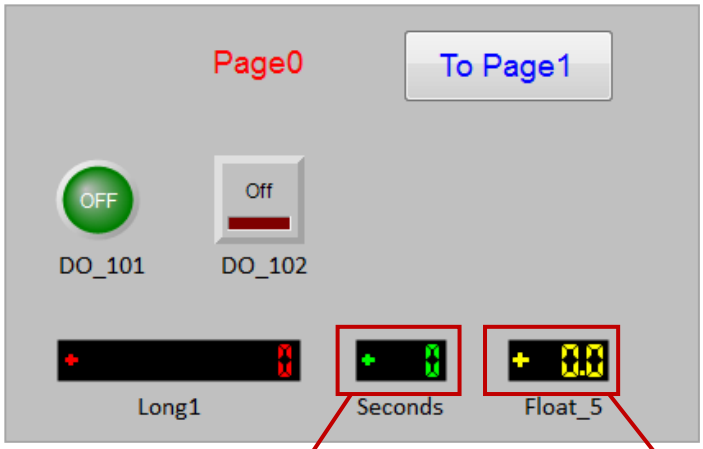
Set the “MouseControl” option to “True”, which means that write data is allowed. If this attribute is set to “False”, it means that data can only be to read.

In this example, the data type for the “Long_1” tag is a 32-bit Long, so no decimal places are required. Set the “Decimal” to “0” and the “DigitalNumber” to “10”. Note that the “DigitalNumber” attribute can be set in the range of 1 to 24.

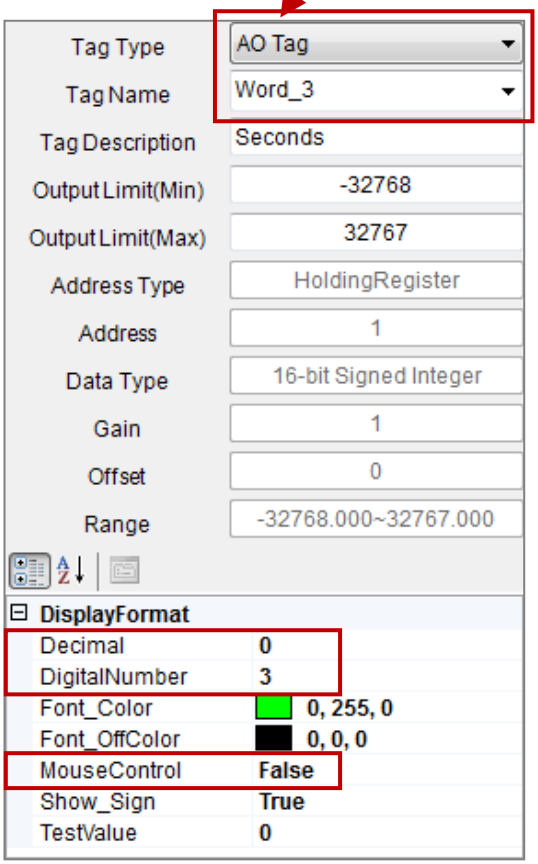
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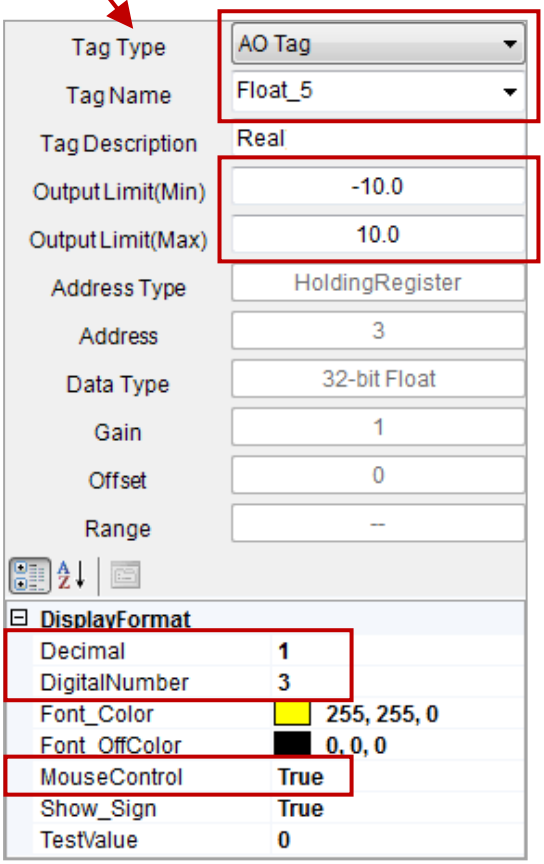
In certain situations, the on-site staff may be required to enter a value within a specified range. To implement this functionality, set the required “OutputLimit (Min.)” and “OutputLimit (Max.)” values in the respective fields. Optionally, you can add a Label component to describe the purpose of this component.

Configure the desired attributes for the component, such as the text style and color, etc., as illustrated in the diagram above. After creating the first 7-segment component, repeat the process to add two further “Seven Segment” components, and configure them using the information illustrated in the figure below. Again, add two more Label components that describe their usage.



Note: You can click the component to display the property window for the component. In addition, you can also right-click on a component to cut, copy, paste or delete it.

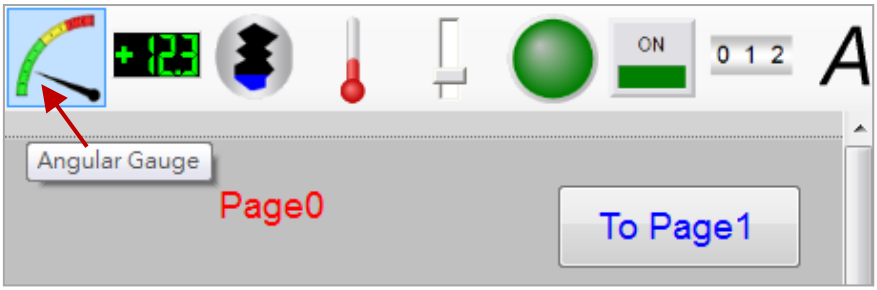




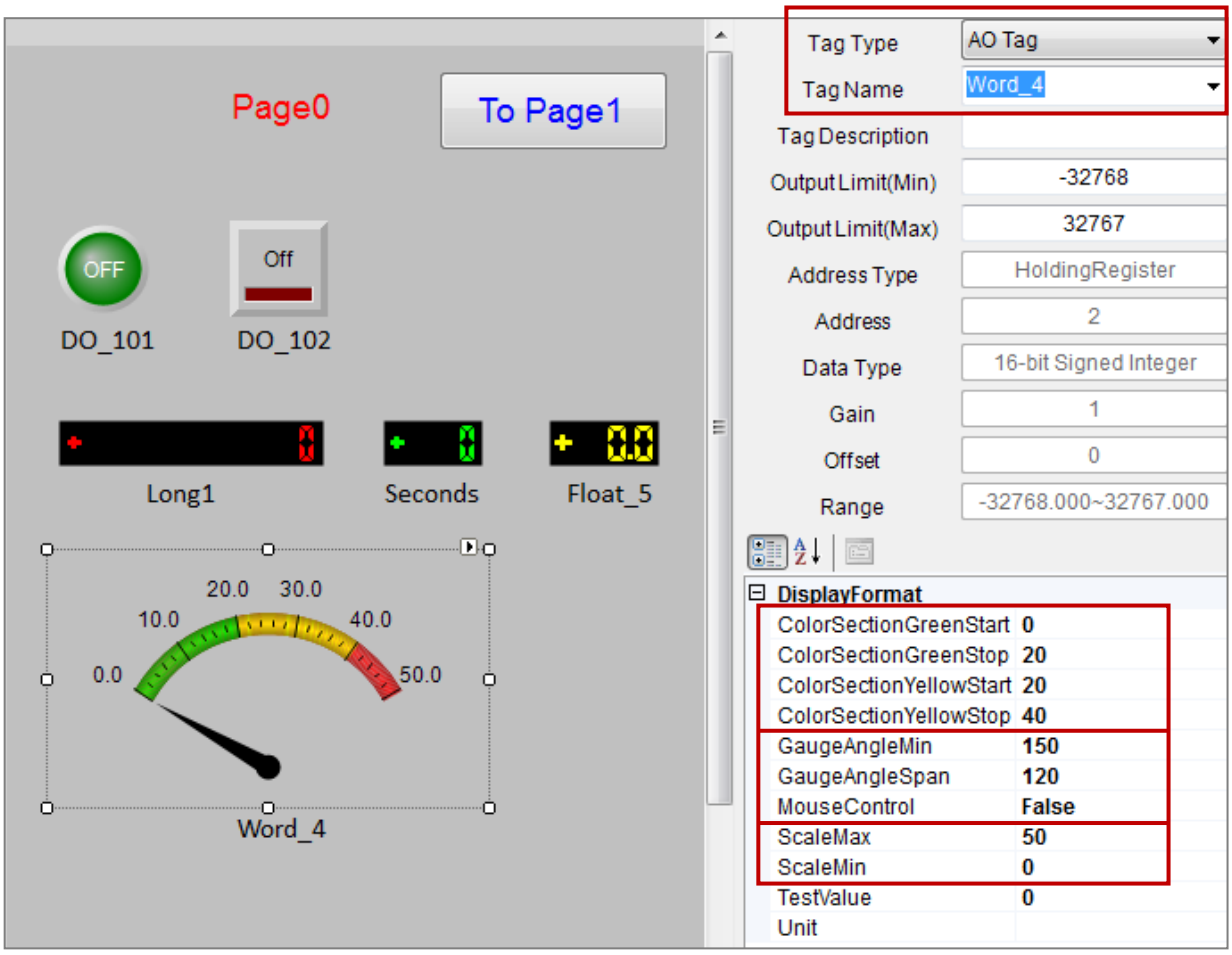
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2.4.6. Add an Angular Gauge Component

It would be helpful to add a component that will allow us to monitor the AO values of a gauge. This can achieve by adding an Angular Gauge component. From the toolbar in the project window, click the "Angular Gauge" item and click on the screen to add an angular gauge component to Page0.



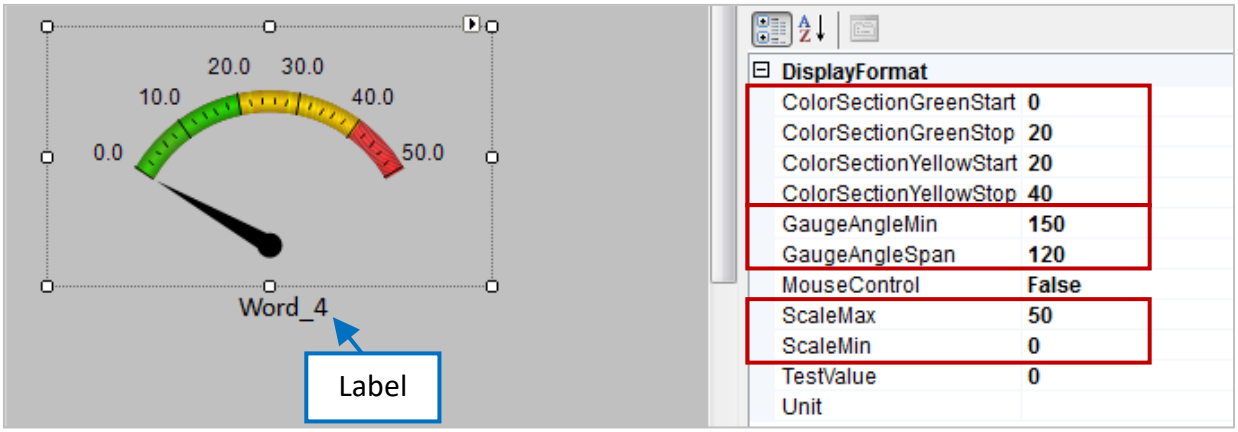
Place the Angular Gauge component in the desired position on the screen and drag the handles to resize it to a suitable size. Select the "AO Tag" option from the "Tag Type" drop-down menu, select "Word_4" from the "Tag Name" options, and set the "MouseControl" option to "False", meaning that data can only be read.



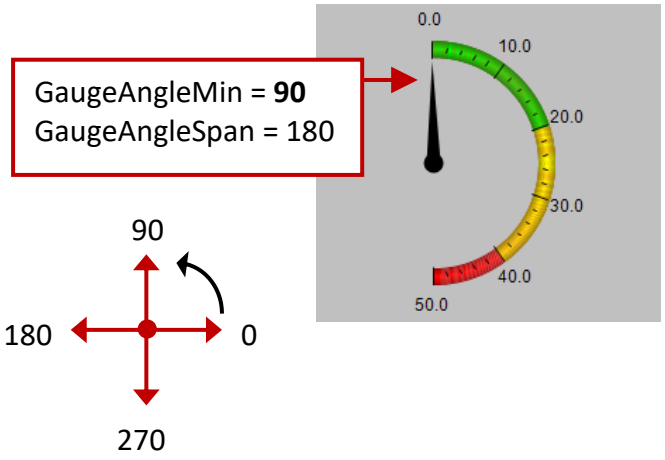
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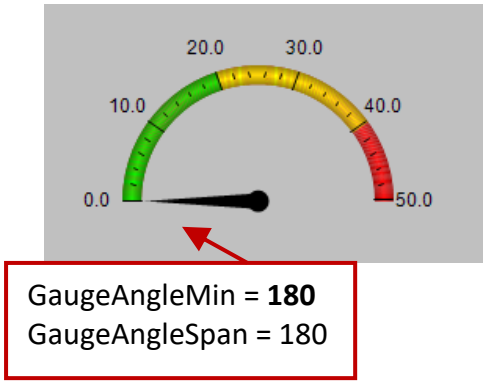
In the “Display Options” section of the property window, set the “ScaleMin” option to “0”, and the “ScaleMax” to “50”. In this example, this output value will be defined in the ISaGRAF program as being in a range from 0 to 50.

Note: You can click the component to display the property window for the component. In addition, you can also right-click on a component to cut, copy, paste or delete it.



Next, set the “GaugeAngleMin” value to 150, which signifies that the minimum value is located at 150 degrees in the anti-clockwise direction, where zero is the baseline of the Angular Gauge component. Set the “GaugeAngleSpan” value to 120, which signifies that the range that the pointer can travel is 120 degrees. For example,





You can specify the color that different sections of the range will be displayed in, e.g., green, yellow and red, which allows you to quickly check the status. In this example, we will set the “ColorSectionGreenStart” value to “0”, the “ColorSectionGreenStop” value to “20”, the “ColorYellowSectionStart” value to “20”, and the “ColorYellowSectionStop” value to “40”, as illustrated in the diagram below.

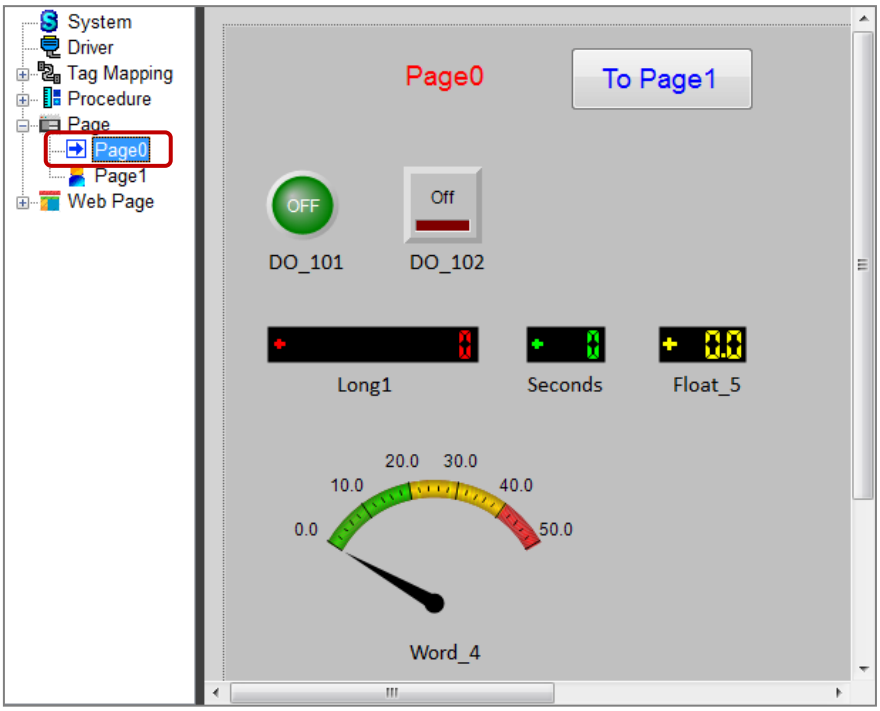
Finally, we will add a Label component to identify this component.

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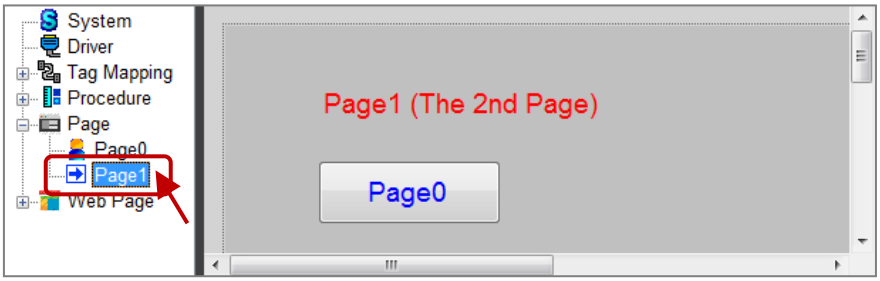
2.5. Save or Backup the eLogger Project

Congratulations! If you have closely followed the instructions above, you should have successfully created your first eLogger project, which should look similar to that illustrated in the diagrams below.

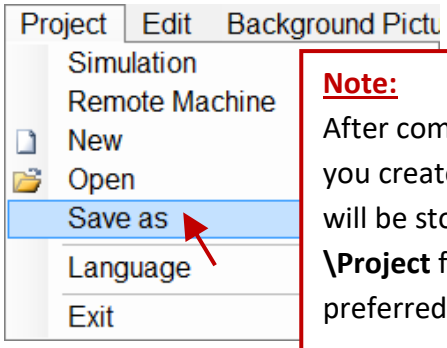
Page0:



Page1:



The next step is to create a backup of the Project file, which will have a .wez file extension. By default, eLogger will automatically save the project file in the **C:\ ICPDAS\eLogger \eLogger_Developer \Project** folder.



Note:

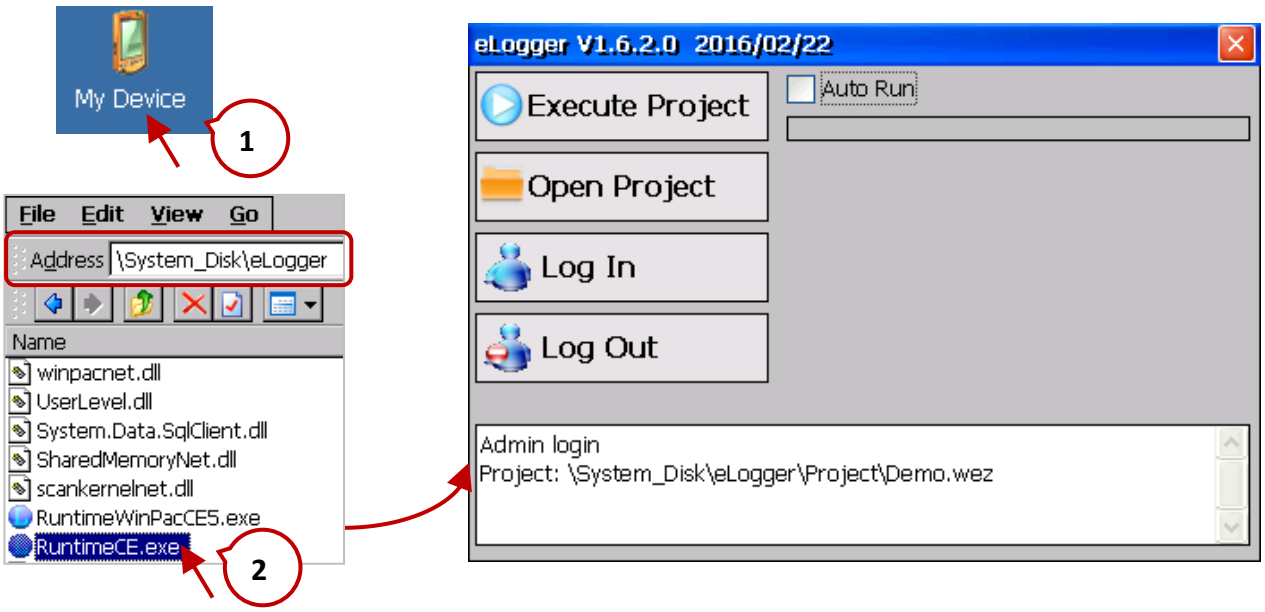
After completing an eLogger project, we recommended that you create a backup of the project file (.wez). By default, the file will be stored in the **C:\ ICPDAS\eLogger \eLogger_Developer \Project** folder. You can also save the backup file in your preferred folder, for example C:\.....\Project**backup**.

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2.6. Uploading the eLogger Project

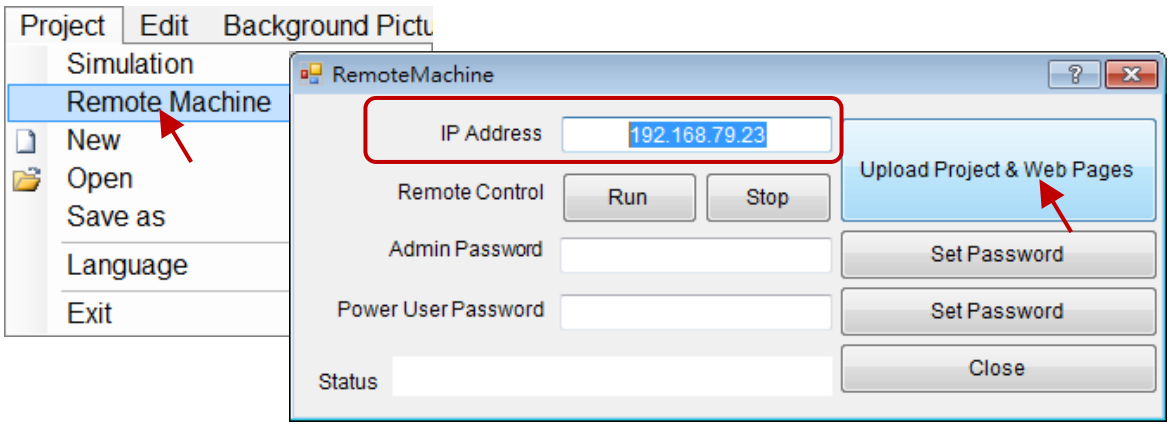
In this example, we will use a WP-5147-OD PAC that has an XW304 expansion board connected, in combination with the ISaGRAF and eLogger HMI software. You need to upload the ISaGRAF project to the WP-5147-OD PAC (see Section 1.7 “Uploading the ISaGRAF Project to the WP-5147-OD device” for details of how to do this).

Next, verify that the eLogger Runtime have been installed on the PAC (see Section 2.1.2 “Installing the eLogger Runtime component on the PAC” for more details). Before uploading the eLogger project to the PAC, first double-click the “My Device” icon on the PAC desktop, and then launch the “RuntimeCE.exe” application from the \System_Disk\eLogger folder.



Next, select the “Remote Machine” option from the “Project” menu in the eLogger Developer on the Host PC and enter the IP address of the PAC in the RemoteMachine dialog box. Click the “Upload Project & Web Pages” button to upload the project to the WP-5147-OD PAC.

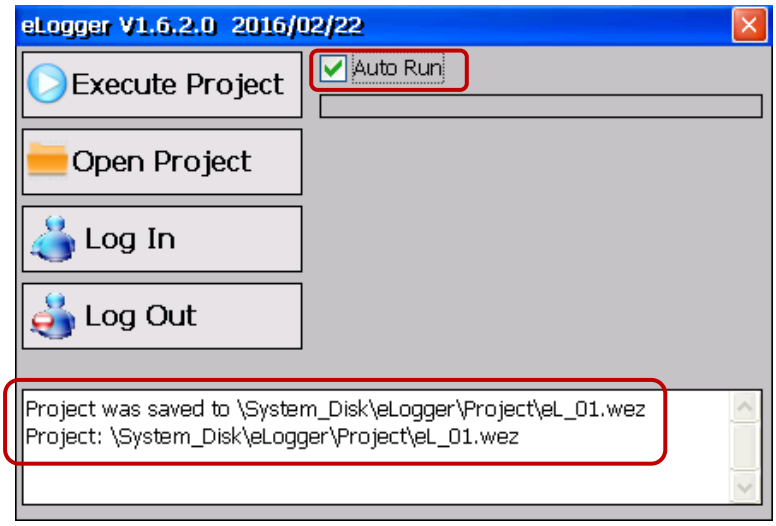
> Note: If the eLogger Runtime application have not activated, a dialog box with an error message will display.



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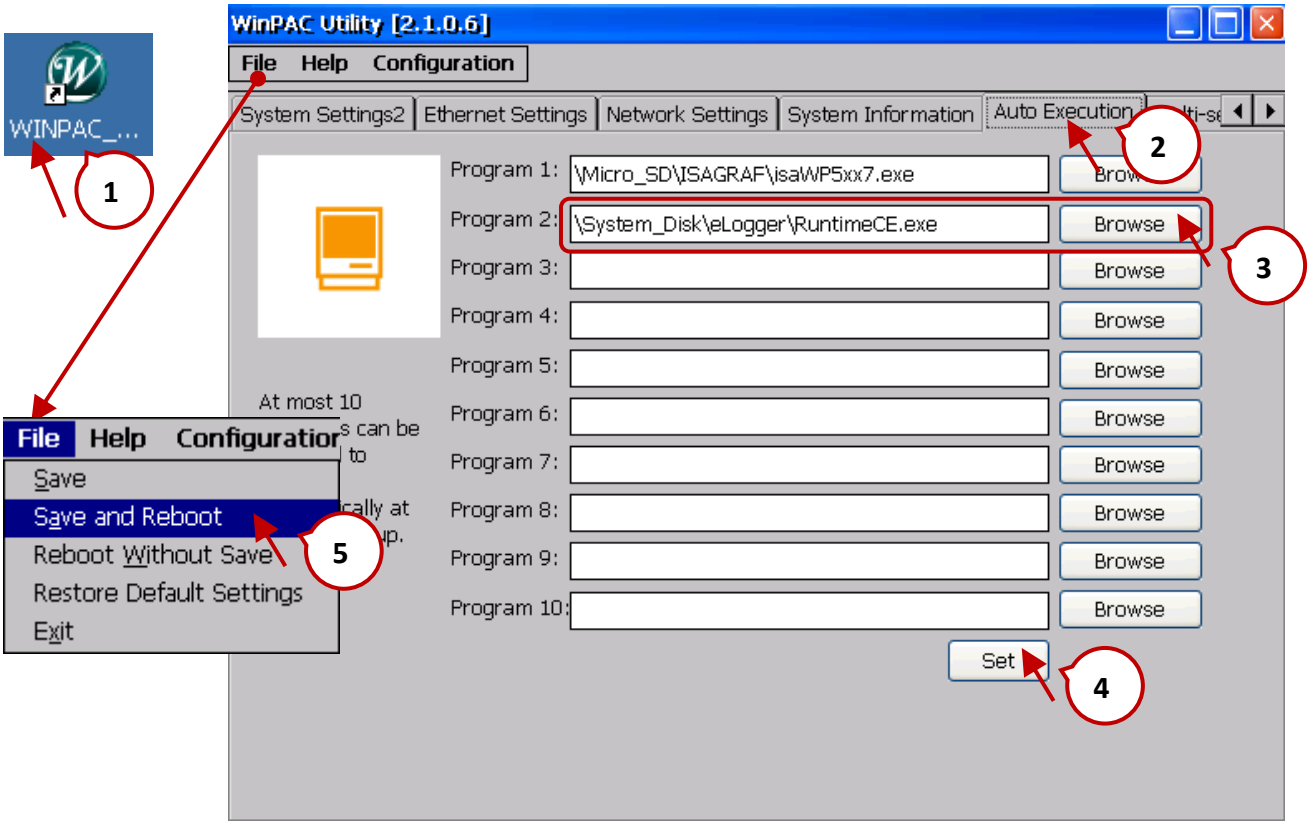
If the project file was successful uploaded, the name of the project (eL01.wez in this case) will be displayed in the eLogger Runtime application.

Once the project is uploading, check the checkbox for the “Auto Run” option automatically to execute the project whenever the "eLogger Runtime" application is activating.



To launch the “eLogger Runtime” application each time the PAC powers on, you need to set the “Auto Execution” options, as illustrated in the diagram below. To do this, launch the WinPAC Utility on the PAC and click the “Auto Execution” tab. Click the “Browse” button for the “Program 2” entry and select the “\System_Disk \eLogger\RuntimeCE.exe” file.

By default, the first program listed in the “Auto Execution” tab (i.e., Program 1) must be the ISaGRAF driver for each PAC, which is isaWP5xx7.exe in this case. Click the “Set” button to save the changes, and then click “Save and Reboot” in the “File” menu.



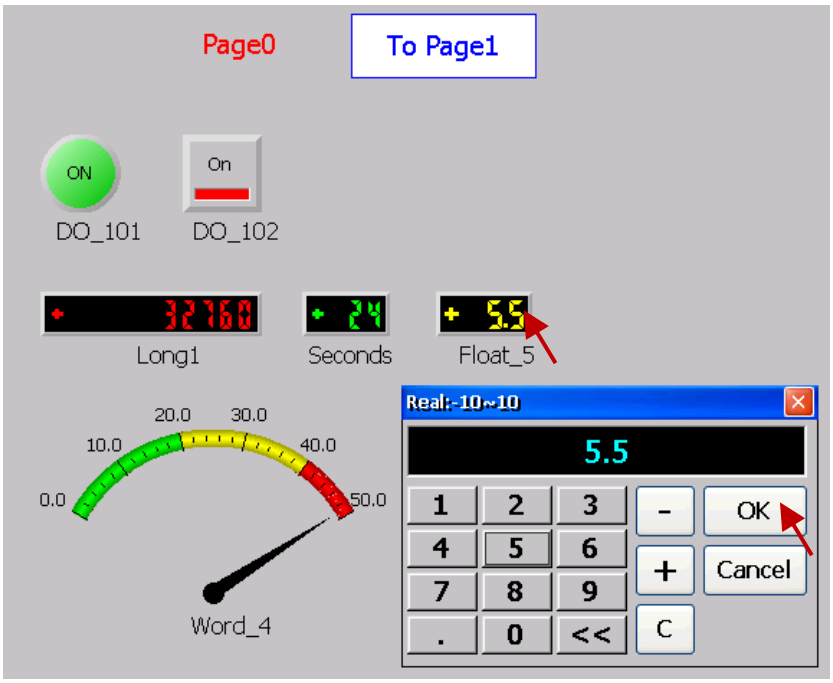
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2.7. Testing the eLogger HMI

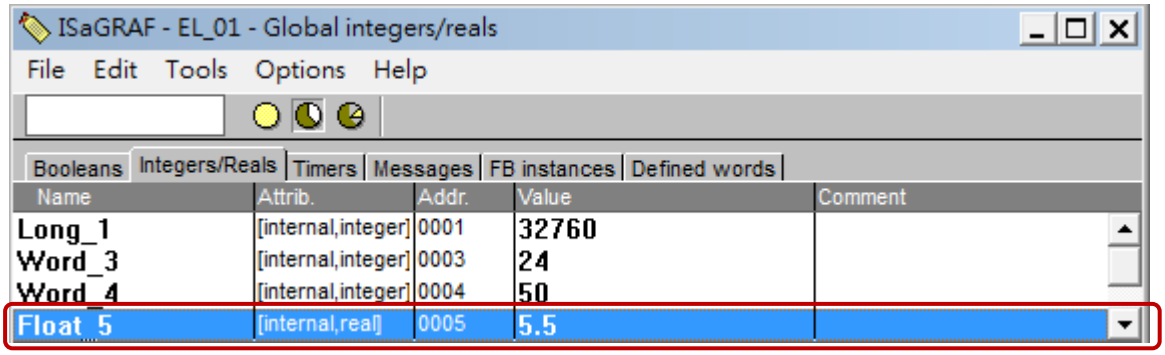
Once the PAC is activating, the eLogger HMI screen that we created in our example above will display, as illustrated the figure below. Click any of components to test that they function correctly, and set the ISaGRAF software to connect to the PAC (see Section 1.7 for more details), to verify that the data is correct.

For example:

1. Click the “Float_5” component, enter the value “5.5” and then click the OK button.



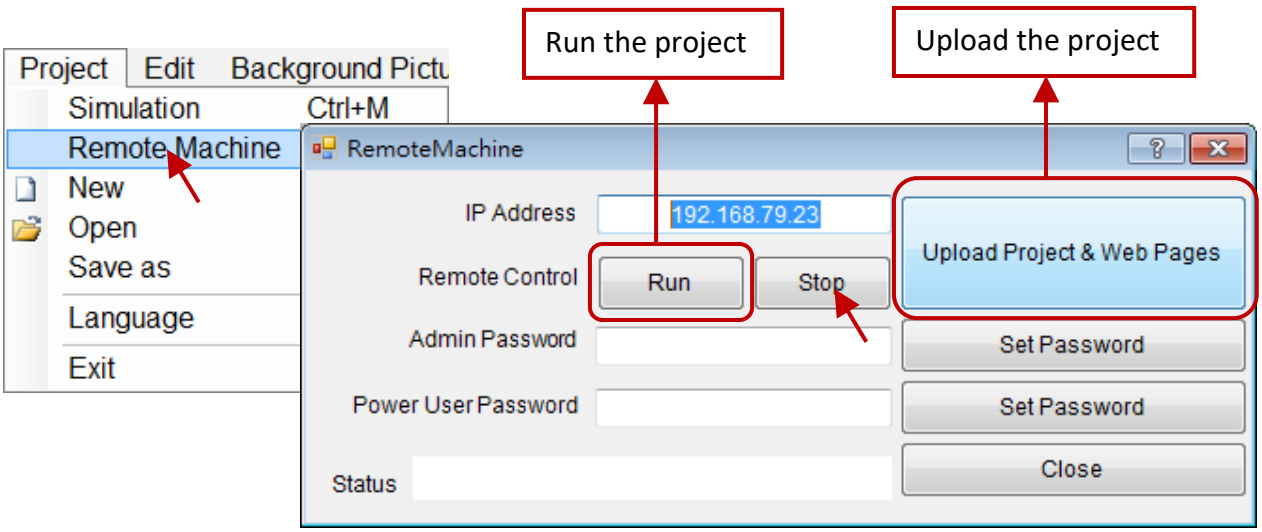
2. Verify that the value of the “Float_5” variable in the ISaGRAF application has changed to “5.5”.



Note: These values will only display when the ISaGRAF project executes.

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The eLogger HMI perform in a full screen on the PAC by default, so you cannot do any operations. When you want to upload a modified project, click the “Remote Machine” option in the “Project” menu in the eLogger Developer application on the Host PC to open the “RemoteMachine” dialog box, and then click the “Stop” button to terminate the project that is currently operating. Click the “Run” button to restart the project.



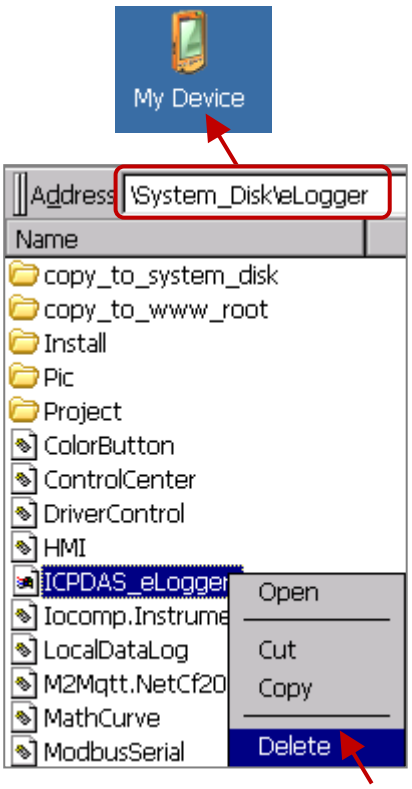
2.8. Troubleshooting eLogger Runtime operations

If you are still unable to close the eLogger HMI page when it displays as full-screen using the method described above, you can remove the “**ICPDAS_eLogger.xml**” file in Safe mode.

To do this, set the Rotary Switch on the PAC panel to position “**1**” and then reboot the PAC. Once the PAC restarts, the ISaGRAF and eLogger applications will not automatically activate, thereby allowing other operations to be performing on the PAC.

First, double-click the “My Device” icon on the PAC desktop. Next, either delete or rename the “**ICPDAS_eLogger.xml**” file that is located in the **\System_Disk\eLogger** folder, and then set the Rotary Switch to “**0**”, and then reboot the PAC.

When the eLogger Runtime activated automatically, you can upload the modified project again.



Note: Remember to check the checkbox for the **“Auto-Run”** option in the eLogger Runtime application.

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2.9. Other Advanced eLogger Functions

There are a number of other more advanced functions available in the eLogger application, which will be described in more detail below.

2.9.1. Setting the Gain and Offset for Scaling Data

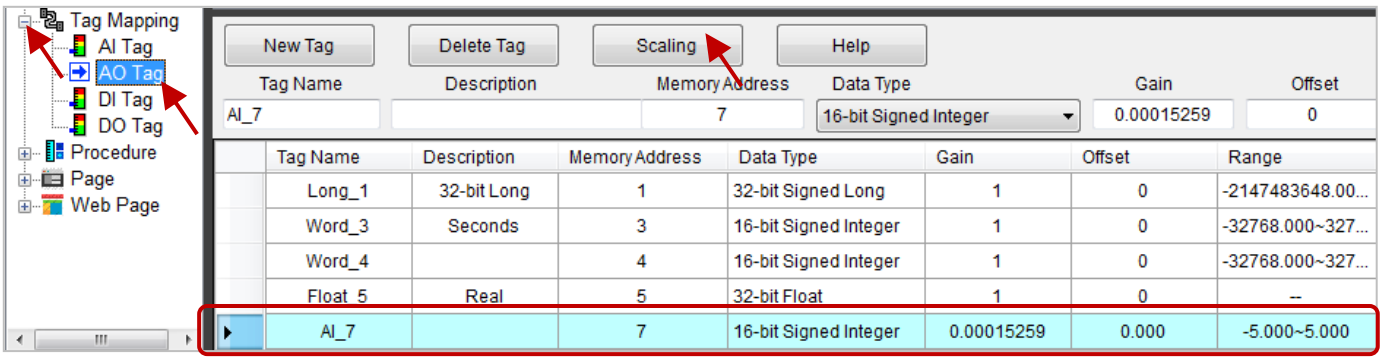
For many applications, the data values displayed in engineering format rather than in integer format.

For instance, when the "Range" value for the XW304 expansion board (6 AI, 1 AO, 4 DI, 4 DO) is set to "0", it means the module is used to measure voltages in a range from -5 to +5 V. See Section 1.5 Connecting the I/O for more details about the use of the XW304 expansion board.

In the ISaGRAF application, the measured value for the "Range" variable is a signed 16-bit integer that has a range from -32768 to +32767. In order to display the range -5 to +5 on the eLogger HMI page, the Gain and the Offset values have to be set.

Note: If the Gain set to "1" and the Offset set to "0", it means that no data conversion will perform.

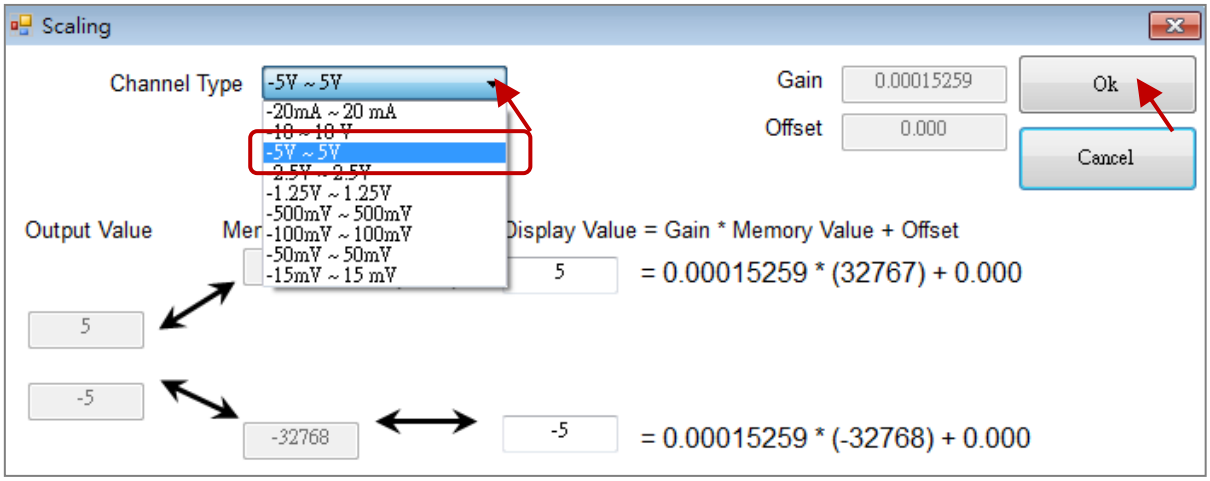
In this case, the "AI_7" variable use to read a value from any channel of the XW304 module. Note that the data type for this variable is set as a "16-bit Signed Integer".



Note: Only eLogger **AO** and **DO tags** can be to share data with ISaGRAF variables. AO tags can be to share eLogger data with Integer, REAL, Timer, AI and AO variables in ISaGRAF.

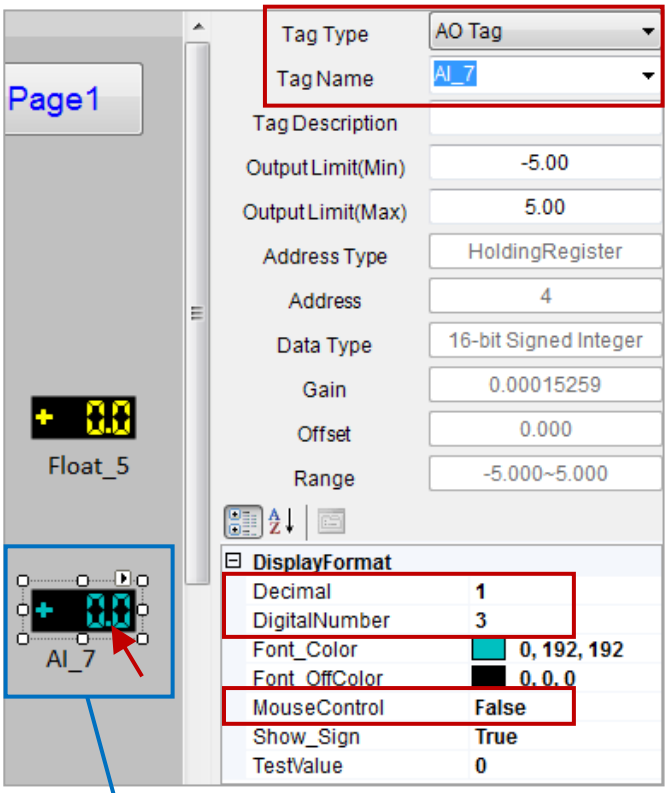
In the navigation pane, expand the "Tag Mapping" section, and click the "AO Tag" item and click the "AI_7" tag to select it, as illustrated in the figure above. In the "AO Tag" screen, click the "Scaling" button to open the "Scaling" dialog box. Select a channel type from the "Channel Type" drop-down menu (e.g., -5 to +5 V), and then click the "OK" button to save the selection. When you return to the "AO Tag" screen, the Gain and Offset values have entered in the respective fields.

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Testing the Data Conversion functionality:

First, add a "Seven Segment" component to any page and configure the attributes as follows.



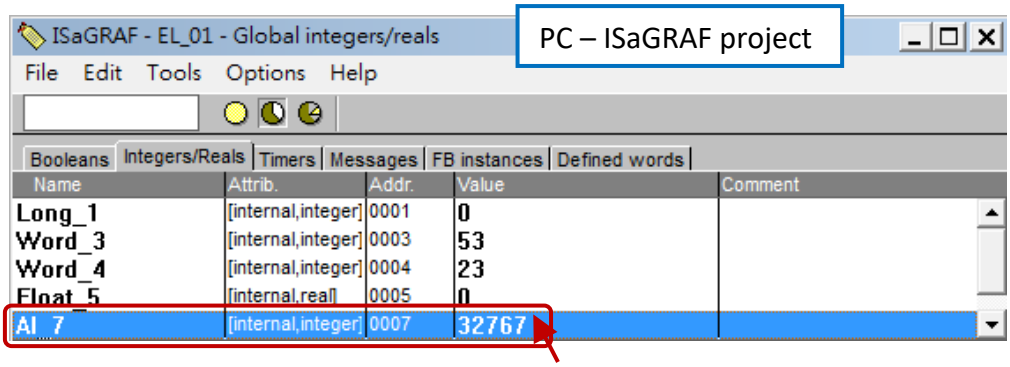
Set the Tag Type to "AO Tag", the Tag Name to "AI_7", and the "MouseControl" option to "False", the "Decimal" item to "1", and the "DigitalNumber" item to "3".

Also, add the "AI_7" variable to the ISaGRAF project, set the "Attrib." property to "internal, integer", and set the "Addr." Value to "7".

After configuring the above settings, upload both the ISaGRAF and the eLogger projects to the PAC.

In the ISaGRAF project, set the value for the "AI_7" variable to "32767", which means that the converted value (AI_7 = 5.0) will be displayed on the eLogger screen on the PAC.



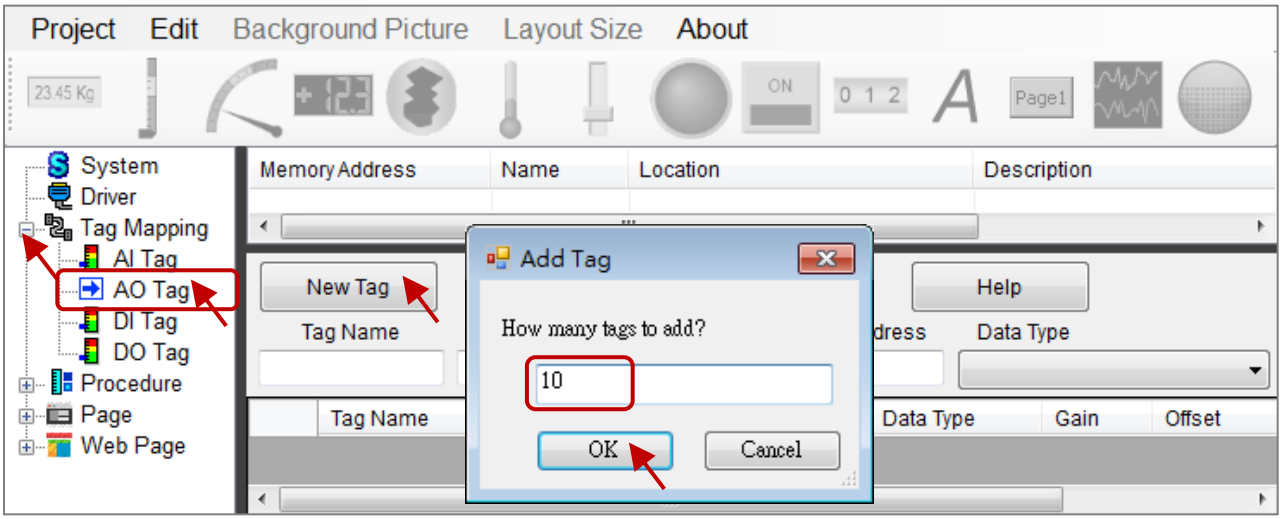


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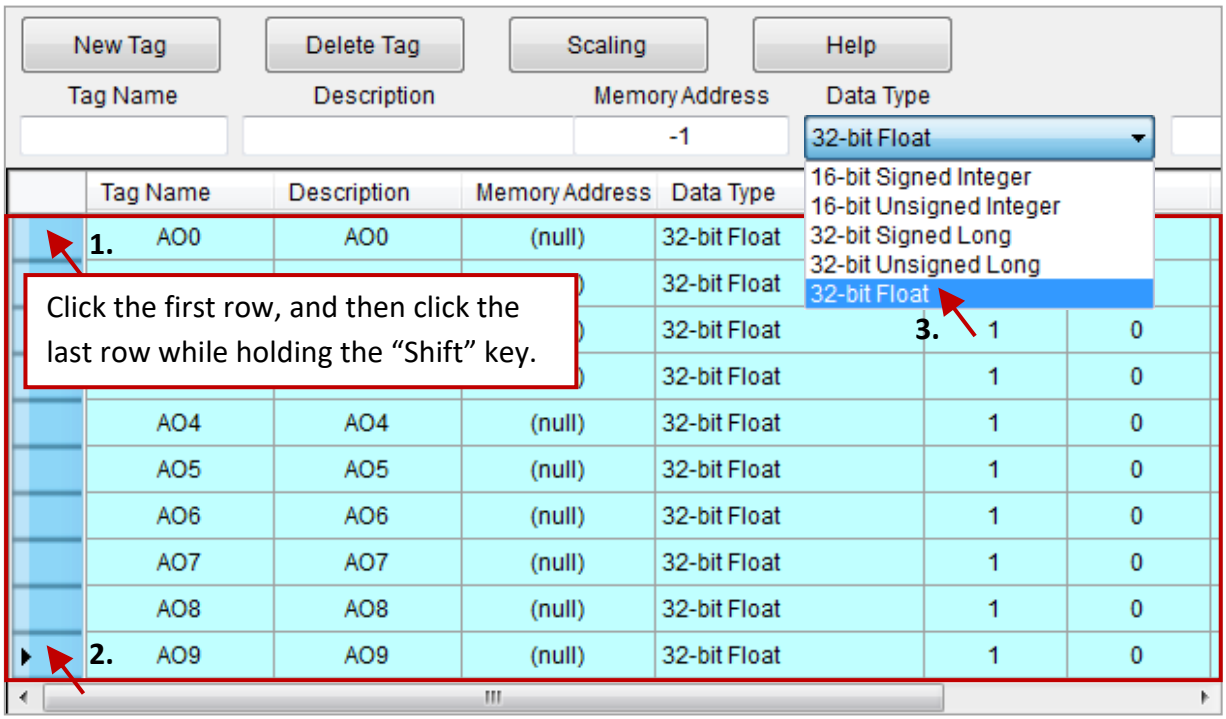
2.9.2. Declaring multiple eLogger Tags that have a similar Name or are of the same Type

The eLogger application allows you to add multiple tags and declare them with a similar name or the same data type.

As an example, expand the “Tag Mapping” section in the navigation pane and click the “AO Tag” item. In the “AO Tag” screen, click the “New Tag” button to open the “Add Tag” dialog box and add ten new AO tags, as illustrated in the figure below.



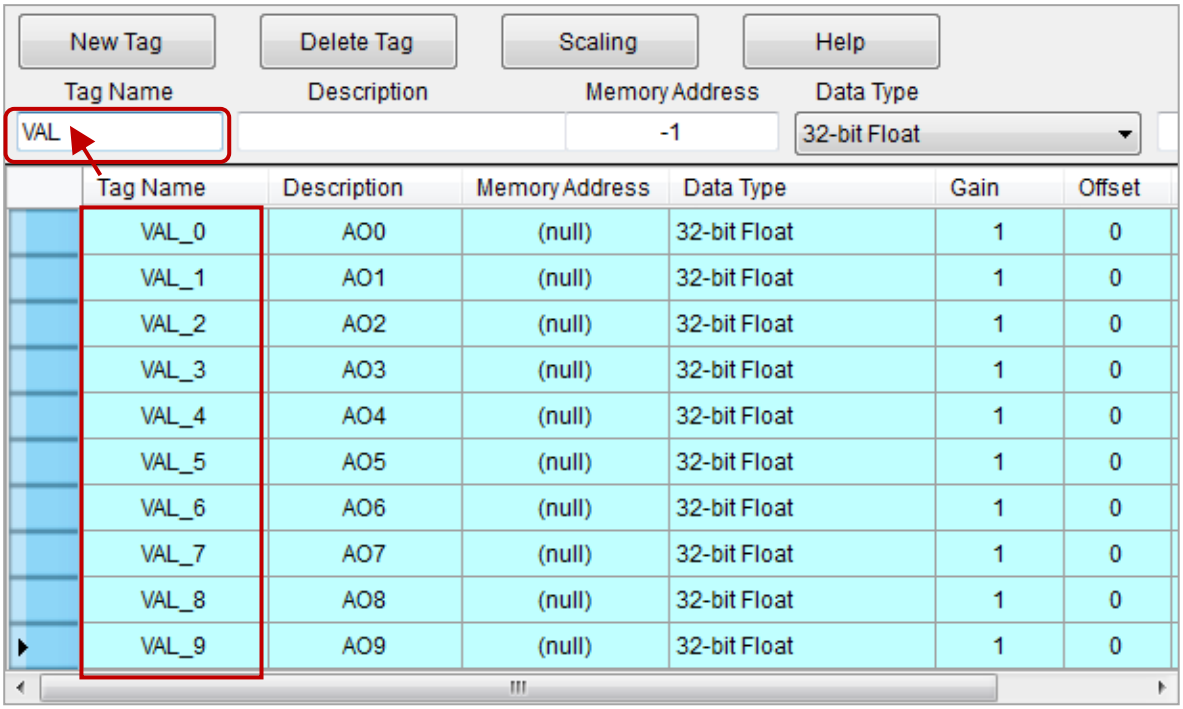
You can simultaneously edit the details of multiple tags by first selecting the first data row then holding the Shift key and clicking the last row to select all of the rows. You are then able to assign any of the data types (e.g., 32-bit Float) to all of the tags at the same time.



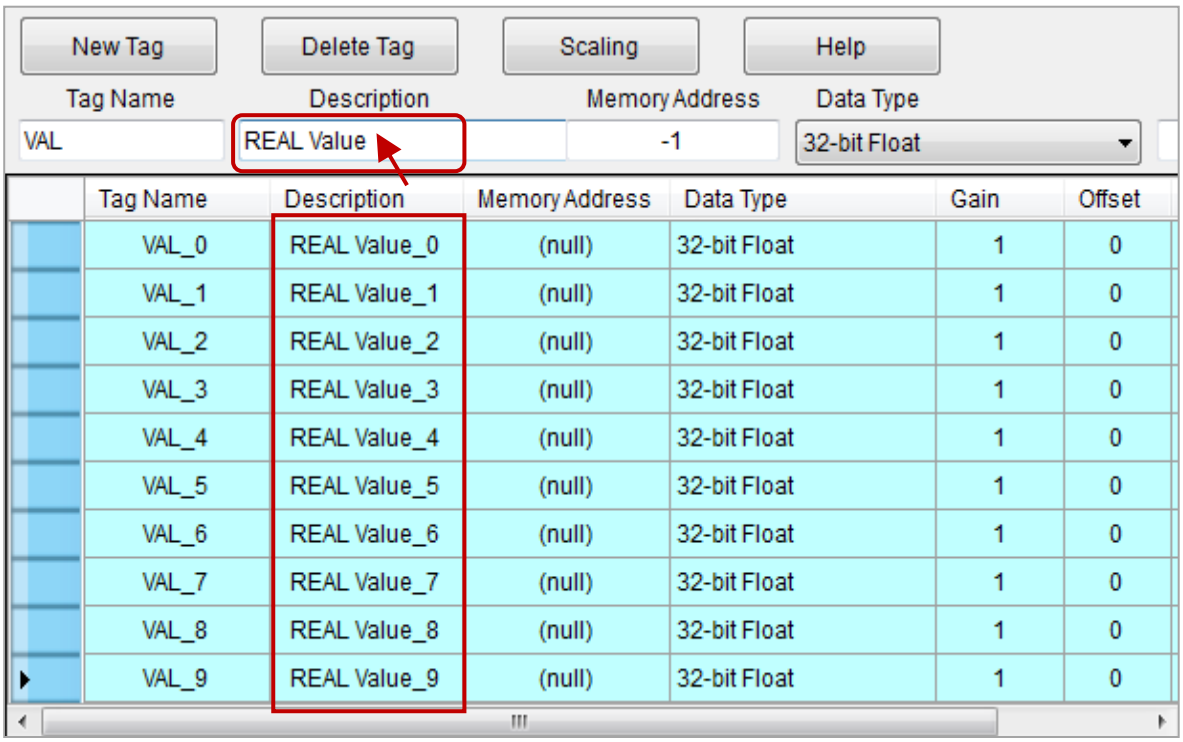
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You can also use the same approach to give a similar name or description to a range of tags by selecting them and entering the desired name in the “Tag Name” field, or by entering the desired description in the “Description” field.

Note that the numeric value in the “Tag Name” or the “Description” field generated based on the position of the tag in the list.



Tag Name	Description	Memory Address	Data Type	Gain	Offset
VAL_0	AO0	(null)	32-bit Float	1	0
VAL_1	AO1	(null)	32-bit Float	1	0
VAL_2	AO2	(null)	32-bit Float	1	0
VAL_3	AO3	(null)	32-bit Float	1	0
VAL_4	AO4	(null)	32-bit Float	1	0
VAL_5	AO5	(null)	32-bit Float	1	0
VAL_6	AO6	(null)	32-bit Float	1	0
VAL_7	AO7	(null)	32-bit Float	1	0
VAL_8	AO8	(null)	32-bit Float	1	0
VAL_9	AO9	(null)	32-bit Float	1	0



Tag Name	Description	Memory Address	Data Type	Gain	Offset
VAL_0	REAL Value_0	(null)	32-bit Float	1	0
VAL_1	REAL Value_1	(null)	32-bit Float	1	0
VAL_2	REAL Value_2	(null)	32-bit Float	1	0
VAL_3	REAL Value_3	(null)	32-bit Float	1	0
VAL_4	REAL Value_4	(null)	32-bit Float	1	0
VAL_5	REAL Value_5	(null)	32-bit Float	1	0
VAL_6	REAL Value_6	(null)	32-bit Float	1	0
VAL_7	REAL Value_7	(null)	32-bit Float	1	0
VAL_8	REAL Value_8	(null)	32-bit Float	1	0
VAL_9	REAL Value_9	(null)	32-bit Float	1	0

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2.9.3. Switching eLogger HMI Pages via the ISaGRAF Program

Creating the functionality that allows the user to navigate between HMI pages via the ISaGRAF program is easy to implement and will be described in detail below.

The ISaGRAF Settings:

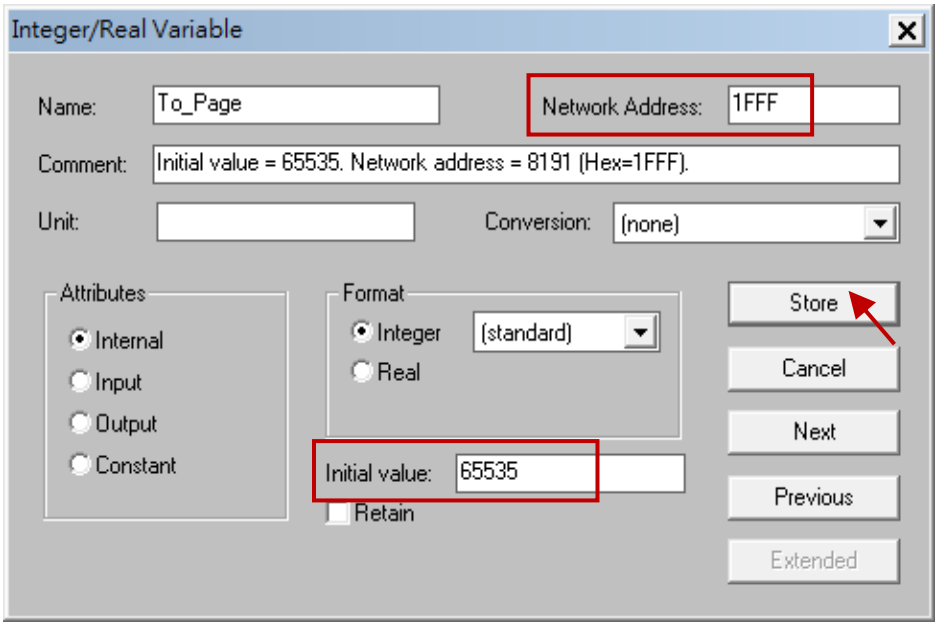
Declare two ISaGRAF variables, as described in the table below:

Name	Format	Attributes	Network Address	Description
To_Page	Integer	Internal	8191 (Hex = 1FFF)	This variable is used to switch between the eLogger HMI pages **Set the initial value to 65535**
Current_Page	Integer	Internal	8190 (Hex = 1FFE)	This variable is used to read the current page number

Note: This function is only supported in eLogger Runtime version 1.2.1.0 or later.

If the Network address of an integer variable, e.g., the "To_Page" variable, is set to **"8191"** (Hex = **1FFF**), it means that the variable value is used to switch to the specified page number. For example, if the "To_Page" variable is set to 5, the eLogger HMI will switch to Page 5, and then the value will be reset to 65535. However, if the "To_Page" variable set to a non-existent page number, the eLogger HMI will not switch to that page.

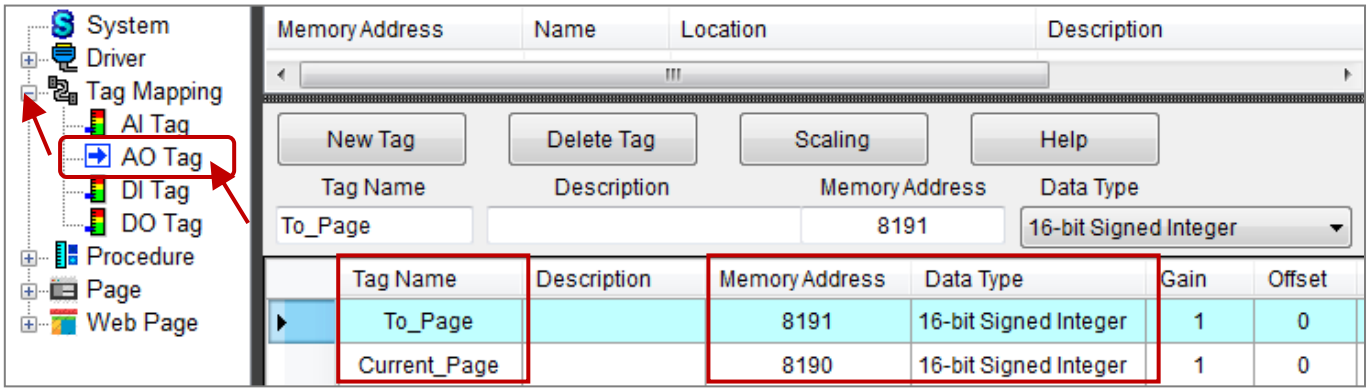
If the Network address of an integer variable, e.g., the "Current_Page" variable, is set to **"8190"** (Hex = **1FFE**), it means that the eLogger HMI will automatically update the variable value to that of the current page number. This value can be 0, 1, or 2, and so on.



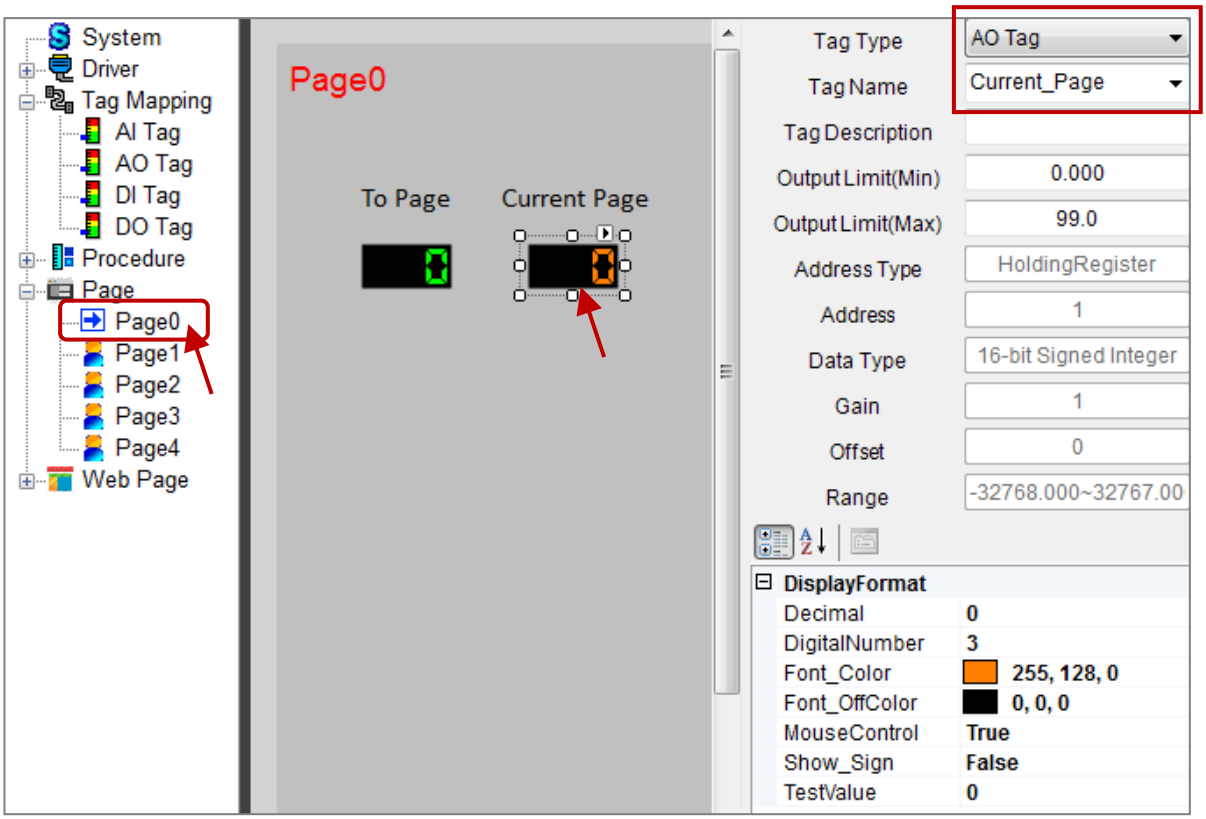
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The eLogger Settings:

We need to declare two AO tags called “To_Page” and “Current_Page”. To do this, expand the “Tag Mapping” section in the navigation pane and click the “AO Tag” item. In the “AO Tag” screen, click the “New Tag” button to open the “Add Tag” dialog box and add two new AO tags, as illustrated in the figure below. For more information related to eLogger tags, refer to Section 2.3 "Declaring the eLogger Tag".



Now add several additional pages and then configure them so they are similar to that shown in the figure below. Refer to Section 2.4 "Creating and editing an eLogger Page".



Finally, upload the ISaGRAF and eLogger projects to the PAC. See Section 1.7 and 2.6. To test that the project is functioning correctly, double-click the component (“To_Page”) to set a value on the HMI screen to verify that the HMI page switched to the specified page, and to verify that the current page number is in the “Current_Page” variable.

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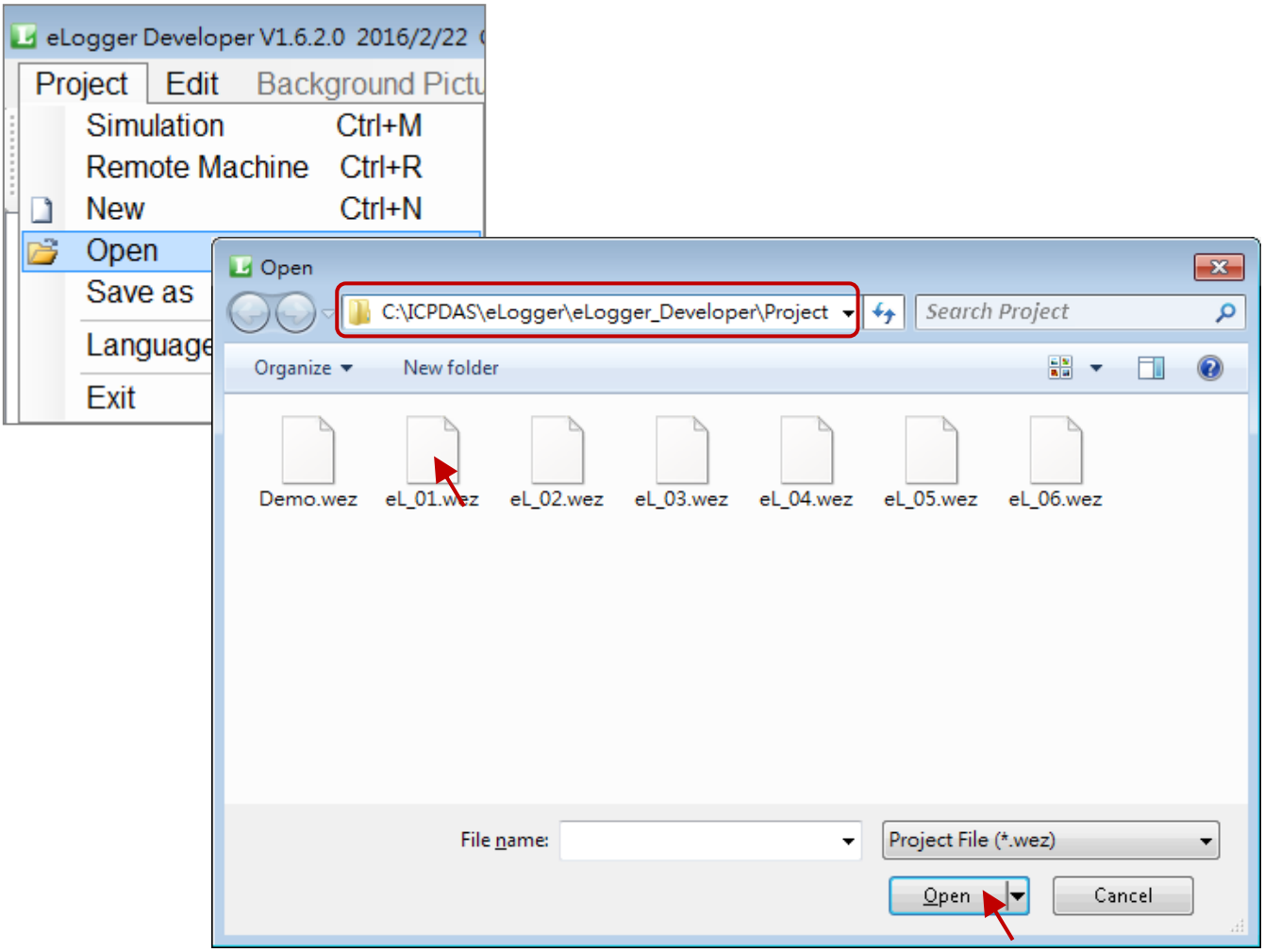
Chapter 3. Example Programs for eLogger and ISaGRAF

3.1. Downloading the eLogger and ISaGRAF Projects described in the this document

ICP DAS provides a zip file named “faq115_demo.zip” that contains all the projects described within this FAQ document. This file can be download from http://www.icpdas.com/web/product/download/software/development_tool/isagraf/document/faq/faq115_demo.zip

3.1.1. Open an eLogger Project

To open an existing eLogger project, unzip the download file and copy all the .wez files, i.e., eL_01.wez to eL_06.wez, to the **C:\ICPDAS\eLogger\eLogger_Developer\Project** folder on the Host PC, or any location you installed the eLogger HMI. Launch the eLogger Developer application, and then click the “Open” item in the "Project” menu to open the file.

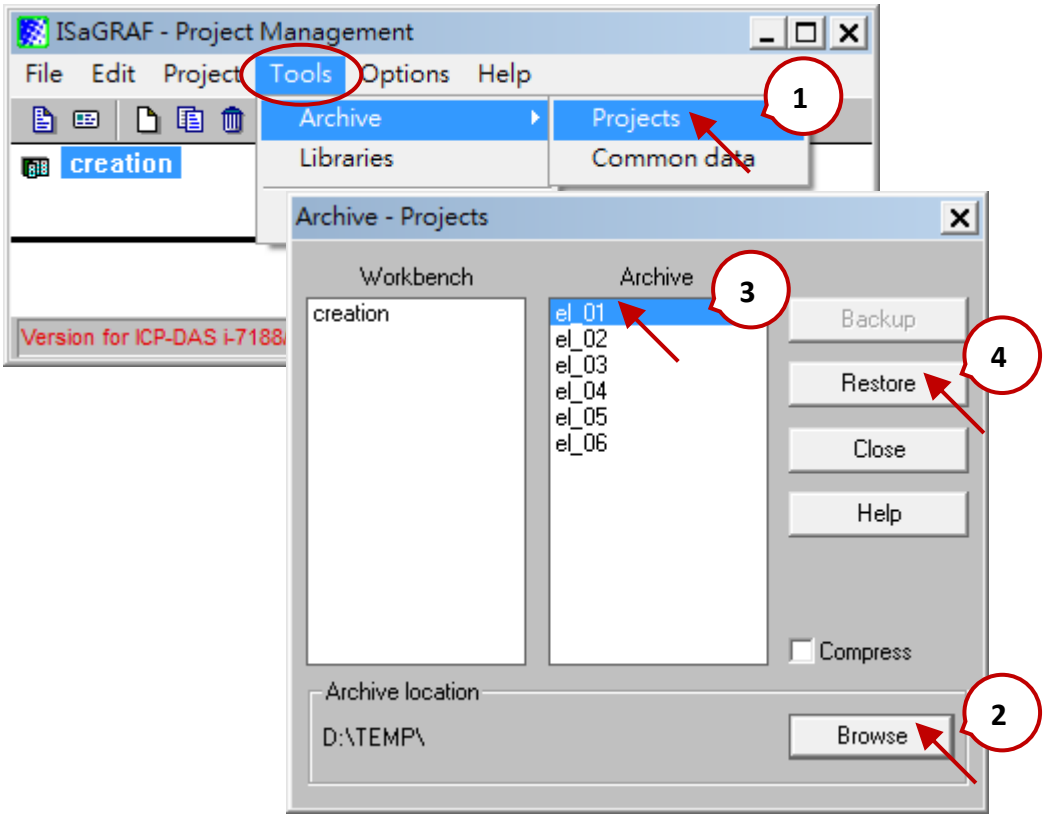


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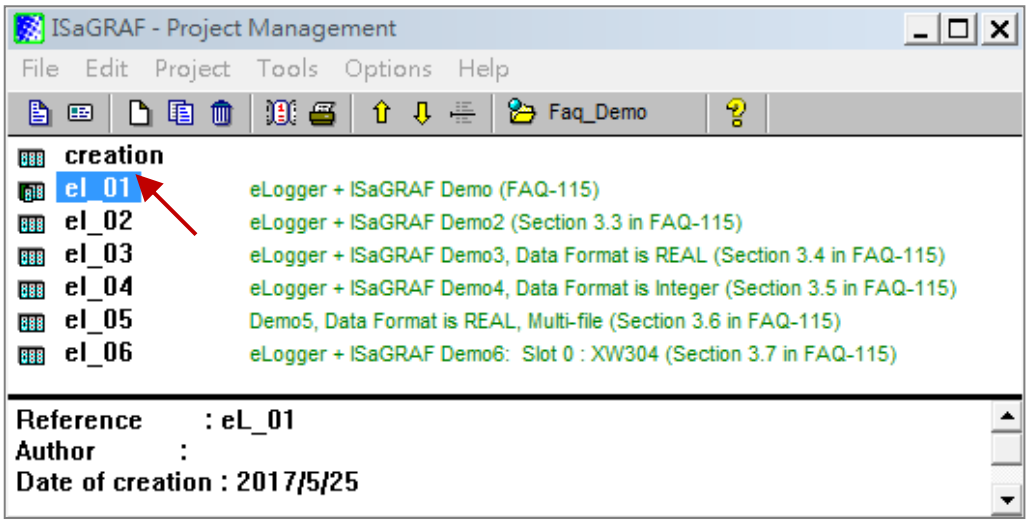
3.1.2. Open an ISaGRAF Project

To open an existing ISaGRAF project, unzip the download file and copy all .pia files, i.e., eL_01.pia to eL_06.pia, to any location on the Host PC, e.g., D:\TEMP\. Launch the ISaGRAF software and click the "Projects" item in the "Archive" option of the "Tools" menu to open the "Projects" dialog box.

Click the "Browse" button to locate files and click the desired project name(s) in the Archive panel of the Projects dialog to select them, and then click the "Restore" button to restore the project(s).



In the ISaGRAF Project Management window, double-click the name of the project to open the project.



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3.2. How to use the eLogger Web HMI

The eLogger Developer software allows you to design web-based HMI pages, set the username and password for the login web page, or import or export an existing web page. After downloading the eLogger project to the PAC, you can log into the web-based HMI page via a regular web browser, such as Google Chrome, Internet Explorer, Firefox, Safari, or Opera, etc., allowing you to control the device remotely.

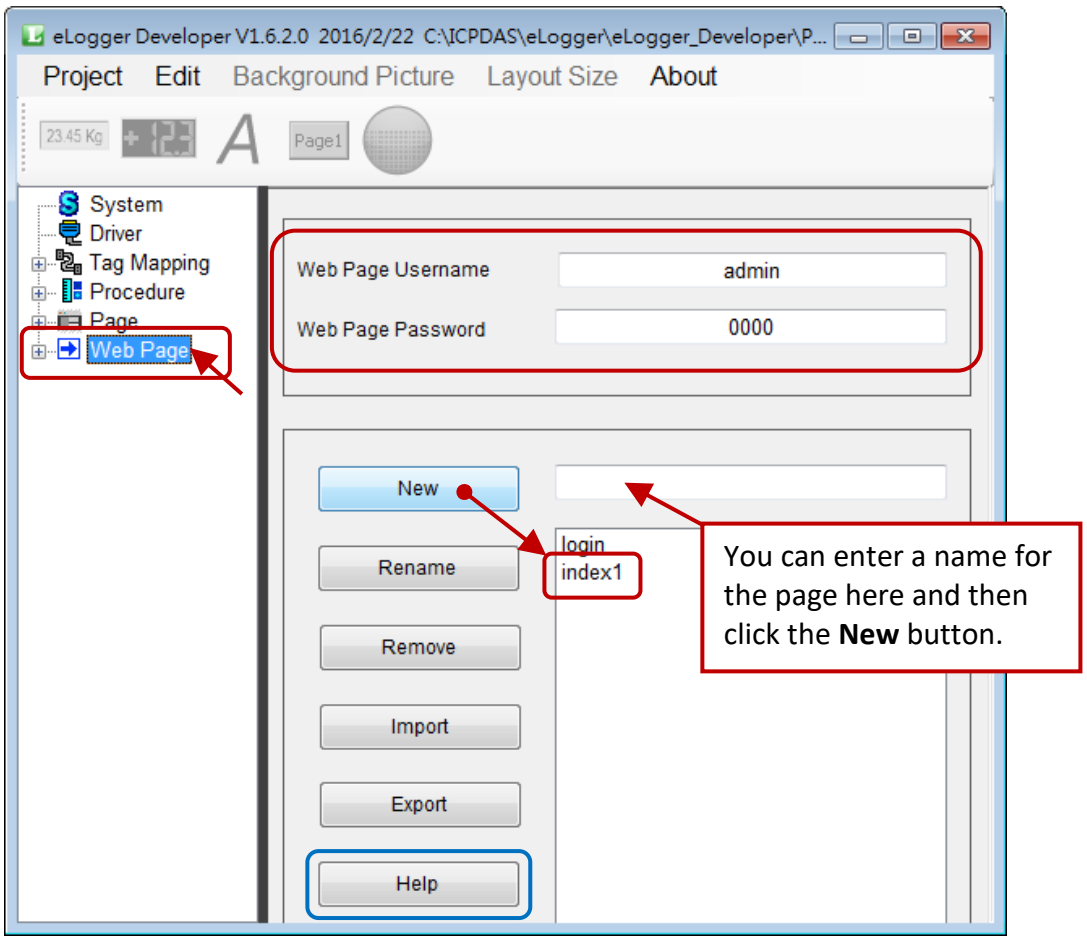
In this example, we will use the following project files:

ISaGRAF Project File: eL_01.pia

eLogger Project File: eL_01.wez, eL_01.wp

We will create two web pages called **login** (the default page) and **index1.** To add a new page, click the **Web Page** item in the navigation panel and then click the “New” button to create a new page. Alternatively, you can create a new page with a specific name by entering the name in the text field and clicking the “New” button.

If desired, enter a name for the page by clicking the “Rename” button and entering the preferred name. This dialog also allows you to create a login username and password if required, as well as import or export specific web pages, refer to the eLogger user manual for more details by clicking the “Help” button.

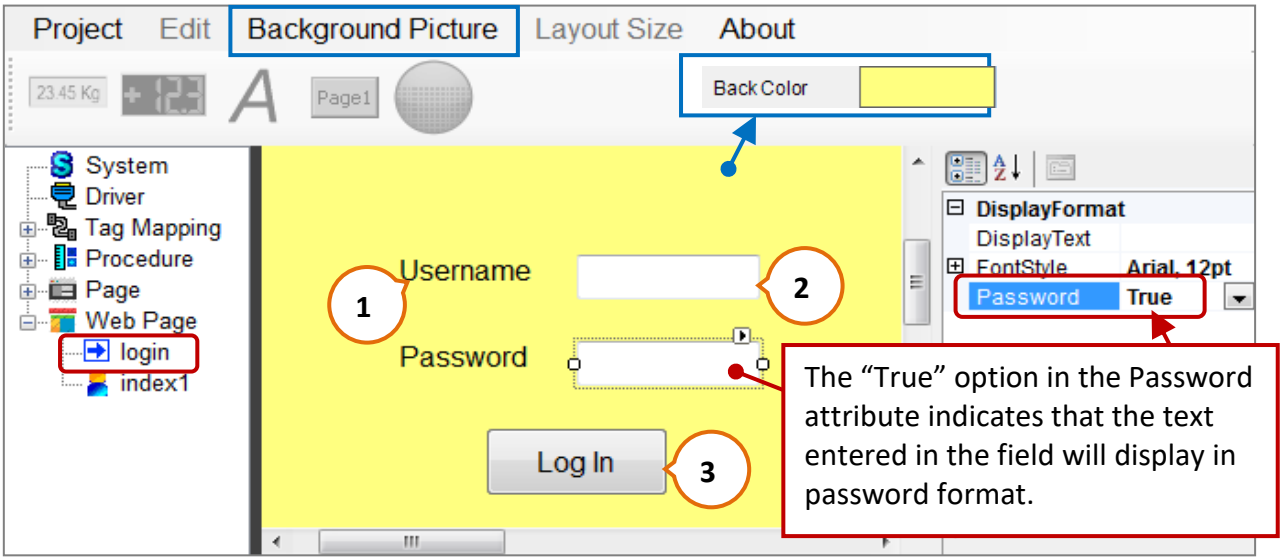


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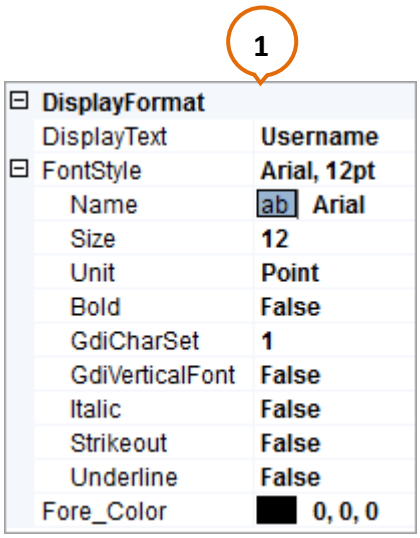
3.2.1. Editing the Login Web Page

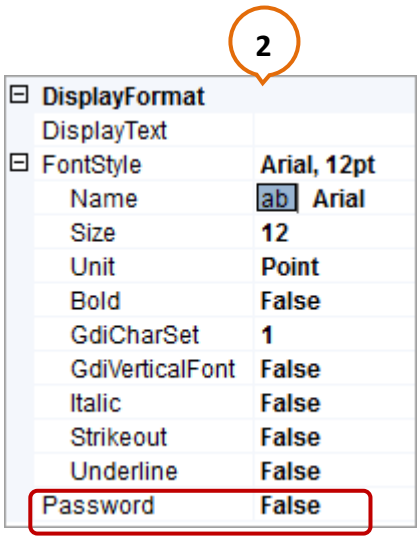
The eLogger Developer software provides a login web page by default, however, you CAN NOT add or remove any components to or from this page, although you are able to modify them where necessary. In addition, you can set the background color by clicking on the page and choosing a desired color from the color options, or add a background image to the web page by clicking the “Background Picture” option from the menu.

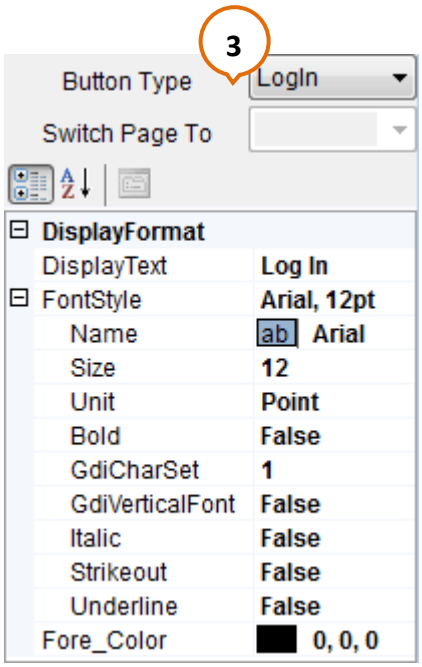
Note that the background image will be upload to the “WebBackPic” folder that is located in the root HTTP directory on the PAC. See Section 2.1.2 to verify the HTTP path in the Network Settings tab of the PAC Utility.



The Login web page contains two label components, two textbox components, and a button component. To configure an individual component, click the component to display the related attribute window and then modify the properties where necessary.





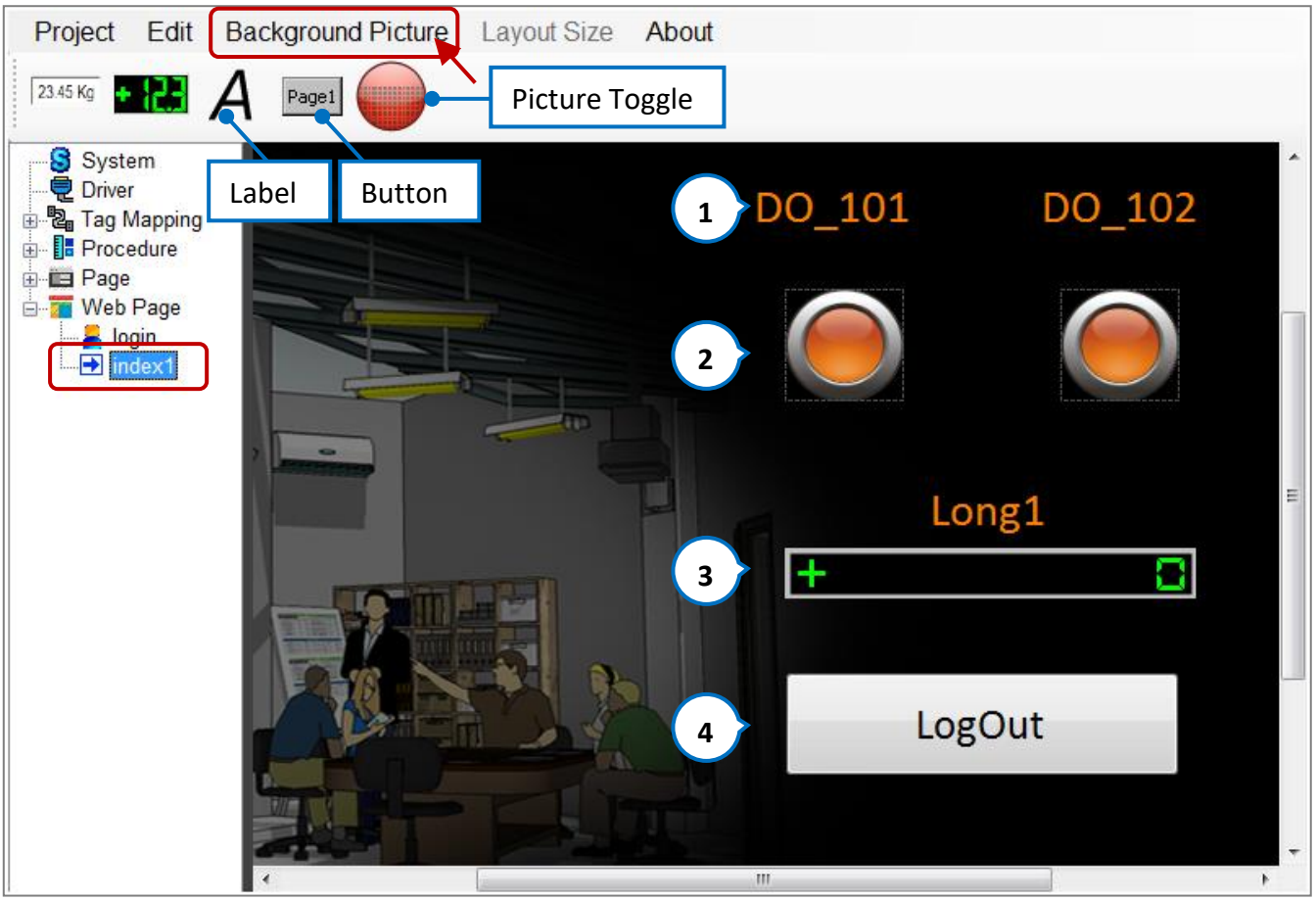


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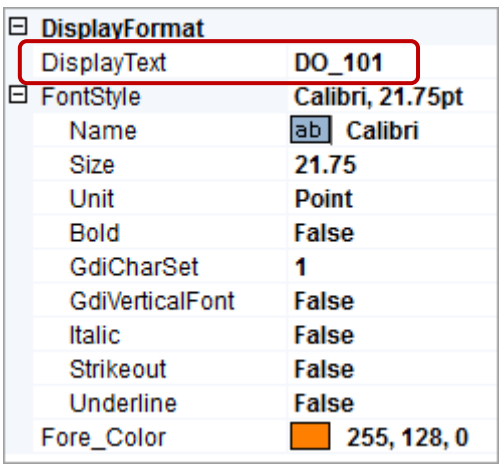
3.2.2. Designing an eLogger Web Page

In Section 2.4, we described how to design a local HMI page. The following is a description of how to create a Web–based HMI page, together with details of how to remote control the components on the page via a standard web browser.

First, add a background image to the web page by clicking the “Background Picture” option from the menu. Note that the background image will be stored in the “WebBackPic” folder that is located in the root HTTP directory.



The following is a description of all the components that used on the eLogger web page - index1.



1) Label:

There are three Label components on this web page (i.e., DO_101, DO_102, and Long1), which are used to describe the purpose of the components.

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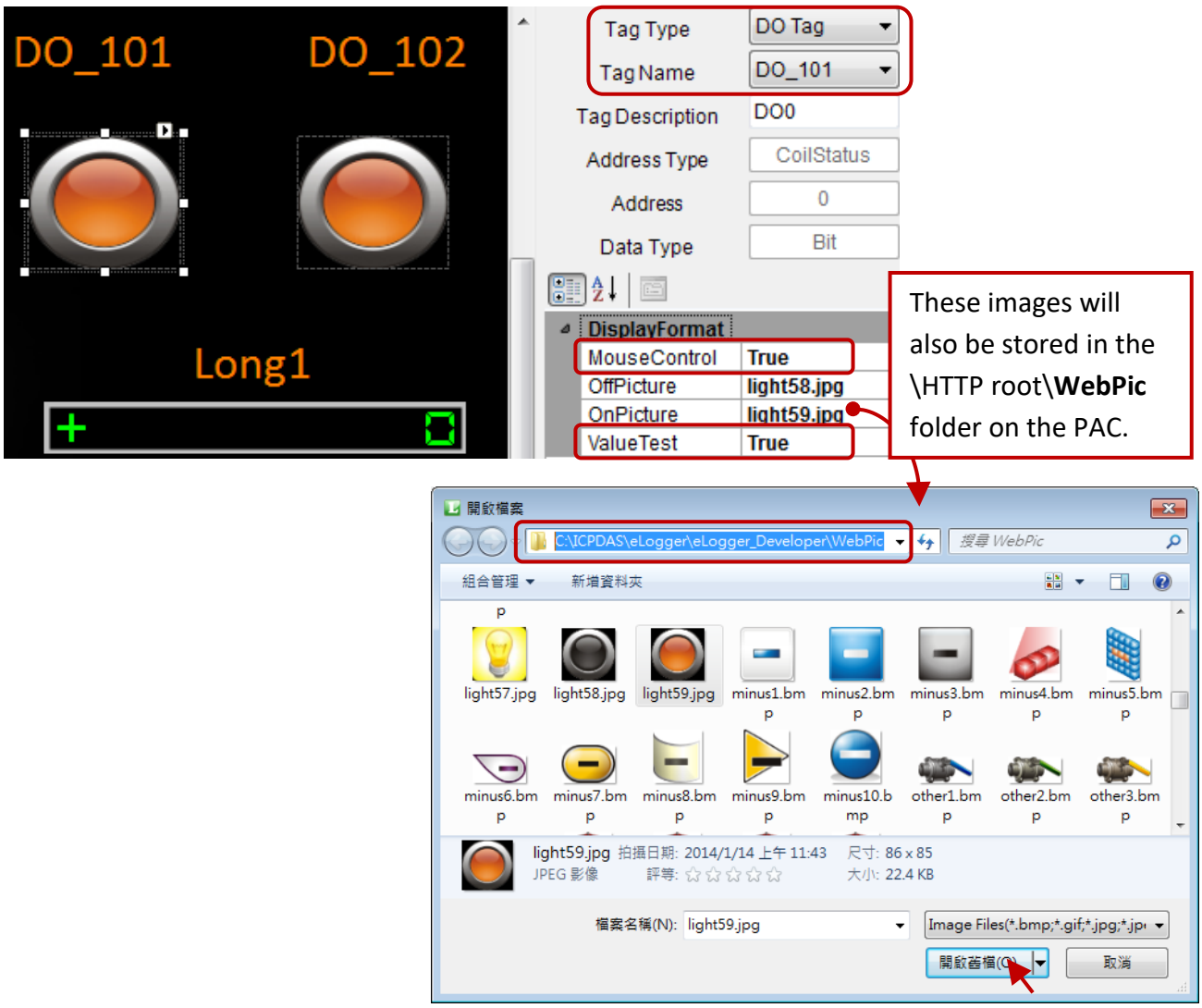
2) Picture Toggle:

Two Picture Toggle components are used to display or control the state of the DO tags (i.e., DO_101 and DO_102). Configure these components as illustrated in the figure below.

MouseControl: When this attribute is set to “True”, it means that the component can read/write data to/from the DO tag.
When set to “False”, it means that data can only read.

Off/OnPicture: This attribute used to select the image to display when the state of the DO tag is set to OFF or ON. Note that the default images are stored in the C:\ICPDAS\eLogger\eLogger_Developer**WebPic** folder.

ValueTest: Set this attribute to “True” to view the ON image; set it to “False” to view the OFF image.

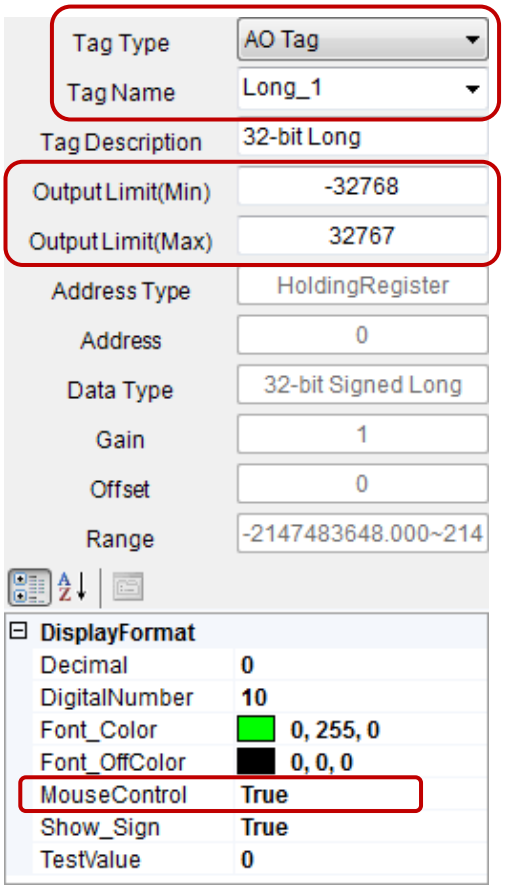


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3) Seven Segment:

The page contains a single Seven Segment component that is used to display or write the value of the AO tag (i.e., Long_1).





Configure this component as illustrated in the figure:

Output Limit (Min/Max):

These attributes used to specify the maximum and minimum values for the output range. Set these values to -32768 and 32767, respectively.

Decimal:

This attribute used to determine the number of decimal places to use. Set this value to “0”.

DigitalNumber:

This attribute used to specify the number of digits to display. Set this value to “10”.

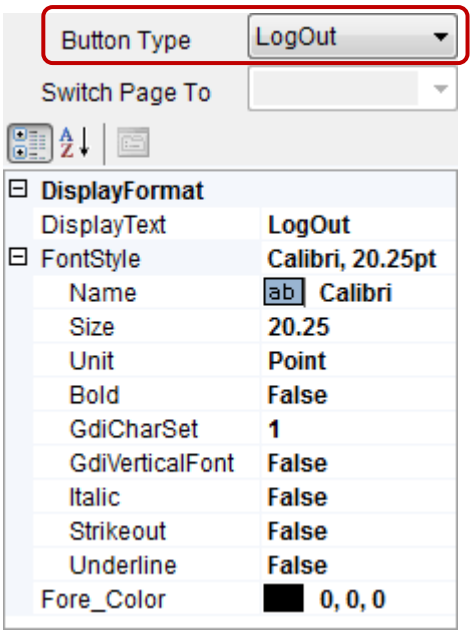
MouseControl:

When this attribute is set to “True”, indicates that the component can read/write the value to/from the AO tag.

4) Button:

The page contains a single Button component to allow users to log out from the page.



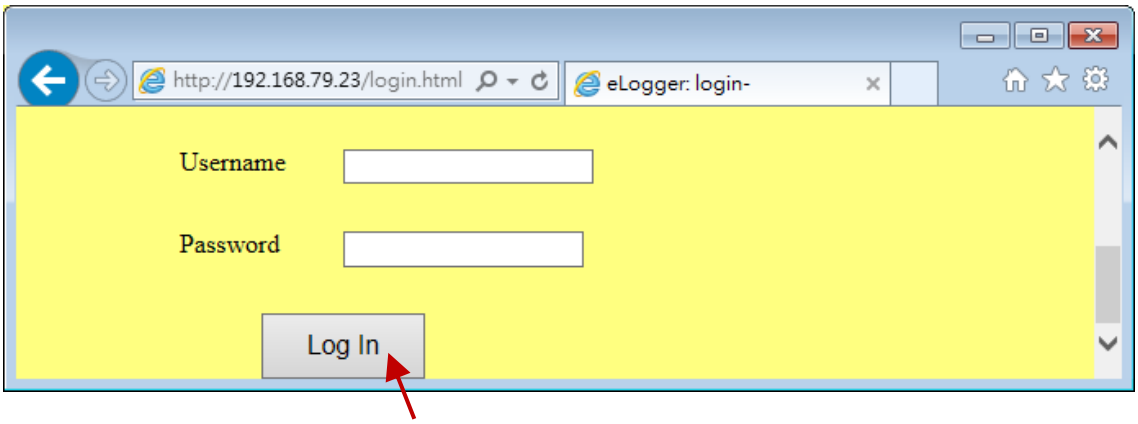


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3.2.3. Testing the eLogger Web HMI

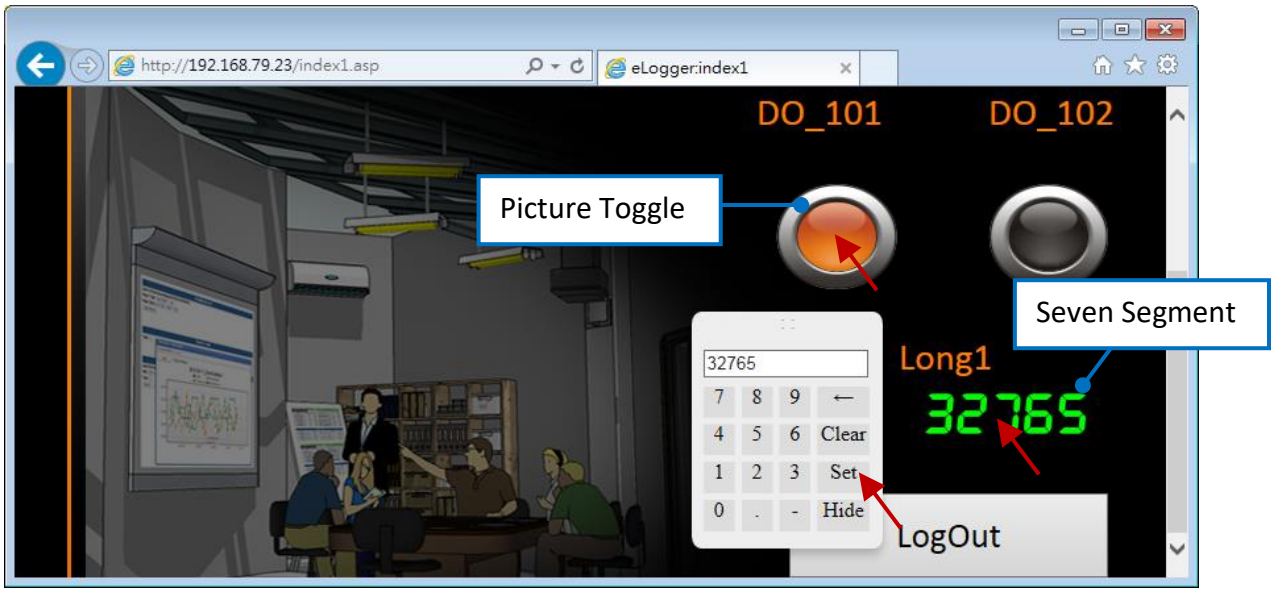
Before testing the web page, make sure that you have uploaded both the ISaGRAF project (eL_01.pia, see Section 1.7 “Uploading the ISaGRAF Project”) and the eLogger project (eL_01.wez, see Section 2.6 “Uploading the eLogger Project”) to the PAC. In addition, the web folders install, see Section 2.1.2.

1. Open a web browser on the Host PC and enter the IP address of the PAC (e.g., 192.168.79.23) in the address bar. When requested, enter the username and password (default is admin/0000) and click the Log in button to log into the web page.



2. Click the Picture Toggle component to set the state of the DO tag to ON or OFF. Also, click the Seven Segment component to enter a value in the “Value Entry” dialog box, and click the “Set” button to change the value of the AO tag.

3. Click the LogOut button to log out the web page.



Note: Before testing the HMI using a negative value, you must first assign a negative value to the Long_1 variable on the **local** HMI page to avoid an error occurring on the digit display.

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3.3. Configuring a Control Button that can be instantly turned ON and then OFF

In this example, we will use the following project files:

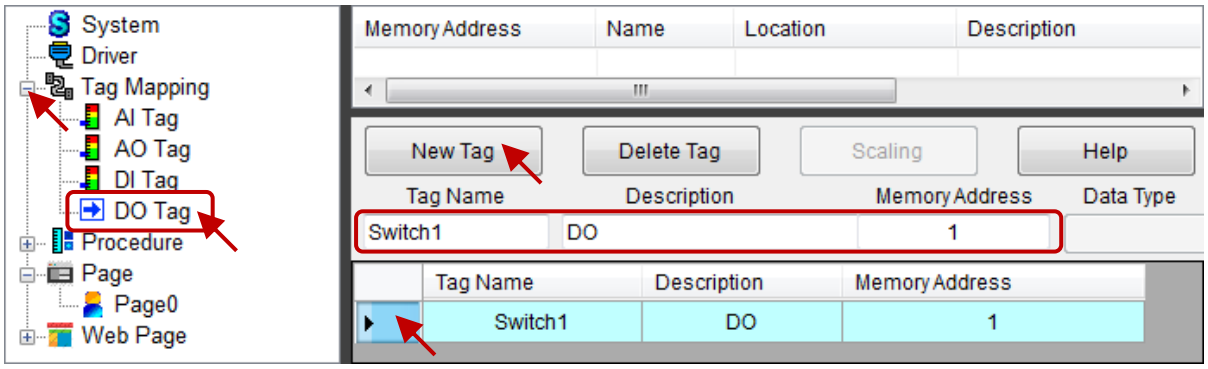
The ISaGRAF Project File: eL_02. pia

The eLogger Project File: eL_02.wez

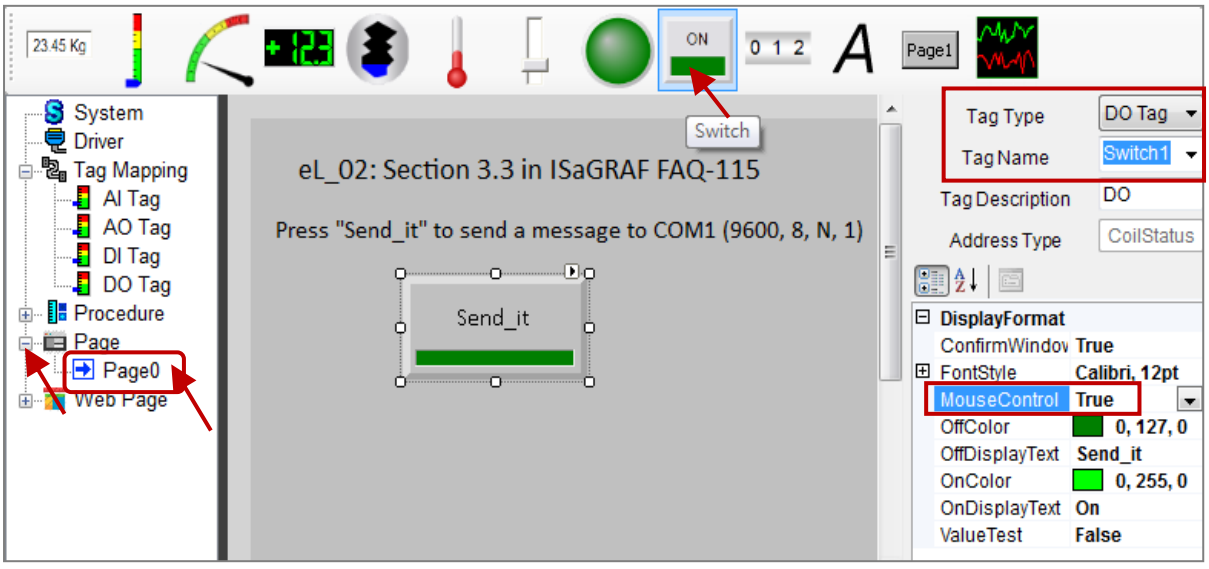
In this example, when you click the Switch component and set it to ON, the ISaGRAF program will send a message that contains the current date and time on the PAC via the COM1 (RS-232) port on the WP-5147-OD. The HyperTerminal utility may launch on the Host PC or be downloaded from the web. In the utility, open an RS-232 port (9600, 8, N, 1) to receive this message. In addition, the state of the “Switch” on the eLogger screen will automatically reset to OFF by the ISaGRAF program.

3.3.1. The Developer Settings in eLogger

Add a new DO tag by expanding the “Tag Mapping” section in the navigation pane and then clicking the “DO Tag” item. In the “DO Tag” screen, click the “New Tag” button to add the new tag. Enter the name “Switch1” and set the memory address to 1. For more information related to eLogger tags, refer to Section 2.3 "Declaring the eLogger Tag".



Expand the “Page” item in the navigation pane, and click the entry for “Page0”. Add a “Switch” component to Page0 and configure it using the values illustrated in the figure below.



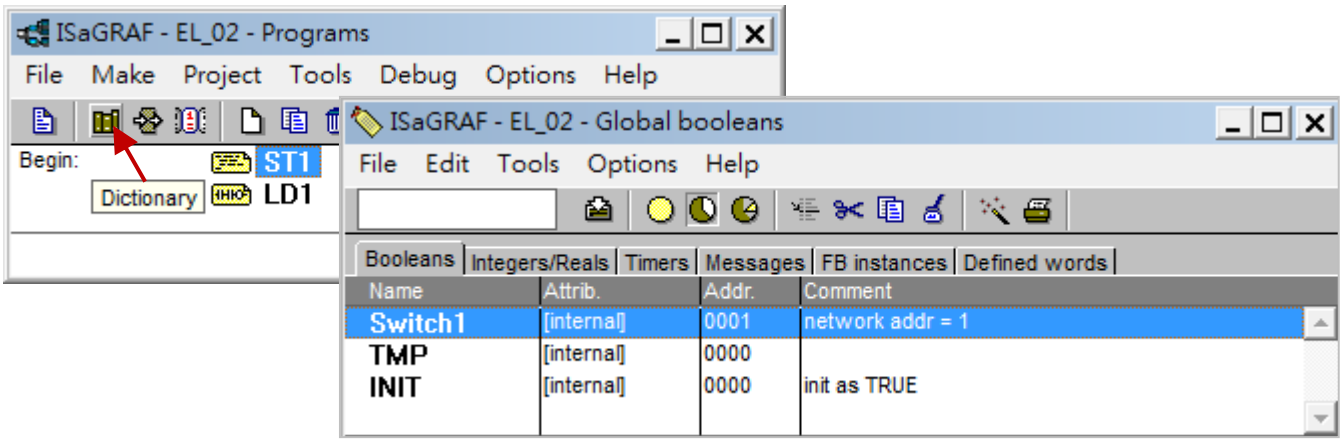
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3.3.2. The ISaGRAF Settings

Before we can begin creating our project, we must first declare the required project variables. See Section 1.2 Declaring the ISaGRAF Project Variables if you are not familiar with this example, we will use the following ISaGRAF variables.

Name	Format	Attributes	Network Address	Description
Switch1	Boolean	Internal	1	This variable is used to access the eLogger Switch
TMP	Boolean	Internal	0	This variable is used to check the COM port is sucessfully be opened TRUE: OK ; FALSE: Failured
INIT	Boolean	Internal	0	Set the Init. value to TRUE and then set it to FALSE to do the COMOPEN() function once at the first scan cycle
STR1	Message	Internal	0	This variable is used to save the date and time in a string format. Set the maximum length of the STR1 to 64
Year1	Integer	Internal	0	These variables are used to read the current date and time on the PAC
Month1	Integer	Internal	0	
Day1	Integer	Internal	0	
WeekDay1	Integer	Internal	0	
Hour1	Integer	Internal	0	
Minute1	Integer	Internal	0	
Second1	Integer	Internal	0	

You can declare or view variables in the variable declaration window by clicking the “Dictionary” button.



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Program - ST1:
When the Switch component is set to TRUE on the eLogger HMI, the program will send a message that contains the current date and time on the PAC via the COM1 port.

```
(* Open COM1 using the default values 9600,8,N,1. In the first scan cycle, "INIT" must declar with an
initial value of True *)

if   INIT   then
     INIT := False ;      (* This only needs to be done once during the first scan cycle *)
     TMP := COMOPEN( 1 , 9600 , 8 , 0 , 1 ) ;
end_if ;

(* If "Switch1" is set to be True in eLogger, send a message to COM1 *)
if   switch1   then

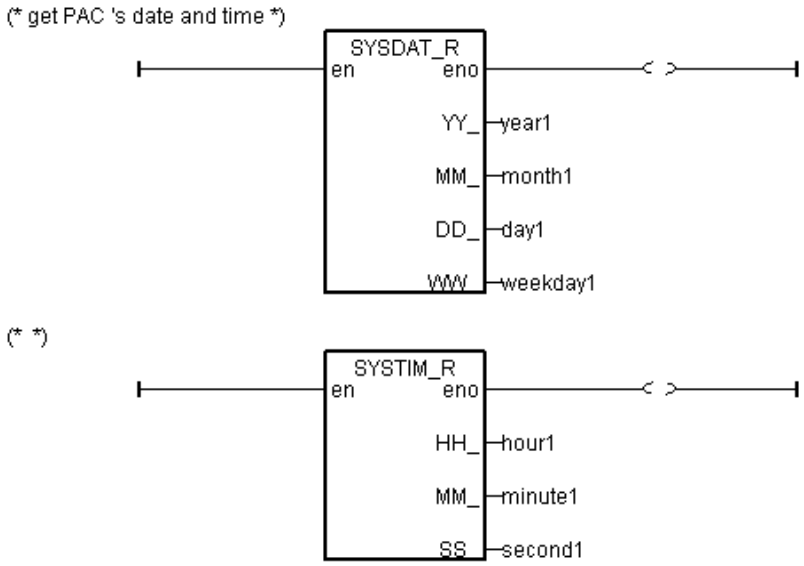
   (* Convert the date and time to a string, such as 'Jun/08/2017,13:25:45' *)
   str1 := time_str( year1 , month1 , day1 , weekday1 , hour1 , minute1 , second1 ) ;
   str1 := str1 + MSG('$0D$0A') ;    (* Add <CR><LF> to the end of the string *)

   (* Send the message to COM1 *)
   TMP := COMSTR_W( 1 , str1 ) ;

   switch1 := False ;    (* Reset Switch1 when finished *)

end_if ;
```

Program - LD1:
Using the SYSDAT_R and SYSTIM_R functions to read the system date and time of the PAC.



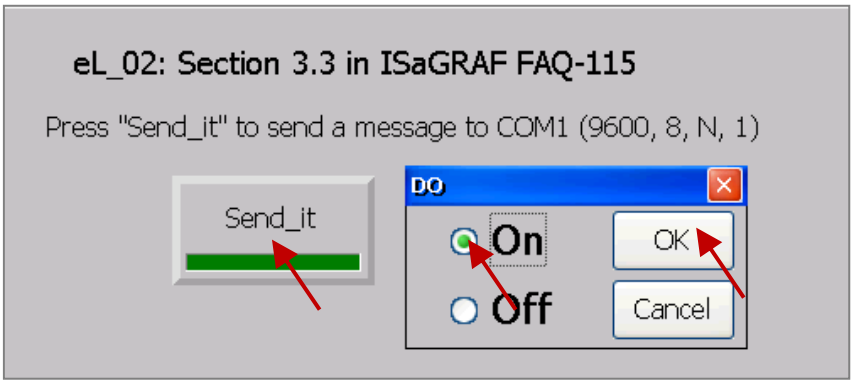
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3.3.3. Testing the "eL_02" Project

Connect an RS-232 cable from the COM1 port on the WP-5147-OD to an RS-232 port on the Host PC. Power on the PAC and launch the HyperTerminal utility to open the RS-232 port using the default values of "9600, 8, N, 1". Note that the HyperTerminal does not exist on Windows after Windows 7 so you can also download it or other software such as PuTTY or PieTTY or Tera Term on the web.

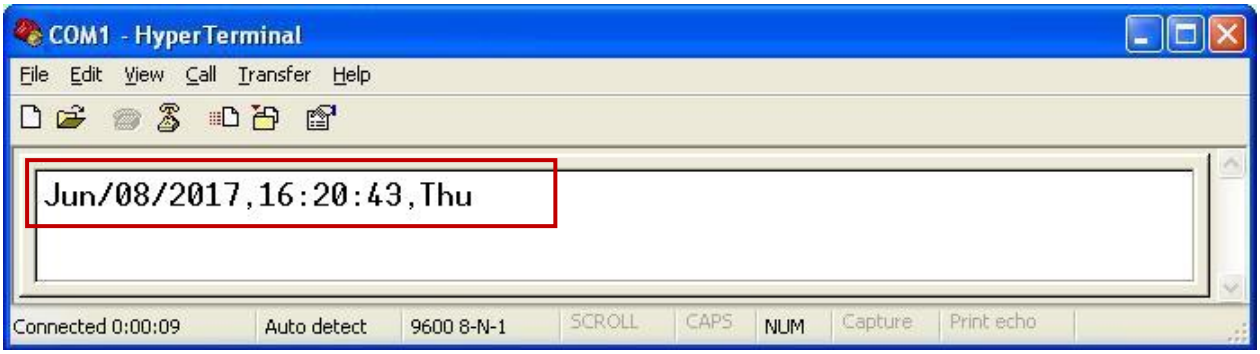
PAC - eLogger HMI screen:

To send a message via the COM1 port, first click the "Send_it" button on the eLogger HMI screen. In the "DO" dialog box, click the "ON" radio button and then click the OK button.



PC – HyperTerminal (9600, 8, N, 1):

Then, you can see the system time of the PAC is display on the HyperTerminal screen.



Note: After uploading a modified ISaGRAF project to the PAC, you should execute the Remote Machine function in the eLogger Developer application to terminate the eLogger project and then launch the project again. See Section 2.6 "Uploading the eLogger Project" for more details.

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3.4. Reading/Saving the Process Parameters from/to a File (Data Format: REAL)

In this example, we will use the following project files:

The ISaGRAF Project File: eL_03. pia
The eLogger Project File: eL_03.wez

This example provides 20 process parameters that enter into the eLogger HMI screen for the WP-5147-OD. These values will be stored in the **Working_Real.txt** file that saved in the **\System_Disk\ folder.** Note that you should ensure this file is using ANSI encoding. The **Working_Real.txt** file contains two rows, and each row contains ten REAL values, as illustrated below:

23, 65.9, 0.12, 5.87, 88.2, 0.34, 8.5, -2.08, 4.08, 5.32
2, -7, 666.8, 456.07, 1.01, 5, 6, 7, 8, 9

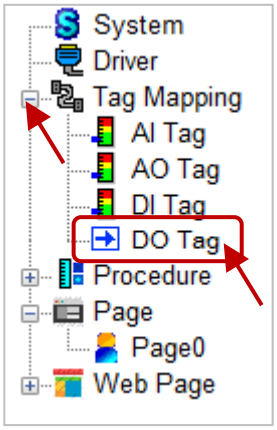
We will create 20 Seven Segment components on the eLogger HMI screen to display the operating parameters, and another 20 Seven Segment components to display the parameters or to allow the user to input new values for the parameters. In addition, we will add three Switch components that can be used to re-load the parameters or to restore them from a file, as well as a Switch that can be used to display whether the data was successfully read or not.

Components	Quantity	Settings
Seven Segment (01-20)	20	Address: 101, 103, 105, ..., 139 MouseContrl: FALSE (Read-only)
Seven Segment (21-40)	20	Address: 201, 203, 205, ..., 239 MouseContrl: TRUE (Read/write)
Switch	3	Address: 1, 2, 3

3.4.1. The eLogger Developer Settings

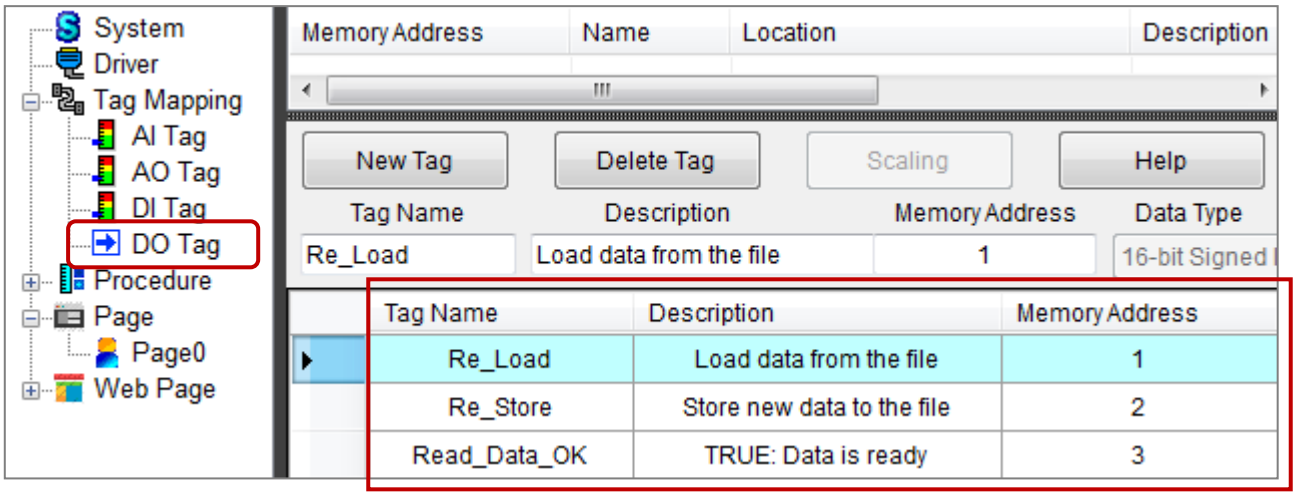
DO Tag:

Add a new DO tag by expanding the “Tag Mapping” section in the navigation pane and then clicking the “DO Tag” item. In the “DO Tag” screen, click the “New Tag” button to add the new tag. Enter the name “Re_Load” and set the memory address to 1. For more information related to eLogger tags, refer to Section 2.3 "Declaring the eLogger Tag".



Repeat this process to add the “Re_Store” tag and the “Read_Data_OK.

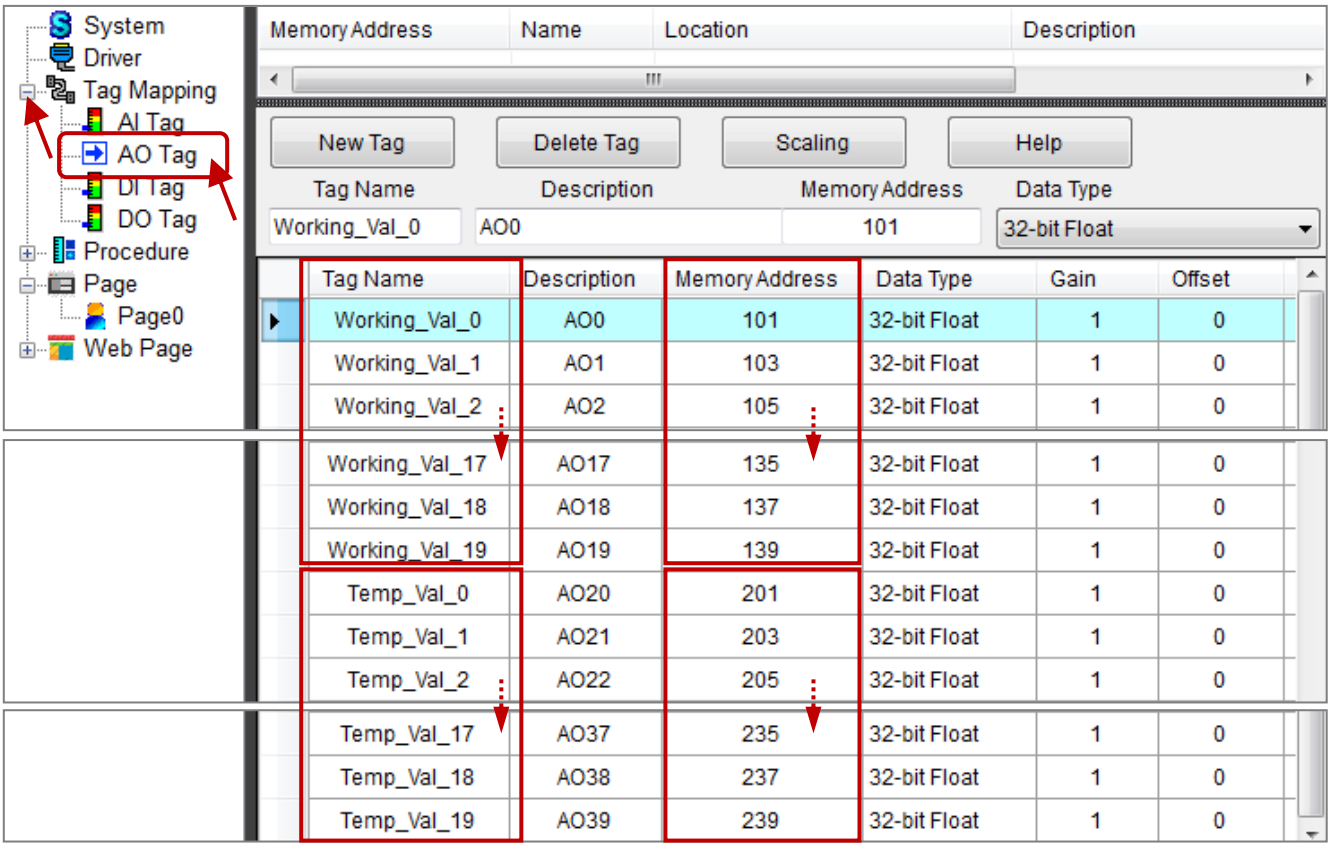
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AO Tag:

Expand the “Tag Mapping” section in the navigation pane and click the “AO Tag” item. In the “AO Tag” screen, click the “New Tag” button to open the “Add Tag” dialog box and add 20 new AO tags, as illustrated in the figure below. Refer to Section 2.3 "Declaring the eLogger Tag".

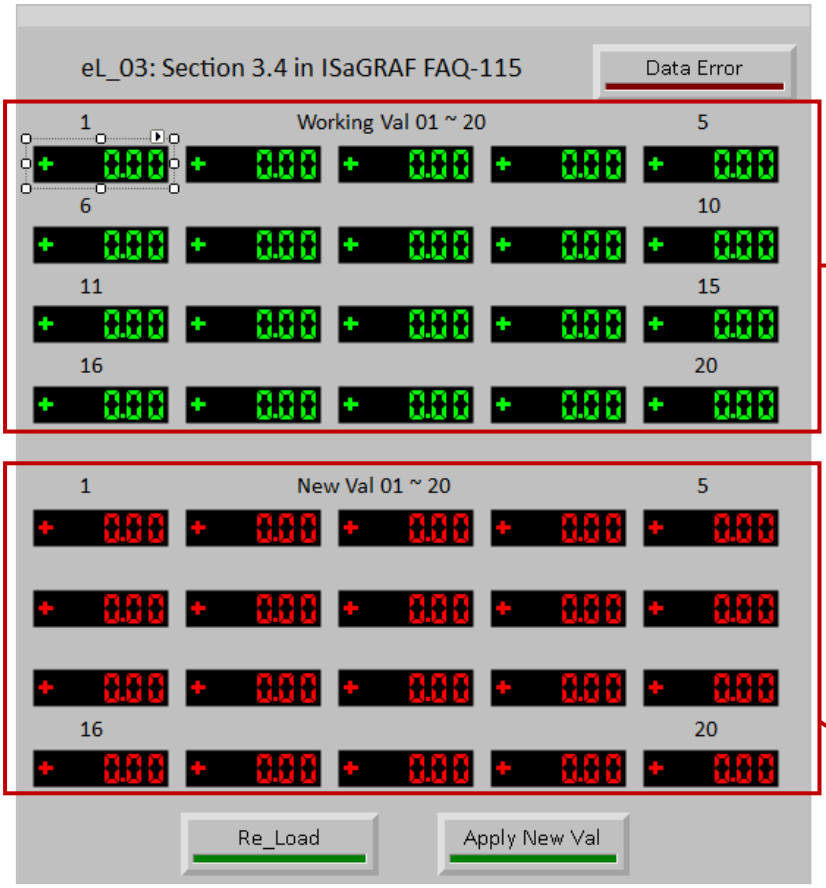
Once the tags have been created, select the rows from Working_Val_0 to Working_Val_19, and set the 1st Memory Address to “101”. The intermediate addresses will automatically add to the respective tags. Next, select the rows from Temp_Val_0 to Temp_Val_19, and set the 1st address to “201”. Again, the intermediate addresses will automatically add.

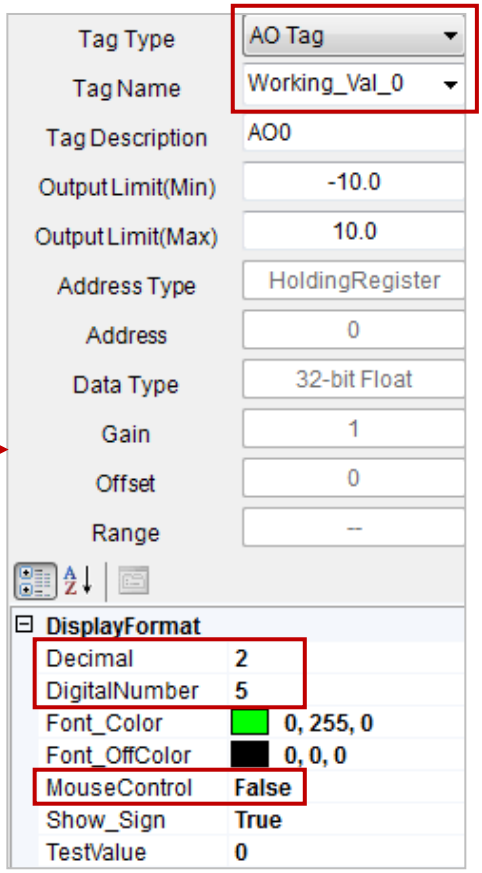


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Page0:

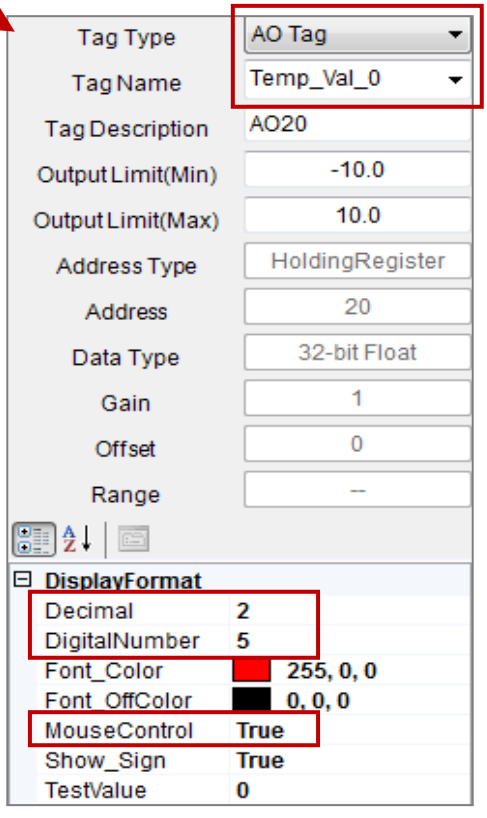
The upper 20 Seven Segment components on the eLogger HMI screen is to display the operating parameters. In this case, using the variable from Working_Val_0 to Working_Val_19.





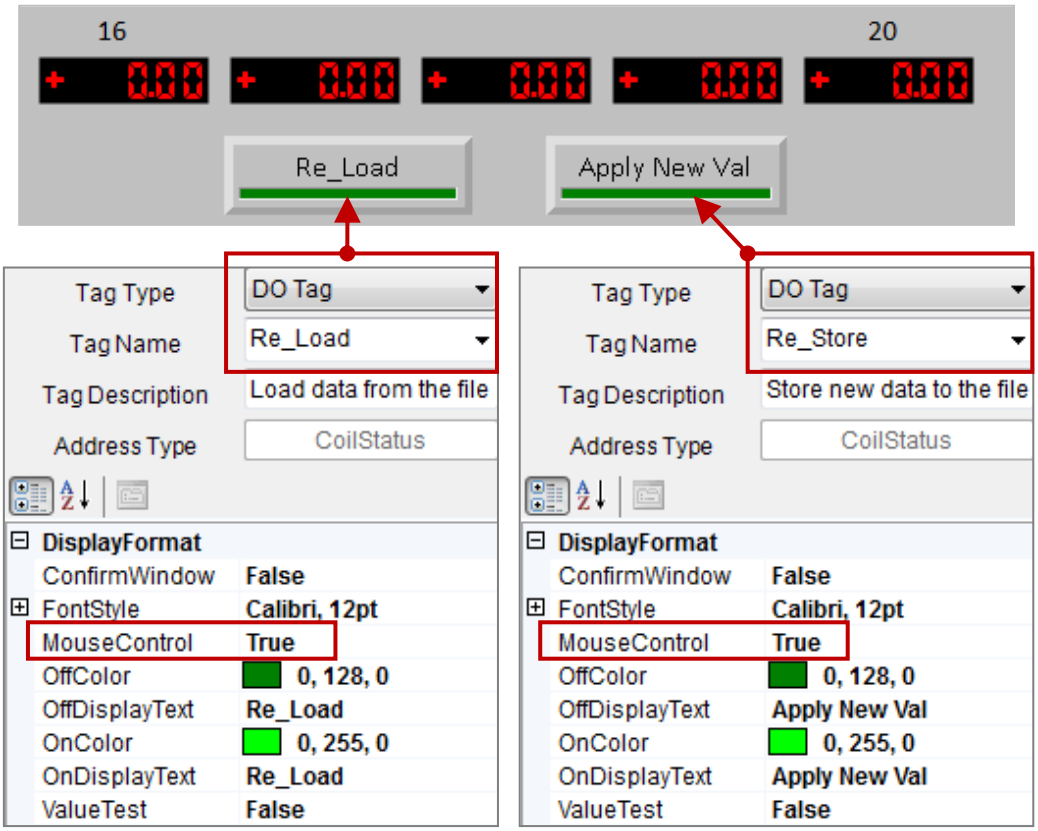
Another 20 Seven Segment components is to display the parameters or to allow the user to input new values for the parameters. In this case, using the variable from Temp_Val_0 to Temp_Val_19.

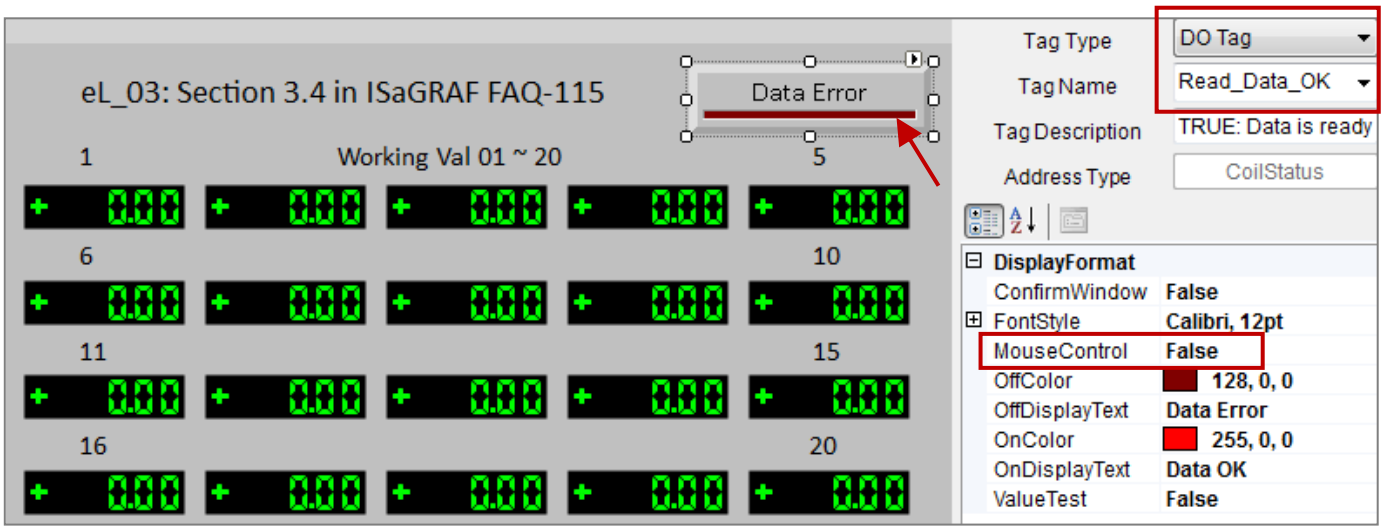
Configure these components as illustrated in the figure.



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In addition, we will add three Switch components that can be used to re-load the parameters or to restore them from a file, as well as a Switch that can be used to display whether the data was successfully read or not. Configure these components as illustrated in the figure below.





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3.4.2. The ISaGRAF Settings

Before we can begin creating our project, we must first declare the required project variables. See Section 1.2 Declaring the ISaGRAF Project Variables if you are not familiar. In this example, we will use the following ISaGRAF variables.

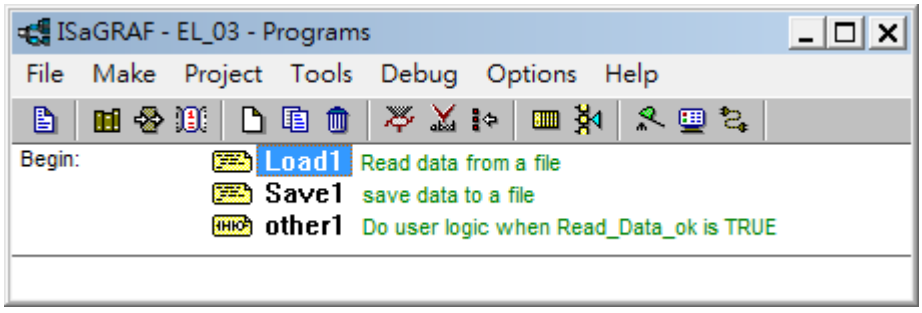
Name	Format	Attributes	Network Address	Description
TMP	Boolean	Internal	0	
RE_LOAD	Boolean	Internal	1	Set this variable to TRUE to re-load a File
RE_Store	Boolean	Internal	2	Set this variable to TRUE to store a File
INIT	Boolean	Internal	0	Declare the initial value as TRUE
Read_Data_OK	Boolean	Internal	3	True: data is ok, False: Data error
Msg1	Message	Internal	0	This variable is used to set the maximum length of the message to 128 characters
str1	Message	Internal	0	This variable is used to set the maximum length of the string to 255 characters
TMP_file_name	Message	Internal	0	This variable is used to set the maximum length of the temporary file name to 128 characters
File1	Integer	Internal	0	This variable is used to temporarily save the status of the .txt file that the user created
Working_ReaL_VAL[0..19]	Real	Internal	101 - 139	This variable is used to define the operating parameters, and is an ISaGRAF variable array, where Dim = 20. Declare the first Addr. value as 101 (Hex=65)
TMP_Real_VAL[0..19]	Real	Internal	201-239	This variable is used to define an ISaGRAF variable array that is used to store the temporary values entered by the user, where Dim = 20. Declare the first Addr. value as 201 (Hex=C9)

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Name	Format	Attributes	Network Address	Description
NUM1	Integer	Internal	0	This variable is used to temporarily save the REAL values
ii	Integer	Internal	0	This variable is used to set the Index value for the for-loop
jj	Integer	Internal	0	This variable is used to set the Index value for the for-loop
Data_Cnt	Integer	Internal	0	This variable is used to count the amount of data in the file
Row_Cnt	Integer	Internal	0	This variable is used to set the number of rows. Set the value to 2 in this case.
Data_Cnt_in_Row	Integer	Internal	0	This variable is used to set the amount of data that can be stored in each row. Set the value to 10 in this case.

Project:

The project contains three programs, the Load1 program is used to read data from a file, the Save1 program is used save data to a file, and the other1 program is used to do the user-defined commands when the Read_Data_ok variable is set to TRUE.



Program - Load1:

The Load1 program is to read data from a file.

```
(* Operations in the first PLC Scan *)
  if   INIT   then
     (* Assign a Network address for the Array Variable *)
     (* Assign the Working_Real_VAL[ ] as 101 , 103, 105, ..., 139 *)
     TMP := S_MB_ADR( 101 , 20 , 1 ) ;
```


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```
  (* Assign the TMP_Real_VAL[ ] as 201 , 203, 205, ..., 239 *)
    TMP := S_MB_ADR( 201 , 20 , 1 ) ;
    (* Assign the name of the file which stores the current working parameters *)
    TMP_file_name := '\System_Disk\Working_Real.txt'    ;
    RE_LOAD := True ;      (* A trigger to read data from the file when the PLC is started *)
 end_if ;

 (* If RE_LOAD is TRUE, open a file and read it *)
 if   RE_LOAD   then
    RE_LOAD   :=   FALSE   ;   (* Reset the status of the RE_LOAD variable to FALSE *)
    Read_Data_ok := False ;      (* Initialize the data error flag as FALSE *)
    Data_Cnt := 0 ;              (* Initialize the data count to indicate that no data has been read *)

    File1 := f_wopen( TMP_file_name )   ;      (* Try opening the file in Read & Write mode *)

    if   File1 = 0 then
     (* If there is an error opening the file, exit this ST program to run the next program *)
       Msg1   :=   'Cannot Open file ' + TMP_file_name ;
       INIT := False ;    (* Reset the initialization before exiting the ST program *)
       return ;
    end_if   ;

    (* To read data. In this case, there are two rows of data and each row contains 10 REAL values,
       totally 20 REAL values in the file. *)
    for   ii   :=   0   to   ( Row_Cnt - 1 )   do
        if   f_eof(File1) = TRUE   then      (* Test if the end of the file has been reached *)
        (* The end of the file has been reached *)
        Msg1 := 'There should be at least ' + MSG(Row_Cnt)+ ' rows in the ' +TMP_file_name+ ' file.'
;
exit ;                  (* Exit the FOR loop *)
        end_if ;

    str1 := fm_read(File1) ;      (* Read one row as a String (Message) *)
```


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```
(* Convert this string to some REAL values and store them in Float array No. 1 *)
  NUM1 := Msg_F( str1 , 1 );
  if   NUM1 <> Data_Cnt_in_Row   then   (* There should be 10 REAL values in each row *)
   (* If there is an error, it means the data is not a REAL value or the amount of data is incorrect *)
      Msg1   :=   'The data format of row No.' + Msg( ii + 1 ) + ' is not correct or the amount of
data is not ' + MSG( Data_Cnt_in_Row ) ;
      exit ;                    (* Exit the FOR loop *)
  end_if;

    Data_Cnt := Data_Cnt + Data_Cnt_in_Row;   (* OK ! Data_Cnt plus Data_Cnt_in_Row *)
    (* The conversion was successful, and these 10 REAL values have been stored in
TMP_Real_VAL[ ] *)
    for jj := 0 to ( Data_Cnt_in_Row - 1 ) do
      (* Retrieve the converted REAL values from address 1 to 10 in Float array No. 1 *)
      TMP_ReaL_VAL[ Data_Cnt_in_Row * ii + jj ] := ARY_F_R( 1 , jj + 1 ) ;
    end_for ;
  end_for ;

  TMP := f_close(File1) ;    (* Any file that is open should be closed using f_close( ) *)

  (* All data has been read successfully *)
  if   ( Data_Cnt = Row_Cnt * Data_Cnt_in_Row )   then
    Msg1 := 'Read ' + TMP_file_name + ' Ok ' ;
    Read_Data_Ok := True ;   (* Set the data read flag to TRUE *)
  (* If this is the first scan, store the TMP_Real_Val[] information in the respective
  Working_ReaL_Val[] array element *)
    if   INIT   then
      for   ii := 0   to   ( Data_Cnt - 1 )   do
          Working_ReaL_VAL[ii] := TMP_ReaL_VAL[ii] ;
      end_for ;
    end_if ;
  end_if ;
 end_if ;
 INIT := False ;   (* Set the initialization to FALSE to indicate that this is not the first PLC scan *)
```


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Program - Save1:

The Save1 program is to save data into a file.

```
(* Save the data in a file when the RE_Store variable is TRUE *)
(* This "RE_Store" variable can be triggered via the eLogger HMI *)
if   RE_Store   then
   RE_Store := False ;          (* Reset the status of the RE_Store variable to FALSE *)
   Read_Data_ok := False ;   (* Initialize the data error flag as FALSE    *)
   Data_Cnt := 0 ;              (* Initialize the data count to indicate that no data has been read *)

    (* Delete file first and then create a new file and write to it *)
   TMP := f_delete( TMP_file_name )   ;
    (* Create a new file *)
   File1 := f_creat( TMP_file_name ) ;

   (* File creation failed, exit the ST program *)
   if   File1 = 0   then
      MSG1 := 'Cannot create a new file - ' + TMP_file_name + ' !' ;
      return ;        (* Exit the ST program *)
   end_if ;

  (* To save data. In this case, there are two rows of data and each row contains 10 REAL values,
  totally 20 REAL values in the file. *)
 for   ii   :=   0   to   ( Row_Cnt - 1 )   do
      str1 := '' ;     (* Set as an empty string at the beginning *)

     (* There are 10 data records in a single row *)
      for   jj := 0   to   ( Data_Cnt_in_Row - 2 )   do
         str1 := str1 + Real_Str( TMP_ReaL_VAL[Data_Cnt_in_Row * ii + jj] ) + ', ' ;
      end_for ;

   (* Add the last data record from this row to the str1 variable *)
      str1 := str1 + Real_Str( TMP_ReaL_VAL[Data_Cnt_in_Row * ii + jj] ) + '$0D$0A' ;
```


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```
        (* Write this row to the file *)
        TMP := F_writ_S( File1 , str1 ) ;
        if   TMP = False   then
            MSG1 := 'Write data to file - ' + TMP_file_name + ' failed !' ;
            exit ;      (* Exit this FOR loop *)
        end_if ;

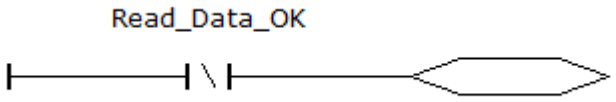
        Data_Cnt := Data_Cnt + Data_Cnt_in_Row;    (* Success! Data_Cnt plus Data_Cnt_in_Row *)
    end_for ;

    TMP := f_close(File1) ;          (* Any file that is open should be closed using f_close() *)
    (* All data has been saved successfully *)
    if   ( Data_Cnt = Row_Cnt * Data_Cnt_in_Row )   then
        Msg1 := 'Write ' + TMP_file_name + ' Ok ' ;
        Read_Data_ok := True ;    (* Set the data read flag to TRUE *)
        (* Store the TMP_Real_Val[] record in the respective Working_ReaL_Val[] array element *)
        for   ii := 0   to   ( Data_Cnt - 1 )   do
          Working_ReaL_VAL[ii] := TMP_ReaL_VAL[ii] ;
        end_for ;
    end_if ;
end_if ;
```

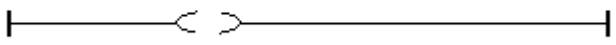
Program - Other1:

The Other1 program is to do the user-defined commands when the Read_Data_ok variable is set to TRUE.

(* If the Read_Data_OK variable is set to False, which means the process parameters of the Working_ReaL_VAL[ ] is not ready. Then return. *)



(* If the Read_Data_OK variable is set to True, then you can use the parameters of the Working_ReaL_VAL[ ] in the user-definded logic below. *)



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3.4.3. Testing the "eL_03" Project

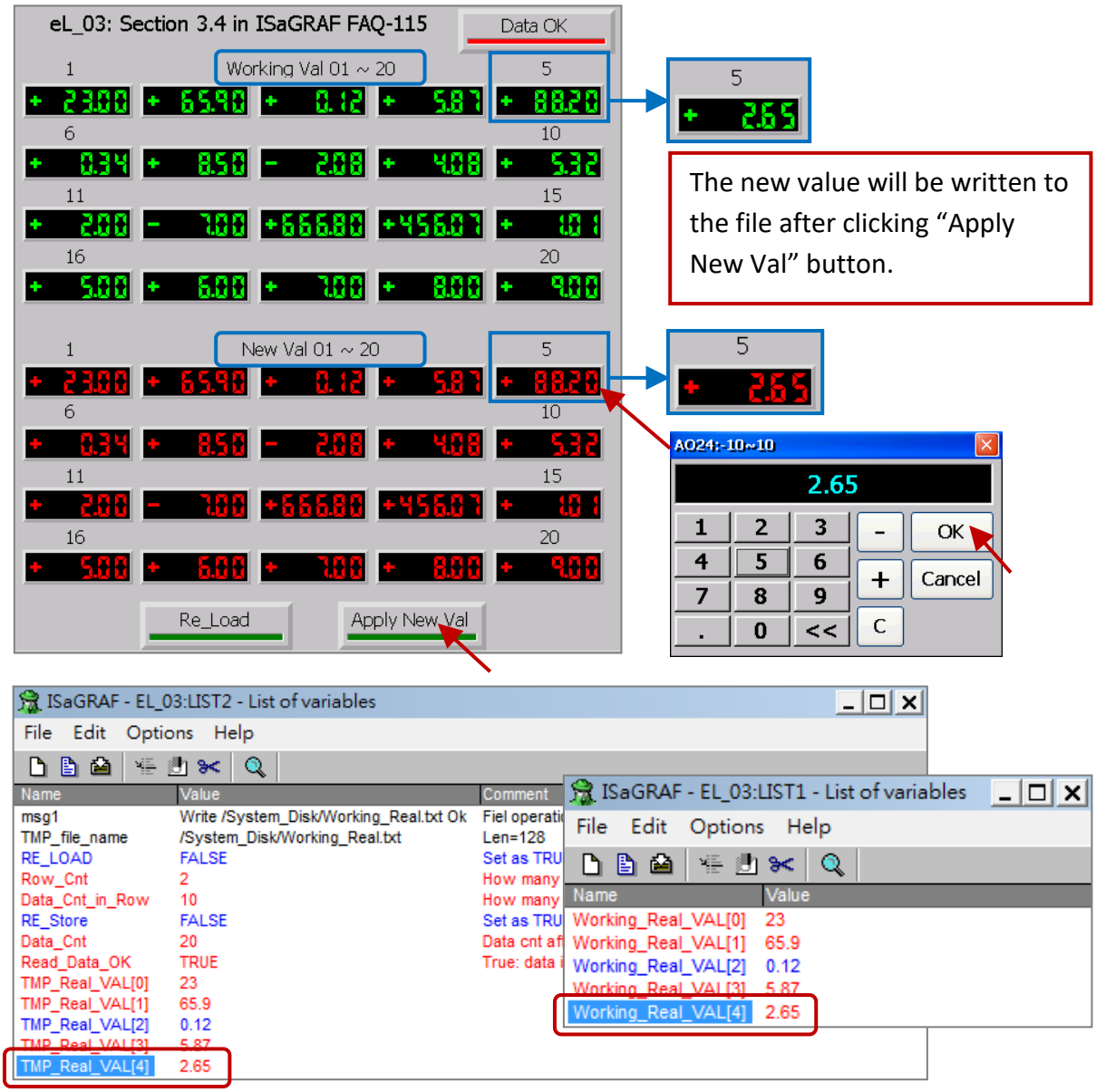
✧ Copy the **Working_Real.txt** file to the **\System_Disk folder** via FTP and reboot the PAC. Make sure this file save using ANSI encoding. The file name must be the same as that declared in the program.

Note: If the file is not coping to the **\System_Disk** folder, the button text "Data Error" will display on the right of the eLogger HMI without any data.

✧ Upload the ISaGRAF project to the PAC first, and then upload the eLogger project.

✧ The values for "New Val" can change in the eLogger HMI.

For example, in the diagram below, click the value you want to change in the "New Val" section to open the "Value Entry" dialog box. Enter the new value and click the "OK" button to save the new value. Repeat this process for each item that you want to change, and then click the "Apply New Val" button to update these values in the "Working Val" area. If the PC/ISaGRAF connect to the PAC, you can also check to see if the variable values have changed.



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3.5. Reading/Saving Process Parameters from/to a File (Data Format: Integer)

In this example, we will use the following project files:

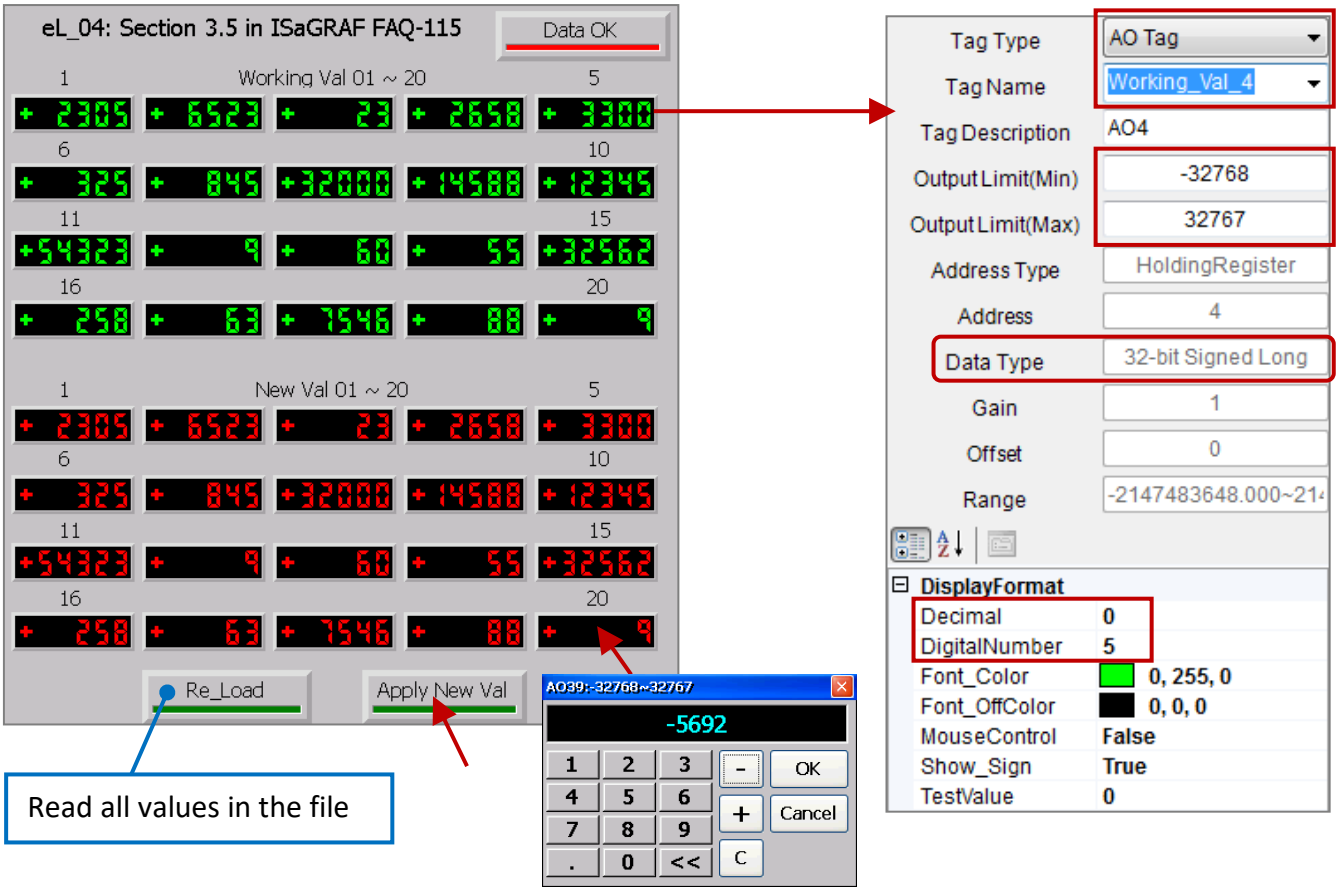
The ISaGRAF Project File: eL_04. pia

The eLogger Project File: eL_04.wez

This project is similar to the previous “eL_03” project (See Section 3.4 “Reading/Saving the Process Parameters from/to a File”), but this time the data format is Integer. First, create a txt file called **Working_Int.txt** that includes two rows of data, with each row containing ten Integer values. Ensure this file is saved using ANSI encoding. Copy the **Working_Int.txt** file to the \System_Disk folder via FTP. Open the ISaGRAF and the eLogger project for more details and then upload projects to the PAC.

Testing the “eL_04” Project:

The values “New Val” can change in the eLogger HMI. For example, in the diagram below, click the value you want to change in the “New Val” section to open the “Value Entry” dialog box. Enter the new value and click the “OK” button to save the new value. Repeat this process for each item that you want to change, and then click the “Apply New Val” button to update these values in the “Working Val” area. If the PC/ISaGRAF is connected to the PAC (See Section 1.7) , you can also online check to see if the related variable values are changed.



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3.6. Reading/Saving Process Parameters from/to Different Files (Data Format: REAL)

In this example, we will use the following project files:

The ISaGRAF Project File: eL_05. pia

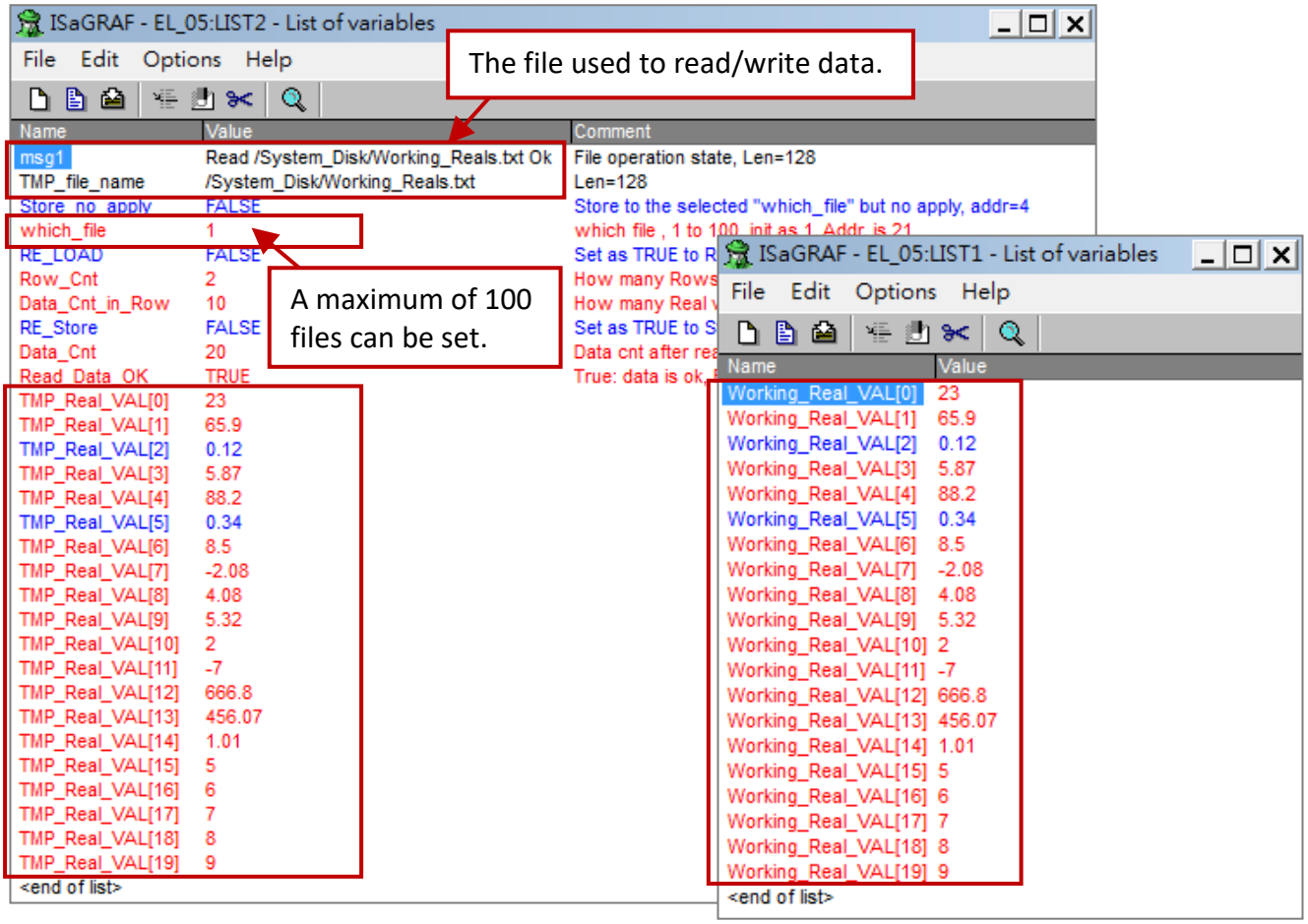
The eLogger Project File: eL_05.wez

This project is similar to the previous "eL_03" project (See Section 3.4 "Reading/Saving the Process Parameters from/to a File") and the data format is REAL. However, multiple values can save into different files. First, create a txt file called **Working_Reals.txt** that includes two rows of data, with each row containing ten REAL values. Ensure the file save using ANSI encoding. Copy this file to the **\System_Disk** folder via FTP. Open the ISaGRAF and the eLogger project for more details and then upload projects to the PAC.

Note: The file name and the storage path must be the same as that declared in the program. The data contained in the txt file can be the same as that used for the "eL_03" demo.

Testing the "eL_05" Project:

Create a connection between the PC/ISaGRAF and the PAC (See Section 1.7 if not familiar), and view the list of variables as illustrated in the figure below.

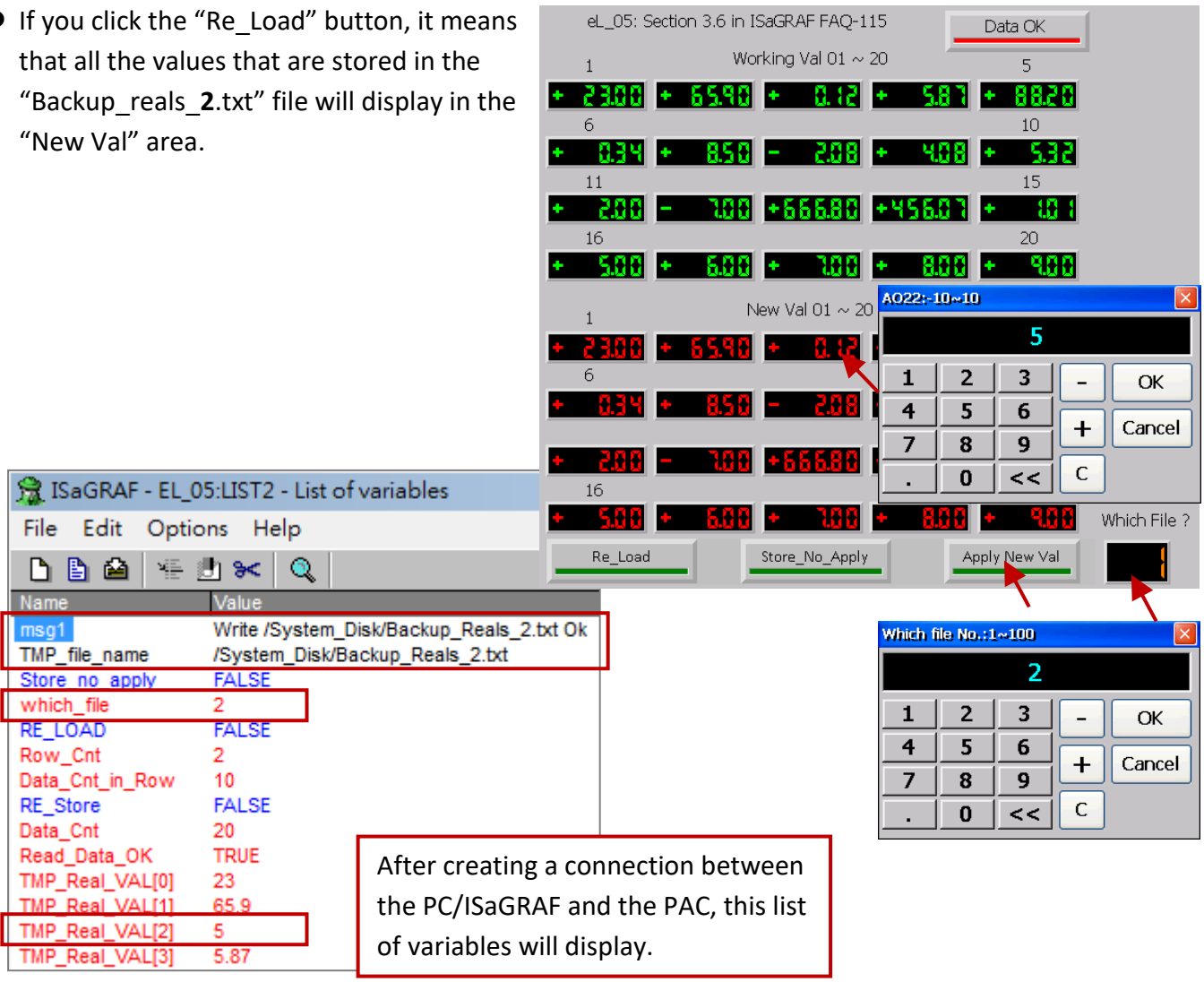


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First, all the values that are stored in the **Working_Reals.txt file in the** \System_Disk folder will display on the eLogger HMI screen. Change the "Which_File" value (where **n** can be in the range of 1 to 100) to write data to the specified "Backup_Reals_**n**.txt" file. Note the txt file will automatically create if it does not exist.

Test:

- In the diagram below, click the value that you want to change in the "New Val" section to open the "Value Entry" dialog box. Enter the new value and click the "OK" button to save the new value. Set the "Which_File" value to "**2**", and then click the "Apply New Val" button to write the data to the "Backup_reals_**2**.txt" file and the "Working_Reals.txt" file in the \System_Disk folder. In addition, the values shown in the "Working Val" area will be updated using those entered in the "New Val" area
- In this case, if you click the "Store_No_Apply" button, it means that the values shown in the "New Val" area written to the "Backup_reals_**2**.txt" file, but the value displayed in the "Working Val" area will not update and will not save into the "Working_Reals.txt" file.
- If you click the "Re_Load" button, it means that all the values that are stored in the "Backup_reals_**2**.txt" file will display in the "New Val" area.



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3.7. Reading or Modifying the Date and Time on the PAC for the Time Control

In this example, we will use the following project files:

The ISaGRAF Project File: eL_06. pia

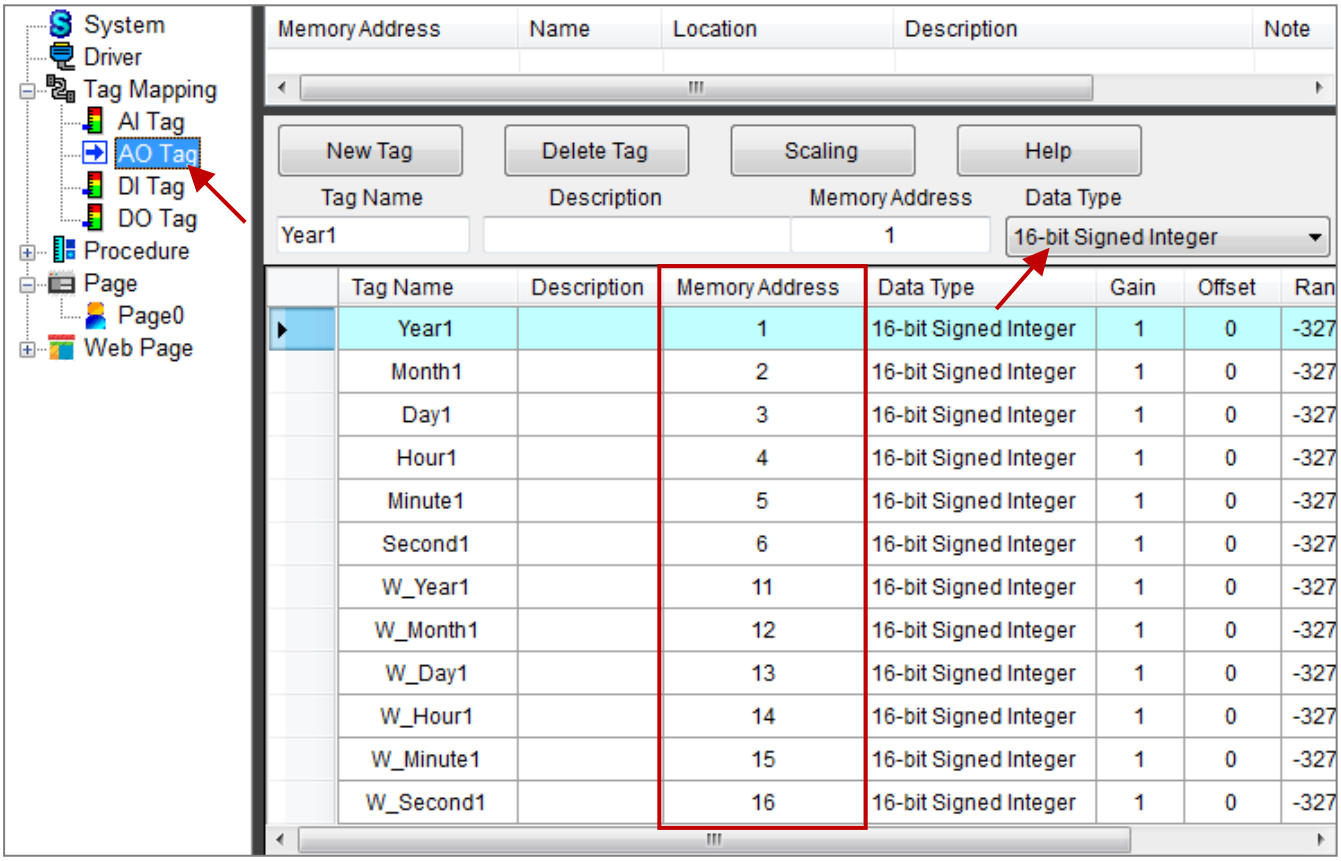
The eLogger Project File: eL_06.wez

The project used in this example shows how to display or change the date and time on the PAC. In this example, we set the OUT1 variable to ON from 09:00 to 18:00 on Monday to Friday, and set the OUT2 variable to ON from 09:00 to 12:00 on Saturday and Sunday.

3.7.1. The eLogger Developer Settings

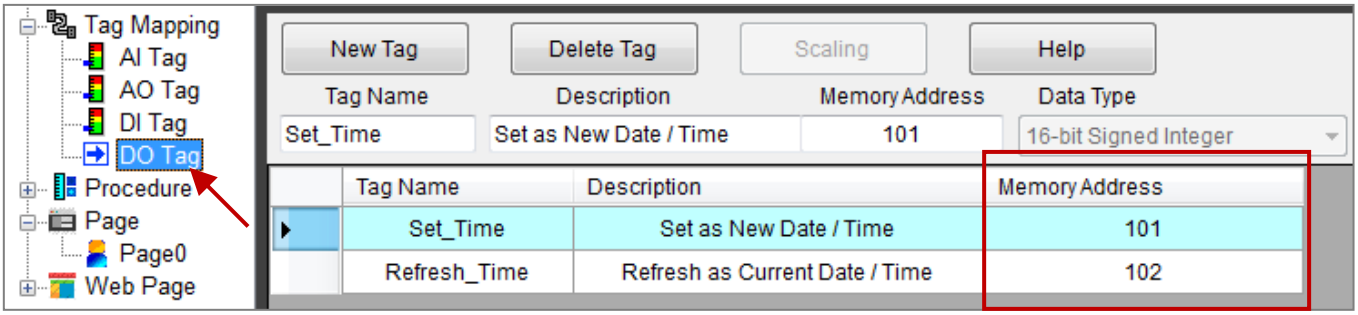
In this example, we will use the following eLogger tags.

AO Tag: Configuring the AO tags as illustrated in the figure beolw. See Section 2.3 if not familiar.

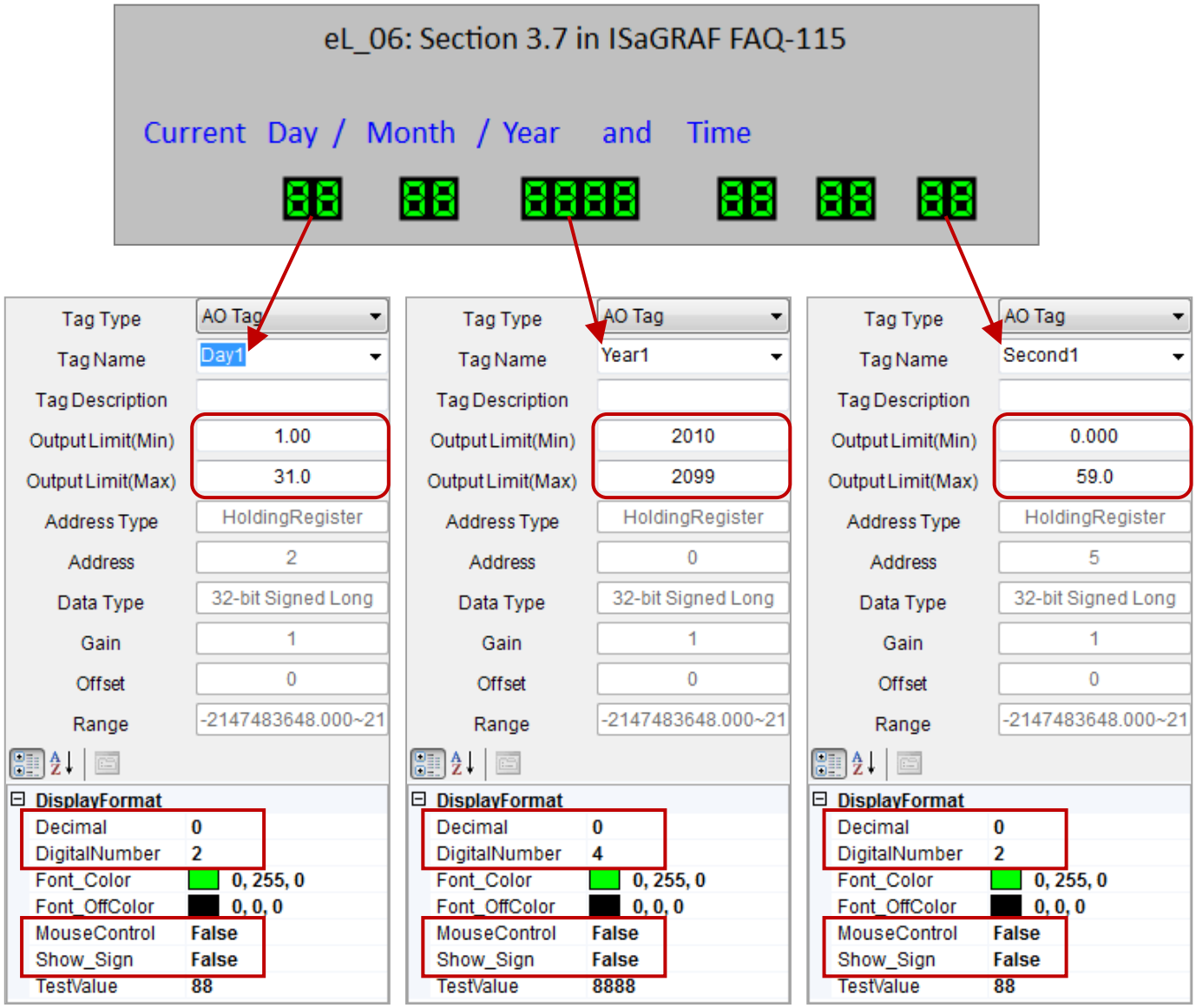


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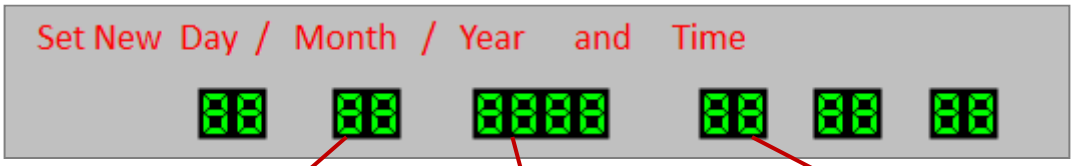
DO Tag: Configure the DO tags as illustrated in the figure below. See Section 2.3 if not familiar.



Page0:
Configuring the following components as illustrated in the figure below. See Section 2.4 if not familiar.



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	W_Month1	W_Year1	W_Hour1
Tag Type	AO Tag	AO Tag	AO Tag
Tag Name	W_Month1	W_Year1	W_Hour1
Tag Description			
Output Limit(Min)	1.00	2010	0.000
Output Limit(Max)	12.0	2099	23.0
Address Type	HoldingRegister	HoldingRegister	HoldingRegister
Address	7	6	9
Data Type	32-bit Signed Long	32-bit Signed Long	32-bit Signed Long
Gain	1	1	1
Offset	0	0	0
Range	-2147483648.000~2	-2147483648.000~2	-2147483648.000~2
DisplayFormat			
Decimal	0	0	0
DigitalNumber	2	4	2
Font_Color	0, 255, 0	0, 255, 0	0, 255, 0
Font_OffColor	0, 0, 0	0, 0, 0	0, 0, 0
MouseControl	True	True	True
Show_Sign	False	False	False
TestValue	88	8888	88



	Refresh_Time	Set_Time
Tag Type	DO Tag	DO Tag
Tag Name	Refresh_Time	Set_Time
Tag Description	Refresh as Current Date / Time	Set as New Date / Time
Address Type	CoilStatus	CoilStatus
DisplayFormat		
ConfirmWindow	False	True
FontStyle	Calibri, 12pt	Calibri, 12pt
MouseControl	True	True
OffColor	0, 127, 0	0, 127, 0
OffDisplayText	Update the Current Date/Time	Set as New Date / Time
OnColor	0, 255, 0	0, 255, 0
OnDisplayText	Update the Current Date/Time	Set as New Date / Time
ValueTest	True	True

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3.7.2. The ISaGRAF Settings

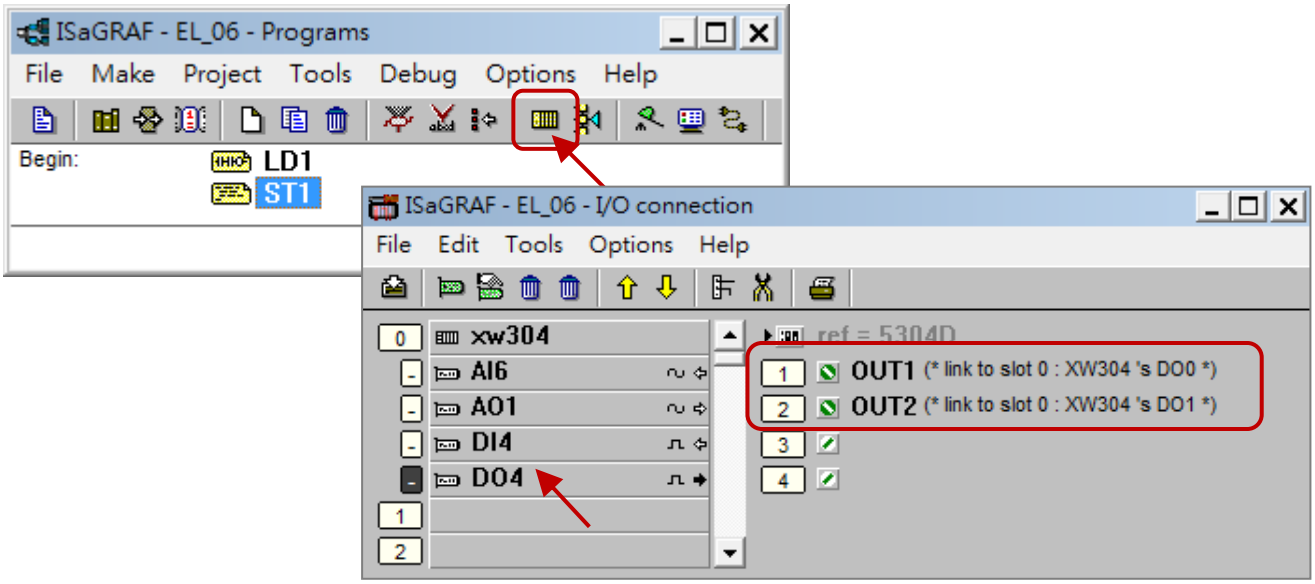
Before we can begin creating our project, we must first declare the required project variables. See Section 1.2 Declaring the ISaGRAF Project Variables if you are not familiar. In this example, we will use the following ISaGRAF variables.

Name	Format	Attributes	Network Address	Description
Set_Time	Boolean	Internal	101	Set this variable to True to allow the date and time to be changed
Refresh_Time	Boolean	Internal	102	This variable is used to refresh the current date and time
OUT1	Boolean	Internal	0	This variable is a link to the DO0 channel on the XW304
OUT2	Boolean	Internal	0	This variable is a link to the DO1 channel on the XW304
Time_Val	Integer	Internal	0	This variable is used to set a time period (unit: minutes, the value 0 to 1439 means 00:00 to 23:59) Set the Initial value to 0
Year1	Integer	Internal	1	These variables are to retrieve the current date and time on the PAC. E.g., Year, Month, Day, Hours, Minutes, Seconds, and Weekday.
Month1	Integer	Internal	2	
Day1	Integer	Internal	3	
Hour1	Integer	Internal	4	
Minute1	Integer	Internal	5	
Second1	Integer	Internal	6	
WeekDay1	Integer	Internal	0	
W_Year1	Integer	Internal	11	These variables are to set the new date and time on the PAC. E.g., Year, Month, Day, Hours, Minutes, and Seconds.
W_Month1	Integer	Internal	12	
W_Day1	Integer	Internal	13	
W_Hour1	Integer	Internal	14	
W_Minute1	Integer	Internal	15	
W_Second1	Integer	Internal	16	

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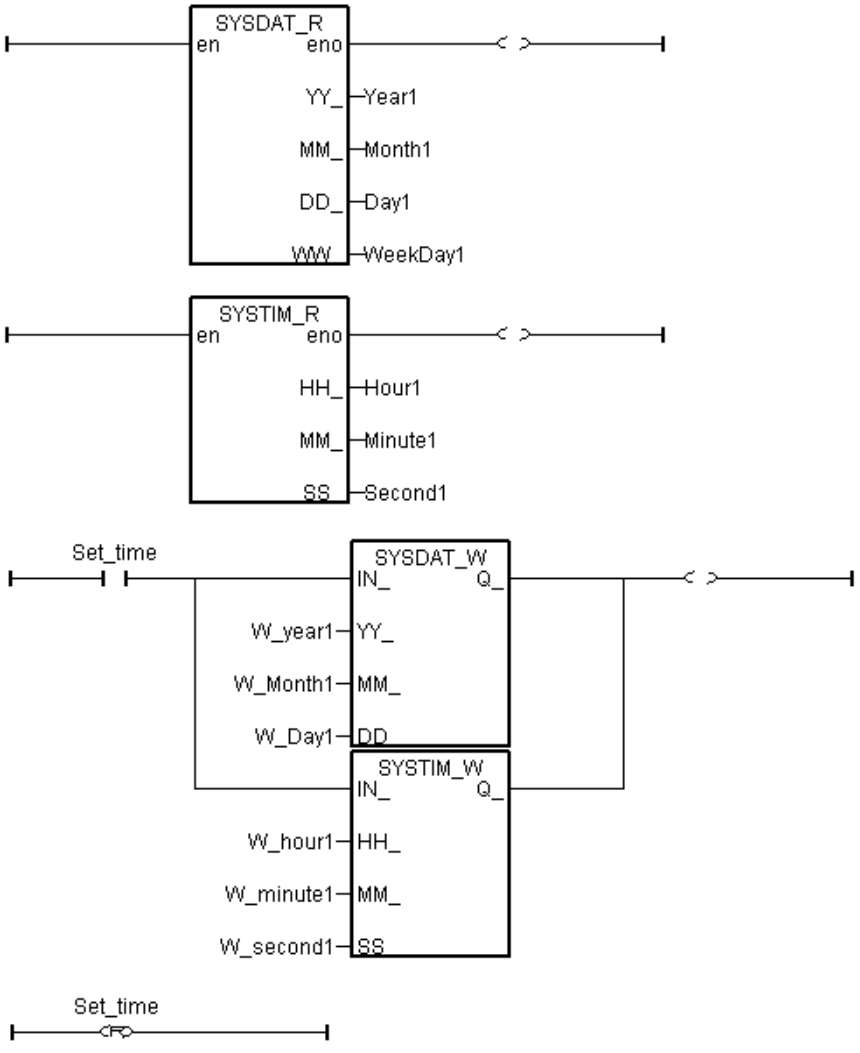
I/O Connection:

Configuring the xw304 board in the I/O connection dialog box as illustrated in the figure below.



Program - LD1:

The LD1 program is to read/write the system date and time on the PAC.



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Program - ST1:

In this program, we set the OUT1 variable to ON from 09:00 to 18:00 on Monday to Friday, and set the OUT2 variable to ON from 09:00 to 12:00 on Saturday and Sunday.

```
(* Units are seconds, 0 ~ 86399
    Time_val:= 3600 * Hour1 + 60* Minute1 + Second1;    *)

 (* Units are minutes, 0 ~ 1439 *)
 Time_Val:= 60 * Hour1 + Minute1;

 OUT1:= False;      (* Initially set to False *)
 OUT2:= False;

 (* Set OUT1 to True for 9:00 to 18:00 on Monday to Friday *)
 if (WeekDay1 >= 1) and (WeekDay1 < 6) and
     (Time_Val >= 540) and (Time_Val < 1080) then
   OUT1:= True;
 end_if;

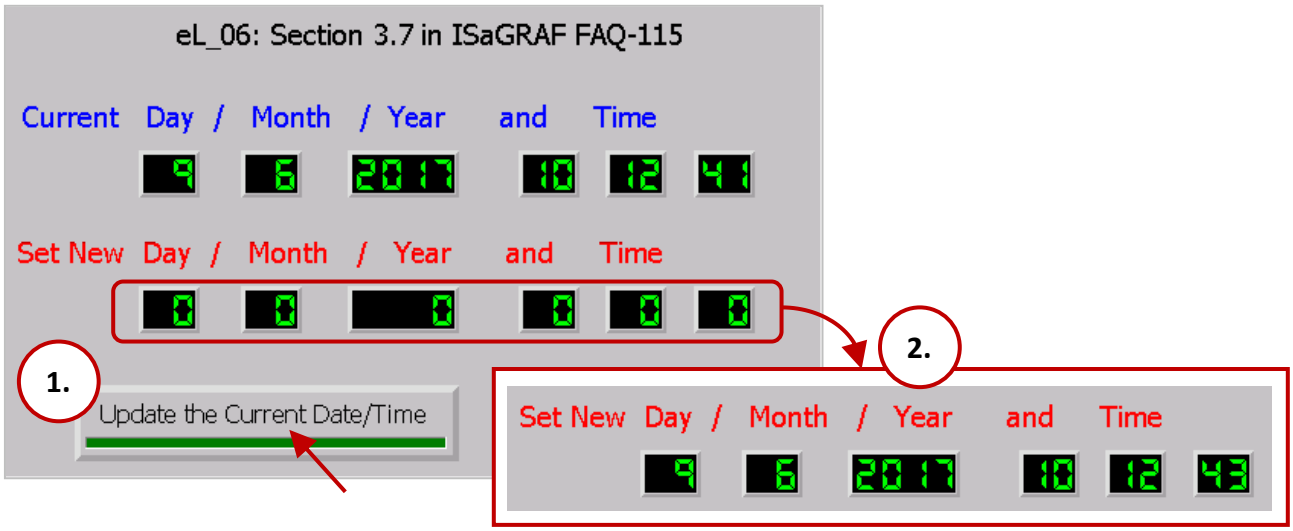
 (* Set OUT2 to True for 9:00 to 12:00 on Saturday and Sunday *)
 if (WeekDay1=6) and (WeekDay1=7) and
     (Time_Val >= 540) and (Time_Val < 720) then
   OUT2:= True;
 end_if;

 (* Refresh to the current date and time *)
 if   Refresh_Time    then
   Refresh_Time:= False;    (* Reset to False *)
   W_Year1:= Year1;
   W_Month1:= Month1;
   W_Day1:= Day1;
   W_Hour1:= Hour1;
   W_Minute1:= Minute1;
   W_Second1:= Second1;
 end_if;
```

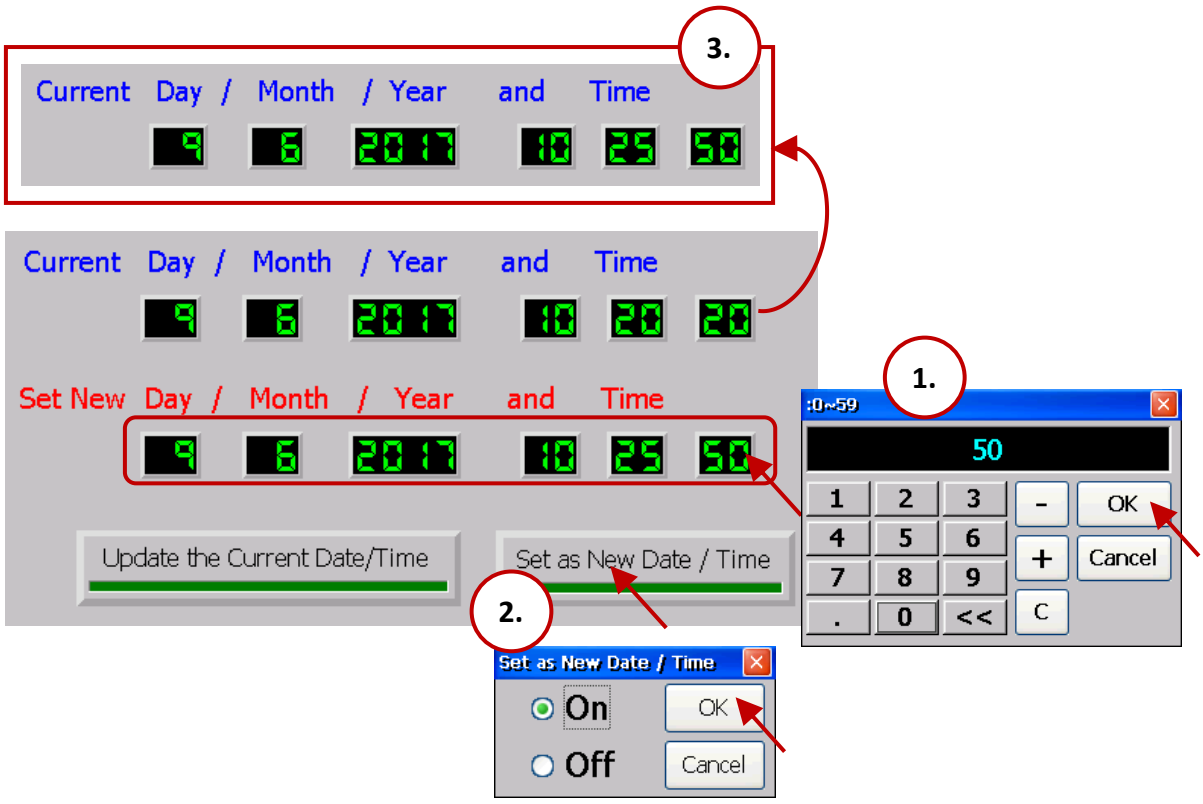

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3.7.3. Testing the "eL_06" Project

Click the "Update the Current Date/Time" button to set the current date and time of the PAC in the "Set New" section.



To adjust the date and time, click each component and enter a new value for the item. For example, in the diagram below, click the second's component in the "Set New" section to open the "Value Entry" dialog box. Enter the new value and click the "OK" button to save the new value. Repeat this process each item that needs to adjust, and then click the "OK" button to change the information displayed in the "Current" date and time section above.



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