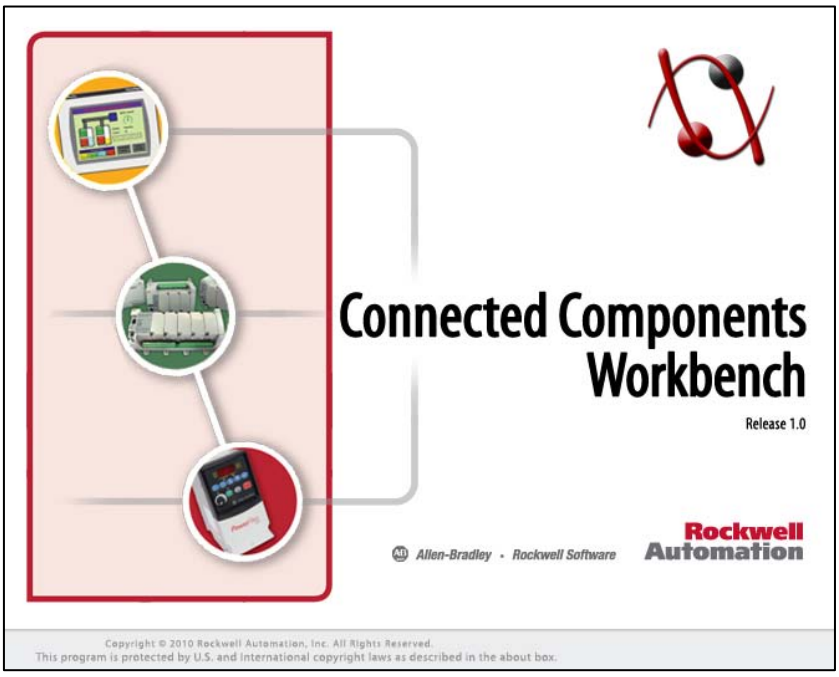
Micro800™ and Connected Components Workbench™

Application Guide



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Requirements

Hardware Requirements:

Micro810, 2080-LC10-12QWB.

Micro830, 2080-LC30-16QWB

Micro830 Plug-In, 2080-SERIALISOL

Standard USB Cable

Software Requirements:

Connected Components Workbench (CCW), Release 1.0

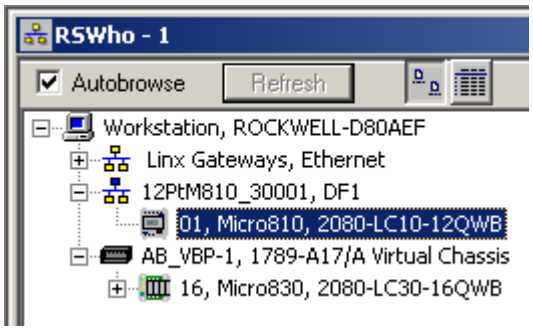
RSLinx, v 2.57

Chapter 1 –
Flash Updating Micro800 Firmware

Flash Updating Micro800 Firmware

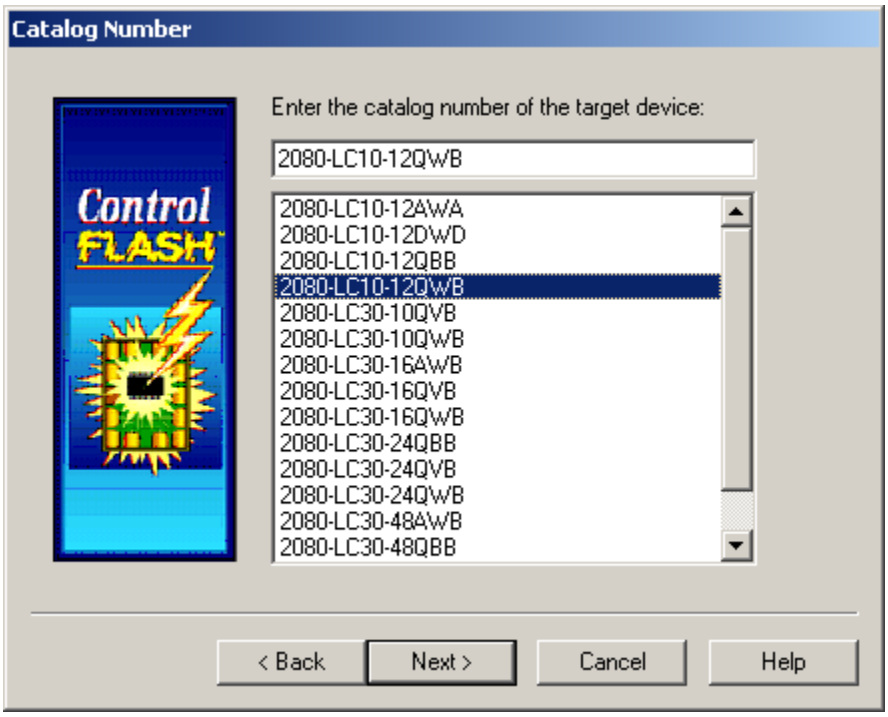
This chapter will show you how to flash update the firmware in a Micro800 controller using ControlFLASH. ControlFLASH is installed or updated with the latest Micro800 firmware when Connected Components Workbench software is installed on your computer.

1. First verify successful RSLinx Classic communications with your Micro800 controller via USB using RSWho (Micro810 12-pt. uses the 12PtM810_xxxxx driver and the Micro830 uses the AB_VBP-x driver).

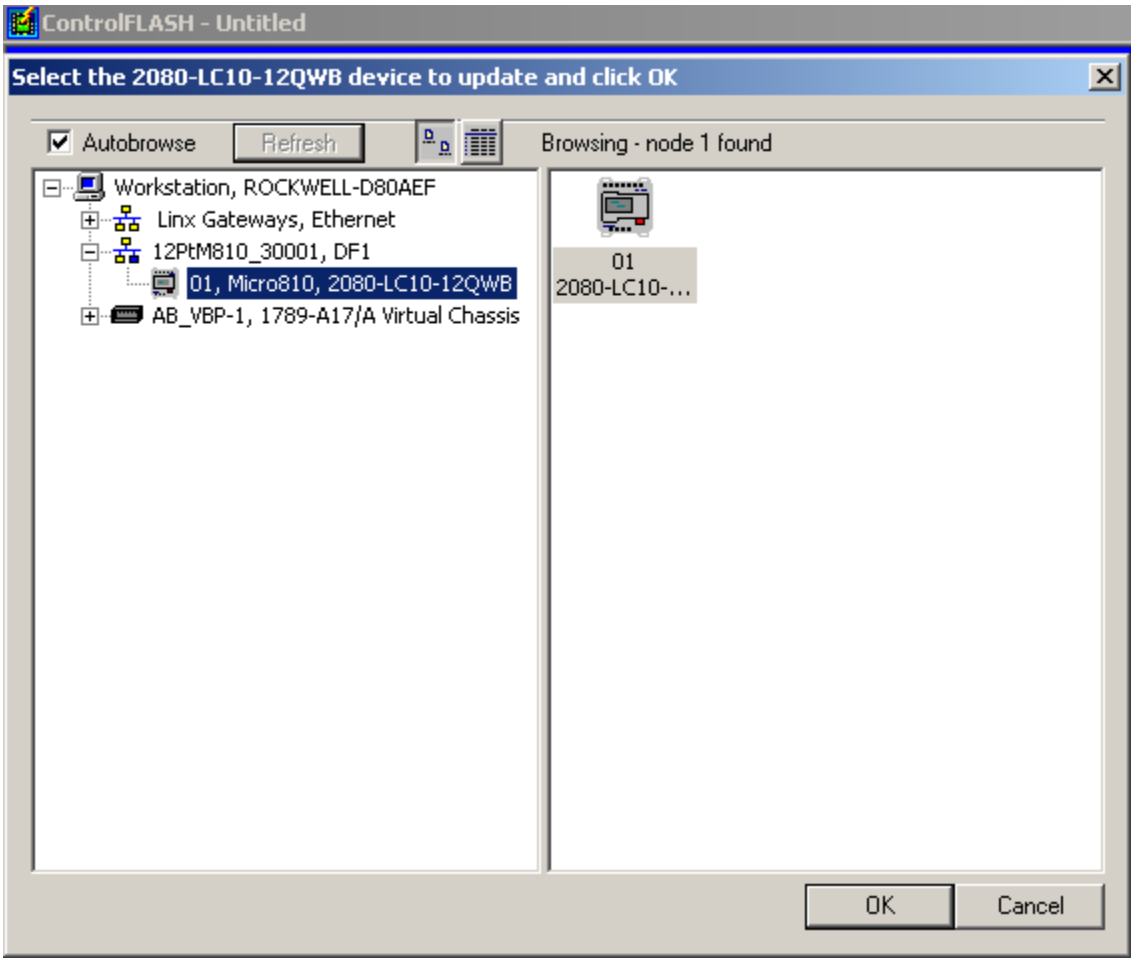


2. Start ControlFLASH and click **Next:**

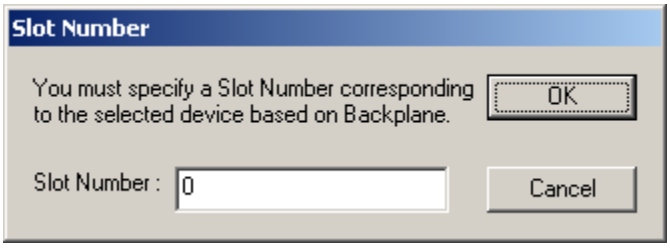
3. Select the catalog number of the Micro800 that you are going to update and click **Next**:



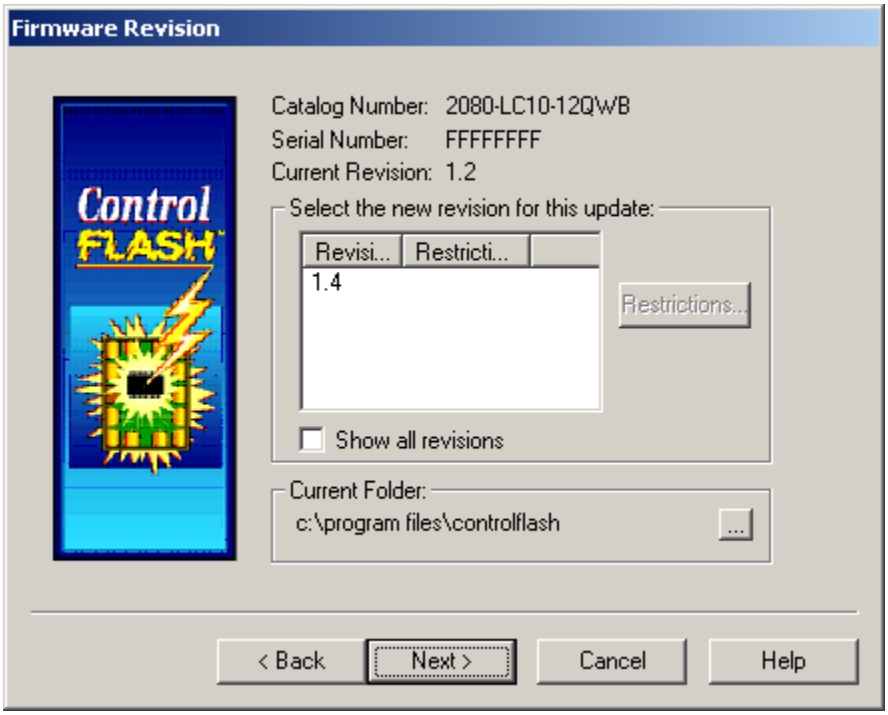
4. Select the controller in the browse window and click **OK**:

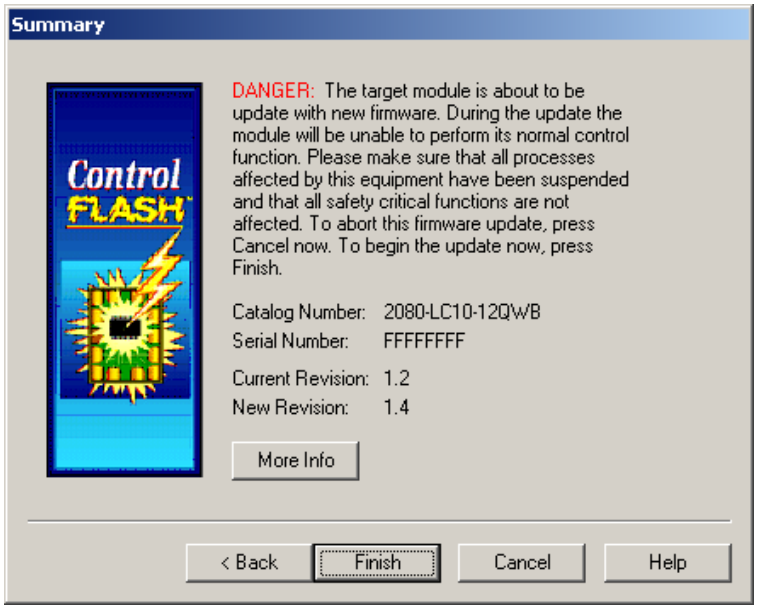


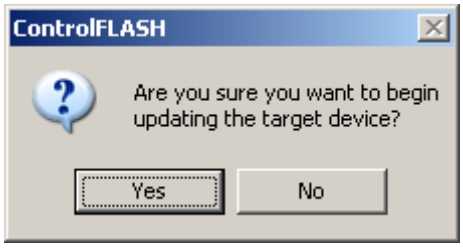
5. If you get the following screen (Micro810 only), leave the **Slot Number** at **0** and click **OK**:



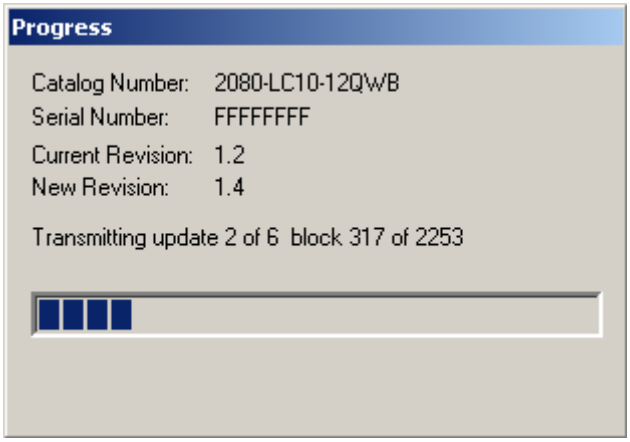
6. Click **Next** to continue, verify the revisions, then click **Finish** and **Yes** to initiate the update:



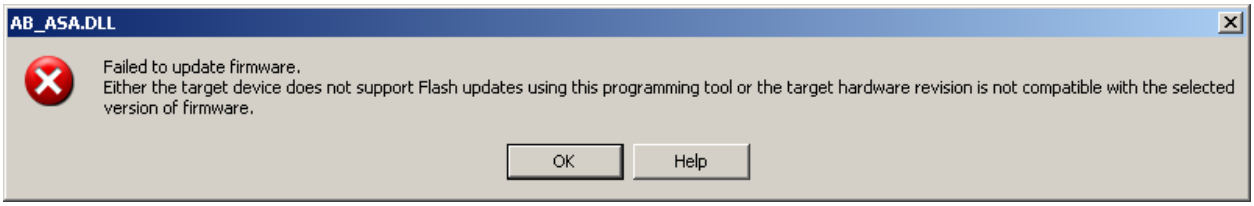




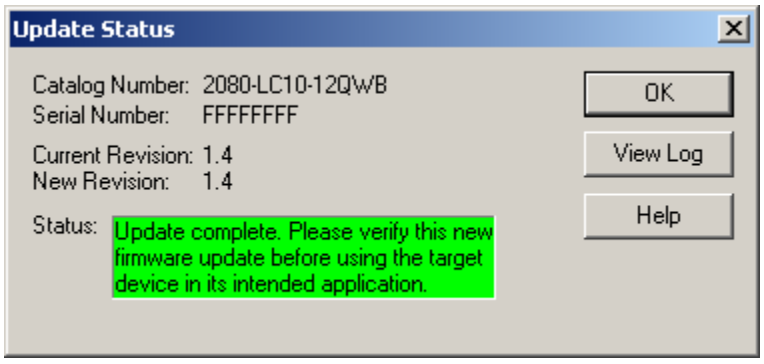
7. The next screen should show the download progress:



8. If you get the following error message instead, check to see if the controller is faulted or in Run mode. If so, clear the fault or switch to Program mode, click **OK** and try again.



9. When the flash update is complete, you should get a status screen similar to the following. Click **OK** to complete:

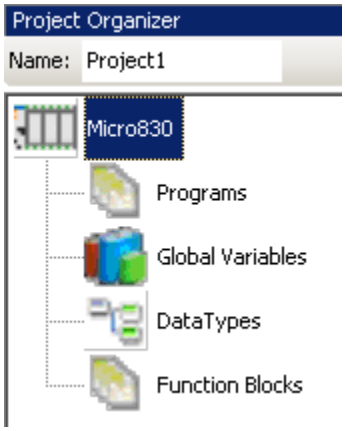


Chapter 2 –
Importing and Exporting User-Defined Function Blocks

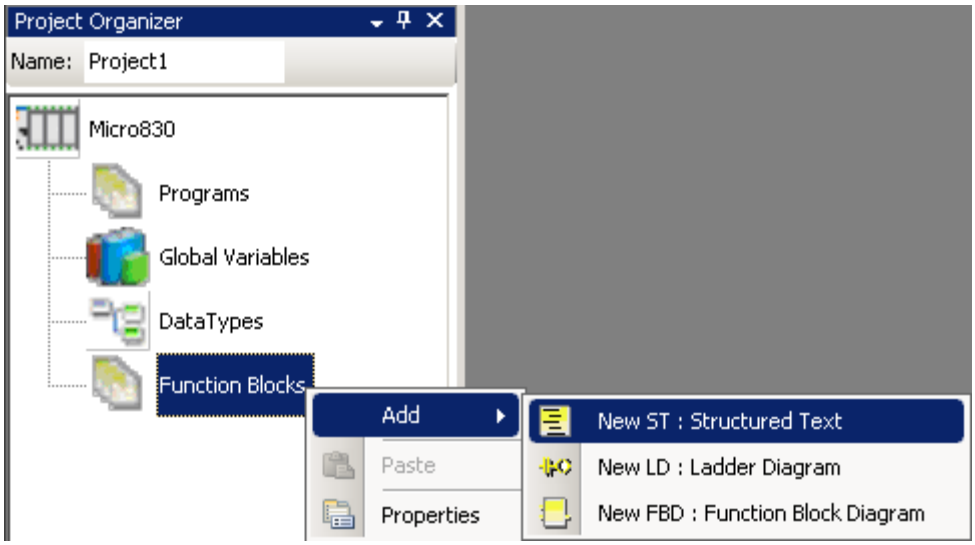
Importing and Exporting User-Defined Function Blocks

This chapter will show you how to create and export a SIM_FB User Defined Function Block (UDFB) so that it can be imported into other projects.

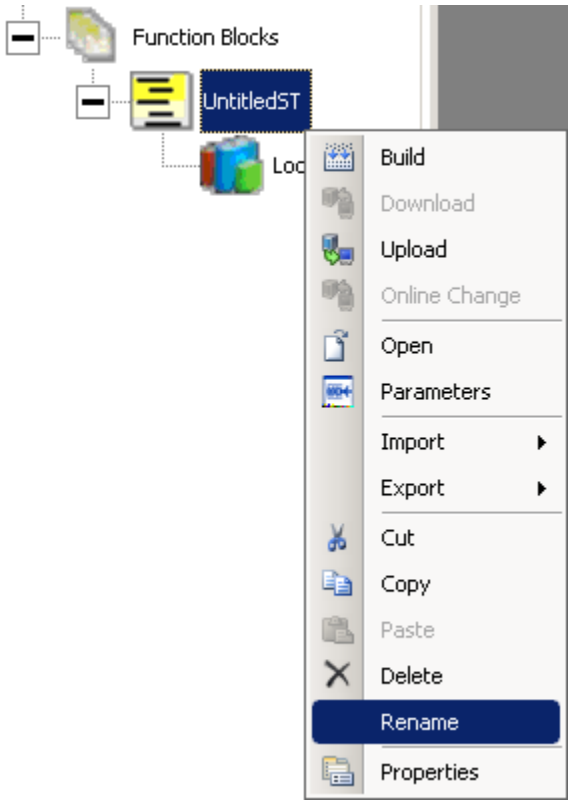
1. Create a new Micro830 project.



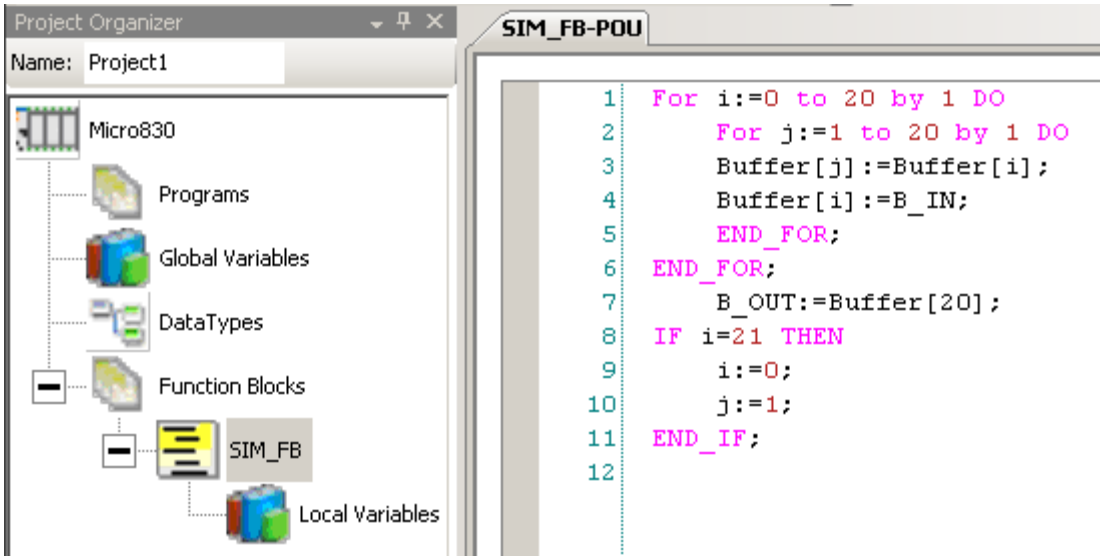
2. Under Project Organizer, right click on Function Blocks, select Add then New ST :Structured Text:



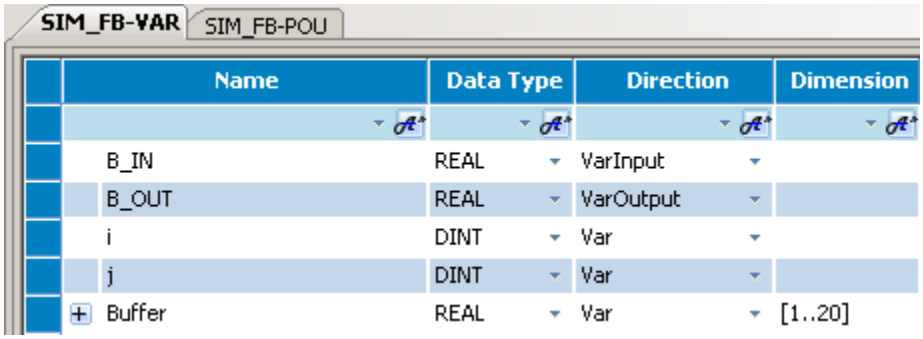
3. Right click on UntitledST, select Rename and type in “SIM_FB”:



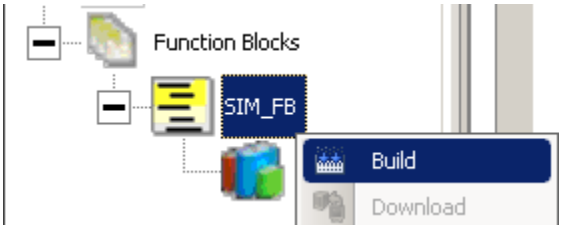
4. Double click on SIM_FB and type in the following:



5. Below SIM_FB, double click on Local Variables and enter in the following:

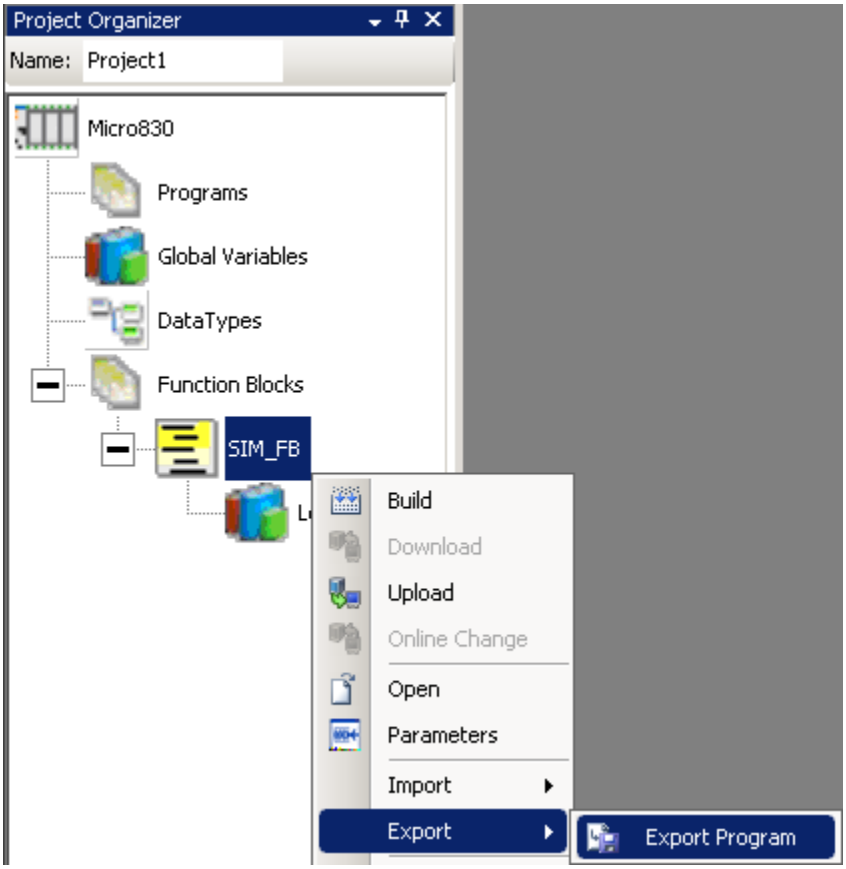


6. Right click on SIM_FB and select Build:

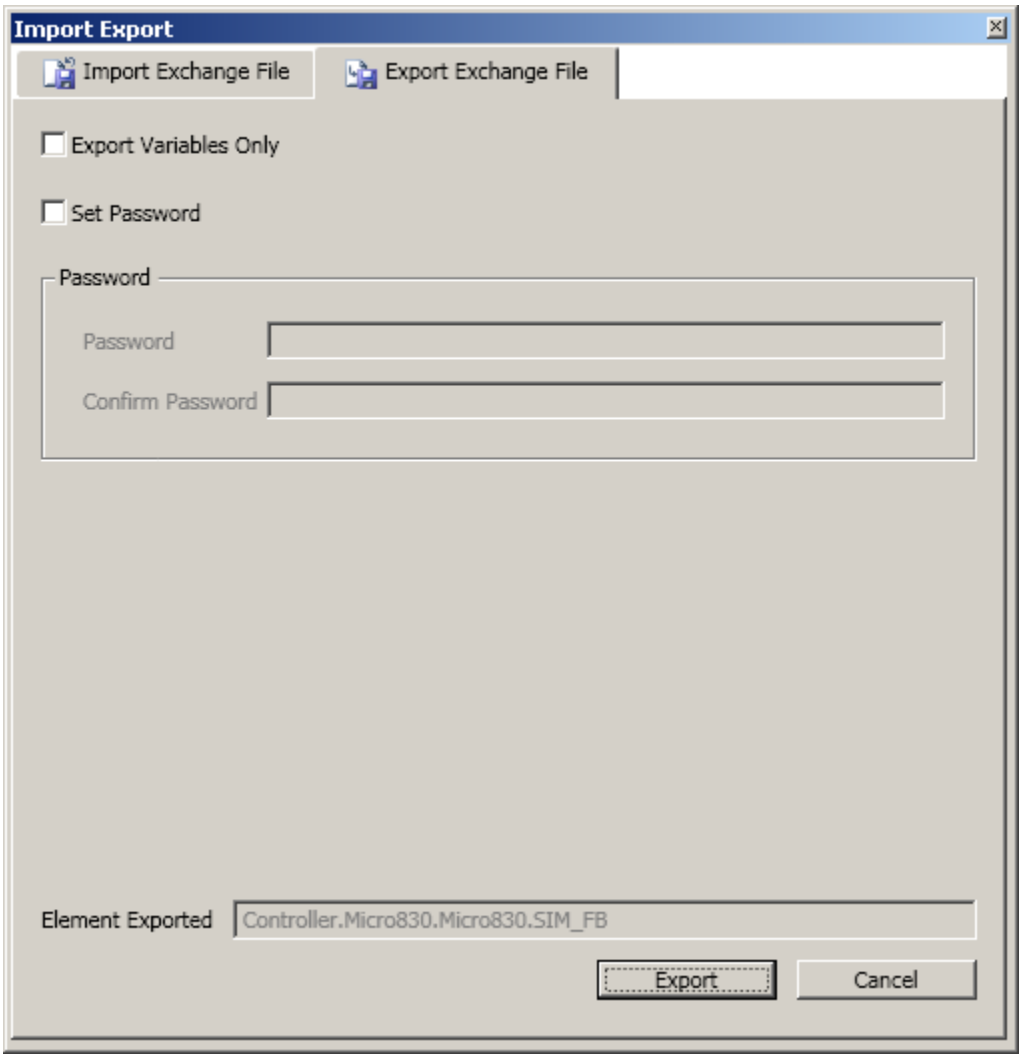


If you get any Build errors, correct the errors and Build again until you succeed with no errors.

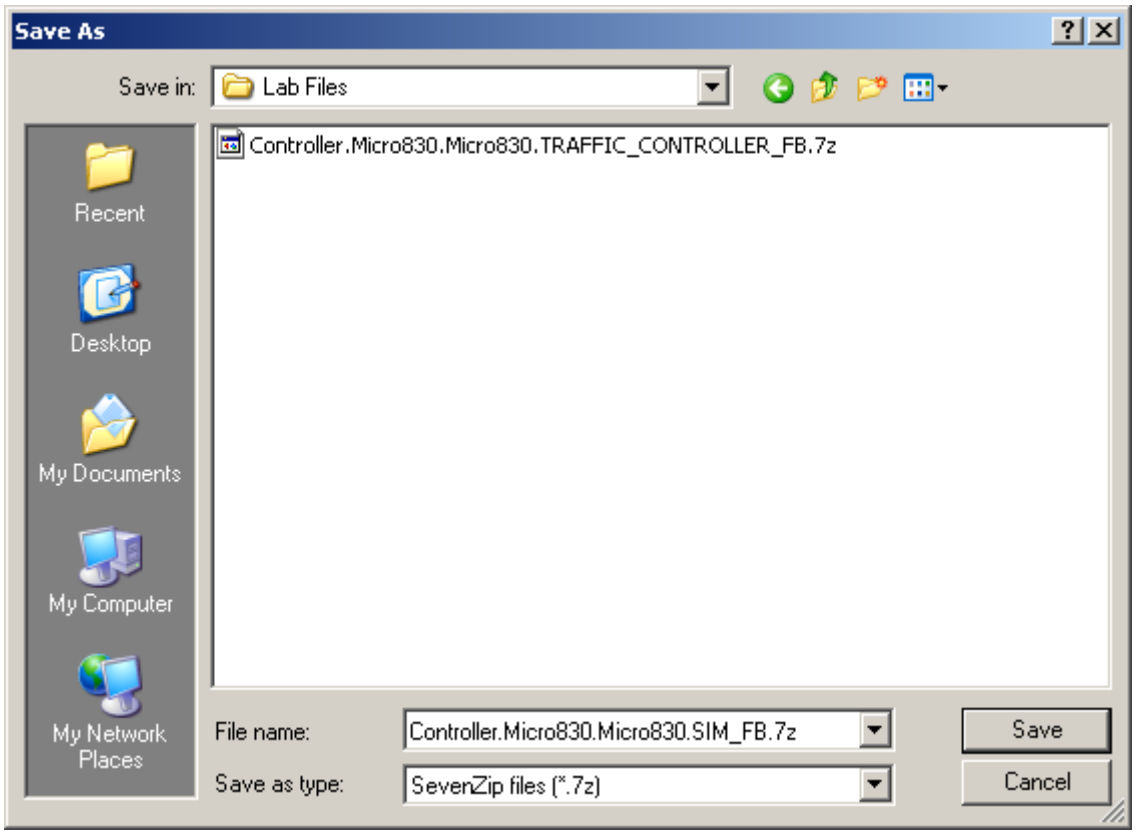
7. Under Project Organizer, right click on SIM_FB, select Export and then **Export Program**:



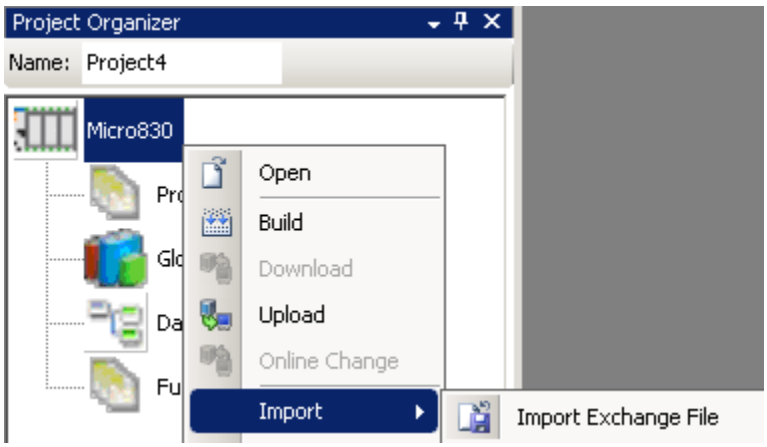
8. Click **Export**:



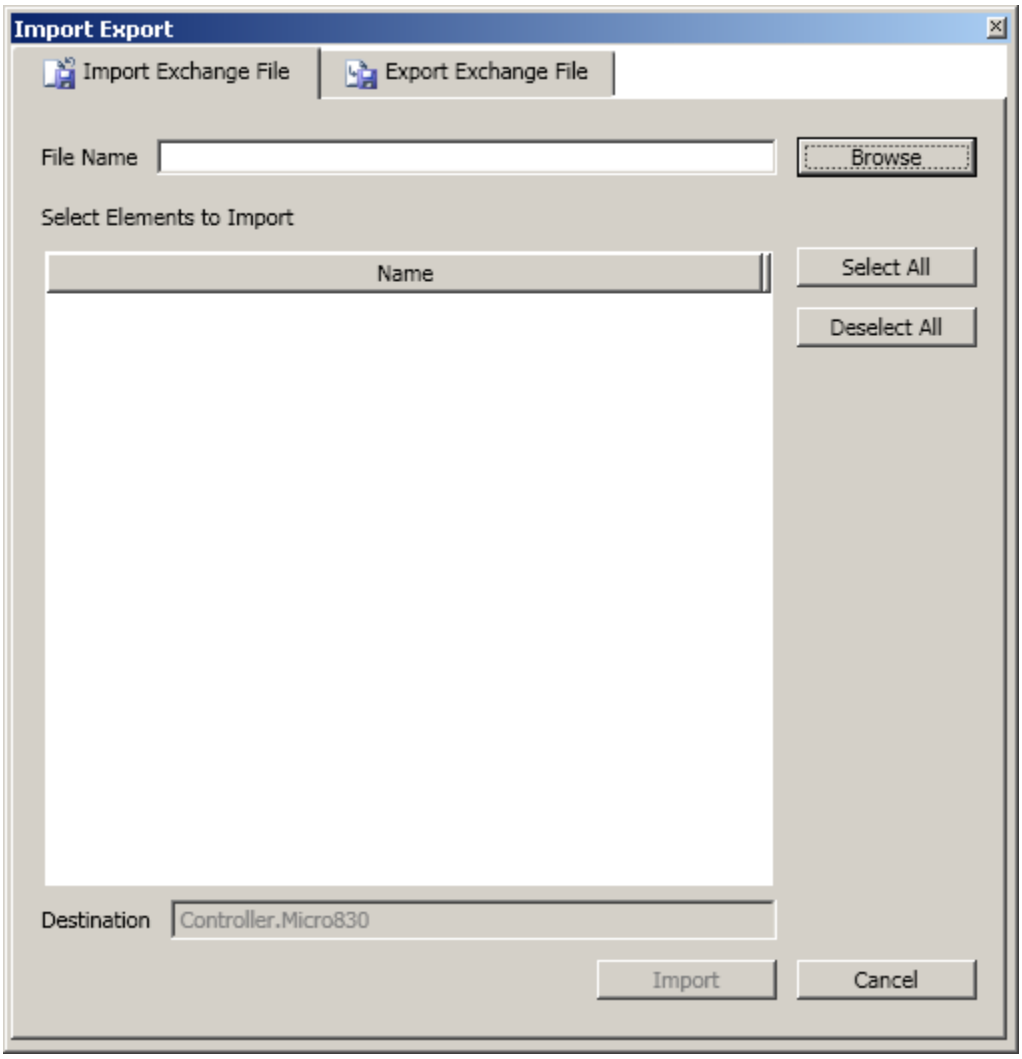
9. Browse to the saving folder location and click **Save**:

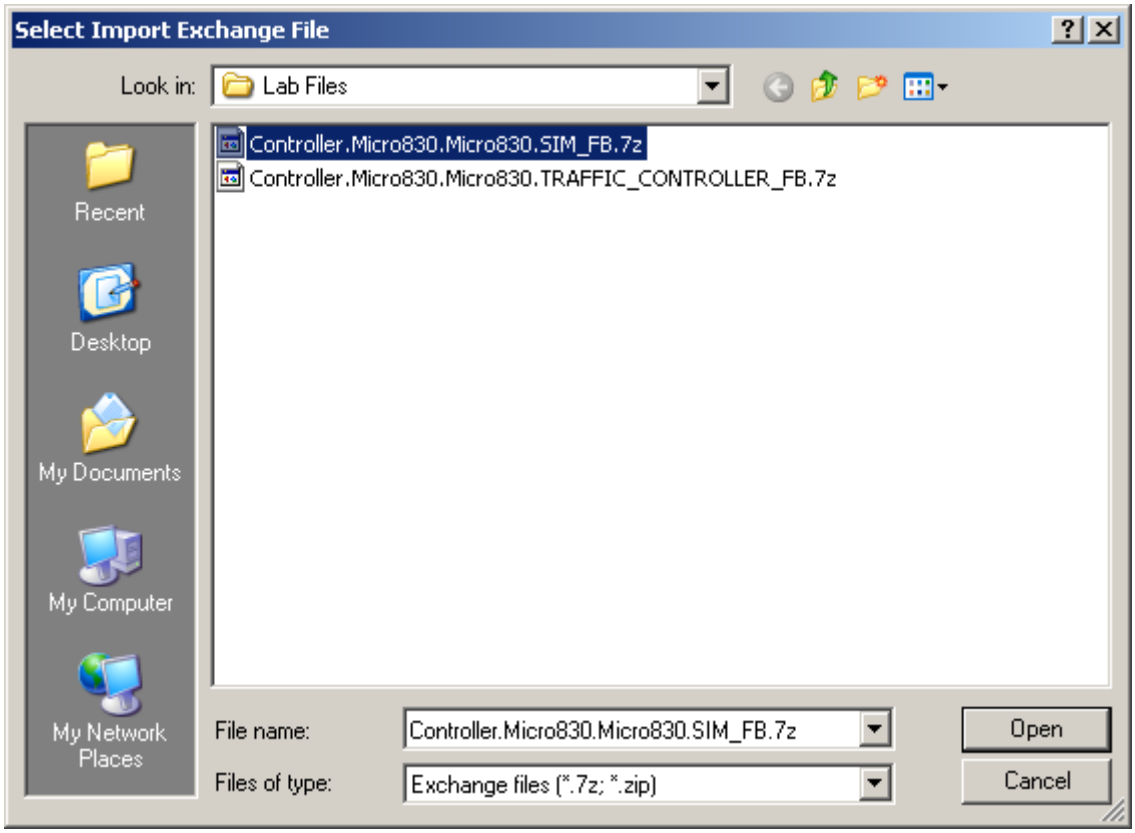


10. To use the **SIM_FB** in a future project, create a new project and right click on **Micro830** under **Project Organizer**, select **Import**, then **Import Exchange File**:

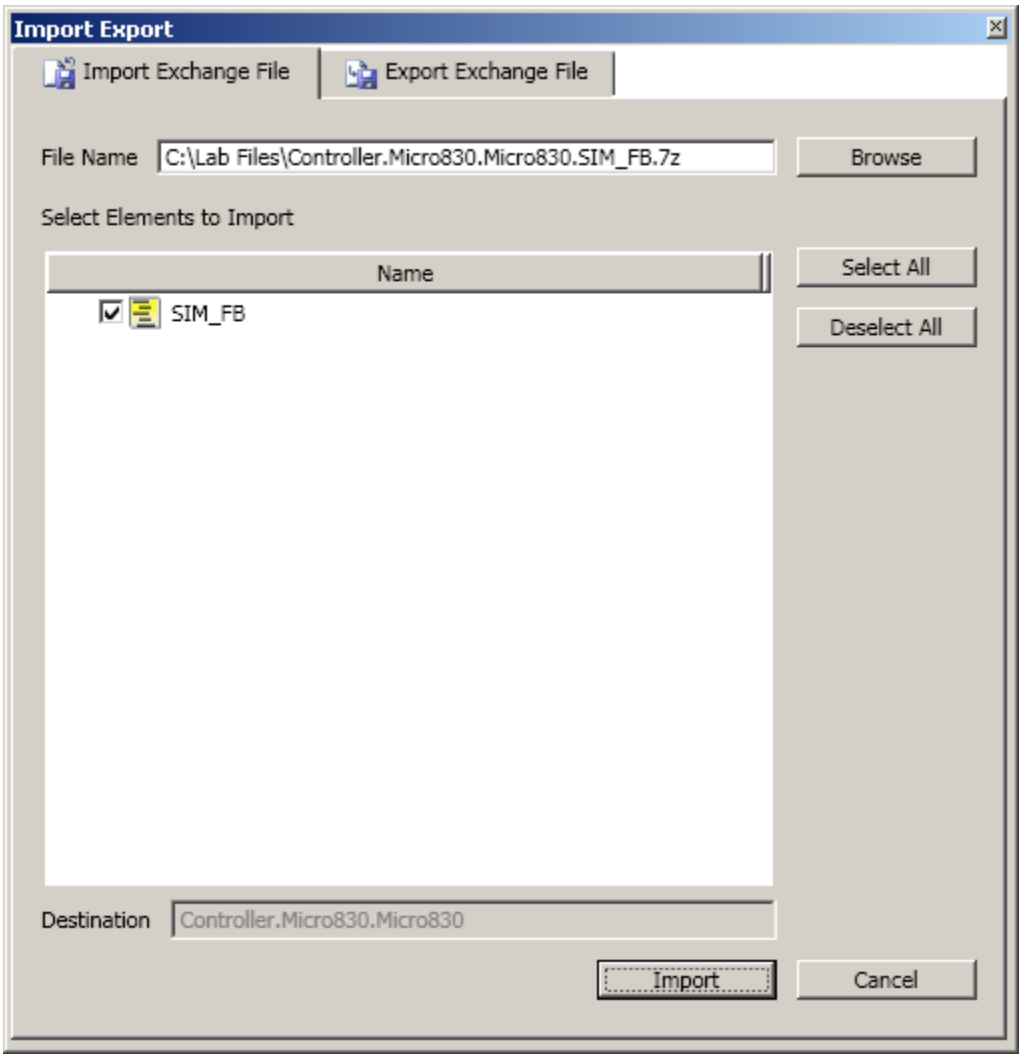


11. Click **Browse**, navigate to the folder location, select the file and click **Open**:




Select Import Exchange File
Look in:
Lab Files
Controller.Micro830.Micro830.SIM_FB.7z
Controller.Micro830.Micro830.TRAFFIC_CONTROLLER_FB.7z
Recent
Desktop
My Documents
My Computer
My Network Places
File name:
Controller.Micro830.Micro830.SIM_FB.7z
Files of type:
Exchange files (*.7z; *.zip)
Open
Cancel

12. With **SIM_FB** checked, click **Import** and verify in the **Output** window that the import was successful:



13. Click **Cancel** to close the Import Export screen.

Chapter 3 - Creating a New Function Block Program

Creating a New Function Block Programming

This section will show you how to create a new function block program. In this function block program, the PID standard function block will be used. A User Defined Function Block will be imported to simulate the process value.

1. Start the Connected Component Workbench from the Start Menu: **Start →All Programs → Rockwell Automation → CCW → Connected Components Workbench**.

Alternatively, double click on the shortcut on the Desktop 

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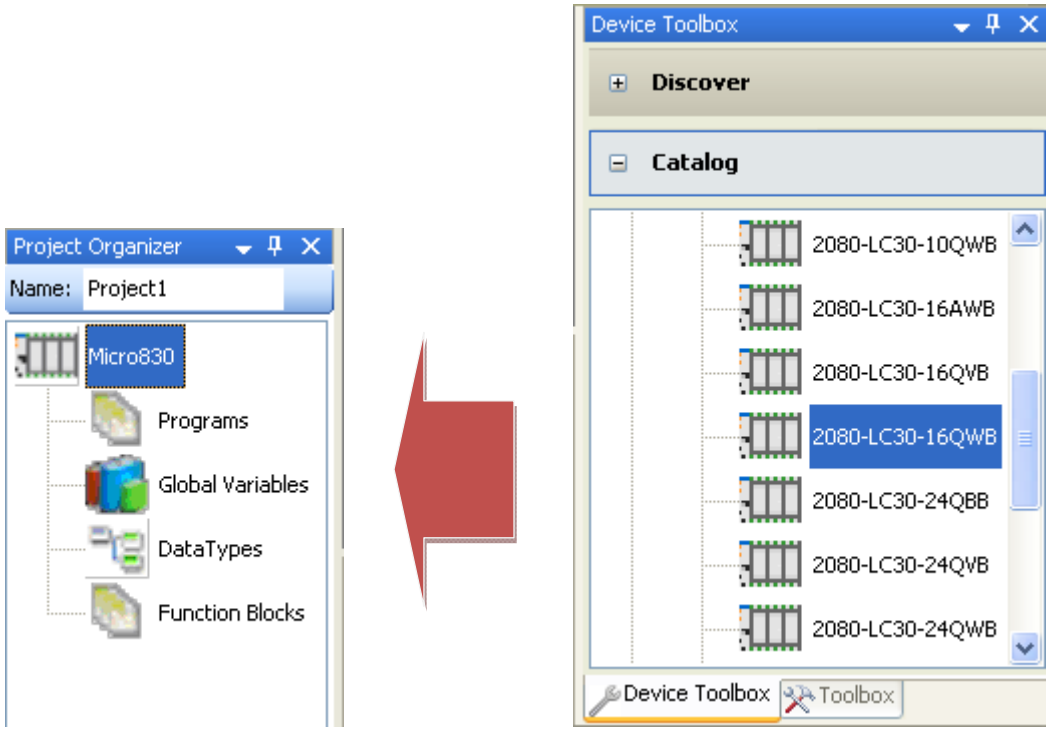
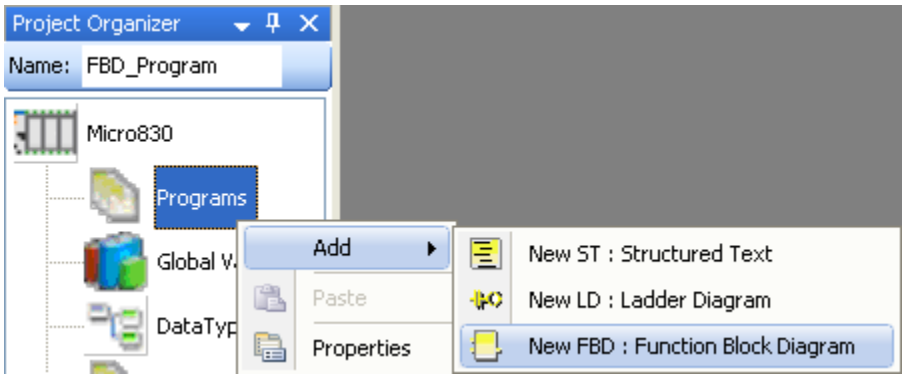
2. At the Connected Component Workbench window, drag **2080-LC30-16QWB** from the **Device Toolbox Catalog** window into the **Project Organizer** window - a new project will be created.

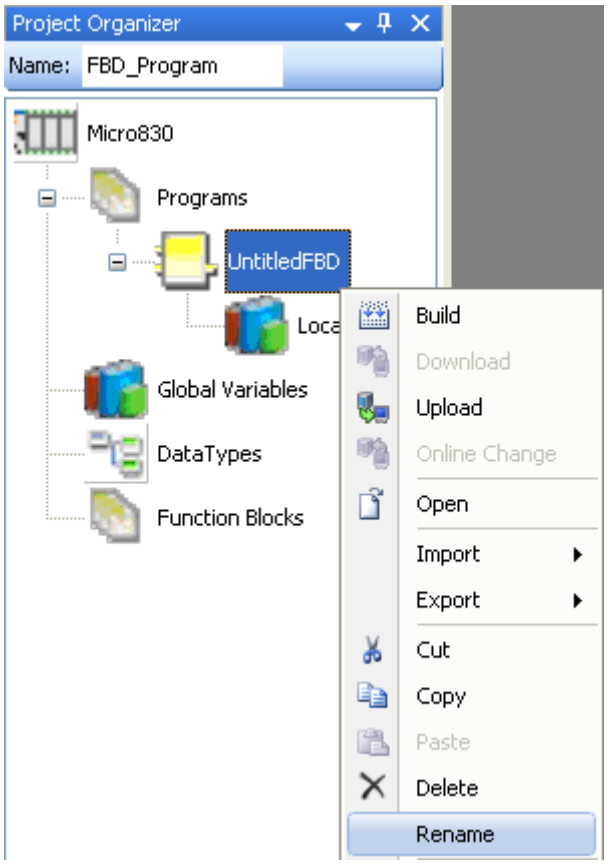


3. In the **Name** field within **Project Organizer**, enter FBD_Program

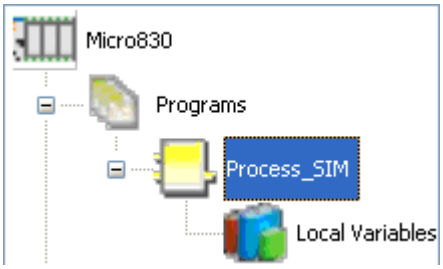
4. Under **Project Organizer**, right click on the **Programs** select **Add** and select **New FBD: Function Block Diagram**.



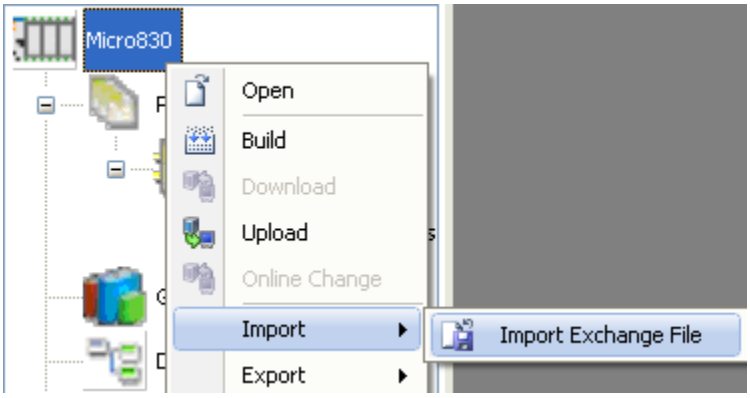
5. Right click on **UntitledFBD** and select **Rename**:



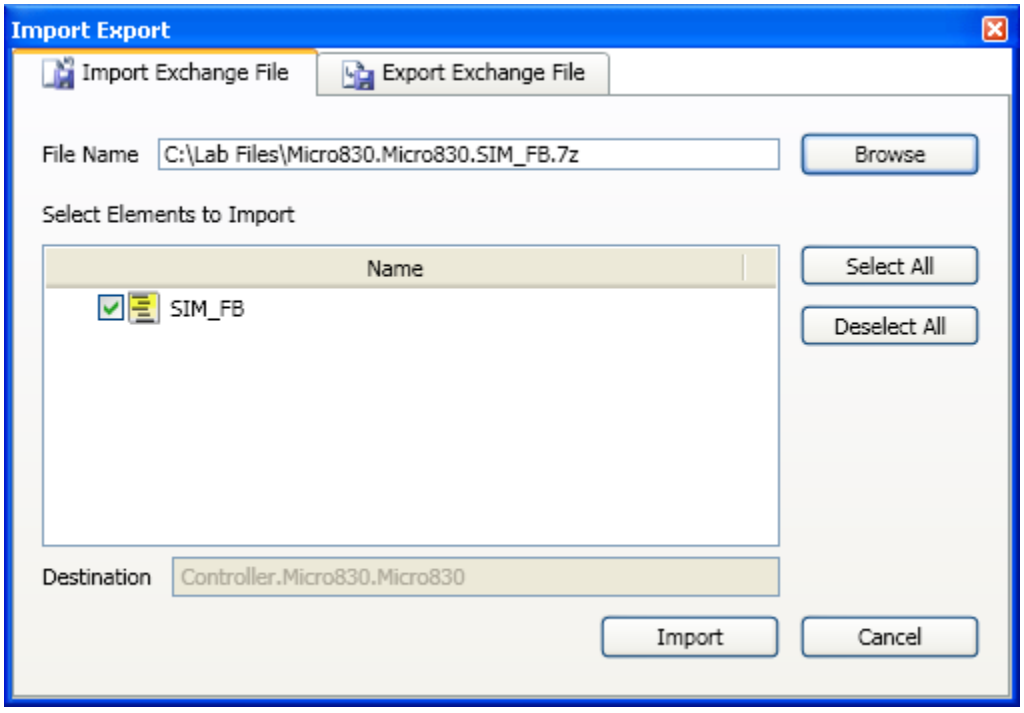
6. Type in **Process_SIM** and Enter:



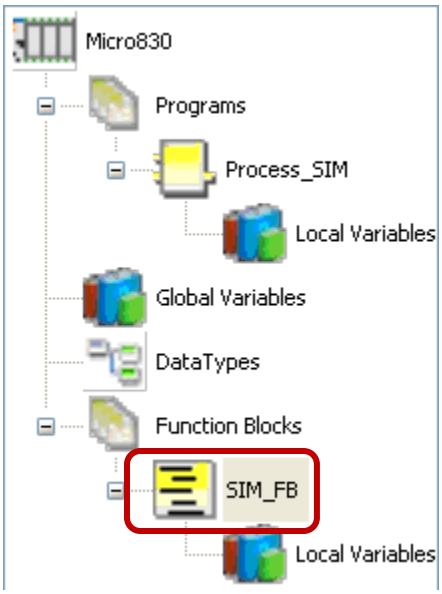
7. Right click on the **Micro830** in **Project Organizer** and from the popup menu select **Import** → **Import Exchange File** as shown.



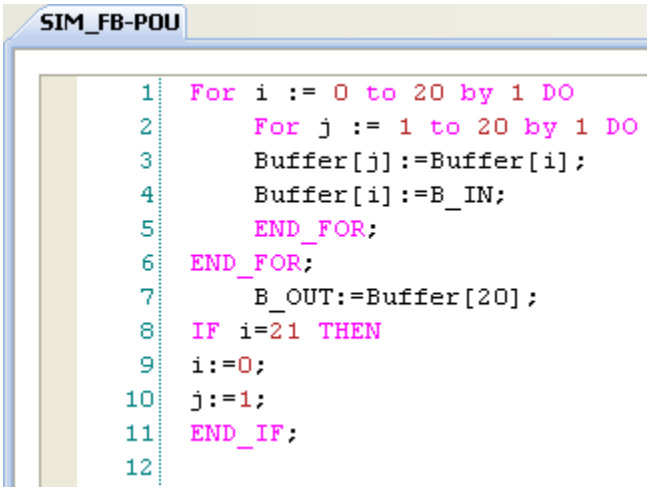
8. The **Import/Export** Window will appear, browse for the file Micro830.Micro830.SIM_FB.7z. Select **SIM_FB**, and press **Import** to import the file. Then, close the window. Note: If you don't have SIM_FB, refer to the previous chapter for details on how to create this user defined function block.



9. The Function Block, SIM_FB will be imported into the **Project Organizer**.

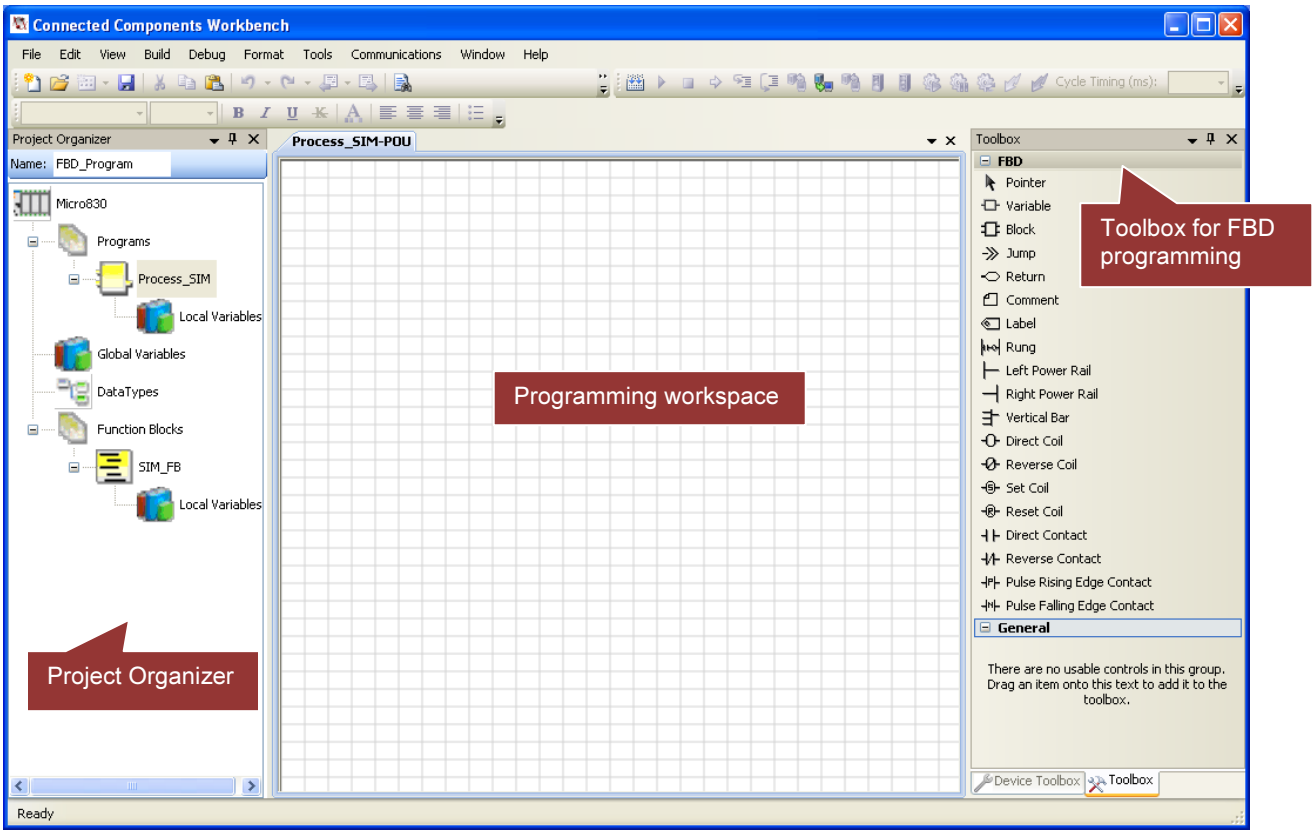


The contents of the SIM_FB Structured Text program is as follows:

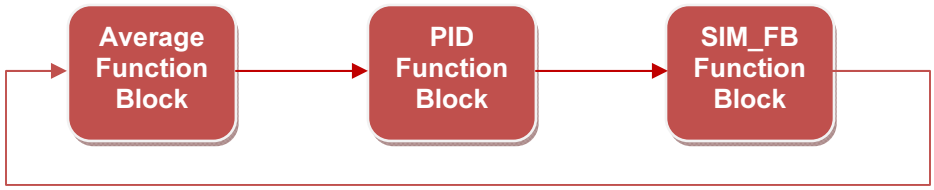


10. Double click on **Process_SIM** within the **Project Organizer** to start editing the Function Block Program.

11. Function Block Diagram (FBD) Programming Toolbox is required for programming.

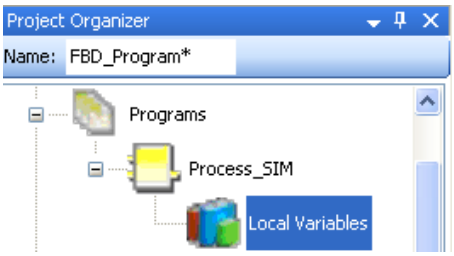


12. The following program logic will be developed.



- The Average Function Block will be used as the sampling rate for the analog input simulation.
- The PID Function Block will be for producing a Control Value (CV) that results in the Process Value (PV) tracking the Setpoint Value (SV).
- The SIM_FB is a simulator block using the concept of FIFO, delaying the feedback to the PID function block.

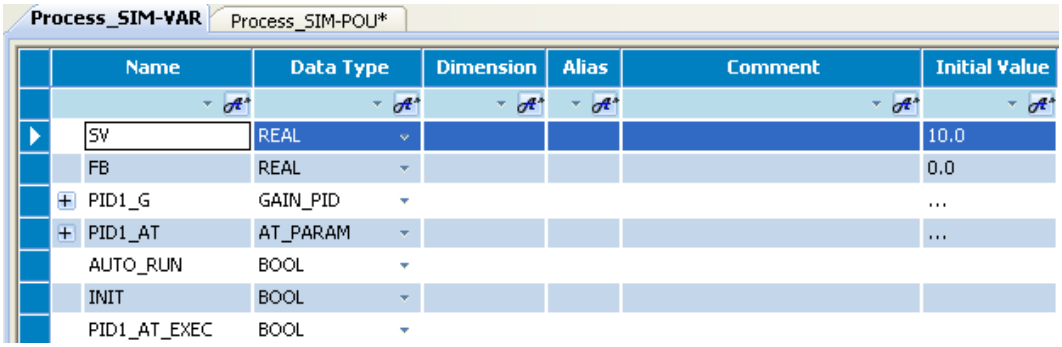
13. Double click on the **Local Variables** in the **Project Organizer** under the **Process_SIM**,



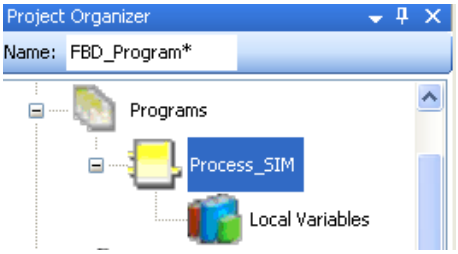
14. Enter the following variables into the **Process_SIM-VAR Tab**.

Name	Data Type	Initial Value
SV	REAL	10.0
FB	REAL	0
PID1_G	GAIN_PID	-
PID1_AT	AT_PARAM	-
AUTO_RUN	BOOL	-
INIT	BOOL	-
PID1_AT_EXEC	BOOL	-

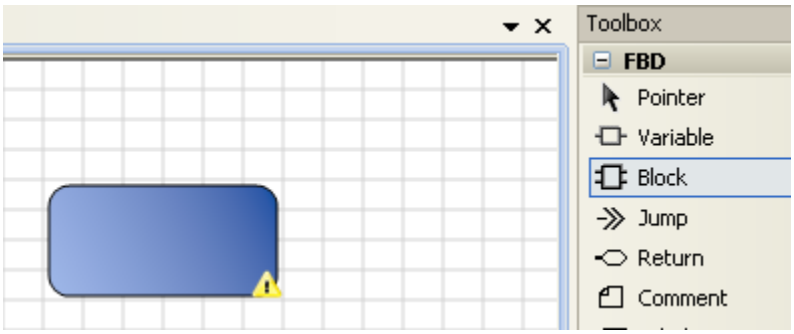
Upon completion, the variables table should be as follows:



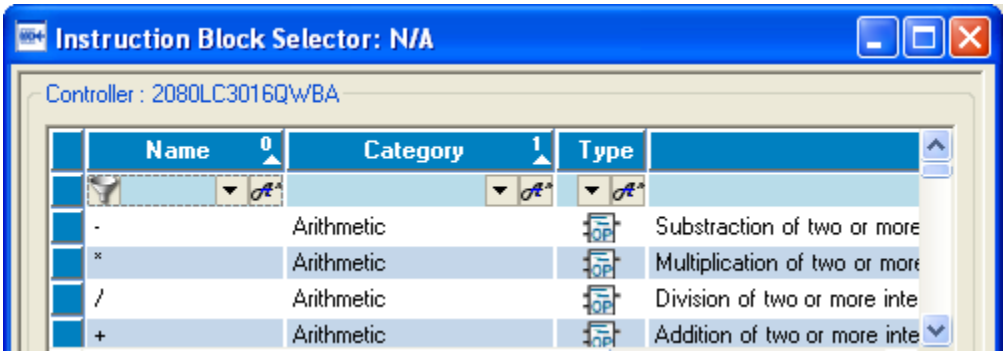
15. Double click on the **Process_SIM**, the programming workspace will appear.



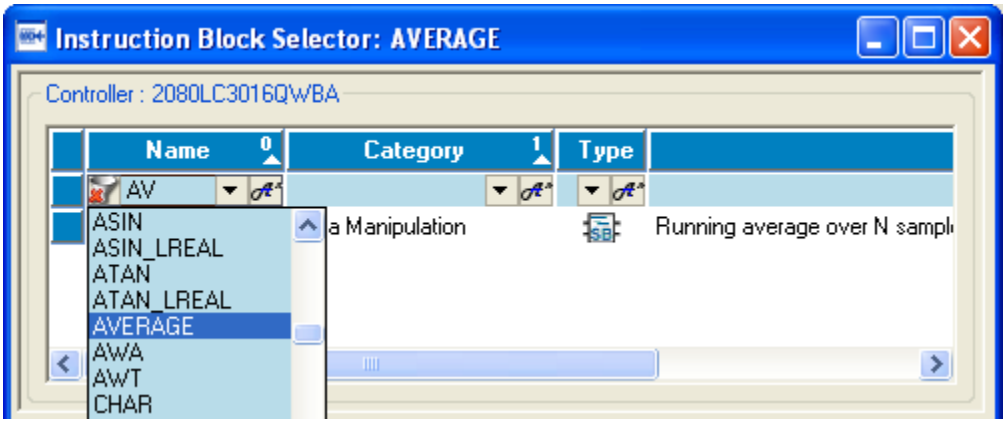
16. Select **Block** from the Toolbox and drag into the Programming Workspace



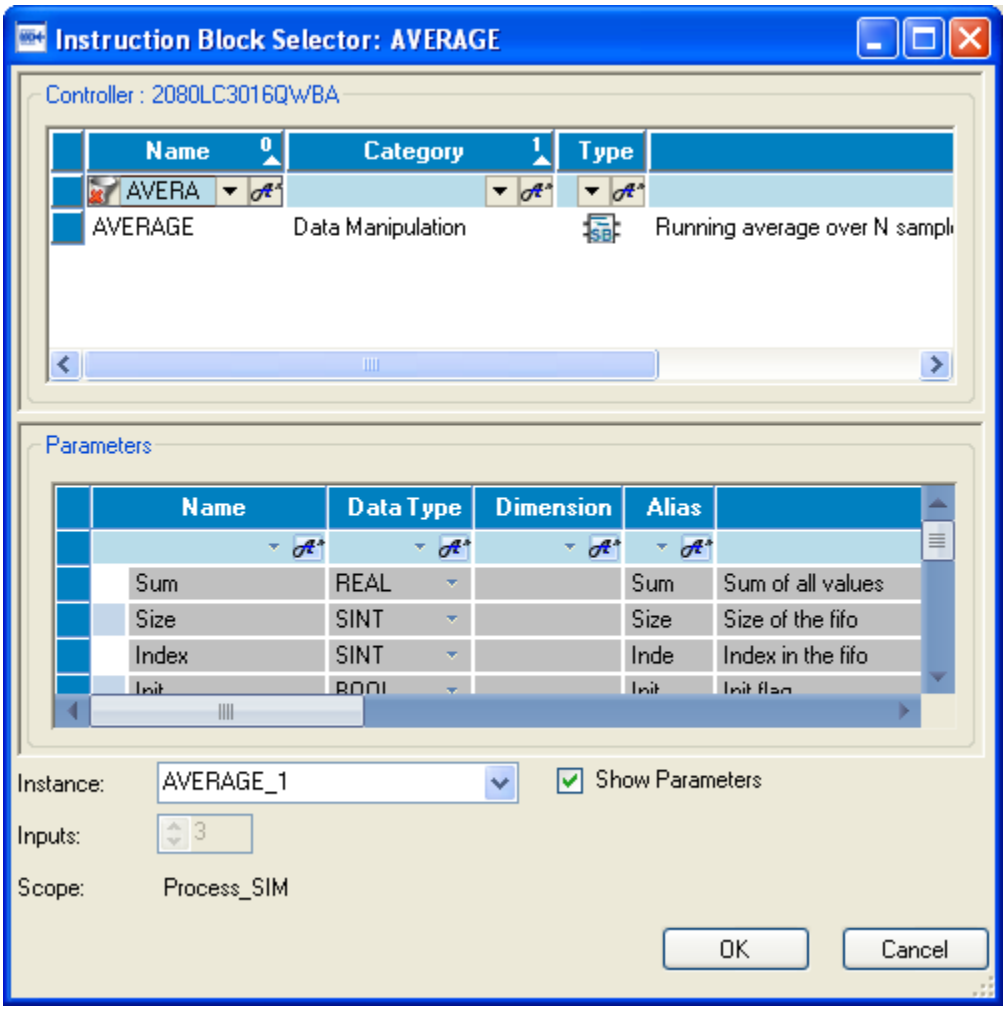
17. The Instruction Block Selector window will appear.



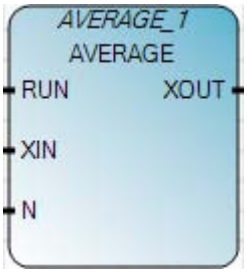
18. Select the **Average** function block from the pull down menu.



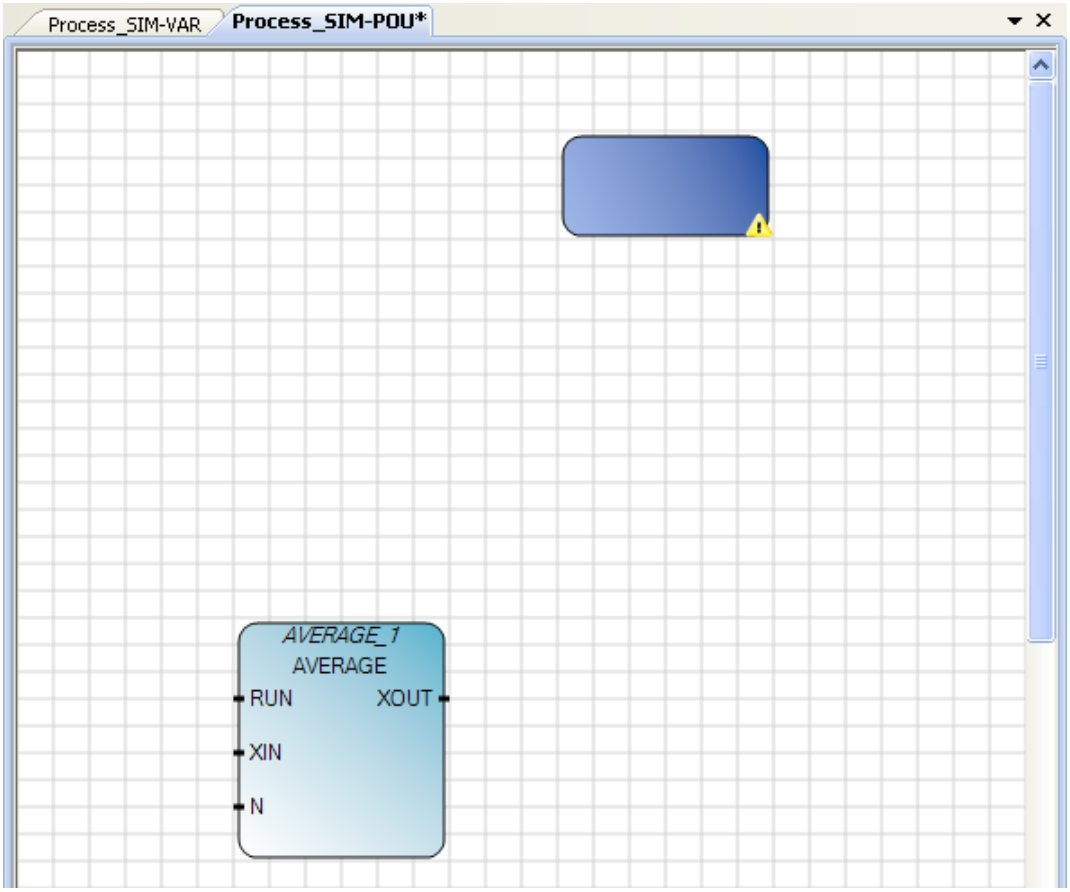
19. The instance AVERAGE_1 will be created, click **OK** to proceed.



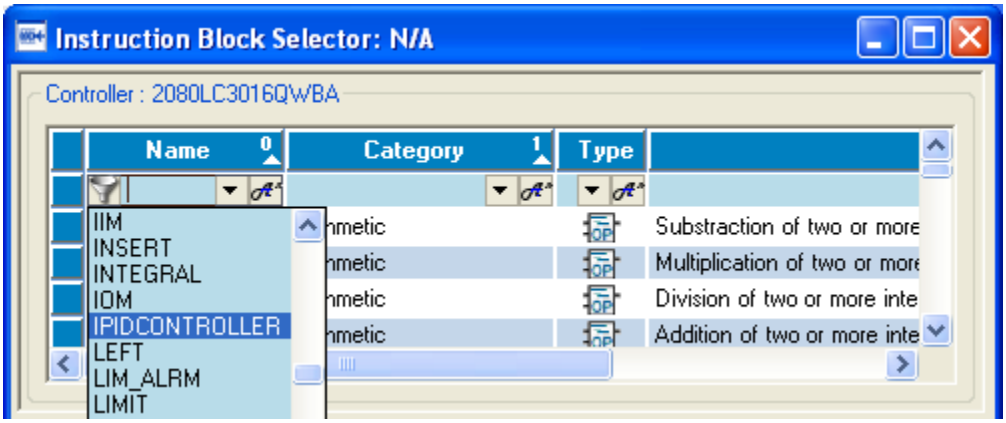
The function block will appear in the workspace.



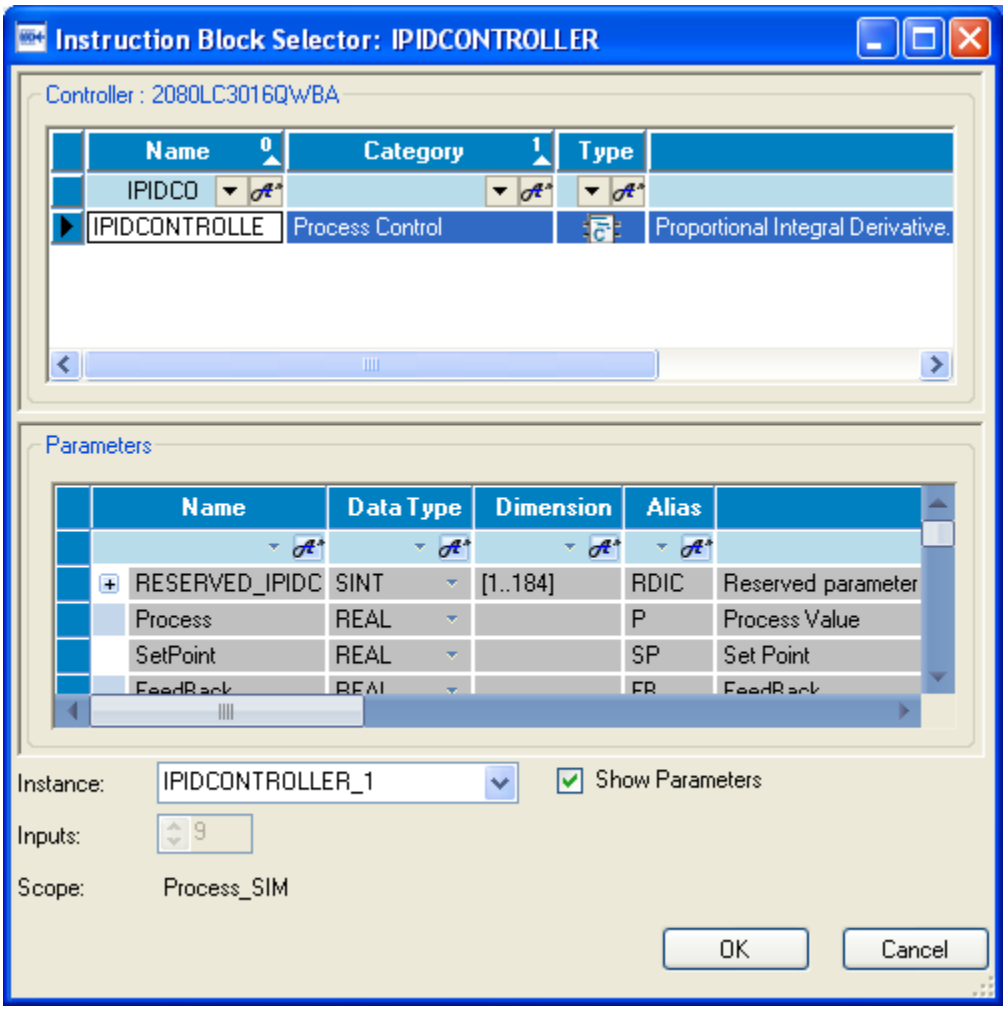
20. Select **Block**, and drag another block into the program workspace.



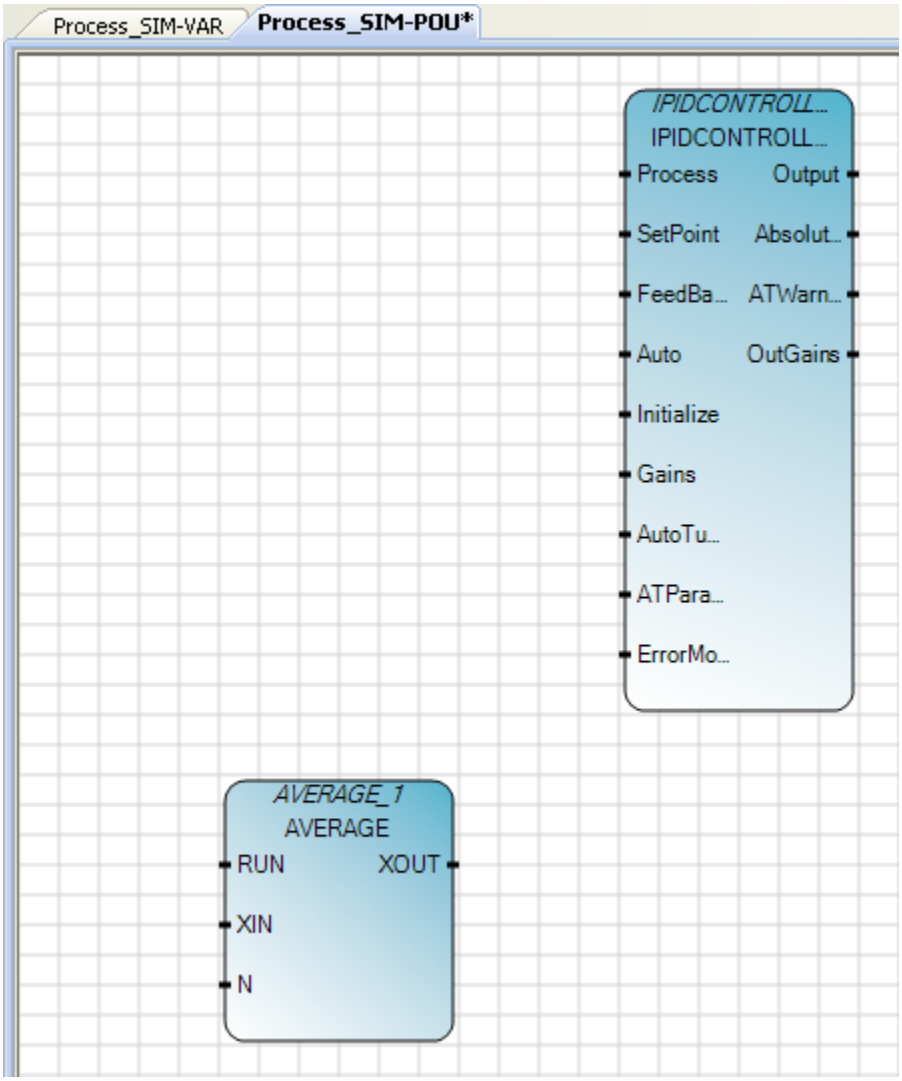
21. Select **IPIDCONTROLLER** function block from the pull-down menu.



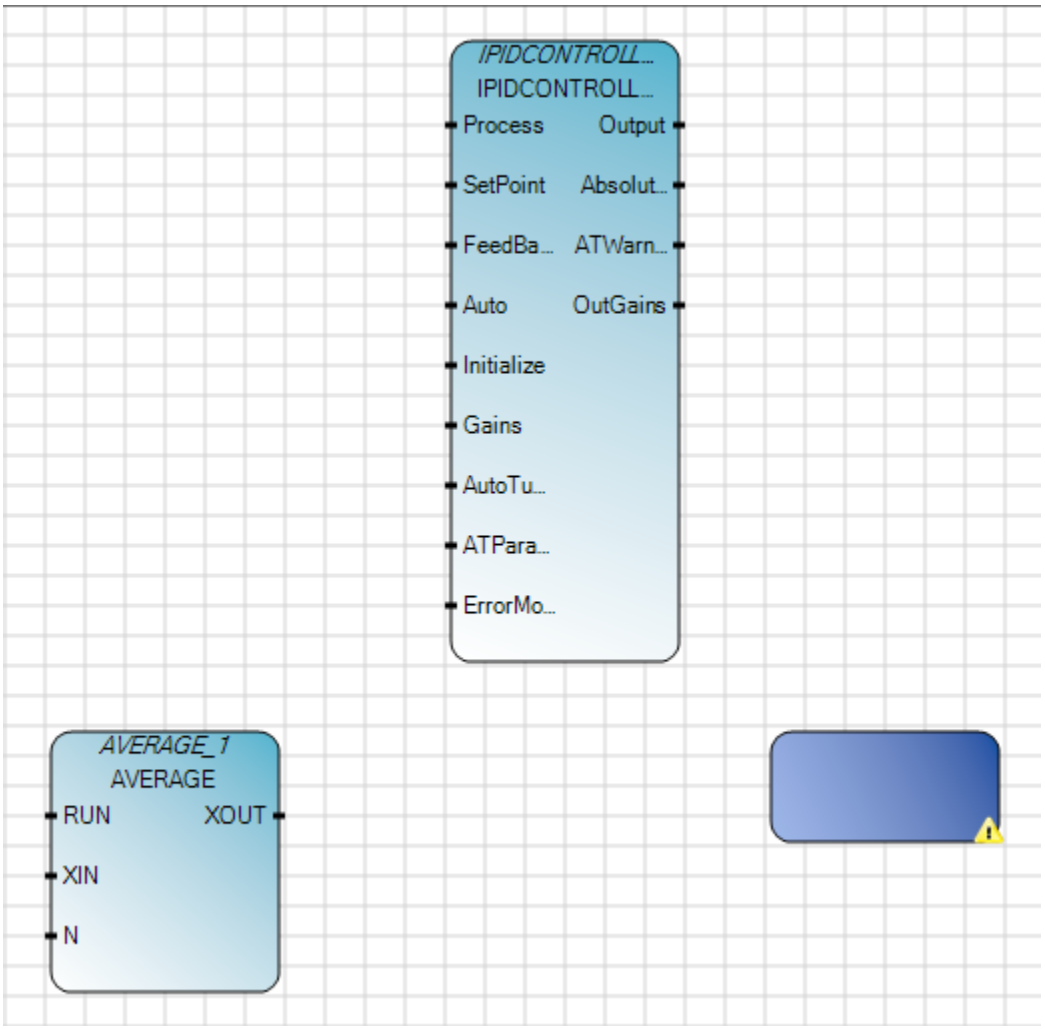
22. The Instance IPIDCONTROLLER_1 will be created.



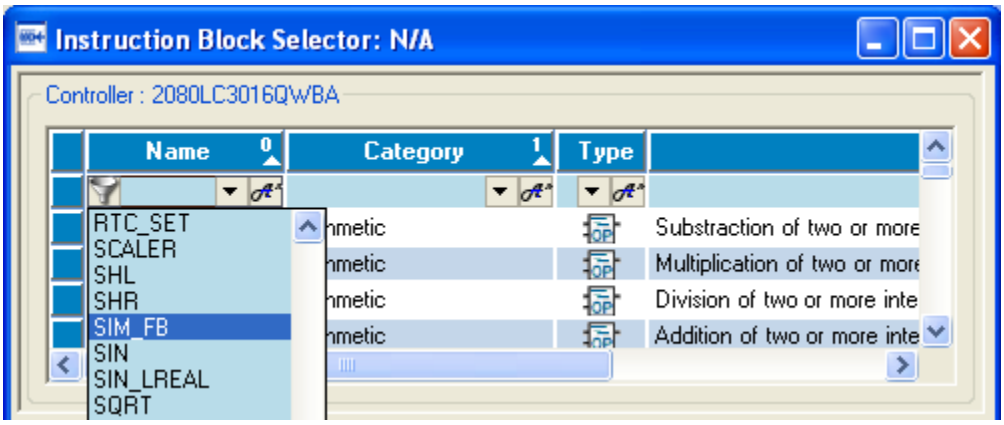
23. The function block will be shown in the programming workspace.



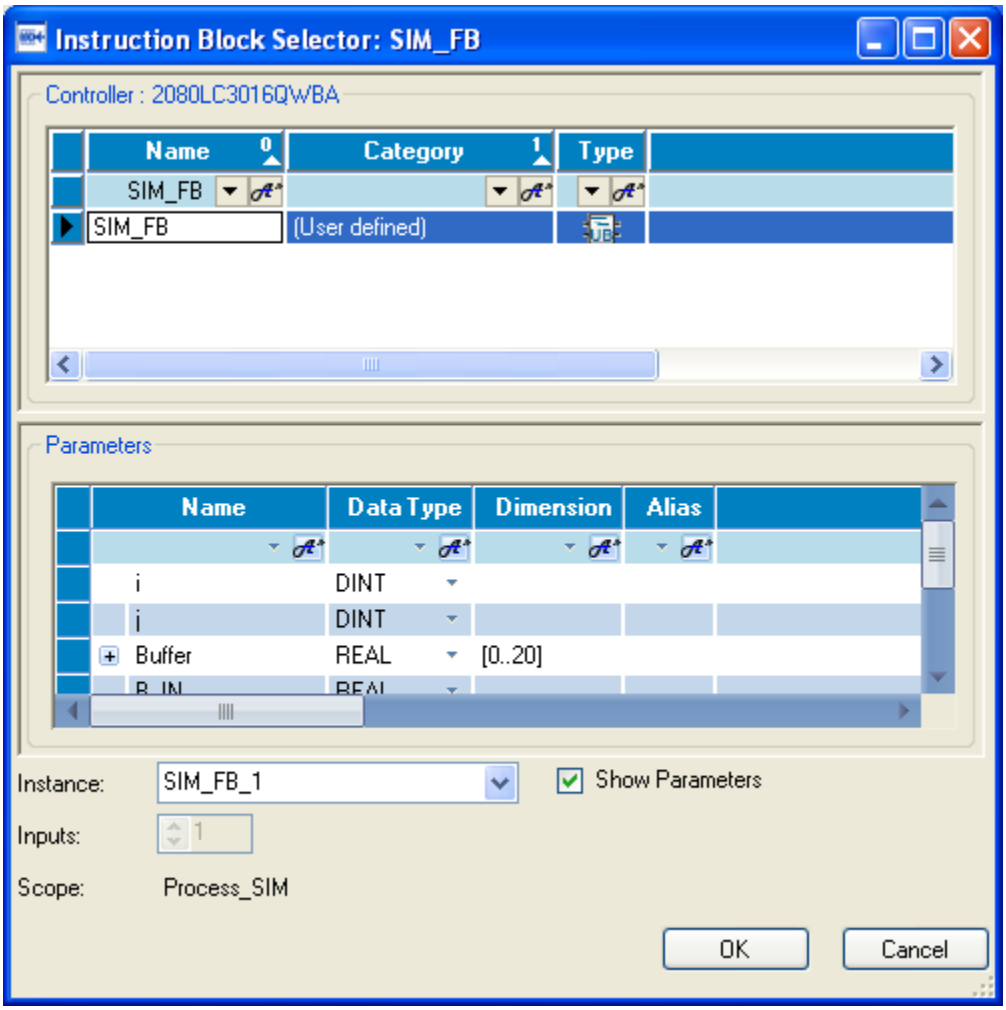
24. Select **Block**, and drag another block into the program workspace.



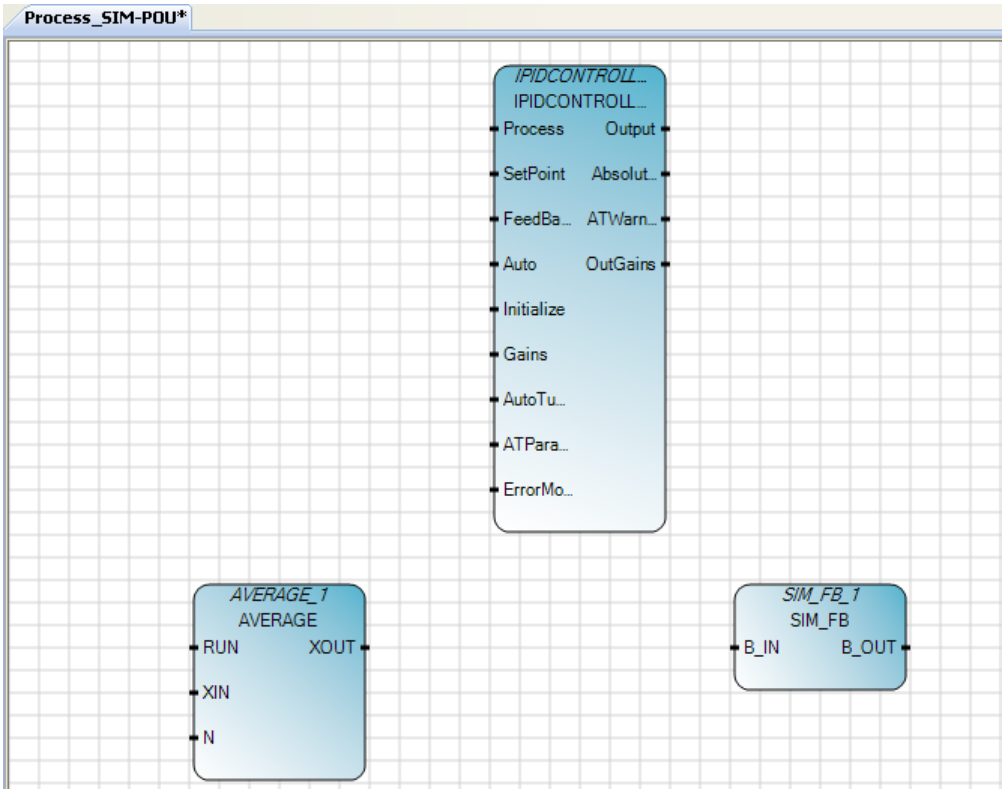
25. Then select **SIM_FB** function block from the pull-down menu.



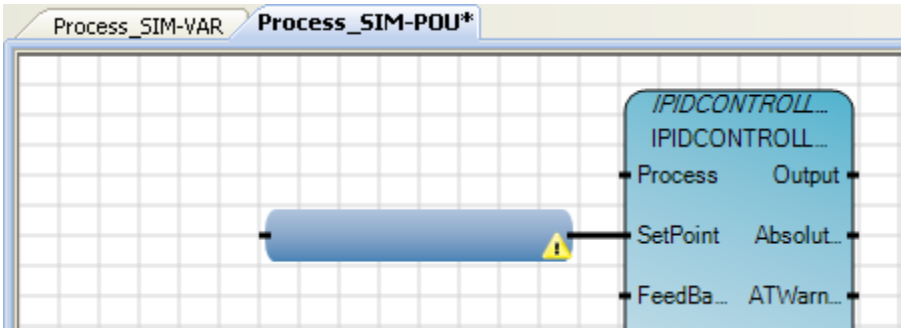
26. The Instance SIM_FB_1 will be created.



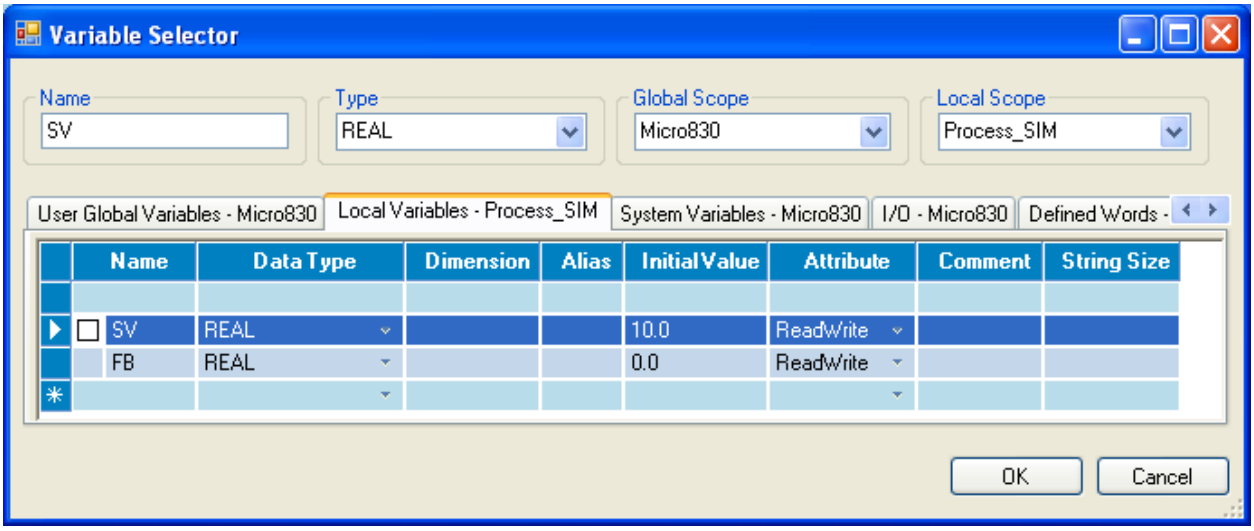
27. After completing Steps 15-26, the programming workspace should have 3 function blocks as shown below.



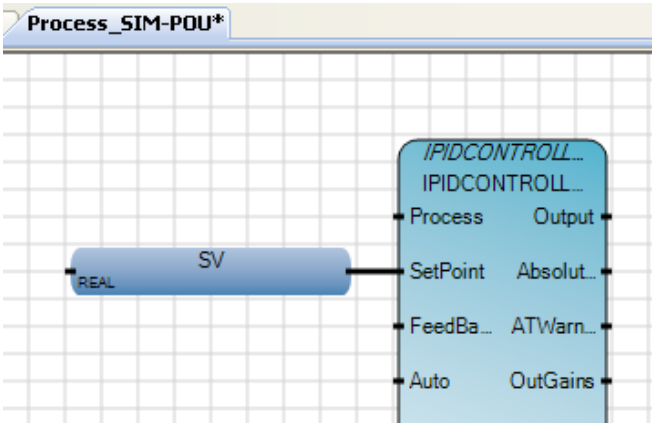
28. Select the **Variable** from the Toolbox, and drag to the programming workspace. Connect it to the **SetPoint** of IPIDCONTROLLER_1 Function Block as shown below:



29. Then select SV from the **Local Variable-Process_SIM**, to assign to the **Setpoint** of the IPIDCONTROLLER_1.



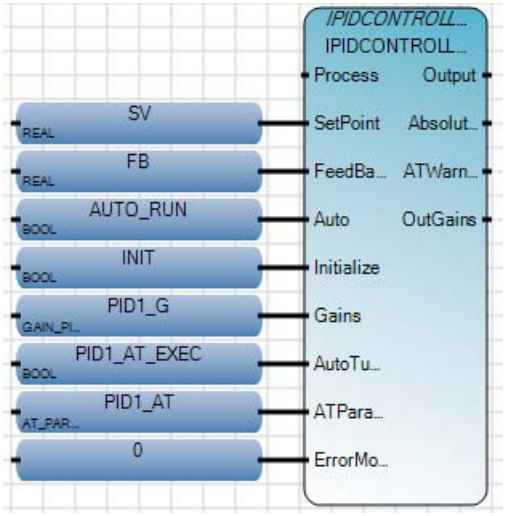
30. SV will pass the parameter value to the **SetPoint** of the IPIDCONTROLLER_1



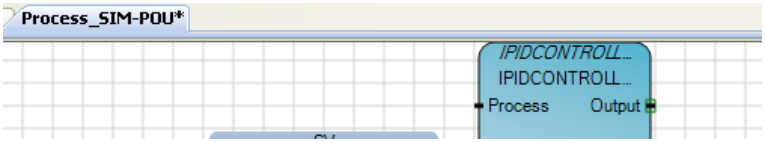
31. Repeat Steps 28-30 for the parameters shown for IPIDCONTROLLER_1

IPIDCONTROLLER Parameter	Local Variable – Process_SIM	Value
Feedback	FB	
Auto	AUTO_RUN	
Initialize	INIT	
Gains	PID1_GAINS	
AutoTune	PID1_AT_EXEC	
ATParameters	PID1_AT	
ErrorMode		0

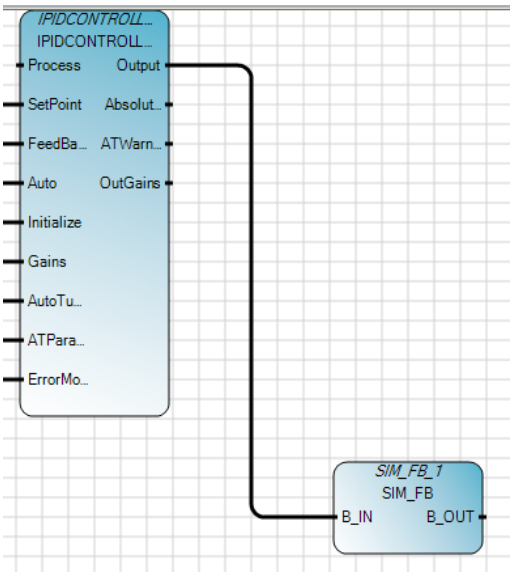
32. After completing, the IPIDCONTROLLER_1 should appear as shown below:



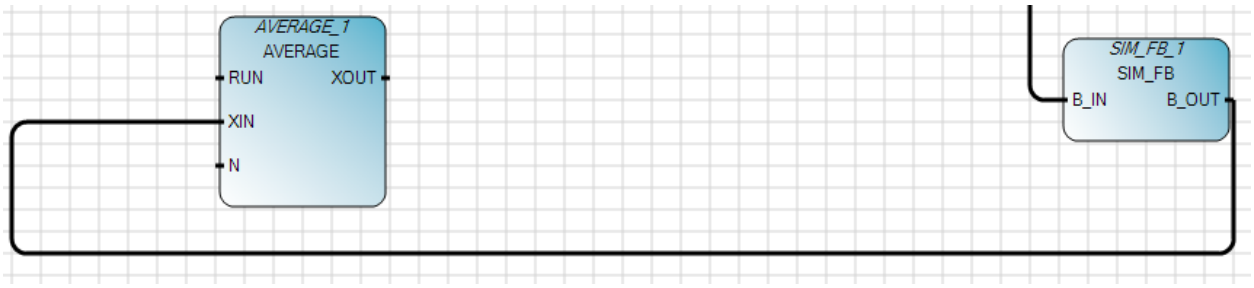
33. Click on the **Output** of IPIDCONTROLLER_1, then connect to the **B_IN** of the SIM_FB_1.



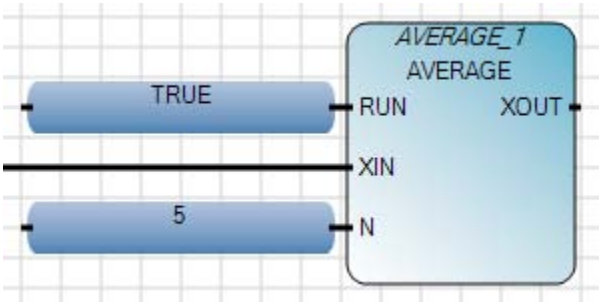
As shown.



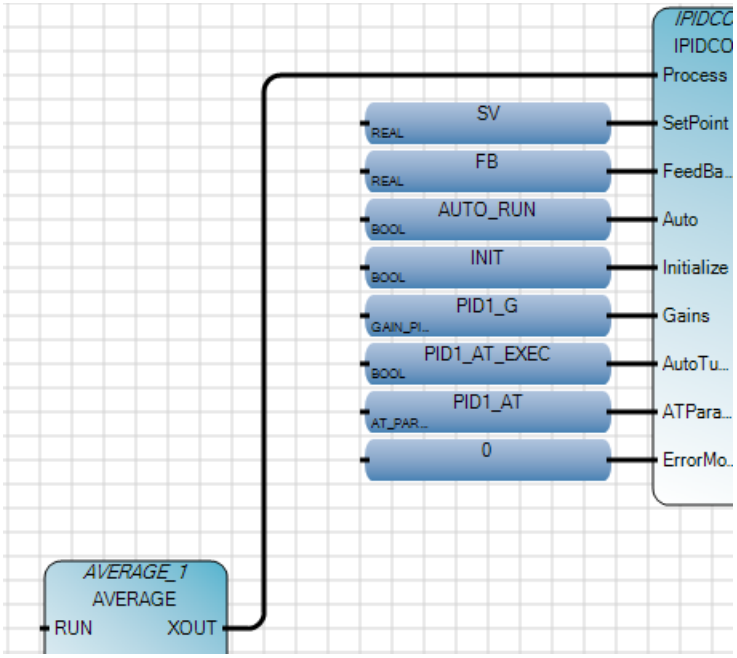
34. Then connect **B_OUT of the SIM_FB_1** to the **XIN** of the AVERAGE_1.



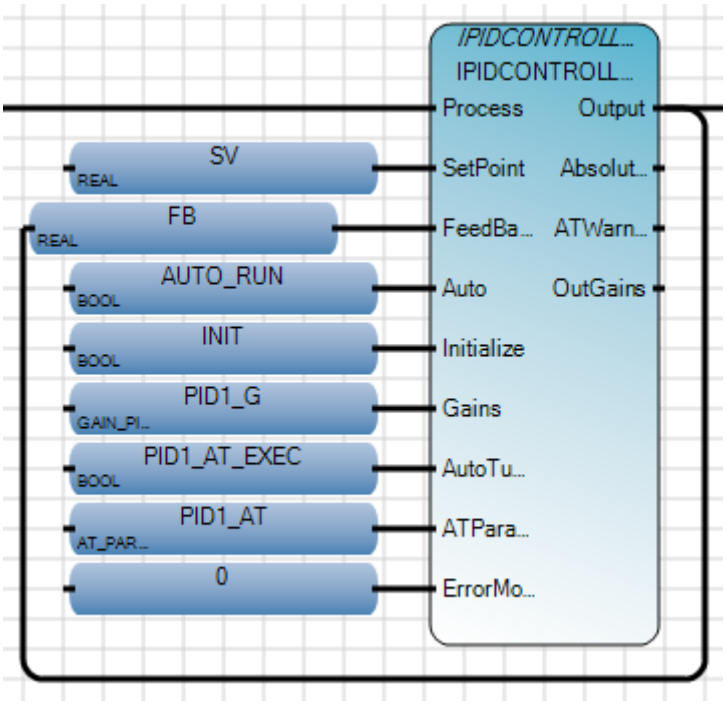
35. Connect a variable at **N** of the AVERAGE_1 and enter a sample cycle value of 5. Insert a TRUE variable for **RUN**.



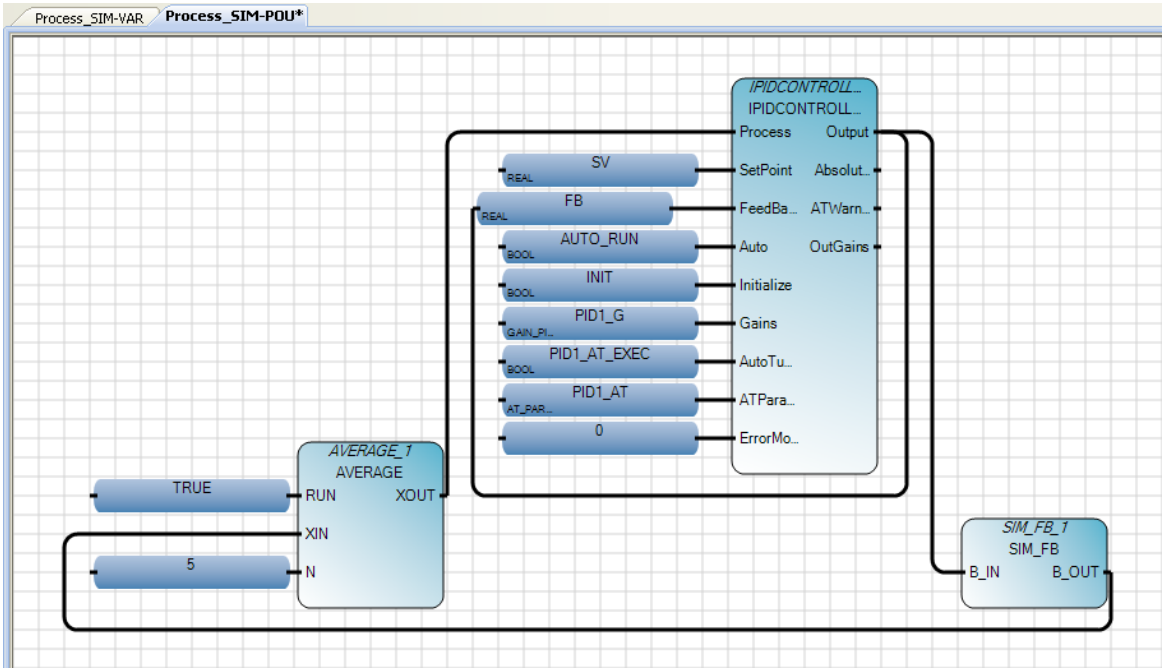
36. Then connect **XOUT** of AVERAGE_1 to the Process of the IPIDCONTROLLER_1.



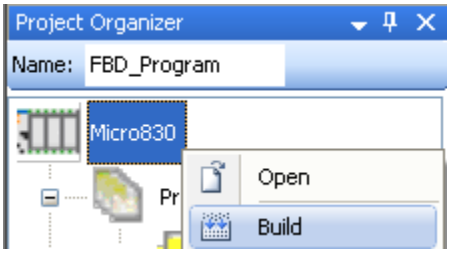
37. Click on the **Output** of IPIDCONTROLLER_1 again, then connect to **FeedBack** of IPIDCONTROLLER_1.



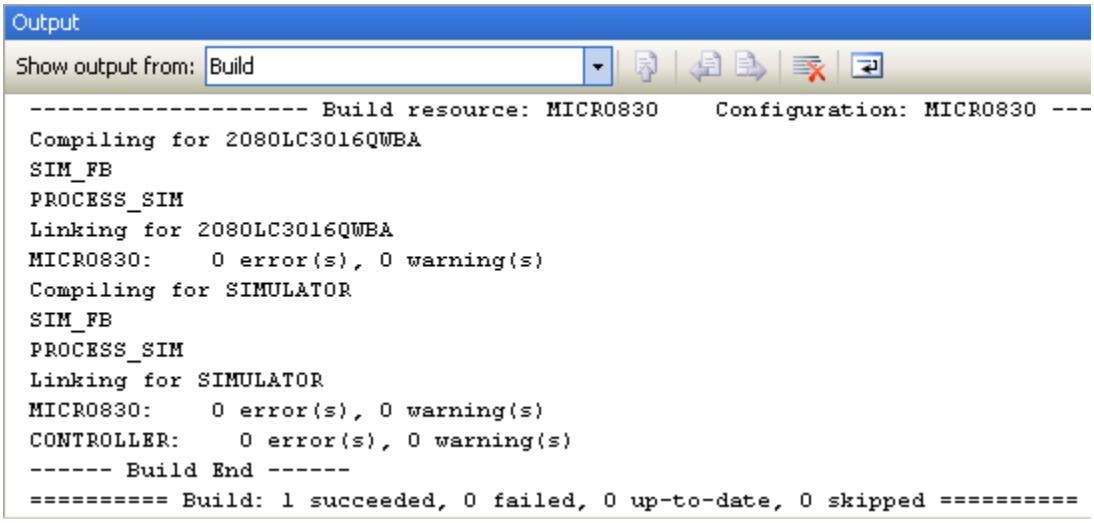
38. The complete program should appear as follows:



39. Finally, build and save the Function Block Program. Right click on the Micro830 icon in Project Organizer and select **Build**.



40. At the **Output** window at the bottom center of the screen, the build should show succeeded.

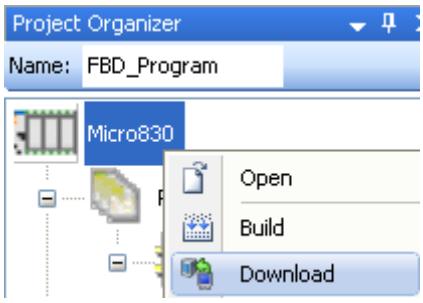


Click on **Save** icon  to save your work.

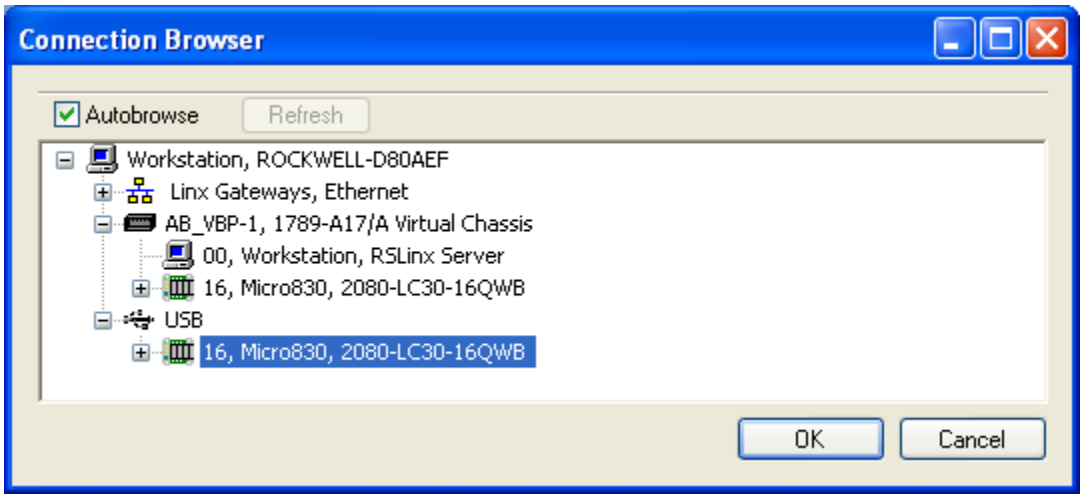
Testing the Function Block Program

This section will show you how to test the Function Block Program created, proceed with the steps shown below.

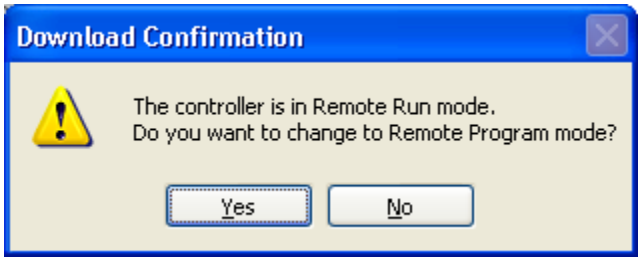
1. In the **Project Organizer**, right click on **Micro830**, and select **Download.**



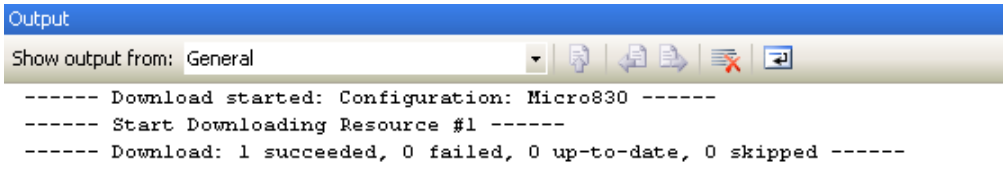
2. From the **Connection Browser**, select **2080-L30-16QWB**, and click on OK.



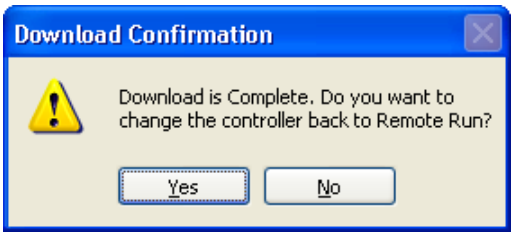
3. The following dialog box will appear for confirmation of the downloading if the controller is in RUN mode click **Yes** to proceed.



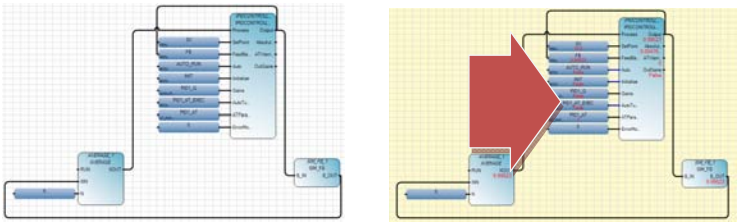
4. If the download is successful the **Output** window will display **Succeeded**



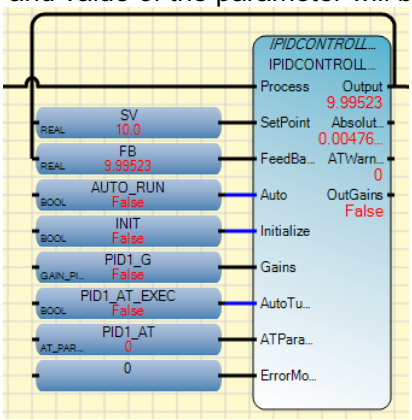
5. The following window will appear to change from Program Mode to Run Mode. Click **Yes** to proceed.



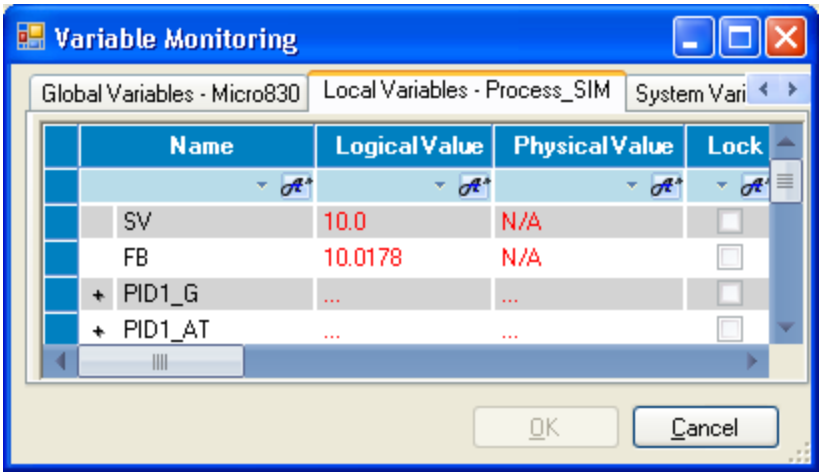
6. Click on the  at the Debug Toolbar, the programming workspace will change from a white to beige background.



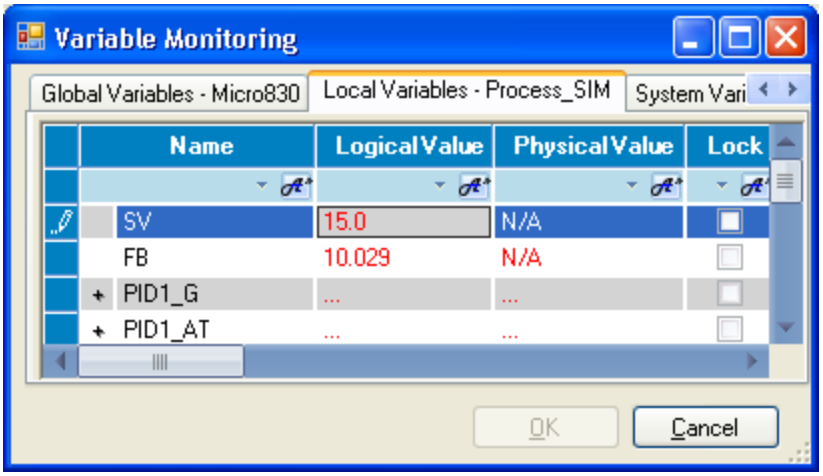
At the same time, the status and value of the parameter will be display on screen.



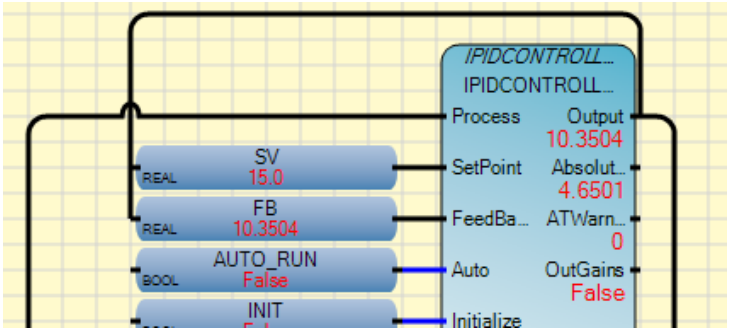
7. To change the **SV** value of the IPIDCONTROLLER_1, double click on **SV**. The following Variable Monitoring window will appear.



8. Change the **SV** to 15.0 by clicking on the **Logical Value** field, then hit enter.

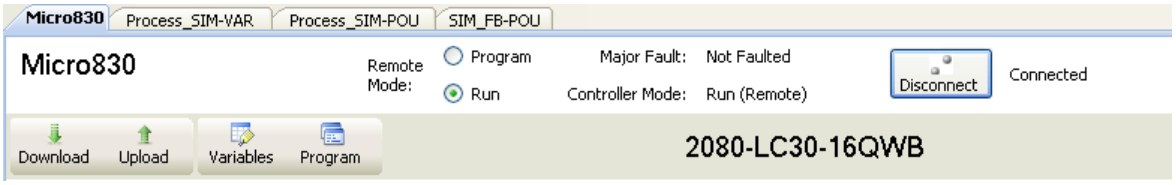


9. Monitored the Output Value of the IPIDCONTROLLER_1, you will be able to see the value increase.



10. To stop monitoring the variable, click on  at the Debug Toolbar.

11. Then from the Micro830 tab, click on **Disconnect** to go offline.



Chapter 4 - Creating a New Structured Text Program

Creating a New Structured Text Program

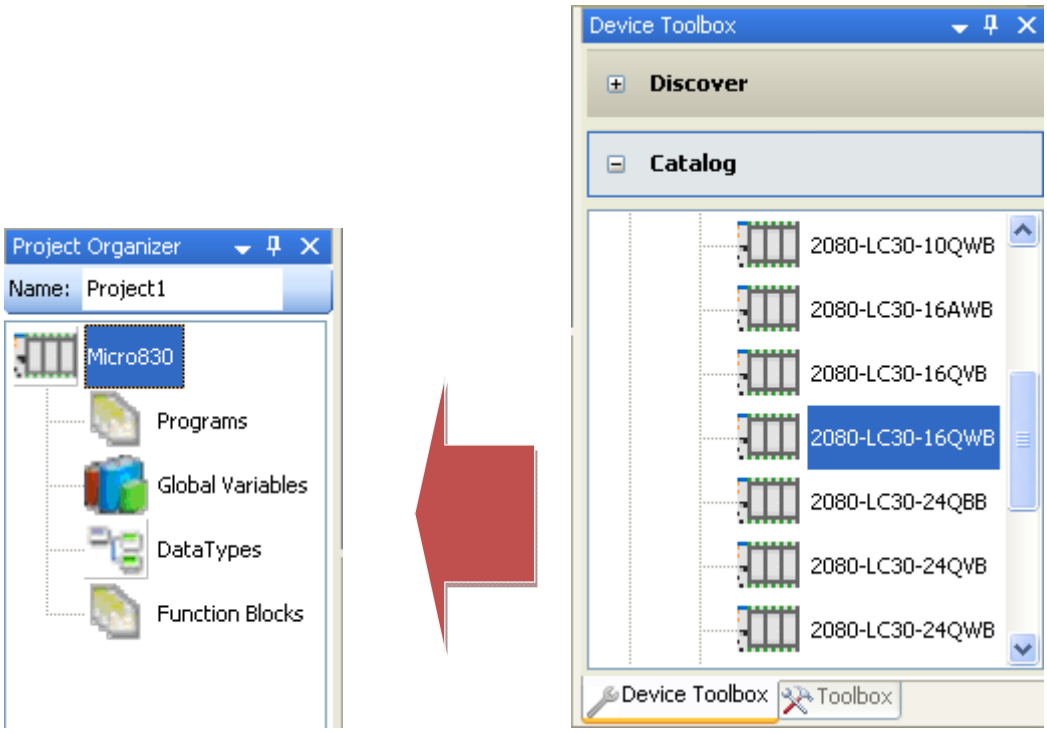
This chapter will show you how to create a new structured text program for creating menu selections and simple mathematical calculations.

1. Start the Connected Component Workbench for the Start Menu: **Start →All Programs → Rockwell Automation → CCW → Connected Components Workbench**.

Alternatively, double click on the shortcut on the Desktop 

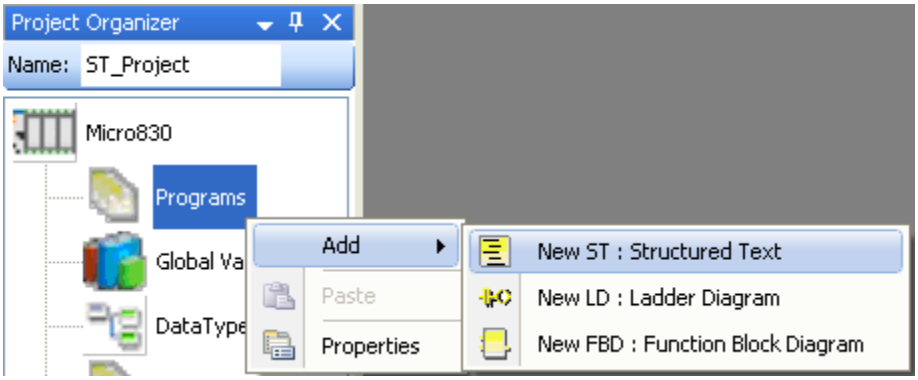
.

2. At the Connected Component Workbench window, drag **2080-LC30-16QWB** from the **Device Toolbox Catalog** window into the **Project Organizer** window. A new project will be created.

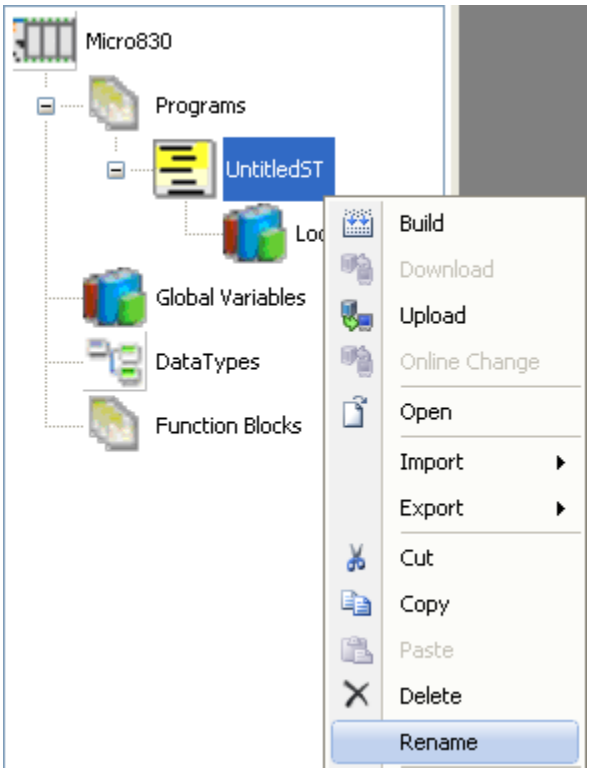


3. At the **Name** field, under the **Project Organizer**, enter ST_Program.

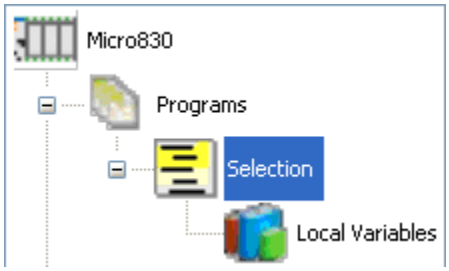
4. Under the **Project Organizer**, right click on the **Programs** select **Add** and select **New ST: Structured Text.**



5. Right click on **UntitledST** and select **Rename**:

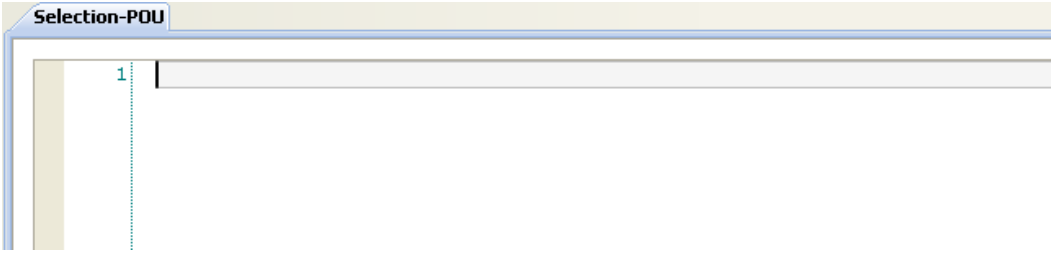


6. Type **Selection** and Enter:

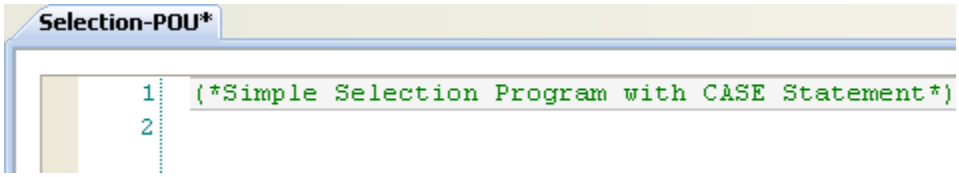


7. Double click on **Selection** within the **Project Organizer** to start editing the Structured Text program.

8. Click at the Line no. “1” at the **Selection-POU*** tab.

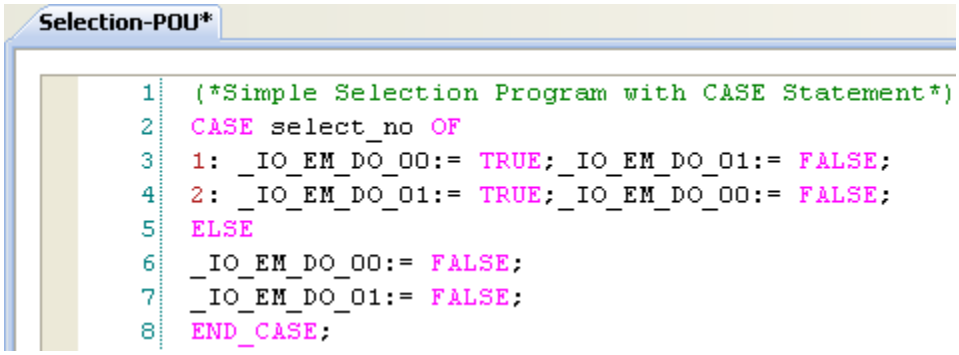


9. Enter the following sentence “(*Simple Selection Program with CASE Statement*)”, then hit enter.



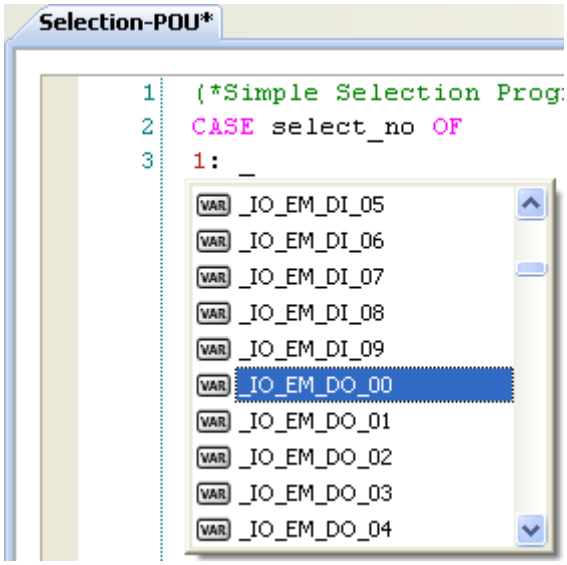
Note: For entering comments use “**(*** comments ***)**”

10. Click at Line no. ”2” at the **Selection-POU*** tab, enter the following program.



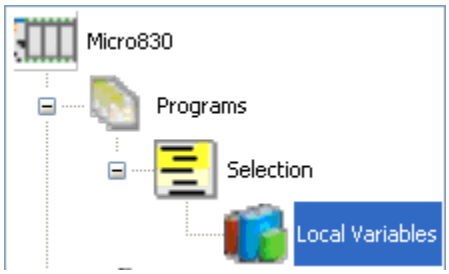
Note: All Structured Text Reserve word will be represented in magenta, and comments will be represented in Green.

When entering the IO variable, we are able to select from the pull down menu as shown

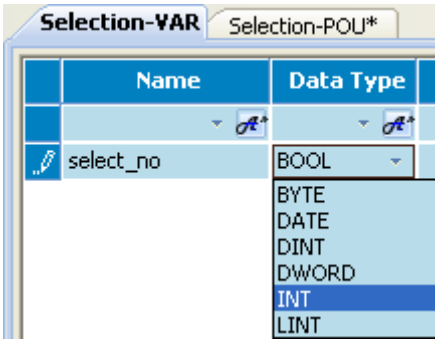


For Boolean expression, True is “1” and False is “0”.

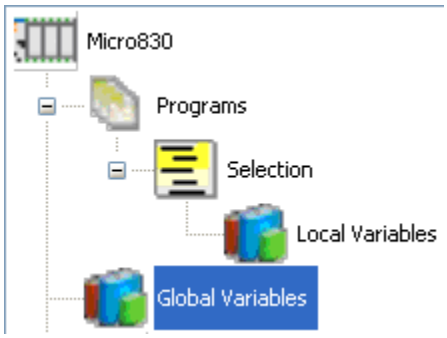
11. Double click on the **Local Variables** under the Selection programs to define a new variable.



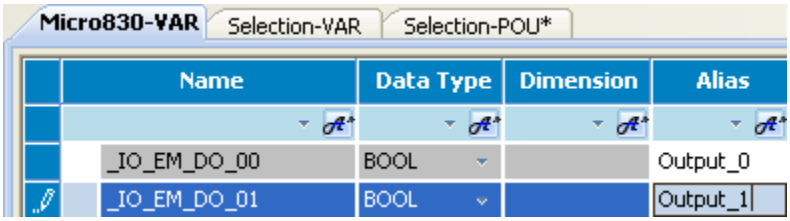
12. Create an **integer** variable **select_no** as shown:



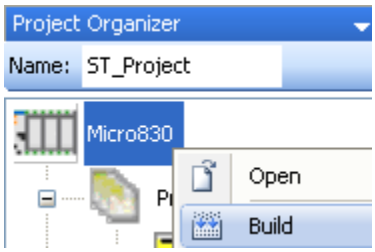
13. At the Project Organizer, double click on the **Global Variables** to create the Alias for the outputs.



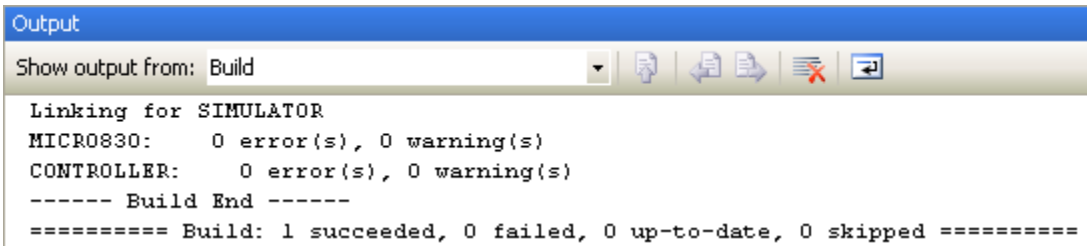
14. At **Micro830-VAR** tab, enter **Output_0** at **Alias** for **_IO_EM_DO_00** and **Output_1** at **Alias** for **_IO_EM_DO_01**.



15. Finally, build and save the structured text programming. Right click on the Micro830 icon in **Project Organizer** and select **Build**.



16. At the **Output** window at the bottom center of the screen, the build should show succeeded.



Click on **Save** icon  to save your work.

Inserting a Function Block in a Structured Text Program

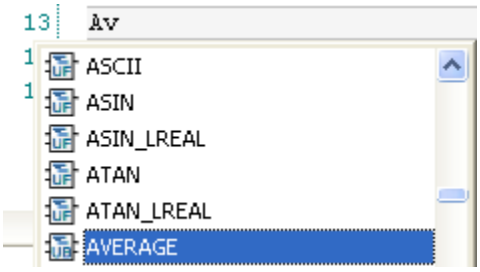
This section will show you how to insert at function block in the existing Structured Text Program.

1. Double click on the **Selection**, to edit.

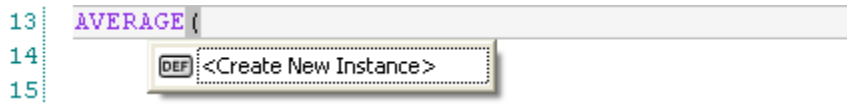
2. At Line 10 of the **Selection-POU*** tab, enter the following sentences

```
 9
10  IF _IO_EM_DO_00 THEN
11  i:= a*b*c;
12      ELSE IF _IO_EM_DO_01 THEN
```

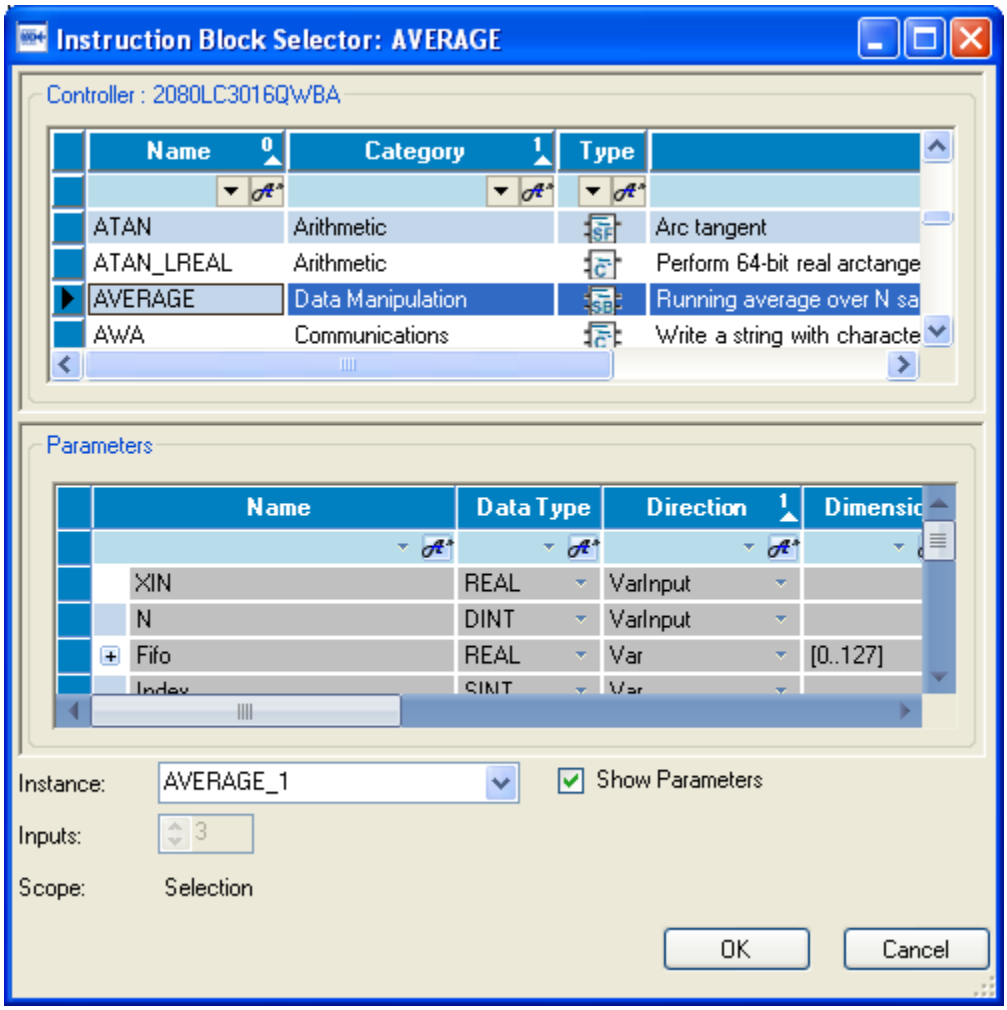
3. At line 13 of the **Selection-POU*** tab, enter "**AV**" and select **AVERAGE** from the pull down menu.



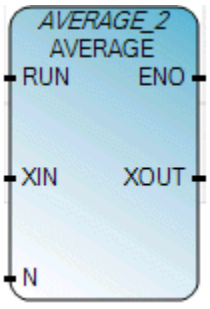
4. Then key in " **(** " the following pull down menu will appear. Select the **<Create New Instance>**



5. The following dialog box will appear, AVERAGE_1 is created.



Note: 3 Inputs are required for Average function block, similar to Ladder Logic Representation.



RUN, XIN,N parameter will be required.

6. Click **OK** to create an instance. When entering the instance, the popup box will indicate the parameter needed for the Function block.

```
10  IF _IO_EM_DO_00 THEN
11  i:= a*b*c;
12      ELSE IF _IO_EM_DO_01 THEN
13  AVERAGE_1(
```

void **AVERAGE_1**(BOOL RUN, REAL XIN, DINT N)
Type : AVERAGE, Running average over N samples

7. Please end the parameter as shown:

   '**AVERAGE_1(_IO_EM_DO_01,a,3)**'
   Where:
   RUN = _IO_EM_DO_01
   XIN = a
   N = 3

8. Then assign the output of the AVERAGE to j, as per shown. Close the IF statement with END_IF.

```
 9
10  IF _IO_EM_DO_00 THEN
11  i:= a*b*c;
12      ELSE IF _IO_EM_DO_01 THEN
13      AVERAGE_1(_IO_EM_DO_01,a,3);
14      j:= AVERAGE_1.XOUT;
15      END_IF;
16  END_IF;
```

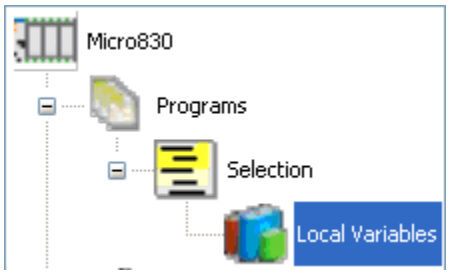
   Notes:

   - The mathematical equation can be expressed by entering it as is. If doing the calculation in ladder, you might need a few function blocks to complete the equation.

     Example: i := a + b + c; or circumference := 2*3,142*r; (with r is the variable) or r:= circumference/(2*3.142);

   - When using IF statement, we must also close with an END_IF, in the case if there is an ELSE_IF statement used, we must also close the ELSE_IF statement with END_IF.

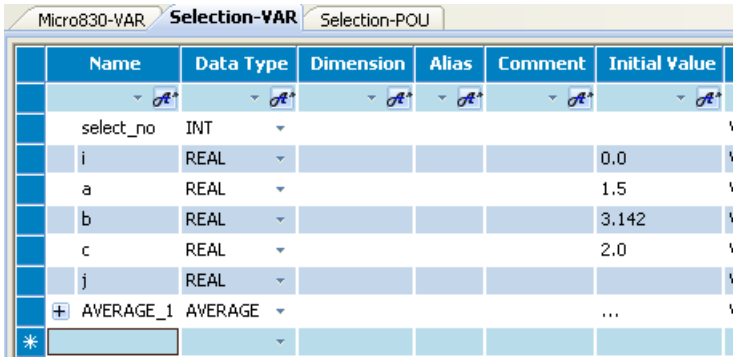
9. In completion of writing the program, variables used must be created. Double click on the **Local Variables** under the Selection programs to create variable.



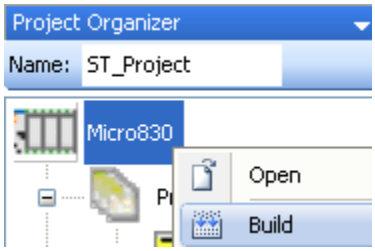
10. Create the following variables for the program

Name	Data Type	Initial Value
a	Real	0.0
b	Real	1.5
c	Real	3.142
i	Real	2.0
j	Real	0.0

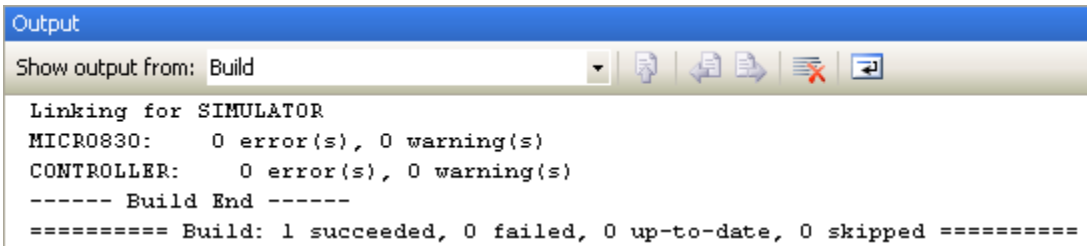
The Selection-VAR tab should look like the following:



11. Finally, build and save the structure text programming. Right click on the Micro830 icon in **Project Organizer** and select **Build**.



12. At the **Output** window at the bottom center of the screen, the build should show succeeded.

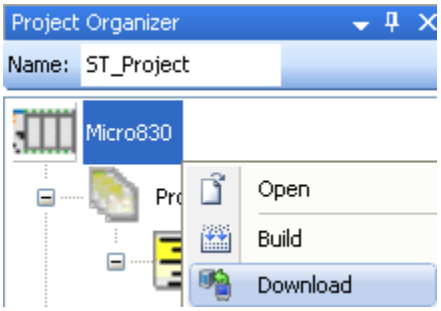


Click on **Save** icon  to save your work.

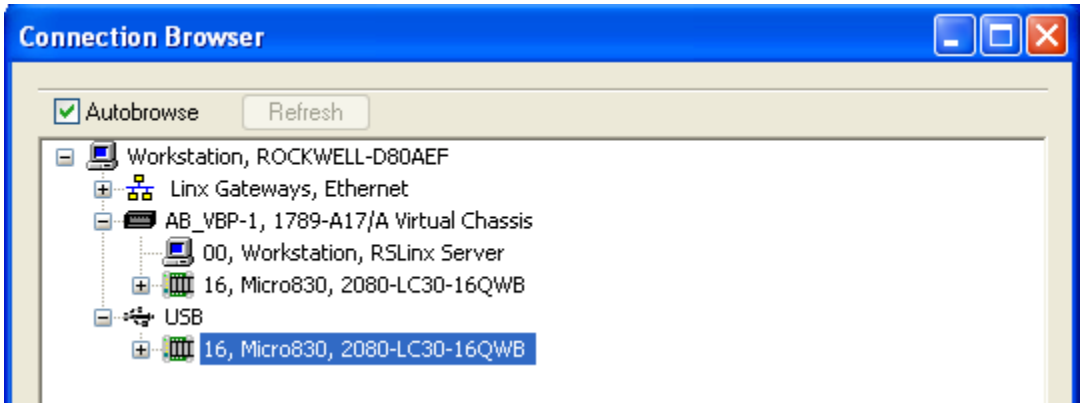
Testing the Function Block Program

This section will show you how to test the Function Block Program created. In continue to the steps in Creating New Function Block Program, proceed with the steps shown below.

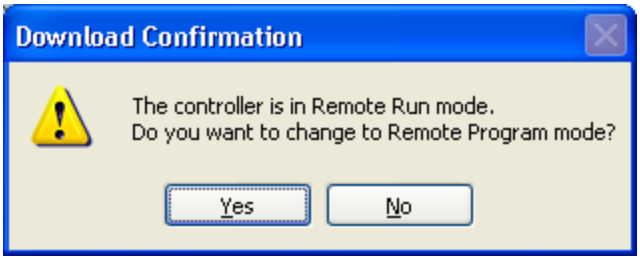
1. In the **Project Organizer**, right click on **Micro830**, and select **Download** to download the program:



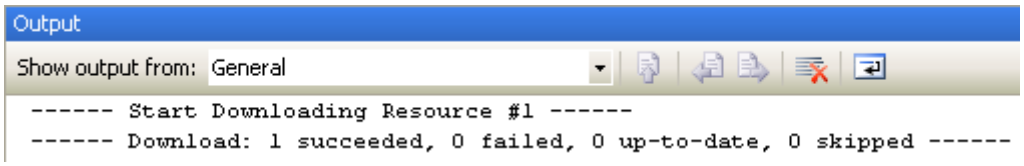
2. From the **Connection Browser**, select **2080-L30-16QWB**, and click on OK.



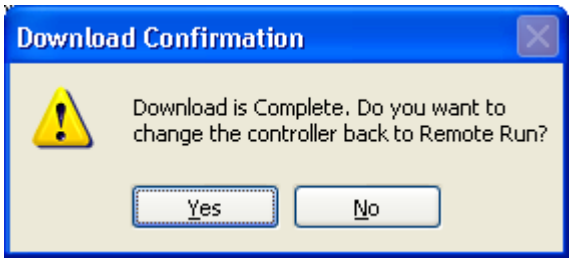
3. The following dialog box will appear for confirmation of the downloading if the controller is in RUN mode. Click on **Yes** to proceed.



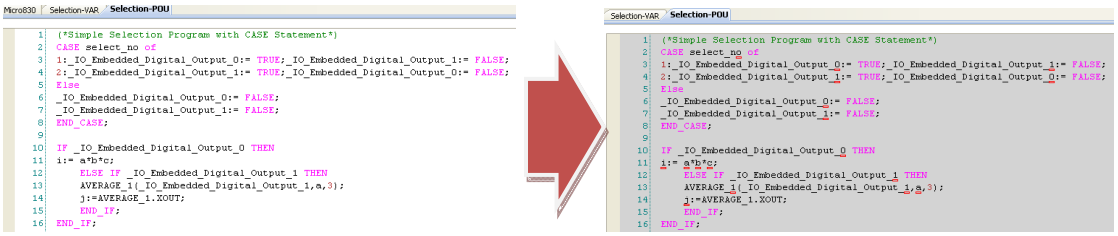
4. In the completion of downloading the program, the **Output** window will display **Succeeded**



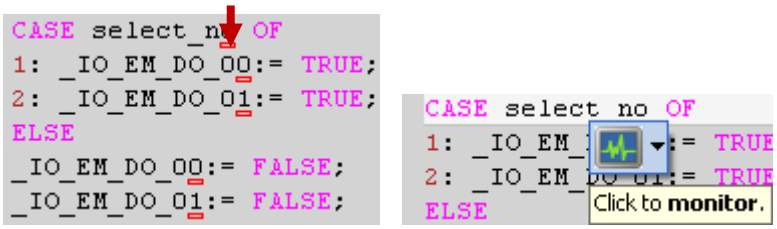
5. The following window will appear to change from Program Mode to Run Mode. Click on **Yes** to proceed.



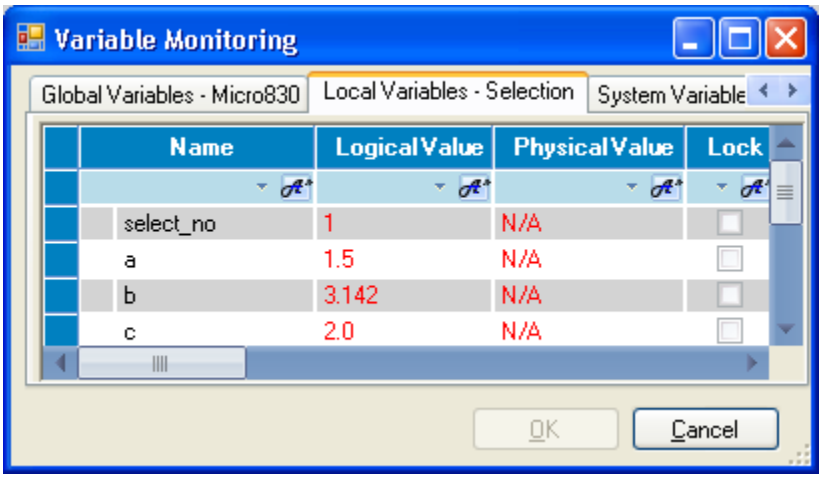
6. Click on the  at the Debug Toolbar, the programming workspace will change from white background to gray background.



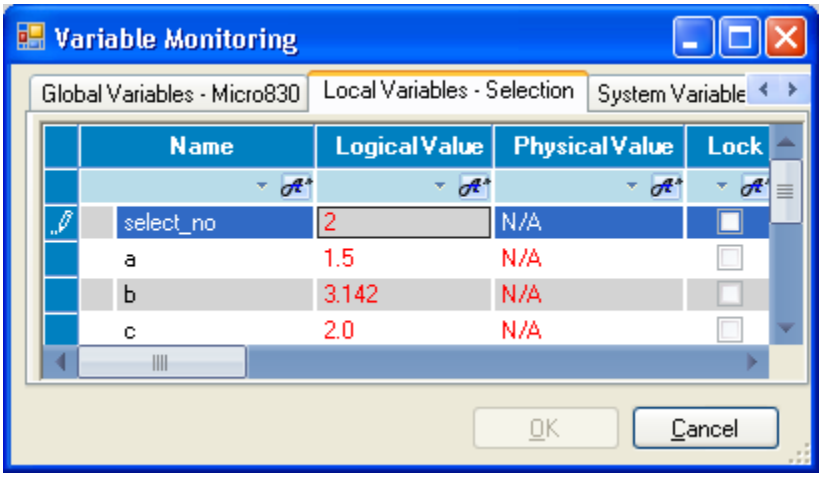
7. To simulate the variable, run over the and the following popup dialog box will appear. Click on the dialog box to monitor.



8. The **Variable Monitoring** window will appear.



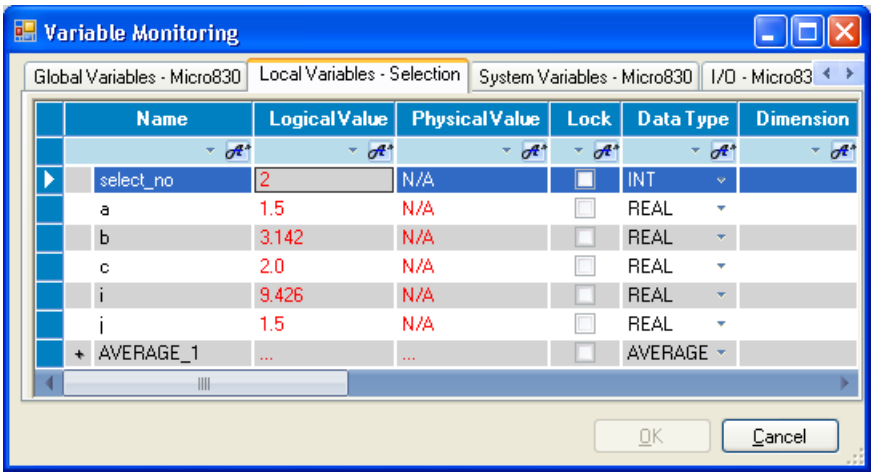
9. Change the value at the **Logical Value** of the variable select_no. to simulate the program.



Simulation for **select_no** using the demo kit output indicators:

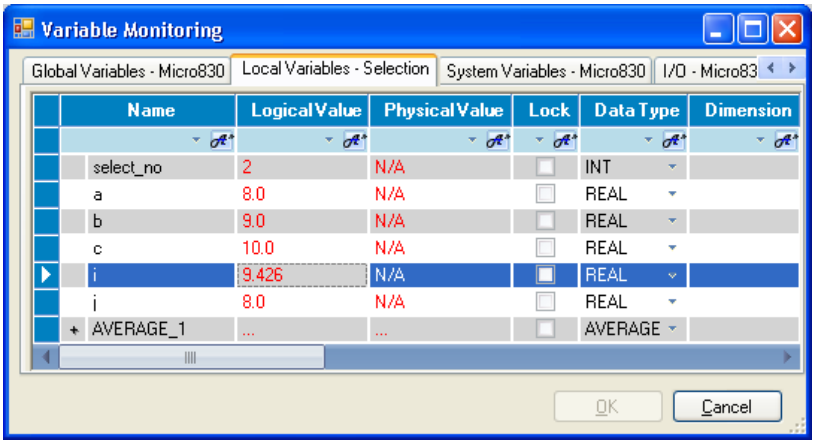
- In the demo kit, Output 0 should be lit when the **select_no** variable is 1. At the Logical Value of **select_no**. change to 2. Now, Output 0 should turn off, and Output 1 should lit.
- Change the value of **select_no** variable to 0 or 3, both Output 0 and Output 1 should turn off.
- The program logic is written so that if the value is not 1 or 2, both Output 0 and Output 1 should turn off.

10. To simulate the mathematic calculation, at the **Variable Monitoring** Window, change the value of a, b and c.

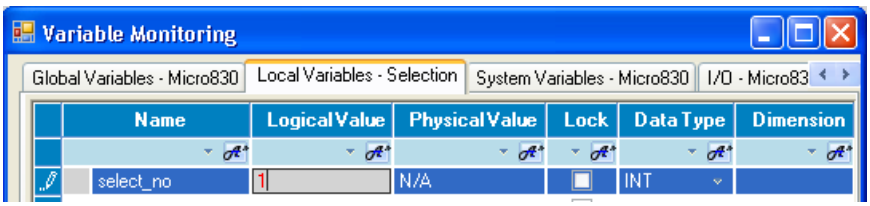


Simulation for the equation i := a*b*c;

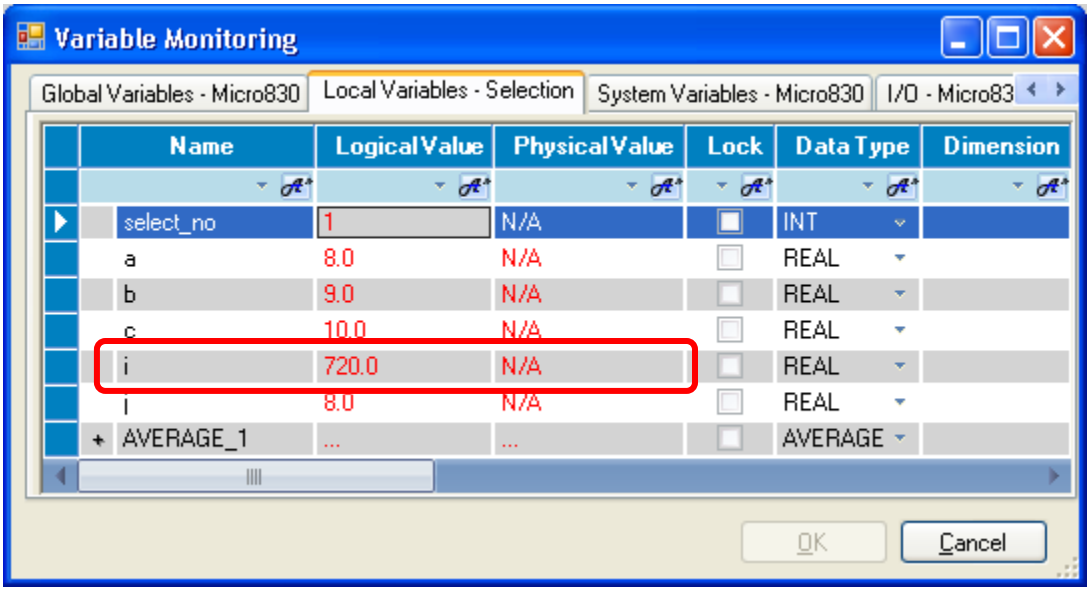
Initial values of a is 1.5, b is 3.142 and c is 2.0, change the values as shown below.



However, we expected i to equal 720.0. We need to change the value of the select_no to **1** to execute the equation i := a*b*c;



When the **select_no**'s value is changed to 1, the equation will be executed. The value will be shown in the **Variable Monitoring** window.



The program is written in such:

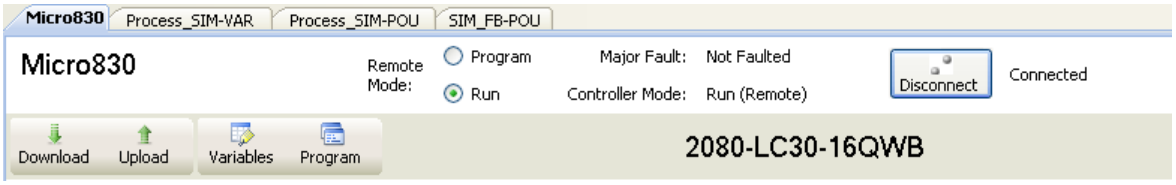
IF _IO_EM_DO_00 THEN

i := a*b*c;

Therefore, only when the Output 0 = 1 will the equation be executed.

11. To stop the monitoring of the variable, click on  at the Debug Toolbar.

12. Then from the Micro830 tab click on **Disconnect** to go offline.



Chapter 5 -
Using Connected Components Workbench with PanelView™ Component

Using Connected Components Workbench with PanelView Component

Before you begin, you should already have a general knowledge of how to use the Connected Components Workbench software and how to create an application for you Micro800 controller. If you do not have this knowledge, please review the Micro800 and CCW Getting Started Guide, Publication 2080-QR001B-EN-P.

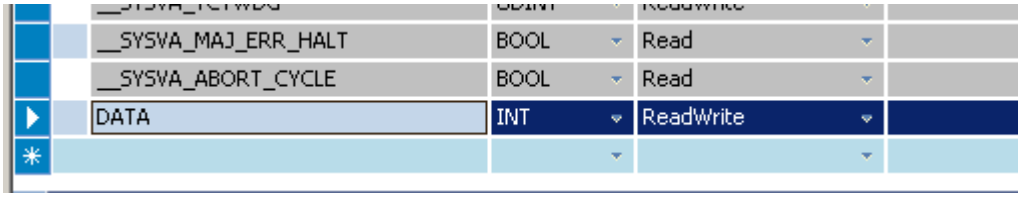
The recommended Modbus RTU network topology for a Micro800 and PanelView Component is to configure the Micro800 controller as a slave device, and the PanelView Component as the master device. Therefore that is the configuration that will be discussed and configured in this guide.

Mapping Variables to Modbus Registers

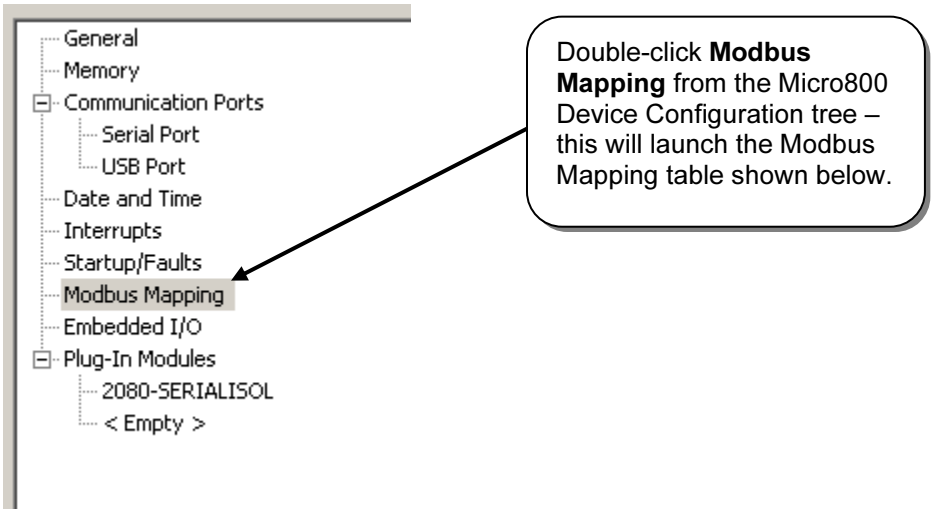
The Micro800 supports the following Modbus registers.

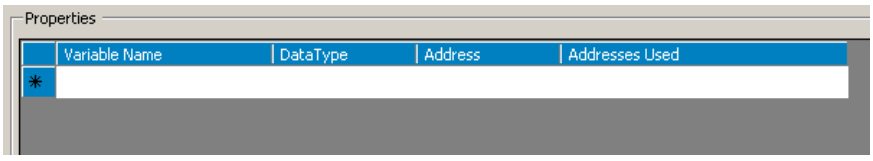
Address	Range	Data Type	Access
Output Coils	000001-065536	Boolean	Read/Write
Input Coils	100001-165536	Boolean	Read Only
Input Registers	300001-365536	Word (16-bit)	Read Only
Holding Registers	400001-465536	Word (16-bit)	Read/Write

1. Create a new CCW project for your Micro800 controller, and create a Global Variable called DATA with data type INT and attribute ReadWrite.

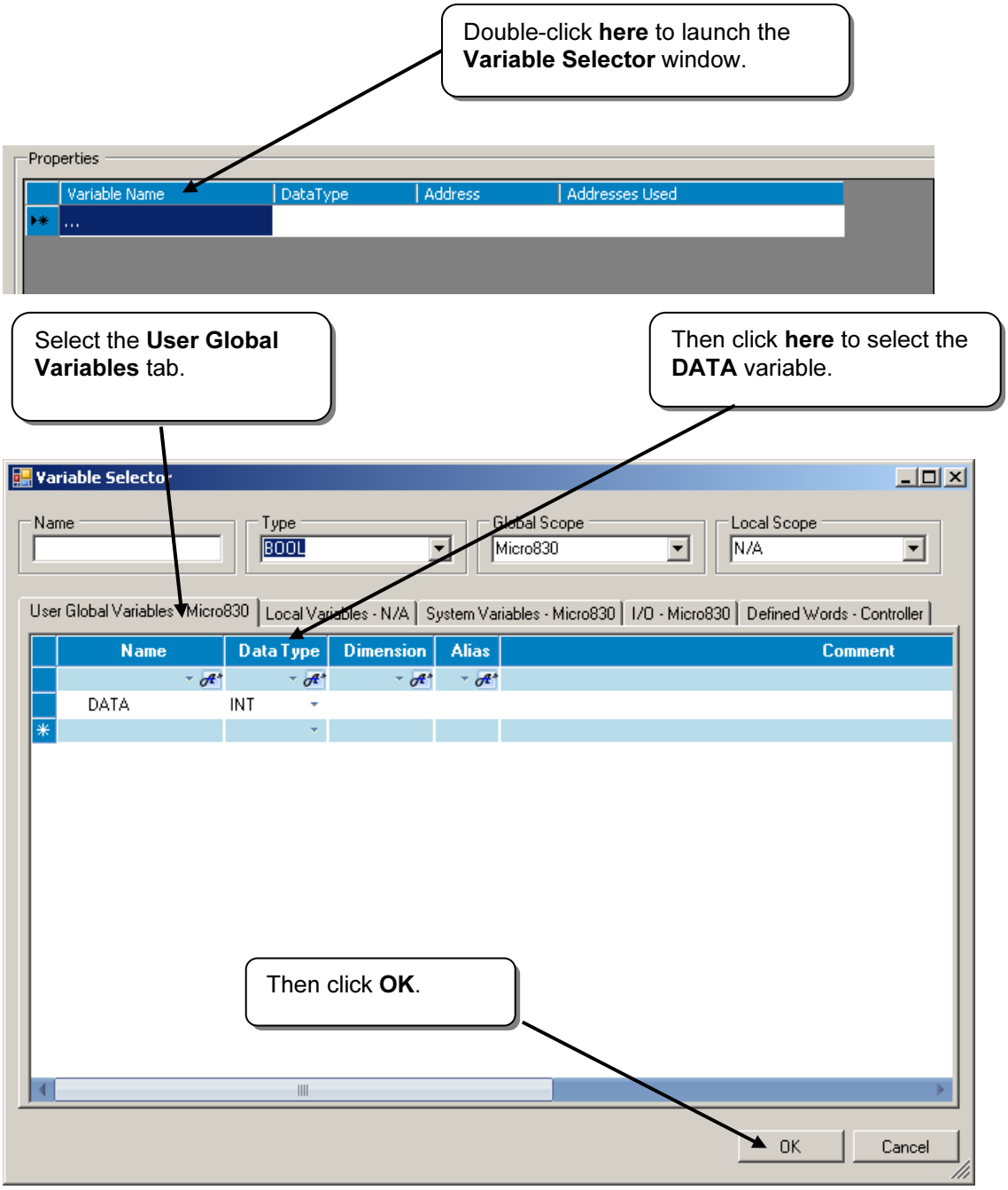


2. Open the Modbus Mapping table by following the steps below.

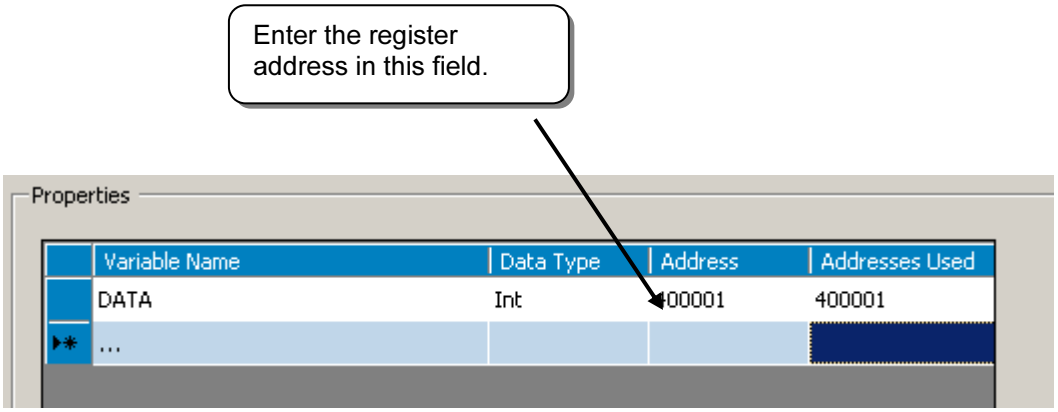




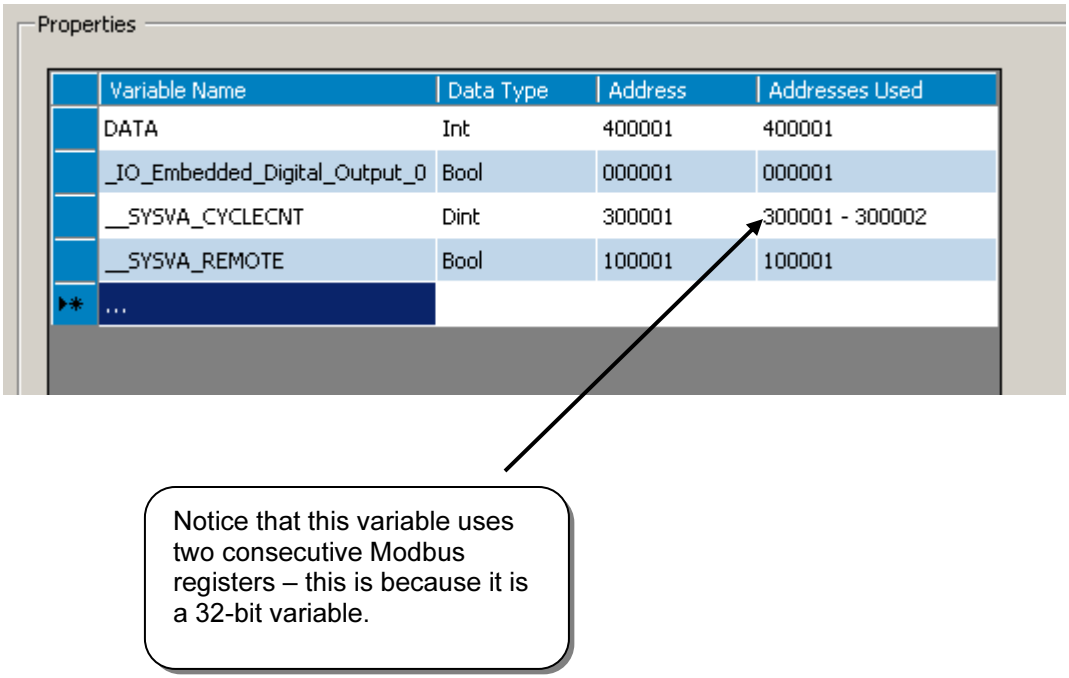
3. Add a Variable to the Mapping table by following the steps below.



4. Map the **DATA** variable to register address 400001.



5. Repeat steps 3 and 4 for variables, **_IO_Embedded_Digital_Output_0** (I/O – Micro830 tab), **__SYSVA_CYCLECNT** (System Variables – Micro830 tab), and **__SYSVA_REMOTE** (System Variables – Micro830 tab), and map them to the register addresses as shown below.

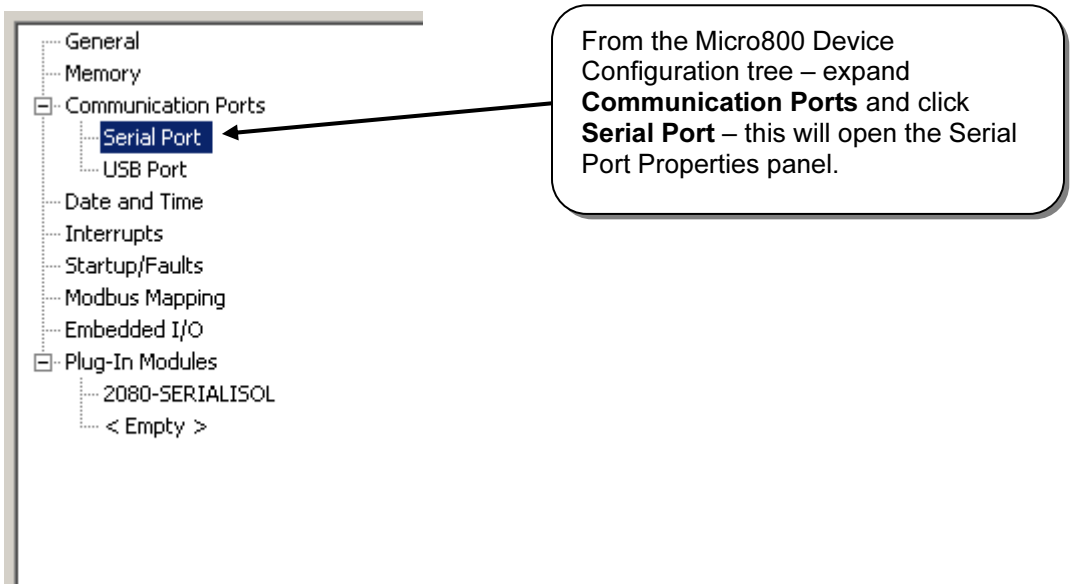


6. You have completed mapping variables to Modbus registers. Save your project.

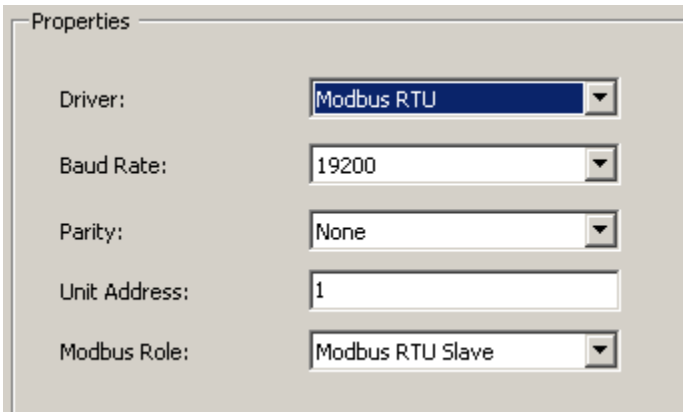
Configure Micro800 Serial Port

You will be configuring your Micro800 controller as a Modbus RTU slave device. The PanelView Component will be configured as the Modbus RTU Master.

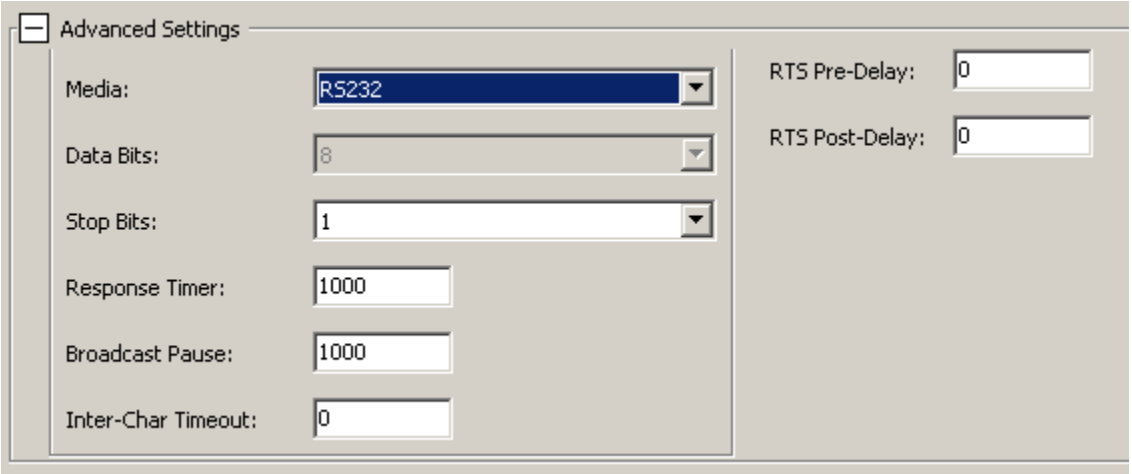
1. Open the Serial Port properties panel.



2. Configure the Serial Port Properties with the following values:



3. Expand **Advanced Settings** to configure the **Protocol Control** properties with the following values:

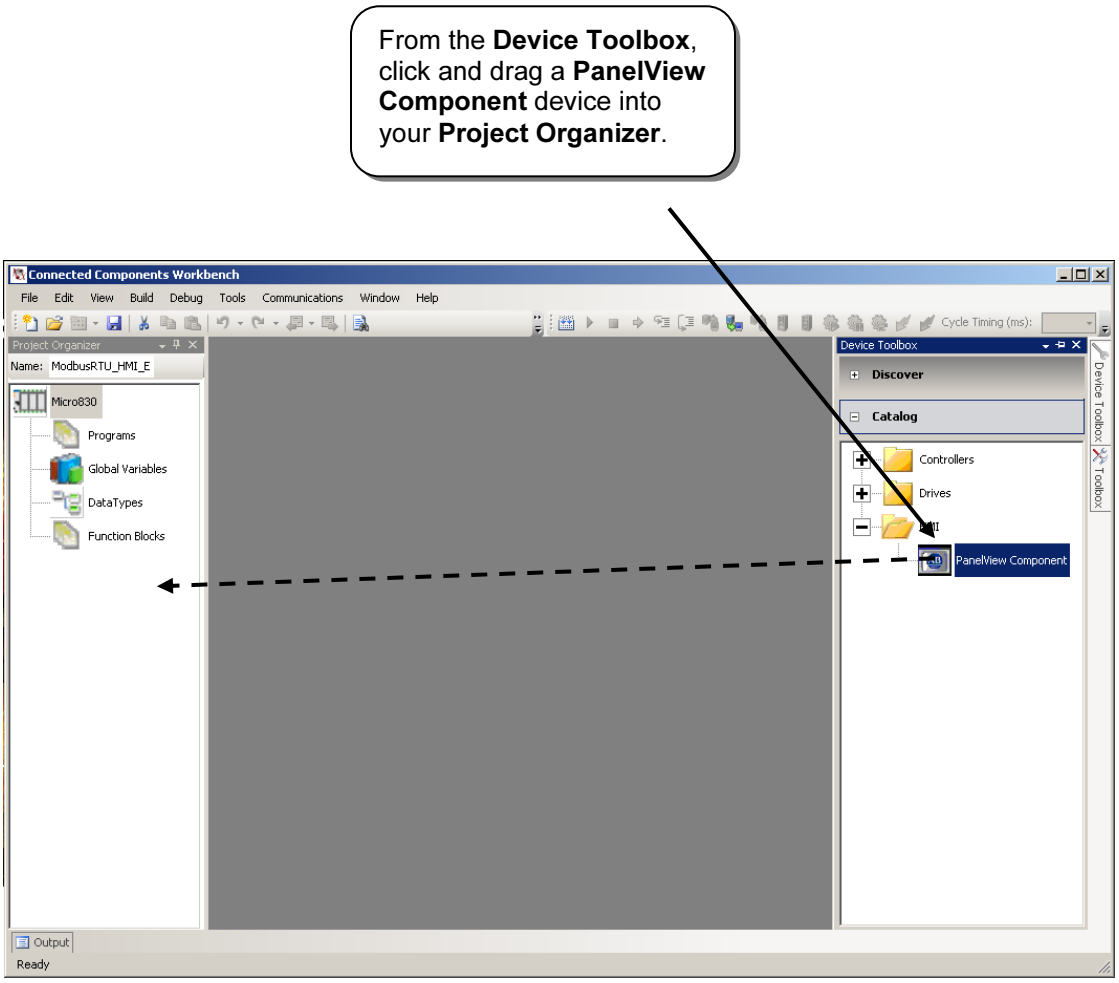


If you are using RS485, you can set the **Media** property to RS485 and leave the remaining settings the same.

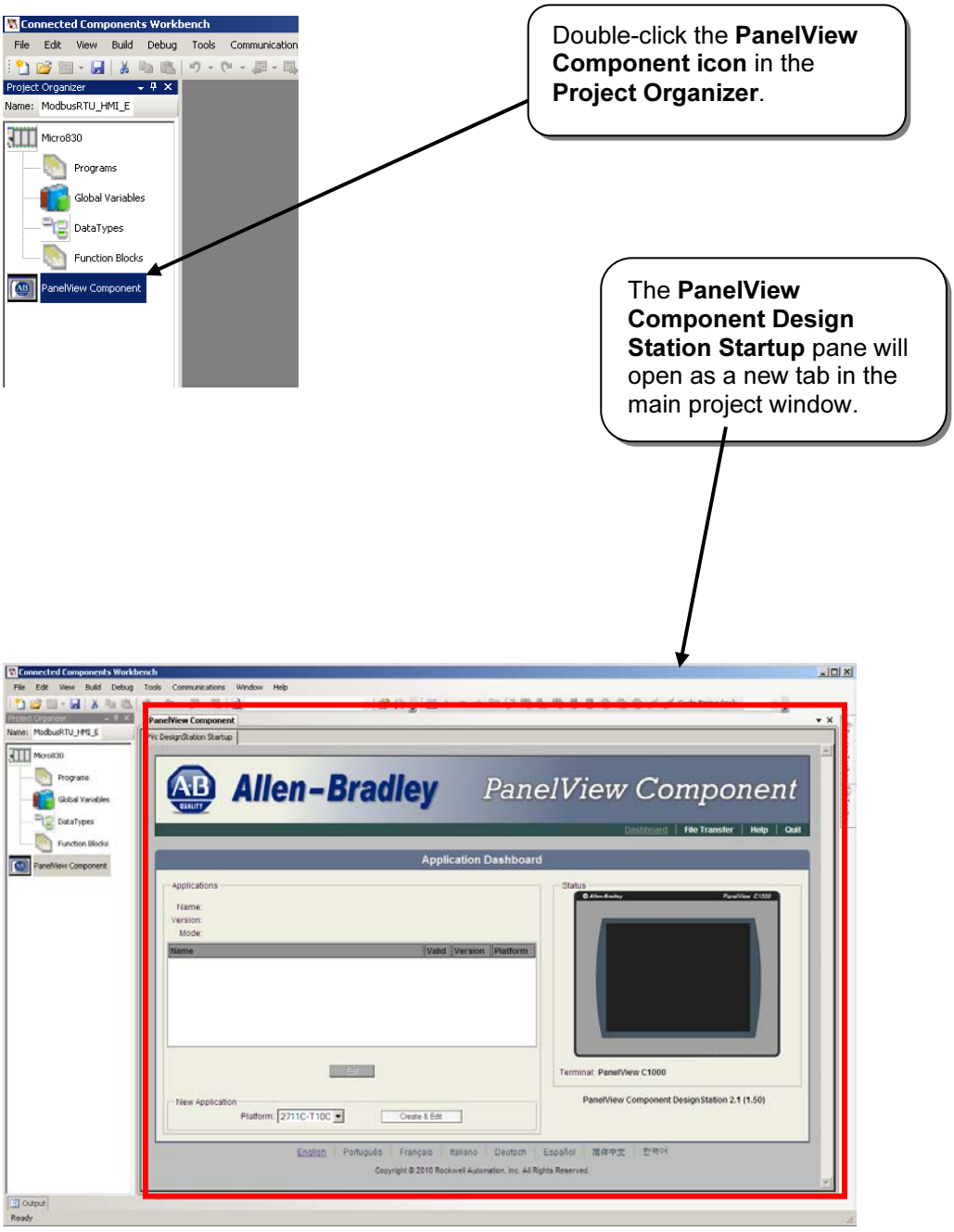
4. You have completed configuring your serial port for Modbus. Build and save your project, and then download it to your controller.

Create an Offline PanelView Component Application

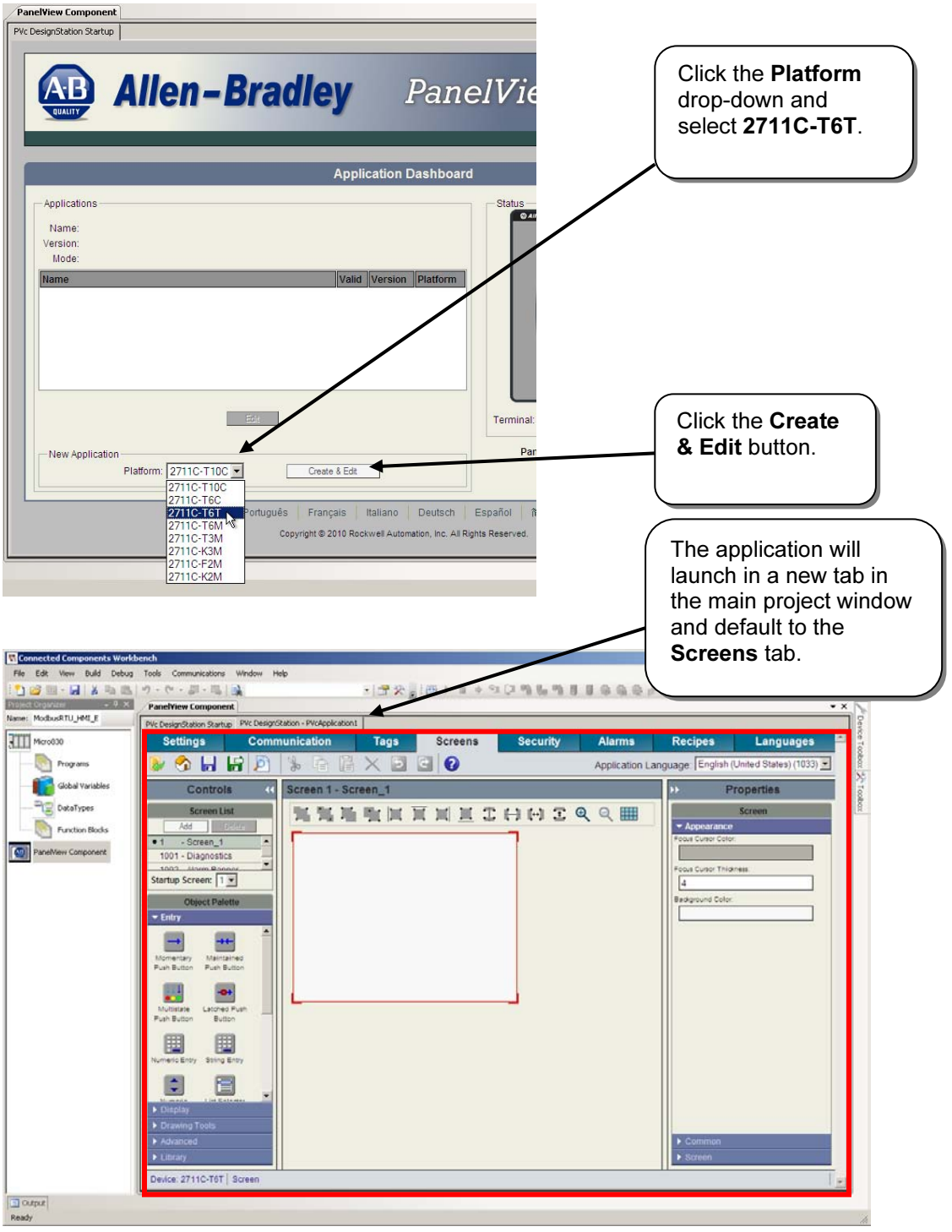
1. Add a PanelView Component device to your project.



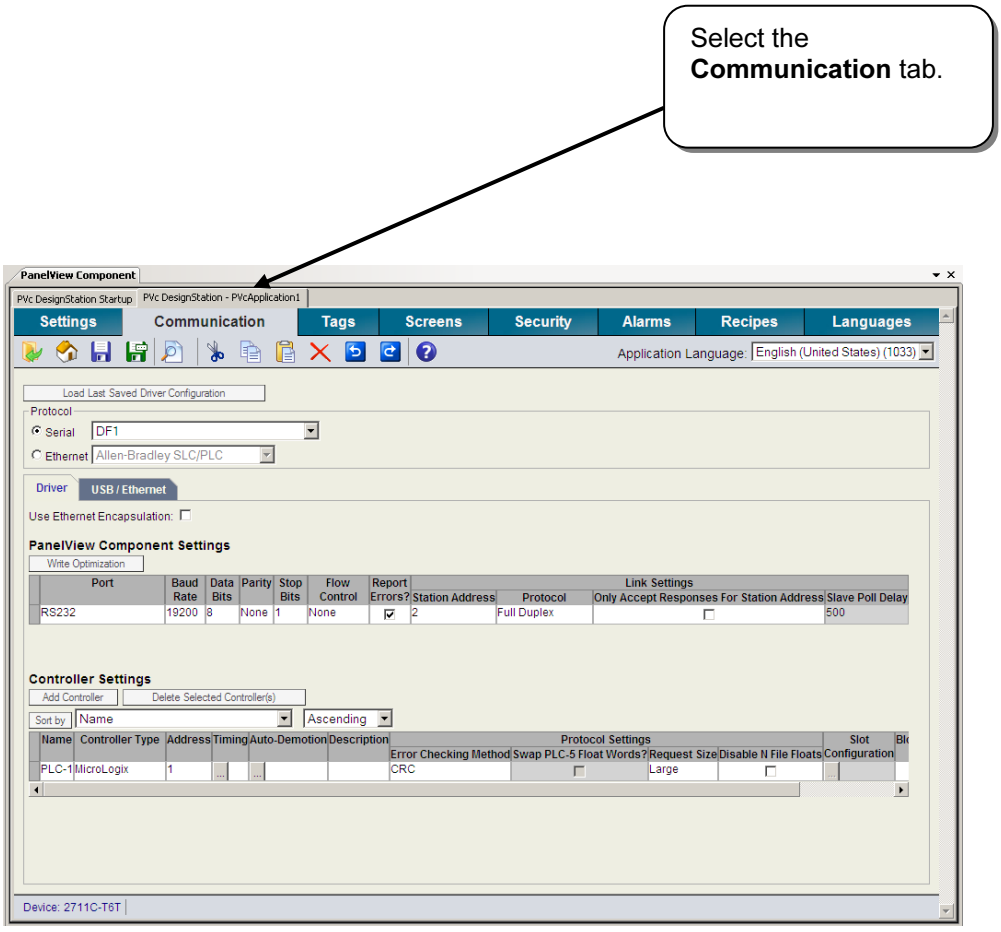
2. Launch PanelView Component Design Station.

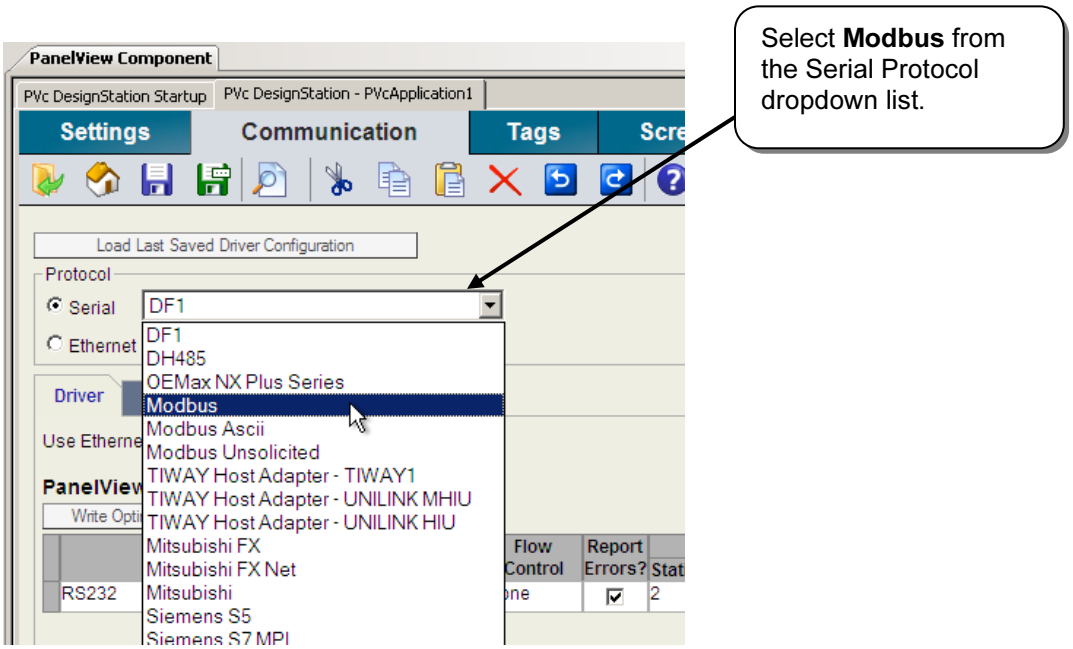


3. Select the PanelView Component platform and create a new application.



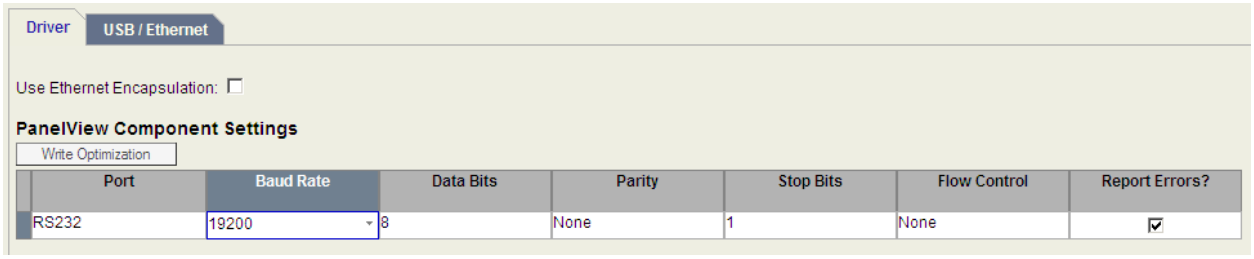
4. Setup **Communication** settings to configure your PanelView Component as a Modbus Master to communicate to your Micro800 controller.



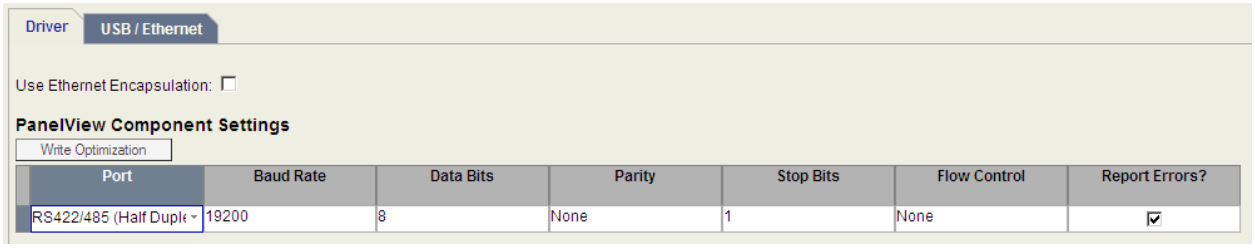


Configure the Driver settings as shown below – the default settings will work for RS232. If using RS485, change the Port settings to **RS422/485 (Half-duplex)**.

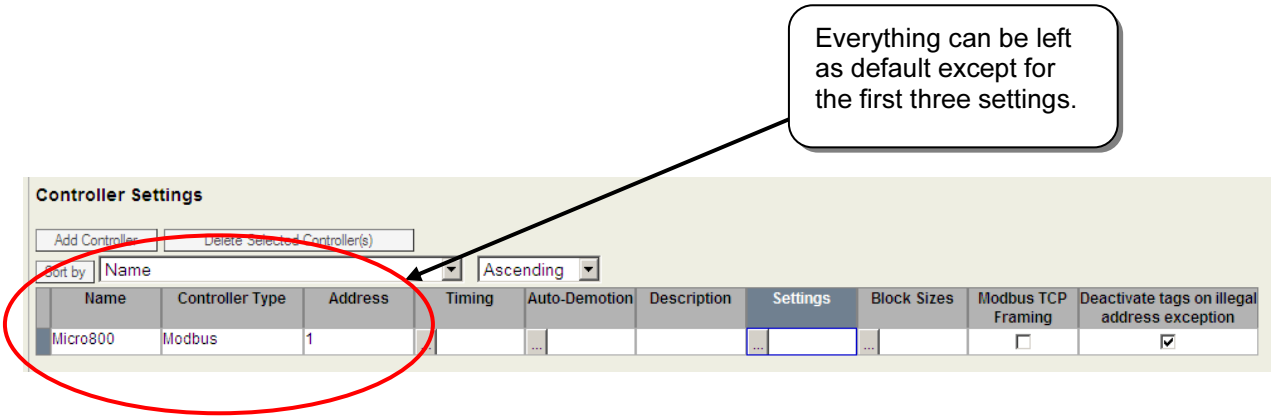
RS232



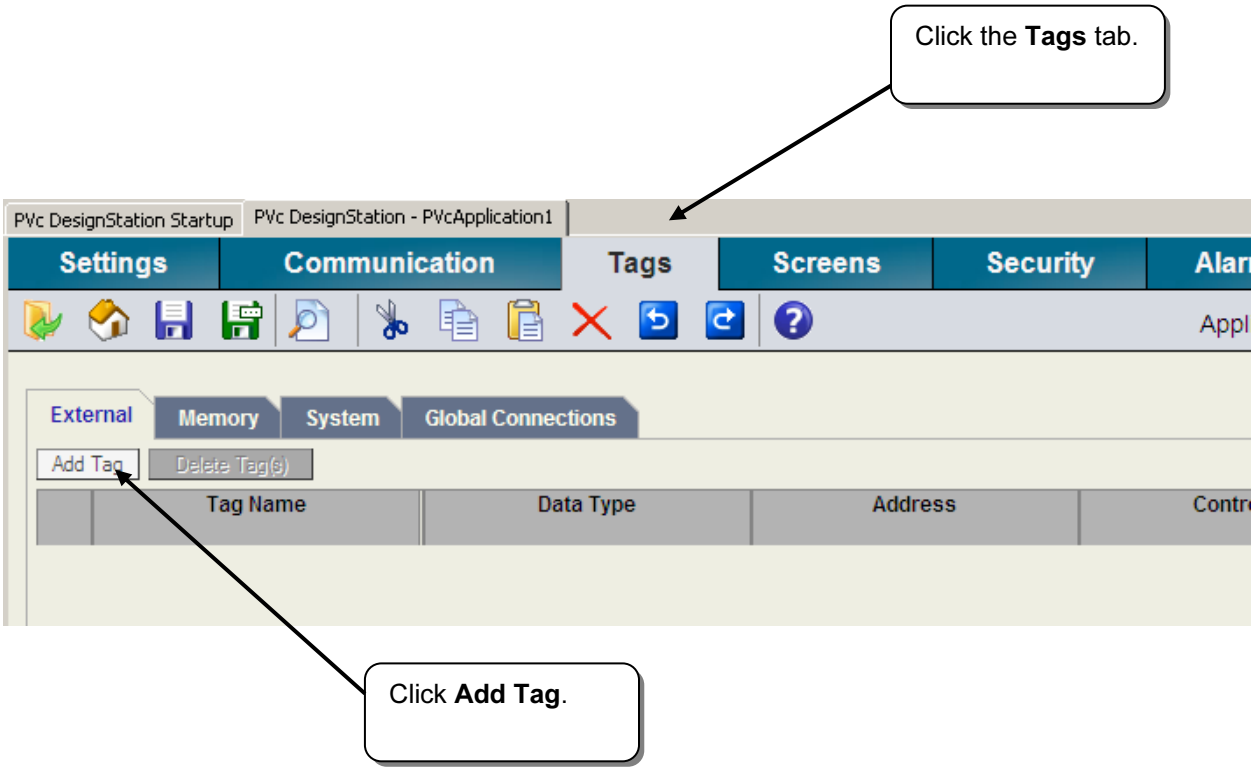
RS485



5. In the Controller Settings, configure a controller with settings as shown below.



6. Create tags addressed to the tags you created earlier in your Micro800. Refer to the section called “Mapping Variables for Modbus Registers” for details on how to create the Micro800 tags.



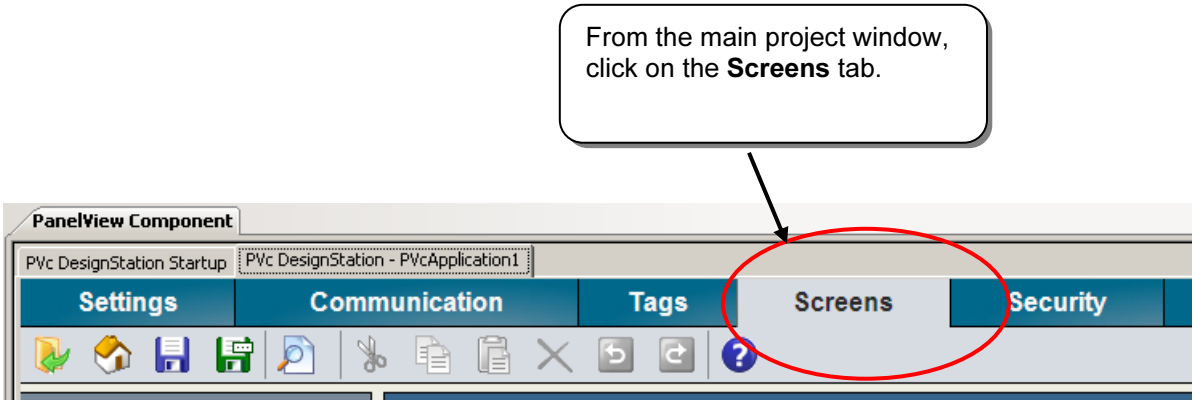
Create the following tags as shown below – make sure to choose the correct data type.

External | Memory | System | Global Connections

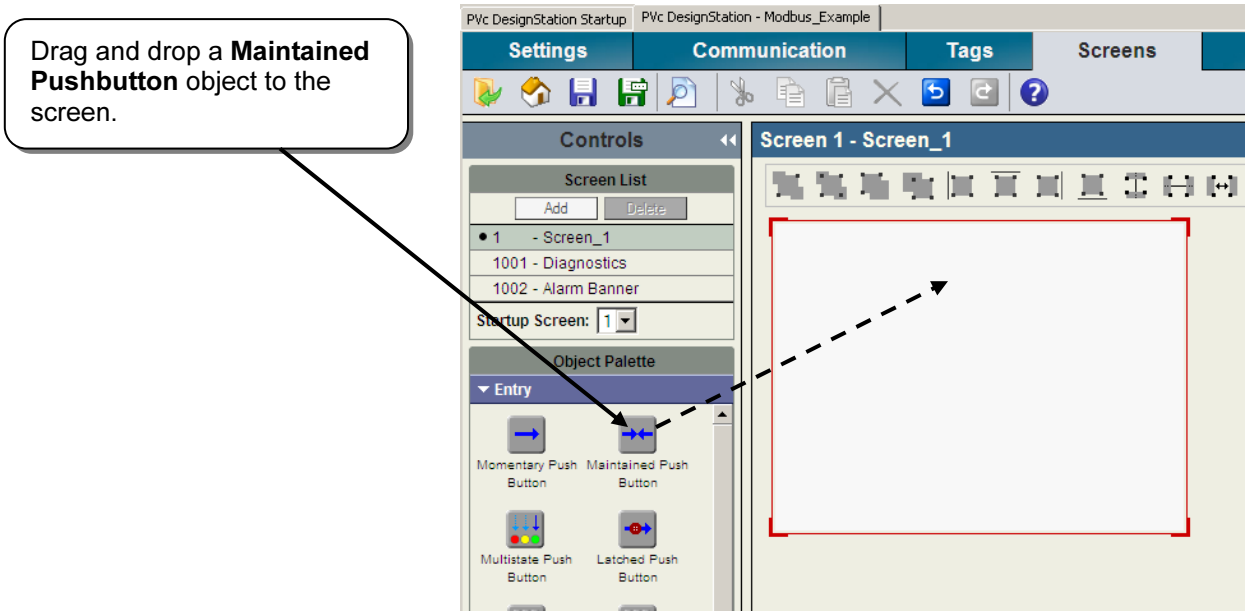
Add Tag | Delete Tag(s)

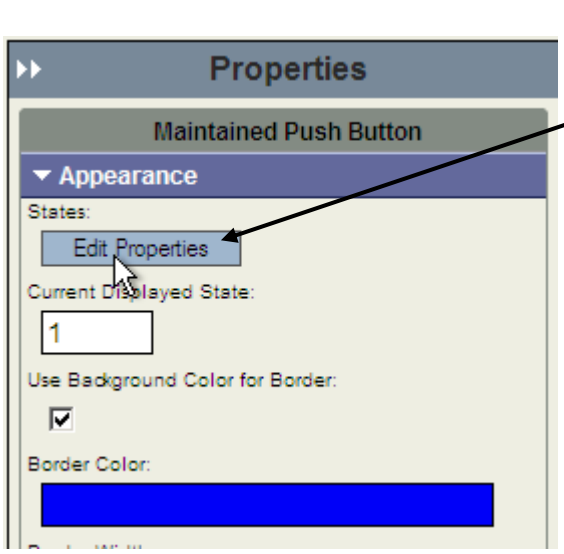
	Tag Name	Data Type	Address	Controller
1	Output_0	Boolean	0000001	MICRO800
2	Cycle_Count	32 bit Integer	3000001	MICRO800
3	Remote_Status	Boolean	1000001	MICRO800
4	DATA	16 bit Integer	4000001	MICRO800

7. Create a screen display with objects linked to the tags you just created.



Create a maintained pushbutton linked to tag, **Output_0**. This is not typical practice, as a direct output should not be turned on/off directly, but is done for demonstration purposes.

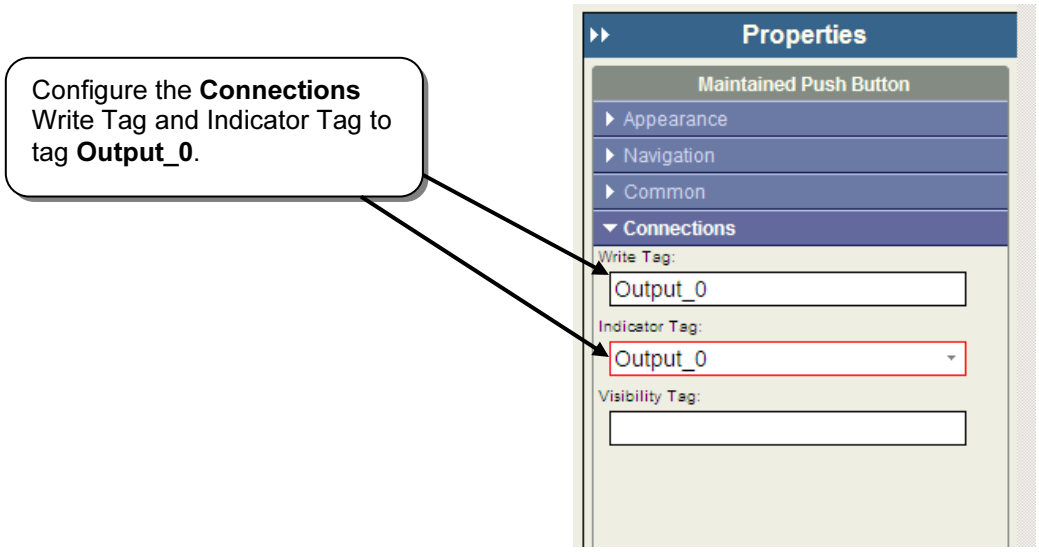




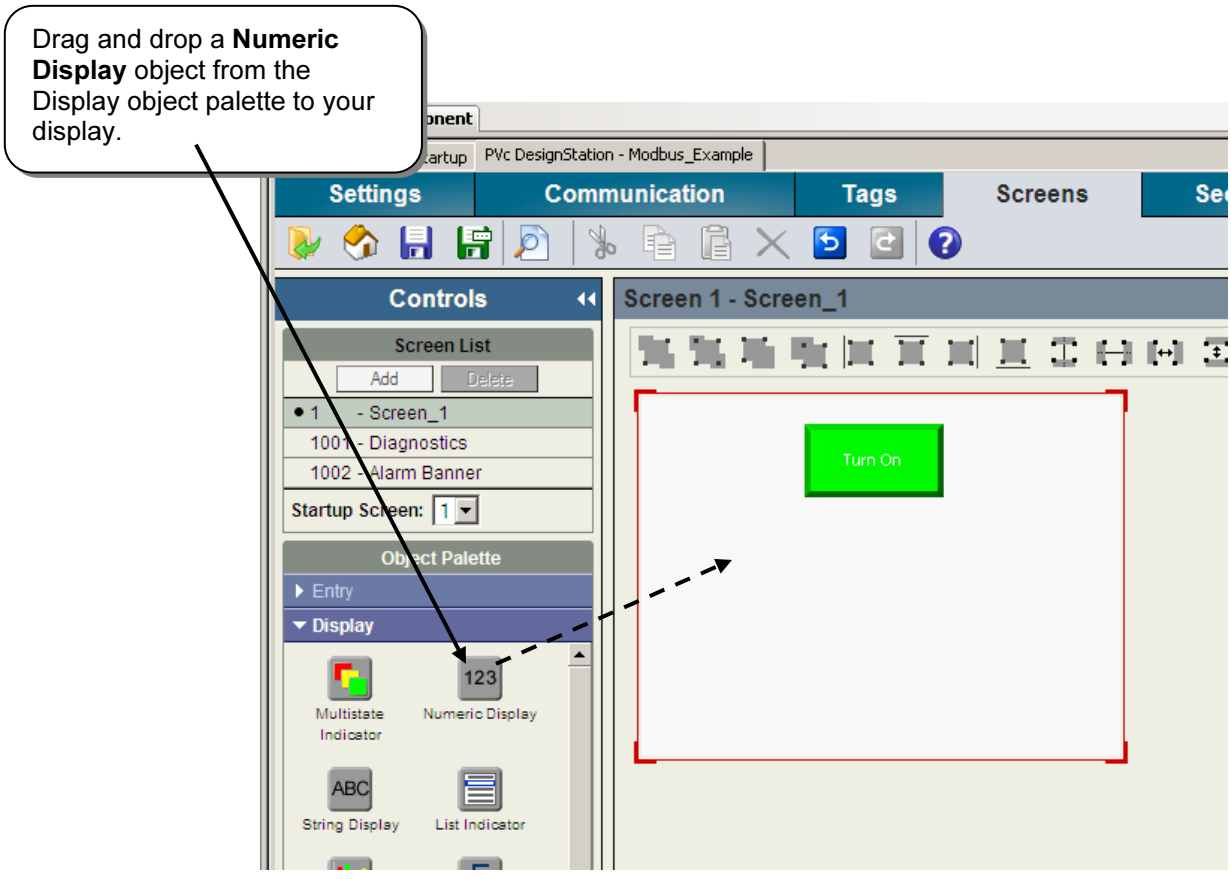
Configure the pushbutton states by selecting the States **Edit Properties** button from the pushbutton's Properties pane on the right hand side.

Configure the color and text of the states as shown below, then click **OK**.

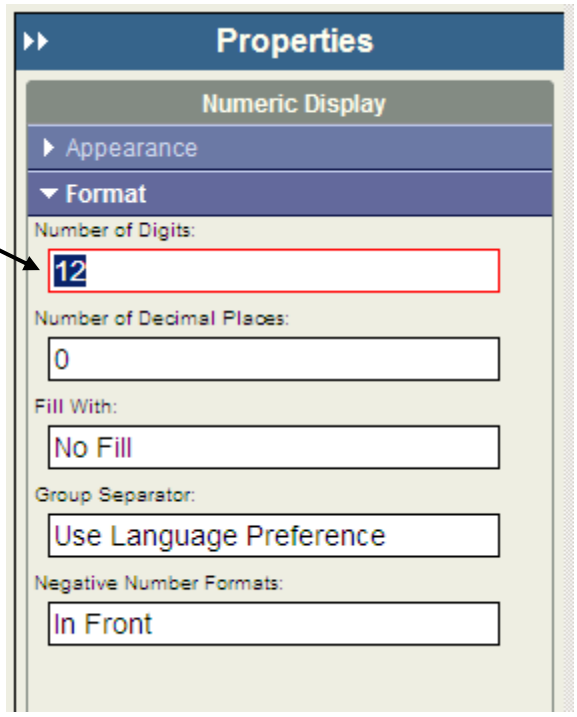
	Value	Background			Text	T
		Color	Fill Style	Fill Color		
1	0		Background Color		Turn On	
2	1		Background Color		Turn Off	
3			Background Color		Error	



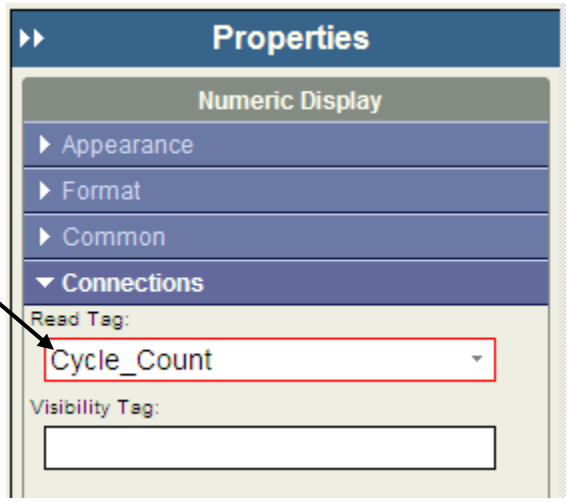
Create a numeric display object linked to tag, **Cycle_Count**.



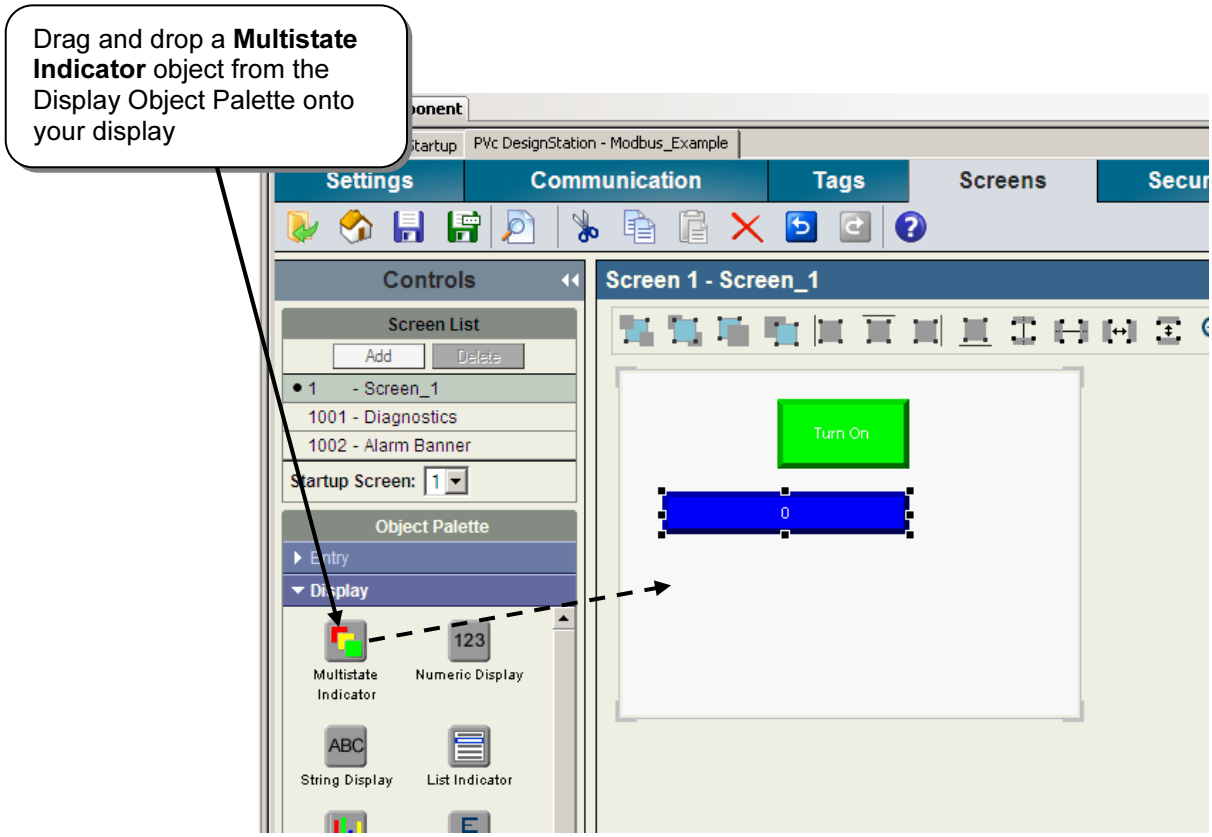
In the Numeric Display Properties pane, select the Format tab, and configure **Number of Digits** to 12.



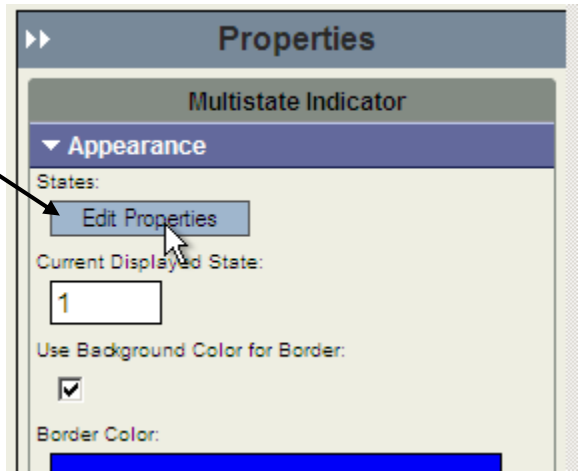
In the Numeric Display Properties pane, select the Connections tab, and configure **Read Tag** to **Cycle_Count**.



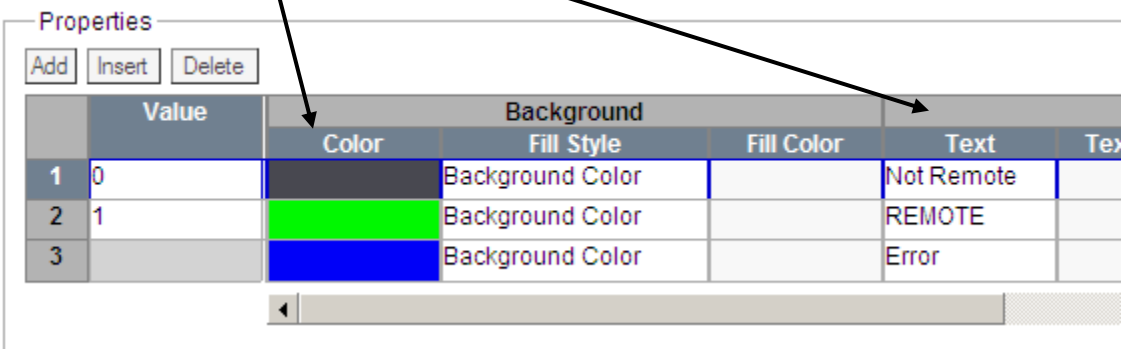
Create a multistate indicator object linked to tag, **Remote_Status**.



Edit the indicator states by going to the Multistate Indicator Properties pane, selecting the Appearance tab, and clicking **Edit Properties**.

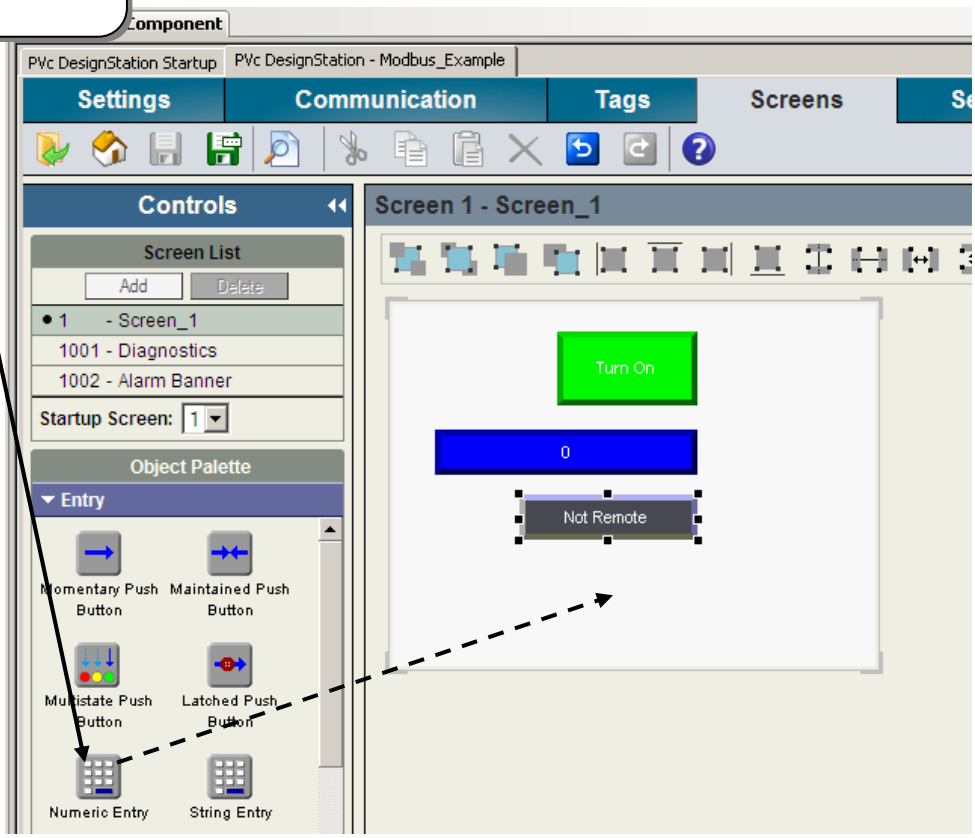


Configure the color and text of the states as shown below, then click **OK**.

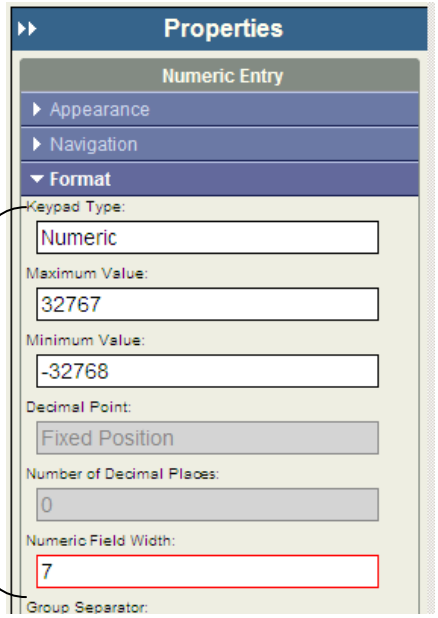


Create a Numeric Input Enable object linked to tag, **DATA**.

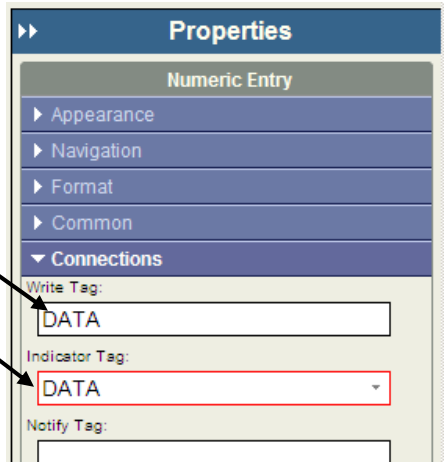
Drag and drop a **Numeric Entry** object from the Entry Object Palette onto your display.



In the Numeric Entry Properties pane, select the Format tab, and configure the properties as shown here.

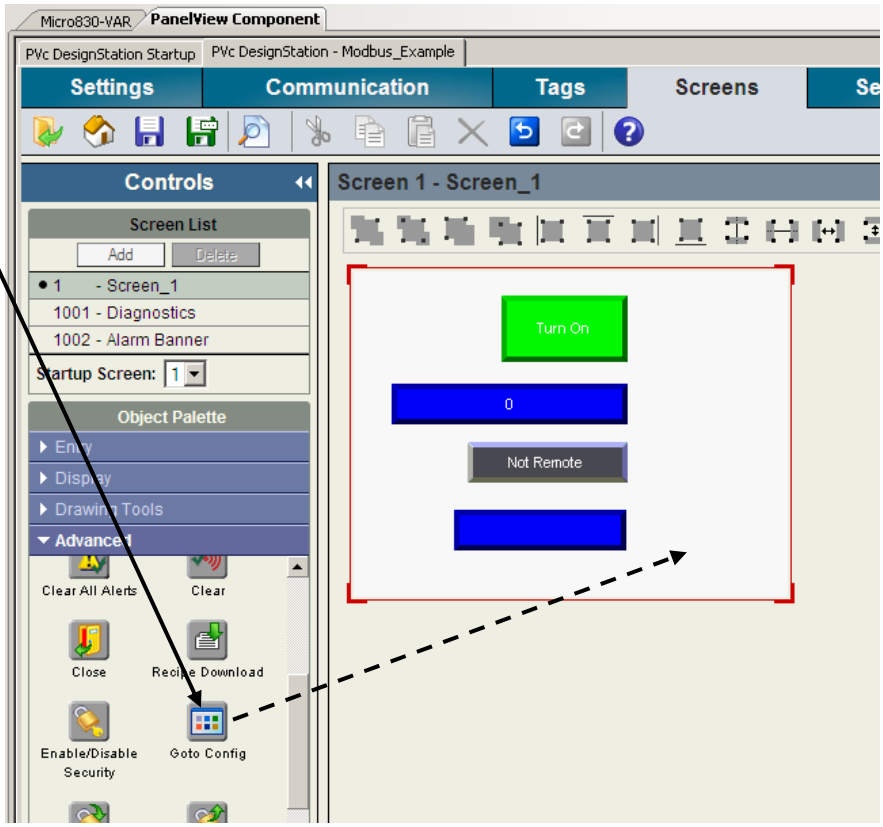


In the Numeric Entry Properties pane, select the Connections tab, and configure the Write Tag and Indicator Tag to, **DATA**.

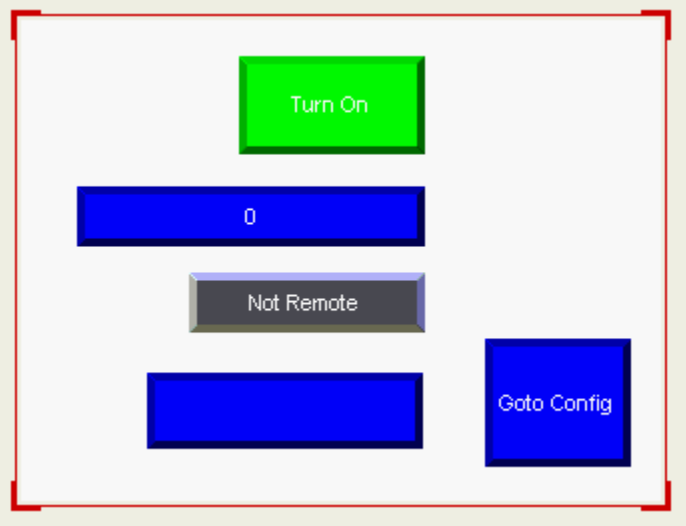


Add a **Goto Config** button to your display.

Drag and drop a **Goto Config** object, from the Advanced Object Palette, onto your display.



Your display should look like the following.



8. You are done creating your PanelView Component application. Save your application.

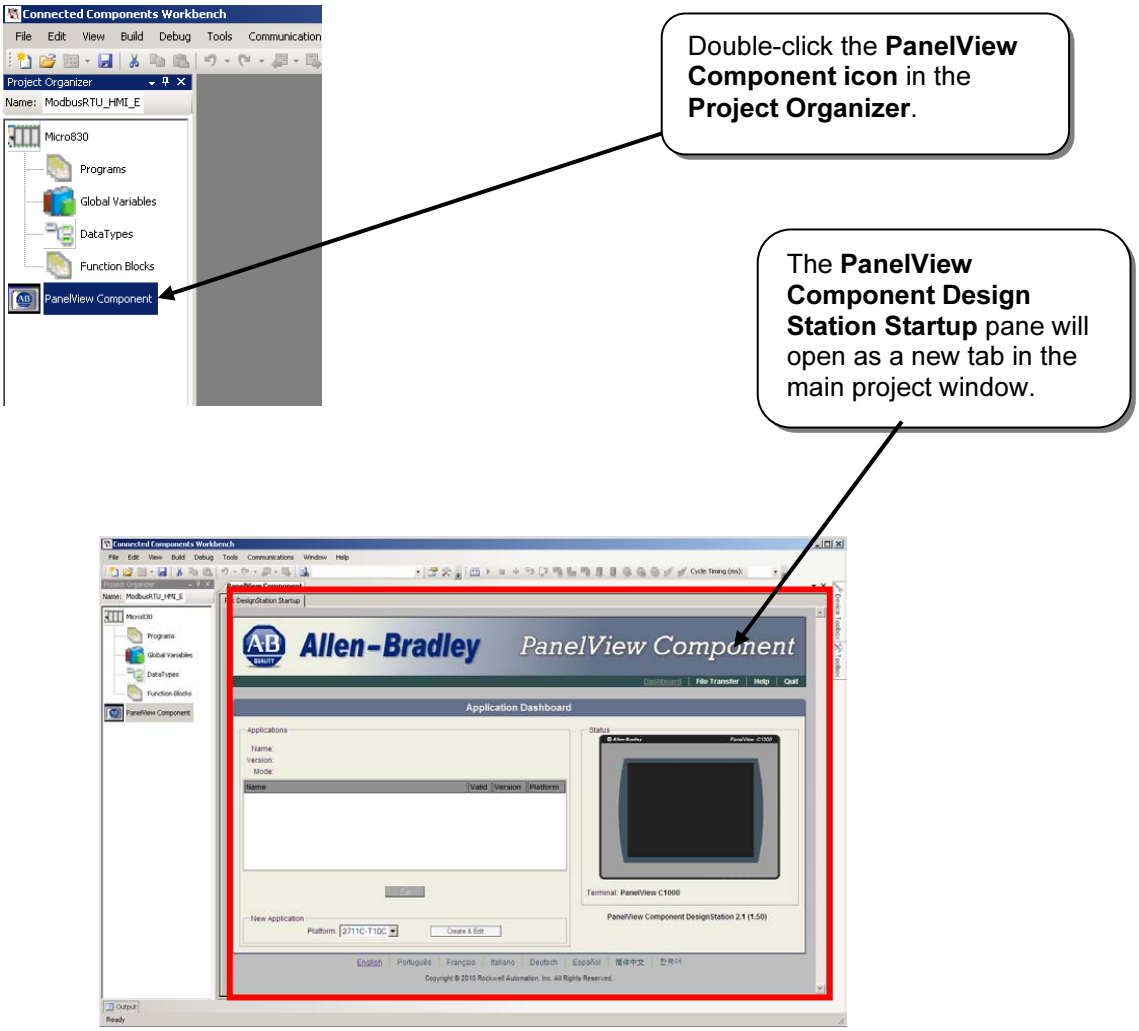
Transferring an Offline PVc Application to a PVc Terminal

Hardware Used

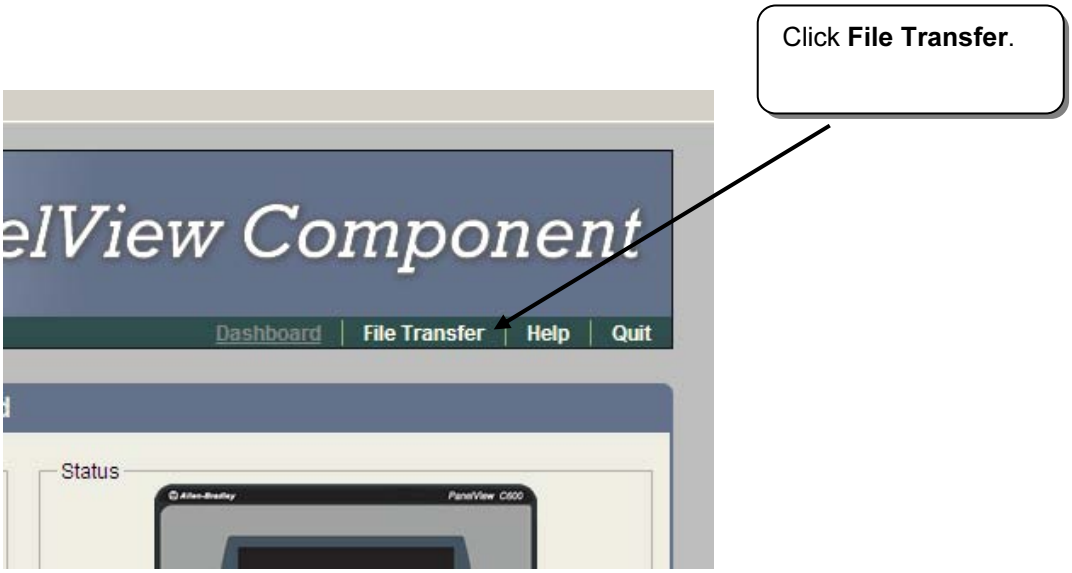
PanelView Component C600 – 2711C-T6T

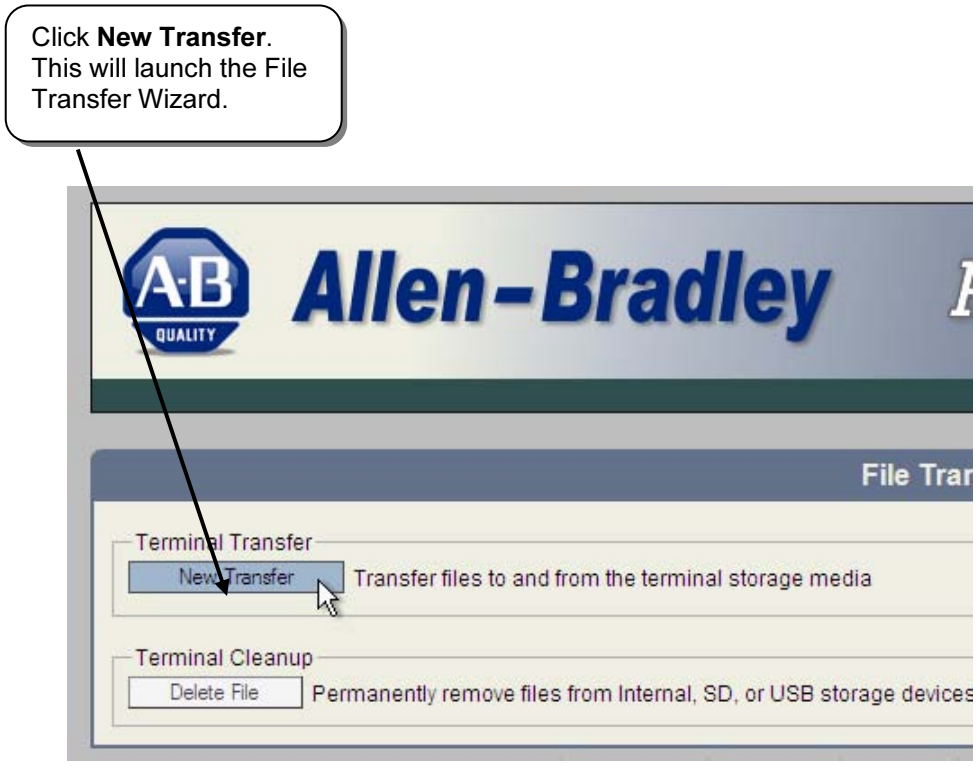
This section will demonstrate how to transfer an offline PVc Application to a PVc terminal. Transferring the file involves copying the application to a USB or SD flash media, and then inserting it into the PVc terminal, and copying it to the terminal.

1. From your CCW project, launch the PVc DesignStation Startup pane.

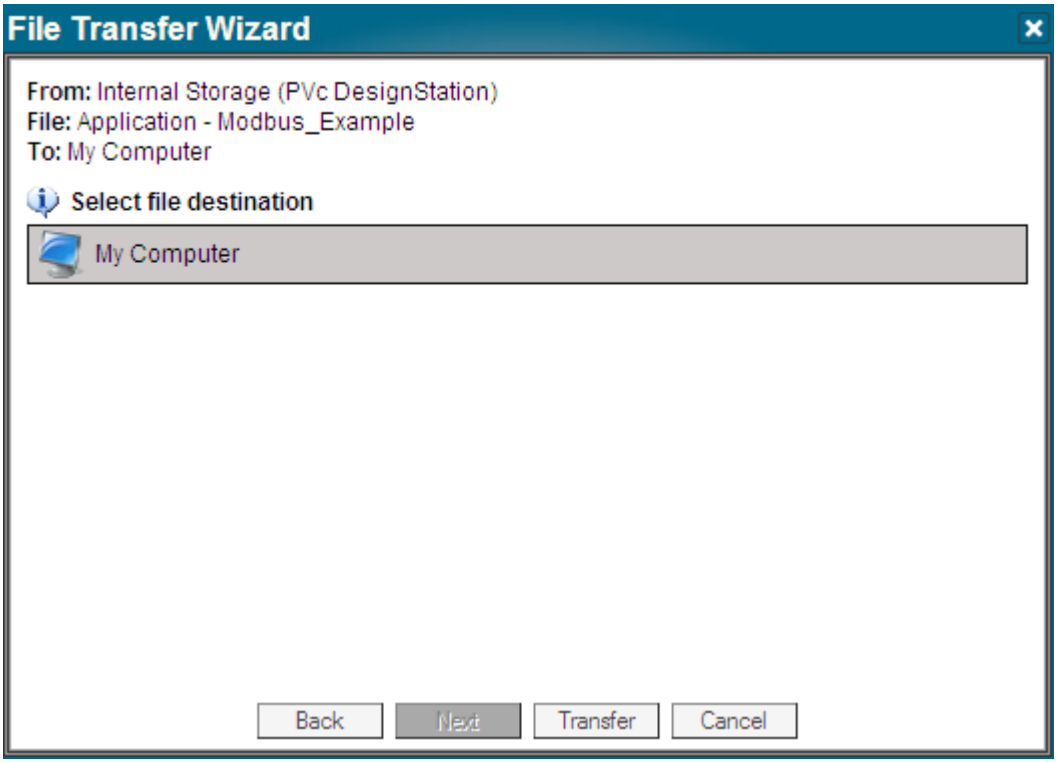


2. Insert either a USB flash drive, or SD card into your computer.
3. Set up a file transfer to copy the application to your USB/SD flash media.

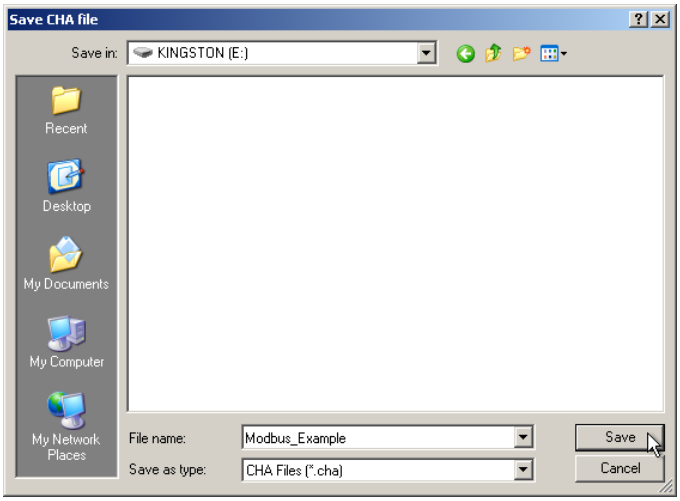




Configure the File Transfer as shown below, and then click Transfer.

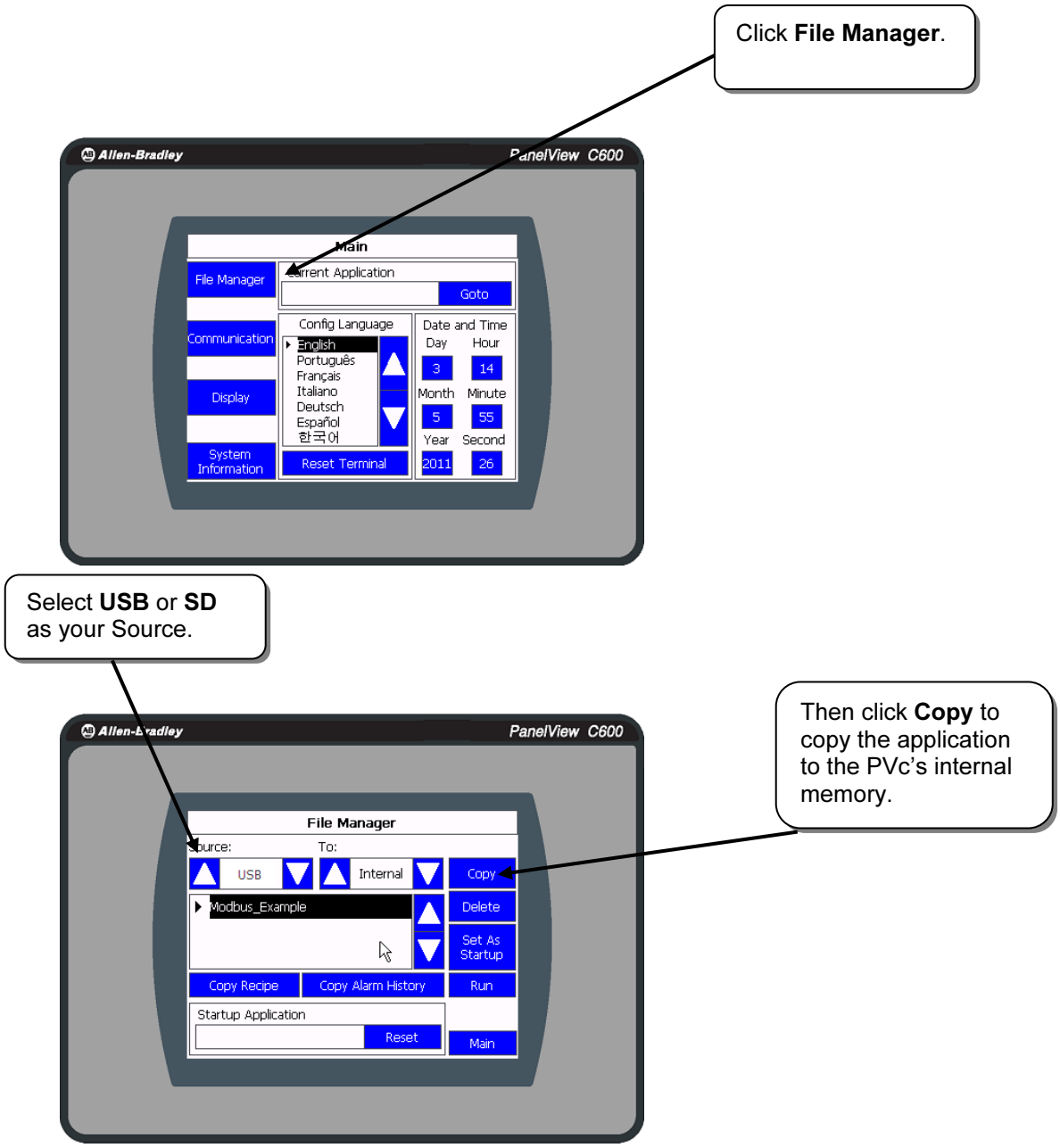


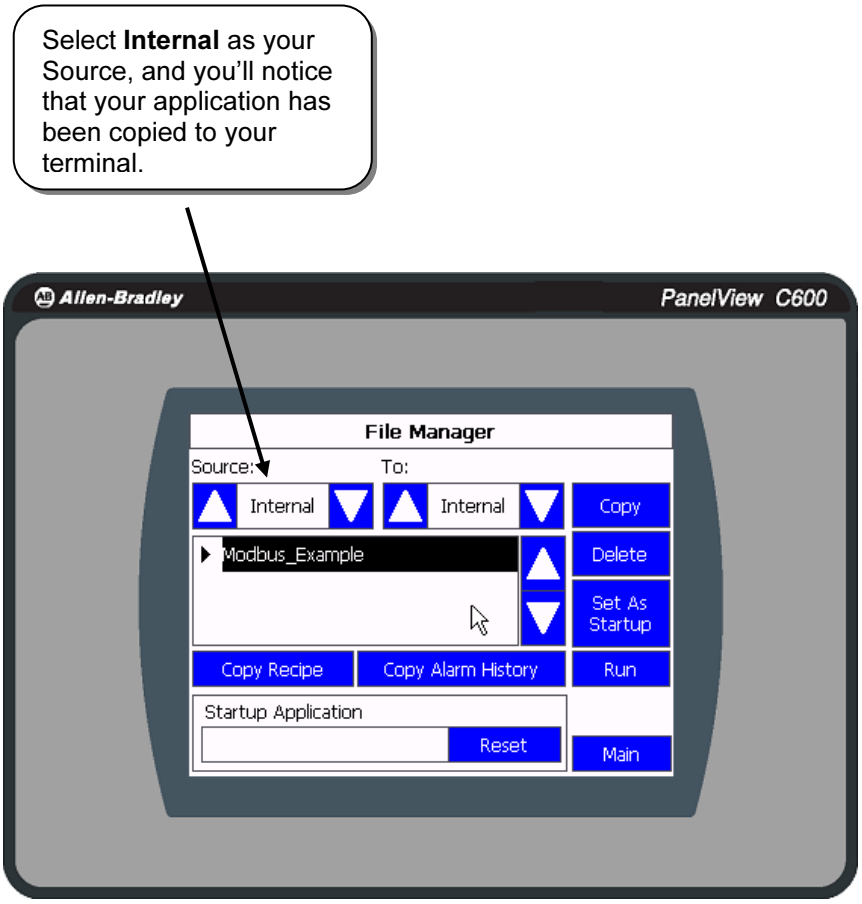
Browse to the root of your flash media, and then click **Save**. This will save the PVc application file (.CHA) to your flash media.



4. Remove the flash media from your computer and insert into PanelView Component terminal.

5. Copy the application from your flash media to your PanelView Component.





6. You have completed transferring an offline application to your PVc terminal.

Cabling the Micro800 to a PanelView Component

Hardware Used

PanelView Component C600 – 2711C-T6T

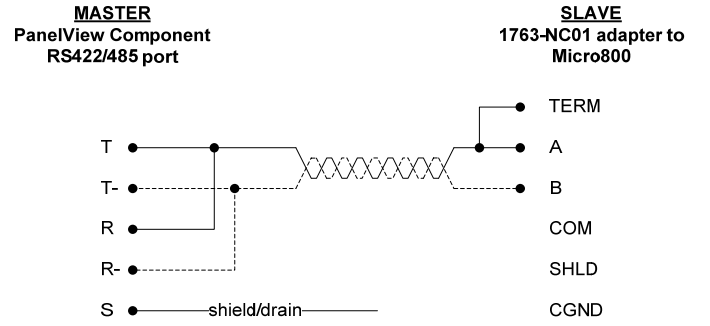
RS232 Cable, 1761-CBL-xxxx or 2711-CBL-PMxx

RS485 Adapter, 1763-NC01

1. For RS232 communications, you will need an 8-pin Mini-DIN to 9-pin D-shell null modem cable. See table below for recommended cables.

0.5 m (1.6 ft)	1761-CBL-AP00
2 m (6.6 ft)	1761-CBL-PM02
5 m (16.4 ft)	2711-CBL-PM05
10 m (32.8 ft)	2711-CBL-PM10

   For RS485 communications, you will need to use a 1763-NC01 adapter, and wire the recommended twisted pair shielded cable as shown below. The recommended cable is Belden 3105A or equivalent (two-wire shielded twisted pair with drain). **Note:** Because both devices' serial ports are non-isolated, connect the shield/drain wire at one end only to prevent a ground loop.



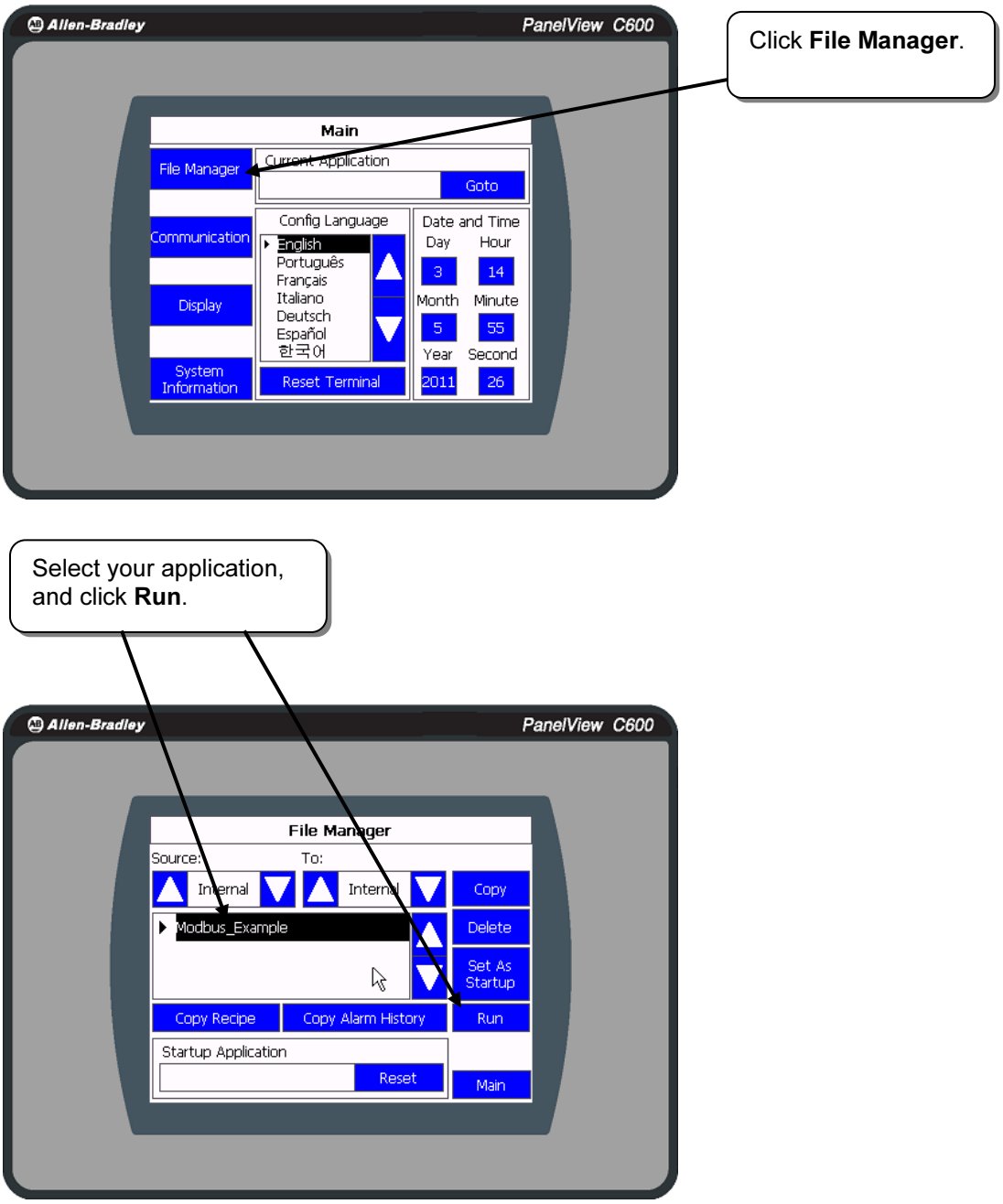
   There is no need for terminating resistors. The PanelView Component has an internal 121 ohm resistor across the R and R- terminals, and the Micro800 is terminated by jumpering TERM to A on the 1763-NC01 adapter.

2. Connect cables, and test the application.

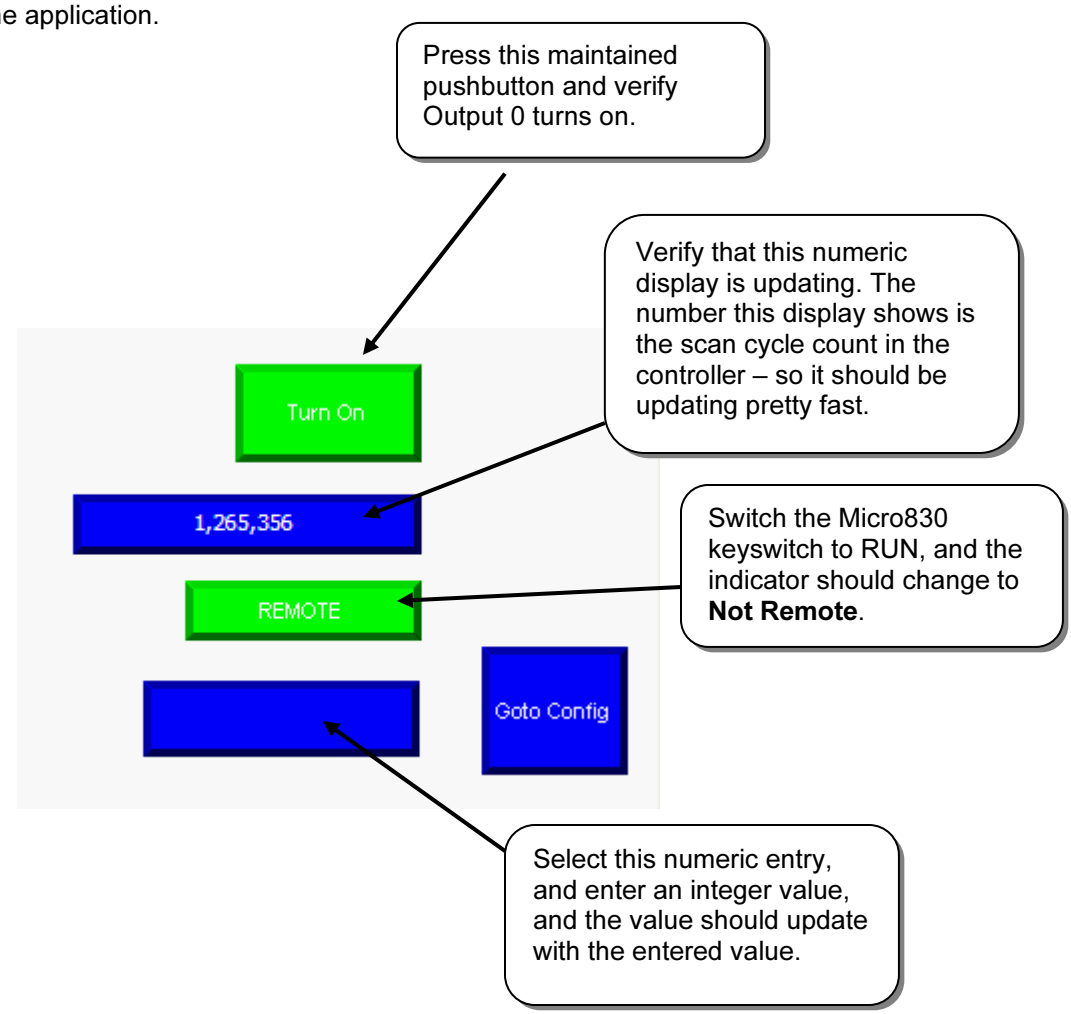
   RS232 - Connect the serial cable from the 8 pin Mini-DIN port on the Micro830 to the D-shell connector on the PanelView Component terminal.

RS485 – Connect the 1763-NC01 adapter to the Mini-DIN port on the Micro830 controller. Connect the RS485 cable from the 1763-NC01 adapter to the RS485/422 port on the PanelView Component.

3. Confirm the controller is in RUN mode and that no faults exist.
4. Load PanelView Component application.



5. Test the application.



6. You have finished testing your application.

Chapter 6-
Using Connected Components Workbench with PowerFlex® Drives

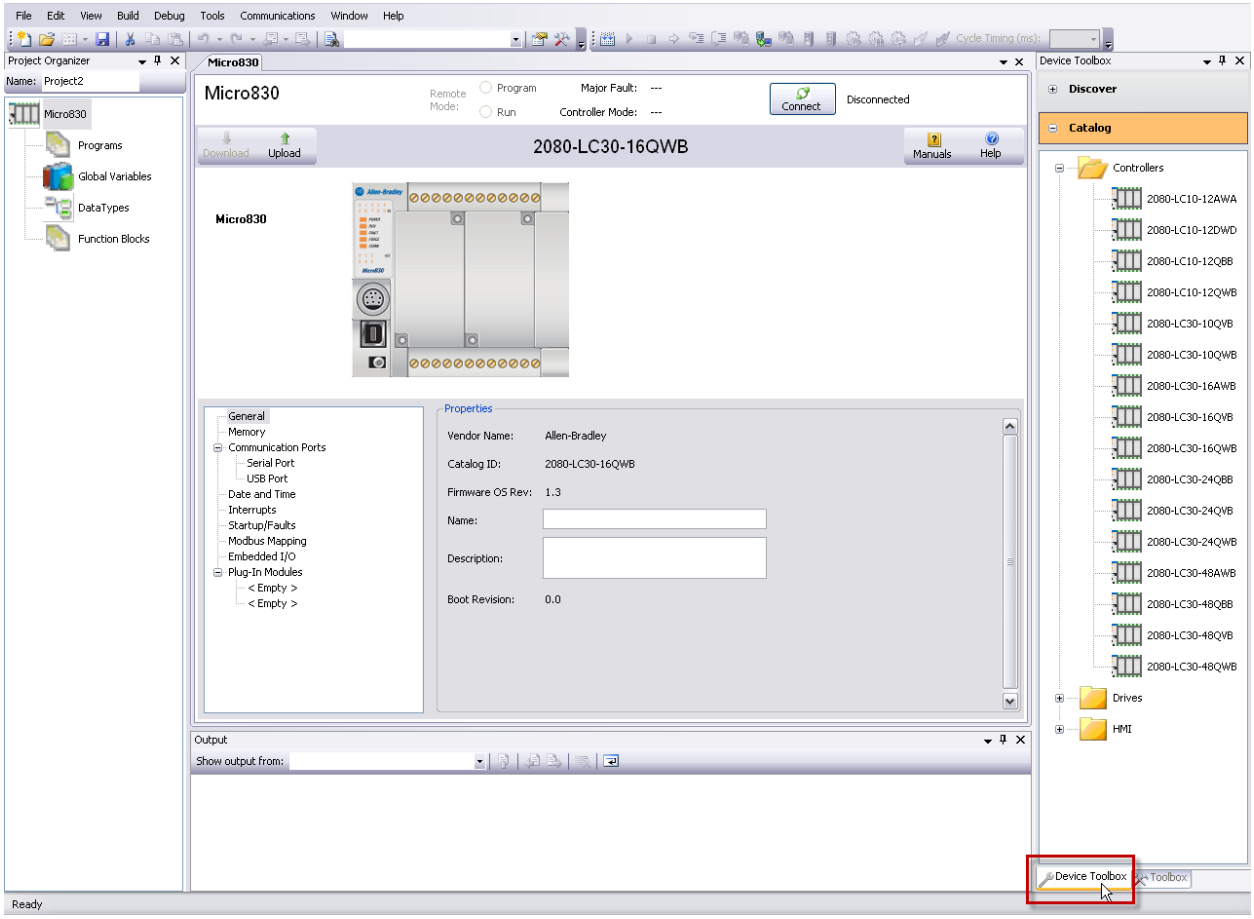
Hardware Used

- PowerFlex 4-Class Drive
- 1203-USB
- Modbus Cable (Flying leads to RJ45)

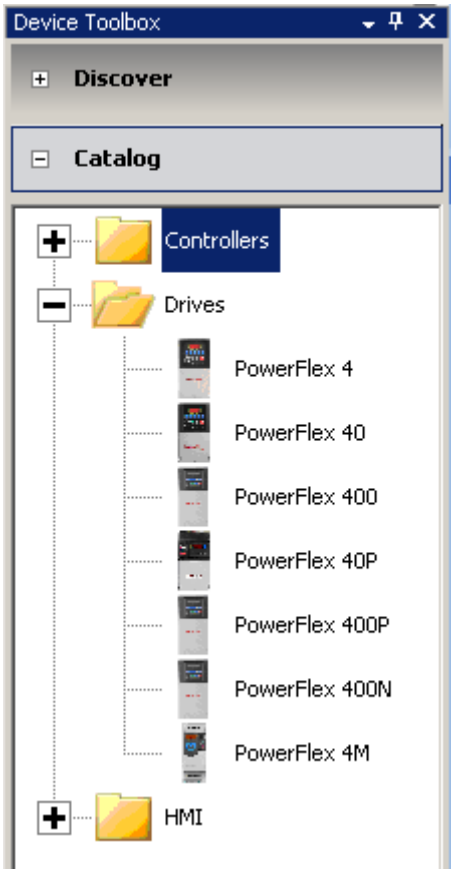
Adding a PowerFlex 4 Drive to a CCW Project

This chapter will show you how to add a PowerFlex 4-Class Drive to a CCW Project.

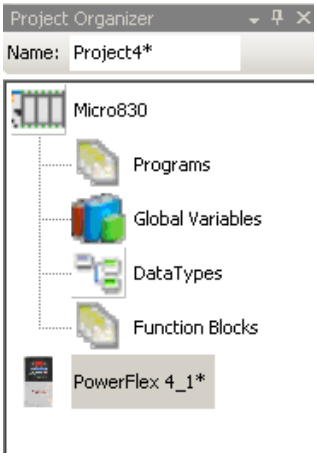
1. Review the Getting Started Guide (Pub# 2080-QR001B-EN-P) to learn how to create a new project and add a controller. Once that's done, the screen should look like the following and click on **Device Toolbox**.



2. Expand the **Drives** folder within **Device Toolbox**:



3. Click on the PowerFlex 4 icon, hold and drag it across to the **Project Organizer**, then release:



Note: The default name for the drive is **PowerFlex4_1*** to change this, just right click on it and select rename to enter the desired name. Also, notice the asterisk (*) next to the project name and the drive that indicates the project has been modified and needs to be saved. Once the project is saved, the asterisk will disappear.

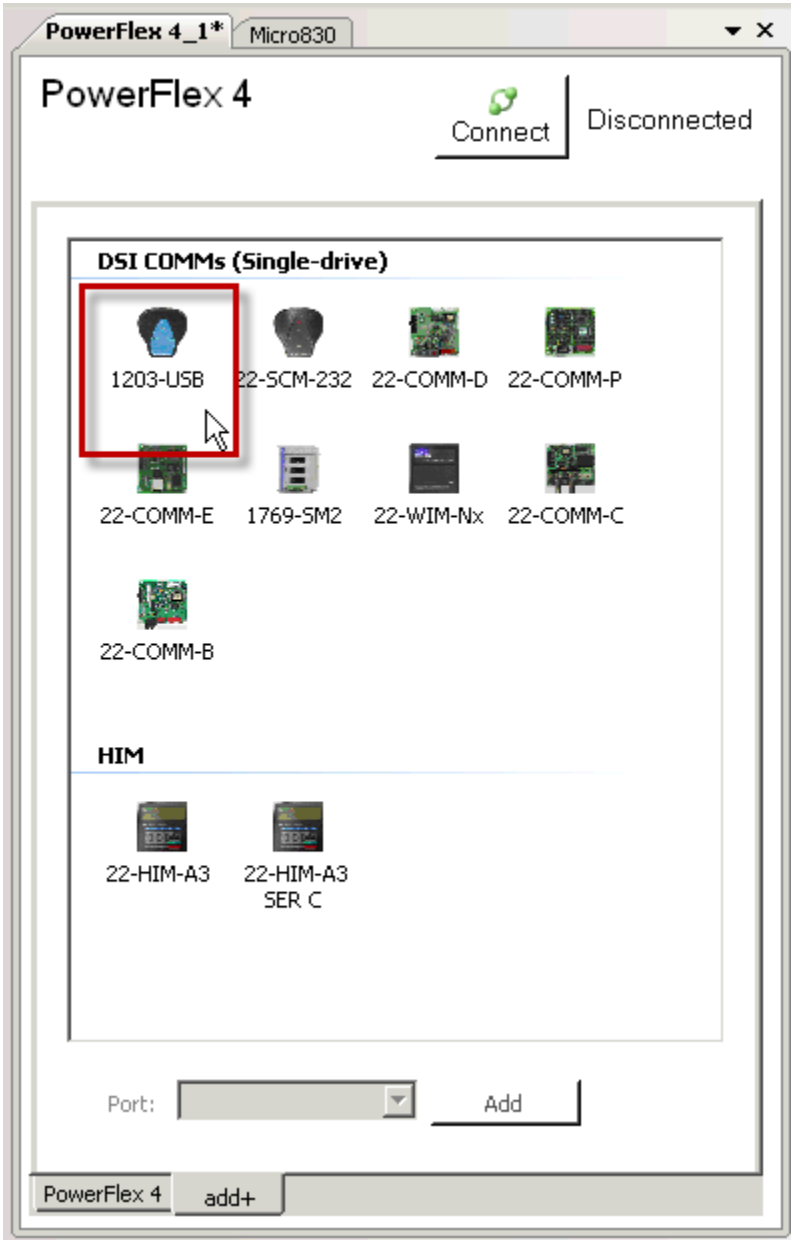
4. Double click on the PowerFlex 4_1 icon and you should see the Device Configuration screen:

Connect to a PowerFlex 4 Drive using a 1203-USB Device

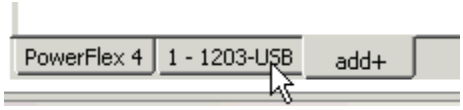
This section will show you how to add 1203-USB to the CCW project to be able to connect to the PowerFlex 4 Drive added in the previous section.

1. Once you are on the PowerFlex 4 Device Configuration window, click on the **add+** tab:

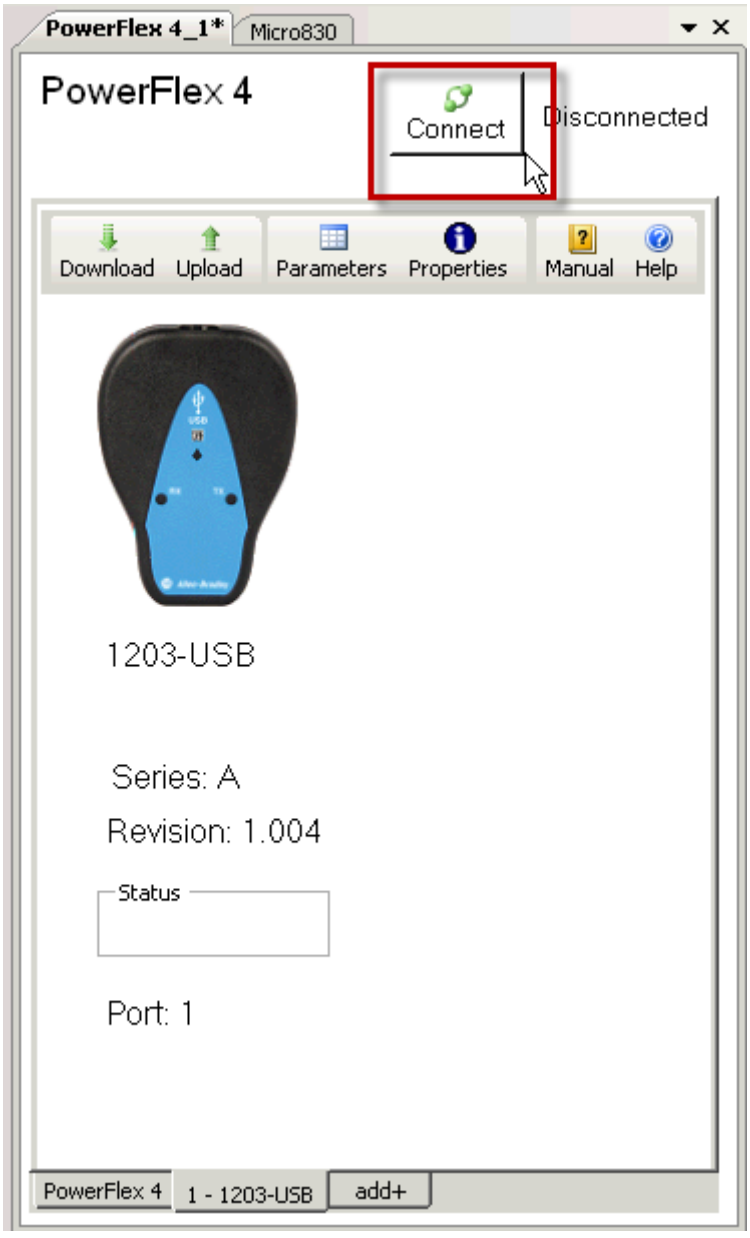
2. Double-click on the **1203-USB**:



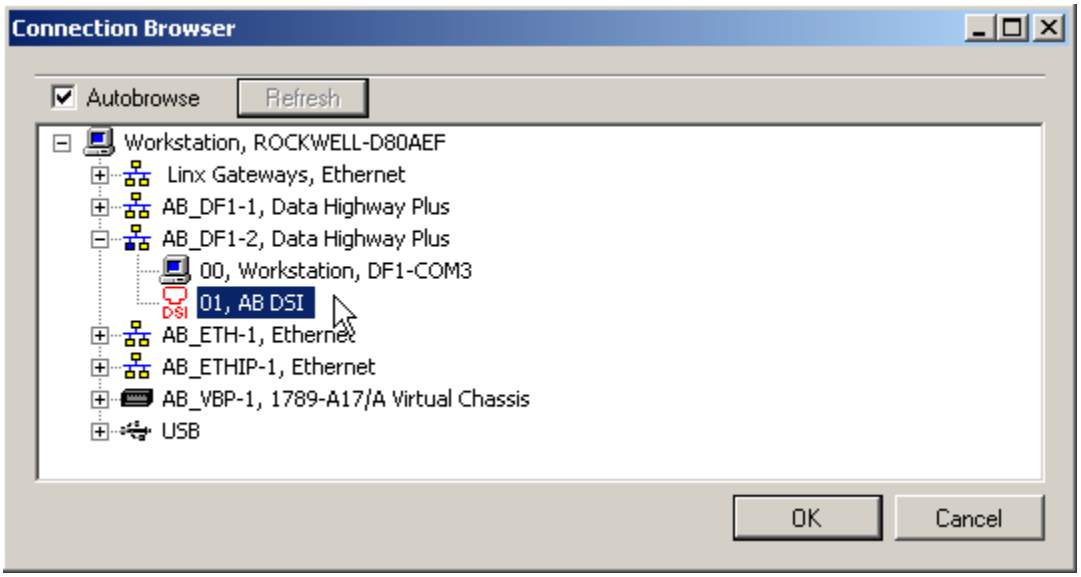
3. Click on the **1203-USB** tab added on the bottom:



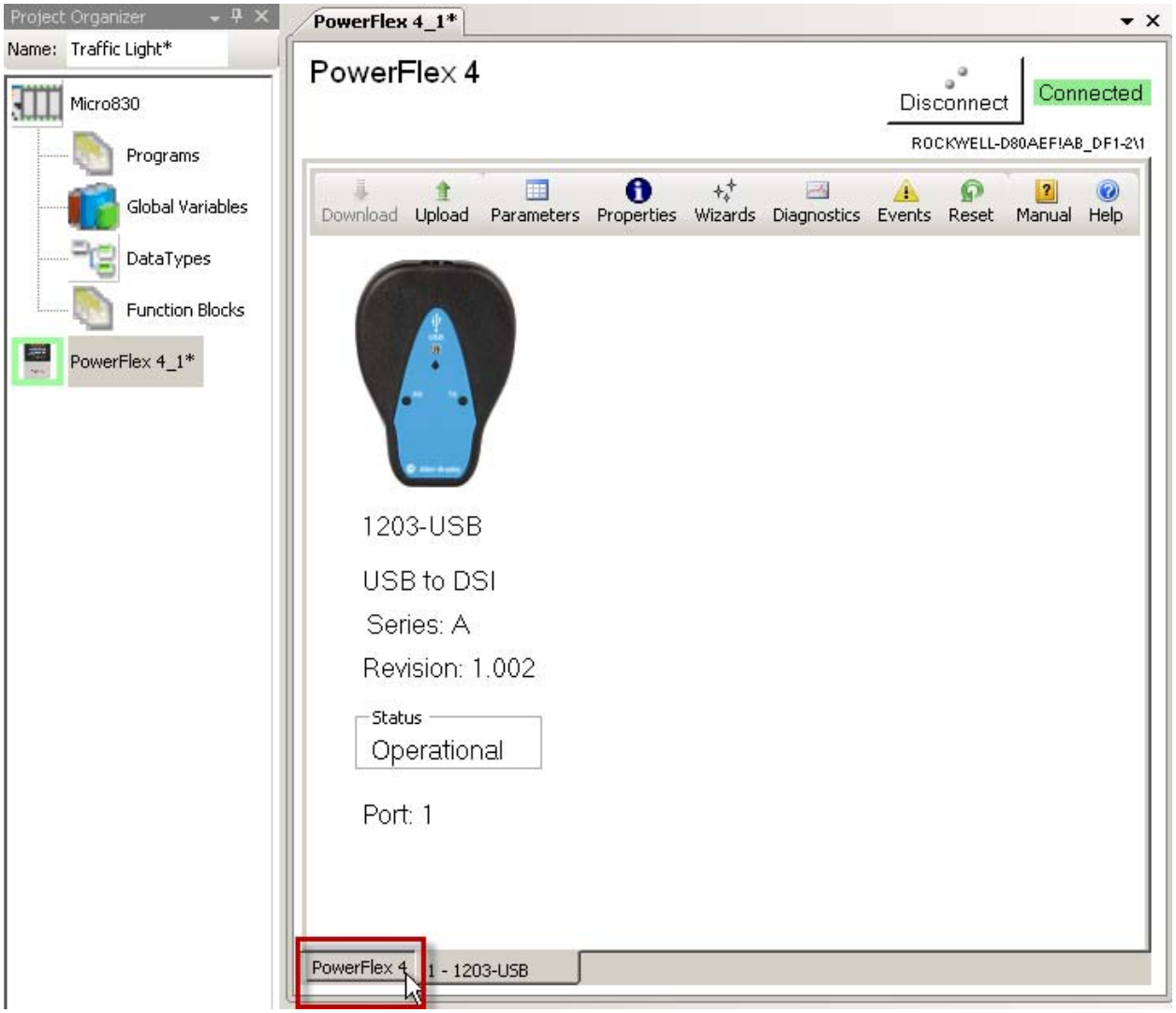
4. Before connecting to the Drive, you must install the 1203-USB drivers and configure a new DF1 connection in RSLinx (refer to publication DRIVES-UM001B-EN-P for more details). Click the **Connect** button:



5. Expand the DF1 connections and look for the **01,AB DSI** representing the 1203-USB, select it and then click **OK**.

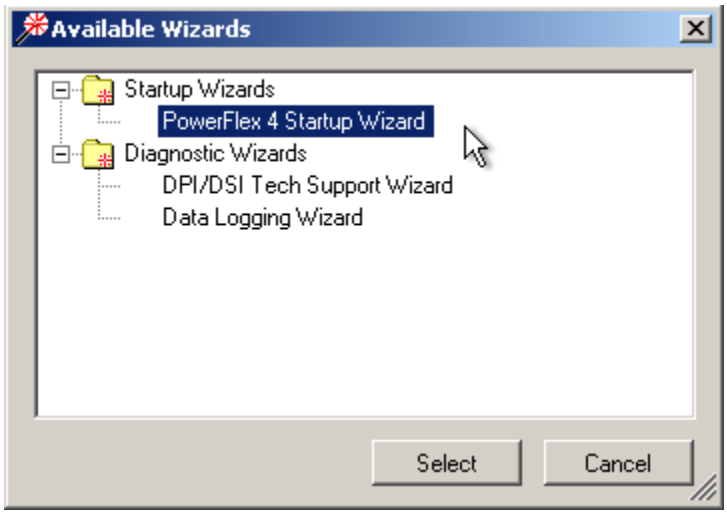


6. Notice the green background around the drive in the Project organizer meaning that you are now connected to the PowerFlex 4 using the 1203-USB. Click on the **PowerFlex 4** drive tab:

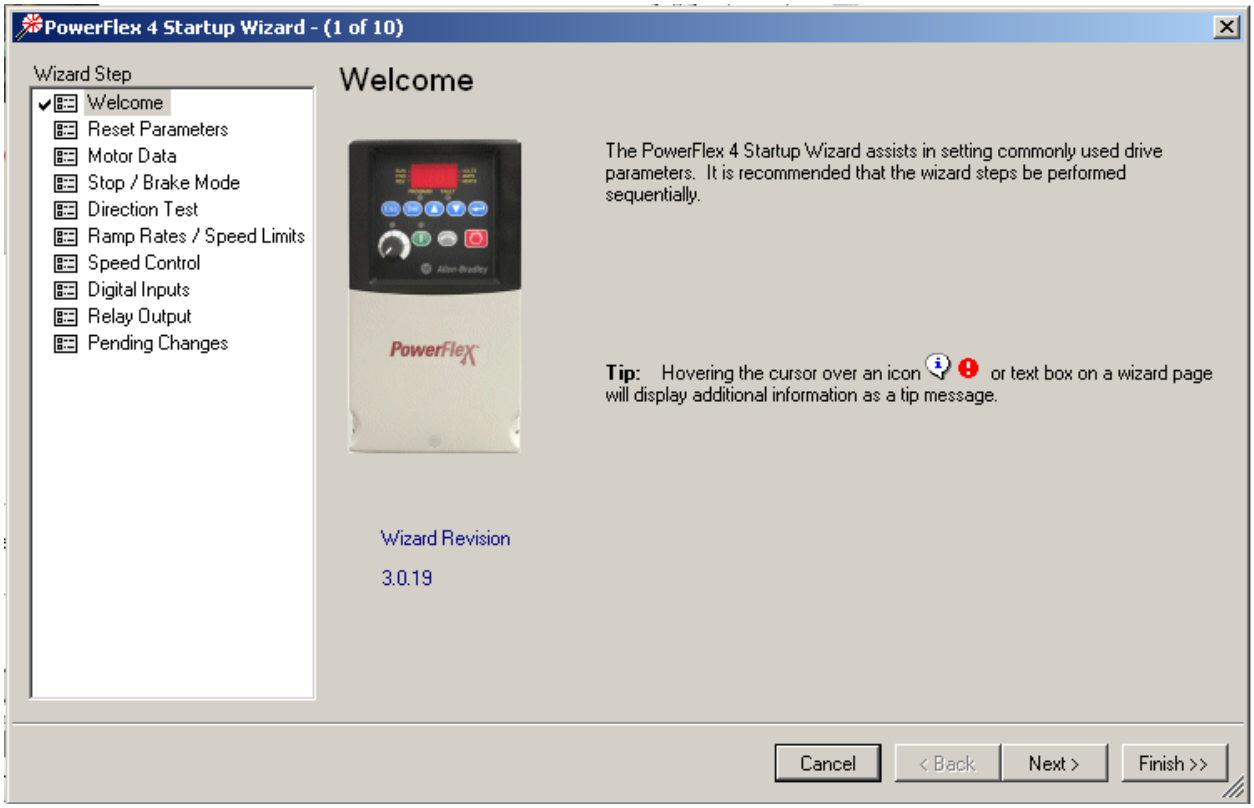


7. Select the **Wizards** as shown:

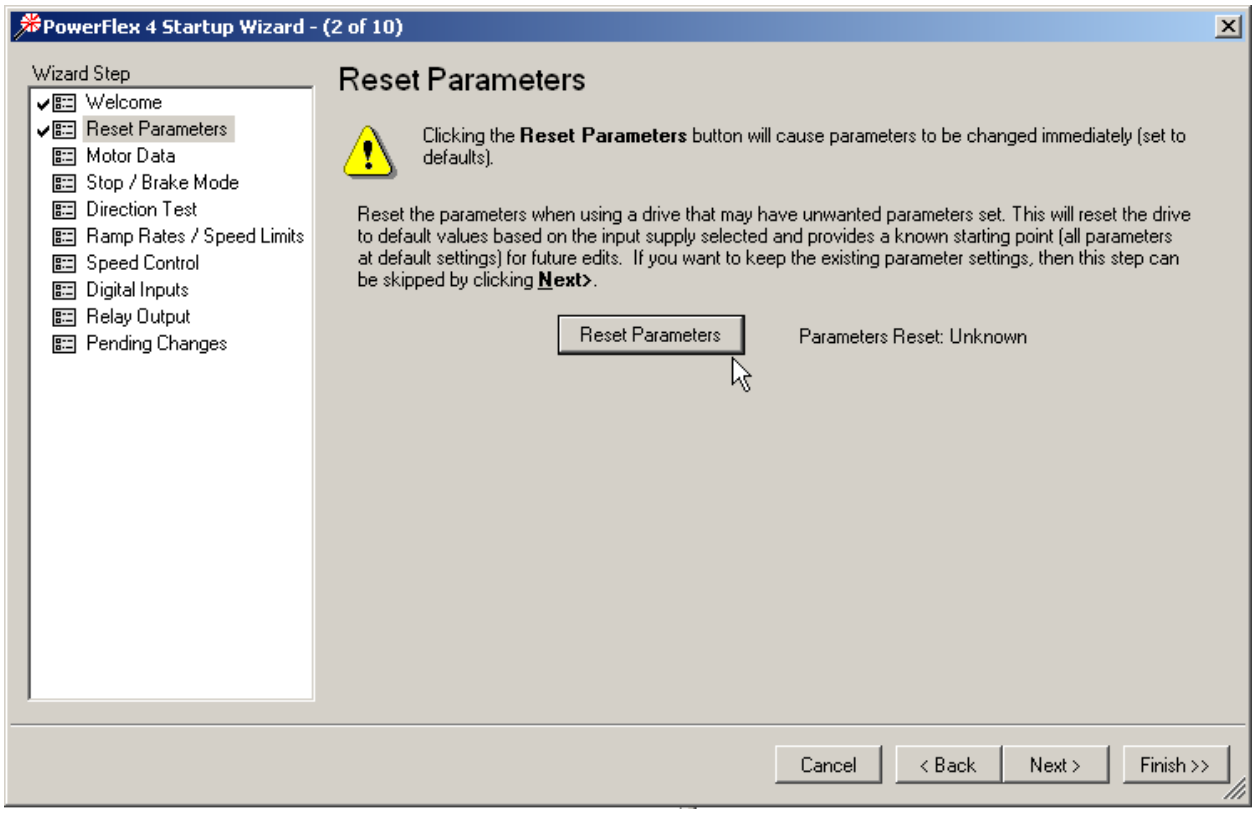
8. Select the **PowerFlex 4 Startup Wizard** and then click **Select**.



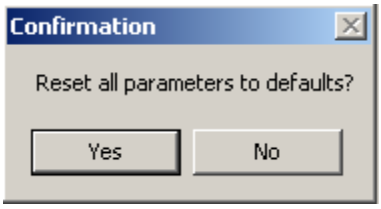
9. The following screen will show. Click **Next** to skip this welcome screen:



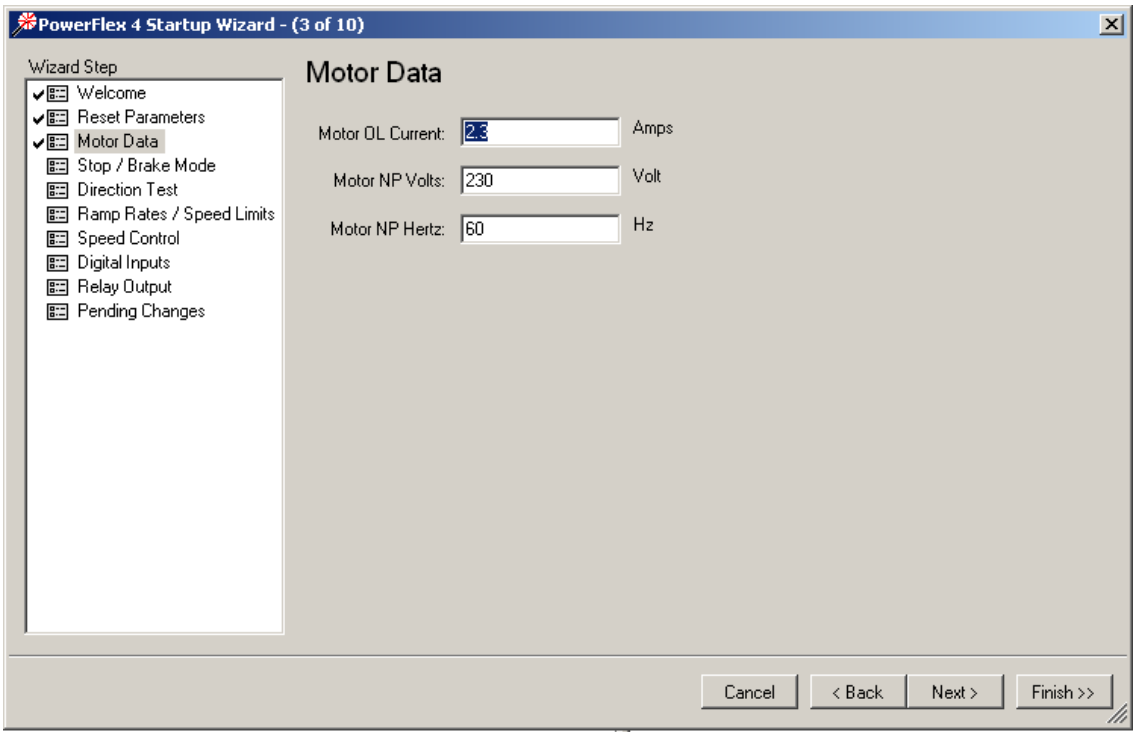
10. Click on **Reset Parameters** :



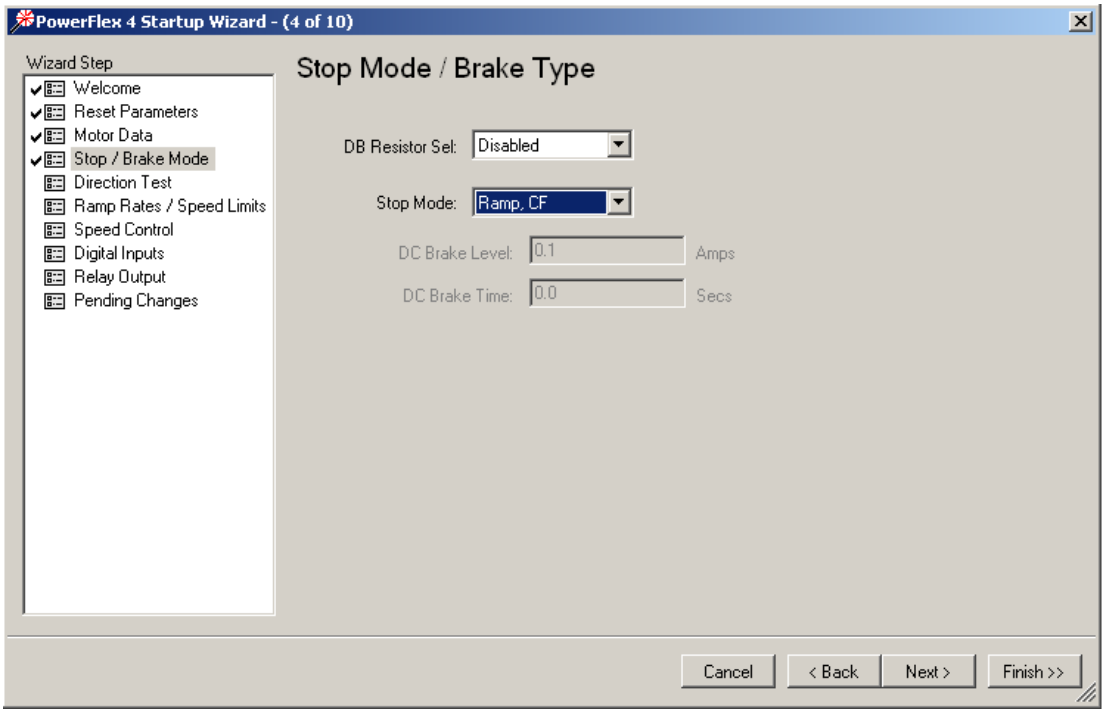
10. Click **Yes** and then click **Next**:



11. In this quick start we will use the default Motor Data. Click **Next**:



12. Select as shown and then click **Next**:



13. To complete the Direction Test follow these steps:

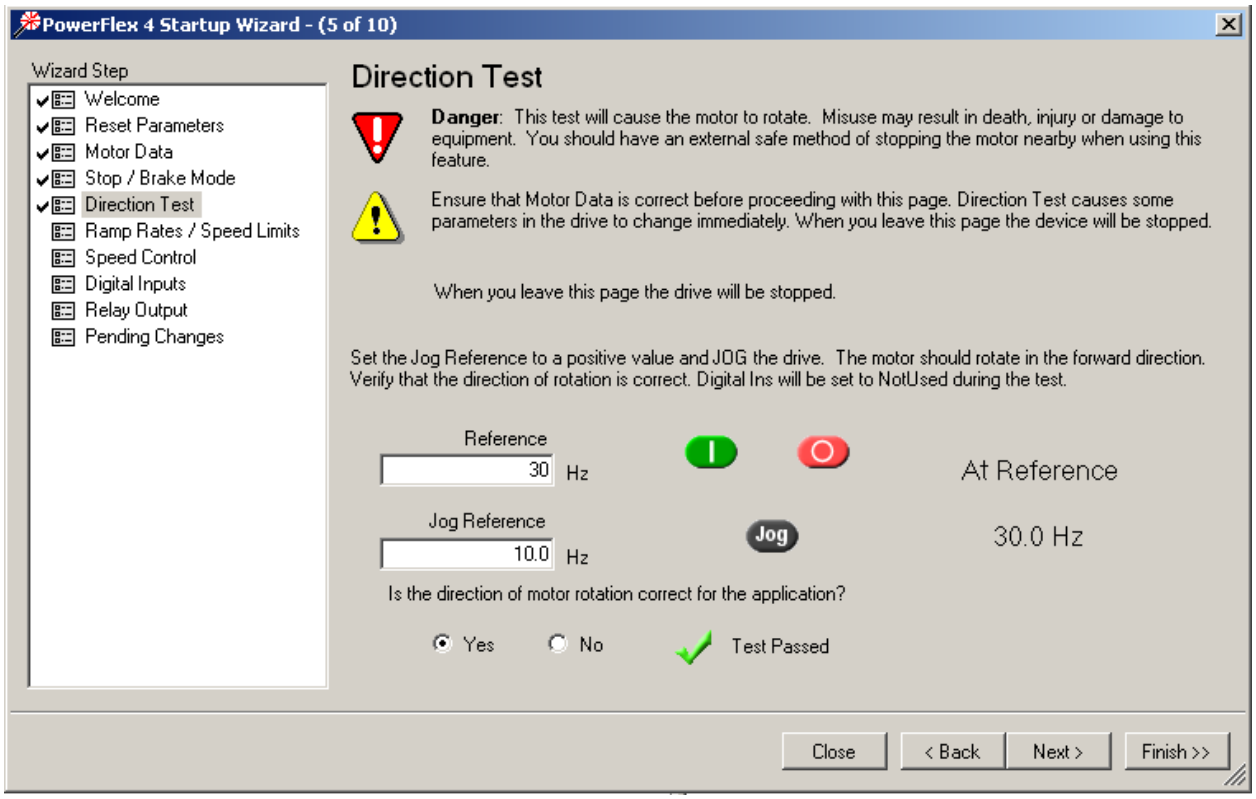
    a. Click  to clear the present fault (F048) if showing.

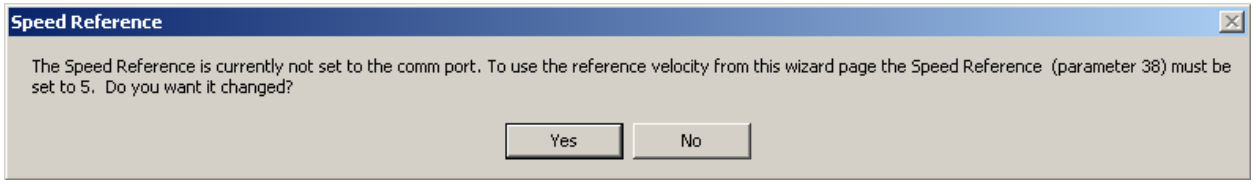
    b. Enter the desired reference. For this quick start we'll use 30Hz and then click  .

    c. A speed reference acknowledgement window will appear to accept a parameter change. Click **Yes.**

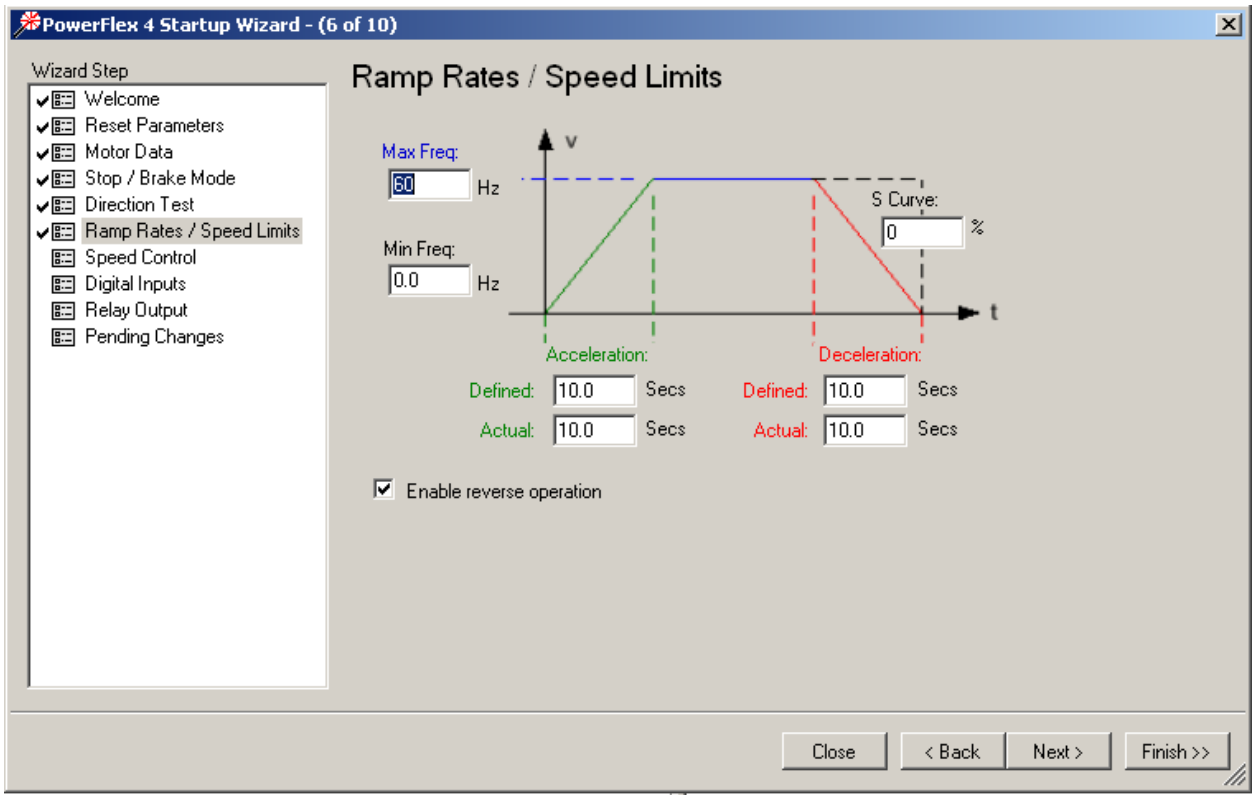
    d. By now the motor should be rotating at reference speed. Verify that the motor direction of rotation is correct and then select the **Yes** radio button.

    e. You are done with the direction test. Click **Next** to continue.

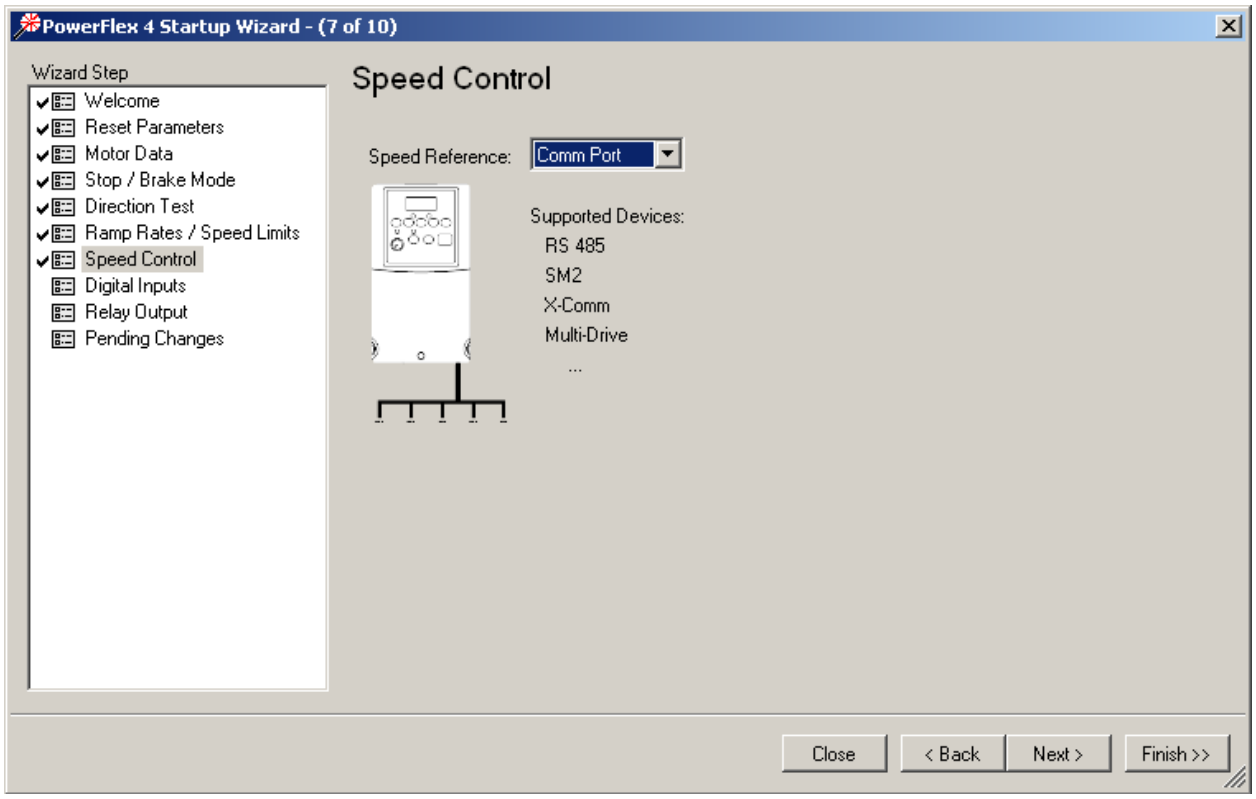




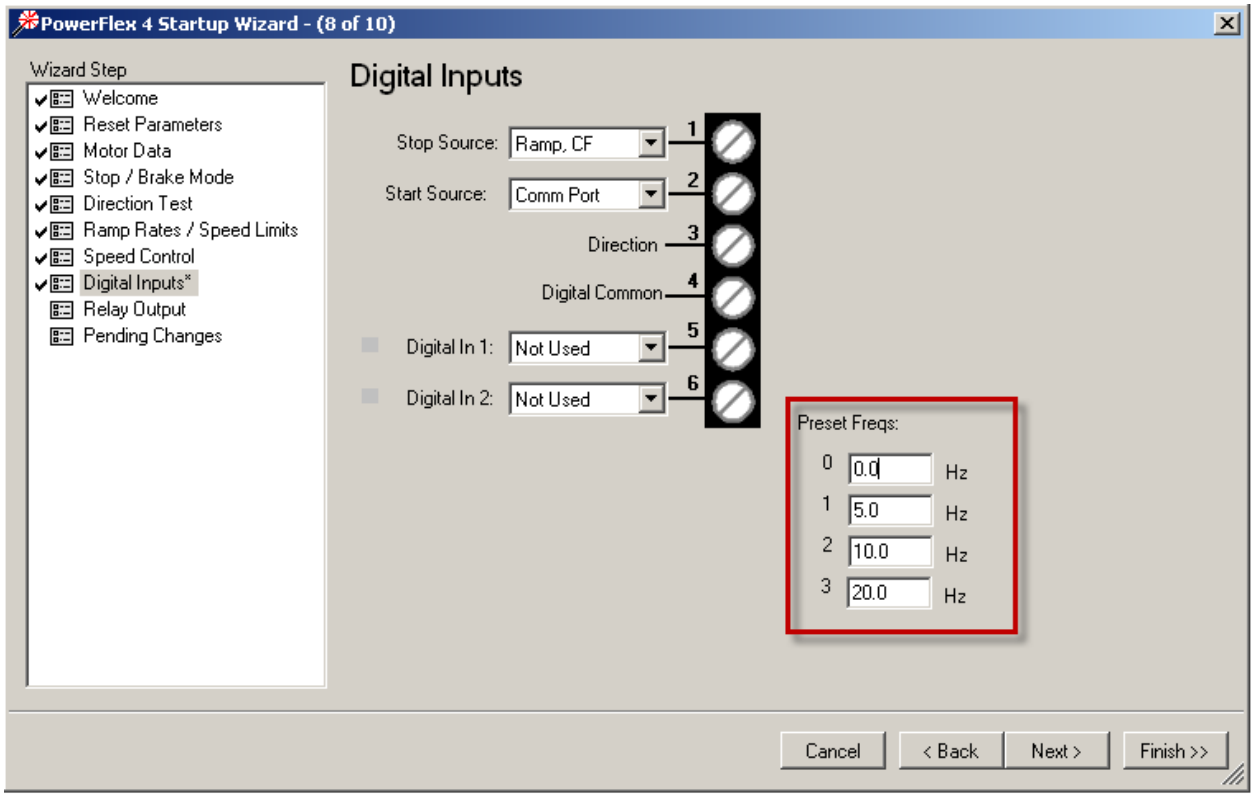
14. Select as shown and then click **Next**:



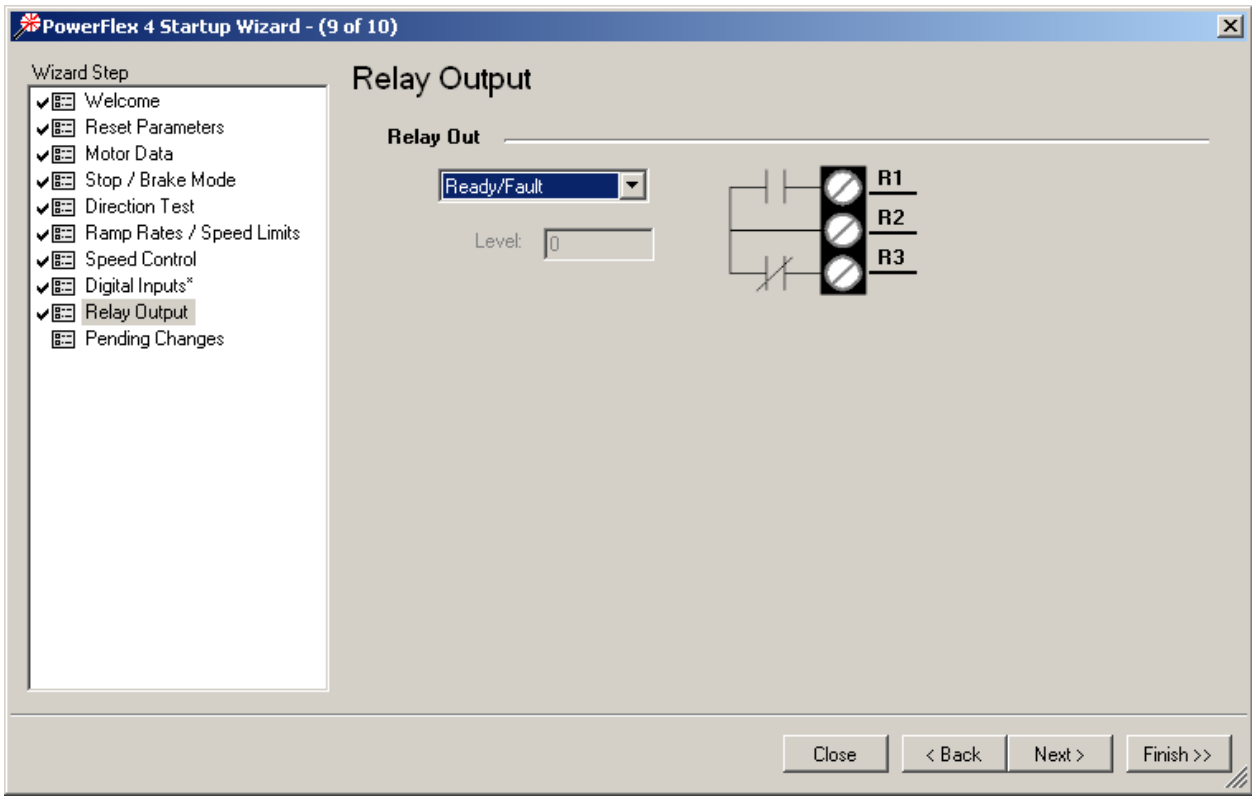
15. Select **Comm Port** and then click **Next**:



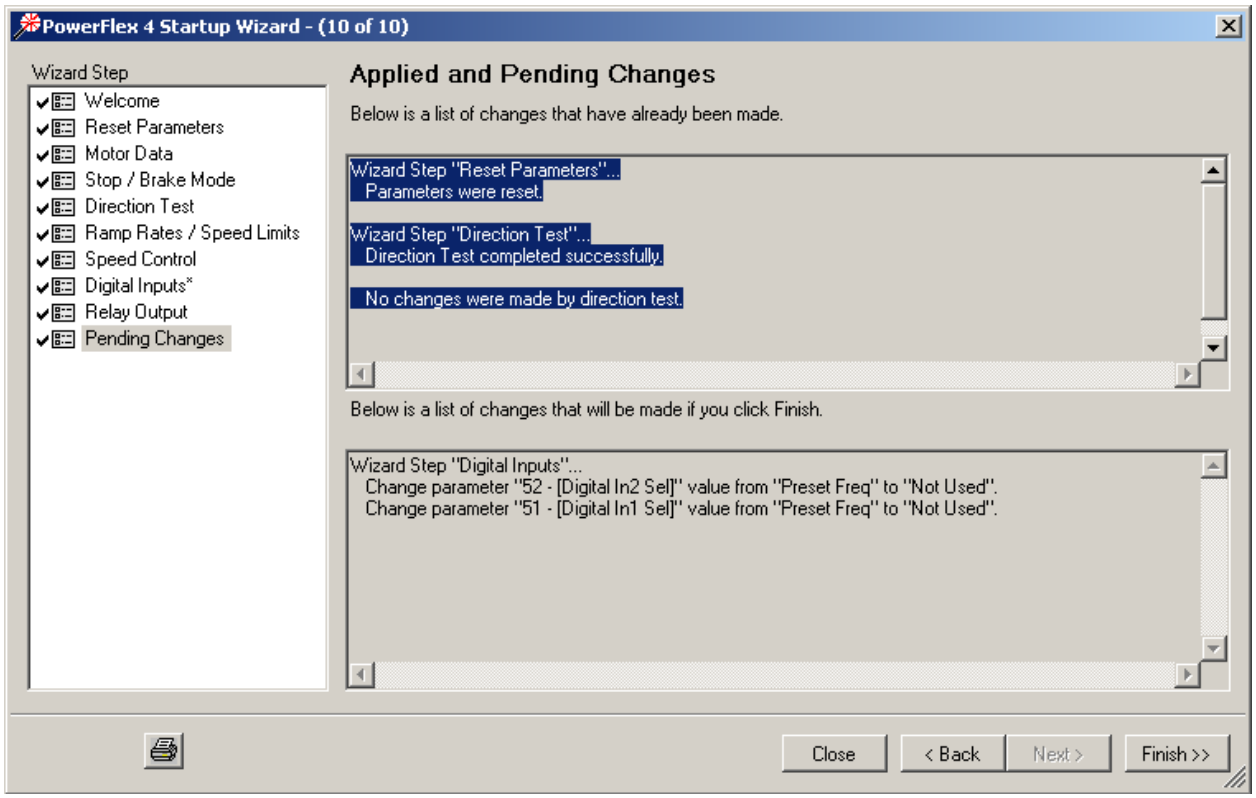
16. Set the **Start Source** to Comm Port to eventually trigger the **Preset Freqs** shown below. Select as shown and then click **Next**:



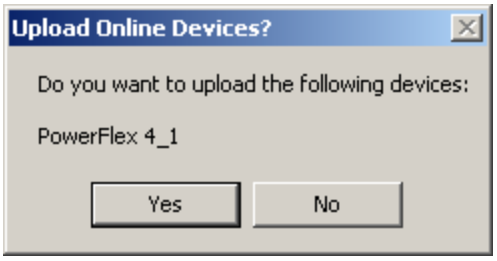
17. Select as shown and then click **Next**:



18. Click **Finish**:



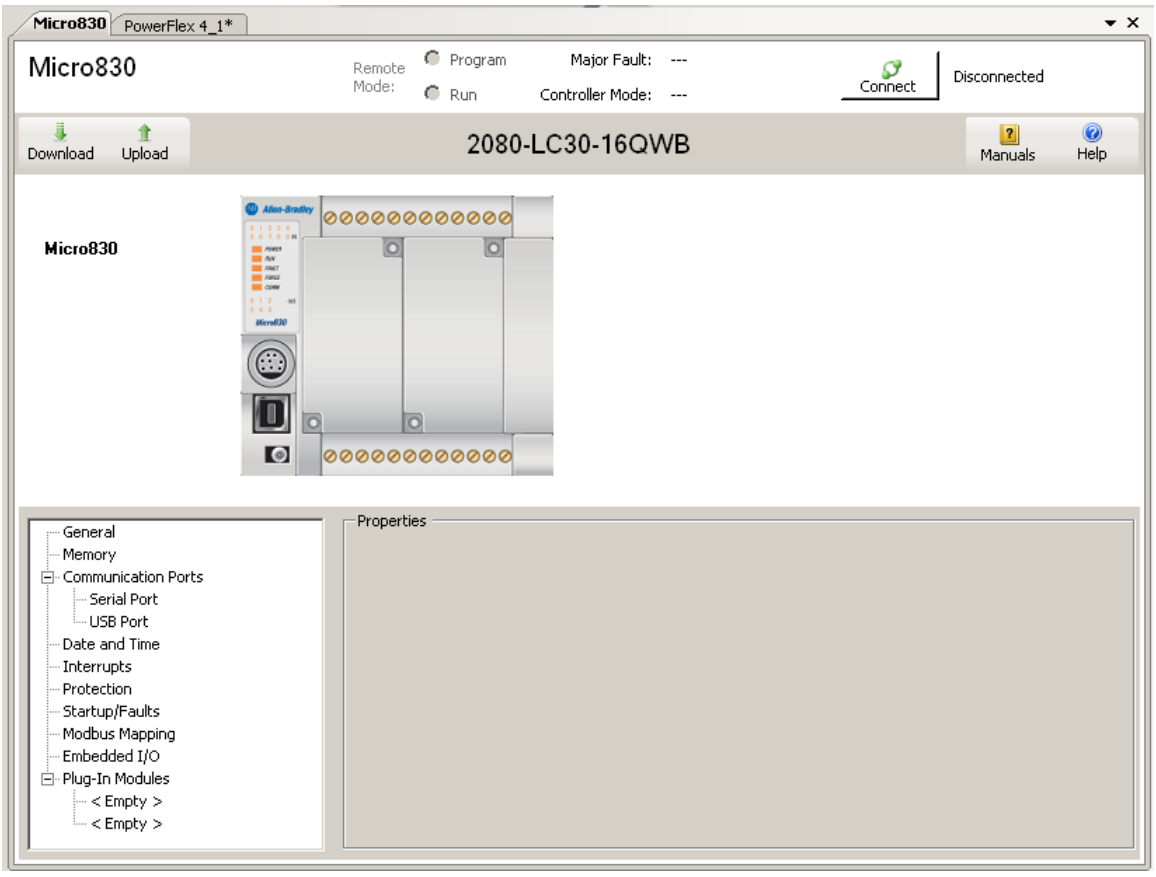
19. Save the project by clicking and the following window will appear. Click **Yes** to upload the drive parameters.



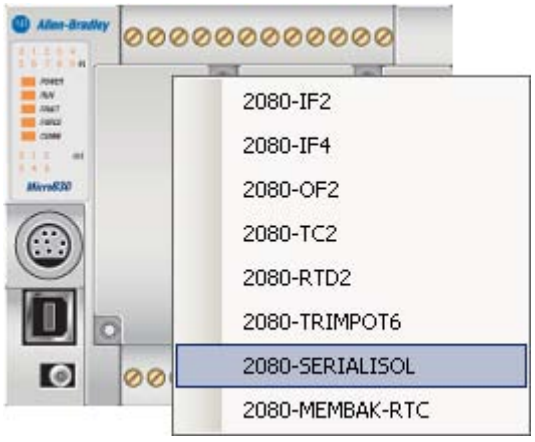
Configuring the Controller for Modbus Communication with a PowerFlex 4

This section will show you how to configure the Micro830 for Modbus communication using the Serial plug-in module.

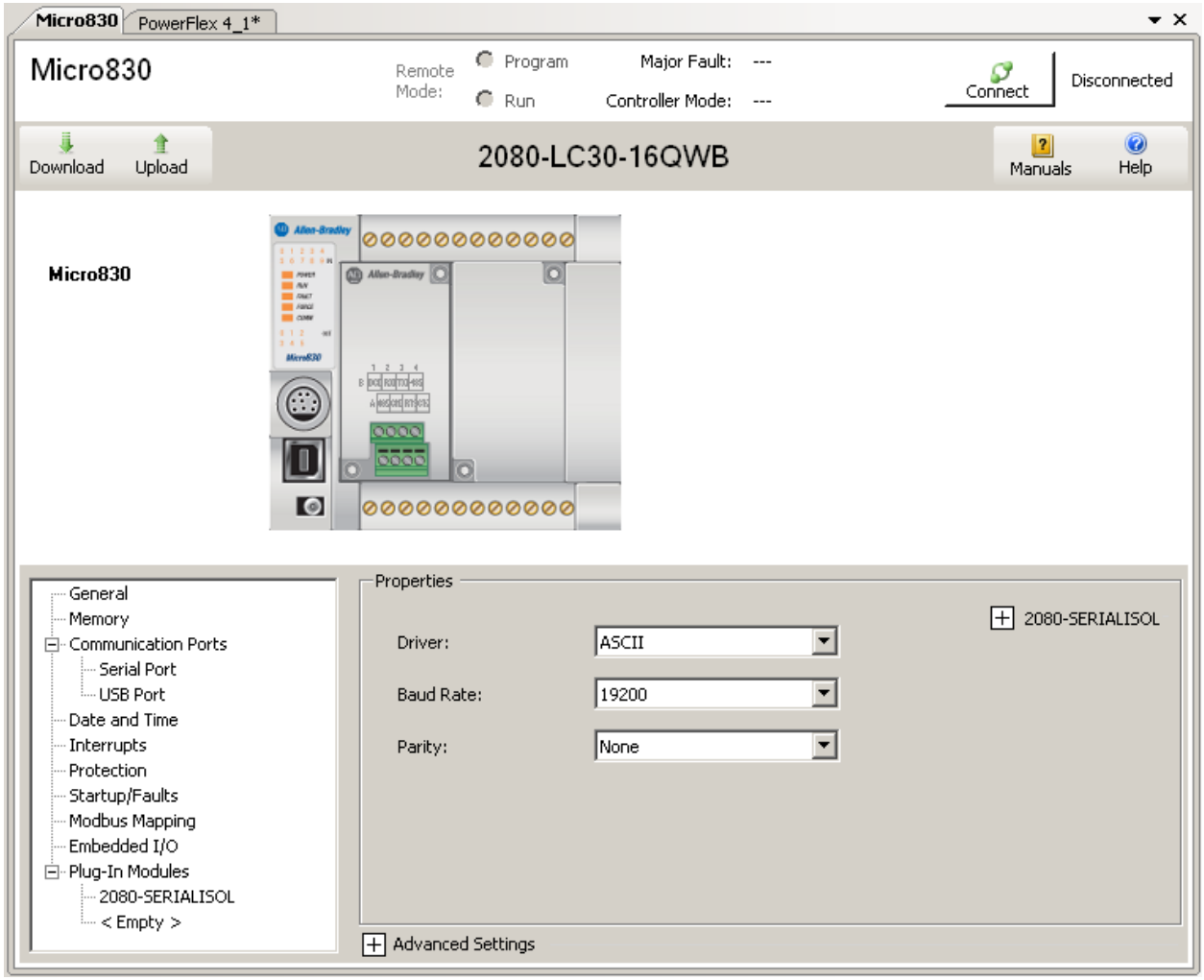
1. To configure the controller plug-ins, double click on the Micro830 icon in the **Project Organizer** to bring up the following screen:



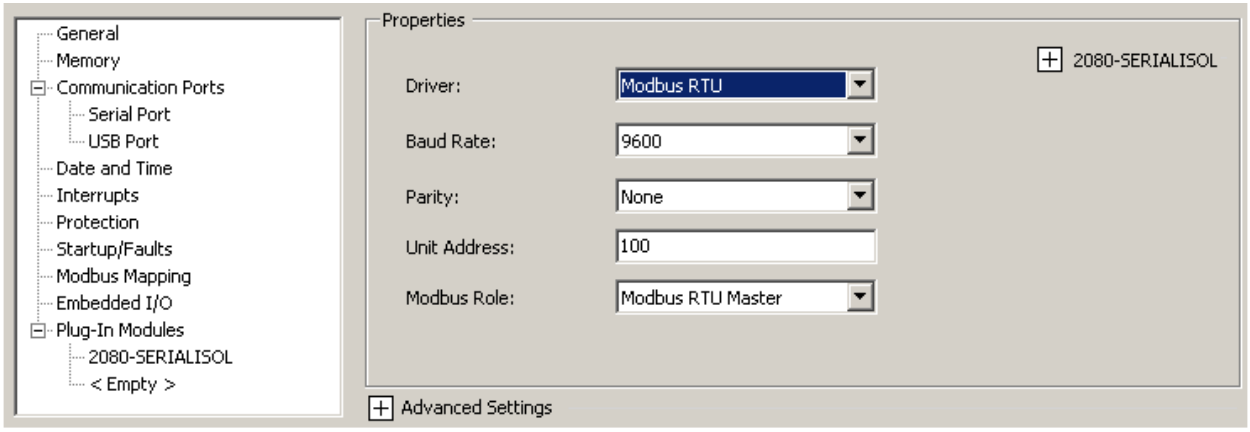
2. Add an isolated serial plug-in to slot 1 by right clicking on the graphic of the first plug-in slot and selecting **2080-SERIALISOL**:

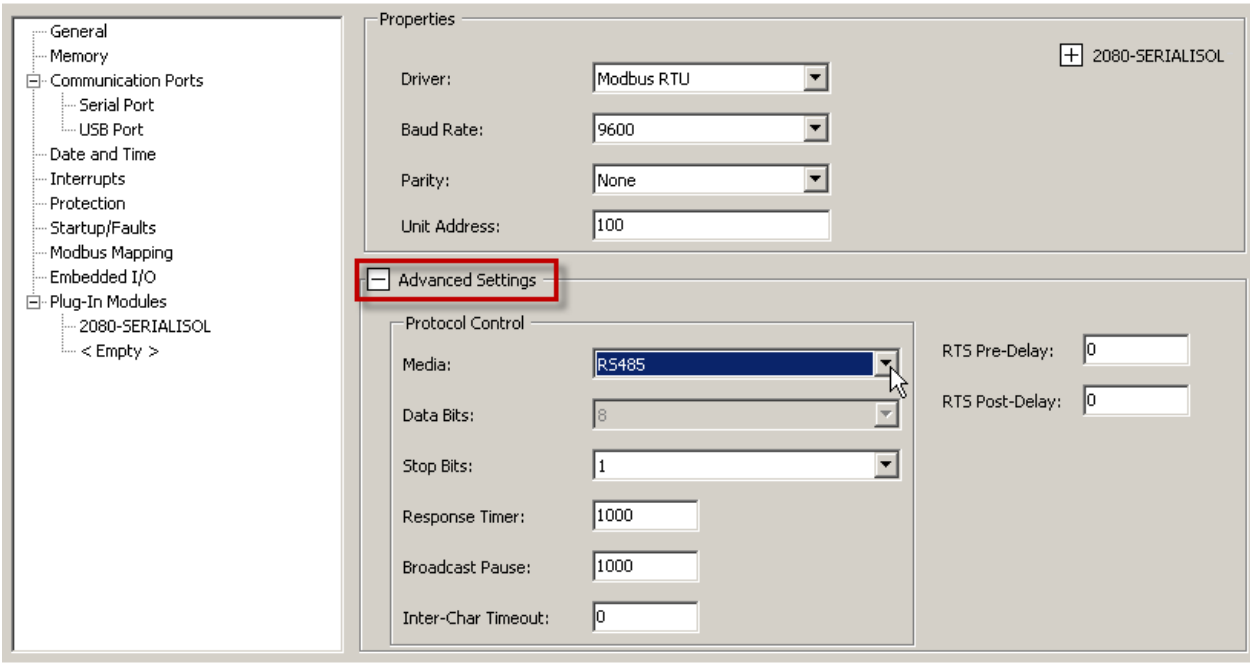


3. The device configuration window will now look like this:

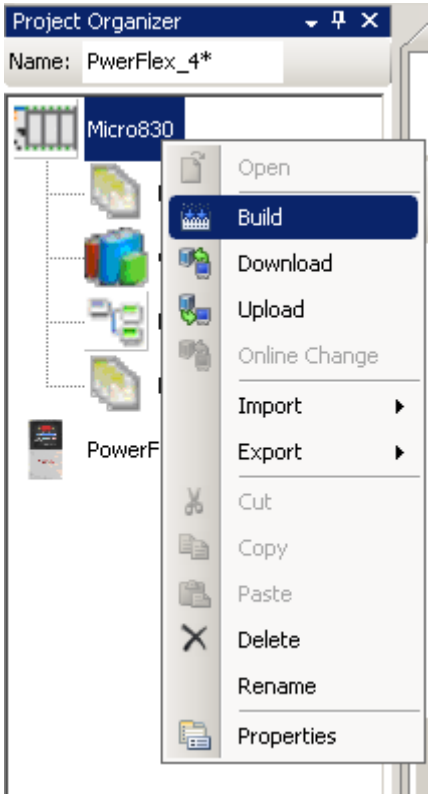


4. Double Click the **2080-SERIALISOL** plug-in and verify the settings are the same as shown below.





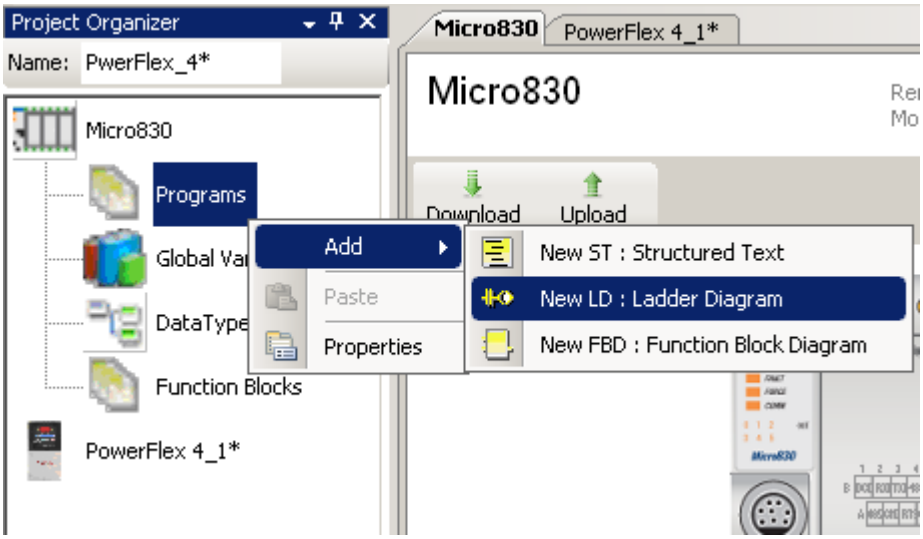
5. Right Click on Micro 830, then select **Build**.



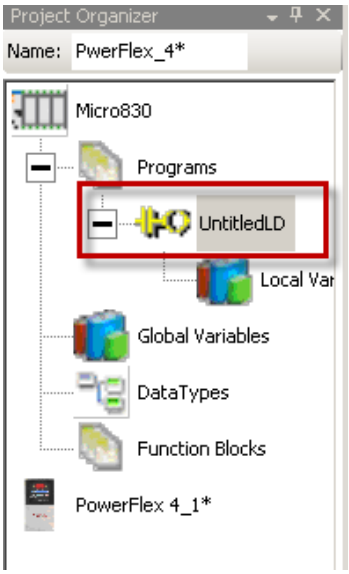
Programming the Controller for Modbus Communication with a PowerFlex 4

This section will show you how to program the Micro830 for Modbus messaging with a PowerFlex 4.

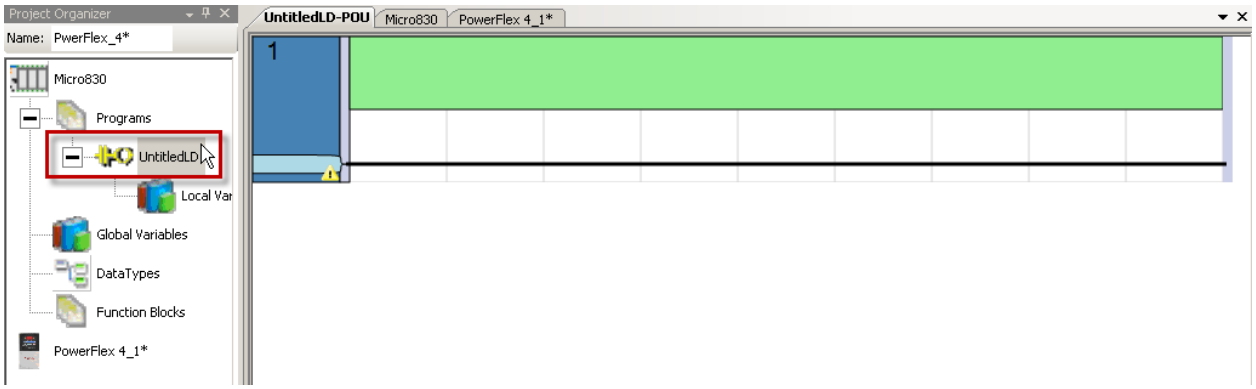
1. Start by creating a new ladder diagram program by right clicking on **Program**. Move the cursor over the **Add** tab and select **New LD :Ladder Diagram.**



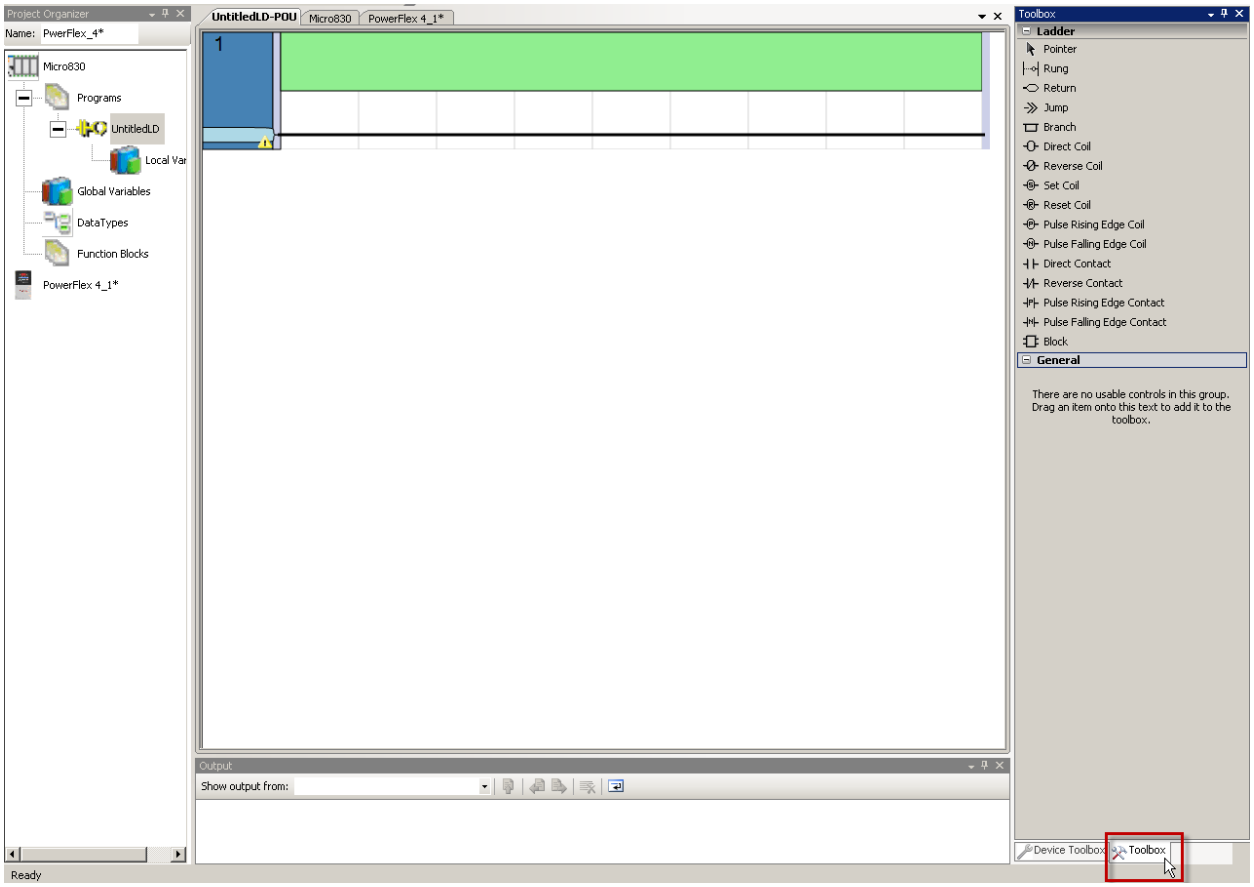
2. A new ladder icon will appear as shown:



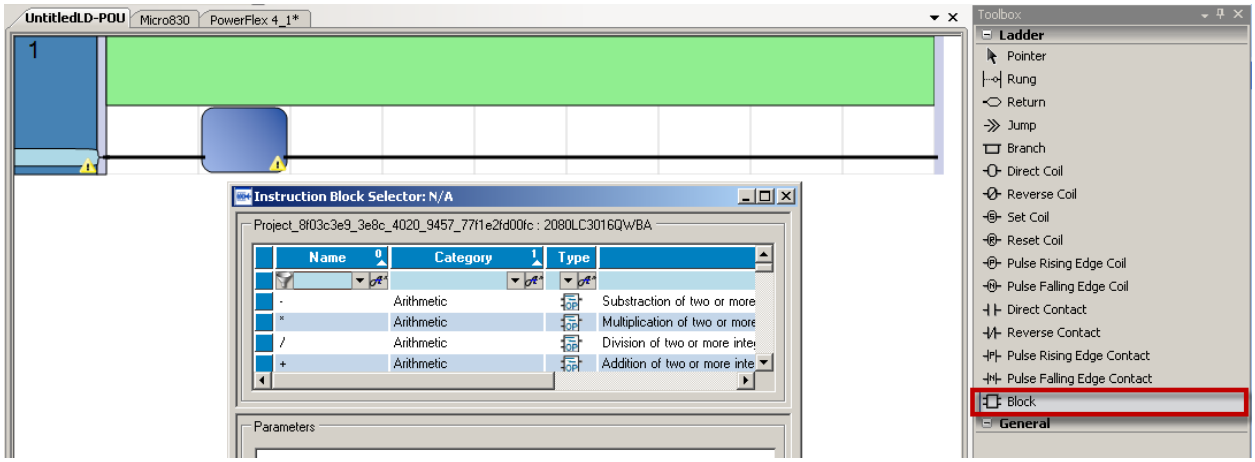
3. Double click on the new ladder icon:



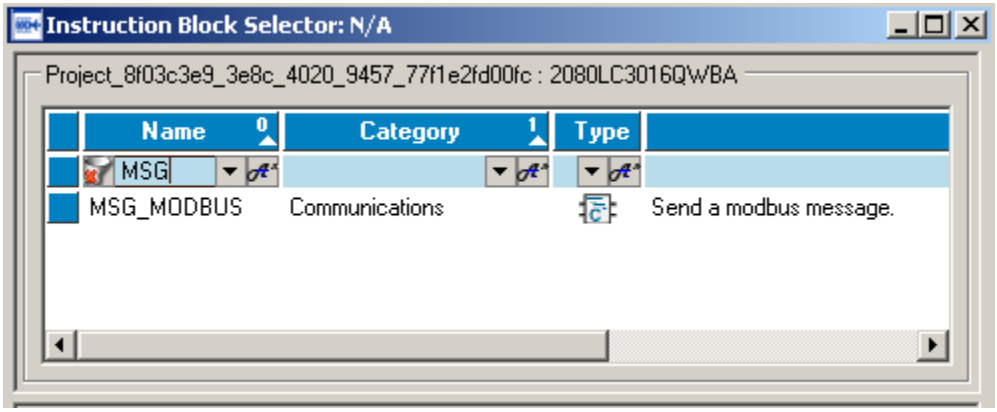
4. Open the **Toolbox** tab if it is not already open



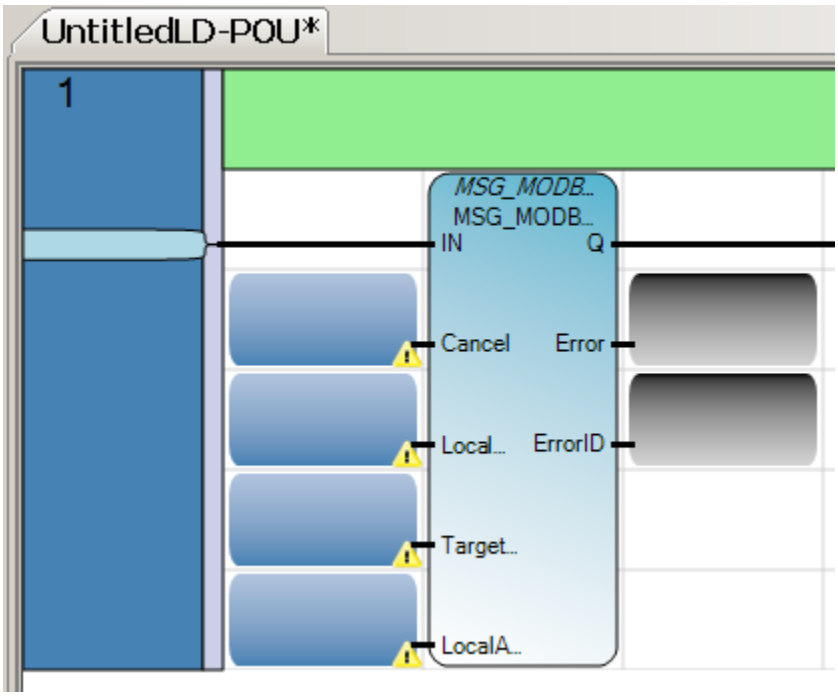
5. Drag and drop a **Block** on the rung. The **Instruction Block Selector** will now open:



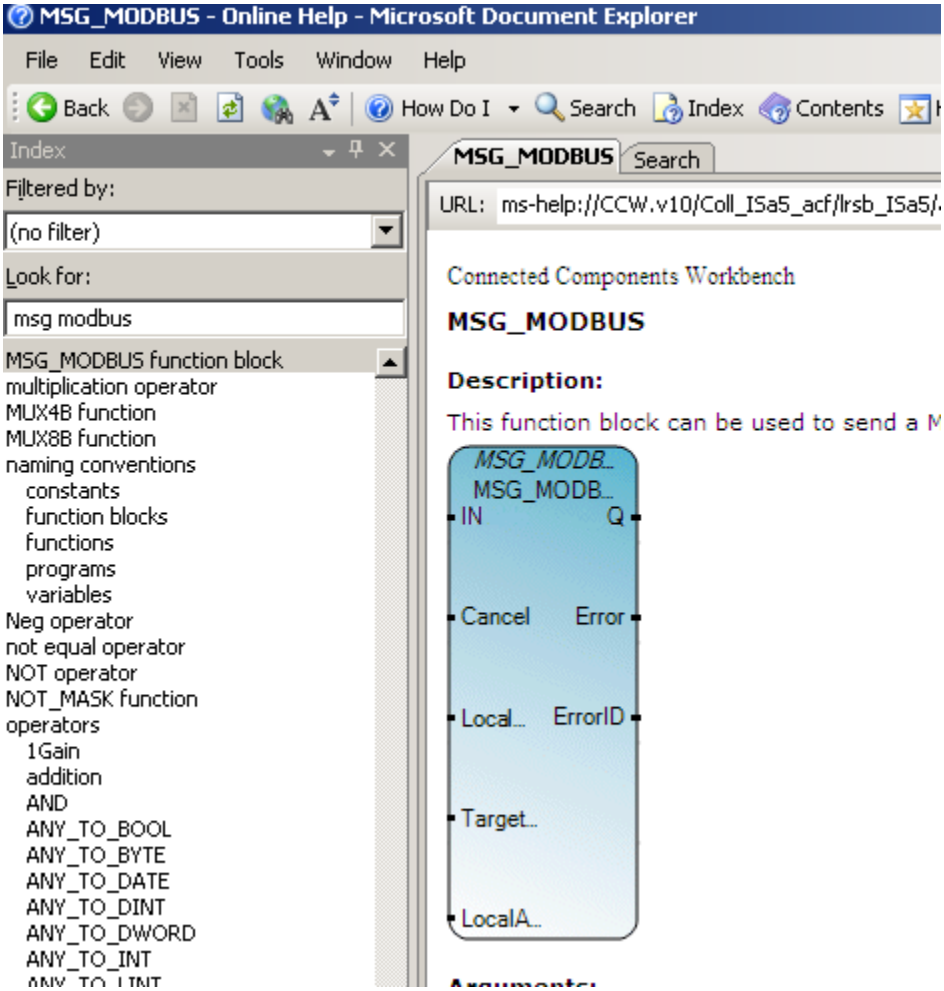
6. Type in **MSG** in the text box under Name and **MSG_MODBUS** will appear:



7. Double click on the **MSG_MODBUS** and the following function block will appear:



8. To use the block, you need to configure it. To find help on the instruction blocks, in this case the **MSG Modbus**, go to Help, Search, click on Local Help, and enter **MSG Modbus** in the search box.

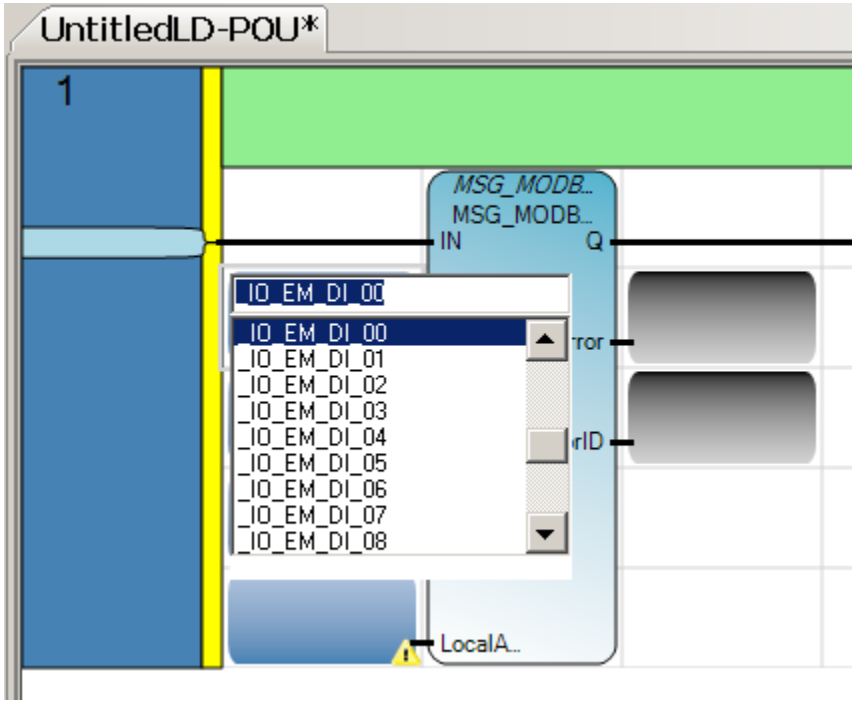


9. Here you will find the information on the inputs and outputs of the block.

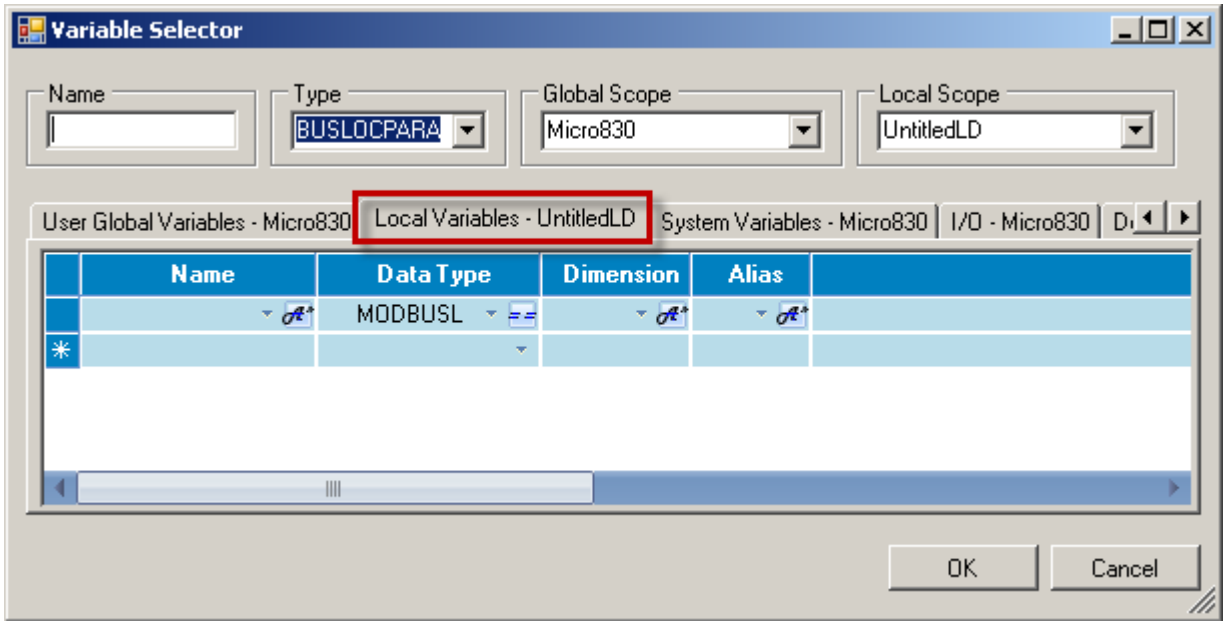
Arguments:

Parameter	Parameter Type	Data Type	Description
IN	Input	BOOL	If Rising Edge (IN turns from FALSE to TRUE), start the function block with the precondition that the last operation has been completed.
Cancel	Input	BOOL	TRUE - Cancel the execution of the function block.
LocalCfg	Input	MODBUSLOCPARA See MODBUSLOCPARA Data Type.	Define structure input (local device).
TargetCfg	Input	MODBUSTARPARA See MODBUSTARPARA Data Type.	Define structure input (target device).
LocalAddr	Input	MODBUSLOCADDR	Define local address (125 words).
Q	Output	BOOL	TRUE - MSG instruction is finished. FALSE - MSG instruction is not finished.
Error	Output	BOOL	TRUE - When error occurs. FALSE - No error.
ErrorID	Output	UINT	Show the error code when message transfer failed. See MSG_MODBUS Error Codes.

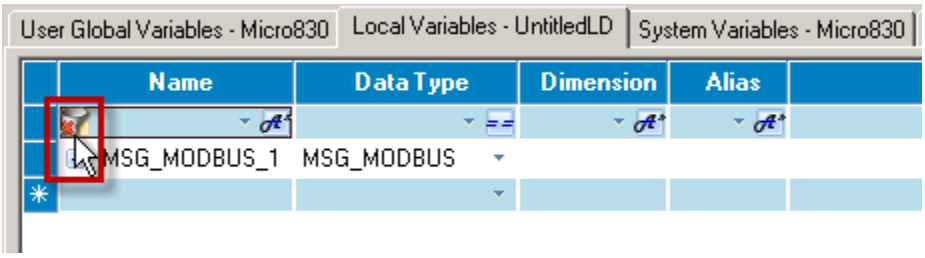
10. For the Cancel parameter, click on the upper part of the blue box and double click on the input from the Micro830 you want to assign, in this case, **Input 0** will be selected.



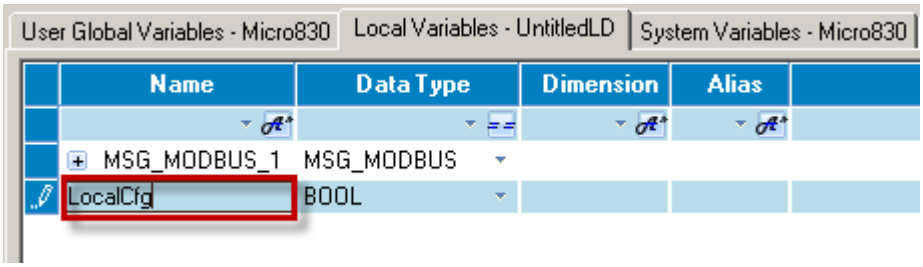
11. To create the other variables for the function block, double click on the bottom of the next blue box which will open the **Local Variables**.



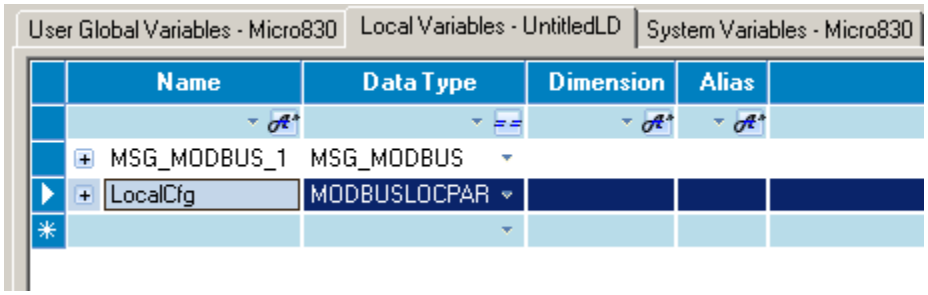
12. If the **MSG_MODBUS_1** variable is not showing, click on the filter as shown below.



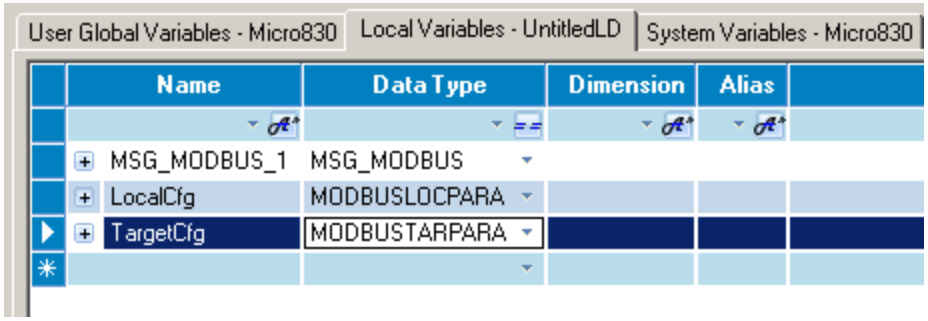
13. We now need to create variables for the other function block inputs. Click on the light blue box to the right of the asterisk. Type in **LocalCfg**. Tab over to Data Type.



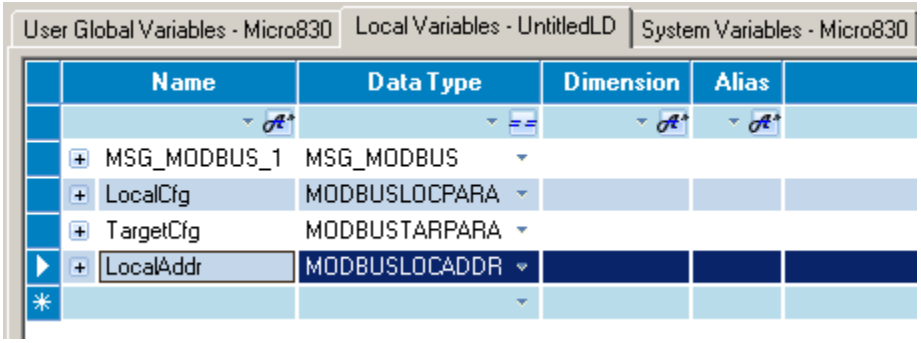
14. Type in **MODBUSLOCPARA**. See step 9 for where this data type assignment came from. You will note as you begin typing, the name will populate. Pay attention to the last half of the word to ensure you have the correct data type. Press Enter.



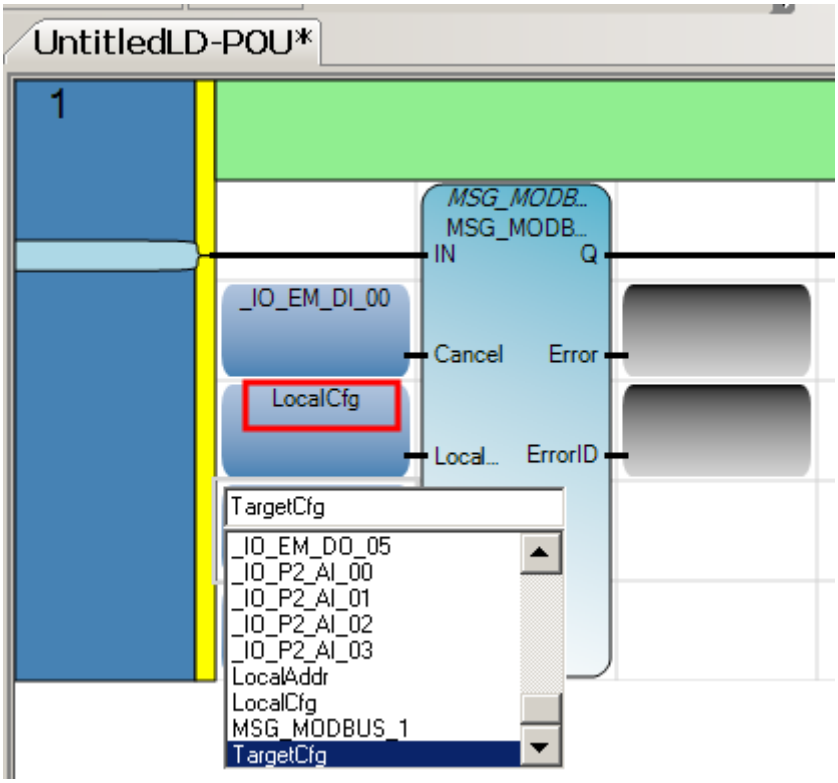
15. Type in **TargetCfg** in the light blue box to the right of the asterisk. Type in **MODBUSTARPARA** under data type. Press Enter.



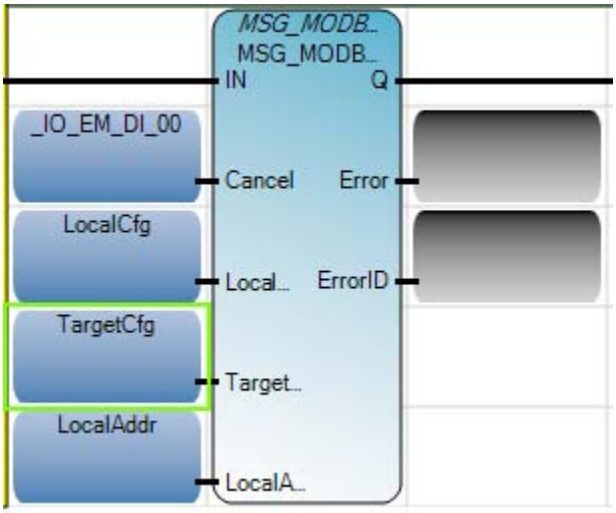
16. Type in **LocalAddr** in the light blue box to the right of the asterisk. Type in **MODBUSOCADDR** under data type. Hit Enter and then click OK on this window to go back to the function block view.



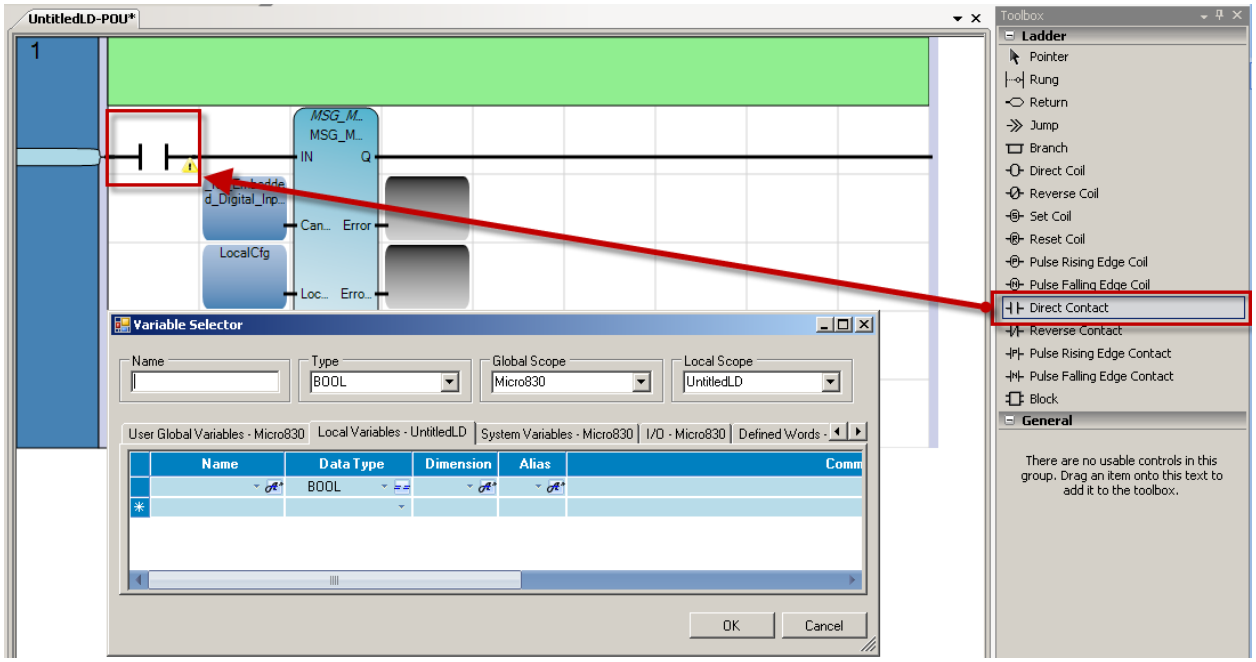
17. Assign the appropriate variables to each of the Input boxes by clicking on top of the box for each and select the corresponding variable.



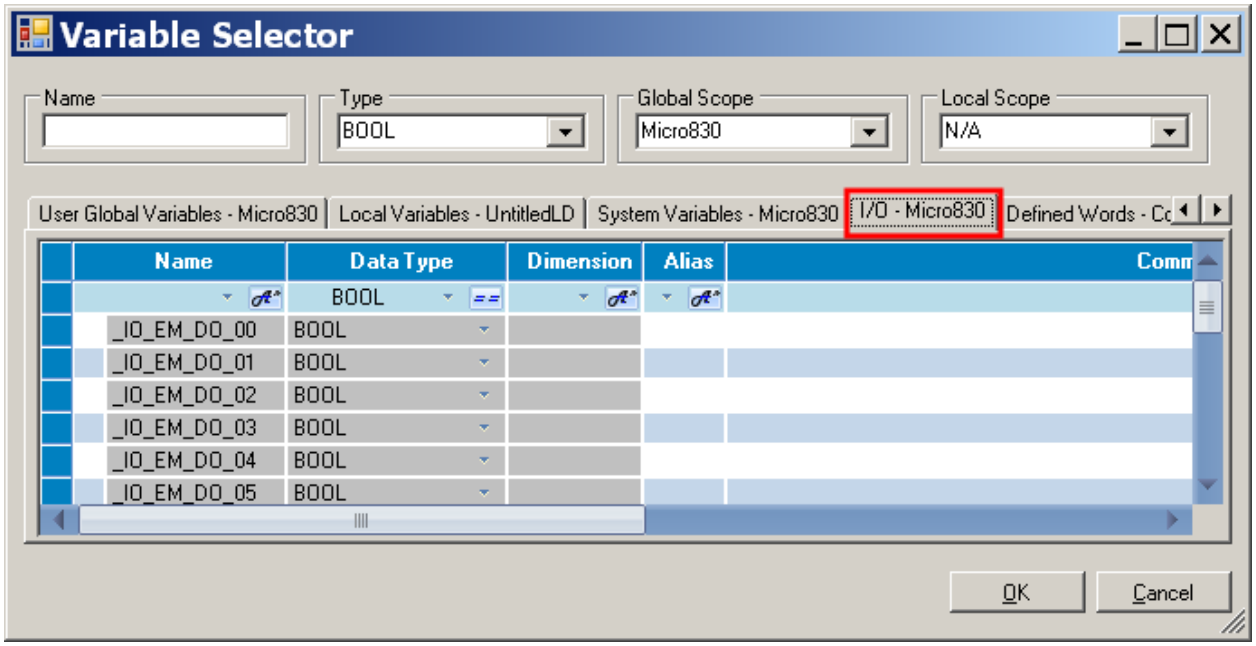
18. Complete the selection to look like this.



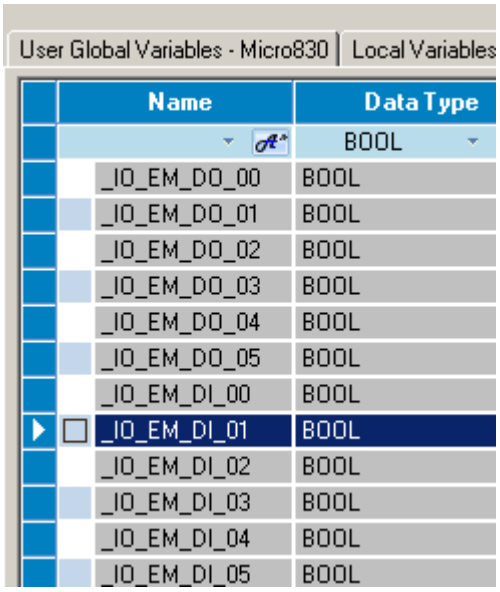
19. To trigger the message, drag and drop a **Direct Contact** to the left of the msg function block from the Toolbox as shown below. Notice the **Variable Selector** will appear.



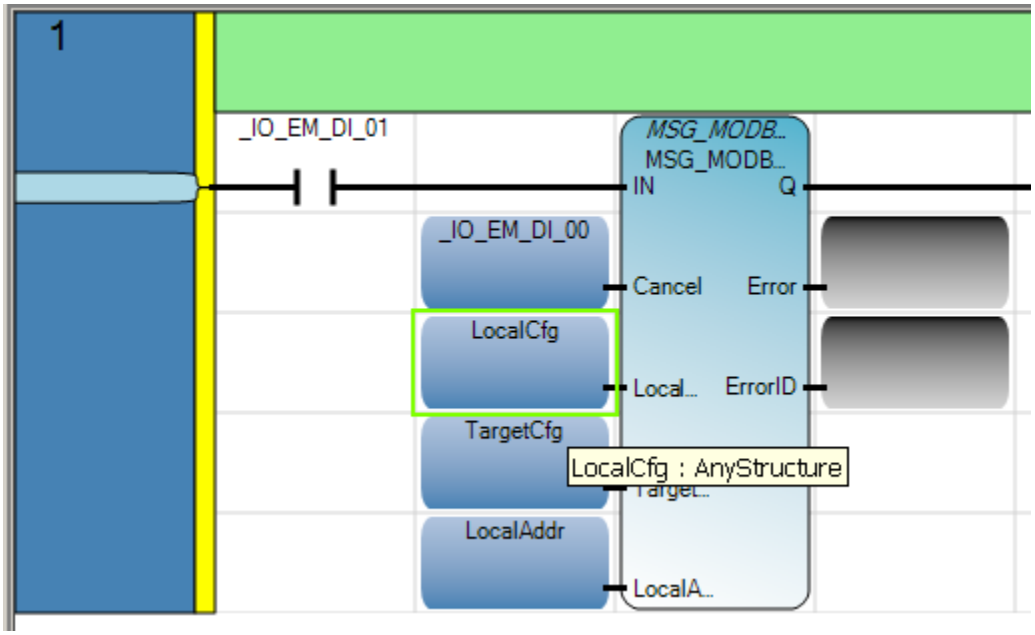
20. In the Variable Selector, click on the **I/O – Micro830** tab.



21. Double click on the Input you need to trigger the message. In this case, select by double clicking **_IO_EM_DI_01** and the selector will close.



22. After assigning the Direct Contact, the ladder now looks like this. Double click (bottom of the box) on one of the Local Variable Inputs to Display the Variable Selector.



23. Once the Variable Selector window appears, complete the following steps:

    a. Expand the Local Variables created (LocalCfg, TargetCfg…).

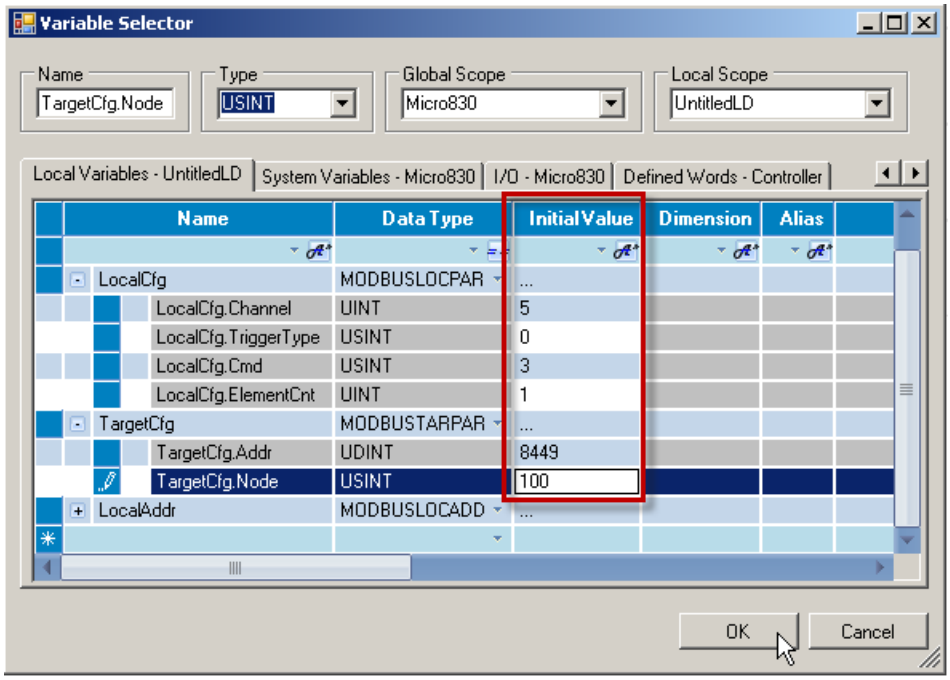
    b. You may have to use the scroll bar at the bottom of the variable tab to see the Initial Values. For ease of use, you can move the **Initial Value** column by dragging the top of the column and moving it next to Data Type.

    c. Set up the variables by clicking on the initial value field for each variable and enter the values shown in steps i, ii, and iii. For more information on the initial values refer to the message instruction CCW Help file:

        i. Channel = 2 (2 is for the embedded serial port and 5 – 9 would be for different slot numbers the serial port could be located)

        ii. Cmd = 3 (3 is for read holding registers and 16 would be for writing multiple registers. For a complete list and description of all the commands refer to the message instruction CCW Help file.)

        iii. For more information on PowerFlex 4 address and node settings refer to drives Publication 22A-UM001I-EN-E.

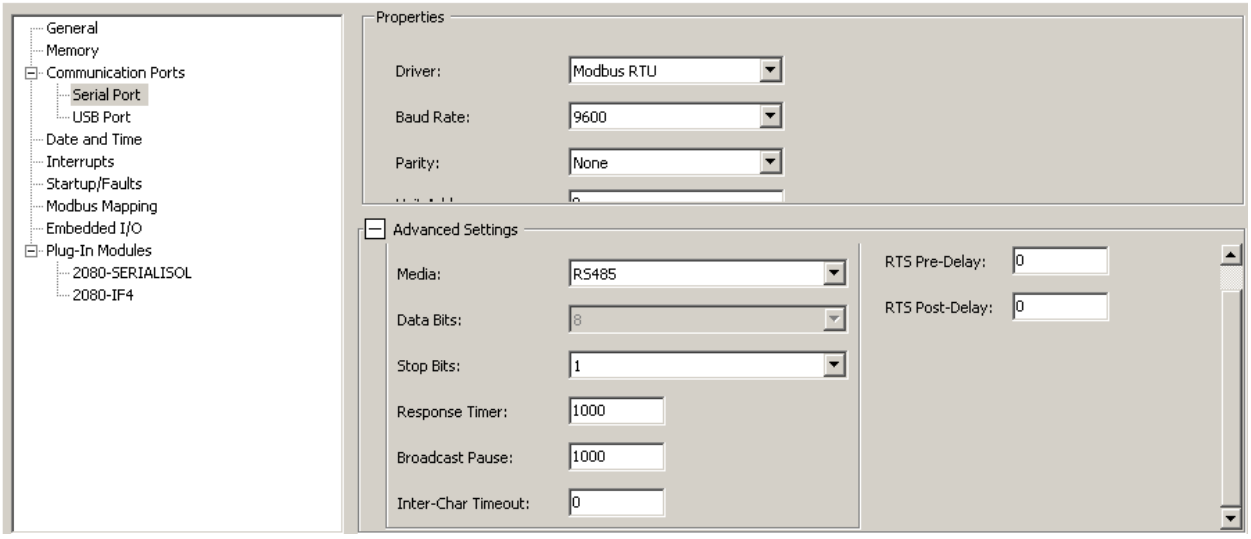


Configuring the Embedded Serial Port on the Micro830.

1. For the embedded serial port on the Micro830, click the Serial Port under Communication Ports, and change the Driver to Modbus RTU. If necessary, change the other properties to match the screen shot below.

Micro830

2. Open the Advanced settings and select RS485 for Mode.



3. Go to the Variables section and change the LocalCfg Channel to 2.

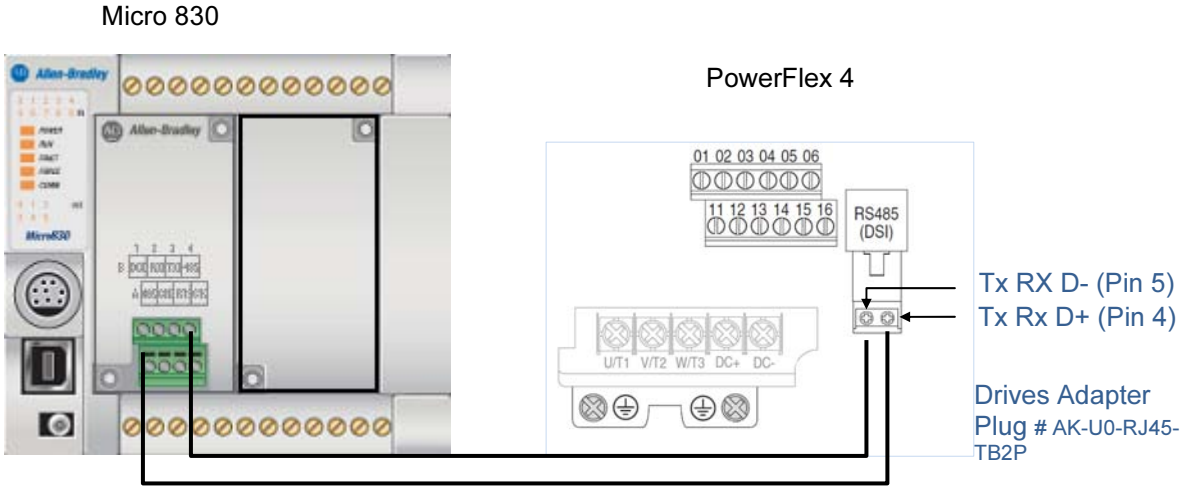
Name	Data Type	Initial Value
MSG_MODBUS_1	MSG_MODBUS	...
LocalCfg	MODBUSLOCPAR	...
LocalCfg.Channel	UINT	2
LocalCfg.TriggerType	USINT	0
LocalCfg.Cmd	USINT	3
LocalCfg.ElementCnt	UINT	1
TargetCfg	MODBUSTARPAR	...
TargetCfg.Addr	UDINT	8449
TargetCfg.Node	USINT	100
LocalAddr	MODBUSLOCADD	...

4. Build the project.

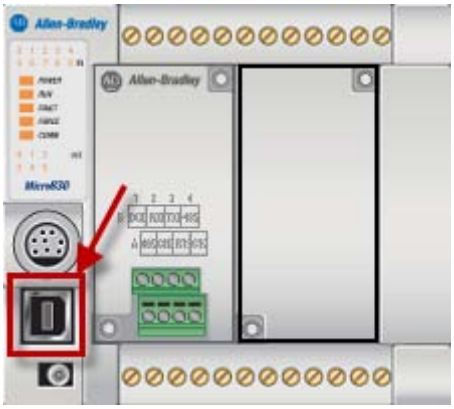
Cabling the Controller to a PowerFlex 4 Class Drive

This quick start will show you how to physically connect a PowerFlex 4 class Drive to the Micro830.

1. Wire the Micro830 Modbus Plugin to the drive as shown below. The PowerFlex 4 comes with a built-in RS485 DSI port where Modbus Communication is available. In order to communicate between the Micro 830 and PowerFlex 4, the Serial Communication port on the Micro830 will be configured as RS485 for the communication media. Below is the basic connection between the Micro830 and PowerFlex 4 using the recommended Belden 3105A twisted pair cable.



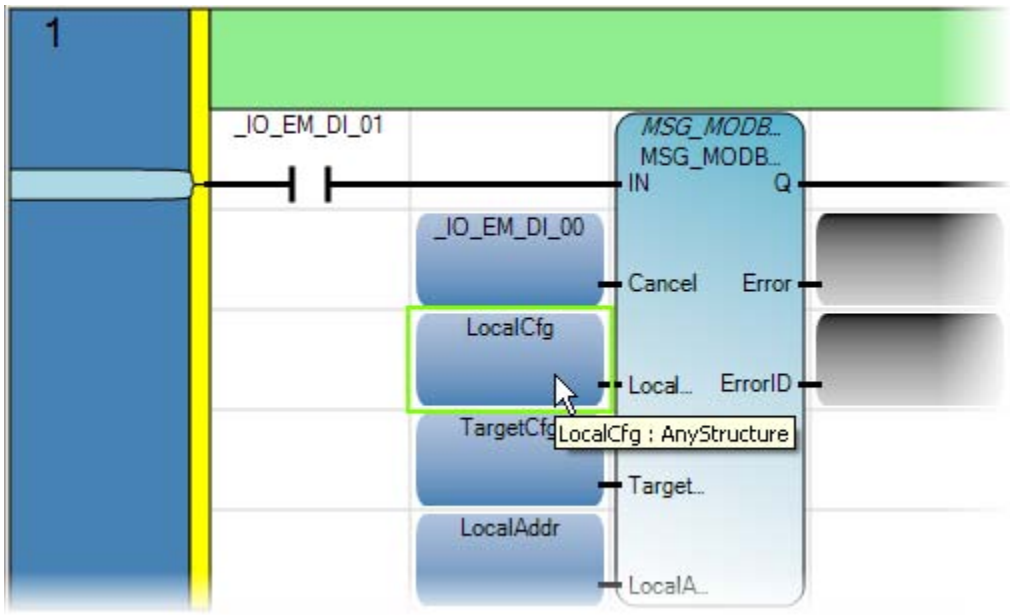
2. Connect the USB cable to the USB port shown below to establish communication between the PC and the Micro830. If this is the first time you connect to the controller, refer to the Getting Started Guide, Pub# 2080-QR001B-EN-P, to establish communications between RSLinx and a Micro830 via USB.



Testing Modbus Communication with a PowerFlex 4 Class Drive

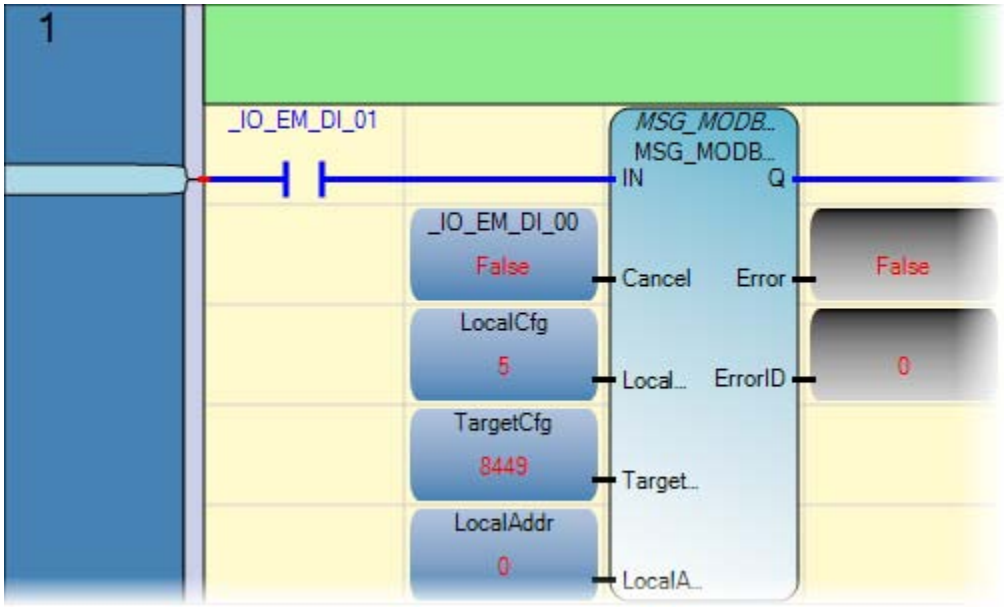
In this section, you will test the Modbus message created in the previous sections. The rung below will trigger an input on the controller that will execute a Modbus read message.

1. Start with the rung shown below. For information on how to create this rung refer to the previous sections starting on Chapter 6.

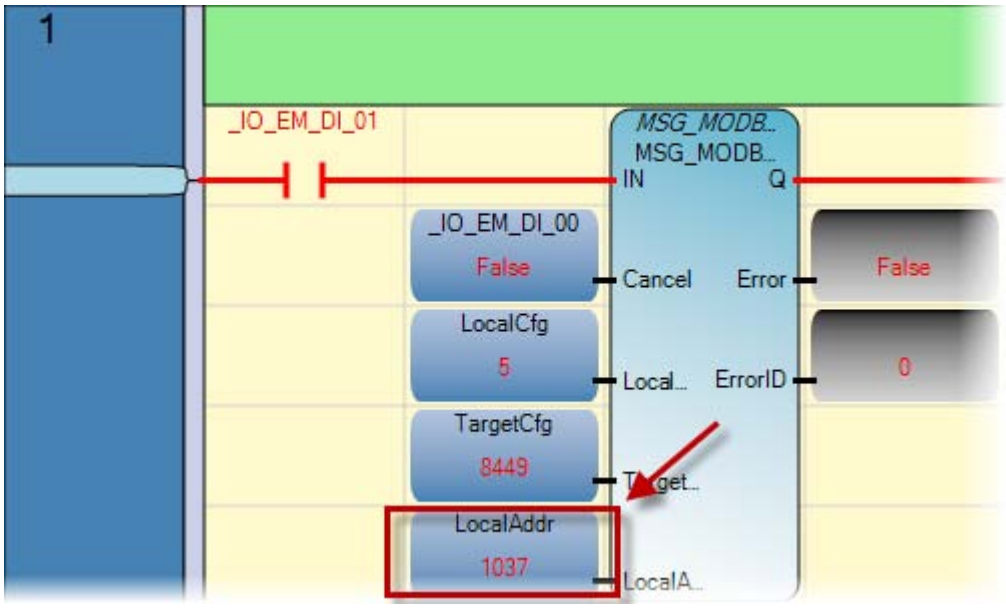


2. Build and download to the controller. If you are not familiar with the download steps, refer to the Getting Started Guide, Pub# 2080-QR001B-EN-P.

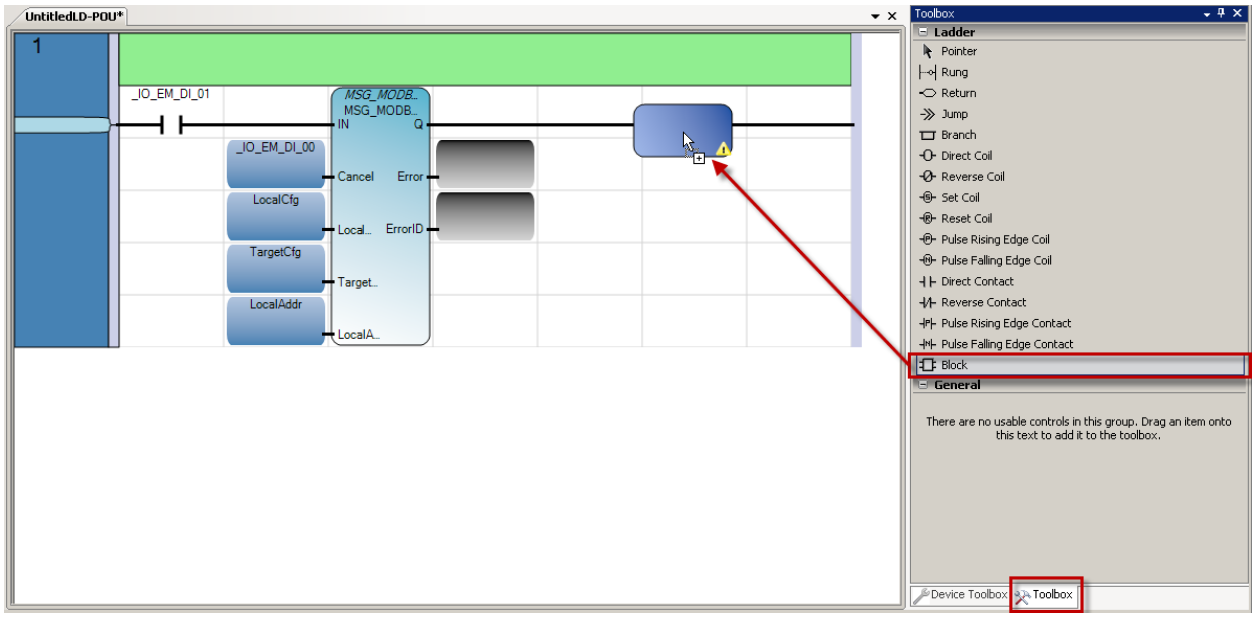
3. Once connection is established with the controller, start debugging by pressing in the top menu bar. The following should show the Modbus message in debug mode:



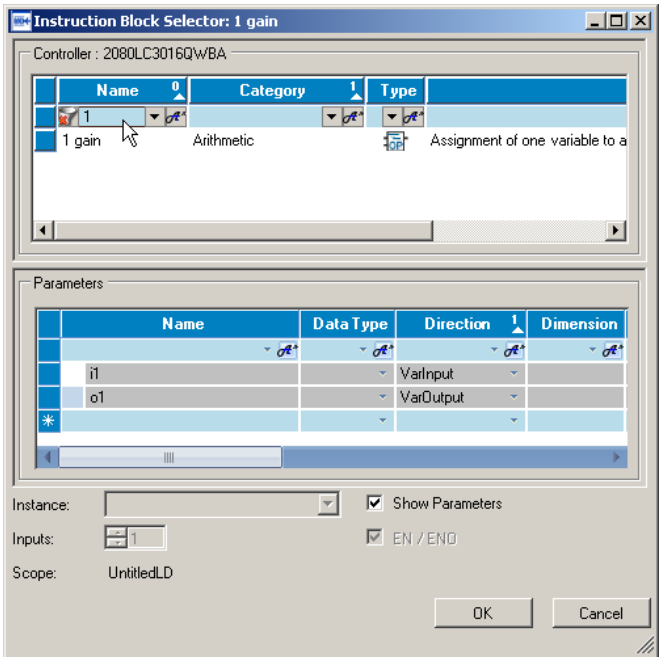
4. Trigger Input **_IO_EM_DI_01** to read a Modbus message from the controller. Notice that the function block input **LocalAddr** now is displaying a WORD value.



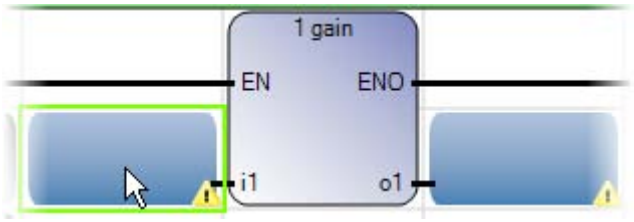
5. Stop debugging by clicking on the stop  button on the top menu. To use the WORD value read from the drive in the previous step, a copy of this value needs to be assigned to a new variable using a **1 gain** function block. In the **Toolbox,** click and drag a **Block** as shown below to the end of the rung.



6. Type **1,** select the **1 gain** function block and click **OK.**

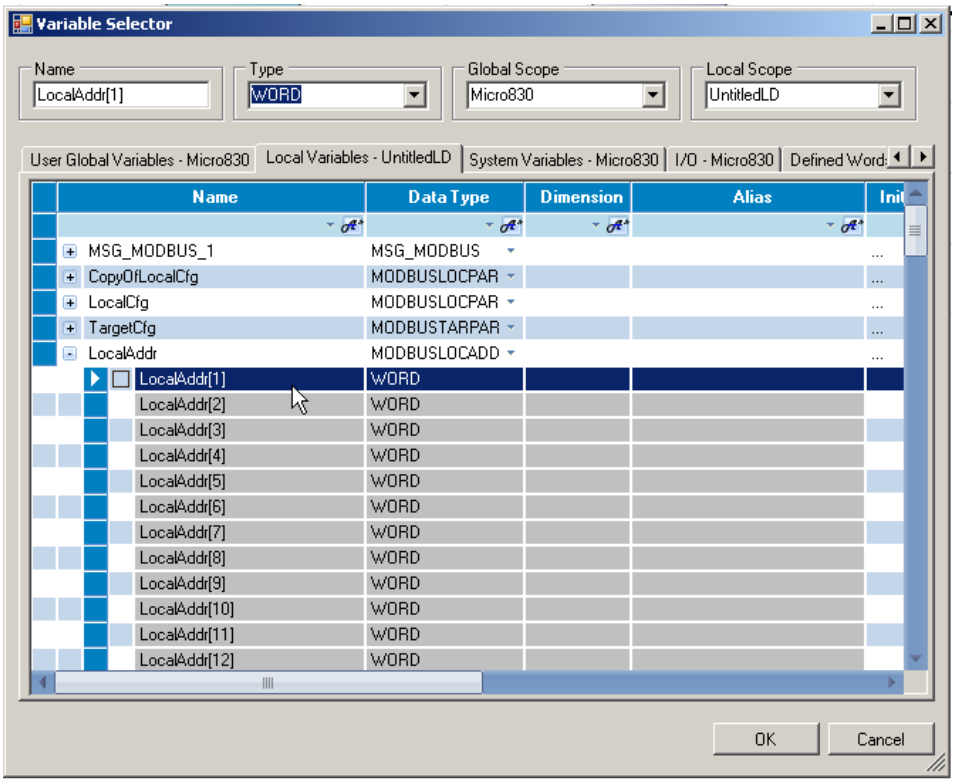


7. A new **1 gain** function block has now been added. Double click on the bottom of the input box to add the desired input to be copied.

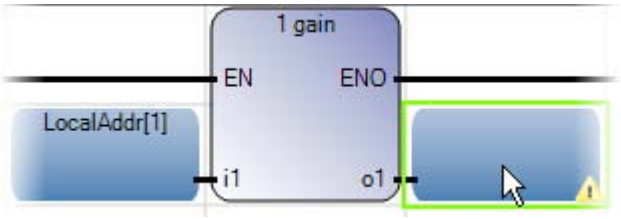


8. Once the **Variable Selector** opens, select the local variable **LocalAddr[1]** as shown below and click **OK.**

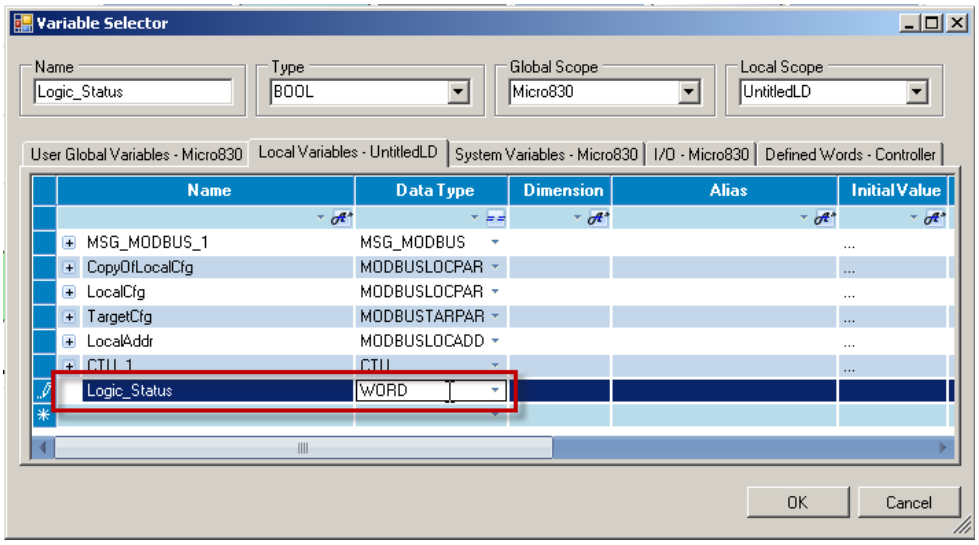
***Note:* LocalAddr[1]** *is the variable holding the WORD value read in step 4.*



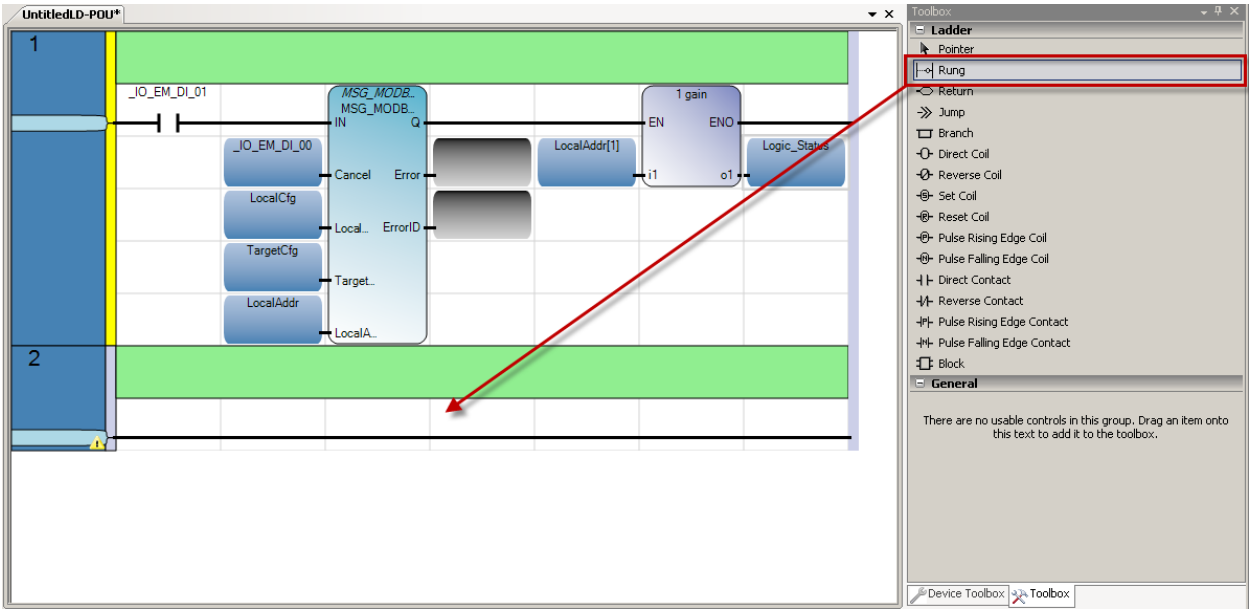
9. Double click on the output box.



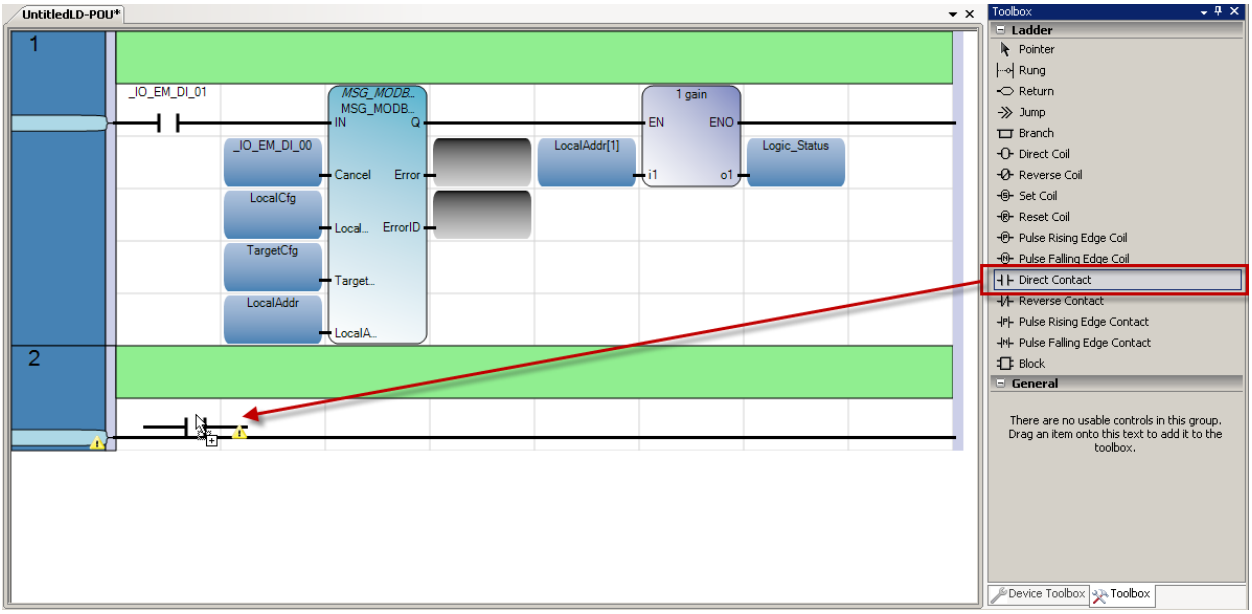
10. Create a new local variable as shown below. For this quick start type ***Logic_Status*** as the name of the variable, select **WORD** as its data type and click **OK**.



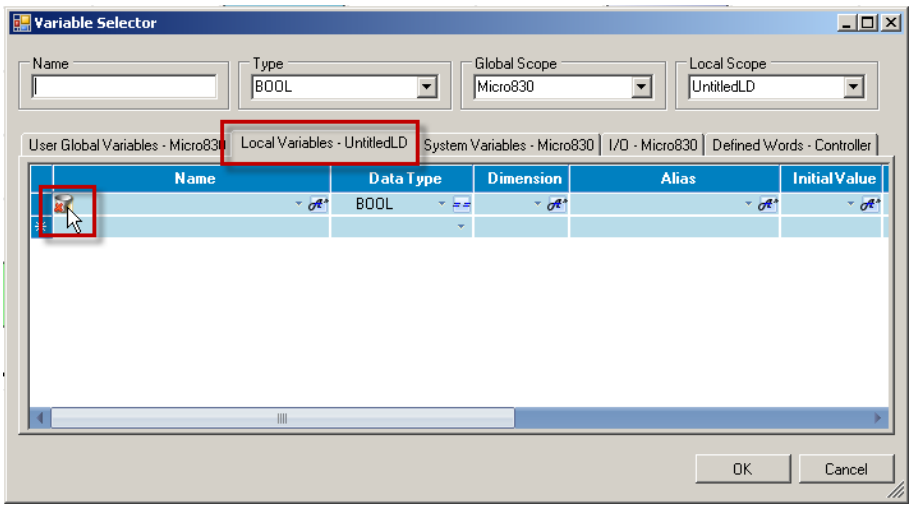
11. To interpret the data read by the message refer to **Appendix A,** *Reading (03) Logical Status Data* table. This table can be used to determine the meaning of each of the 16 bits of the WORD. Start by adding a **Rung** as shown below.



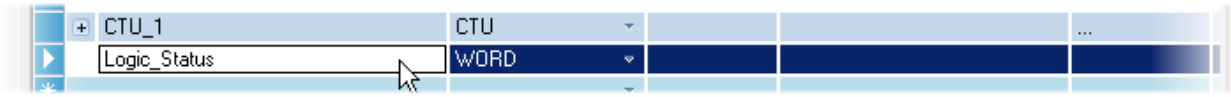
12. Select, drag and drop a **Direct Contact** from the toolbox to the start of the newly added rung.



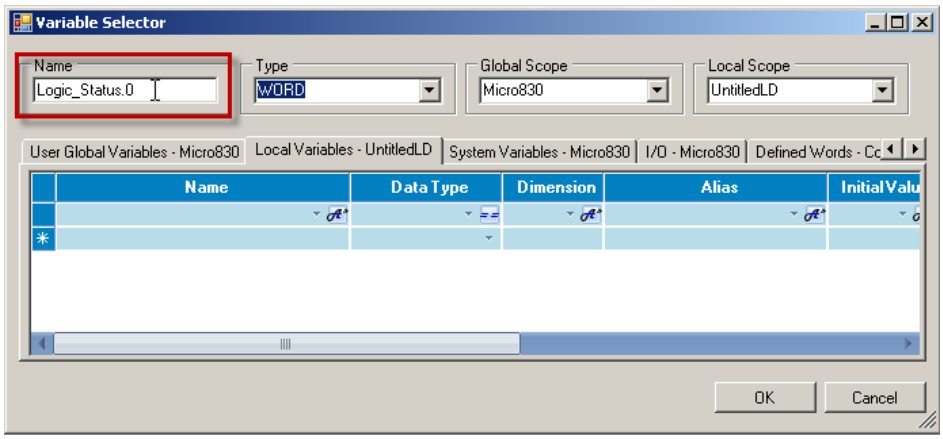
13. Once the Variable Selector displays, under the **Local Variables** click on the filter as shown below to display the variables.



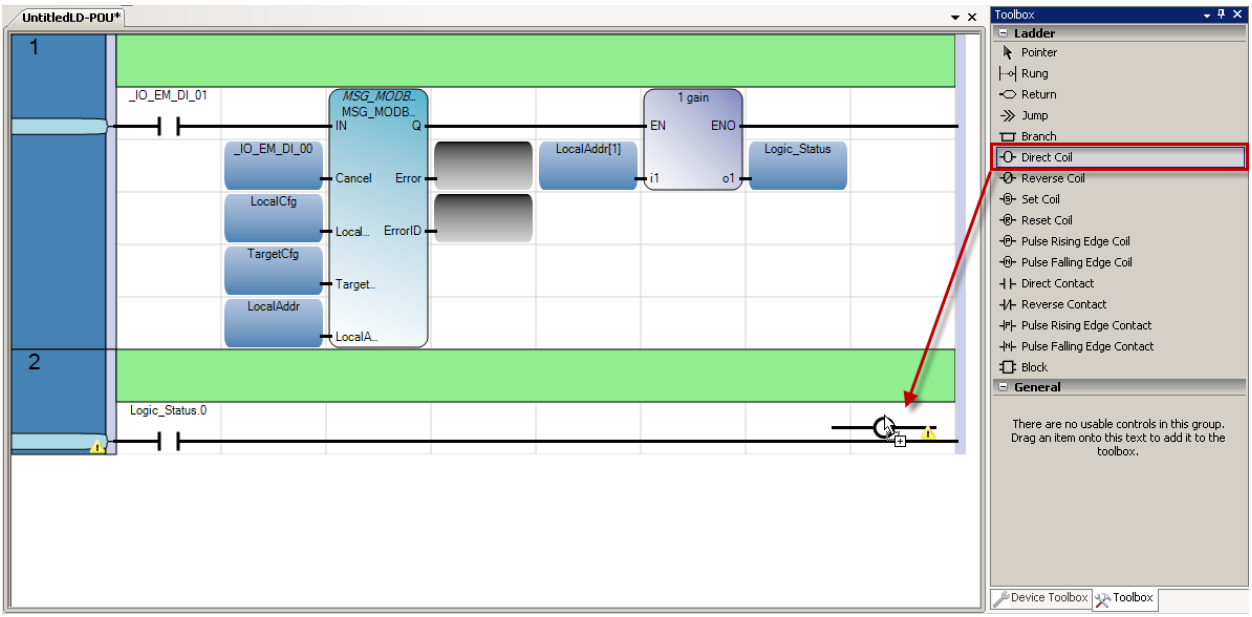
14. Select the ***Logic_Status*** variable created before.



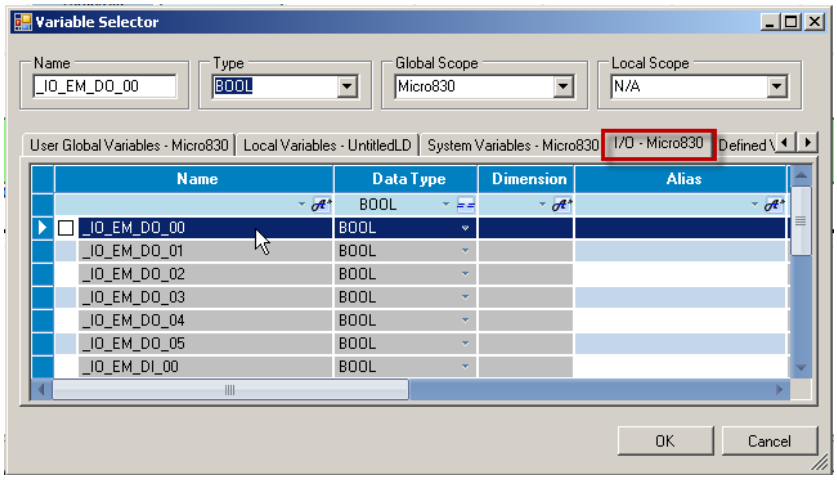
15. Go to the name field and type ***Logic_Status.0*** for the bit ***0*** of the Logic Status WORD. Then click **OK.**



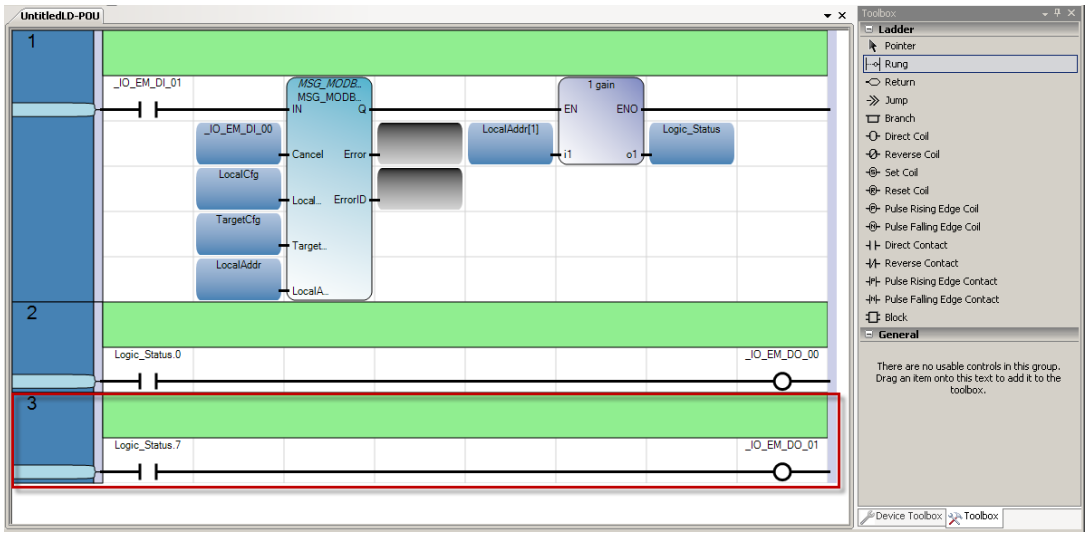
16. Select, drag and drop a **Direct Coil** to the end of the rung as shown below.



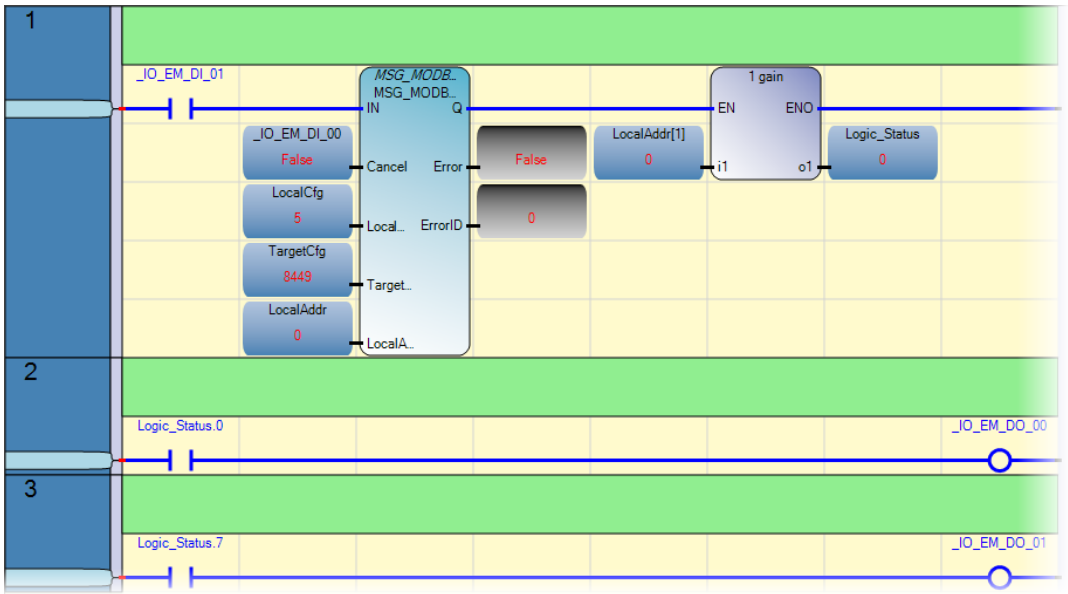
17. In the Variable Selector **I\O Micro830** tab, select **_IO_EM_DO_00** as the embedded output for this rung. Then click **OK.**



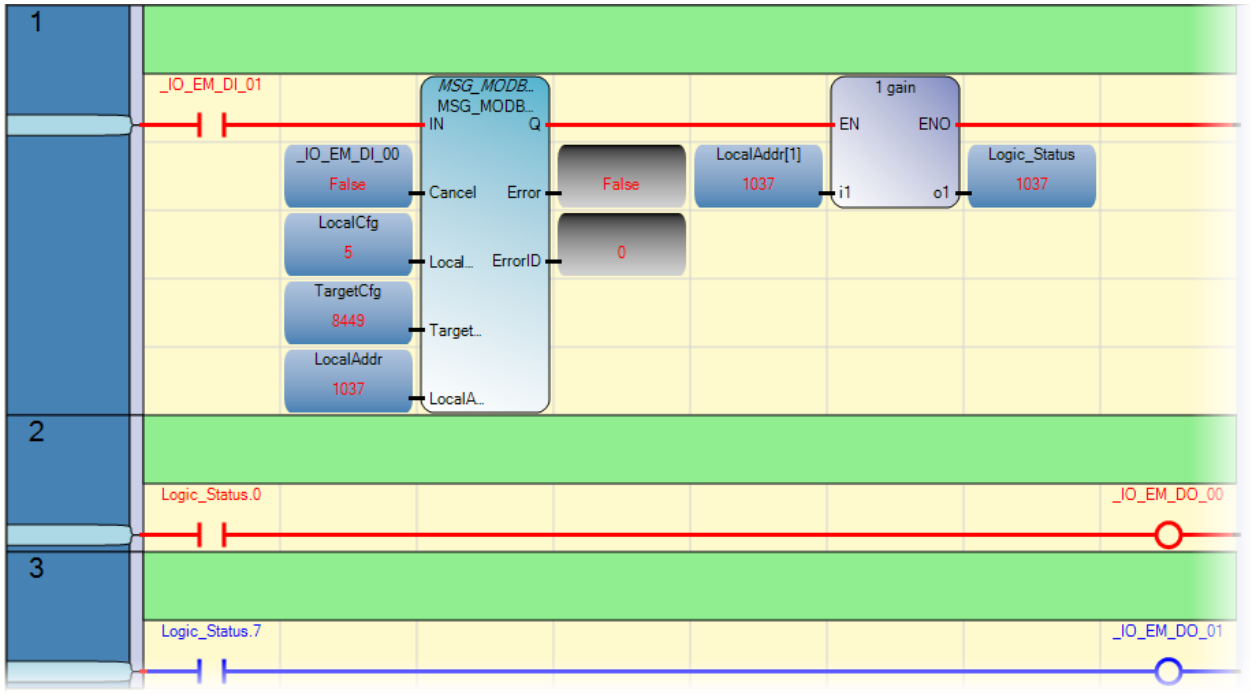
18. Repeat steps 11 – 17 from this quick start to add an additional Logic Status rung that will read bit 7 to determine whether the drive is faulted or not.



19. Build and download at this time. Now you are ready to start debugging by clicking the  button on the top menu bar and the ladder should look as shown below.



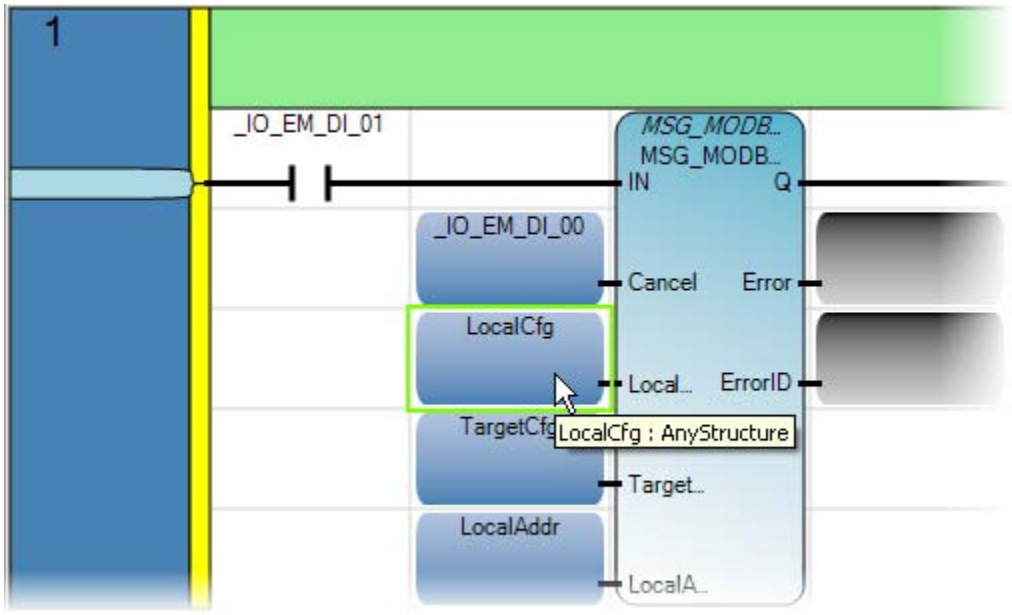
20. Trigger Input 1 (**_IO_EM_DI_01**) as shown below and notice that the Modbus message will return the status WORD shown before to be 1037. Now it can be shown that at the bit level ***Logic_Status.0*** is true stating that the Drive is READY and showing this status by enabling Output 0 (**_IO_EM_DO_00**).



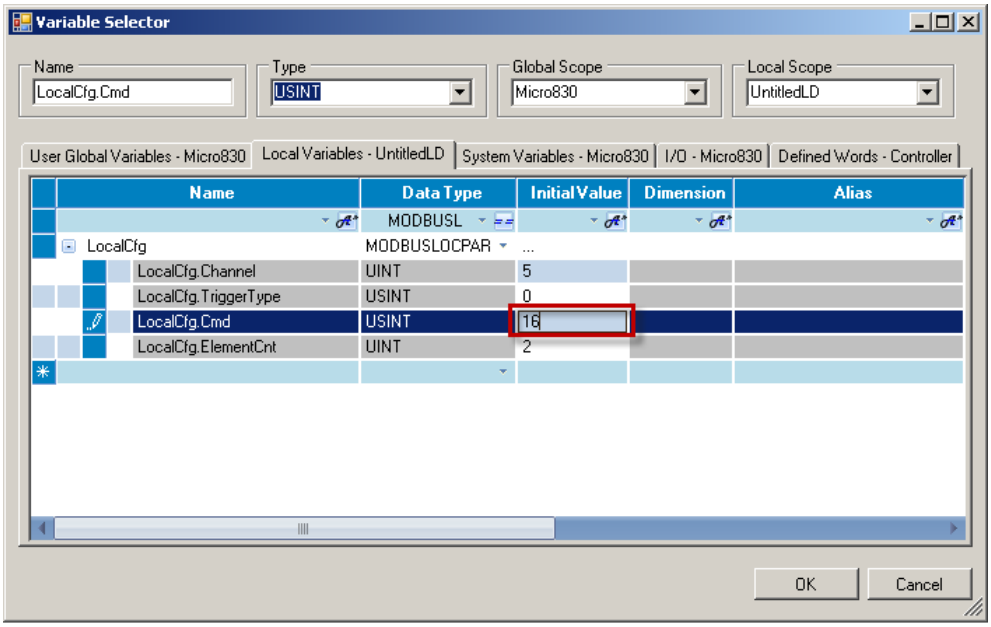
Sending a Write Message to the Drive to Start, Stop and Change Speed

In this section, you will change the Modbus message to write to the drive and be able to control the drive. To do this, you will need to add some additional ladder logic to be able to Start, Stop and set a Speed on the drive. This section of the quick start will modify the modbus message used in the previous section to read the drive's status.

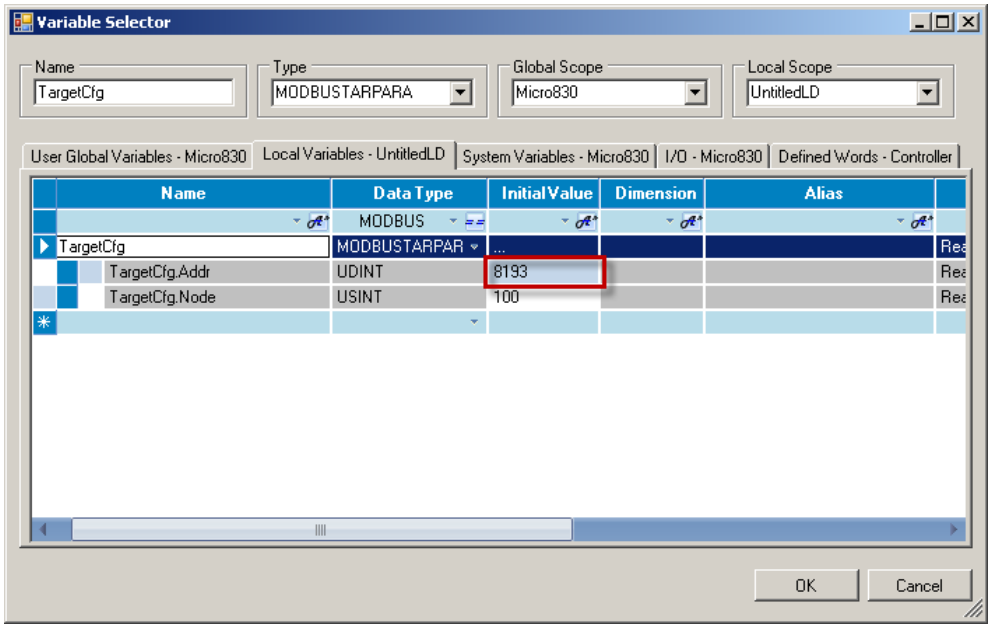
1. Start by double clicking on the ***LocalCfg*** input as shown:



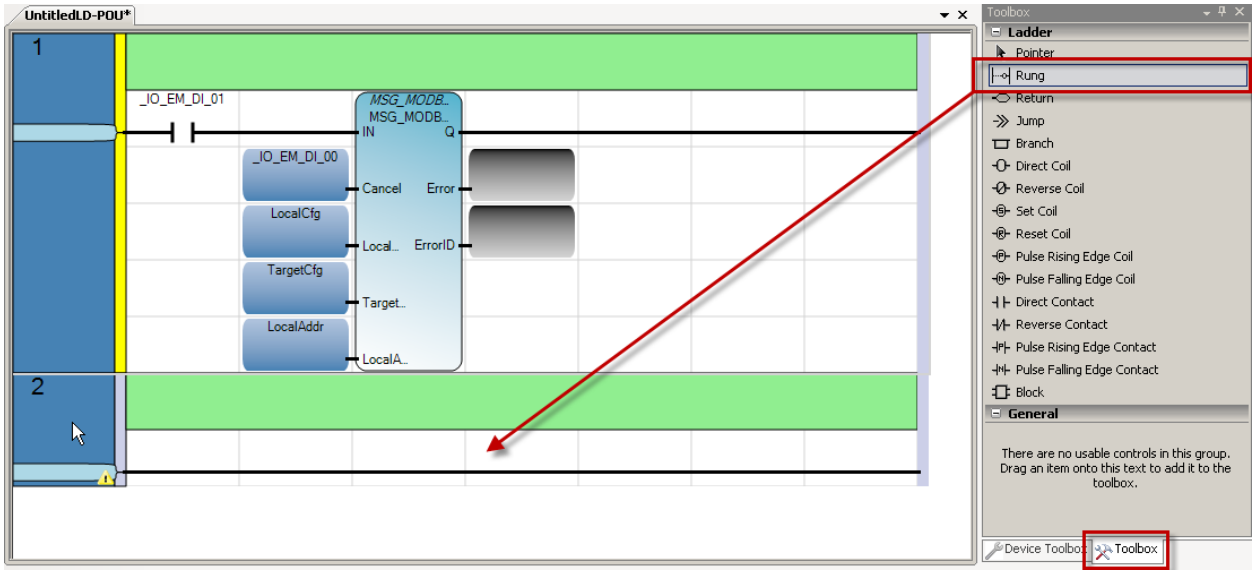
2. Once the **Variable Selector** displays change the **Initial Value** of the ***LocalCfg.Cmd*** from a read value of 3 to a value of **16** for writing holding registers. The ***LocalCfg.Channel*** should be set to 2 if you are using the embedded serial port, otherwise enter the slot number of the serial port you are using.



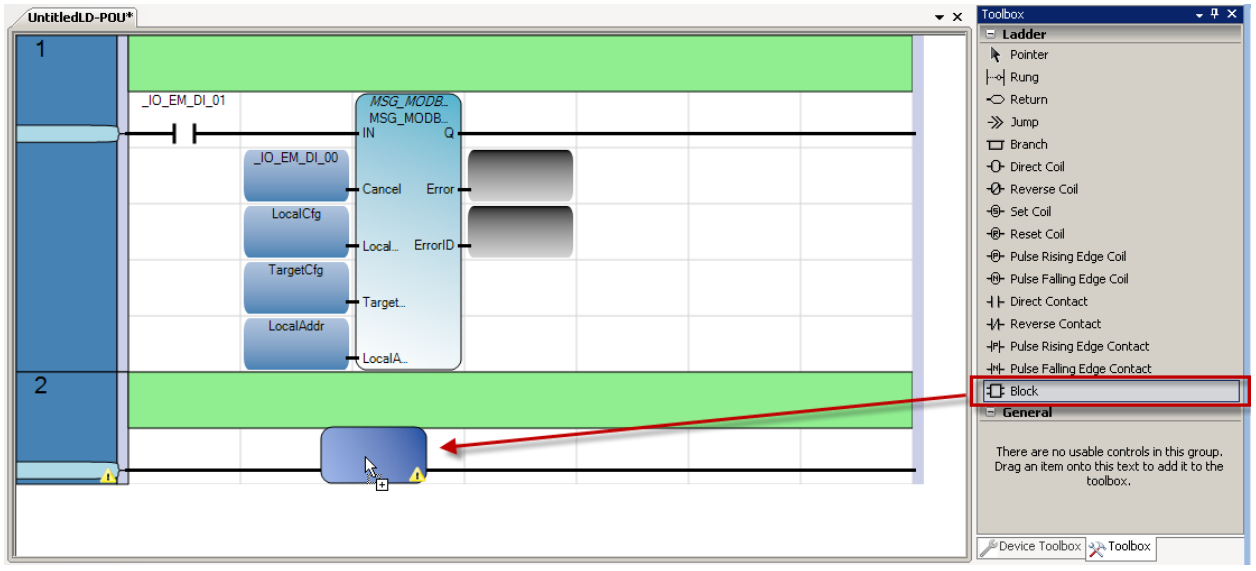
3. Also Change the ***TargetCfg.Addr*** to **8193** as shown below. Remember that the Micro830 uses 1-based Modbus addressing, therefore for writing logic command data (Appendix A), use 8192 +1 = 8193 (Reference Publication 22A-UM001I-EN-E).



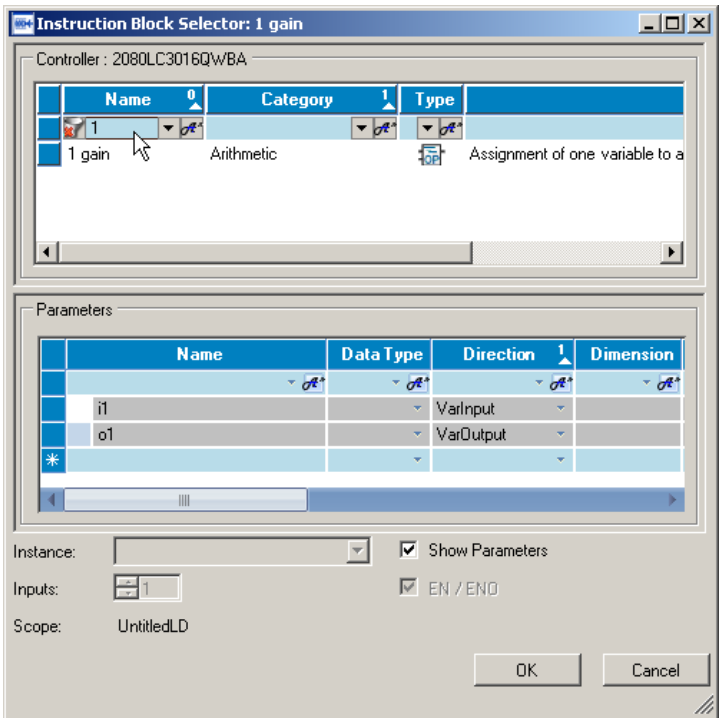
4. Now that the Modbus message will be writing to the drive, create a rung that will trigger a 1 gain copy function block to hold the value that will be written to the drive. Therefore toggling the bit in front of the 1 gain will determine if the controller sends a Start, Stop, or Speed change message. Start by selecting, dragging and dropping a **Rung** as shown below.



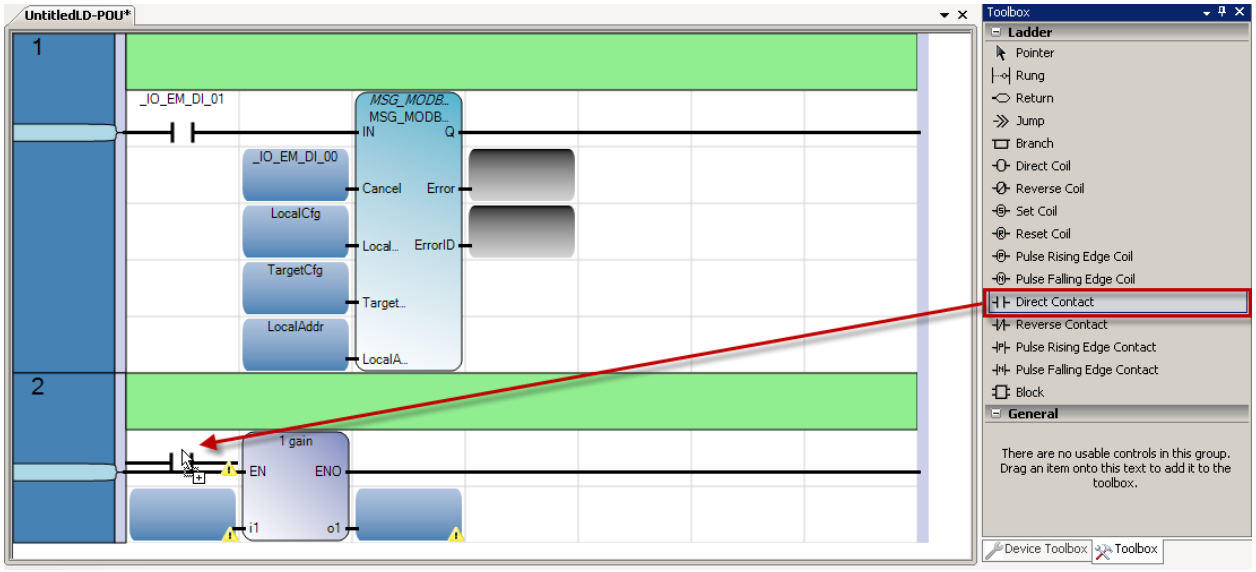
5. Select, drag and drop a **Block.**



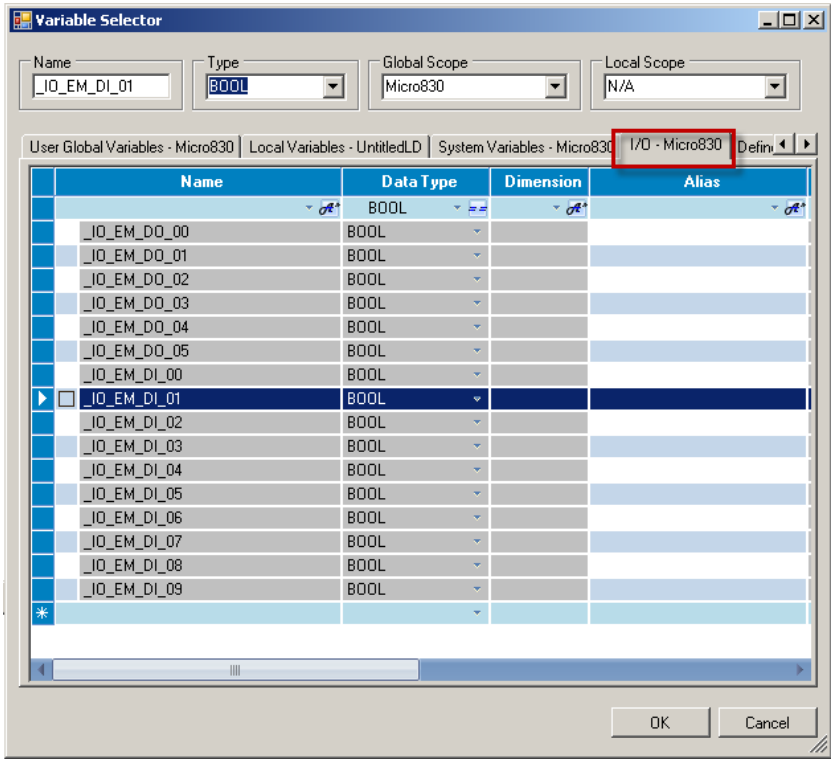
6. Type **1,** select the **1 gain** function block and click **OK.**



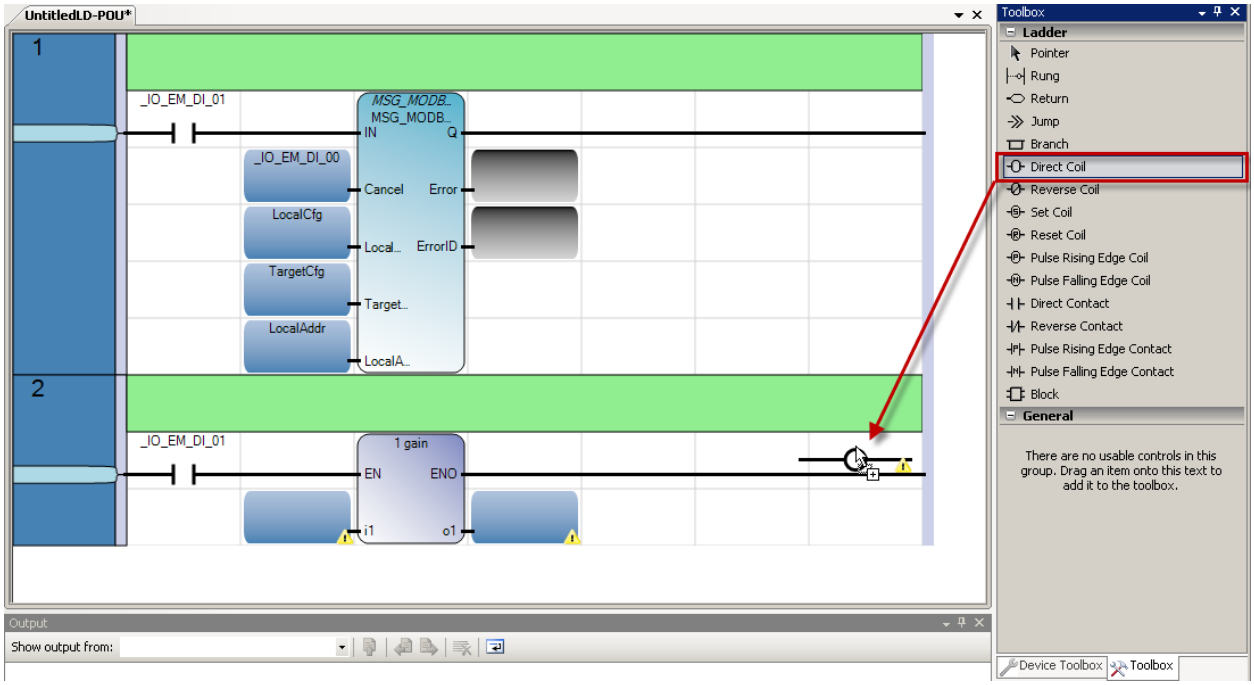
7. Select, drag and drop a **Direct Contact** as shown below.



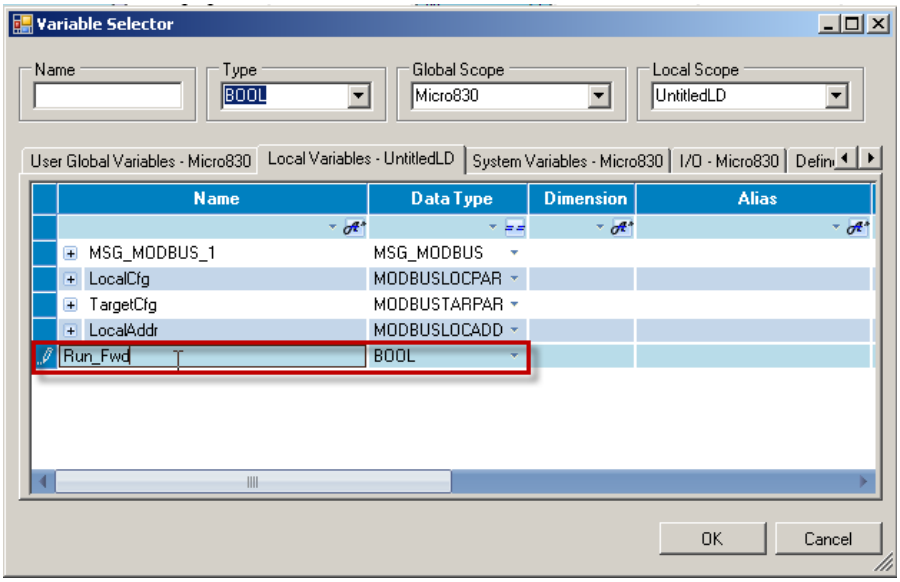
8. From the **I/O – Micro830** tab, select **_IO_EM_DI_01** (Input1).



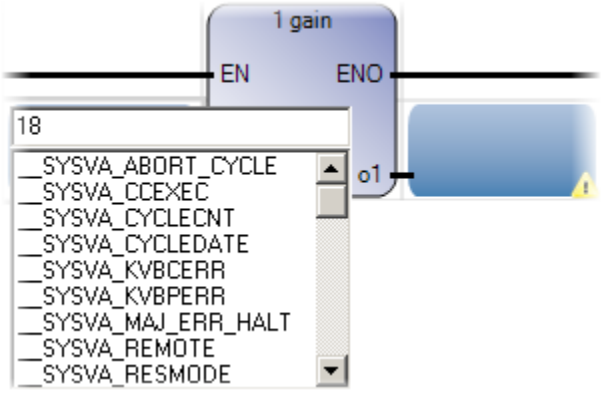
9. Select, drag and drop a **Direct Coil** as shown below.



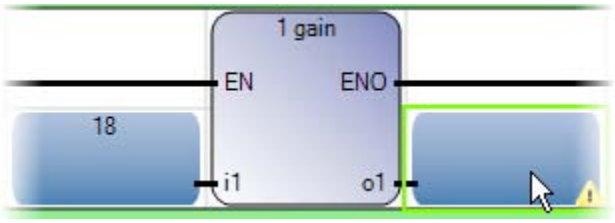
10. Create a variable **Run_Fwd** as shown below. Then click **OK.**



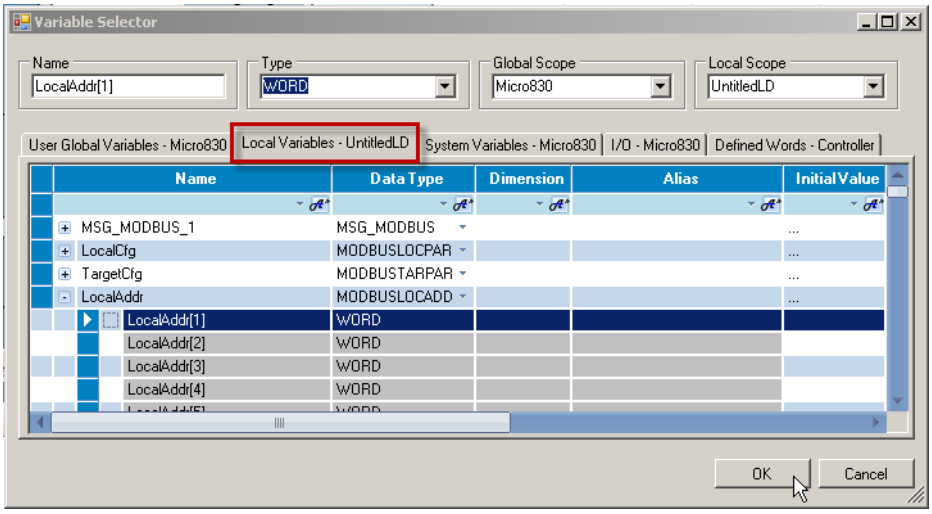
11. Now click on top of the input box for the **1 gain** function block and type **18** as the WORD that will be copied to trigger the forward command. Refer to **Appendix A** *Writing (06) Logic Command Data* to determine why when the forward command bit is high it equals decimal 18.



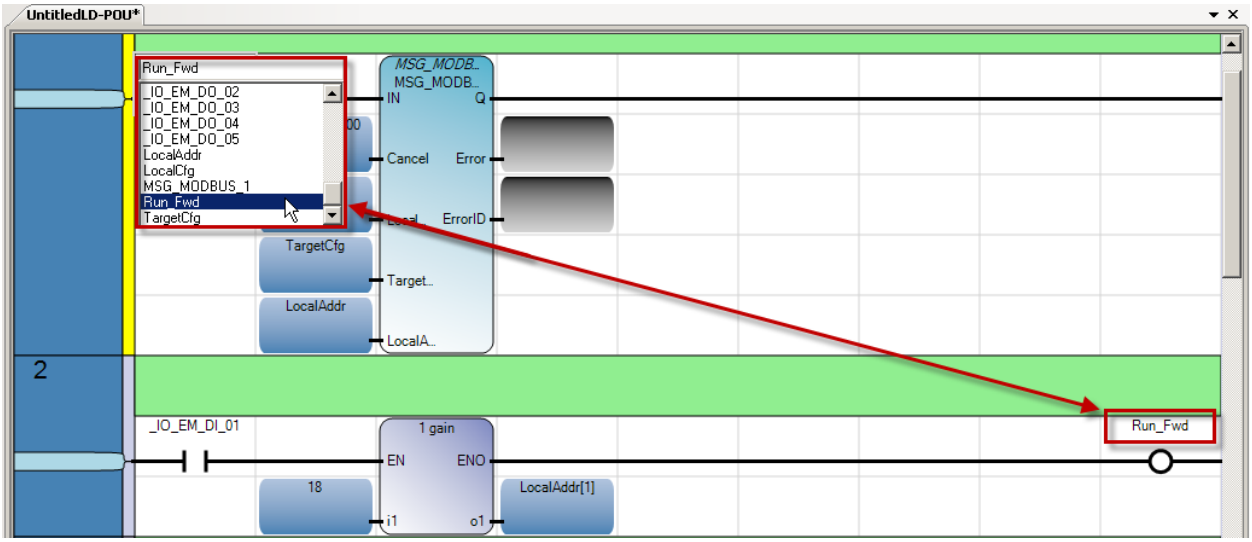
12. Double click on the output box.



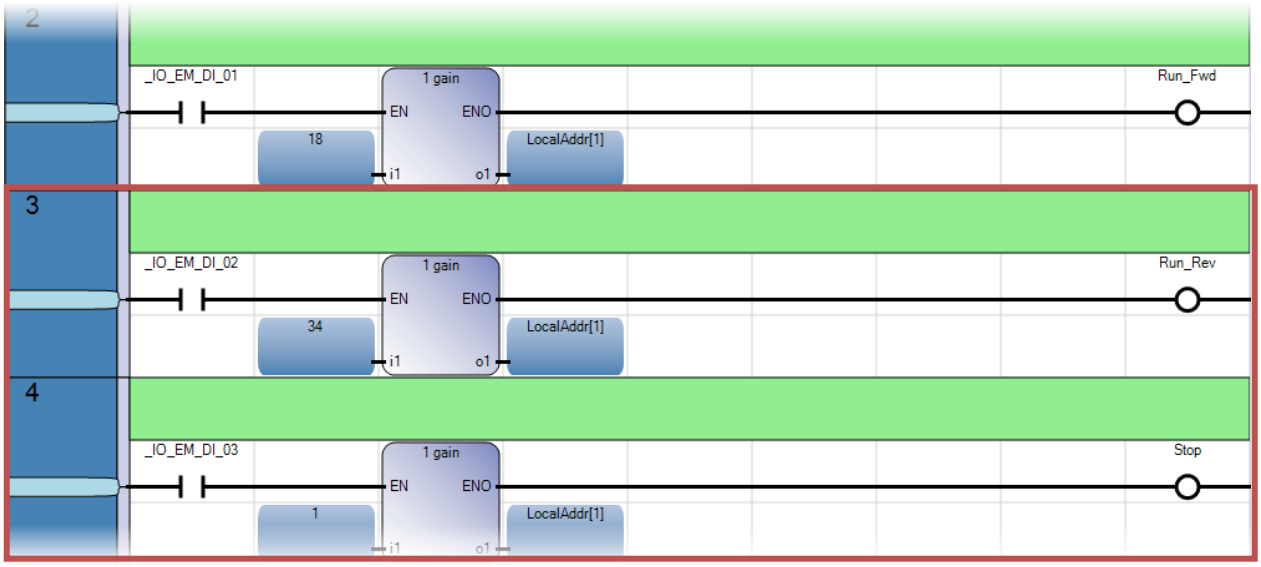
13. Once the Variable Selector displays, select ***LocalAddr[1].*** Then click **OK.**



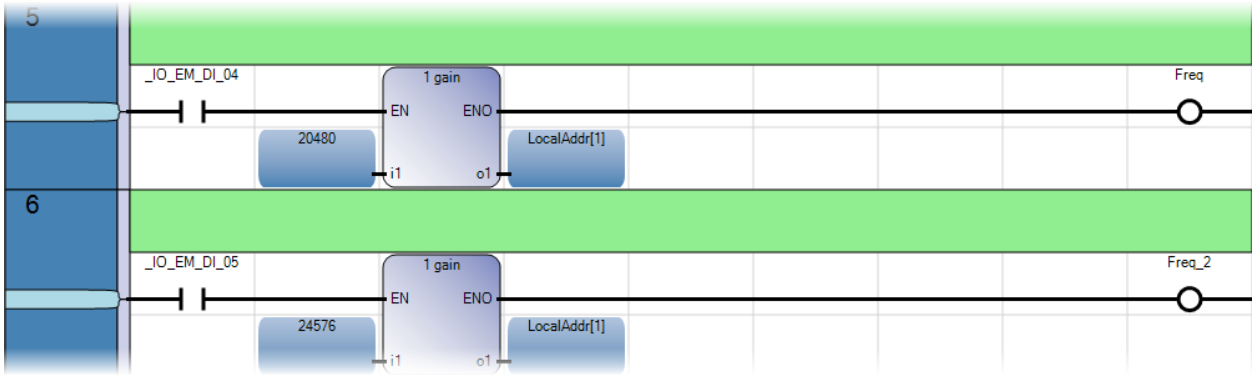
14. Now that the new rung is complete, click on top of the direct contact to the left of the Modbus message and select the new variable created **Run_Fwd.**



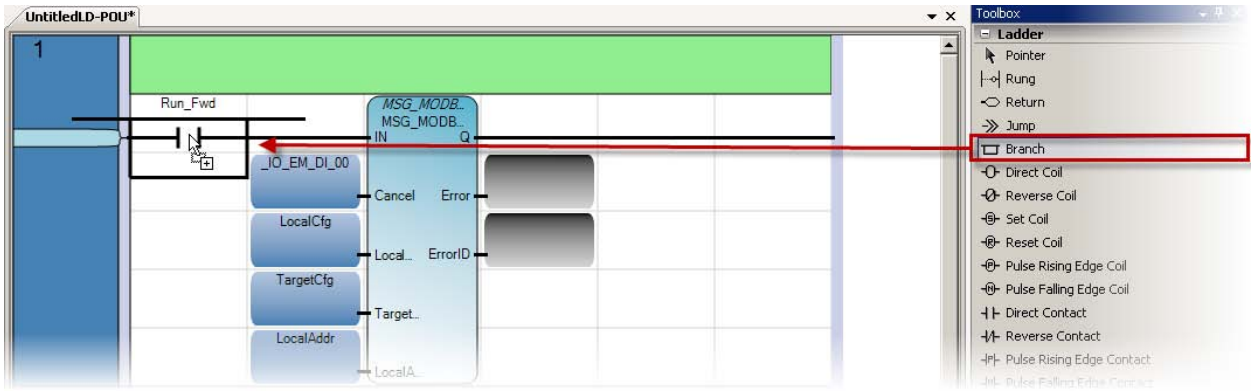
15. Just as the previous rung, add the two rungs shown below to trigger the reverse command (**Run_Rev**) and the stop command (**Stop**).



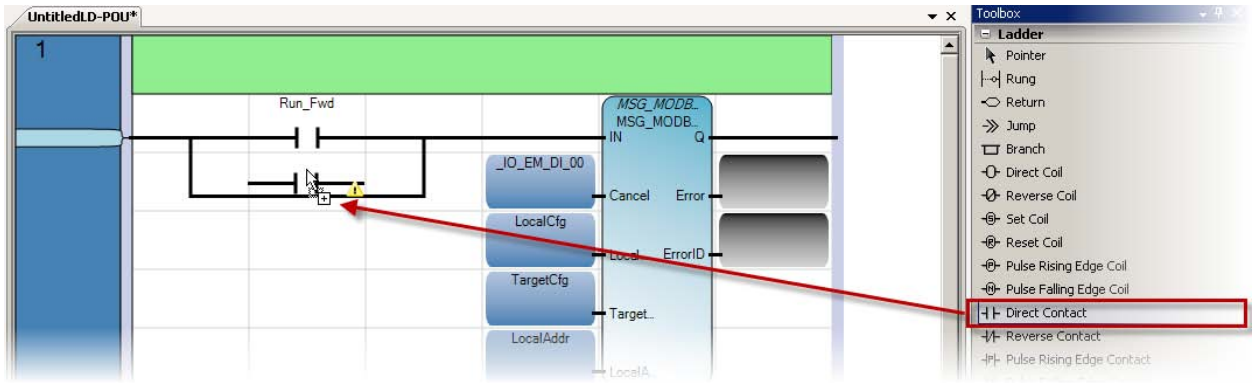
16. Also, create two additional rungs that will trigger two preset frequencies as shown below. This example uses pre-set frequencies 1 and 2 as **Freq** and **Freq2** respectively, or as what can be consider a slow and fast speed for the drive depending on the application.



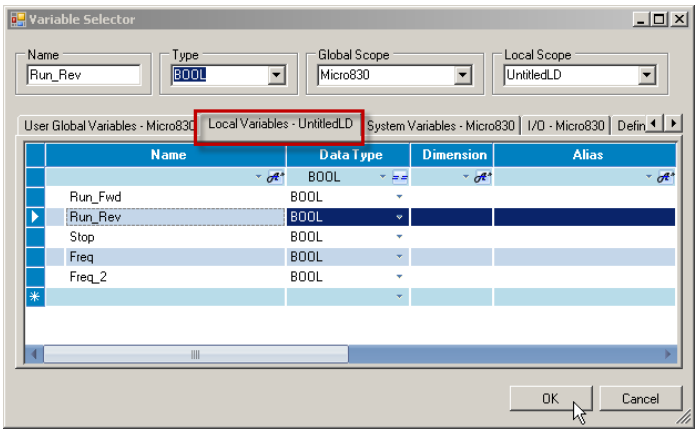
17. Select, drag and drop a branch under the **Run_Fwd** direct contact as shown below.



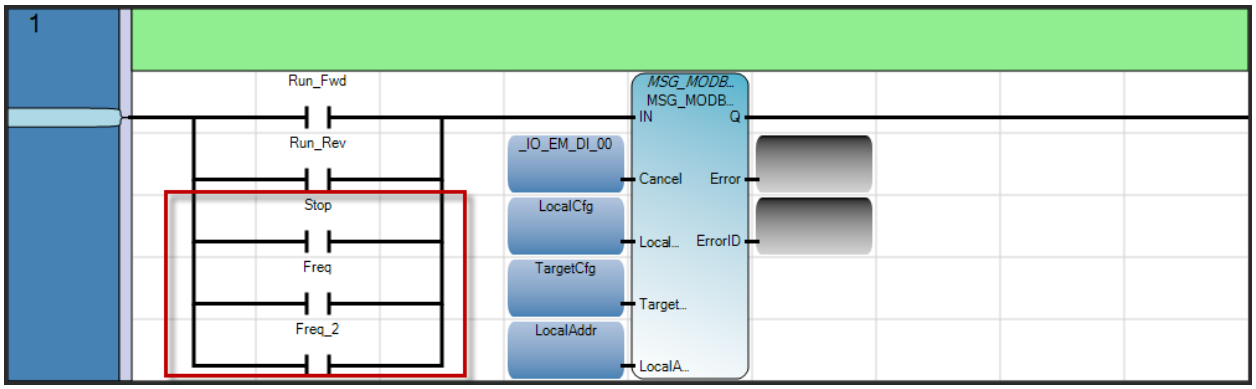
18. Now add a new **Direct Contact** to the newly added branch.



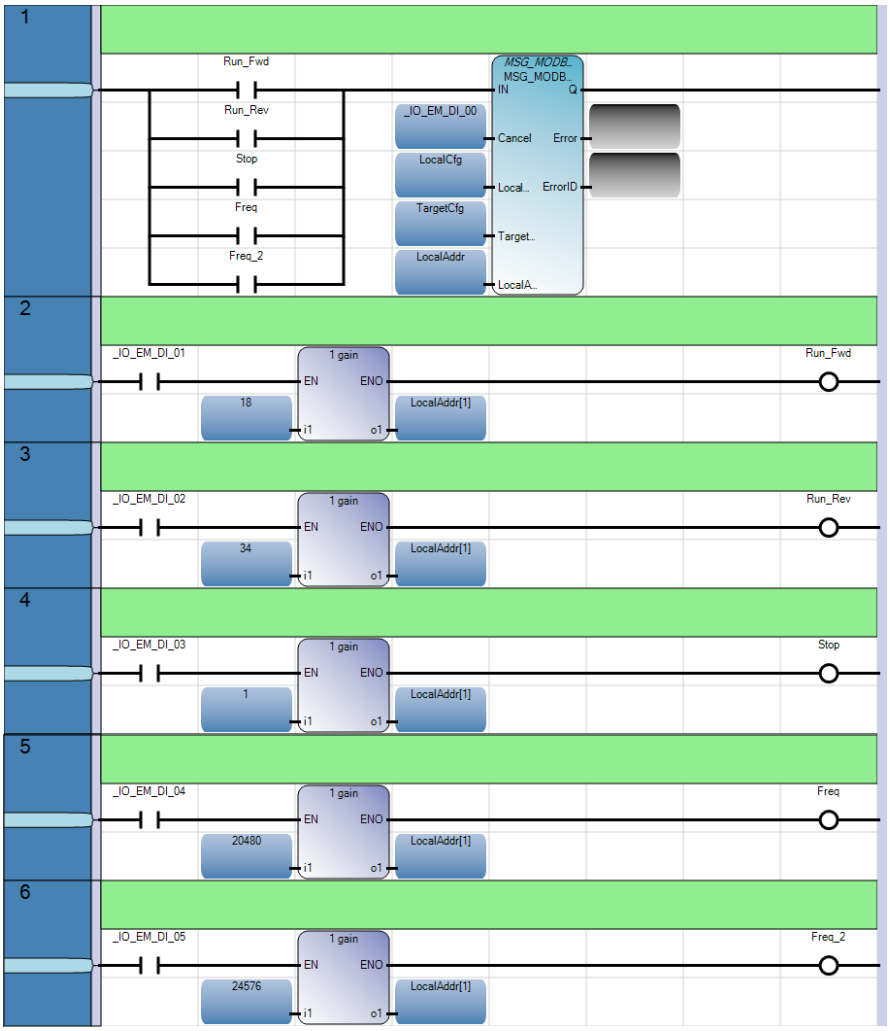
19. Once the Variable Selector displays, select the variable **Run_Rev**. Then click **OK.**



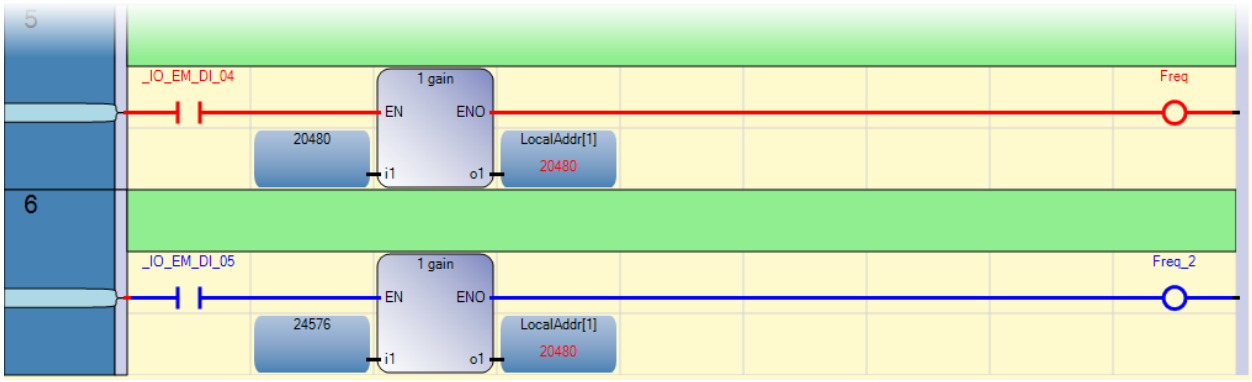
20. Repeat steps 18 and 19 for Stop, Freq, and Freq_2 branches.



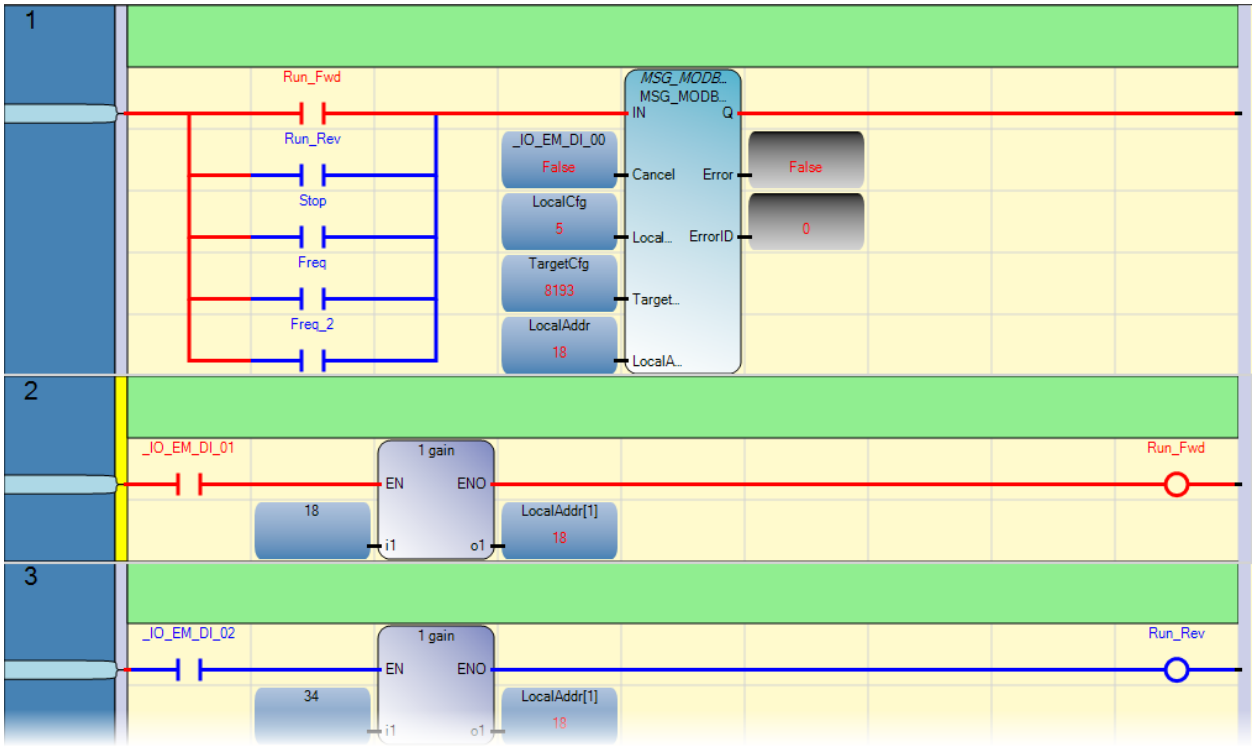
21. Your ladder is now complete and it should look like this:



22. Now you are ready to start debugging. Save, build and download your project. Click on the button on the top menu bar. Trigger input 4 (**_IO_EM_DI_04**) to write pre-set frequency 1 (**Freq**).



23. Now that a frequency is set, trigger input 1 (**_IO_EM_DI_01**) to enable the forward command in the drive as shown below. This verifies the message is working as intended feel free to toggle the other bits to test Stop, Run_Rev, and Freq_2.



Appendix A

1Gain

Description:

Directly links the input to output. When used with a Boolean negation, moves a copy of i1 to o1 .

Arguments:

Parameter	Parameter Type	Data Type	Description
EN	Input	BOOL	Function enable. When EN = TRUE, execute the direct link to an output computation. When EN = FALSE, there is no computation.
i1	Input	BOOL - DINT - REAL - TIME - STRING - SINT - USINT - INT - UINT - UDINT - LINT - ULINT - DATE - LREAL - BYTE - WORD - DWORD - LWORD	Input and output must use the same format.
o1	Output	BOOL - DINT - REAL - TIME - STRING - SINT - USINT - INT - UINT - UDINT - LINT - ULINT - DATE - LREAL - BYTE - WORD - DWORD - LWORD	Input and output must use the same format.
ENO	Output	BOOL	Enable out.

Reading (03) Logic Status Data

The PowerFlex 4 Logic Status data can be read via the network by sending Function Code 03 reads to register address 8448 (Logic Status).

Logic Status		
Address (Decimal)	**Bit(s)**	**Description**
8448	0	1 = Ready, 0 = Not Ready
	1	1 = Active (Running), 0 = Not Active
	2	1 = Cmd Forward, 0 = Cmd Reverse
	3	1 = Rotating Forward, 0 = Rotating Reverse
	4	1 = Accelerating, 0 = Not Accelerating
	5	1 = Decelerating, 0 = Not Decelerating
	6	1 = Alarm, 0 = No Alarm
	7	1 = Faulted, 0 = Not Faulted
	8	1 = At Reference, 0 = Not At Reference
	9	1 = Reference Controlled by Comm
	10	1 = Operation Cmd Controlled by Comm
	11	1 = Parameters have been locked
	12	Digital Input 1 Status
	13	Digital Input 2 Status
	14	Not Used
	15	Not Used

Writing (06) Logic Command Data

The PowerFlex 4 drive can be controlled via the network by sending Function Code 06 writes to register address 8192 (Logic Command). P036 [Start Source] must be set to 5 "RS485 (DSI) Port" in order to accept the commands. In addition to being written, register address 8192 can be read using Function Code 03.

Logic Command		
Address (Decimal)	**Bit(s)**	**Description**
8192	0	1 = Stop, 0 = Not Stop
	1	1 = Start, 0 = Not Start
	2	1 = Jog, 0 = No Jog
	3	1 = Clear Faults, 0 = Not Clear Faults
	5,4	00 = No Command
		01 = Forward Command
		10 = Reverse Command
		11 = No Command
	6	Not Used
	7	Not Used
	9,8	00 = No Command
		01 = Accel Rate 1 Enable
		10 = Accel Rate 2 Enable
		11 = Hold Accel Rate Selected
	11,10	00 = No Command
		01 = Decel Rate 1 Enable
		10 = Decel Rate 2 Enable
		11 = Hold Decel Rate Selected
	14,13,12	000 = No Command
		001 = Freq. Source = P036 [Start Source]
		010 = Freq. Source = A069 [Internal Freq]
		011 = Freq. Source = Comms (Addr 8193)
		100 = A070 [Preset Freq 0]
		101 = A071 [Preset Freq 1]
		110 = A072 [Preset Freq 2]
		111 = A073 [Preset Freq 3]
	15	Not Used

Chapter 7 – Using Connected Components Workbench with Temperature Controllers

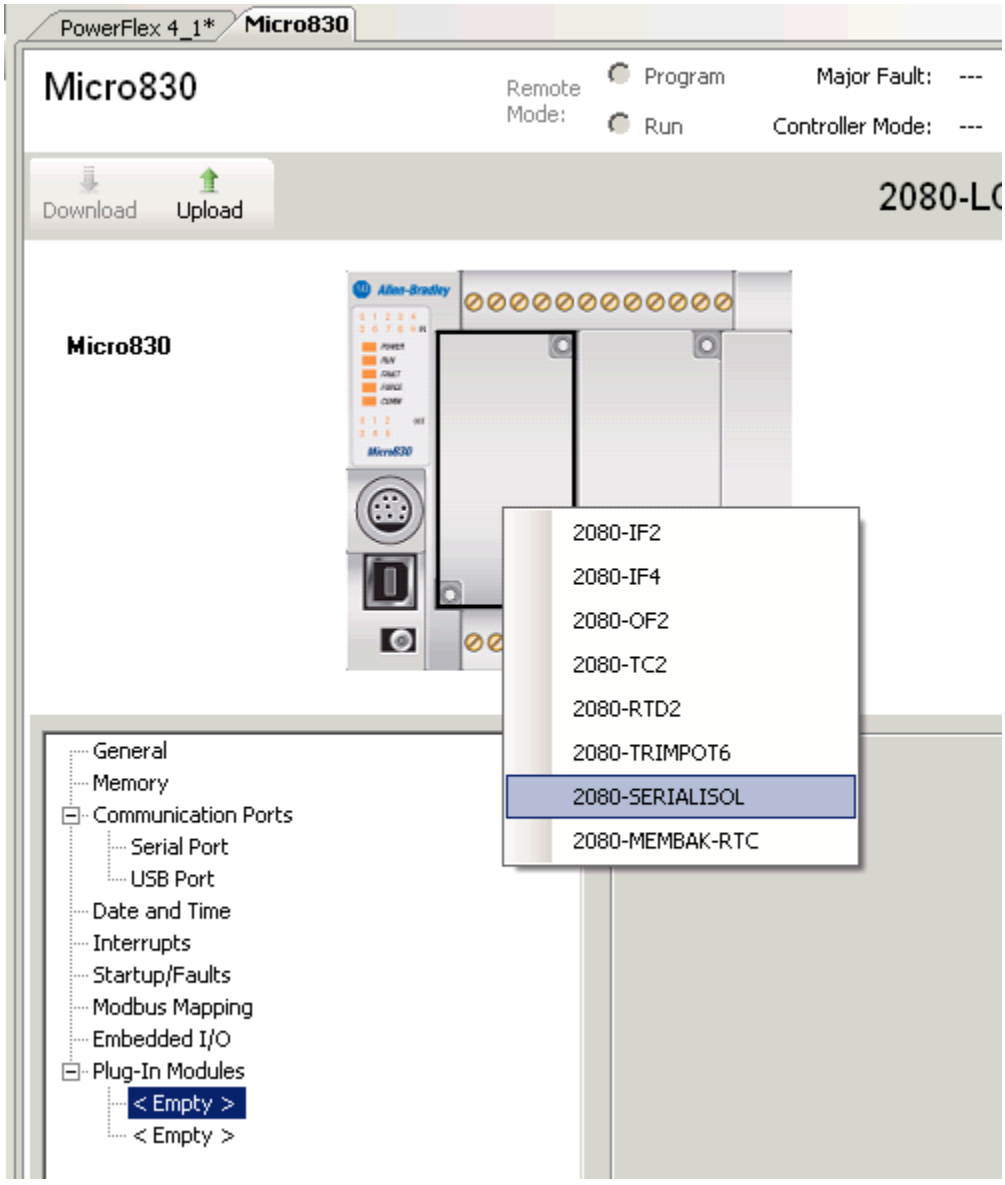
Hardware & Software Versions Used

- Temperature Controller, 900-TC8 or 900-TC16
- Simple Temperature Control Connected Component Building Block, Pub# CC-QS005A-EN-P
- Appropriate communication module for the 900-TC per application
    - 900-TC8COM
    - 900-TC16NACCOM

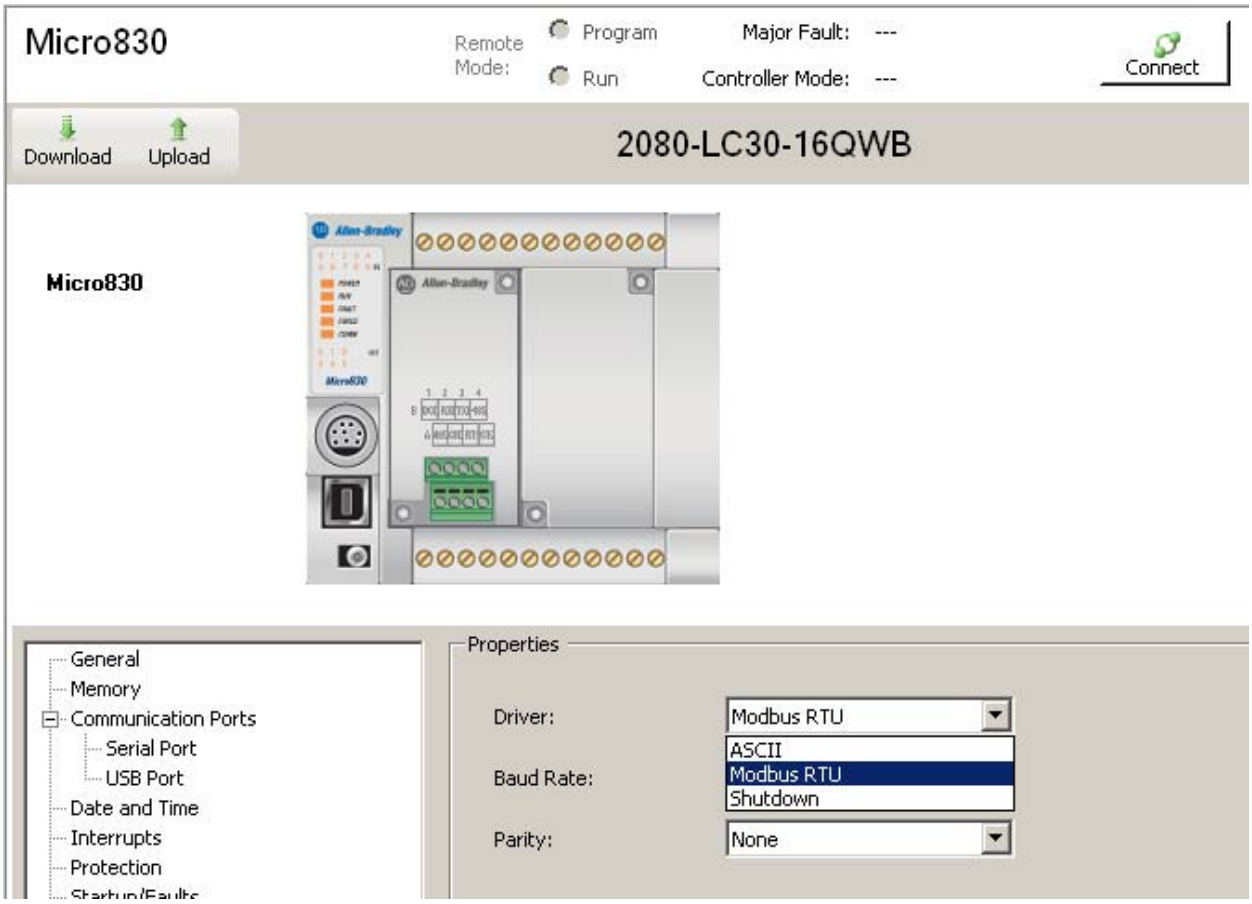
Configuring and Programming the Controller for Modbus Communications to a 900-TC Temperature Controller

This chapter will show you how to configure and program the Micro830 controller with the 2080-SERIALISOL and the 900-TC termperature controller.

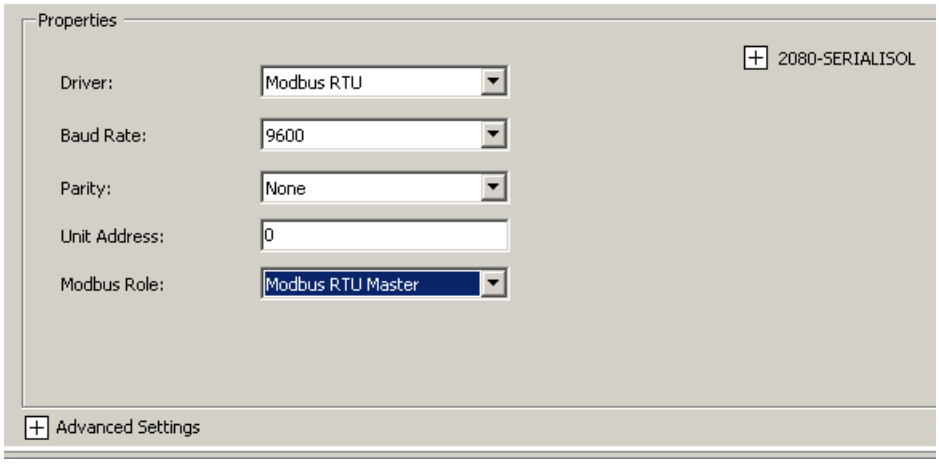
1. With the assumption you have the Micro830 controller selected in the project file, you can now go to the controller window and select the 2080-SERIALISOL plug-in card. For more information on how to create a new Micro830 project, review the Getting Started Guide (Pub# 2080-QR001B-EN-P).



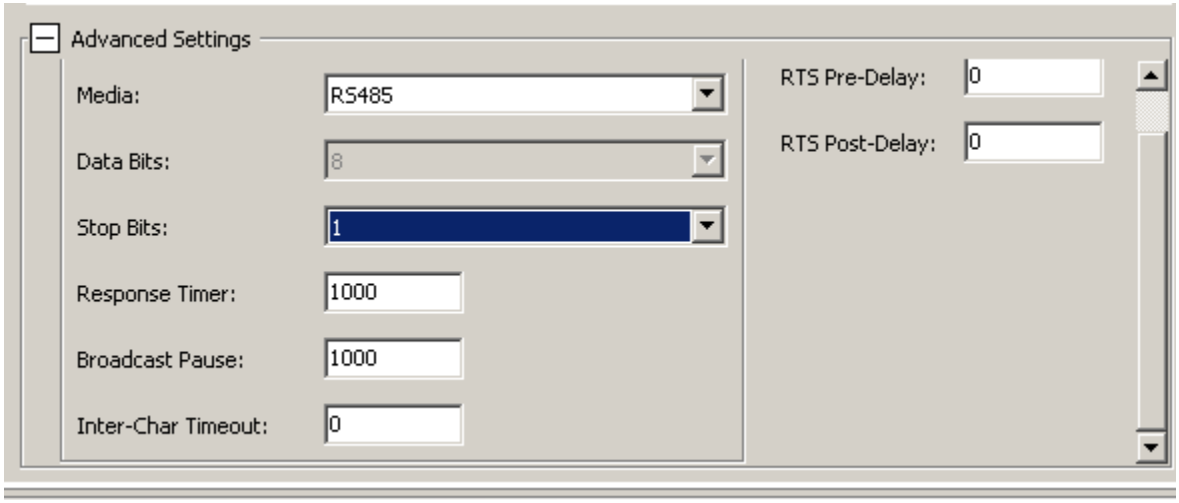
2. Click the down arrow, and select Modbus RTU



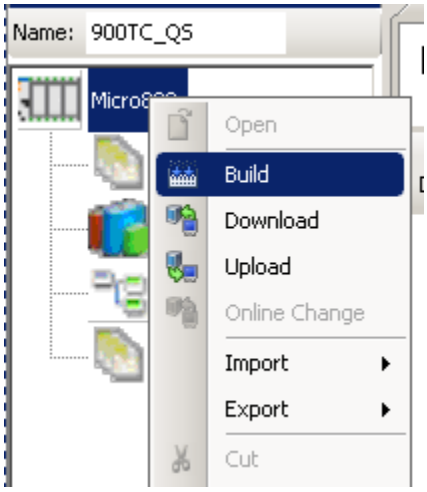
3. Change the rest of the parameters to the following listed below, using the down arrows.



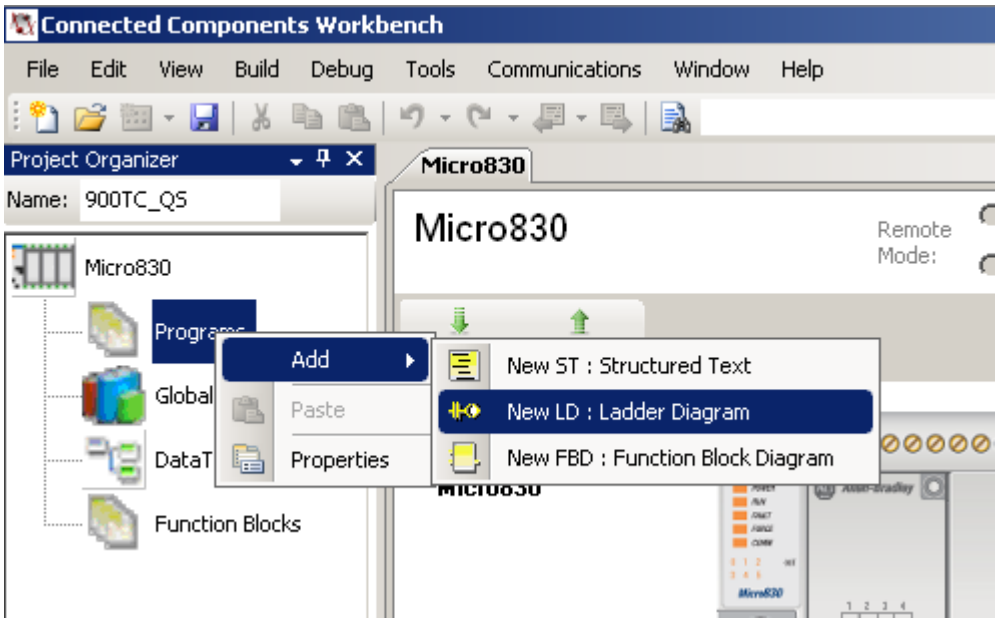
4. Expand the Advanced Settings and change the **Media** to **RS485**. Leave the rest of the parameters as shown below.



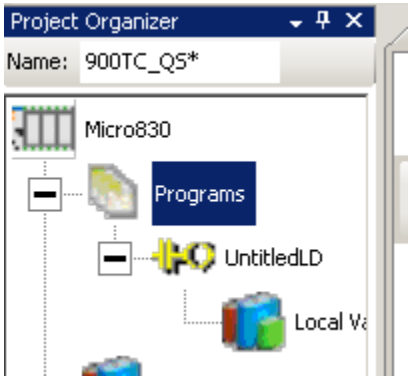
5. Right click on Micro830, then select Build.



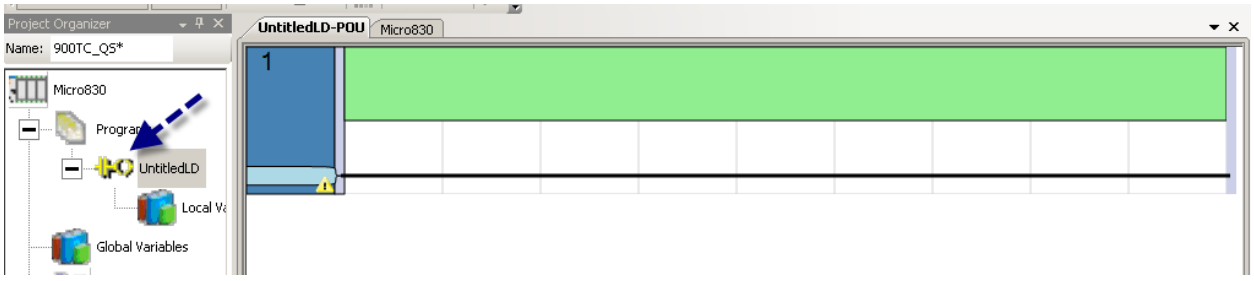
6. Right click on programs. Move the cursor over the Add tab, to New LD: Ladder Diagram.



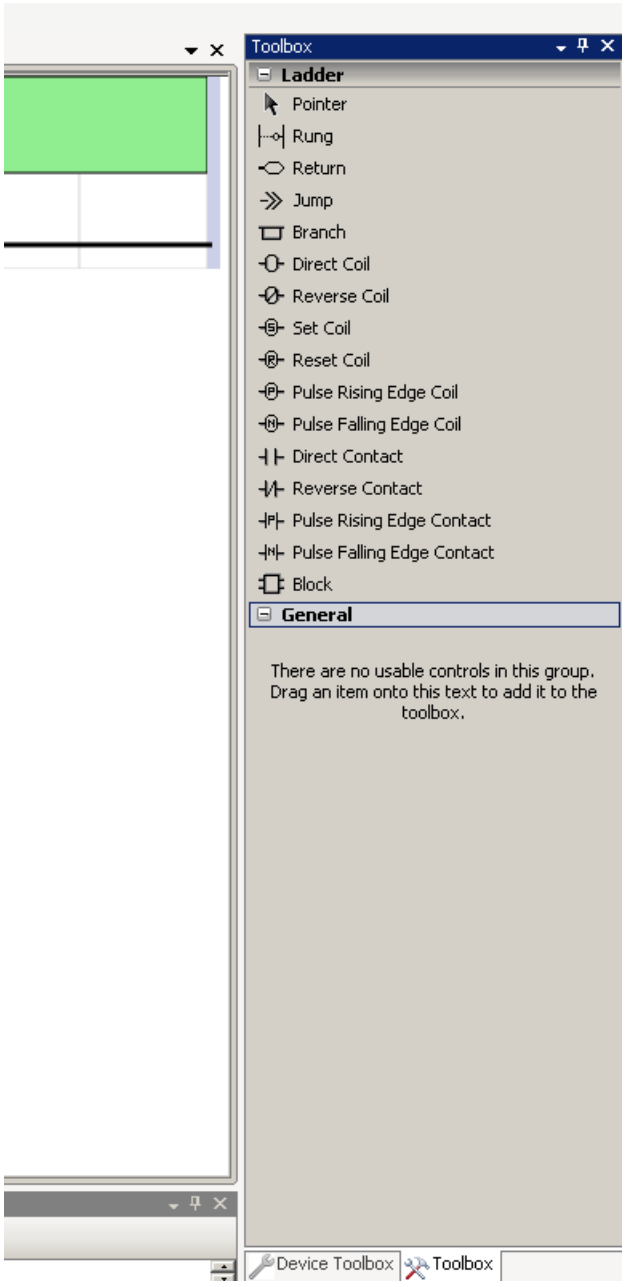
The following will now appear.



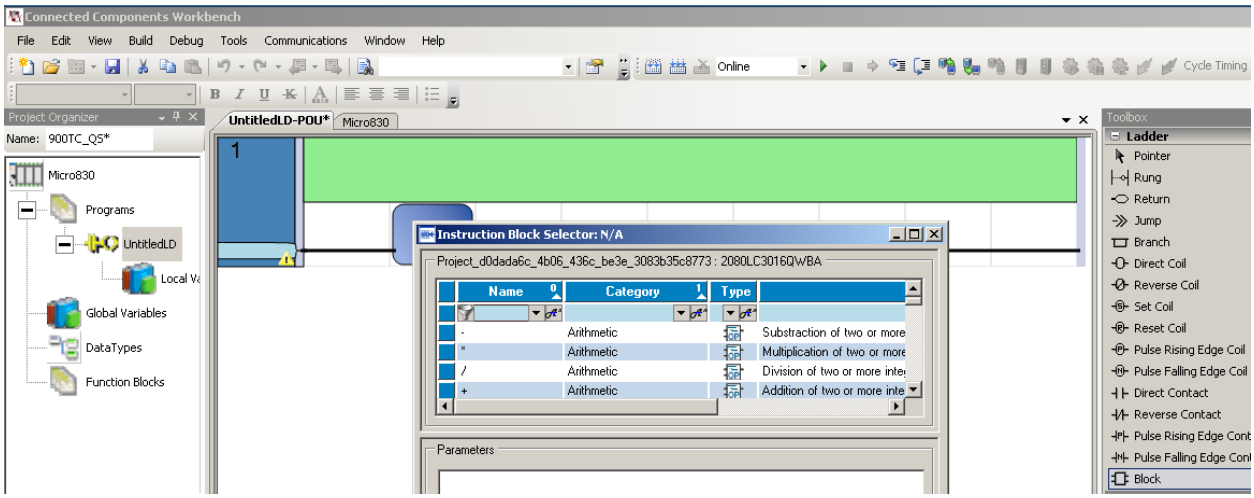
7. Double click the ladder icon.



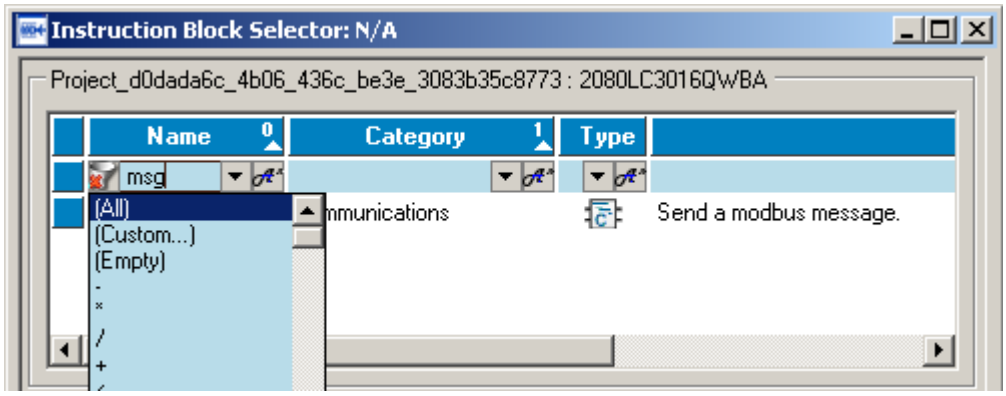
8. Open the Toolbox tab if it is not open.



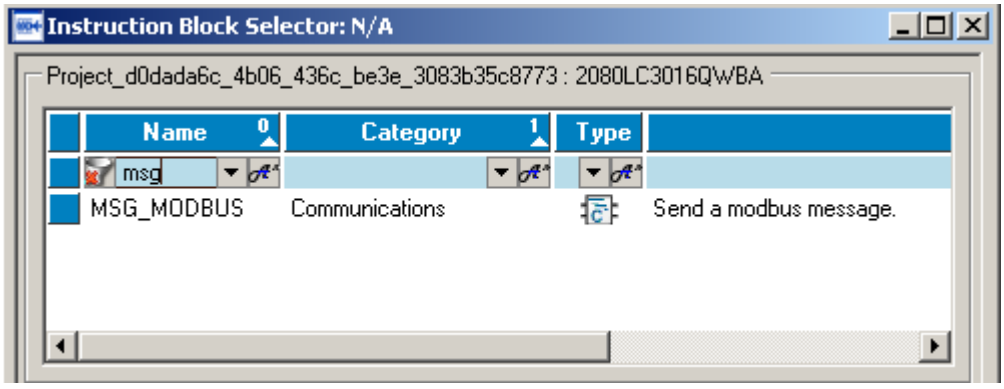
9. Click and drop a **Block** on the rung. The Instruction Block Selector window will now open.



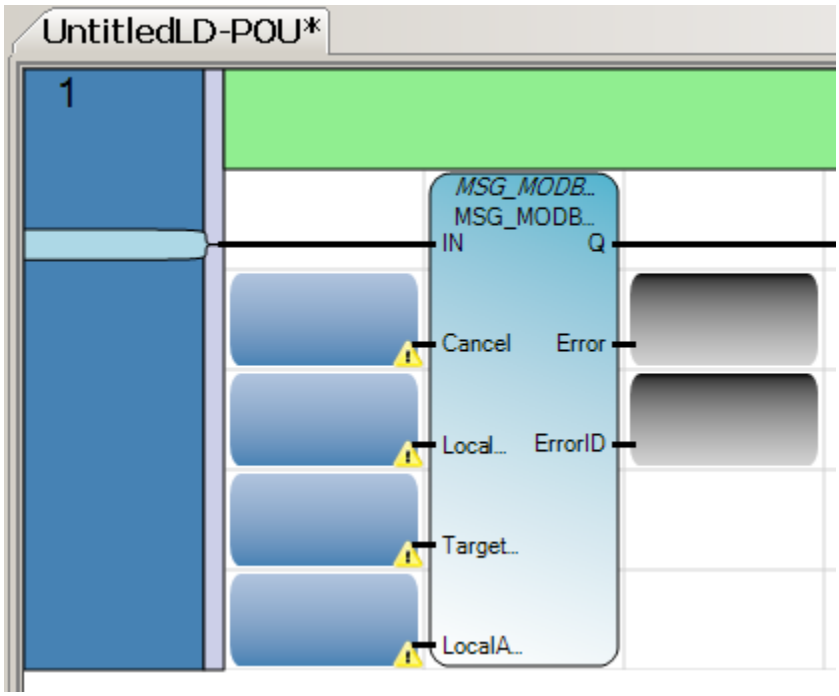
10. Type in MSG in the cell under Name.



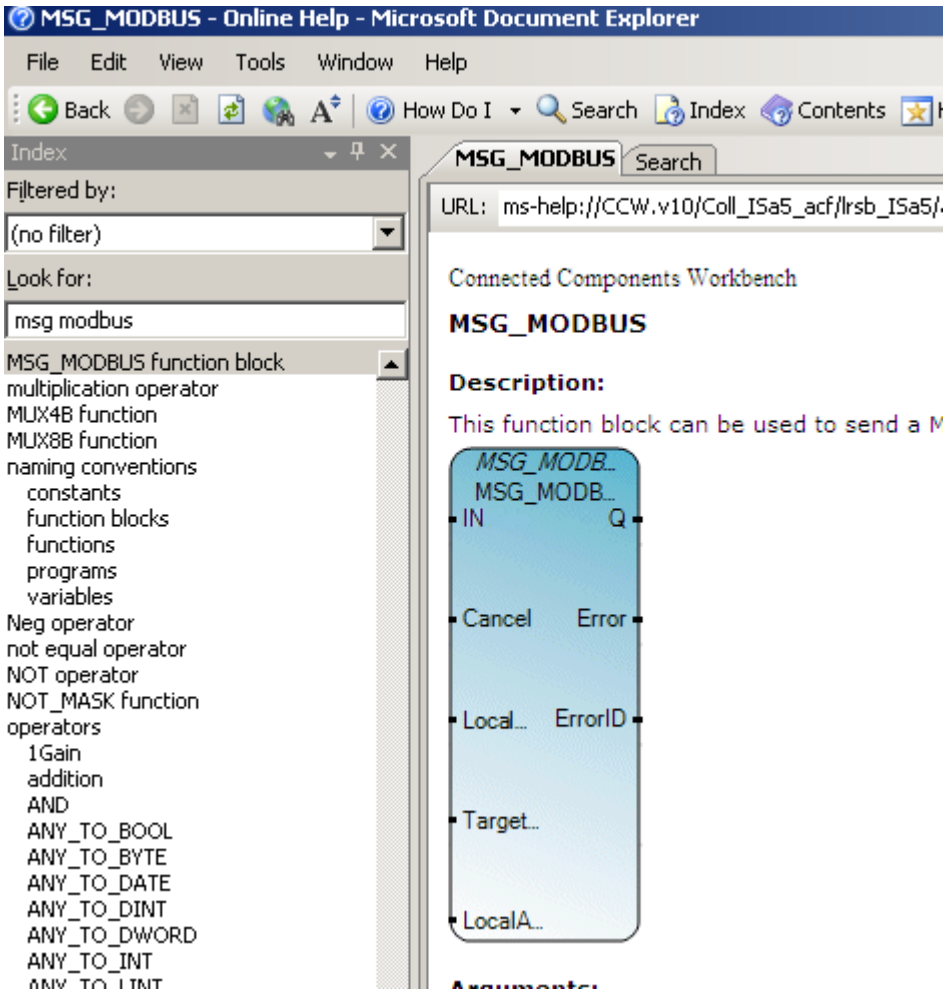
11. MSG_MODBUS will now appear as one of the available instruction blocks.



12. Double click on MSG_MODBUS and the following will appear.



13. To use the block, you need to configure it. To find help on the instruction blocks, in this case the **MSG Modbus**, go to Help, Search, click on Local Help, and enter **MSG Modbus** in the search box.

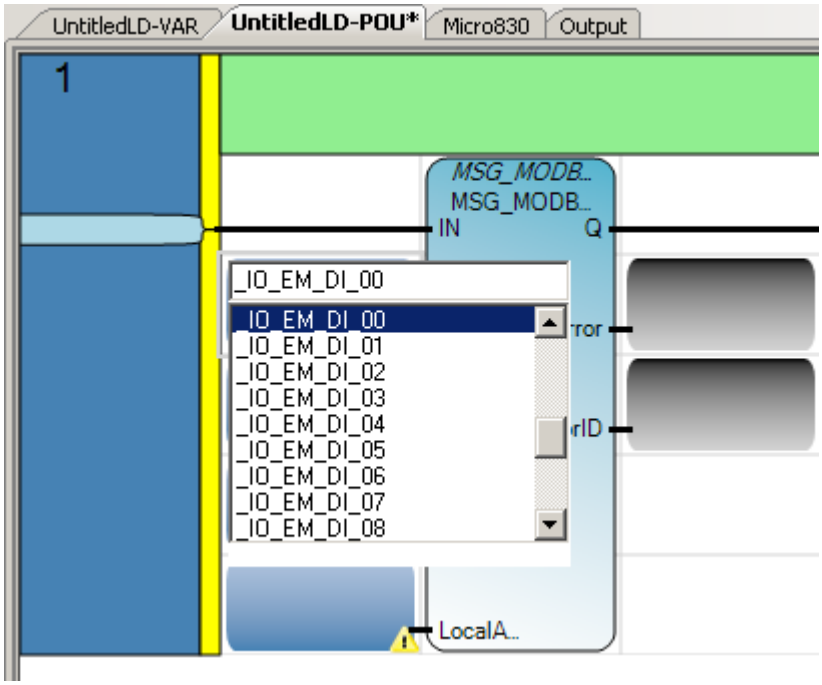


14. Here you will find the information on the inputs and outputs of the block.

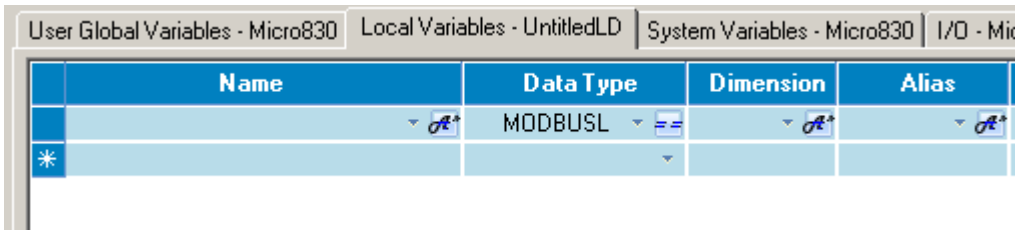
Arguments:

Parameter	Parameter Type	Data Type	Description
IN	Input	BOOL	If Rising Edge (IN turns from FALSE to TRUE), start the function block with the precondition that the last operation has been completed.
Cancel	Input	BOOL	TRUE - Cancel the execution of the function block.
LocalCfg	Input	MODBUSLOCPARA See MODBUSLOCPARA Data Type.	Define structure input (local device).
TargetCfg	Input	MODBUSTARPARA See MODBUSTARPARA Data Type.	Define structure input (target device).
LocalAddr	Input	MODBUSLOCADDR	Define local address (125 words).
Q	Output	BOOL	TRUE - MSG instruction is finished. FALSE - MSG instruction is not finished.
Error	Output	BOOL	TRUE - When error occurs. FALSE - No error.
ErrorID	Output	UINT	Show the error code when message transfer failed. See MSG_MODBUS Error Codes.

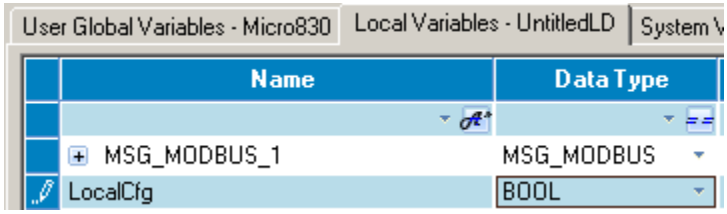
15. For the Cancel parameter, click on the upper part of the blue box and double click on the input from the Micro830 you want to use, in this case, Input 0.



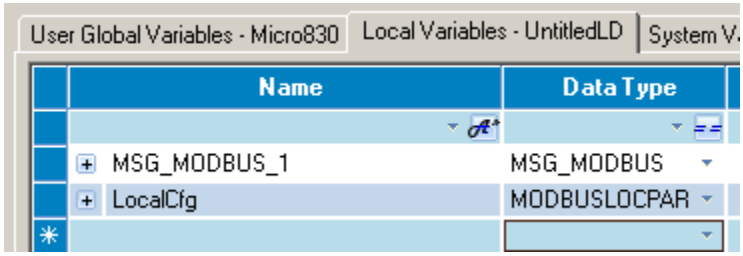
16. To create the other variables for the function block, double click on the bottom of the next blue box and open up the Local Variables.



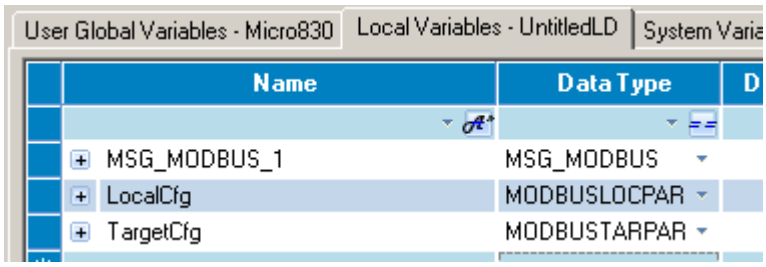
17. We now need to create variables for use with the function blocks. Click on the light blue box to the right of the asterick. Type in LocalCfg. Tab over to Data Type.



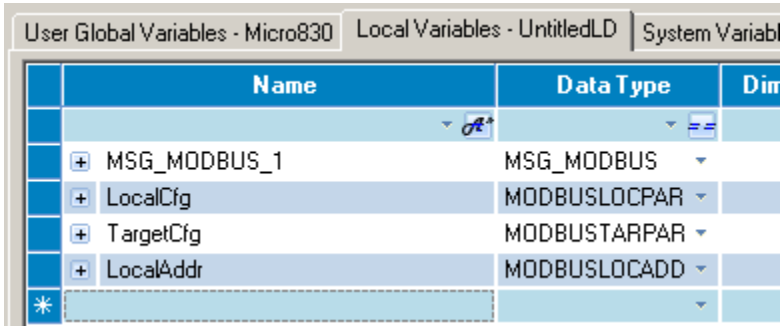
18. Type in MODBUSLOCPARA. See step 15 for where this data type assignment came from. You will note as you begin typing, the name will populate. Pay attention to the last half of the word to ensure you have the correct data type. Hit enter.



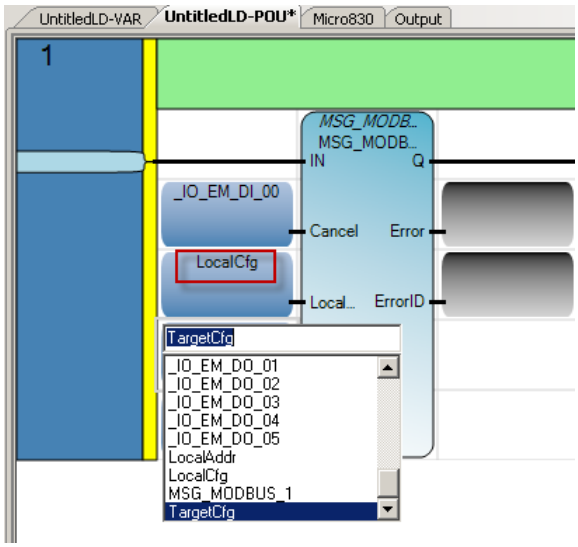
19. Type in TargetCfg in the light blue box to the right of the asterisk. Type in MODBUSTARPARA under data type. Hit enter.



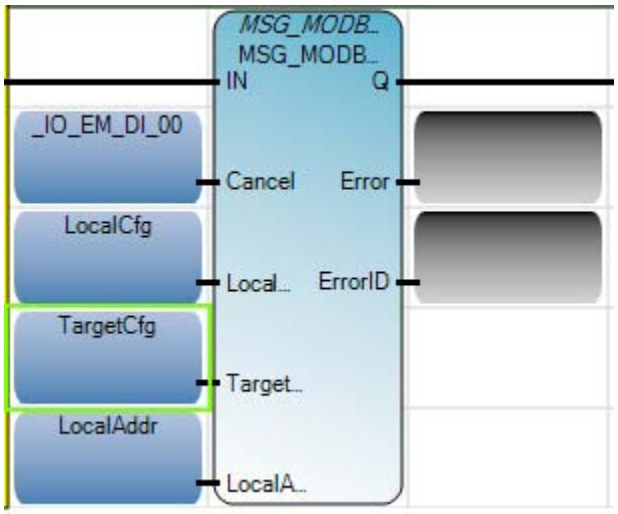
20. Type in LocalAddr in the light blue box to the right of the asterisk. Type in MODBUSOCADDR under data type. Hit enter.



21. Assign the appropriate variables as listed below by clicking the top half of the box and selecting the variable.

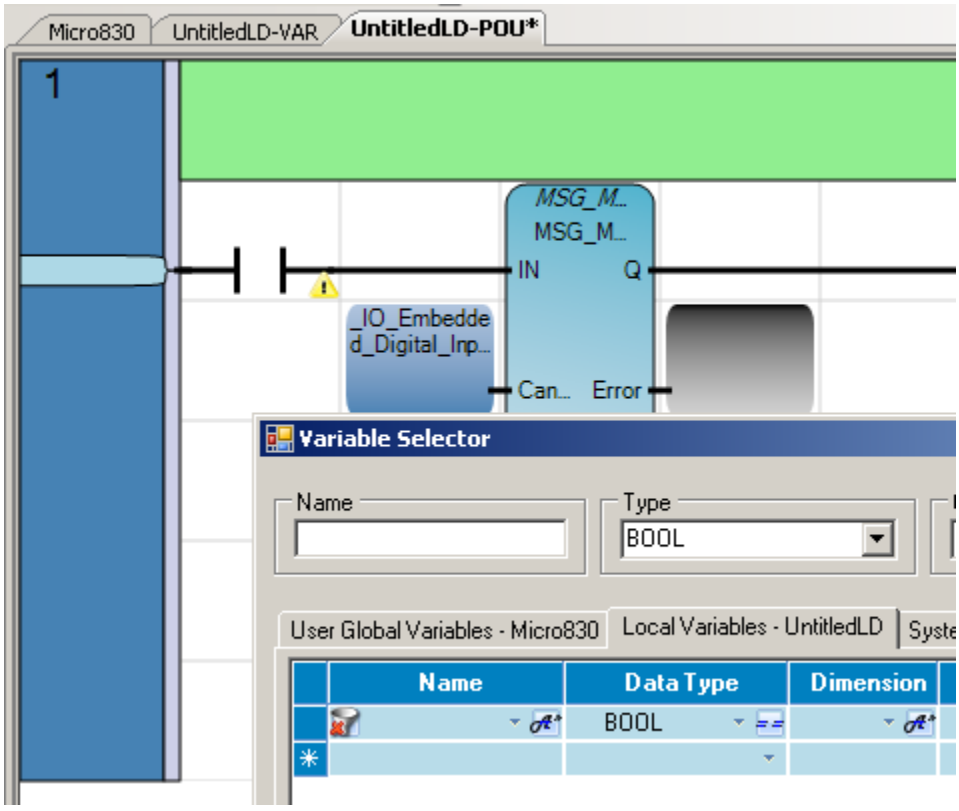


22. Complete the selection to look like this.

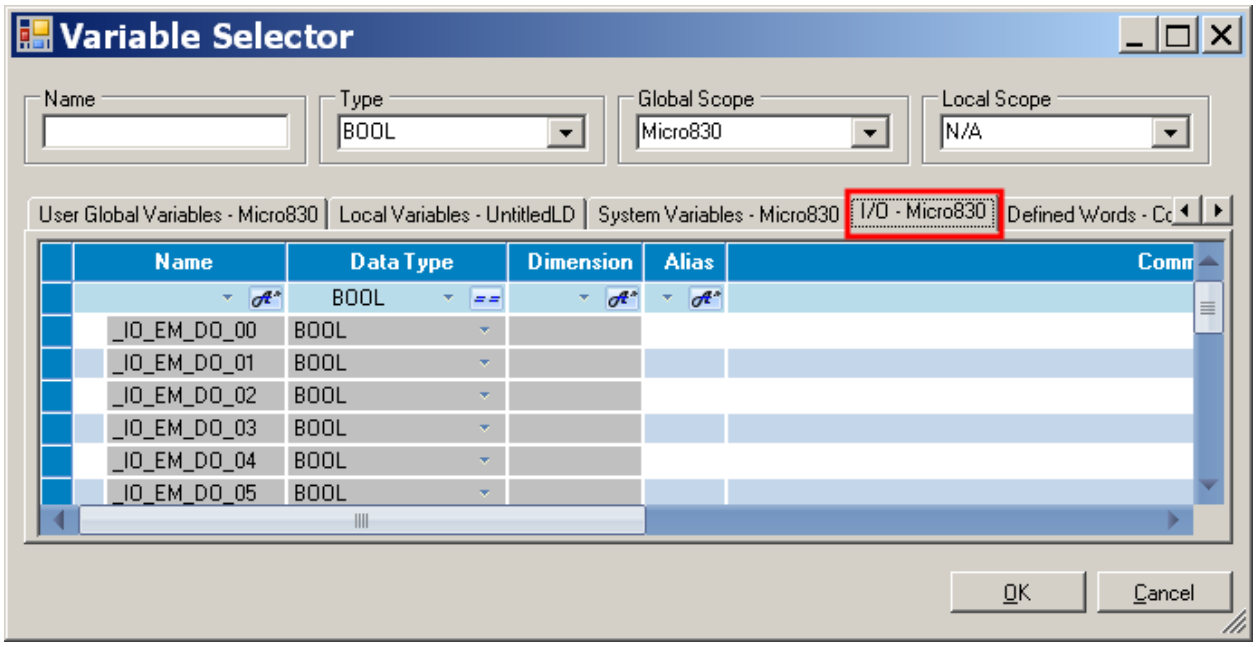


23. Now, to trigger the message, the addition of a direct contact will be used.

24. Click, hold and drop the direct contact to the left of the msg function block from the Toolbox.

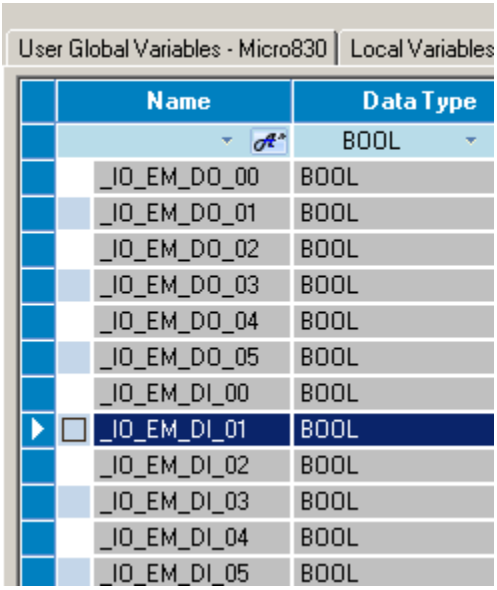


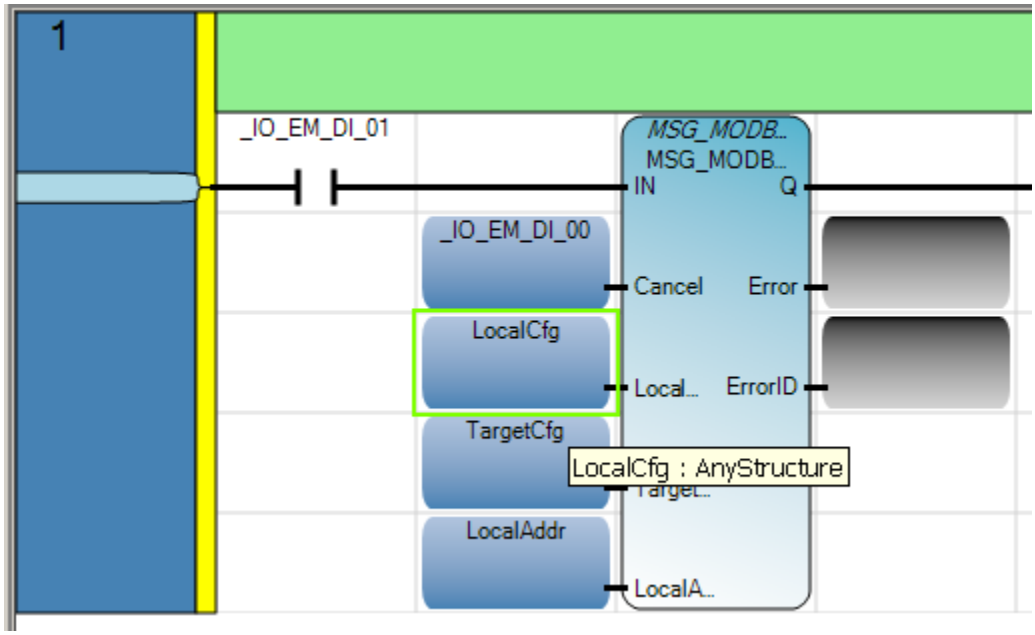
25. Click the I/O – Micro830 tab.



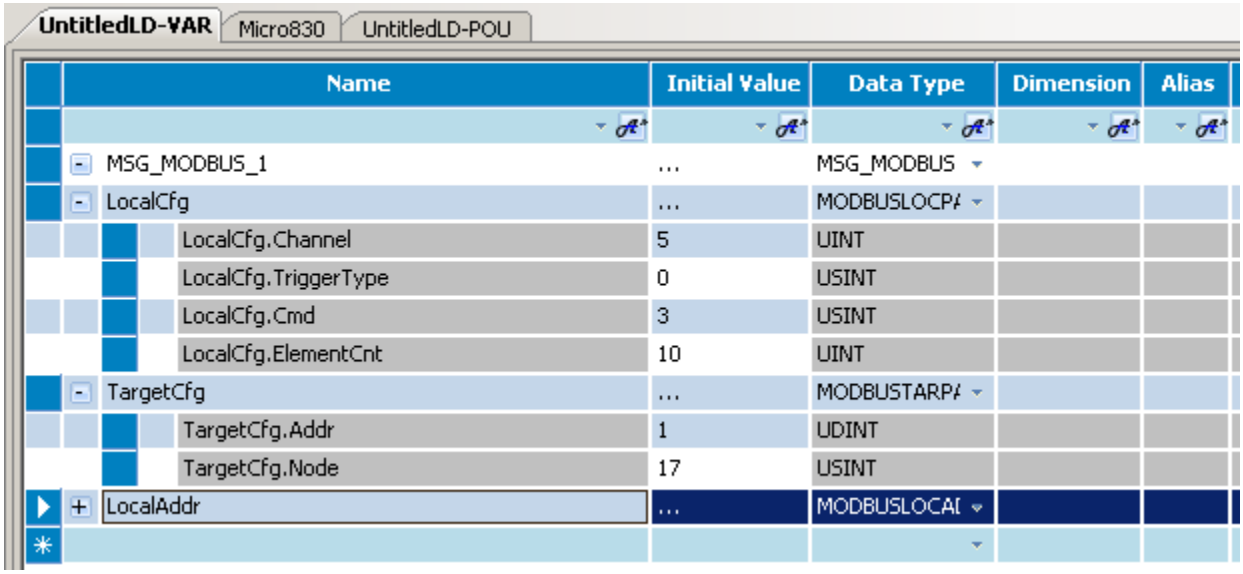
26. Click and hold the right side of the Name column.This changes the grouping and order of the Digital Inputs and Outputs.

27. Double click on the Input you need to trigger the message. After the double click, the selector will close, and the program ladder will open.





28. Set up the parameters as shown below by clicking on the Initial Value box for each variable. You may have to use the scroll bar at the bottom of the variable tab to see the Initial Value column. For ease of use, you can move the Initial Value column by click and holding the top of the column and moving the column to where you want it. These settings are based on the 900-TC settings used and found in Publication CC-QS005A-EN-P. Information on the message variables can be found in the CCW Help.

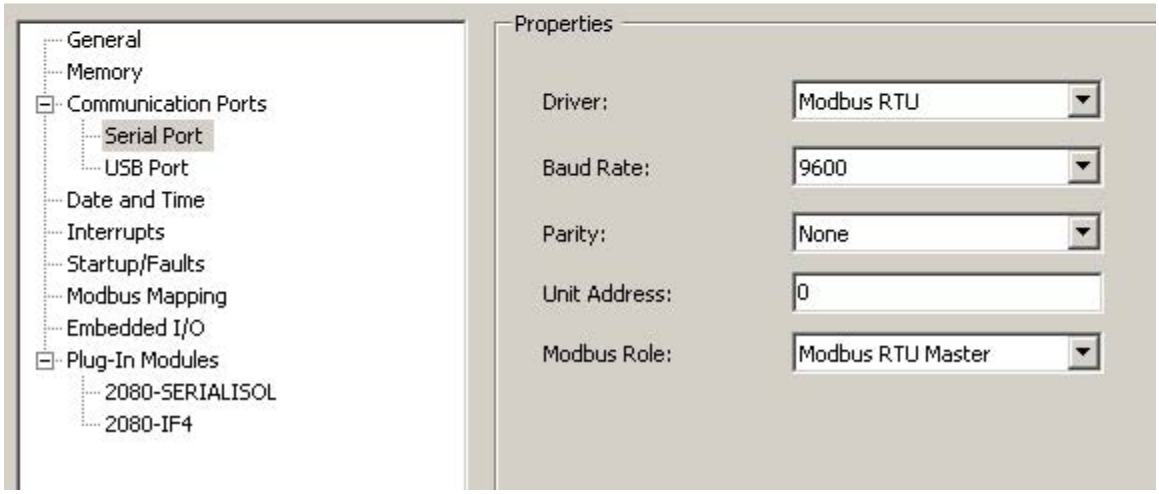


29. Build and download the program.

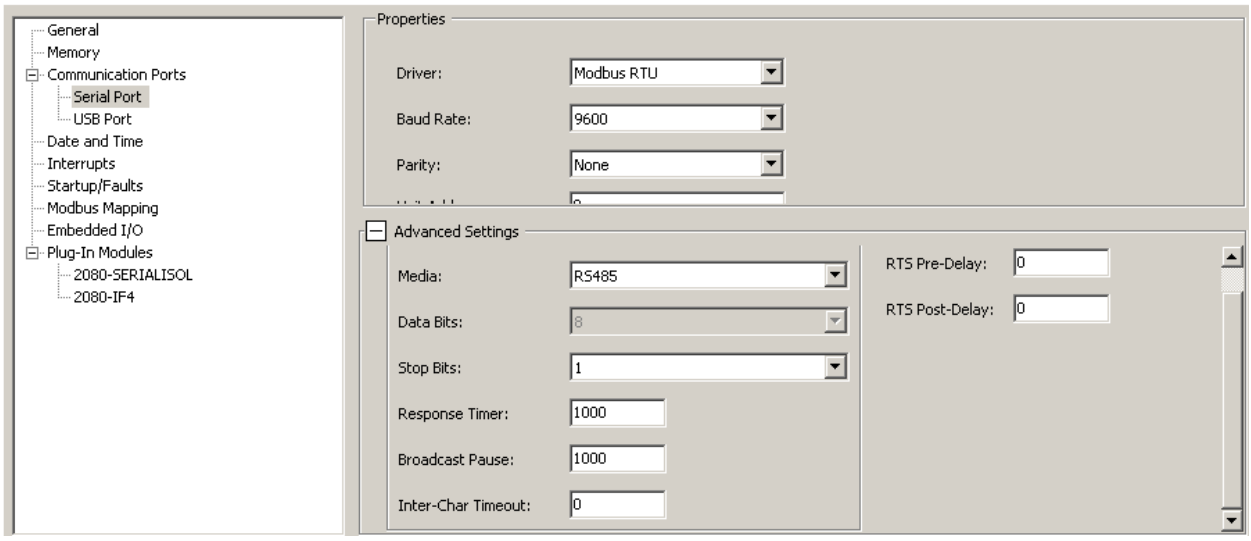
Configuring the Embedded Serial Port on the Micro830

1. For the embedded serial port on the Micro830, click the Serial Port under Communication Ports, and change the Driver to Modbus RTU. If necessary, change the other properties to match the screen shot.

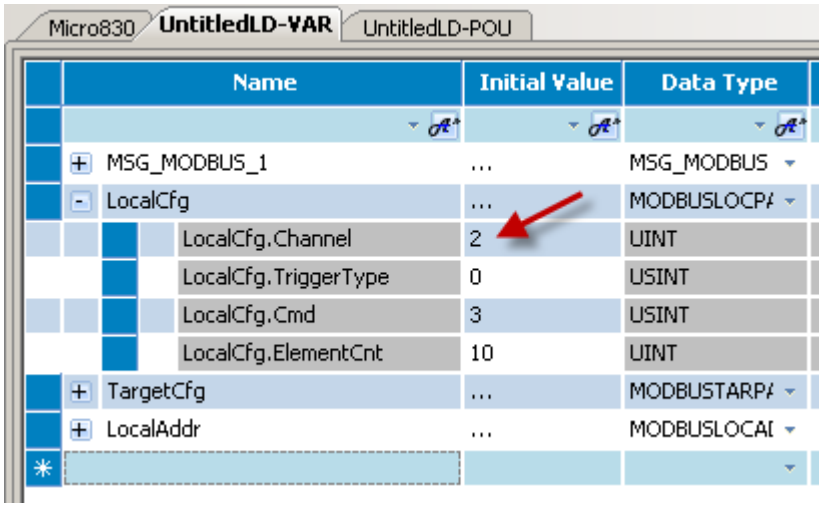
Micro830



2. Open the Advanced settings and select RS485 for Media.



3. Go to the variables window and change the LocalCfg Channel to 2.



4. Build the project.

Cabling the Controller for a 900-TC Temperature Controller and Testing the Controller Program.

This section will show you how to configure and program the Micro830 controller with the 2080-SERIALISOL and the 900-TC temperature controller.

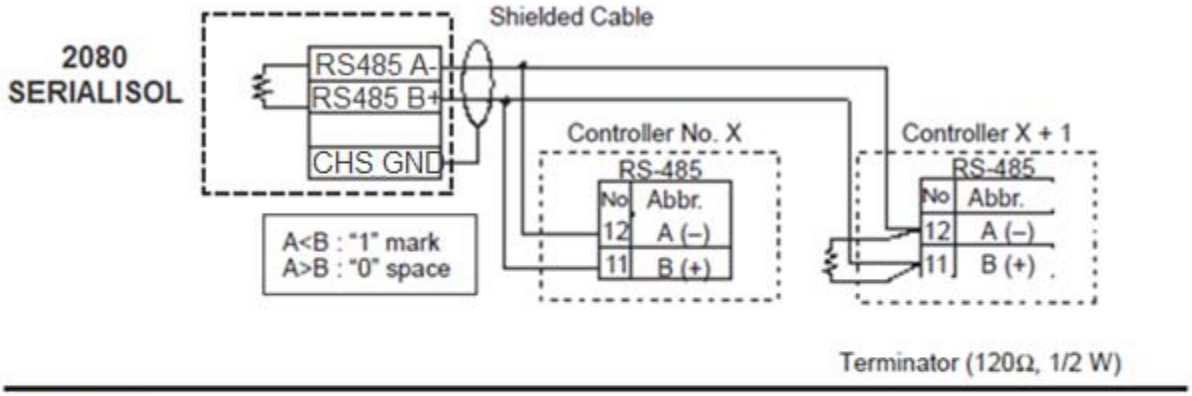
1. For this section, program the 900-TC as listed in the Simple Temperature Control Connected Components Building Block, Publication CC-QS005A and Temperature Controllers User Manual, Publication 900-UM007D.

   Follow the steps below for the 900-TC communication setup:

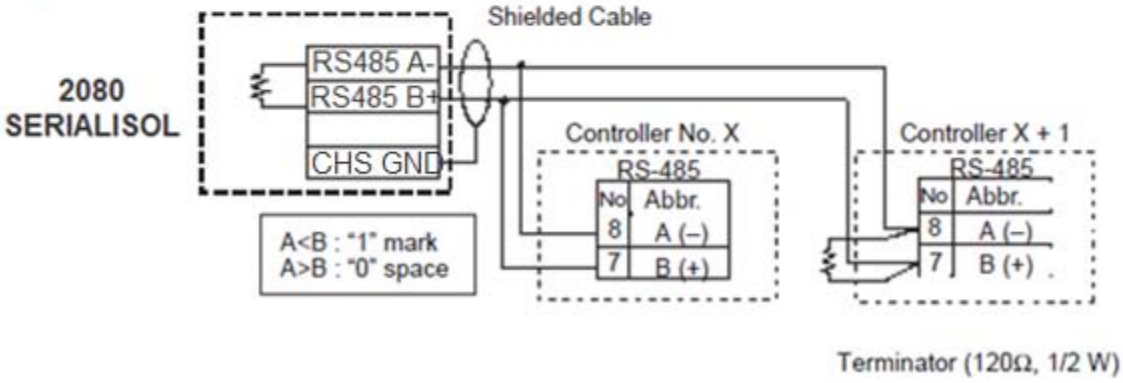
- Communication protocol: Mod
- Communications unit no.: 17
  This parameter sets a unique unit number for each temperature controller, letting the host identify the temperature controller during communication. When two or more temperature controllers are used, do not use the same unit number. This building block uses unit numbers (nodes) 17…24.
- Communication baud rate: 9.6 kbps
- Communications parity: NONE
- Send data wait time: 20

2. Follow the basic wiring connections shown below, select the appropriate drawings based on the 900-TC you are using. When using the 2080 SERIALISOL module, ground the shield/drain to the chassis of the controller.

900-TC8 & 900-TC16

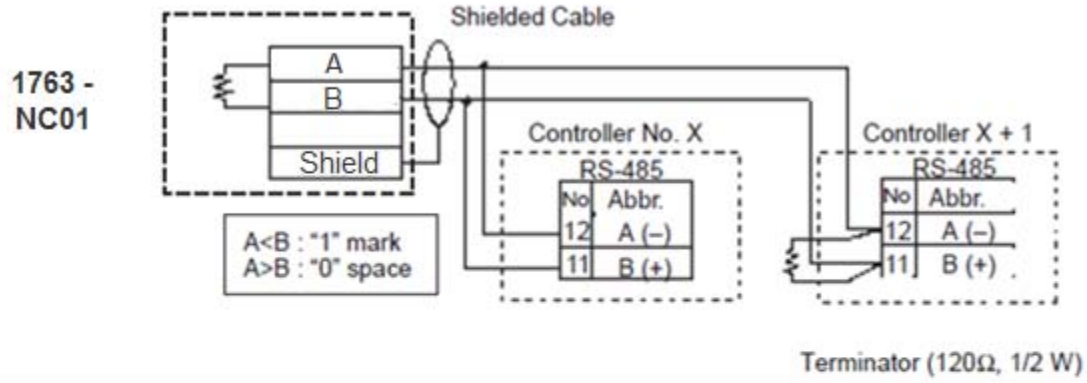


900-TC32

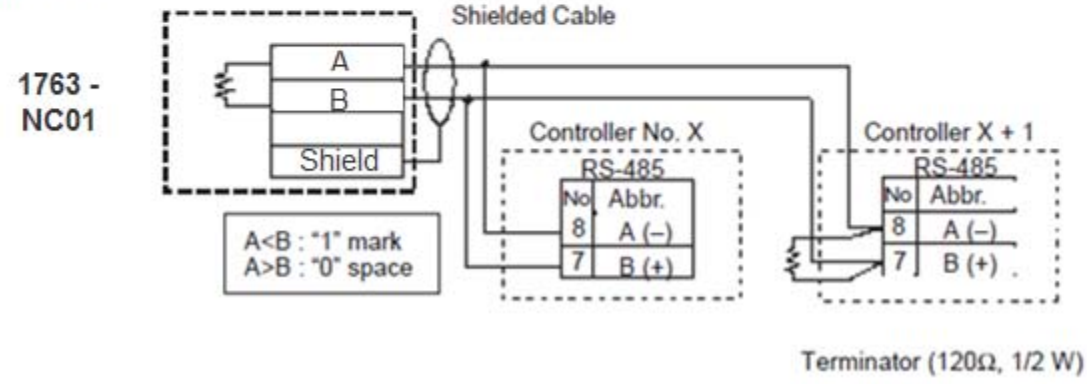


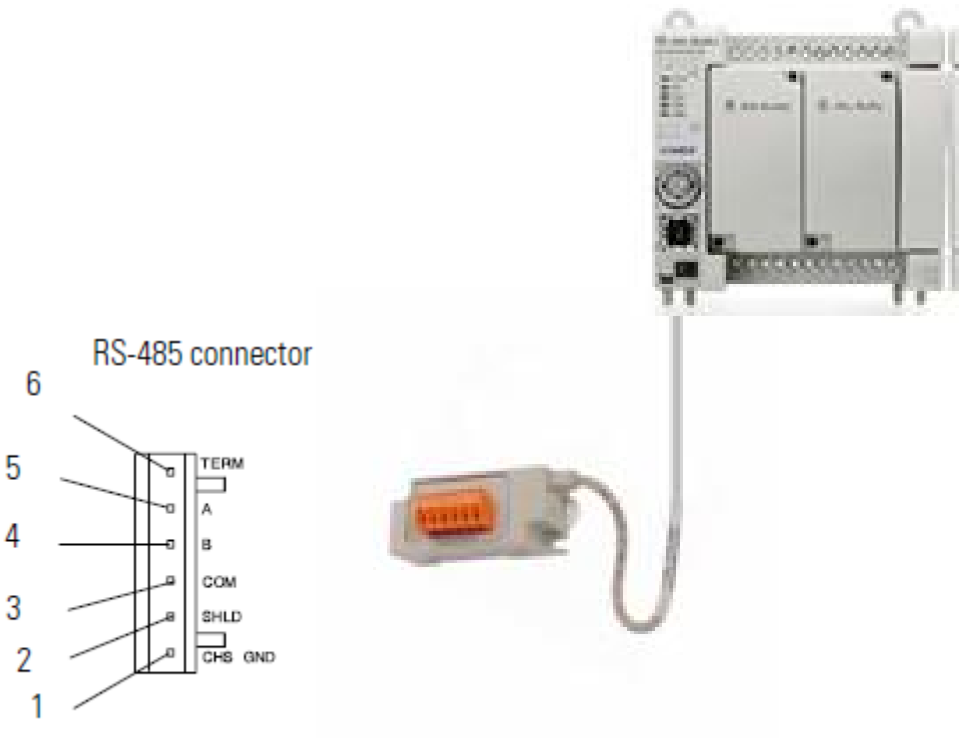
Note: If using the 1763-NC01 cable, wire the same for the 900-TC, connect the following way.

900-TC8 & 900-TC16



900-TC32





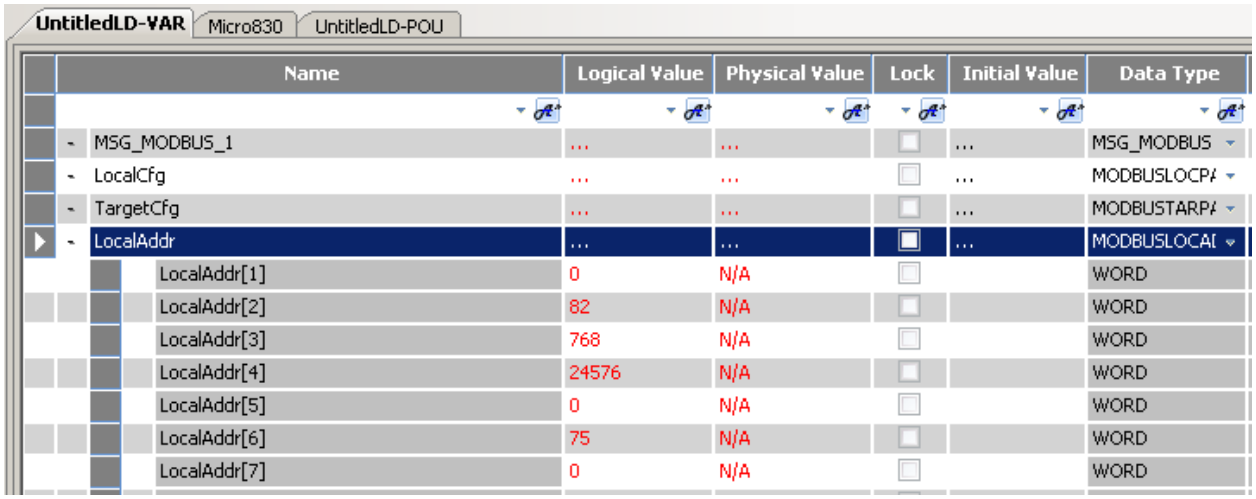
Note: Grounding Your Analog Cable

Use shielded communication cable, such as the Belden #3105A. The Belden #3105A cable has two signal wires (White/Blue Stripe and Blue/White Stripe), one drain wire, and a foil shield. The drain wire and foil shield must be grounded at end of cable.

3. Assuming you have created the program from the previous sections starting in Chapter 7, built and downloaded the program on the Micro830, you can now proceed.

4. Verify the program by running the debugger.

5. View the variable tab. Energize input 1 on the Micro830. You should get something similar to this. LocalAddr(2) is the process variable, LocalAddr(3) is the lower status word, LocalAddr(4) is the upper status word, and LocalAddr(6) is the set point.



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