

Module 1 - Lesson 2.0



Allen Bradley ControlLogix

Getting Started Studio 5000

Lesson 2.0:

Getting Started - Studio 5000

Studio 5000 Introduction.....	3
Running Studio 5000.....	3
Studio 5000 Start Screen.....	5
Create A Project File.....	7
Studio 5000 File Types.....	7
Controller Properties.....	13
Offline I/O Configuration.....	15
Online I/O Configuration.....	20
Discover Modules.....	25
Add Ladder Instructions.....	35
Tag Descriptions.....	42
Download Project.....	47
Review Questions.....	51

Studio 5000

Studio 5000 is an Online & Offline, programming and monitoring software for ControlLogix family of Allen Bradley PLCs. These include CompactLogix, ControlLogix and GuardLogix PLCs.

When Rockwell Software updated RSLogix 5000 software from version 20 to version 21, the software was renamed Studio 5000. (Sometimes referred to as Logix Designer).

Allen Bradley's ControlLogix 1756 – L7x series of PLCs are the current processors that can use Studio 5000 software. The 1756 – L7x processors include 1756 – L71, L72, L73, L74, L75.

Note: RSLogix 5000 software versions 18, 19 and 20 can be used with early releases of 1756-L7x processors, version 18 – L73/75, version 19- L72/73/74/75, version 20 – L71/72/73/74/75

RSLogix 5000 software is used with 1756-L1, 1756-L5x, 1756-L6x and some 1756-L7x PLCs (See Note above).

Start/Running Studio 5000

Execute RSLogix5000 from an icon on the desktop,



Figure 1-A Shortcut Icon – Studio 5000

Note: Different Shortcut icon for Studio 5000 than for Logix 5000



Figure 2-A Shortcut Icon – Logix 5000

or by choosing the application from the Rockwell Software folder within the Start menu.

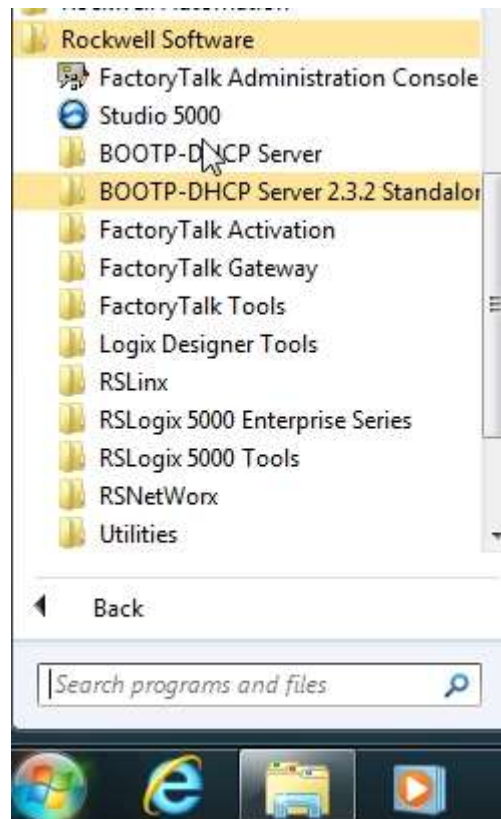


Figure 3-A

RSLinx Classic may need to be updated to work with Studio 5000 software: Studio 5000 v21 – RSLinx v3.51.00.10

Studio 5000 v23 – RSLinx v3.61.00

Studio 5000 v24 – RSLinx v3.71.00

Studio 5000 is copy protected with a FactoryTalk Activation. The EVRSI activation files cannot be used the Studio 5000.

If FactoryTalk Activation is missing or cannot be found, Studio 5000 will not run.

The start screen for Studio 5000 is shown in Figure 4-A.



Figure 4-A – Start Screen Studio 5000

From the start screen:

Create – start a new project

 Import a project

 open an included sample file

Open – open an existing project

 upload a project

 open an included sample file

Explore – navigate to Help File information

Recent Projects – lists latest projects that were opened in Studio 5000.

To select a Recent Project – Click on the project name.
The Studio 5000 splash screen opens

See Figure 5-A



Figure 5-A
Studio 5000 Splash Screen

The selected project opens in the main screen of Studio 5000

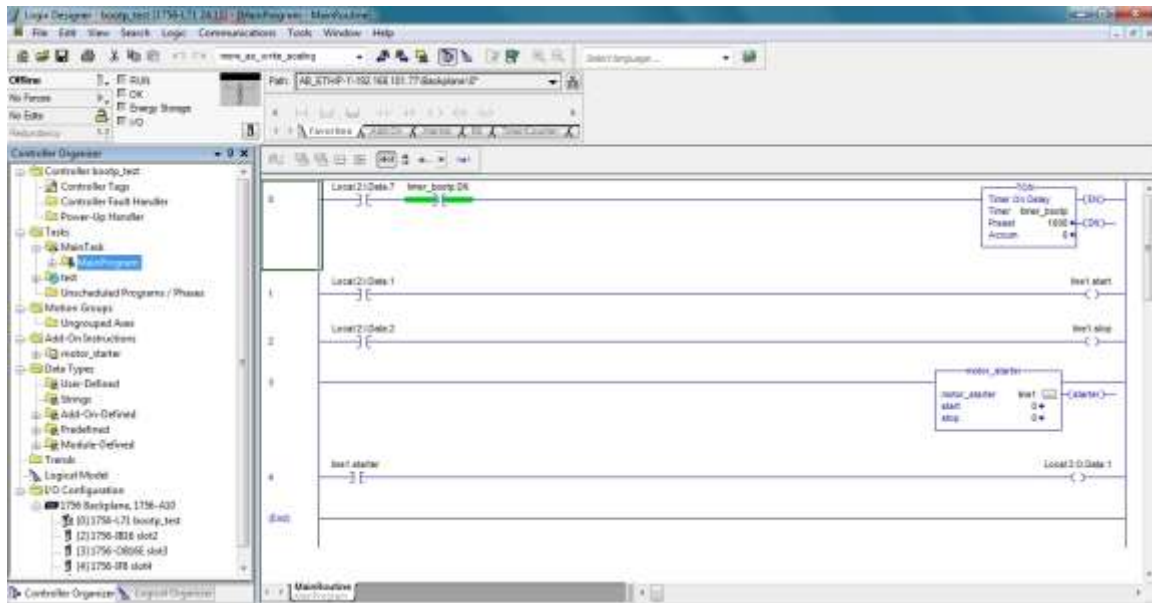


Figure 6-A – Main Screen

Note: To view Ladder Logic window – Click on the Routine icon

Note: The main screen in Studio 5000 is similar to Logix 5000

See ControlLogix Lesson6 Intro to RSLogix5000 for
Toolbar and Window descriptions

This Lesson will cover the steps to create a new project in Studio 5000.

On the Start Screen - Select New Project in the Create list.



Figure 7-A

Studio 5000 will create an ACD project file.

NOTE: This is the same file extension used in RSLogix 5000.

- .ACD –is the extension for the native 5000 project file. This holds all of the project's, data, instructions, configurations and descriptions. This is the project that opens in the Studio 5000 software and is downloaded to the processor.



Figure 8-A

Icon for ACD project file

There are two addition file types that Studio 5000 projects files

can use:

Note: These are projects that are imported into Studio 5000
and are used to create an .ACD project file.

- .L5K – ASCII text file which is an archived or compressed file created by an .ACD file. When this file is opened with Studio 5000, an import will occur which creates the .ACD file in the Project Directory, and then Studio 5000 will open the .ACD file. Able to view file information in a text editor.

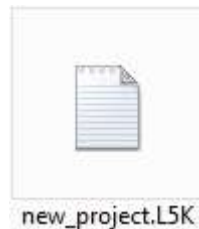


Figure 9-A

Icon for L5K project file

- .L5X – Extensible Markup Language (XML) file. Similar to an .L5K file. File can be viewed in a text editor or web browser.



Figure 10-A

Icon for L5X project file

After choosing New Project from the Start Screen – the New Project window opens.

See Figure 11-A.

Select the type of processor for the project.

This example will use a ControlLogix 1756-L71.

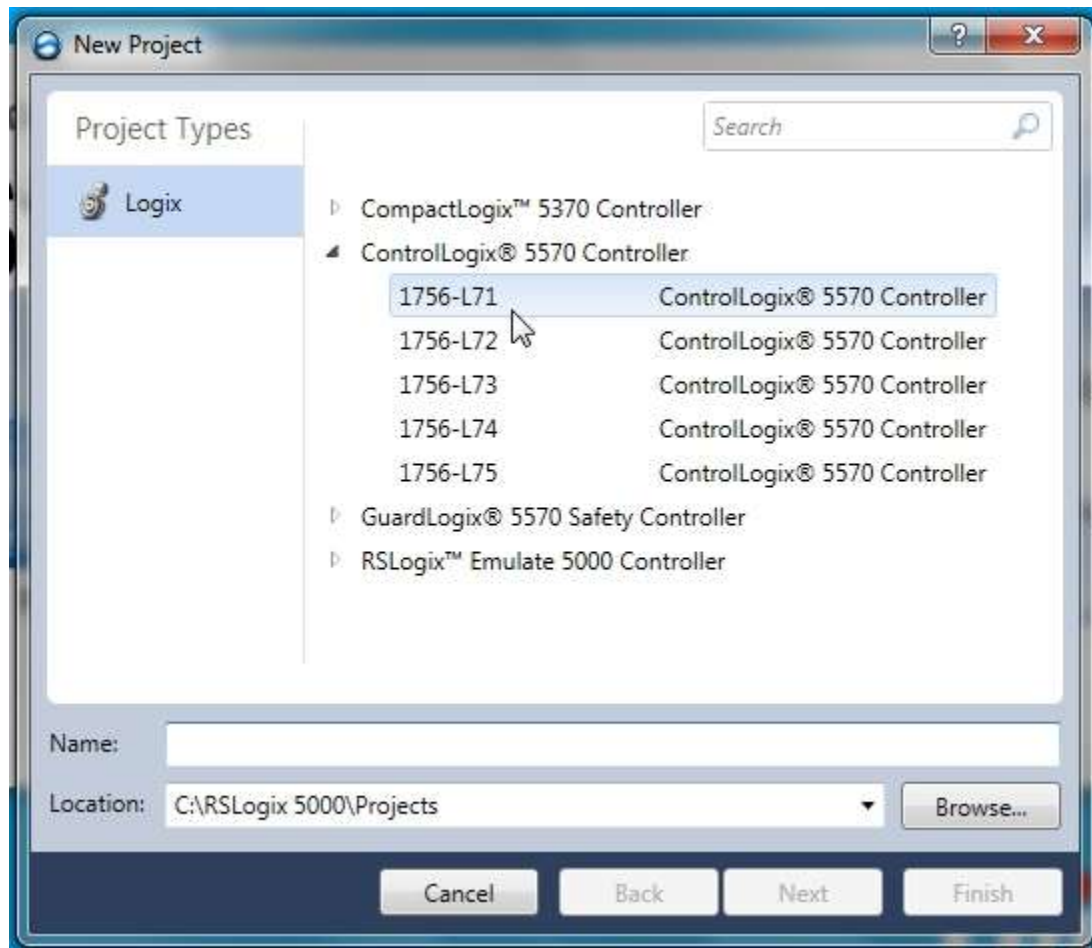


Figure 11-A

Name the Project

Use Lesson1.0 RSLinx to create an on-line connection to PLC.

Conventions for Names

Throughout a Studio 5000 project, you define names for the different elements of the project, such as the project name, controller, data addresses (tags), routines, and I/O modules. As you enter names, follow these rules.

- Only letters, numbers, and underscores (_)

- Must start with a letter or an underscore
- ≤ 40 characters
- No consecutive or trailing underscores
- Not case sensitive

For the example the project name is new_project

Location: is where the project file will be stored

Use the Browse button to change Location

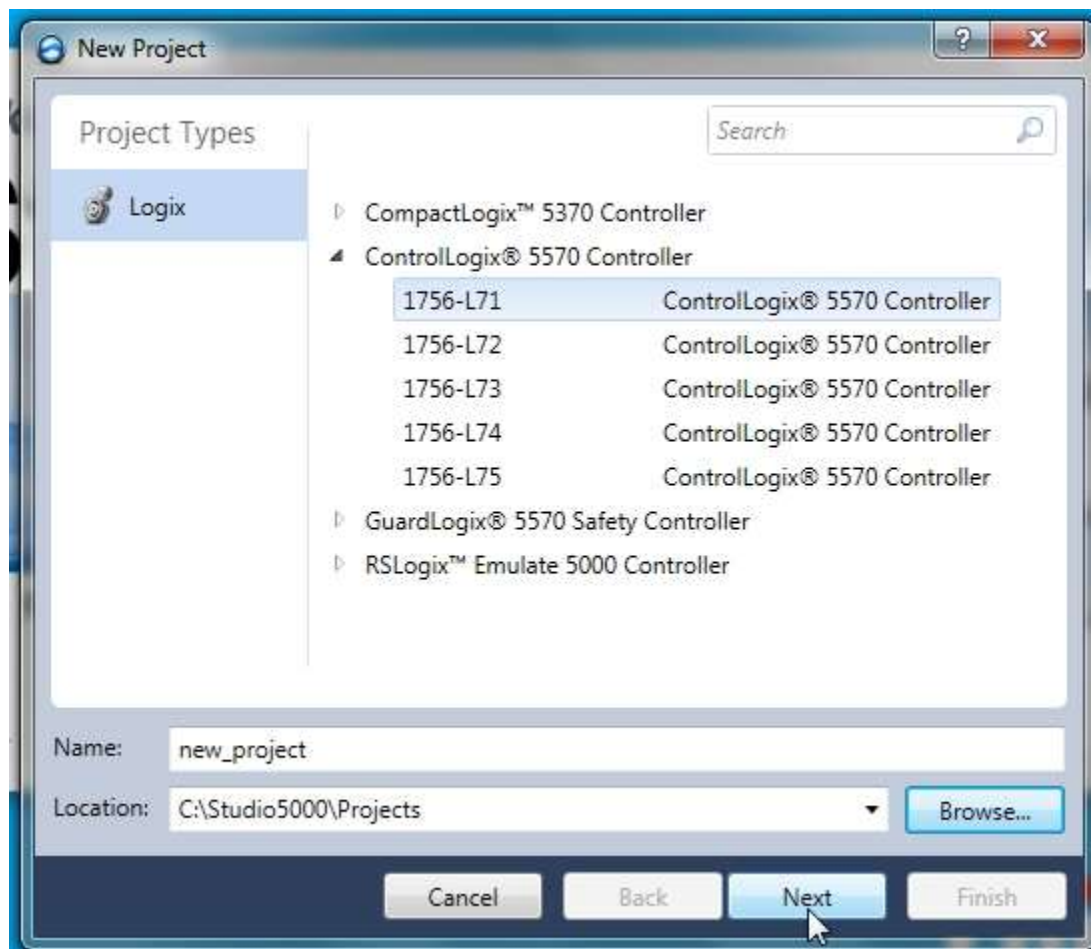


Figure 12-A

Click the Next button

The next screen contains

- Processor revision
- Chassis size
- Processor slot location

This information can be viewed from the RSWho screen in RSLinx.



Figure 13-A

Hardware Information for the ControlLogix System

Click the Finish button

Studio 5000 will create an .ACD and store it in the Location path.

Note: Project Name will also be the name of the processor.

This can be changed by saving the project file with a different name.

The Studio 5000 Main Screen opens.

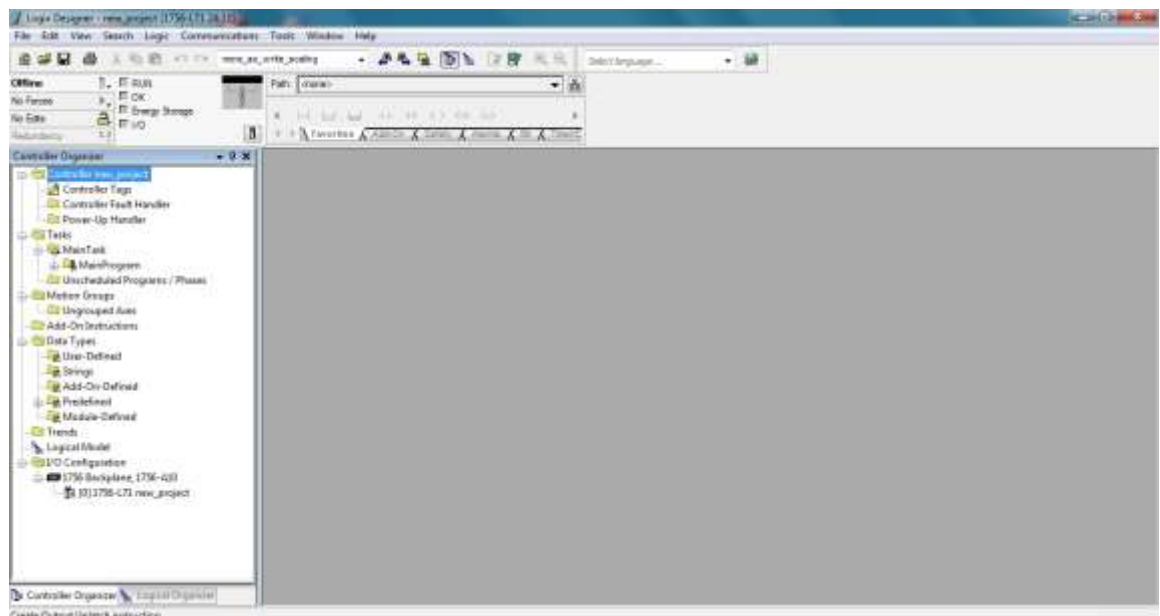


Figure 14-A
Studio 5000 Main Screen

By default the left-side windows opens with the Controller Organizer view, same as RSLogix 5000.

In Studio 5000, the left-side widow can be toggled to the Logical Organizer view by clicking on the icon shown in Figure 15-A on the standard toolbar.

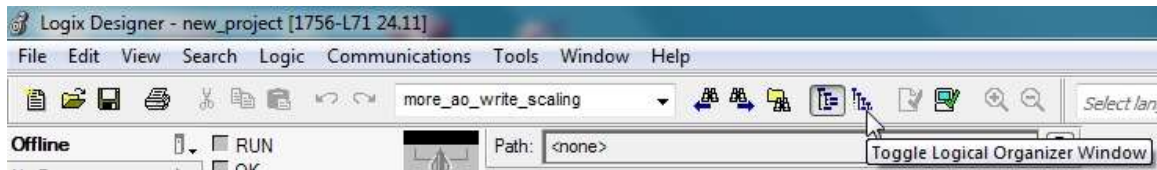


Figure 15-A Logical Organizer icon

To return to the Controller Organizer window, click the icon to the left of the Logical Organizer icon.

Studio 5000 main screen - Logical Organizer window

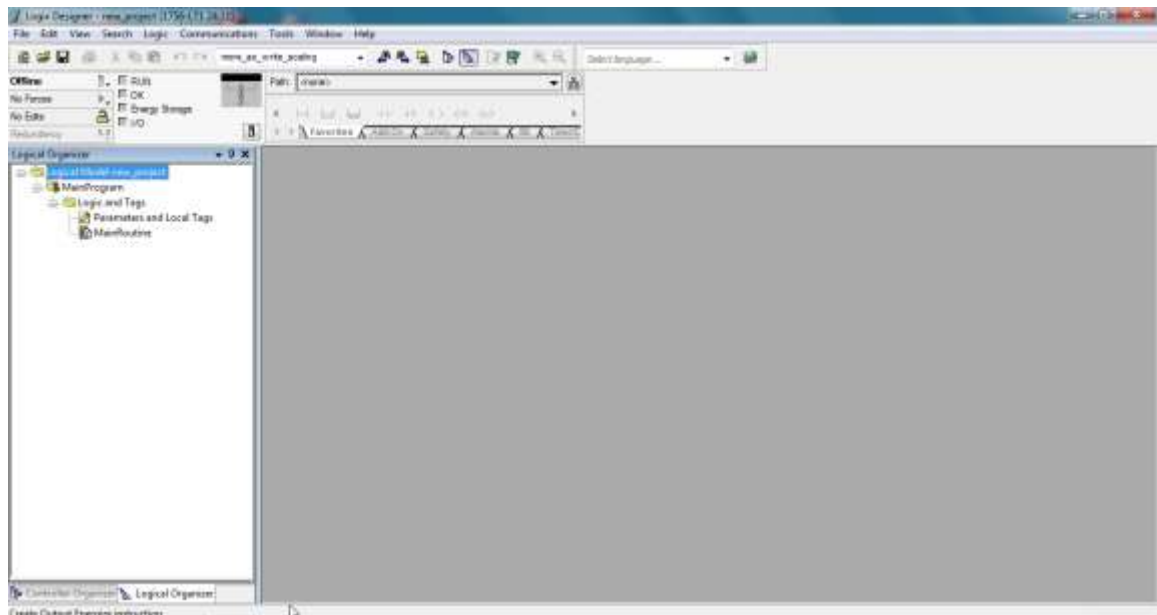


Figure 16-A

Configure the Studio 5000 main screen to view the Controller Organizer window.

From the Online toolbar – Click the Controller Properties icon.
The Controller Properties icon is below the Key Switch icon.

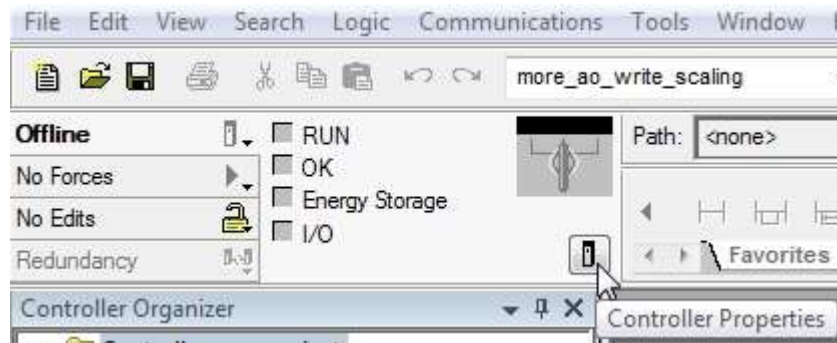


Figure 17-A
Controller Properties icon

On the Controller Properties window – navigate to General tab.
The General tab shows hardware information that was configured at the beginning of the project.

Project information can be view/ modified on the General tab.

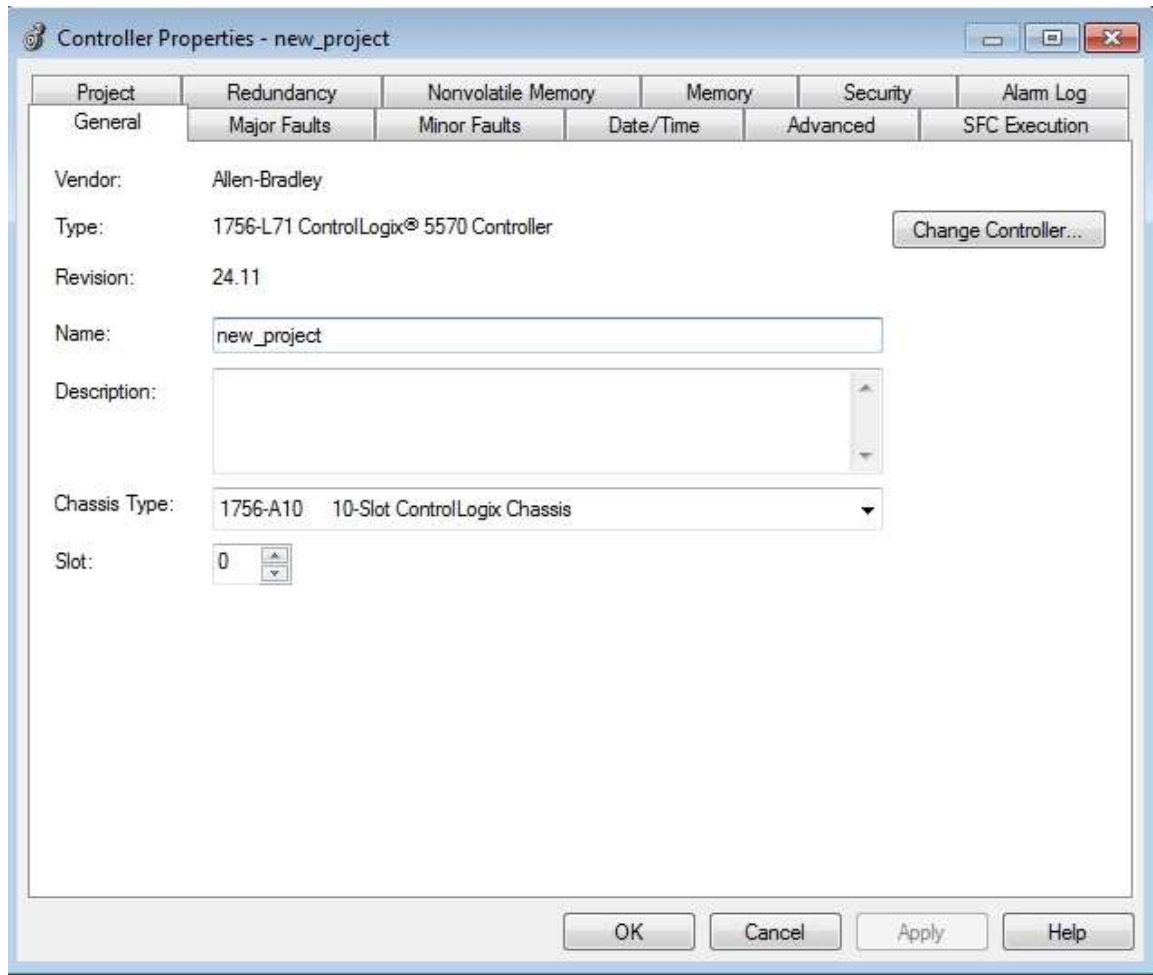


Figure 18-A

Type: Processor used for project

Revision: Revision of project file

Note: Major revision of project file must match major revision of processor.

Note: Change Type and Revision information using Change Controller button.

Note: Processor revision information can be found on RSWho

screen in RSLinx.

Name: Processor Name

Chassis Type: Chassis Part Number for project

Slot: Slot location of Processor

If any changes are made on the Controller Properties window –
Click Apply or OK button to keep changes.

I/O Configuration

Using 1756-L7x processors, I/O configuration can be accomplished offline or online. With previous types of ControlLogix processors (1756-L6x or 1756-L5x) I/O configuration is offline only.

Offline I/O Configuration

Right mouse click on the I/O Configuration folder in the Controller Organizer window.

Select New Module

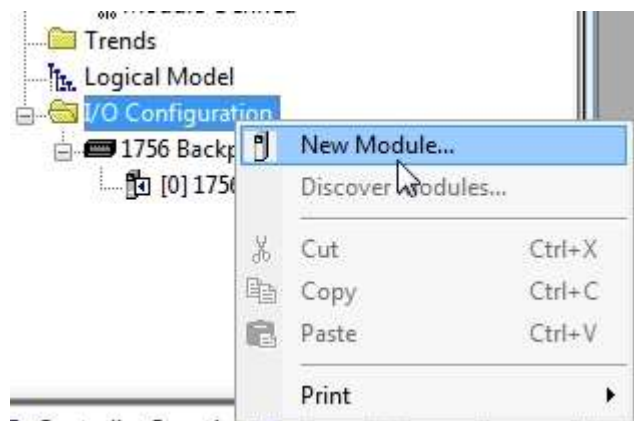


Figure 19-A

On the Select Module Type screen - Click the Show Filters button in the upper right corner of the screen.

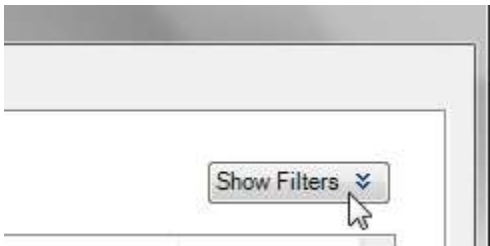


Figure 20-A

Select only Digital check box in the Module Type Category Filters area of the screen. Catalog Numbers are now only for Digital type of I/O modules.

Select 1756-IB16 – This matches part number of module in slot 2 of Demo Board.

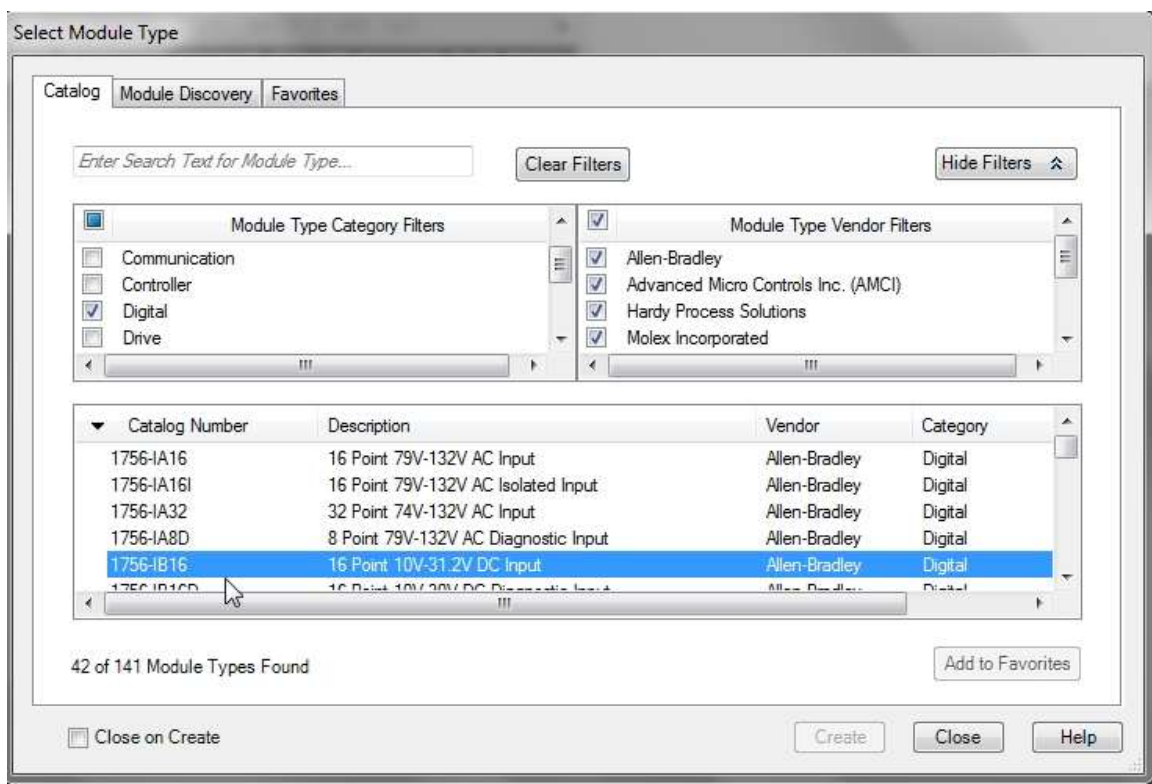


Figure 21-A

Double Click 1756-IB16 and on the Select Major Revision screen select 3 for Major Revision

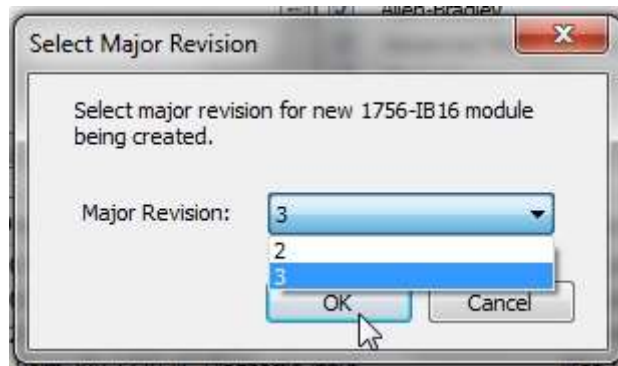


Figure 22-A

Note: I/O module part number and revision information can be found on RSWho screen in RSLinx.

Click OK button

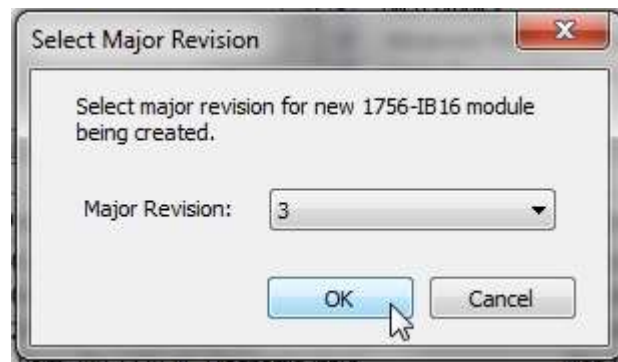


Figure 23-A

On the New Module screen name the module and change slot as shown in Figure 24-A.

Name – Slot2 (use Studio 5000 naming rules – See page 9)

Slot – is the slot location in the chassis where the module is

located. Slot 2 on Demo Board layout.

See Figure 24-A

Click the OK button

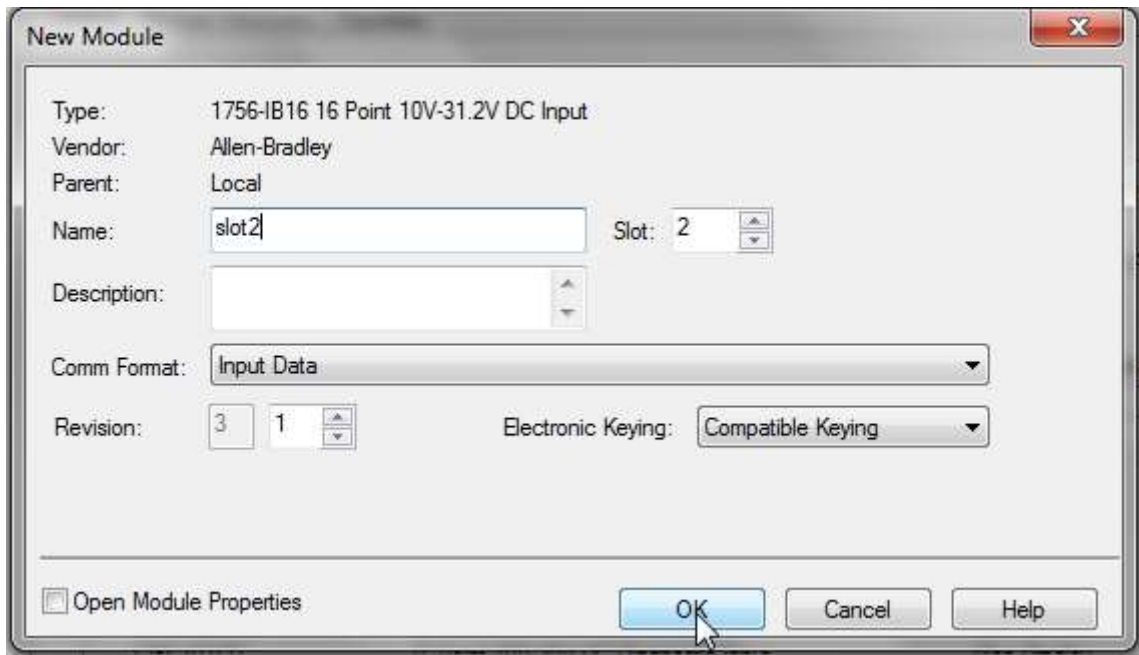


Figure 24-A

In the Controller Organizer window – I/O Configuration folder – verify [2]1756-IB16 slot2 is in the configuration list.

[2] – Slot location

1756-IB16 module part number

slot2 – module name

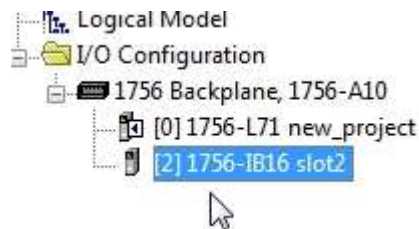


Figure 25-A

In the Controller Organizer window – navigate to Controller Tags listed under Controller folder.

See Figure 26-A



Figure 26-A

Double click – Controller Tags to open tag screen

Local:2:C and Local:2:I are tag categories for the 1756-IB16 module.

Scope: new_project		Show: All Tags					
Name	Value	Force Mask	Style	Data Type	Description		
+ Local:2:C	{...}	{...}		AB:1756_DI:C:0			
+ Local:2:I	{...}	{...}		AB:1756_DI:I:0			

Figure 27-A

Local – module located in same chassis as processor

2 – slot location in chassis

C – configuration data

I – Input data

To close the tag screen – navigate to the upper right corner of the Studio 5000 screen.

Click the lower x button

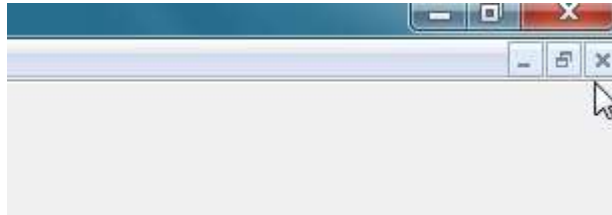


Figure 28-A

Note: upper (Red) x will close the Studio 5000 application

Online I/O Configuration

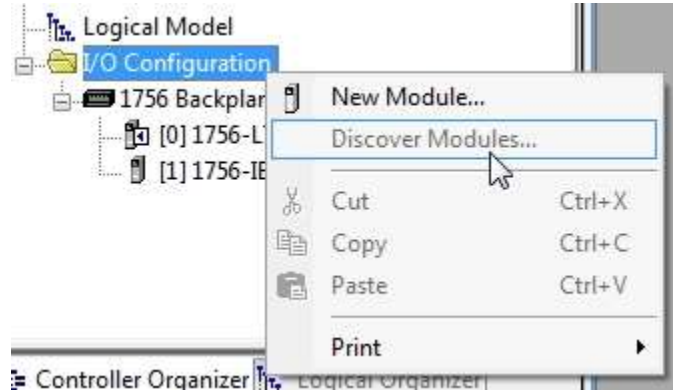


Figure 29-A

Click New Module to open Select Module Type screen

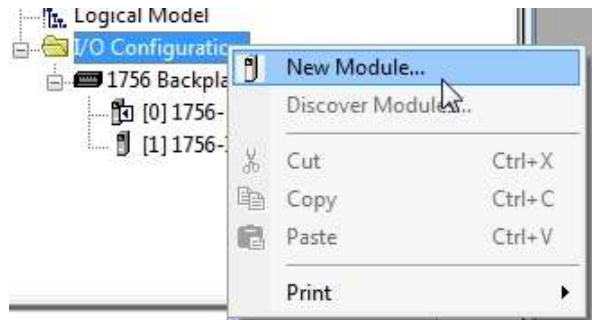


Figure 30-A

Click Module Discovery tab

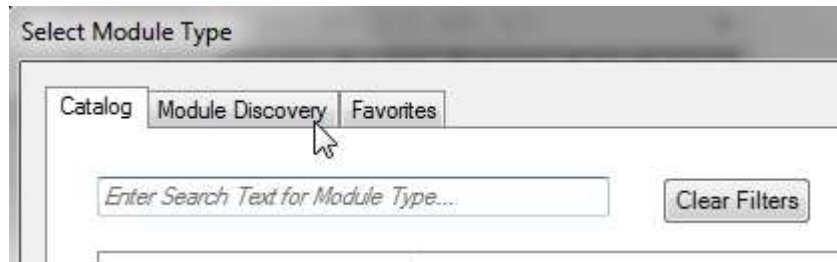


Figure 31-A

Must be online to use Module Discovery

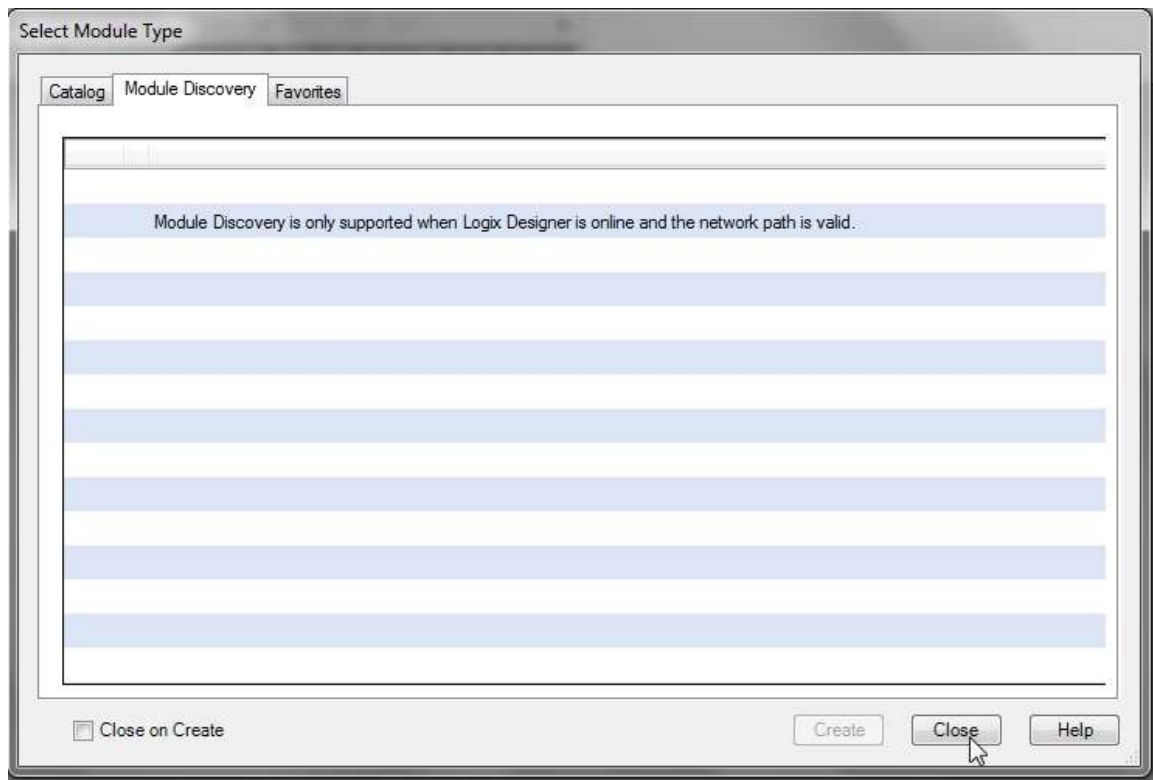


Figure 32-A

Click Close button

Choose File -> Save to save project file

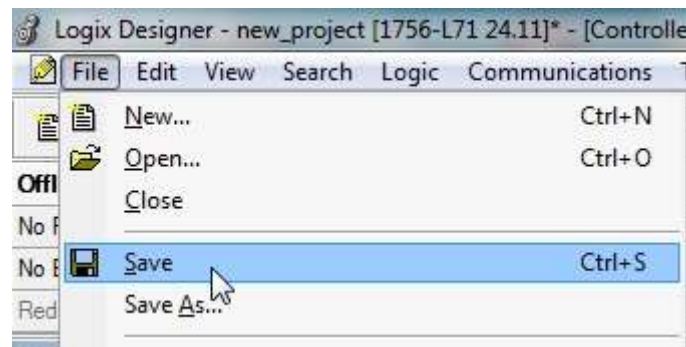


Figure 33-A

Navigate to Path toolbar and click the Who Active button.



Figure 34-A

From the Who Active screen

Using AB_ETHIP-1 driver – Select Ethernet module that matches the Ethernet address of module in Demo Board.

Click + sign to left of Ethernet module

Click + sign to left of Backplane icon

Click on the processor from module list

Click Download button on right side of the Who Active screen.

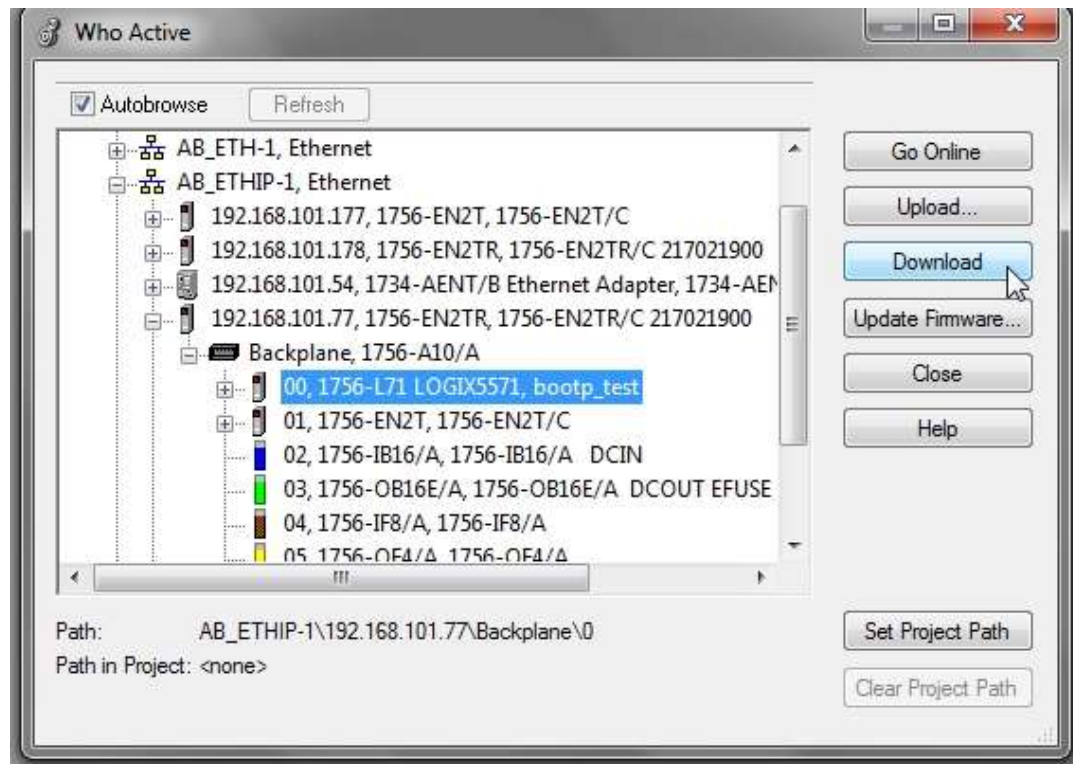


Figure 35-A

Click Download on the bottom of the Download screen

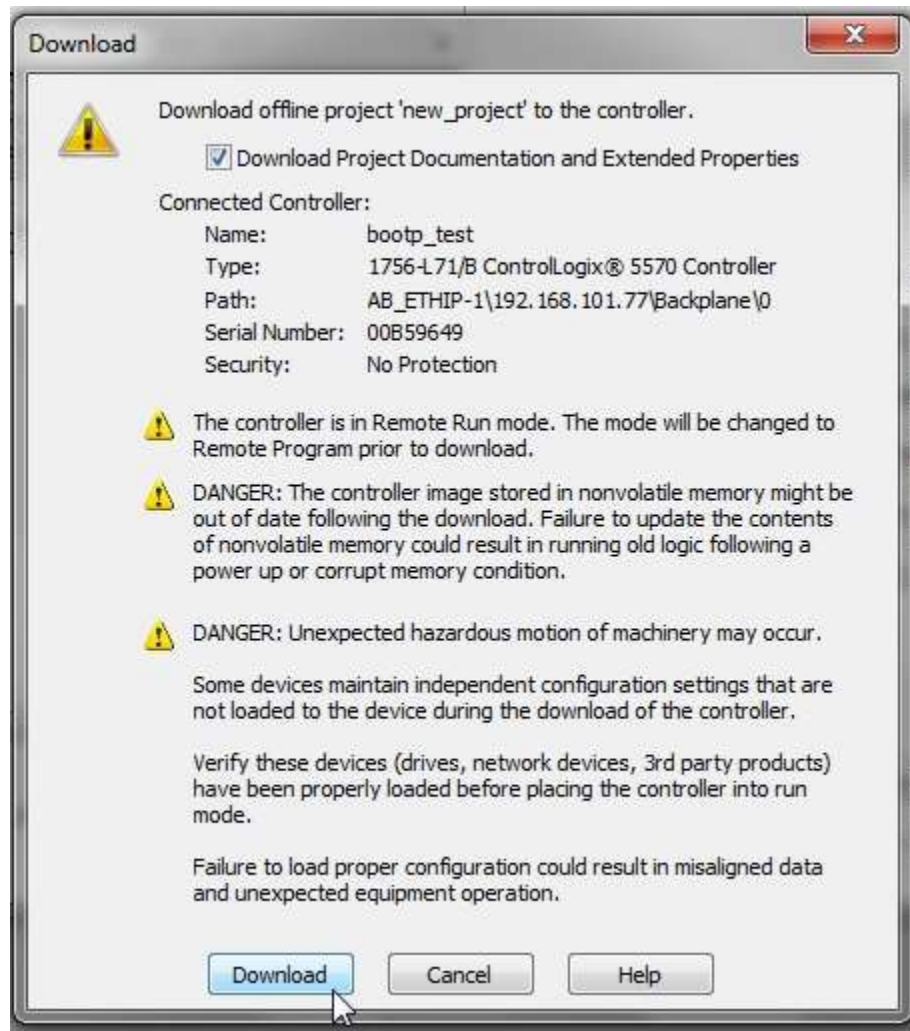


Figure 36-A

Downloading screen shows download status

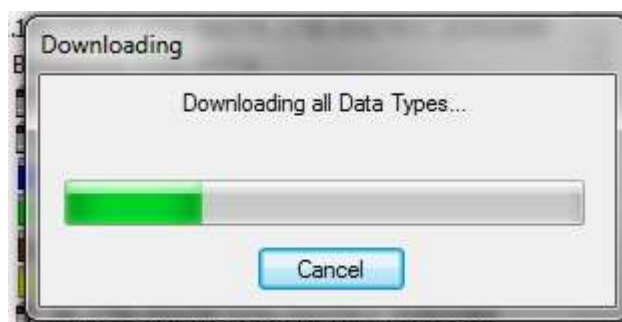


Figure 37-A

If the processor was in RUN mode prior to downloading, the Logix Designer screen can put the processor back into RUN by clicking the Yes button or to leave the processor in PROGRAM mode click No button.

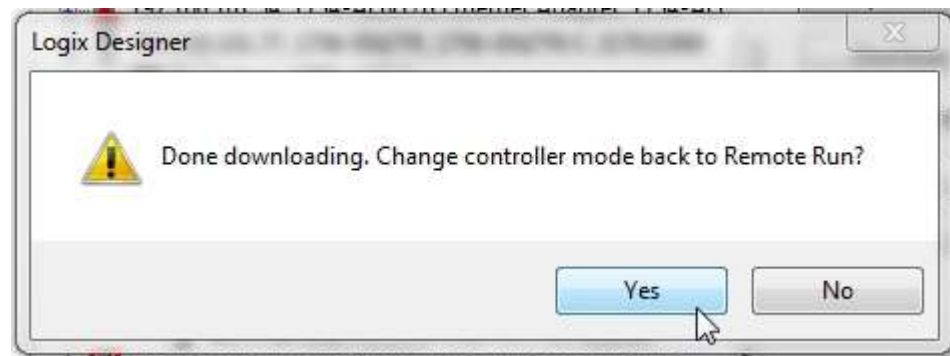


Figure 38-A

From the Task folder in the Controller Organizer window – drill down to MainRoutine.

Double click MainRoutine to open the ladder logic window.

There are no instructions in the MainRoutine.



Figure 39-A

Right mouse click on the I/O Configuration folder in the Controller Organizer window.

Note: Discover Modules is active when online.

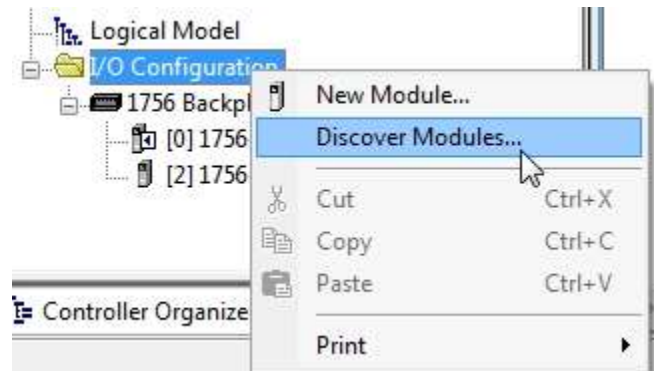


Figure 40-A

Right click or double click Discover Module to open Select Module Type – Module Discovery tab.

Note: Modules in the chassis not listed in I/O Configuration tab have Create button in action column

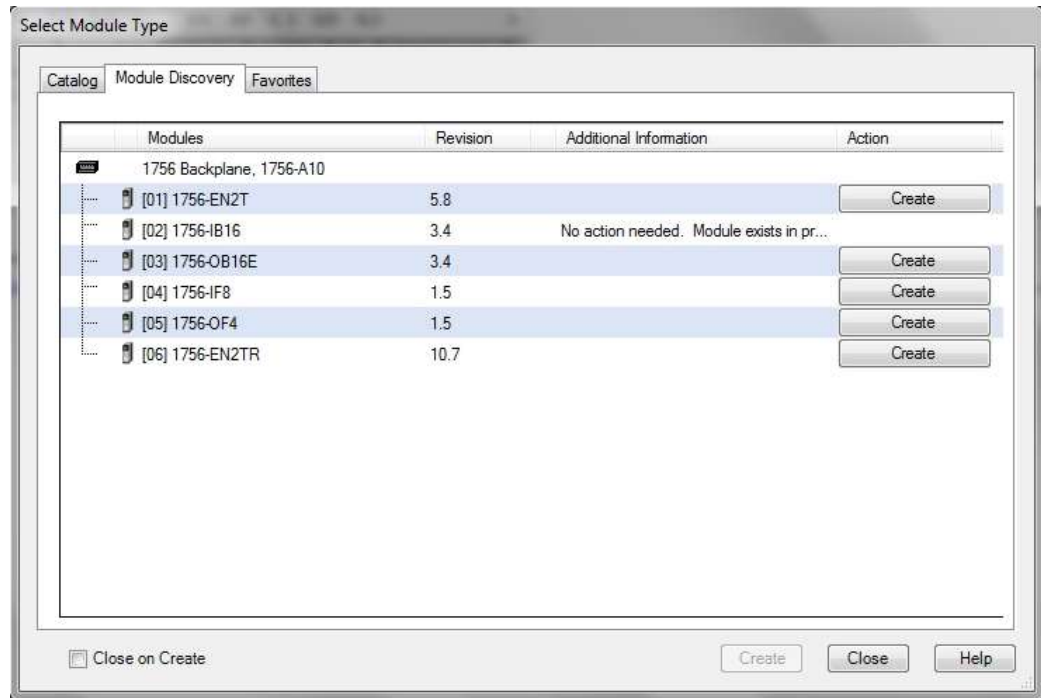


Figure 41-A

Note: 1756-IB16 module already listed in I/O Configuration – No action needed.

An alternate way to navigate to the Module Discovery tab is to right click on I/O Configuration in the Controller Organizer window.

Click New Module

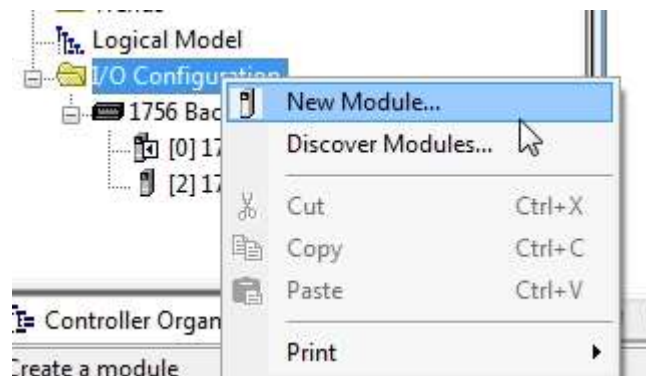


Figure 42-A

On the Select Module Type screen – Click Module Discovery tab

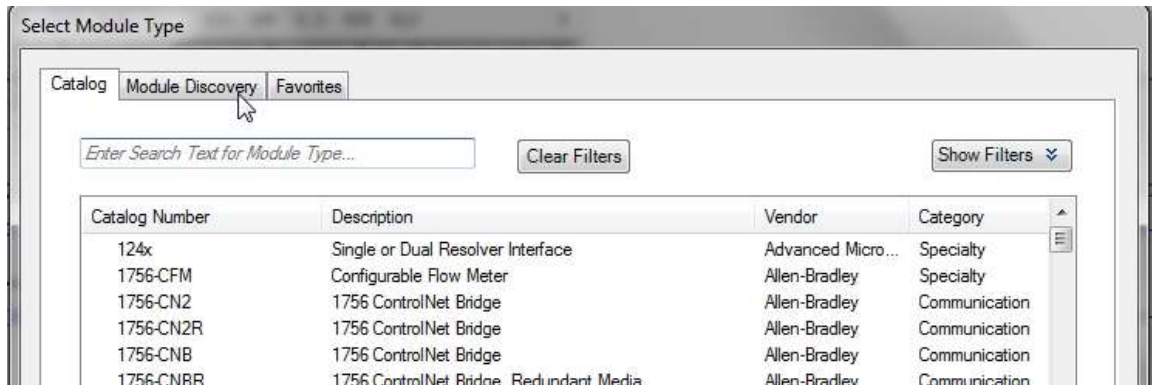


Figure 43-A

A list of modules in the chassis is shown in the Select Module Type screen.

See Figure 44-A.

Note: Figure 44-A is the same screen as Figure 41-A

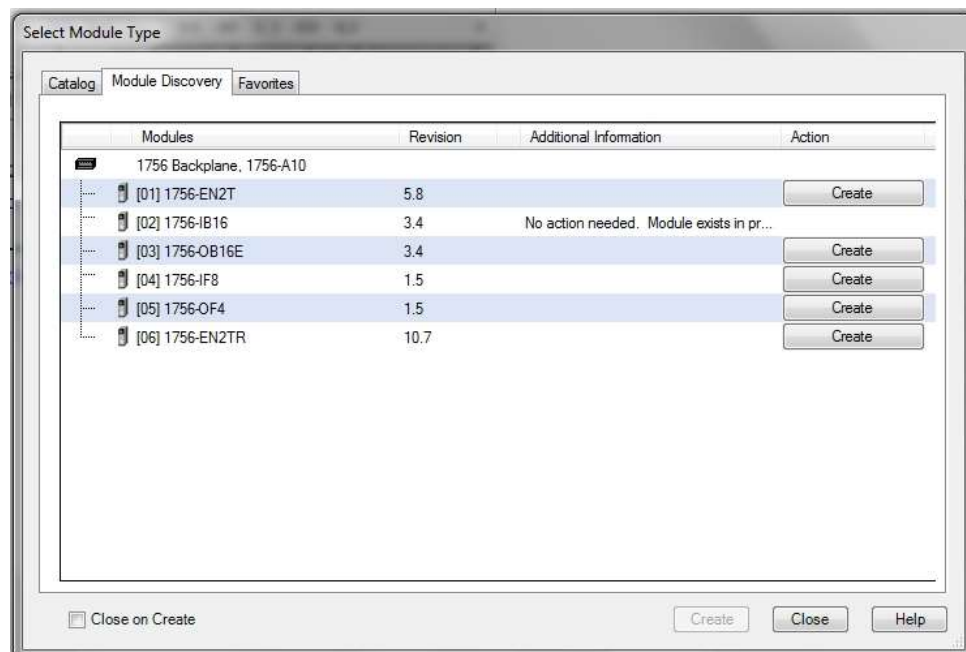


Figure 44-A - Select Module Type

To add a module click the Create button in the Action column.

For this example the module in Slot 3 will be added online

Click the Create button for 1756-OB16E

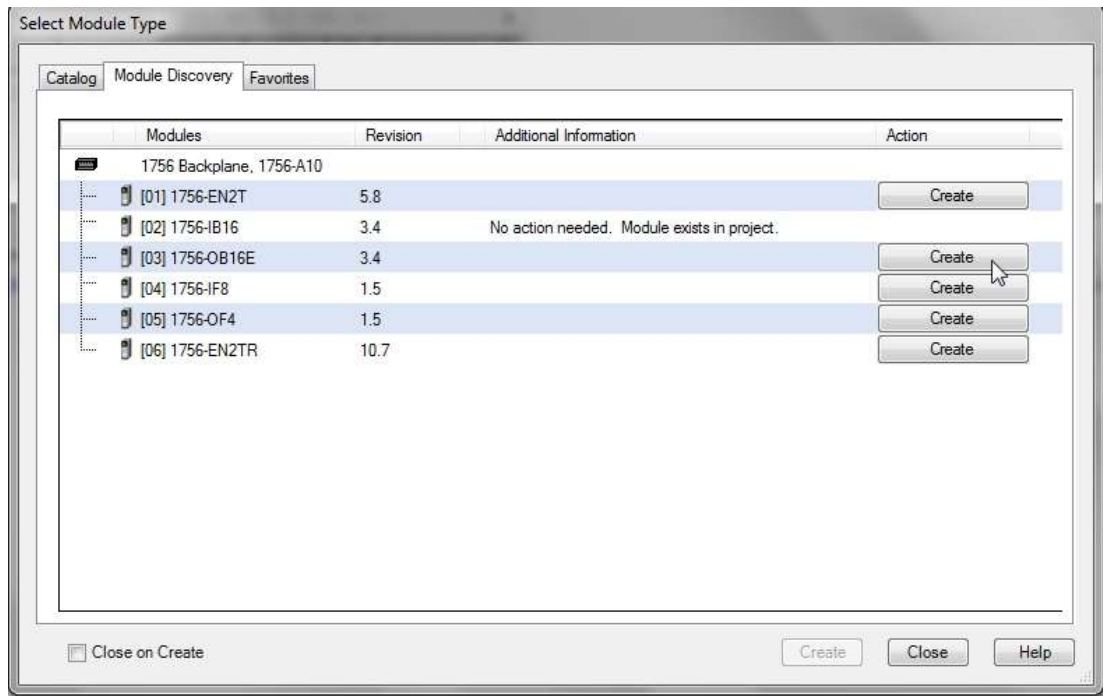


Figure 45-A

Fill –in Name for module as shown in Figure 46-A

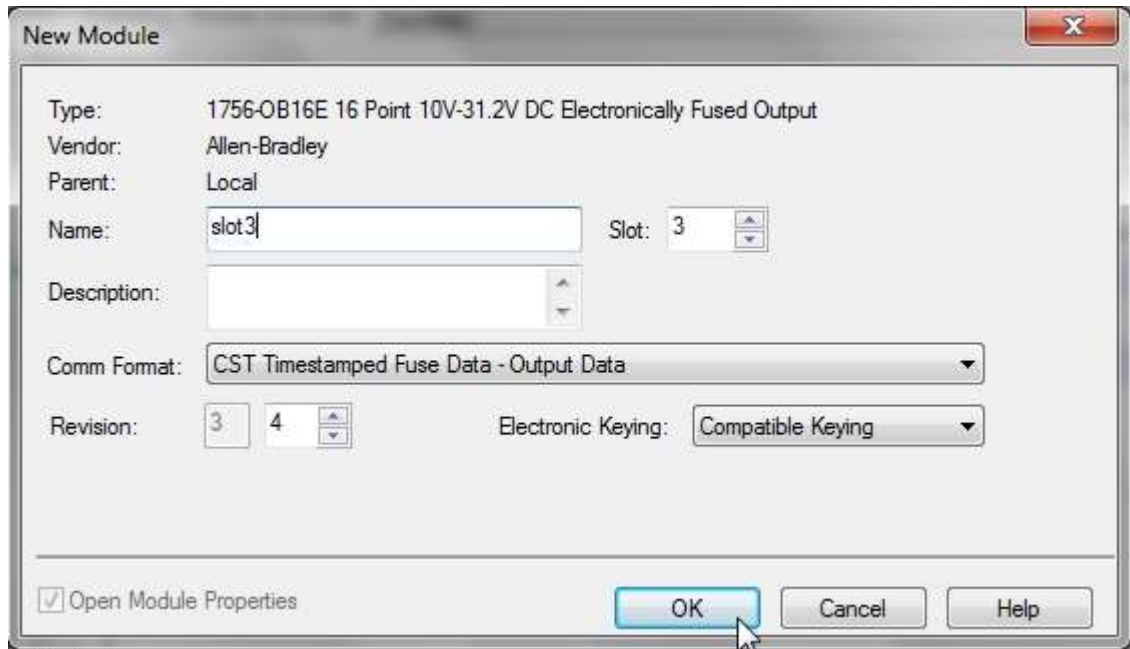


Figure 46-A

Click the OK button

Note: Danger warning when creating module online



Figure 47-A

Click OK Button

If Module Properties Report screen opens

Click OK to close

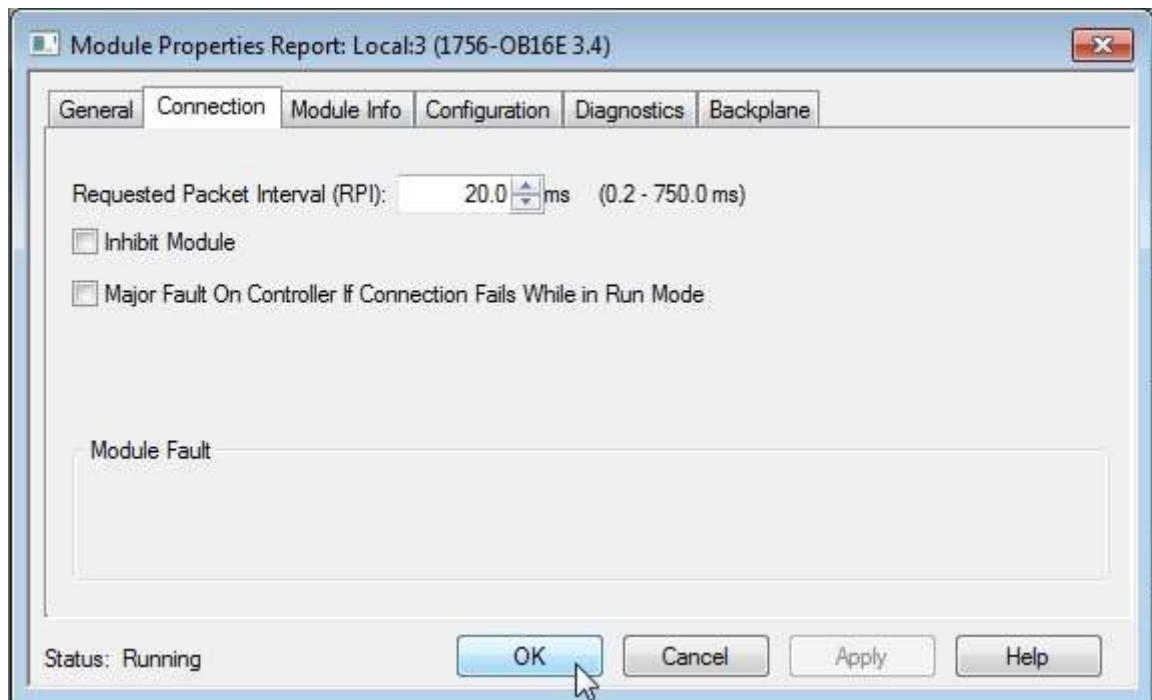


Figure 48-A

Module is now in the I/O Configuration folder

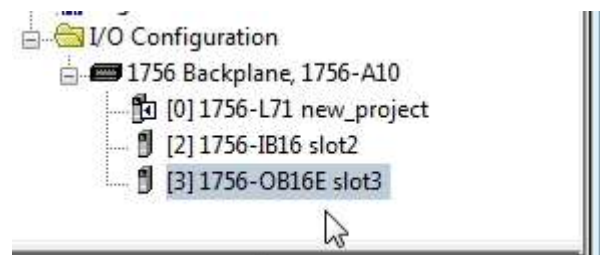


Figure 49-A



Figure 50-A

Double click – Controller Tags to open tag screen

Local:2:C and Local:2:I are tag categories for the 1756-IB16 module.

Local:3:C, Local:2:I and Local:2:O are tag categories for the 1756-OB16E module.

Scope: new_project		Show: All Tags		Enter Name Filter..			
	Name	Value	Force Mask	Style	Data Type	Description	
+	Local:2:C	{...}	{...}		AB:1756_DI:C:0		
+	Local:2:I	{...}	{...}		AB:1756_DI:I:0		
+	Local:3:C	{...}	{...}		AB:1756_DO:C:0		
+	Local:3:I	{...}	{...}		AB:1756_DO_Fus...		
+	Local:3:O	{...}	{...}		AB:1756_DO:O:0		

Figure 51-A

Controller Tags

To close the tag screen – navigate to the upper right corner of the Studio 5000 screen.

Click the lower x button

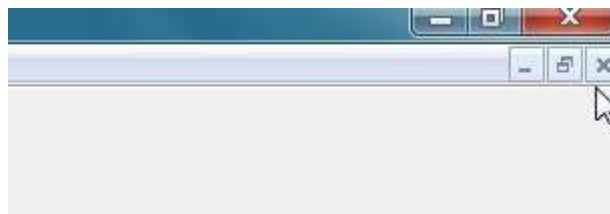


Figure 52-A

Note: upper (Red) x will close the Studio 5000 application

Navigate to I/O Configuration tab

Right mouse click on the I/O Configuration folder in the Controller Organizer window.

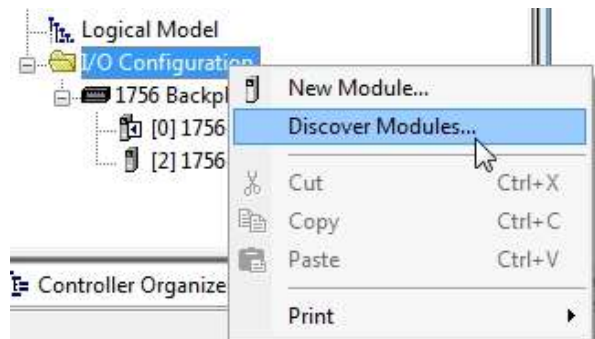


Figure 53-A

Right click or double click Discover Module to open Select Module Type – Module Discovery tab.

Note: 1756-OB16E no longer has Create button since it is now in the I/O Configuration list.

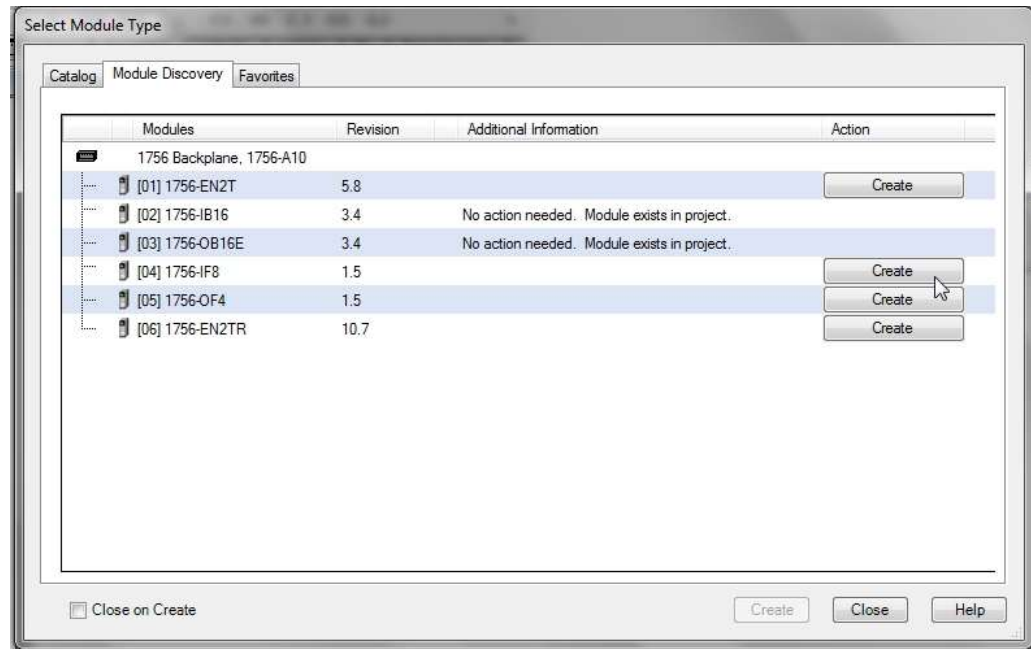


Figure 54-A

Repeat Module Discovery to add additional modules online

Note: Module can be added manually online by choosing

I/O Configuration -> New Modules

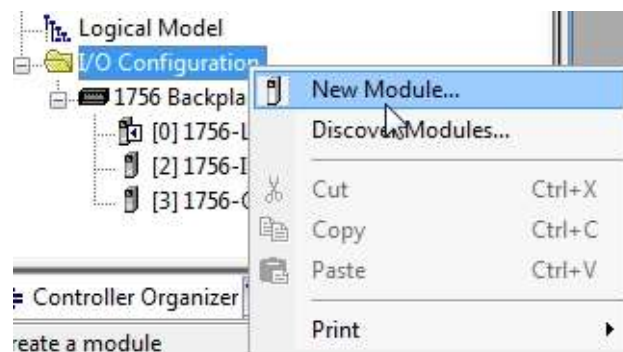


Figure 55-A

The process will follow the steps outlined in Offline I/O Configuration page 15.

Module can be deleted online as long as none of the modules tags are being referenced by processor instructions

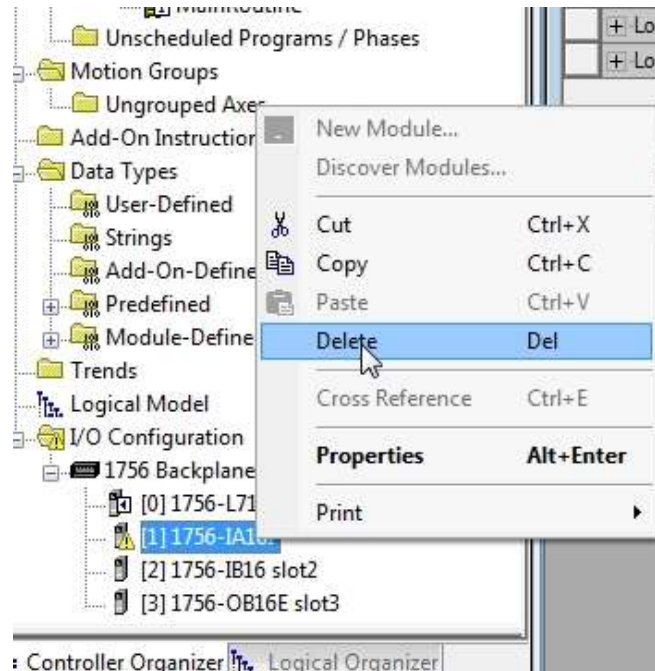


Figure 56-A

In the I/O Configuration folder – Right click module to be deleted and click Delete

Confirm the deletion by clicking Yes

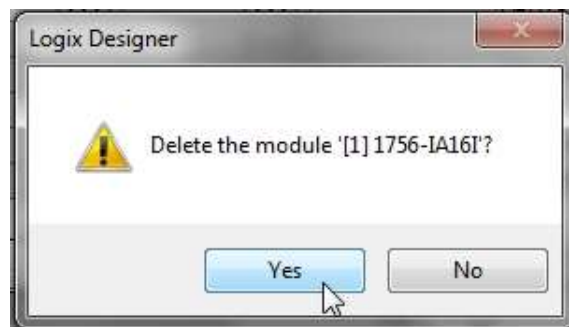


Figure 57-A

The module is no longer list in the I/O Configuration folder

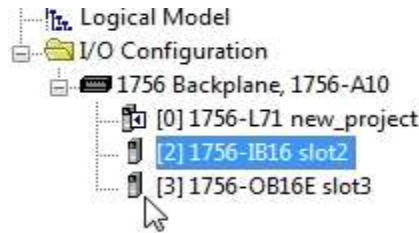


Figure 58-A

Save Online changes

From the Menu bar – Select File -> Save As

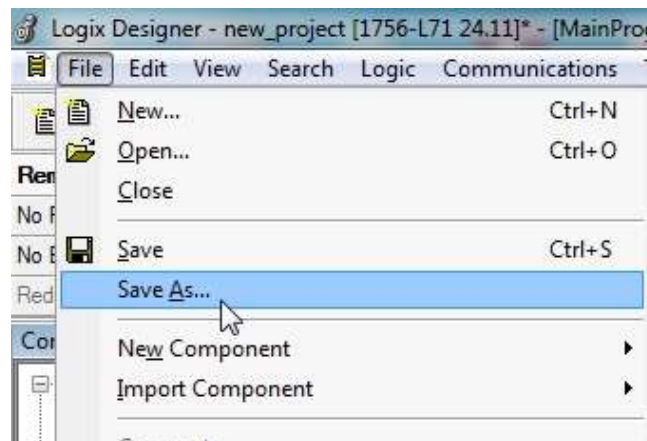


Figure 59-A

Click Yes to Save changes made online

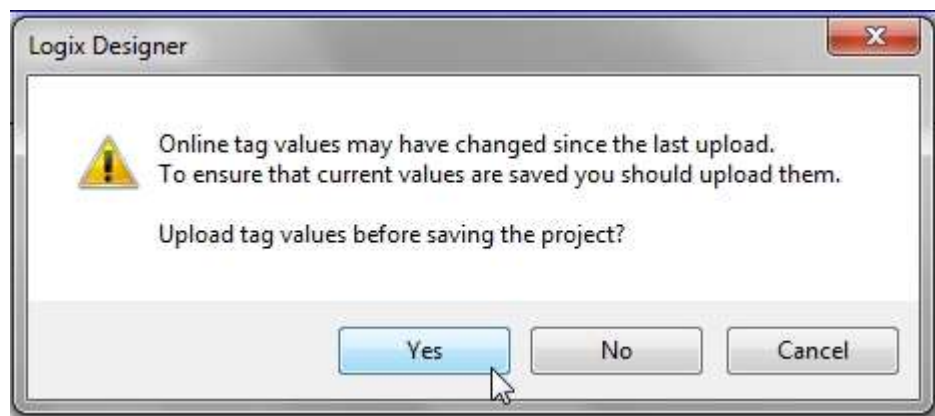


Figure 60-A

Click the icon on processor mode button

- Green if processor is in RUN mode
- Light Blue if processor is in PROGRAM mode
- Yellow if processor is in TEST mode

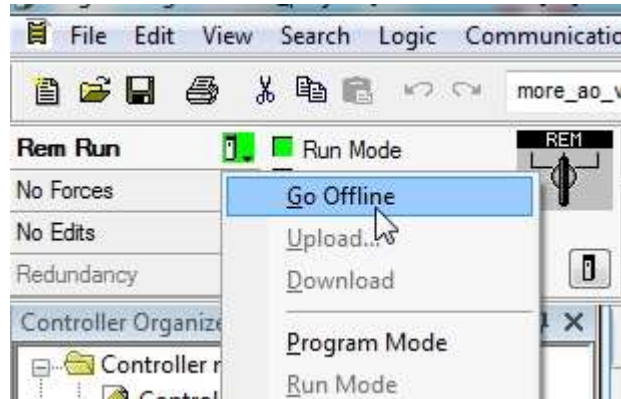


Figure 61-A

Click Go Offline

Studio 5000 will be taken Offline and the computer is on longer monitoring processor.

The mode button on the Online toolbar indicate Offline



Figure 62-A

Adding Ladder Instructions

From the Task folder navigate to MainRoutine

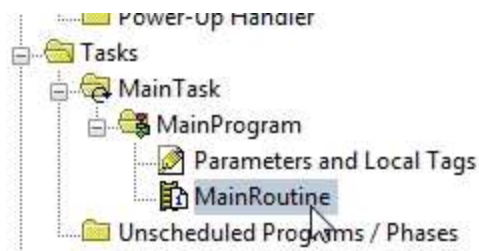


Figure 63-A

Double click MainRoutine to open Ladder window if it is not already opened.

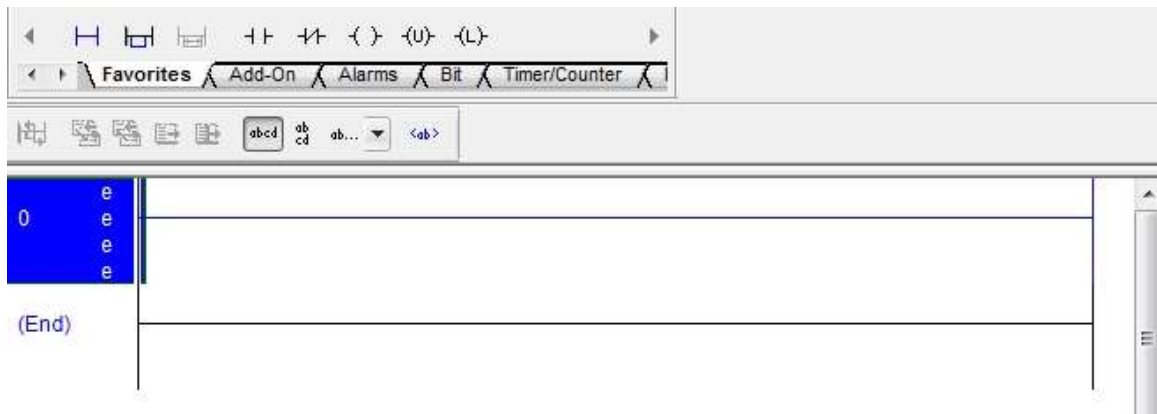


Figure 64-A

From the Language Element toolbar -> Favorite tab drag the XIC instruction (NO contact symbol) and position it on the left side of ladder rung 0.



Figure 65-A

From the Language Element toolbar -> Favorite tab drag the OTE instruction - () symbol- and position it on the right side of ladder rung 0.



Figure 66-A

Rung 0 should appear as shown in Figure 67-A



Figure 67-A

To assign tags to the XIC instruction, click the “?” above the instruction to place a blue rectangle on the “?”.

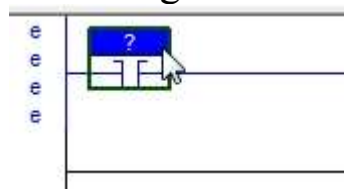


Figure 68-A

Double click the blue rectangle to open a selection box

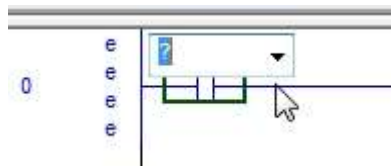


Figure 69-A

Click the down arrow on the selection box to view Show tag window.

Ensure the Show controller tags box is checked.
Click Local:2:I to select input tags for the module in Slot 2.

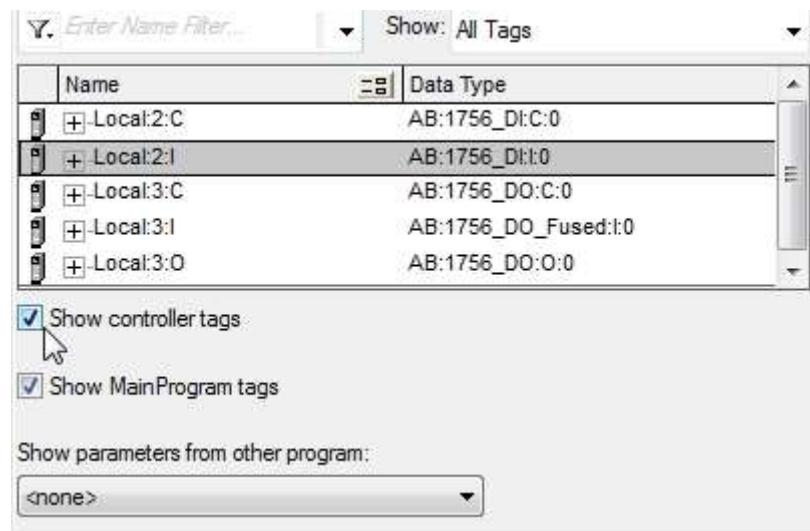


Figure 70-A

Click the “+” sign to the left Local:2:I to expand tag selection.

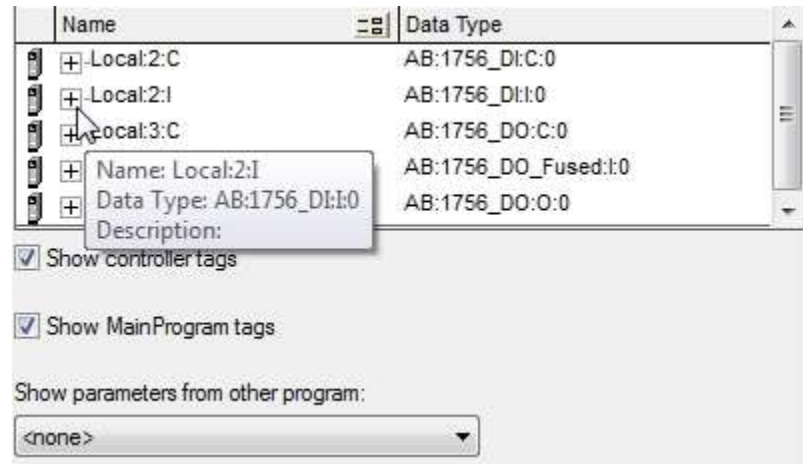


Figure 71-A

On the expanded Local:2:I tree – click Local:2:I.Data
A down arrow appears to the left of DINT

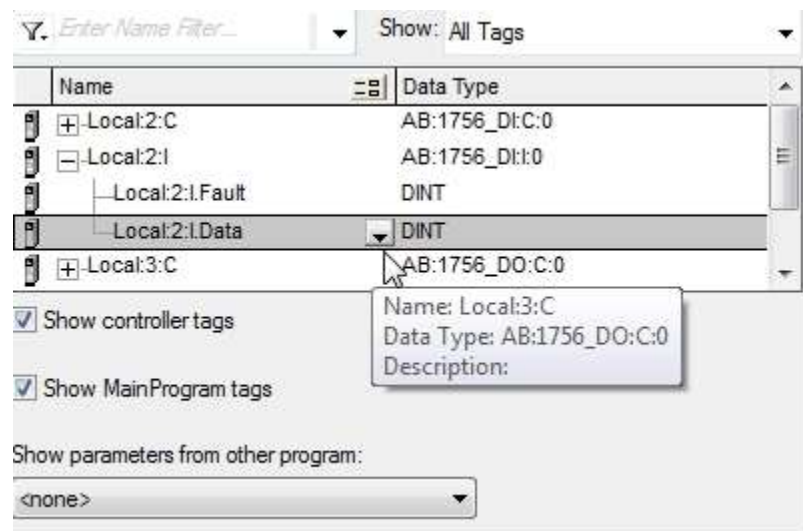


Figure 72-A

Click the down arrow to the left of DINT to view a number pallet 0-31. Sometimes call a Bit Picker screen. These numbers represents the module terminal connections.

Toggle the SS7 switch on the demo board – Note a yellow 7 on the input module faceplate when the switch is providing a voltage signal to terminal 7 on the module. When the module has no voltage on terminal the yellow 7 is off.

Click 7 on the number pallet screen.

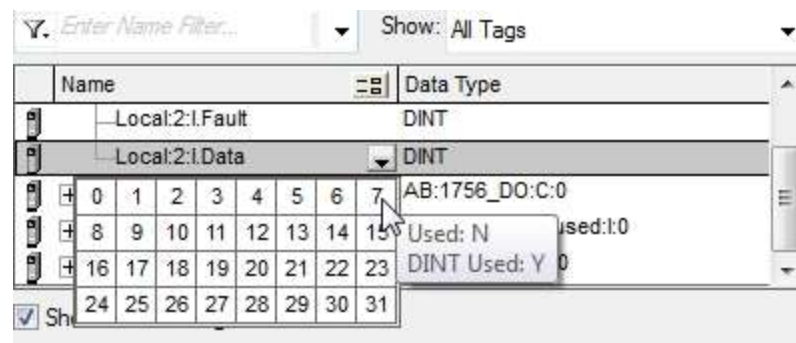


Figure 73-A

Press Enter key on computer keyboard.

The tag – Local:2:I.Data.7 – appears above the XIC instruction. This represents the SS7 switch on the demo board.

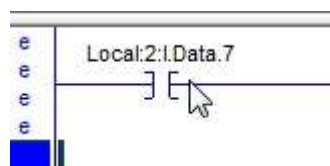


Figure 74-A

Follow the same steps to assign a tag to the OTE instruction (output).

Click the “?” above the OTE instruction to place a blue rectangle on the “?”.

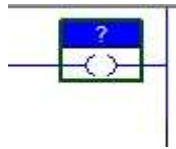


Figure 75-A

Double click the blue rectangle to open a selection box

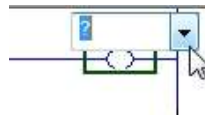


Figure 76-A

Click the down arrow on the selection box to view Show tag window.

Ensure the Show controller tags box is checked.

Click Local:3:O to select output tags for the module in Slot 3

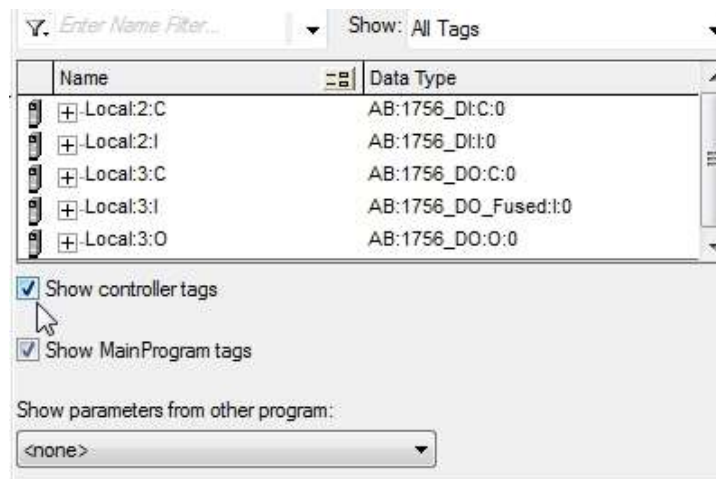


Figure 77-A

Note: The output module in slot 3 has a group of tags – Local:3:I
and a group of tags – Local:3:O

Tags that control the output devices connected to the module in slot 3 use the Local:3:O group.

Click the “+” sign to the left Local:3:O to expand tag selection.

On the expanded Local:3:O tree – click Local:3:O.Data
A down arrow appears to the left of DINT

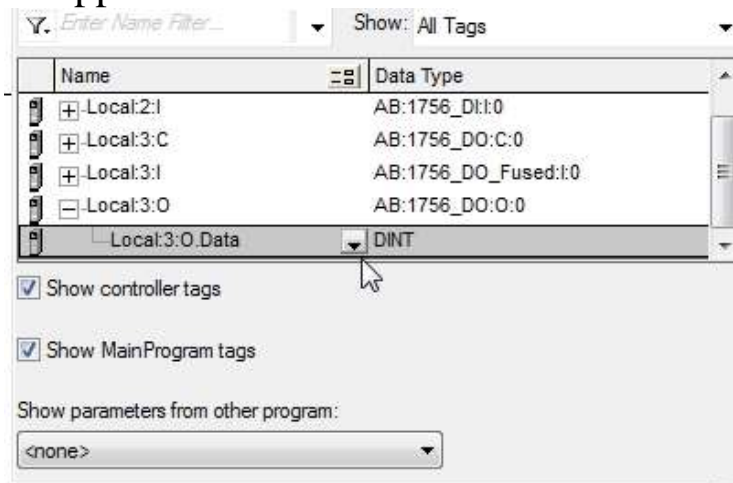


Figure 78-A

Click the down arrow to the left of DINT to view a number pallet 0-31. These numbers represents the module terminal connections.

Click 3 on the number pallet screen.

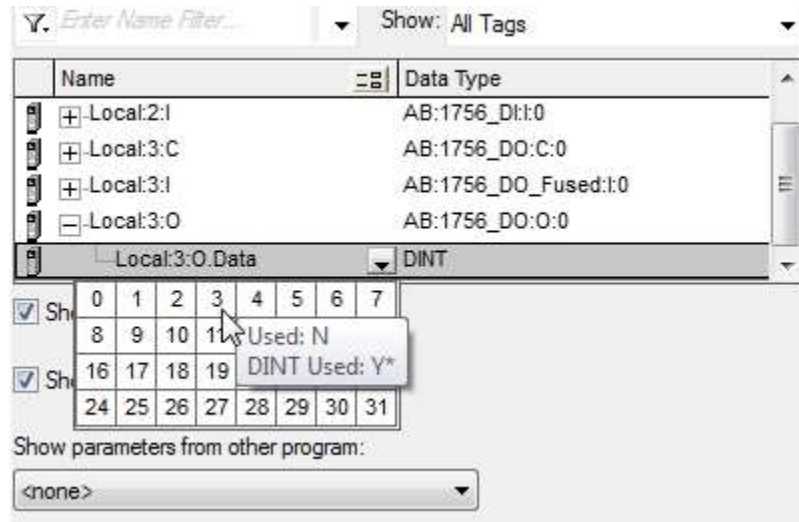


Figure 79-A

Press Enter key on computer keyboard.

The tag – Local:3:O.Data.3 – appears above the OTE instruction.
This represents the PL3 indicator on the demo board.
See Figure 80-A

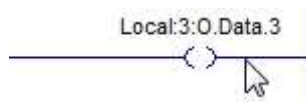


Figure 80-A

Add Tag Descriptions

Place mouse pointer on tag Local:2:I.Data.7
Right click to view the menu show in Figure 81-A.

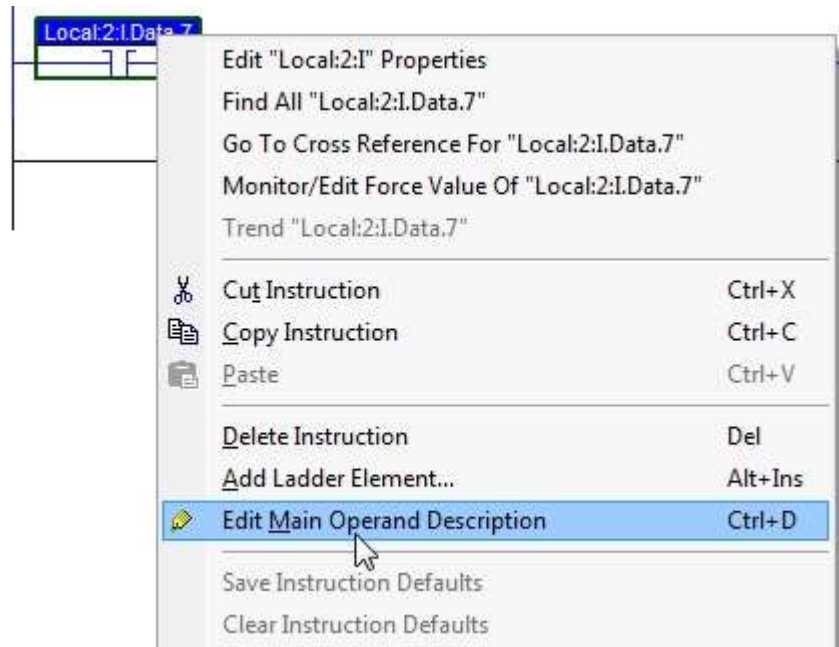


Figure 81-A

Click the Edit Main Operand Description selection to view tag Description editor window

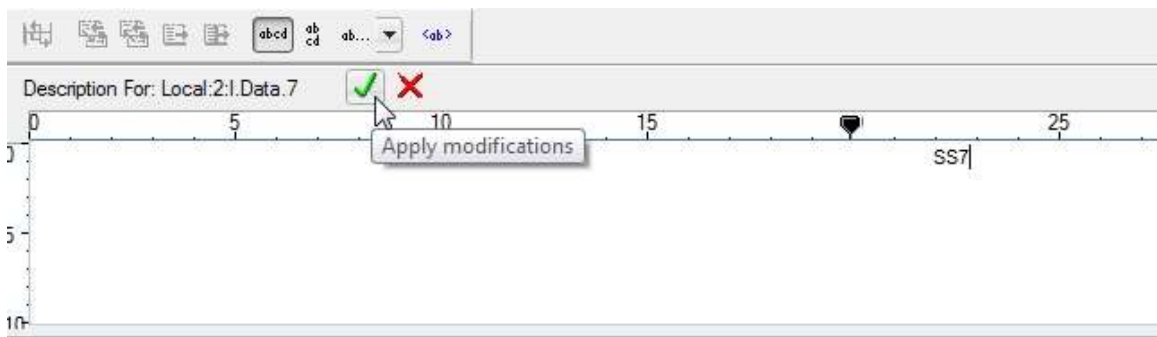


Figure 82-A

Type in a tag description of SS7 in the Description editor window

Click the green check mark (Apply modifications) to assign the description SS7 to the tag Local:2:I.Data.7.

The description SS7 appears above the tag name for the XIC instruction.

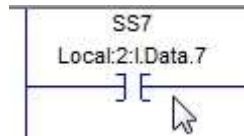


Figure 83-A

Follow the same steps to assign a tag description to the OTE instruction tag Local:3:O.Data.3.

Place mouse pointer on tag Local:3:O.Data.3
Right click to view the menu show in Figure 84-A.

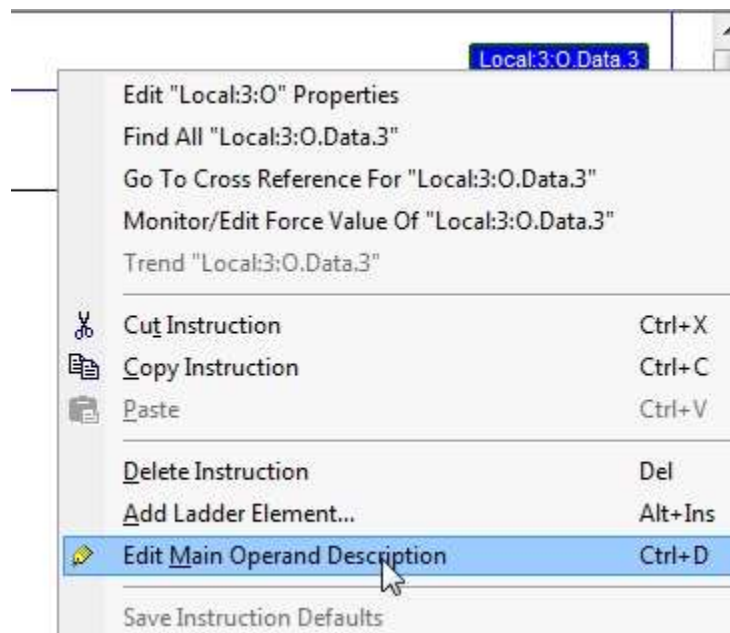


Figure 84-A

Click the Edit Main Operand Description selection to view tag Description editor window

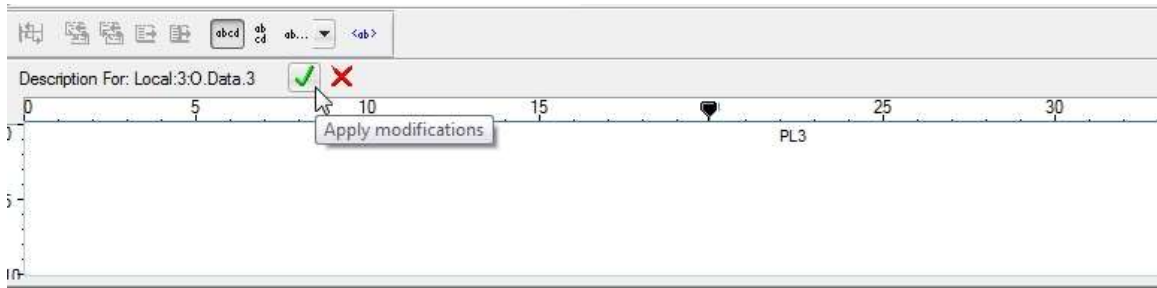


Figure 85-A

Type in a tag description of PL3 in the Description editor window

Click the green check mark (Apply modifications) to assign the description PL3 to the tag Local:3:O.Data.3.

The description PL3 appears above the tag name for the XIC instruction.

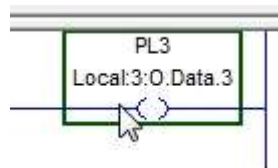


Figure 86-A

From the Menu bar – click File -> Save to save modifications to the project file.

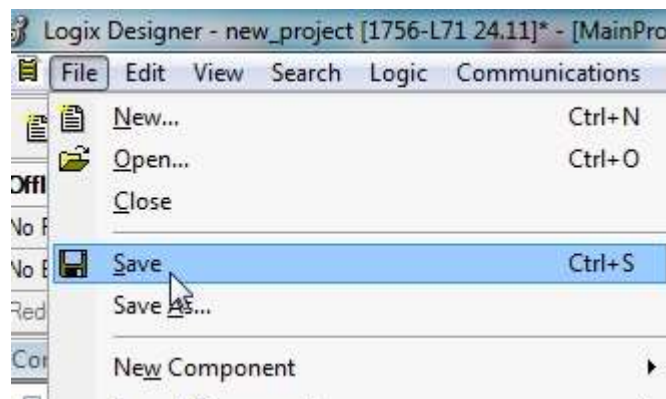


Figure 87-A

Click the Controller Properties button on the Online toolbar.



Figure 88-A

On the Controller Properties window – Click the Project tab.

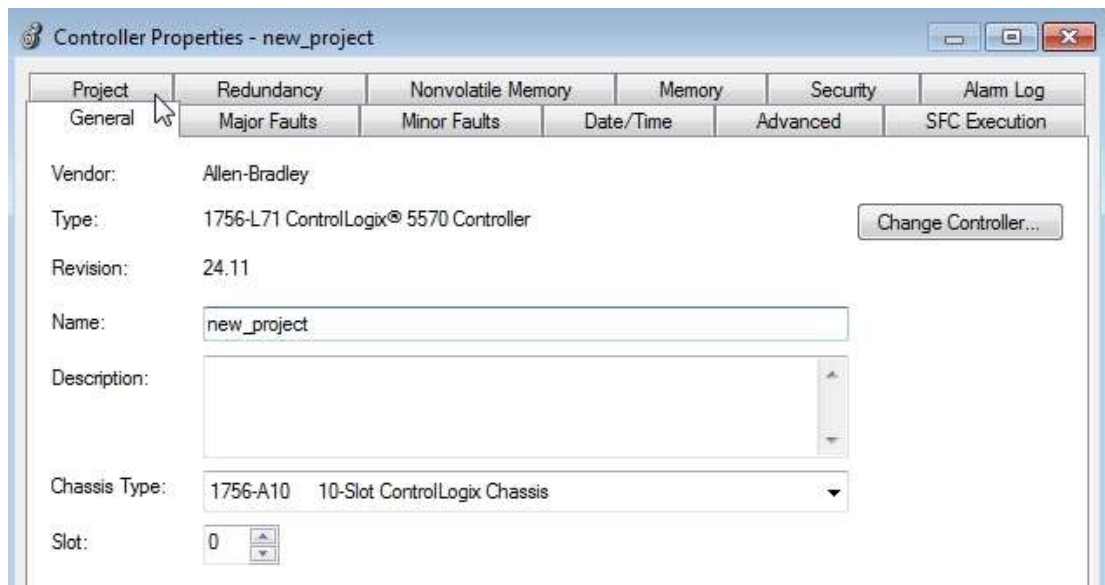


Figure 89-A

On the Project screen verify Download Project Documentation and Extended Properties check box is checked.

See Figure 90-A

When the Download Project Documentation and Extended Properties check box is checked project, documentation (Comments / Descriptions) are downloaded to a 1756-L7x processor.

With previous ControlLogix processors, 1756-L5x and 1756-L6x, and Allen Bradley legacy PLCs – SLC 500 and PLC 5 systems – documentation is stored in the offline project file and is not downloaded to the processors.

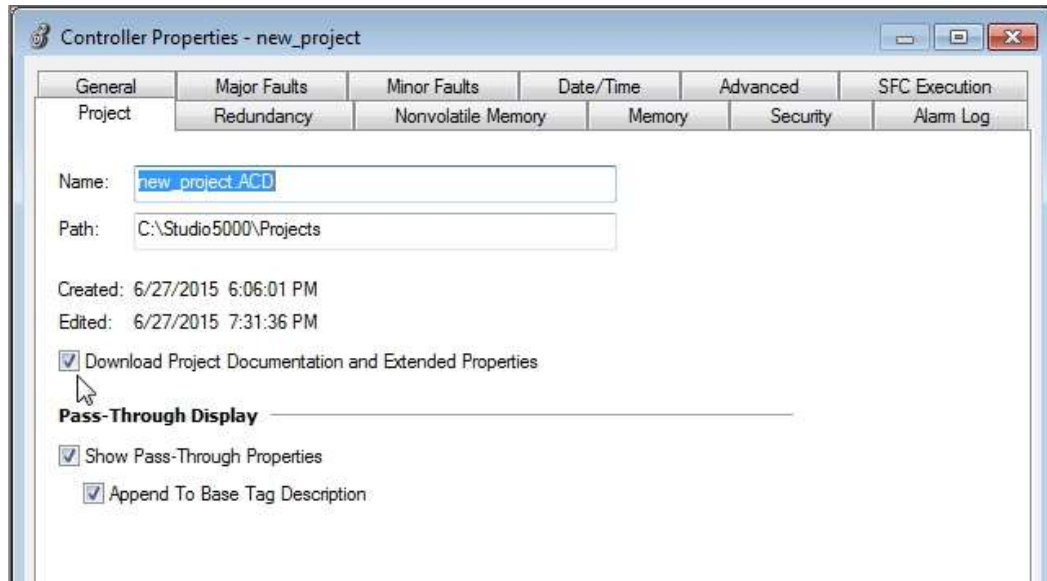


Figure 90-A
Download Project Documentation and Extended Properties
Check Box

Click the OK button to close Controller Properties window.

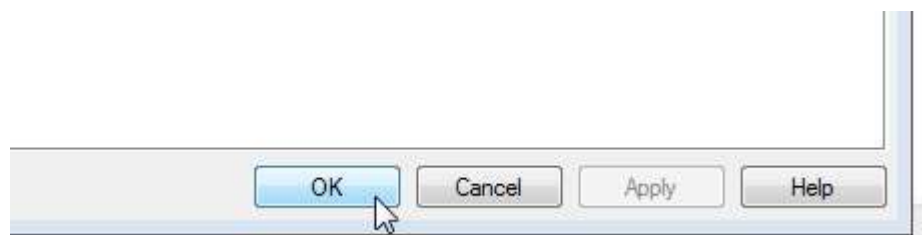


Figure 91-A

Download Project to Processor

Navigate to Path toolbar and click the Who Active button.



Figure 92-A

From the Who Active screen

Using AB_ETHIP-1 driver – Select Ethernet module that matches the Ethernet address of module in Demo Board.

Click + sign to left of Ethernet module

Click + sign to left of Backplane icon

Click on the processor from module list

Click Download button on right side of the Who Active screen.

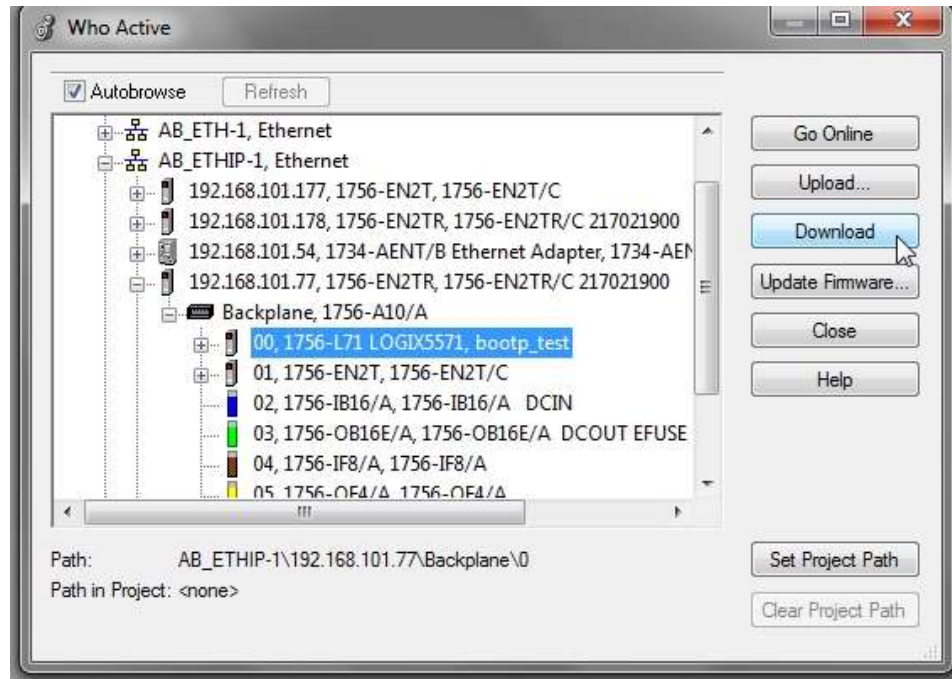


Figure 93-A

Click Download on the bottom of the Download screen

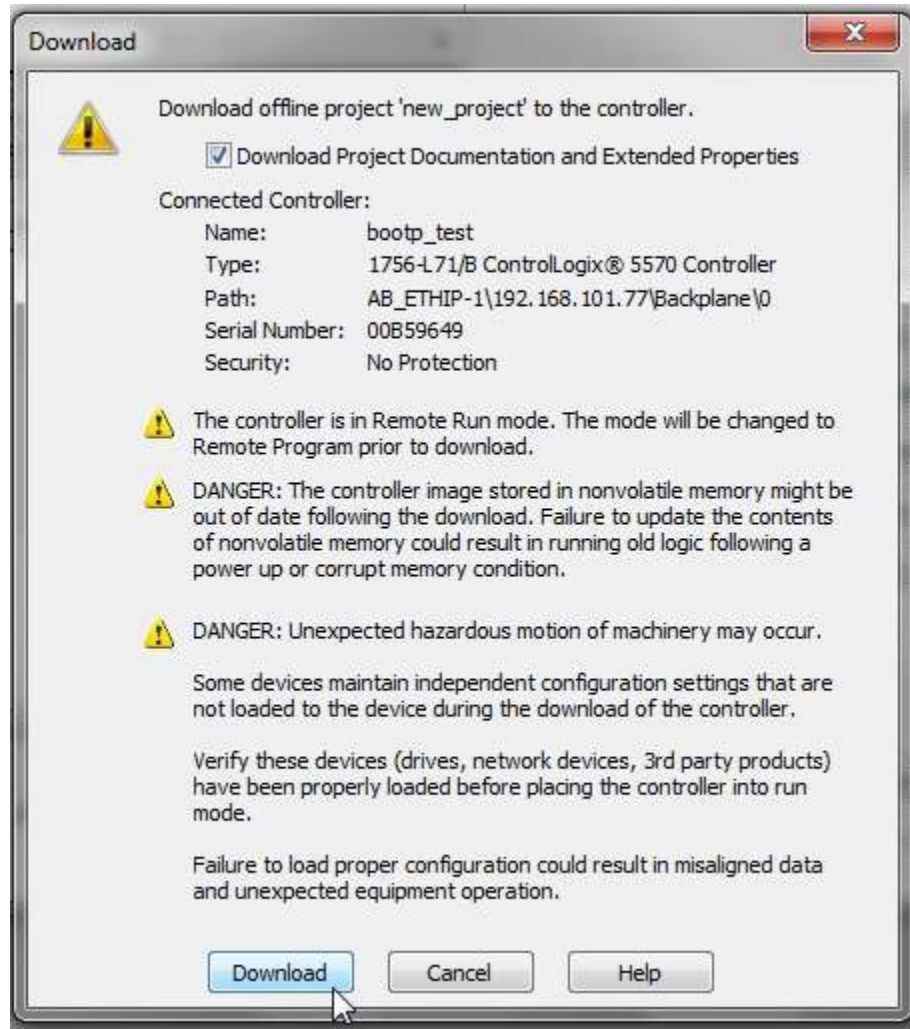


Figure 94-A

Downloading screen shows download status

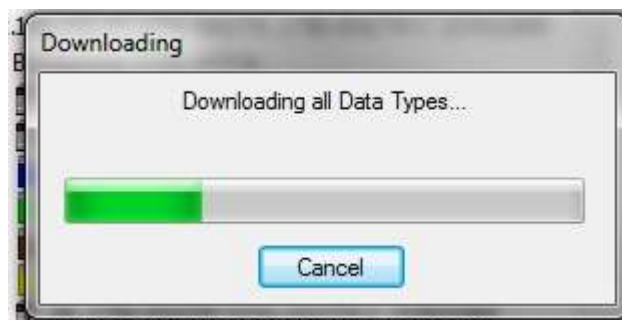


Figure 95-A

If the processor was in RUN mode prior to downloading, the Logix Designer screen can put the processor back into RUN by clicking the Yes button or to leave the processor in PROGRAM mode click No button.

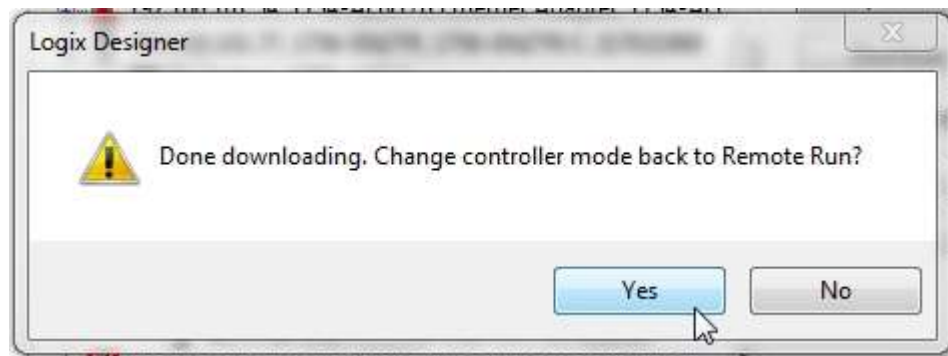


Figure 96-A

View Ladder Logic window

Toggle SS7 switch on the demo board

SS7 turned to left - PL3 indicator OFF

SS7 turned to right – PL3 indicator ON

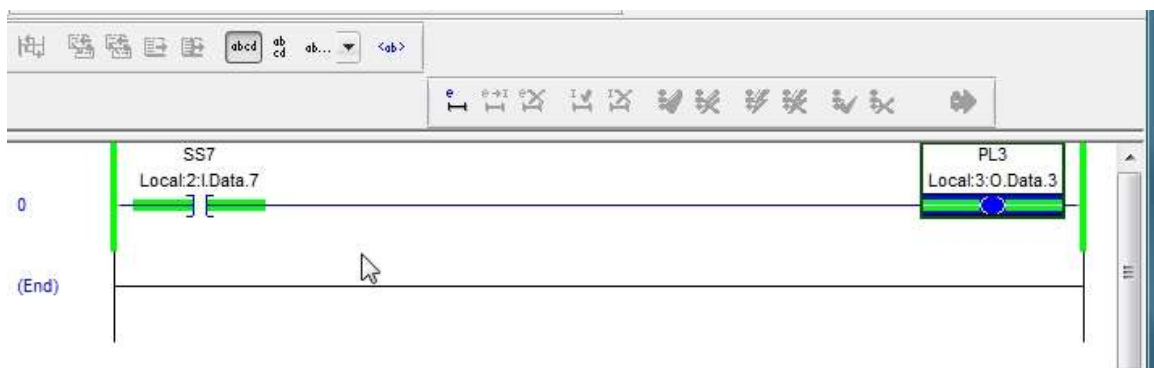


Figure 97-A

Compare Online toolbar information in Studio 5000 software to 1756-L71 processor faceplate information.

The display on the 1756-L7x processor shows the processor name if every is correctly configured

Note; The display will scroll error information if there are processor faults or configuration errors.

When there are no errors or faults processor OK indicator - solid green.

When processor is in RUN mode - RUN indicator – solid green

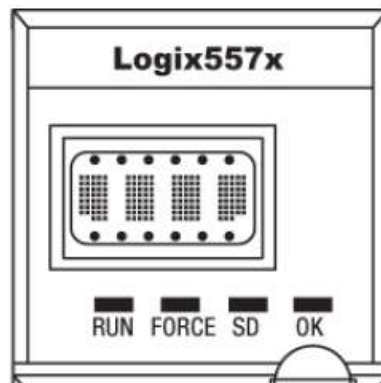


Figure 98-A
1756-L7x Faceplate

When there are no errors or faults processor Controller OK indicator - solid green.

When processor is in RUN mode - RUN Mode indicator – solid green



Figure 98-A
Studio 5000 Online Toolbar

Review Questions

1. **T F The controller tags will be sent to the PLC during a download.**

2. **The designation in the Controller Organizer window that indicates that an object can be expanded out (there are sub-objects) is:**
 - a) A “+” sign.
 - b) A “-“ sign.
 - c) A folder.
 - d) An asterisk “*”.

3. **The command used to designate the transfer of a program from the Project Directory to the PLC.**
 - a) Download
 - b) Upload
 - c) Online
 - d) Verify

4. **T F RSLinx must be running in order to go Online to a ControlLogix processor with Studio 5000.**

5. **While viewing a project file Online to a processor with Studio 5000, what data on the screen is could be from the project file on the hard drive?**
- a) Ladder Logic
 - b) Data Values
 - c) Tags
 - d) None of the above
6. **T F When a project file is downloaded to a ControlLogix processor, the machine the processor is running will be shut down.**
7. **T F The project file can be downloaded to a PLC, if the PLC is in RUN mode.**
8. **T F When a project file is uploaded from an ControlLogix processor, the machine the processor is running will be shut down.**
9. **T F ControlLogix manuals are included in the Help**

files.

10. T F Typically a .ACD file will be smaller in size than a .L5K file, for a given project.

11. Valid file types used with Studio 5000 software are

- a) .ACD
- b) .L5K
- c) .L5X
- d) .RSS

12. The Controller Properties button is located on which toolbar

- a) Path
- b) Online.
- c) Standard
- d) Language Element.

Review Question Answers:

1) T

2) a

3) a

4) T

5) d

6) T

7) F

8) F

9) T

10) F

11) a, b, c

12) b



STRENGTHENING
COMMUNITY COLLEGES
TRAINING GRANTS

DOL DISCLAIMER:

The document was originally created under “I AM iSTAR” a DOL funded project and used in this SCC project. “This workforce product was funded by a grant awarded by the U.S. Department of Labor’s

Employment and Training Administration. The product was created by the grantee and does not necessarily reflect the official position of the U.S. Department of Labor. The U.S. Department of Labor makes no guarantees, warranties, or assurances of any kind, express or implied, with respect to such information, including any information on linked sites and including, but not limited to, accuracy of the information or its completeness, timeliness, usefulness, adequacy, continued availability, or ownership. This product is copyrighted by the institution that created it.”



This work is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/).