

Lab 5.2: Using Logix Designer to Create a ControlLogix Project

Upon completion of this lab exercise the student should be able to:

1. Create a new project for the ControlLogix system using Logix Designer
2. Configure the I/O for a ControlLogix project
3. Create Alias Tags that are linked to Controller Tags
4. Create a ladder routine made up of relay type instructions using Logix Designer
5. Verify and Save the project to the computer
6. Download and go Online to the controller
7. Monitor the data in a BOOL type of tag

***This lab could be performed in the Terra PLC Lab.**

Part 1: Create a ControlLogix Project

1. Figure 1 the rung that will be created using Studio 5000 Logix Designer, then downloaded into the ControlLogix controller. View the following videos to see the steps required to create this project.

Intro to Logix Designer Software 051023: <https://youtu.be/D0mj4wxjfe0>

Creating a ControlLogix Project 051123: https://youtu.be/rVq7M57_miI

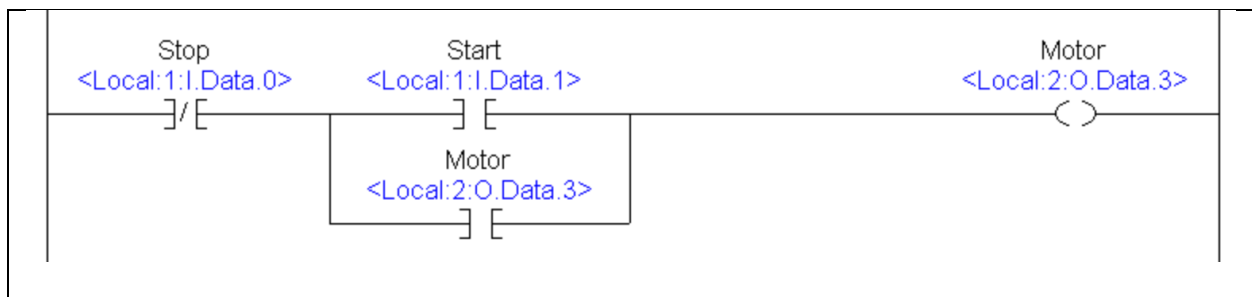


Figure 1. The rung of logic in the Main Routine.

Important: In this routine, the first pushbutton on this trainer is wired normally open, so to simulate a stop pushbutton, an XIO is used. If the pushbutton on the training unit is wired normally closed, an XIC would be used for the Stop instruction on this rung.

Also Important: In this project, the tags named: Stop, Start and Motor, are Alias tags, which do not hold values, but instead point to a Base tag which holds a value. As an example: Local:1:I.Data.0 is the Base Tag which holds a value of 0 or 1 (based on the voltage level of

input terminal 0 on the input module located in slot 1), and the Stop tag (Alias Tag) is assigned to Local:1:I.Data.0 base tag.

2. **Add the I/O modules to the I/O configuration.** Right mouse click on the Backplane in the I/O Configuration and add the discrete I/O modules. The corresponding Controller Tags will be created as shown in Figure 2.

Important: Controller Tags are tags that can be accessed from any Routine in the Controller. This is compared to a Program Tag that can only be accessed by a Routine within a specific program.

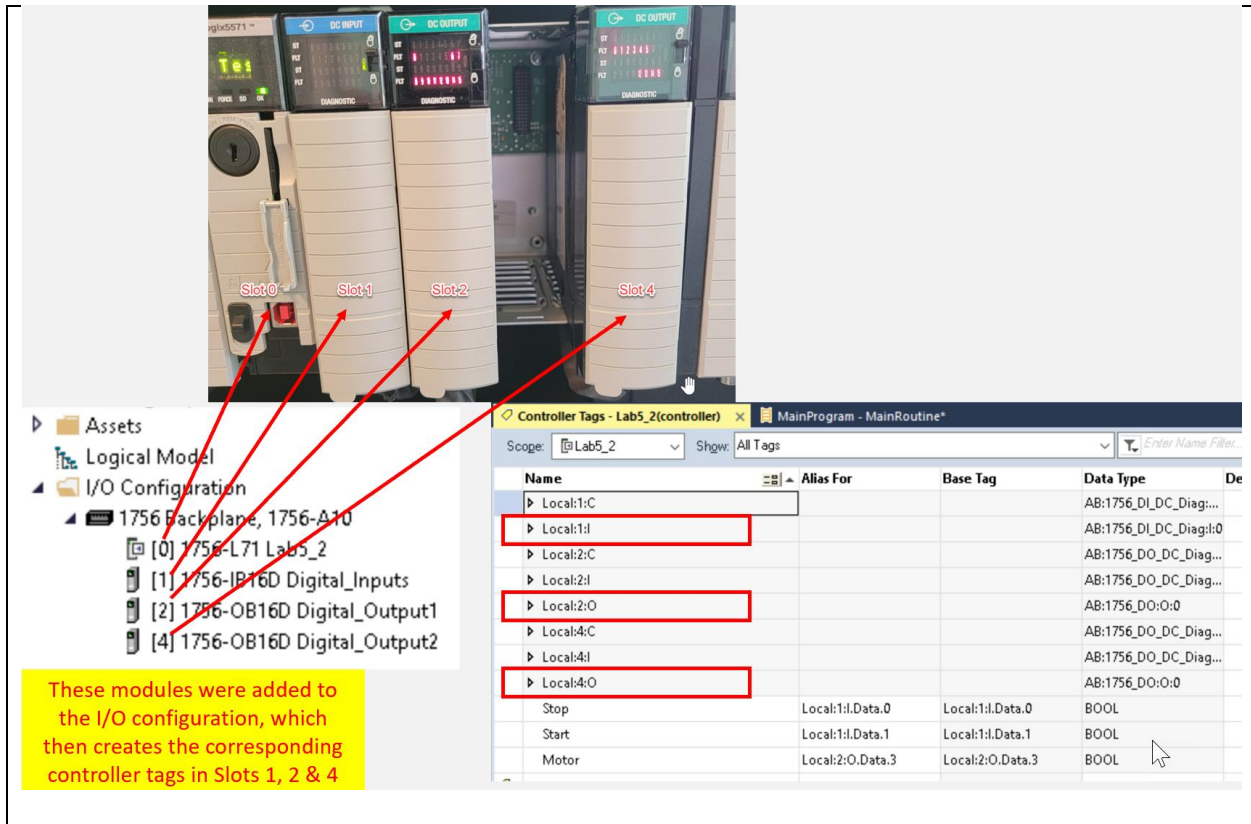


Figure 2. Adding the I/O modules to the I/O Configuration.

3. **Create the Alias Tags:** The user can create the three Alias Tags (Stop, Start & Motor) 4 ways:
 - a. Type the Alias Tag name in when ladder logic is entered, then right click on the name, then choose New "Stop" to create the tag named Stop.
 - b. Right click on any tag in the Controller Tags window and choose New Tag.
 - c. Right click on the Controller Tags folder and choose New Tag.

- d. Open the Controller Tags (upper left of screen under Controller Organizer) window as shown in Figure 3. At the bottom of the window, click on the “Edit Tags” tab (#1), then enter the name of the Alias Tag (#2), then click on the “Alias For” column (#3) to choose the Base Tag for the Alias to be assigned to.

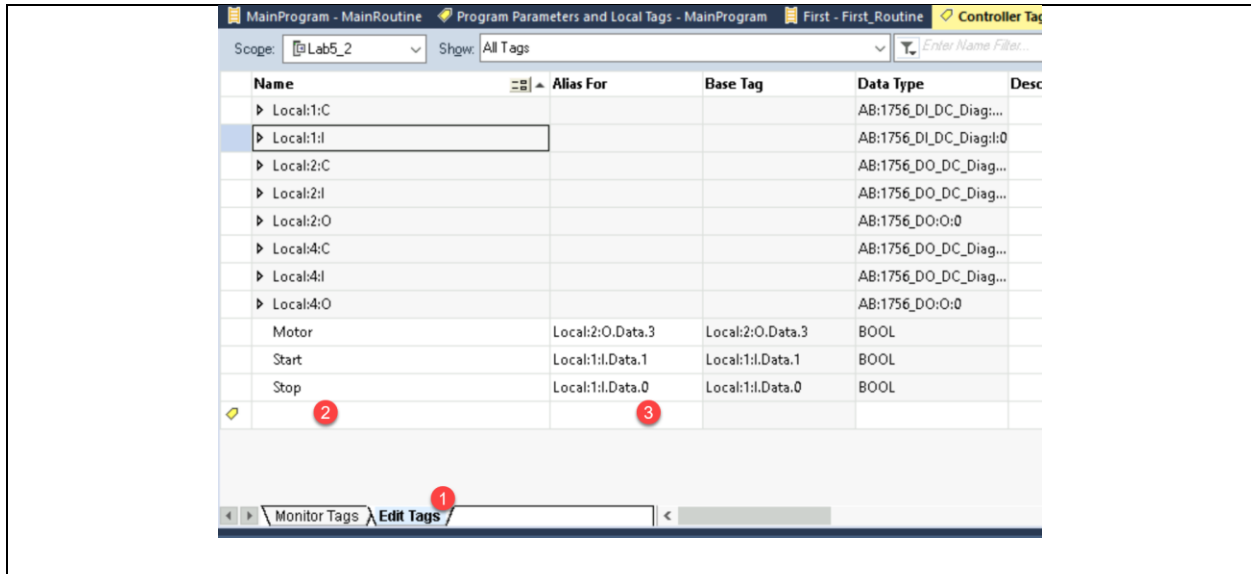


Figure 3. The Controller Tags Window.

4. **Verify and Save the Project:** Before the user downloads the project to the controller, they should do a Project Verify (#1 in Figure 4), then see if there are any errors (#2). If there are errors, the user can scroll in the Errors window. The next step is to Save the project by clicking on the disc icon (#3). Finally to do a download, the user can open the RSWho window (#4), and choose the processor to download the project to.

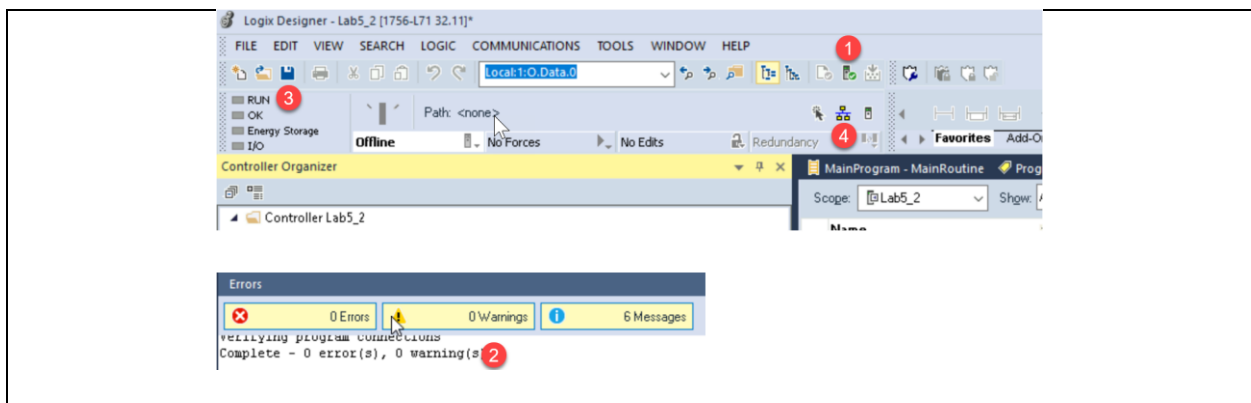


Figure 4. Verify and Save the Project.

- Download the project and go Online, and put the controller in the Run mode (or Remote Run). The user should see the rung as shown in Figure 5, after the Start pushbutton is pressed.

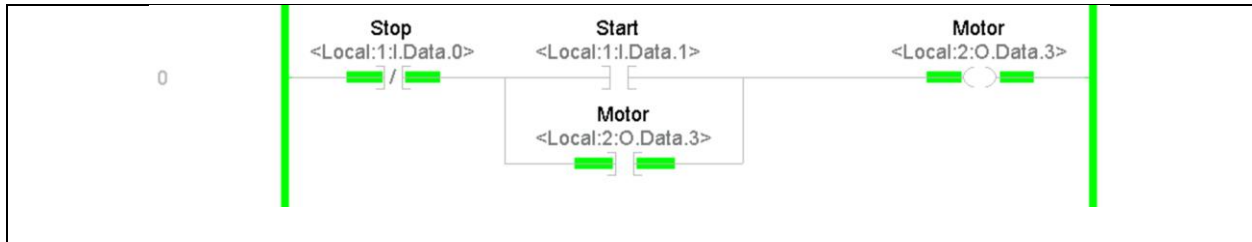


Figure 5. The ladder routine.

- Monitor a Tag in the Controller Tags Window: Figure 6 shows the steps to monitor the Start Tag (Alias Tag) using Logix Designer. Right mouse click on the Start Tag in Rung 0 (#1), then choose “Monitor/Edit Force Value Of “Start” (#2), then the window will show the tag in the Controller Tags Window (#3). There is currently a value of “0” in the Start tag, so the XIC does not have highlight.

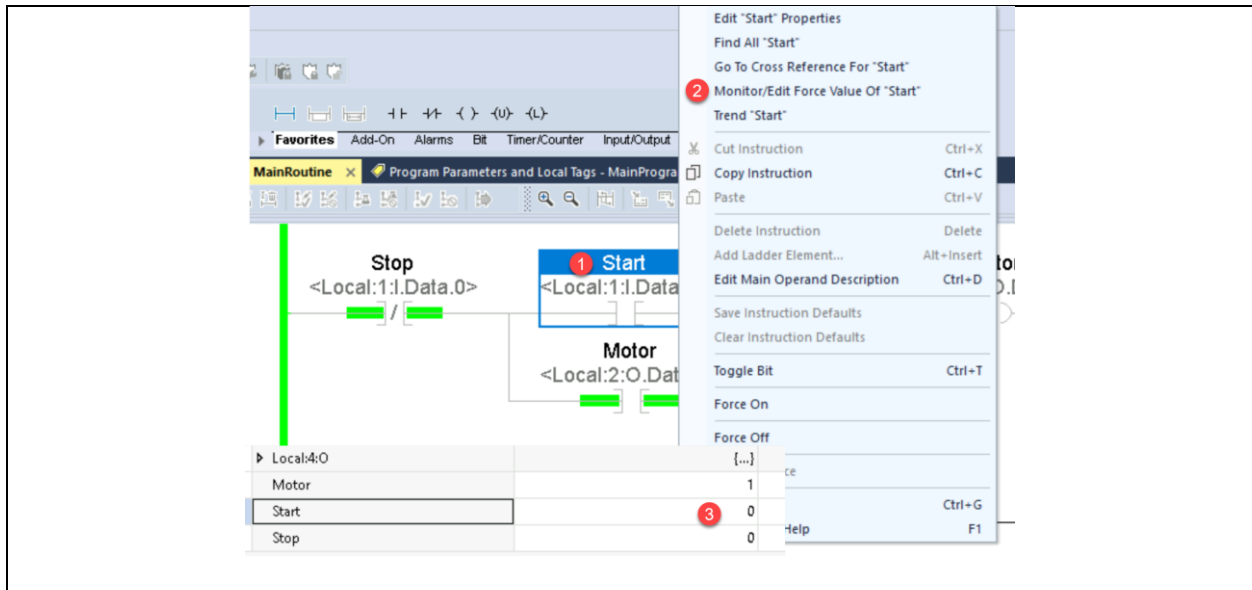


Figure 6. Monitor the value of a Tag.

Some important things to know about this lab:

1. Studio 5000 is a shell application that will launch Logix Designer, View Designer and Factory Talk View Machine Edition. Logix Designer (sometimes called: Studio 5000 Logix Designer) is the software package that is used to program and troubleshoot an Allen Bradley Logix5000 controllers. Older versions of L5000 controllers and older firmware versions used RSLogix5000 as the programming package, which is very similar in operation to Logix Designer.
2. Base tags are tags that hold a value. Another way of looking at base tags is that they actually define the memory where data is stored. Alias tags represent another tag (or points to another tag). All tags can use descriptive names which are valuable to the Technician. Also, Controller Tags are tags that can be used in any program in the controller (yes, there can be multiple programs in the controller). Controller Tags are sometimes referred to as Global scoped tags, whereas Program Tags are termed Local scoped Tags and can only be used in the program where they reside
3. When an I/O module is added to the I/O Configuration in Logix Designer, Controller Tags are created in the Controller Tags Folder in the Controller Organizer. These tags can be accessed by any program in the controller. The I/O Tags (Local:1:I.Data.0) are also base tags (since they hold a value). They are also a BOOL (short for Boolean) data type, which means they have a digital state of “1” or ”0” (on or off).

Review Questions:

1. How does Studio 5000 Logix Designer know what slot the controller is in?
 - a. Logix Designer detects the processor in a specific slot
 - b. When the project is created, a controller type and slot number is specified
 - c. The controller must always be in slot 0
 - d. All of the listed options

2. What position must the processor key switch be in, so Logix Designer can change the mode of the processor?
 - a. RUN
 - b. PROG
 - c. REM
 - d. Any key switch position will allow Logix Designer to change the processor mode

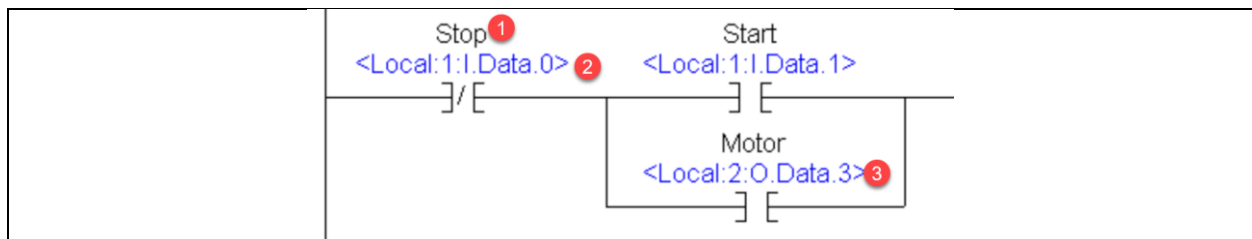


Figure 5. Part of a ladder routine in ControlLogix.

3. The object that is marked with a “1” in Figure 5 would be called a(n):
 - a. Base Tag
 - b. Alias Tag
 - c. Symbol
 - d. Floating Tag
4. The object that is marked with a “2” in Figure 5 would be called a(n):
 - a. Base Tag
 - b. Alias Tag
 - c. Program Tag
 - d. Local Scope Tag
5. What slot number on the ControlLogix chassis is the module located in, that has the tag marked with “3” in Figure 5?
 - a. 0
 - b. 1
 - c. 2
 - d. 3
6. T F An Alias Tag in a ControlLogix processor actually holds a value.
7. T F A Base Tag in a ControlLogix processor actually holds a value.
8. What does the tag named “*Local:2:O.Data.3*” mean?
 - a. Bit 3 of the output module in slot 2
 - b. Bit 2 of the output module in slot 3
 - c. Bit 3 of the output module in slot 0
 - d. Bit 0 of the input module in slot 3
9. T F A Tag found in the Controller Tags folder can be used in any Program in the controller.
10. What is the best way to switch between an open Controller Tags folder, a Main Routine that is opened, and another ladder Routine that is opened?
 - a. Tabs
 - b. Reopen each object in the Controller Organizer
 - c. Do a File Open
 - d. Choose the objects from the Standard Toolbar

Answers to the Review Questions:

1. b
2. c
3. b
4. a
5. c
6. F
7. T
8. a
9. T
10. a

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