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PLC Programming Tutorial

Purpose:

The purpose of this tutorial is to give a brief introduction to using the PLC trainers and the RSLogix software available at SIUC. RSLogix is Windows based software that is used to program Allen-Bradley PLCs. This tutorial will give basic instructions on how to write and download programs. This will give new users the foundation to learn the many advanced features of RSLogix.

Starting RSLogix

From the desktop click START>>Programs>>Rockwell Software>>RSLogix 500 English>>. Click on RSLogix 500 English. When RSLogix starts click the FILE heading and select NEW or use the shortcut key that is identical to the new file key in Microsoft Word.

When a new file is selected the window in Figure 1 will open. This window is used to configure the program to a particular model of Allen Bradley PLC. The PLC used is this tutorial is a Micrologix 1500 series A. The model numbers are listed on the side of the PLC. Use the scroll to find the model of the PLC. Select it using the mouse and click OK
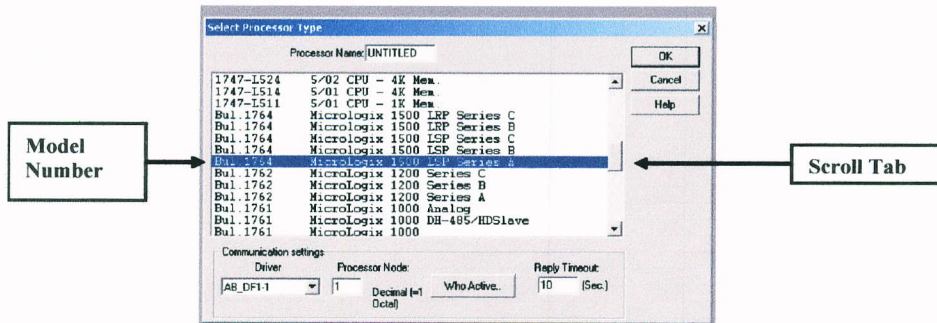

Figure 1: Processor Type Window

RSLogix Interface

The RSLogix interface is shown below. To begin constructing a program click on the number 0000 next to the first and only blue rung. The number should now be inside of a red box. The red box means that the rung has been selected and can be edited. Start by clicking the XIC button on the USER tool bar. Then click on the OUTPUT ENERGIZE button on the USER toolbar. Rung 0000 should now appear as it does in the program below. Once there are instructions in rung 0000 rung 0001 will appear below it. Click on the 0001 to select the rung. Click on the XIO and OUTPUT ENERGIZE buttons on the USER toolbar. Rung 0001 should now appear as it does in Figure 2.

Figure 1: RSLogix Interface

Defining Inputs and Outputs (I/O)

Using the left mouse button, double click on the logic symbols to define the I/O address. When the symbols are selected a box will appear (refer to Figure 3). Define input addresses for XIO and XIC symbols using "I:0/0" format. Define output energize addresses using the "O:0/0" format. The capital I and O stand for input and output, respectively. The first number before the forward slash is the slot number and the number after the slash is the point number. Make sure to not to use Os for 0s and vice versa.

When all the I/O addresses have been defined use the VERIFY PROJECT button (shown in Figure 3) to check the program for errors.
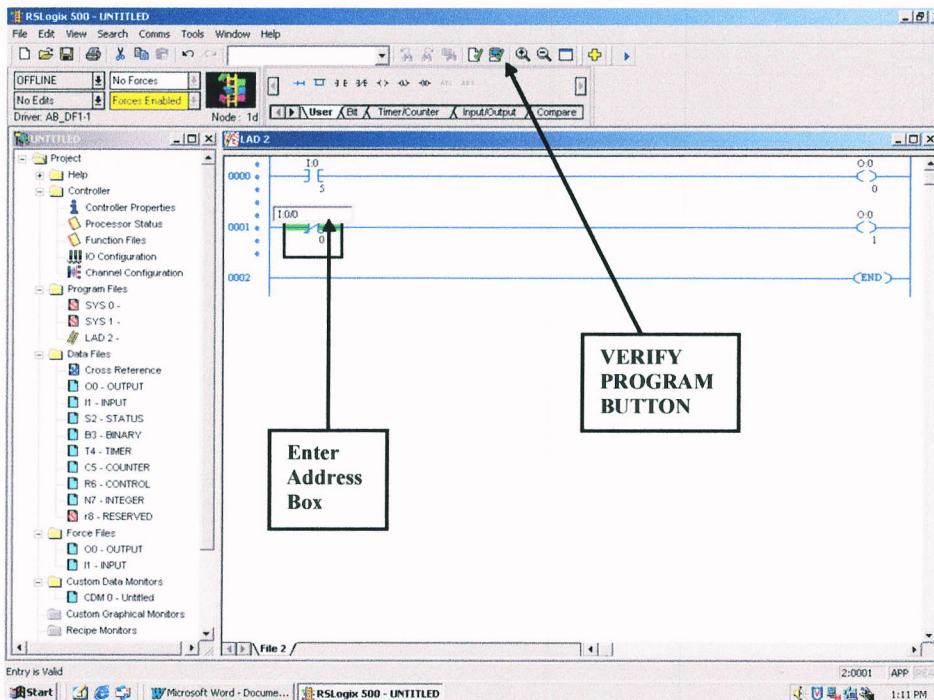
Figure 1: Instruction Addressing

Should there be a program error, a window will appear at the bottom of the screen. Use the "+" and "-" symbols to expand the errors. The expanded message will state what rung and which instruction contains the error (see Figure 4). Double clicking on the expanded part of the message will select the operation that has the error.
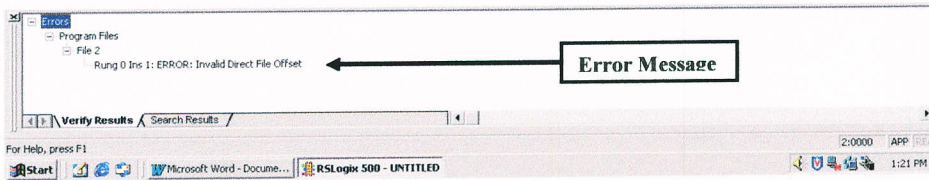

Figure 1: Error Message

If the program has no errors the message "Verify has completed, no errors found" will appear above the Windows START button in the lower left hand corner of the screen (see Figure 5).
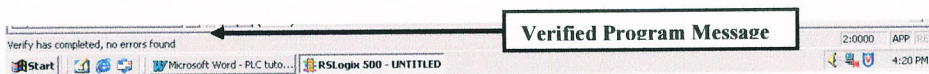
Figure 2: Verified Program

Downloading Programs

The next step is to download the program. To download the program the status menu is used. At this stage in the program the status menu will show OFFLINE. To select the status menu click the arrow next to the menu that shows OFFLINE. Then select download (see Figure 6).
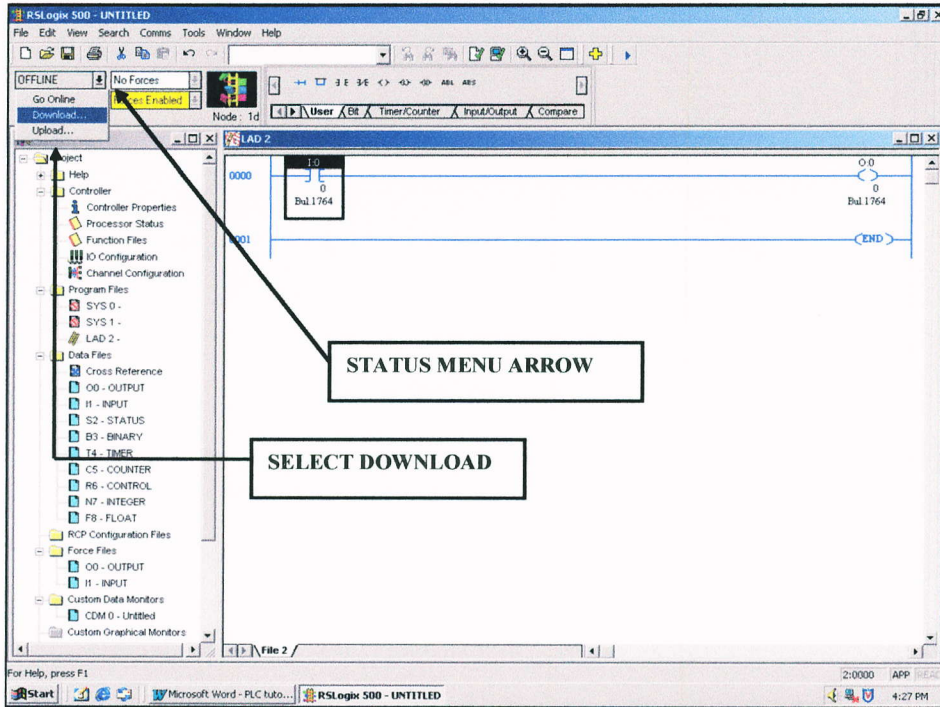

Figure 1: Downloading a Program

Saving a Program

In order to download a program it must be saved. If the program is not saved the window in Figure 7 will open automatically. Name the program and save it to a 3.5" floppy disk (Drive A). A program can also be saved before trying to download by using the FILE drop down menu or the SAVE shortcut, which are identical to the ones in Microsoft Word.
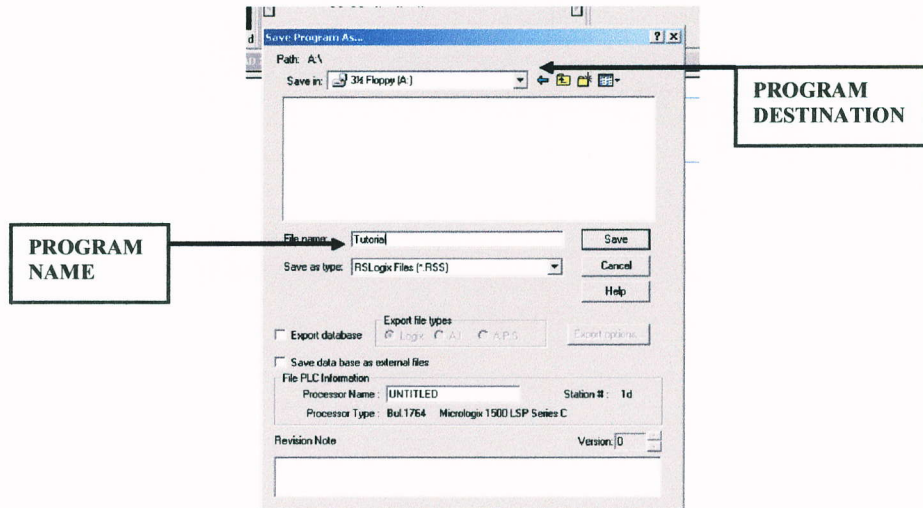
PROGRAM DESTINATION

PROGRAM NAME

Figure 1: Saving a Program

Downloading (Continued)

After the program is saved the following window will pop up. The window displays the program name, its origin and destination. Select the YES button to proceed with the download (see Figure 8).
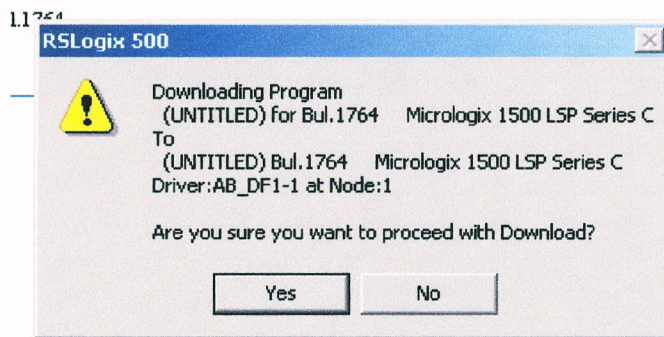
Figure 2: Downloading Procedure

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The next window that opens displays that the PLC is in remote run mode. This means that the PLC is in run mode. When a PLC is in run mode it is executing the currently loaded program. In order to download a new program to a PLC it must be in program mode. Select YES to switch the PLC to program mode (see Figure 9).
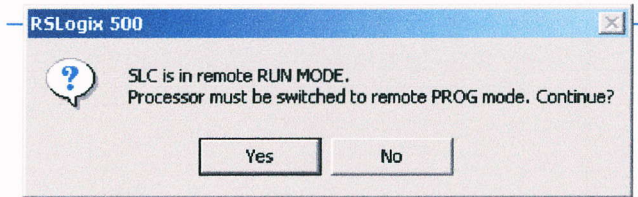

Figure 1: Switching from Run Mode to Program Mode

The next window that will open is the download status window. This window displays the status of the download (not pictured). When the download is complete the window will automatically close and the next window will open. This window asks if the PLC should change back to run mode. Select YES so the PLC can switch to run mode to execute the program (see Figure 10).
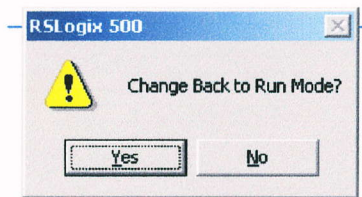

Figure 2: Switching back to Run Mode Dialogue

The final window that pops up asks if the PC should go online. When a PC is online with a PLC it means that the PC is communicating with the PLC in real time. In this mode the operator at the PC can see the program that is being executed and monitor the status of the input and output points. This is a very useful feature in manufacturing operations because it allows remote supervision and control of the PLC. Select YES to go online with the PLC.
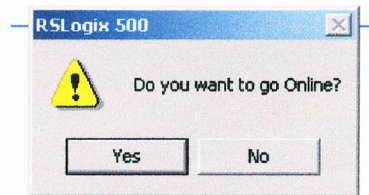

Figure 3: Online Mode Dialogue

Using the Program

At this point the program should be operating. Using the addressed input buttons on the trainer observe the output lights on the trainer. Since the computer is also online the changing inputs and outputs can be observed from the PC monitor.

Editing the Program

Use the program status menu to go offline. Click the arrow next to the menu and select GO OFFLINE. Once the PC is offline with the PLC it is possible to edit the program.

Summary

This tutorial has been designed to give a basic introduction of PLC programming to the new user. There are many additional instructions, shortcuts and features in the RSLogix software that are similar to features found in other Windows based programs. Many of the additional features can be discovered through additional use of RSLogix. To read more about RSLogix visit: http://www.software.rockwell.com/rslogix/