LISTEN.
THINK.
SOLVE.SM

Micro*Logix*
1100
RSLogix 500 LAB#1

Starting & Stopping Motors

ALLEN-BRADLEY • ROCKWELL SOFTWARE

Rockwell Automation

What we are going to do:

- We are going to program a series of three basic ladder logic rungs. These basic rungs are the most common rungs found in every ladder program.
- Each of these rungs will help you to “Frame” how a PLC is programmed, and how they operate.

Steps for Today's Assignments

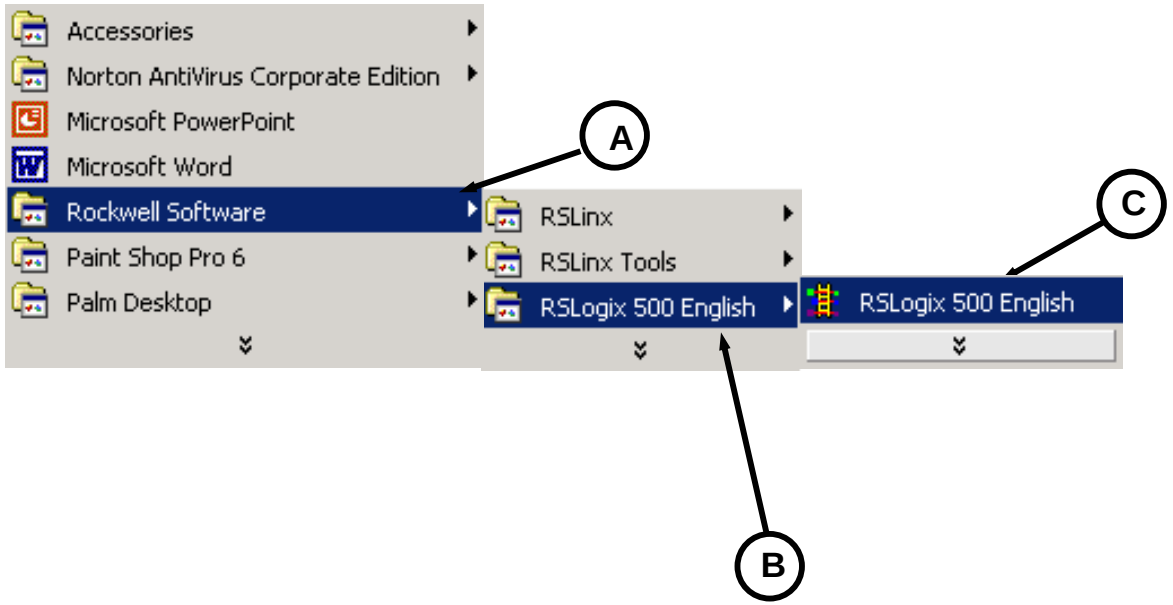
1. Open RSLogix500 programming software
2. Create a new project
3. Enter 3 rungs of ladder logic
4. Save your program to the hard drive
5. Transfer your program to the MicroLogix 1100
6. Monitor and test your program

Getting Started

1. On your computer desktop locate the menu item

   Start>Programs>Rockwell Software>RSLogix 500 English>RSLogix 500 English

2. Click to open the program



A. Rockwell Software Menu

Contains all files created during installation

B. RSLogix500 Menu

Launches RSLogix 500 Session

C. Release Notes

Contains product information

A. Release Notes
B. Corrections
C. Etc.

Creating a “PROJECT”

3.Maximize RSLogix 500 Shell

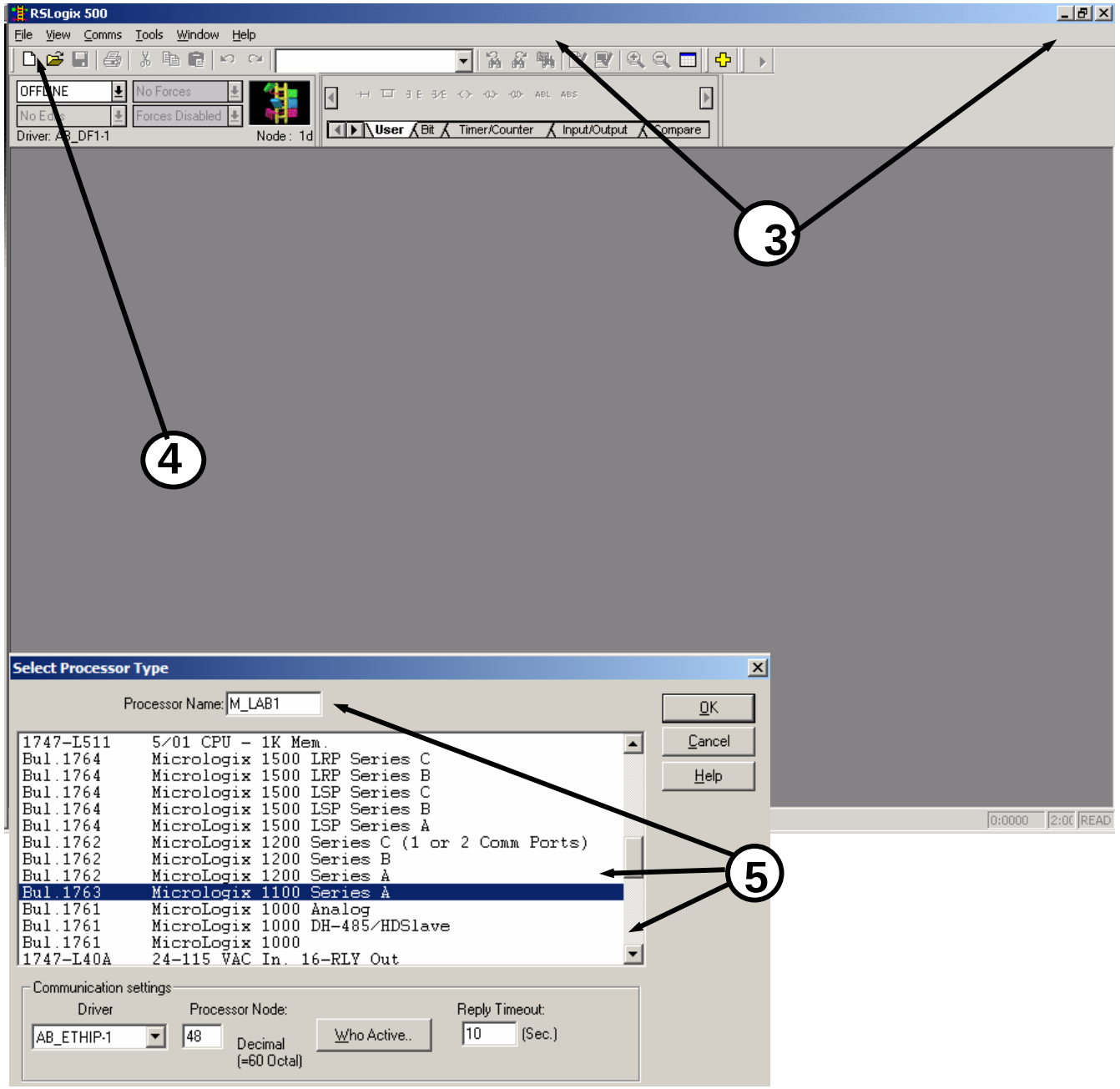
- **Windows 95/NT**
  - drag/Drop, Double Click, Right Mouse Button all work just like any Windows based software package

4.Click “File” Menu

- **Select “NEW” To Create a File**

5.Select Controller

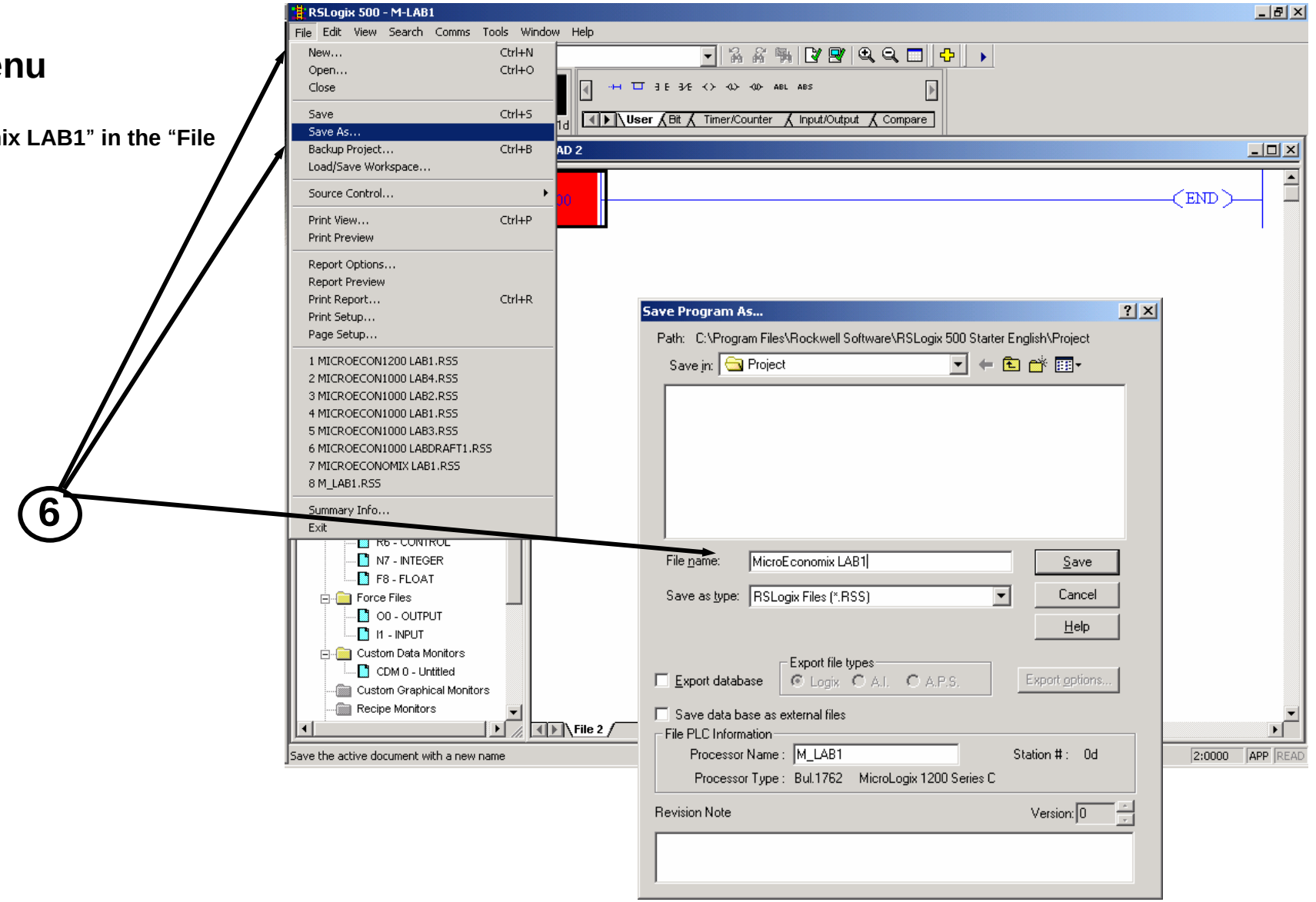
- **Enter Processor Name “M-LAB1”**
- **Using the down arrow, move to the center of the list**
- **“Click” BUL.1763 MicroLogix 1100 Series A**
- **(Either double click, or select and then click OK)**



Save Project

6.Click “File” Menu

- Select “Save As”
- Type “MicroEconomix LAB1” in the “File name” box
- Click “Save”



RSLogix “Components”

A. Project Viewer

- **Displays Controller Resources**
  - Controller information/setup
  - Program Files
  - Data Files
  - Force Files
  - Custom Data Monitors
  - Database Files

B. Program Viewer

- **Where Programs reside**
- **Where ladder logic is entered**

C. Program “TABS”

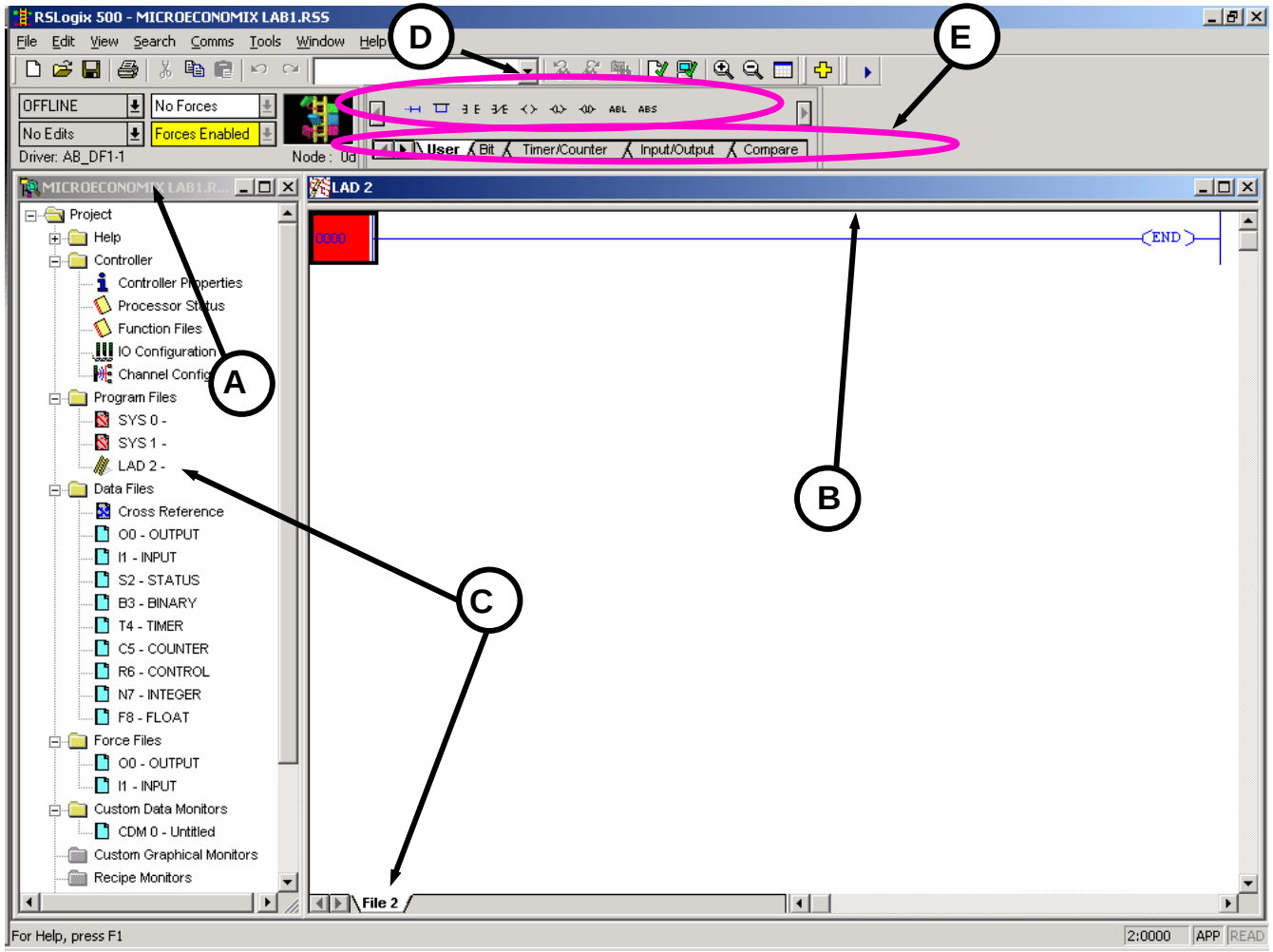
- **When a program file is open a “TAB” is created**
- **Allows easy/quick access to program file contents**

D. Instruction Buttons

- **drag&Drop, or Double Click**
- **Must have “Program Viewer” Active**

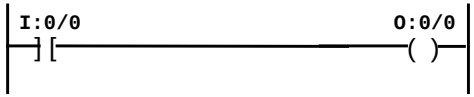
E. Tabbed Toolbar

- **Instructions grouped by function.**
- **Floating Toolbar Support**



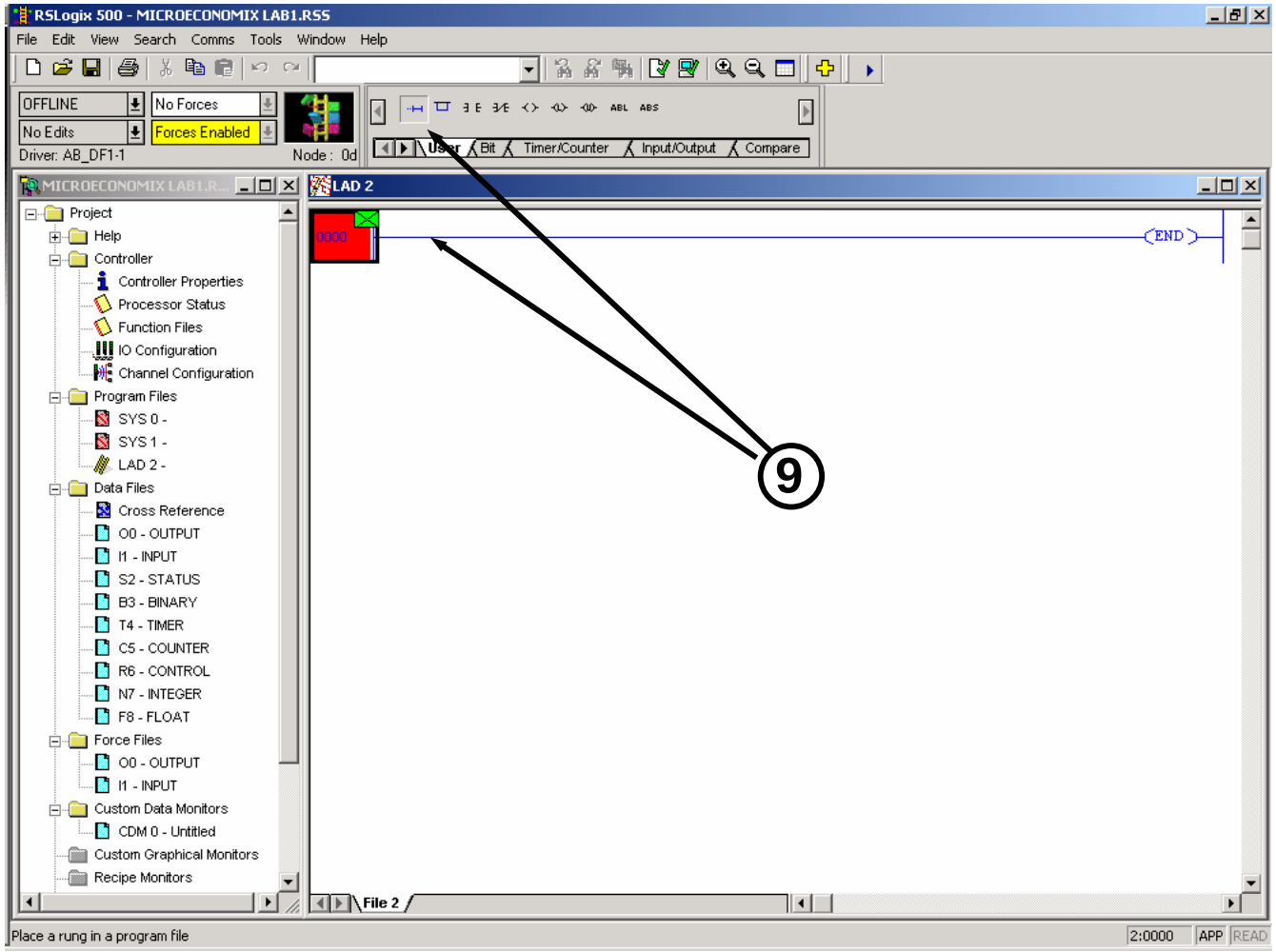
Creating the 1st Rung of Ladder Logic

Program this 1st rung:



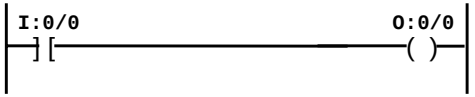
9.To Create a New Rung

- Make sure the Program Window is active (the right window title bar is colored or highlighted).
- Click on the “User” tab. These are the basic instructions used to create your first rungs of logic.
- Click, hold the left mouse button and drag the “New Rung” button over to rung “0000” until you see a green box appear. When you see this green box, release the left mouse button. You have now created your first rung.



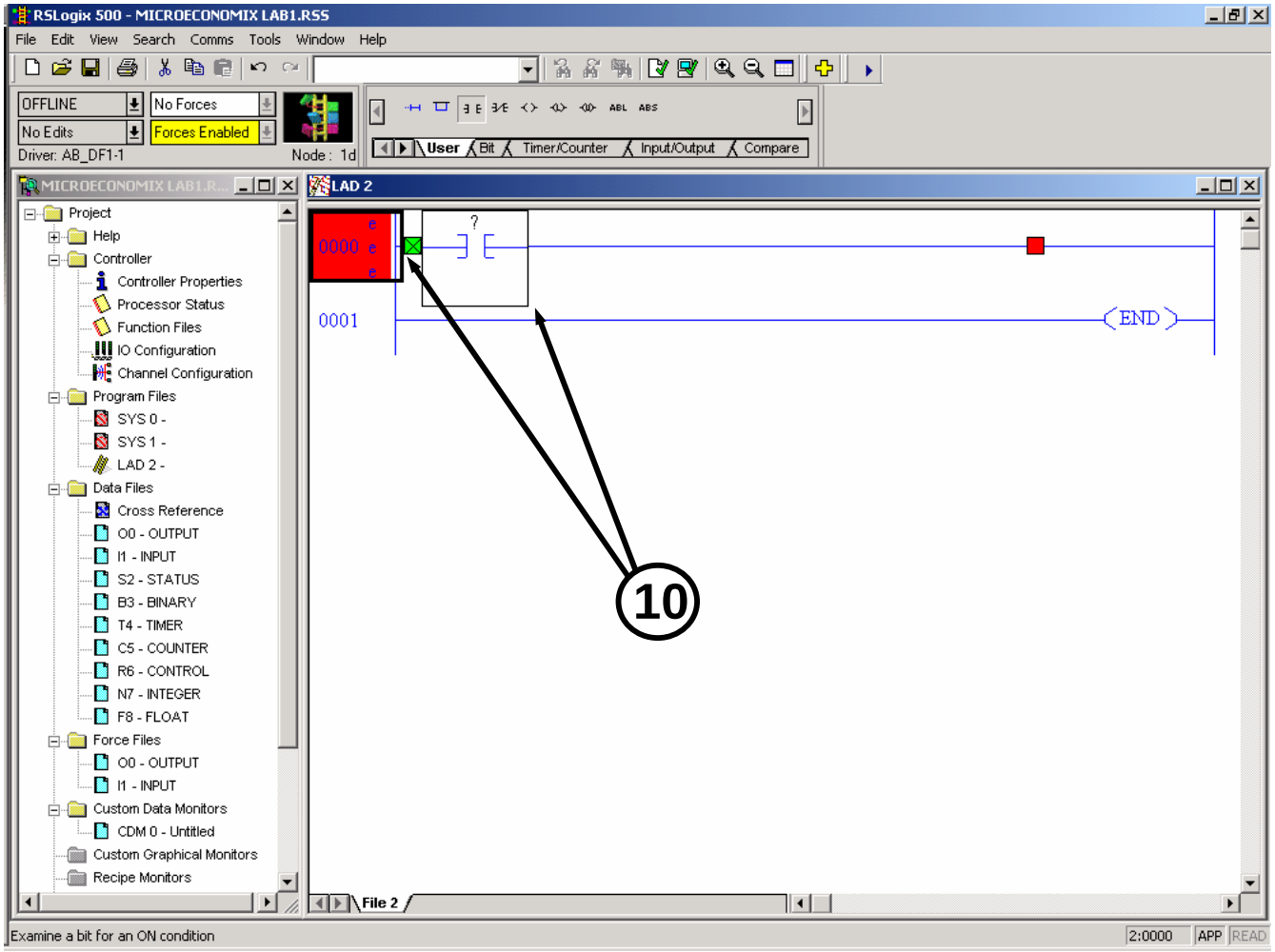
Creating the 1st Rung of Ladder Logic

Program this 1st rung cont:



10. Add an Input Instruction

- **Click, hold the left mouse button and drag the XIC(examine if closed) button onto the left side of the rung you just created. When you see a green box, release the mouse button.**
- **With the instruction highlighted Type I:0/0 [Enter]. This is the address of the XIC(examine if closed) instruction**

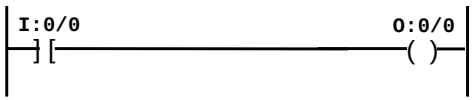


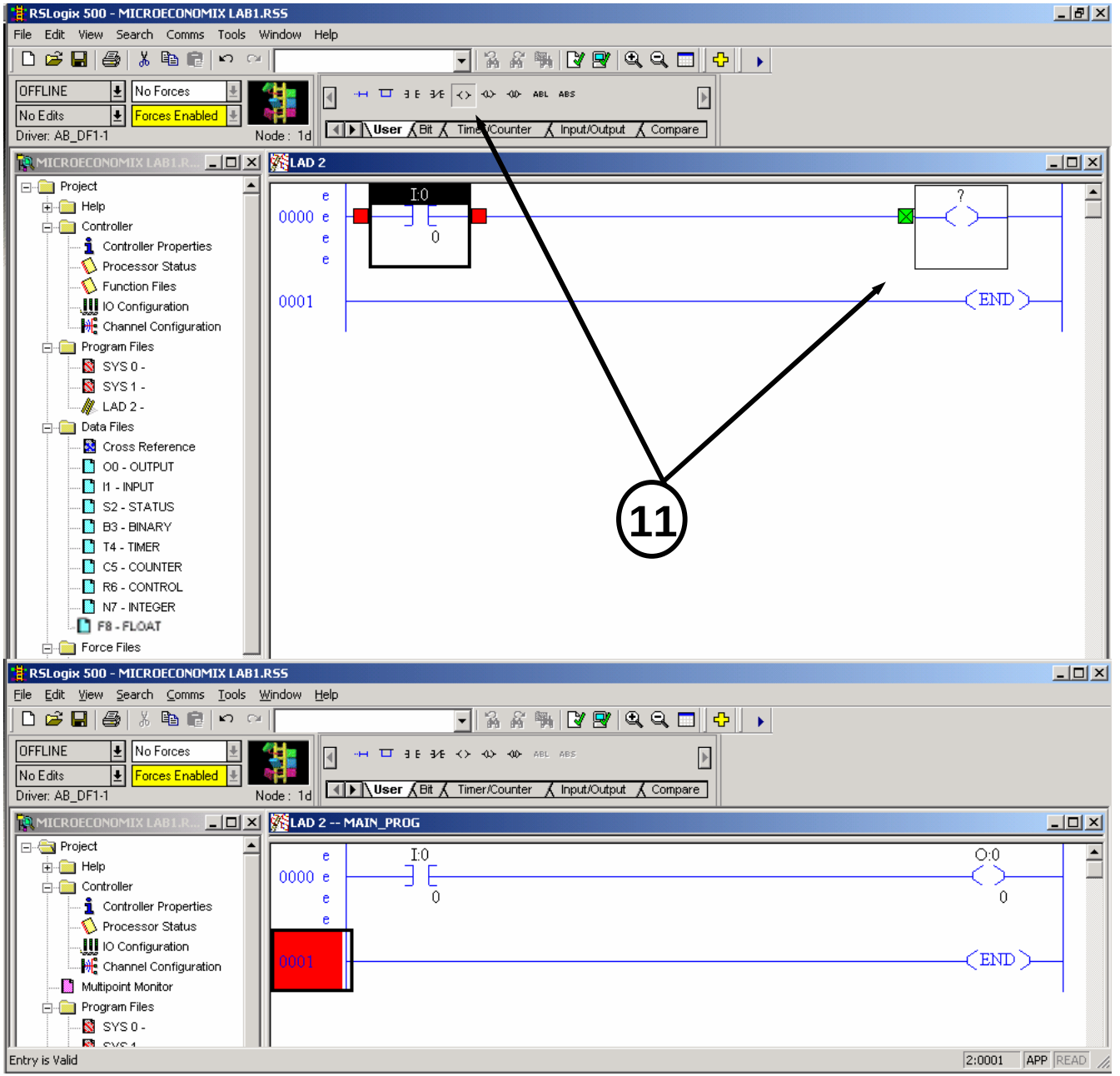
Creating the 1st Rung of Ladder Logic

11.Add Output Instruction

- Click, hold the left mouse button and drag the OTE (output energized) button onto the right side of the rung you just created. When you see a green box, release the mouse button.
- With the instruction highlighted Type O:0/0 [Enter]. This is the address of the OTE instruction .

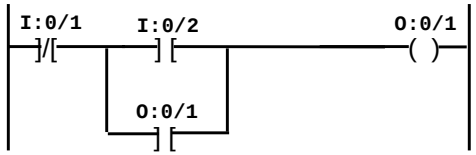
Your first rung should now look like this:





Creating the 2nd Rung of Logic

Program this 2nd rung:

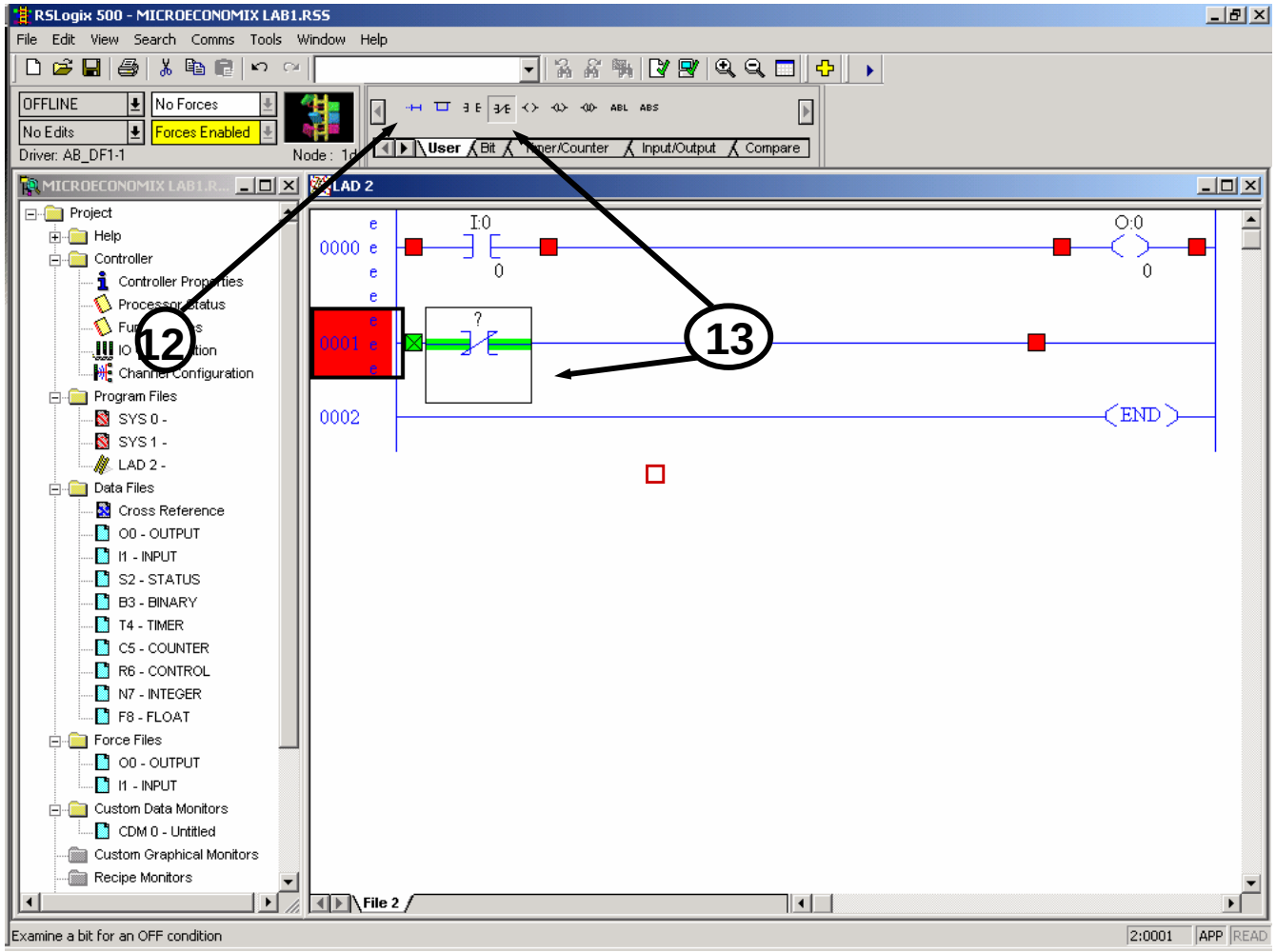


12. Create a New Rung

- **Click, hold the left mouse button and drag the "New Rung" button over rung "0001". When you see a green box, release the mouse button.**

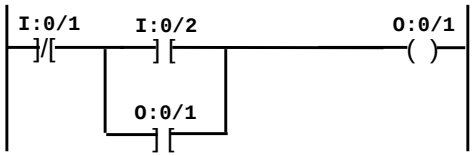
13. Add the 1st Input Instruction

- **Click, hold the left mouse button and drag the XIO (examine if open) button onto the left side of the rung you just created. When you see a green box, release the mouse button.**
- **With the instruction highlighted Type I:0/1 [Enter]. This is the address of the XIO instruction .**



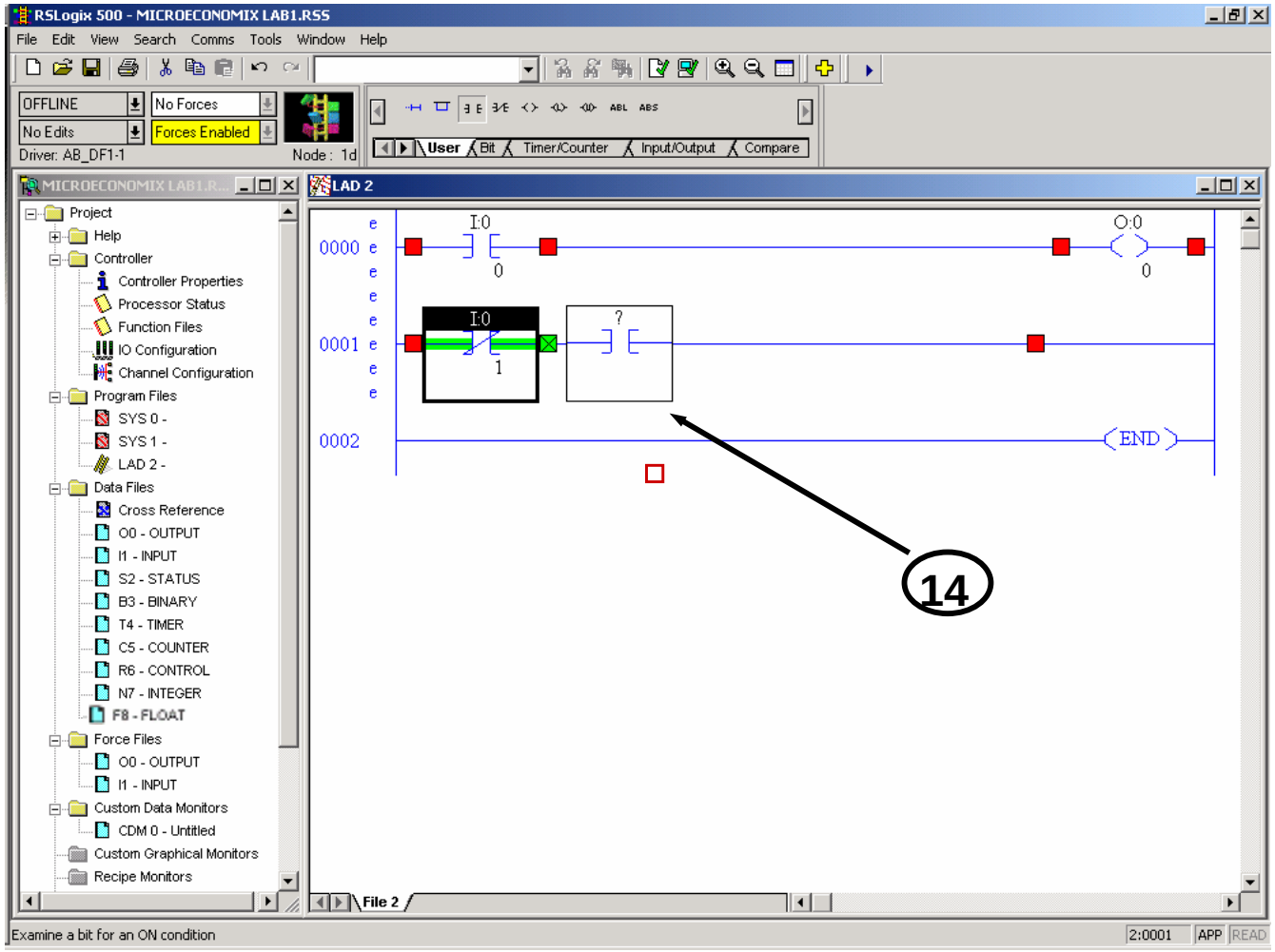
Creating the 2nd Rung of Logic

Program this 2nd rung:



14.Add 2nd Input Instruction

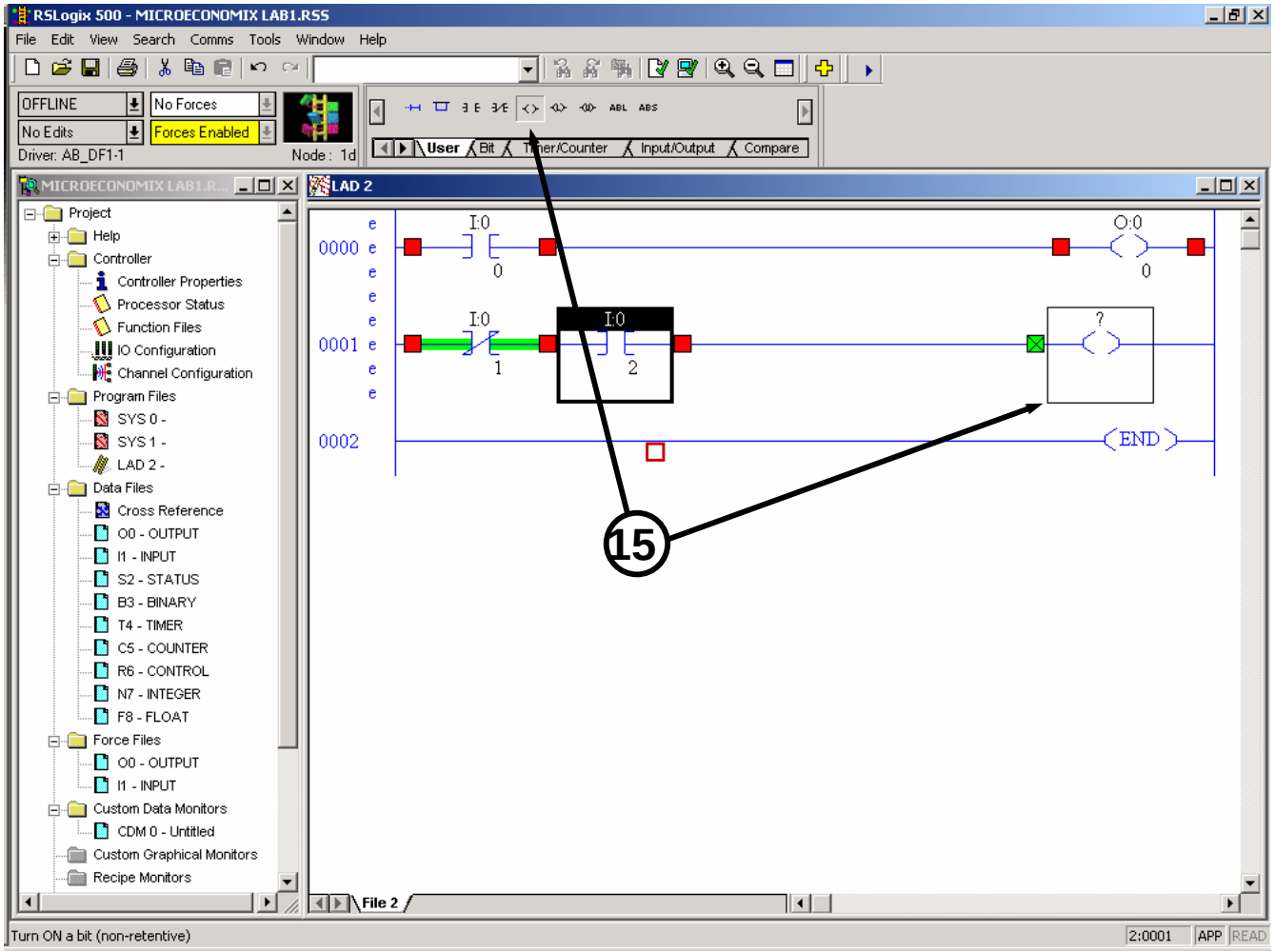
- **Click, hold the left mouse button and drag the XIC(examine if closed) button to the right of the XIO (examine if open) you just created. When you see a green box, release the mouse button.**
- **With the instruction highlighted Type I:0/2 [Enter]. This is the address of the XIC instruction .**



Creating the 2nd Rung of Logic

15.Add Output Instruction

- **Click, hold the left mouse button and drag the OTE (output energized) button onto the right side of the rung. When you see a green box, release the mouse button.**
- **With the instruction highlighted Type O:0/1 [Enter]. This is the address of the OTE instruction .**



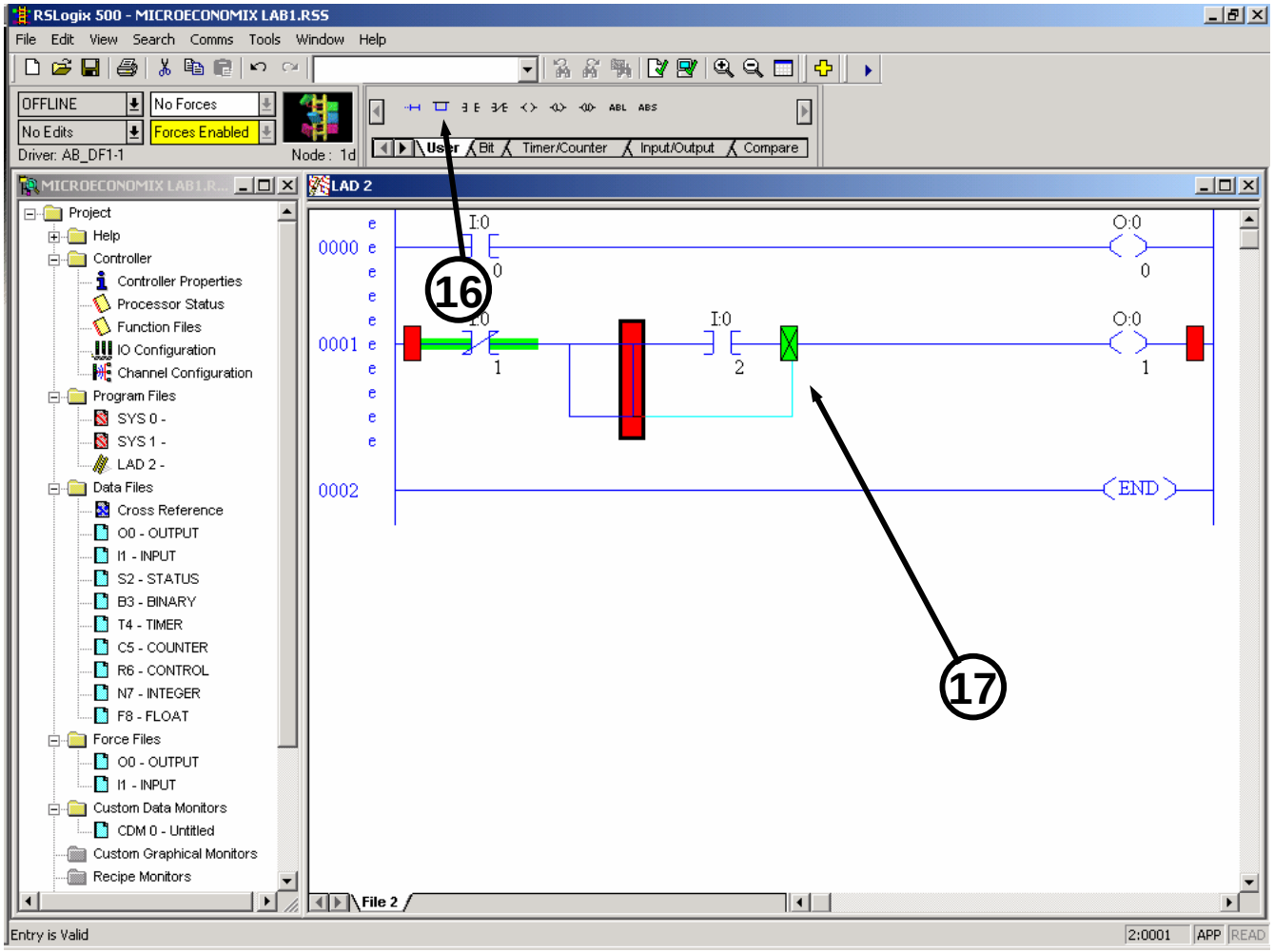
Creating the 2nd Rung of Logic

16.Add an empty branch

- **Click, hold the left mouse button and drag the RUNG BRANCH button in between the first XIO and the XIC instructions. When you see a green box, release the mouse button.**

17.Move the Branch

- **Click, hold the left mouse button and drag the red highlighted branch leg to the right side of the XIC instruction. When you see a green box, release the mouse button.**

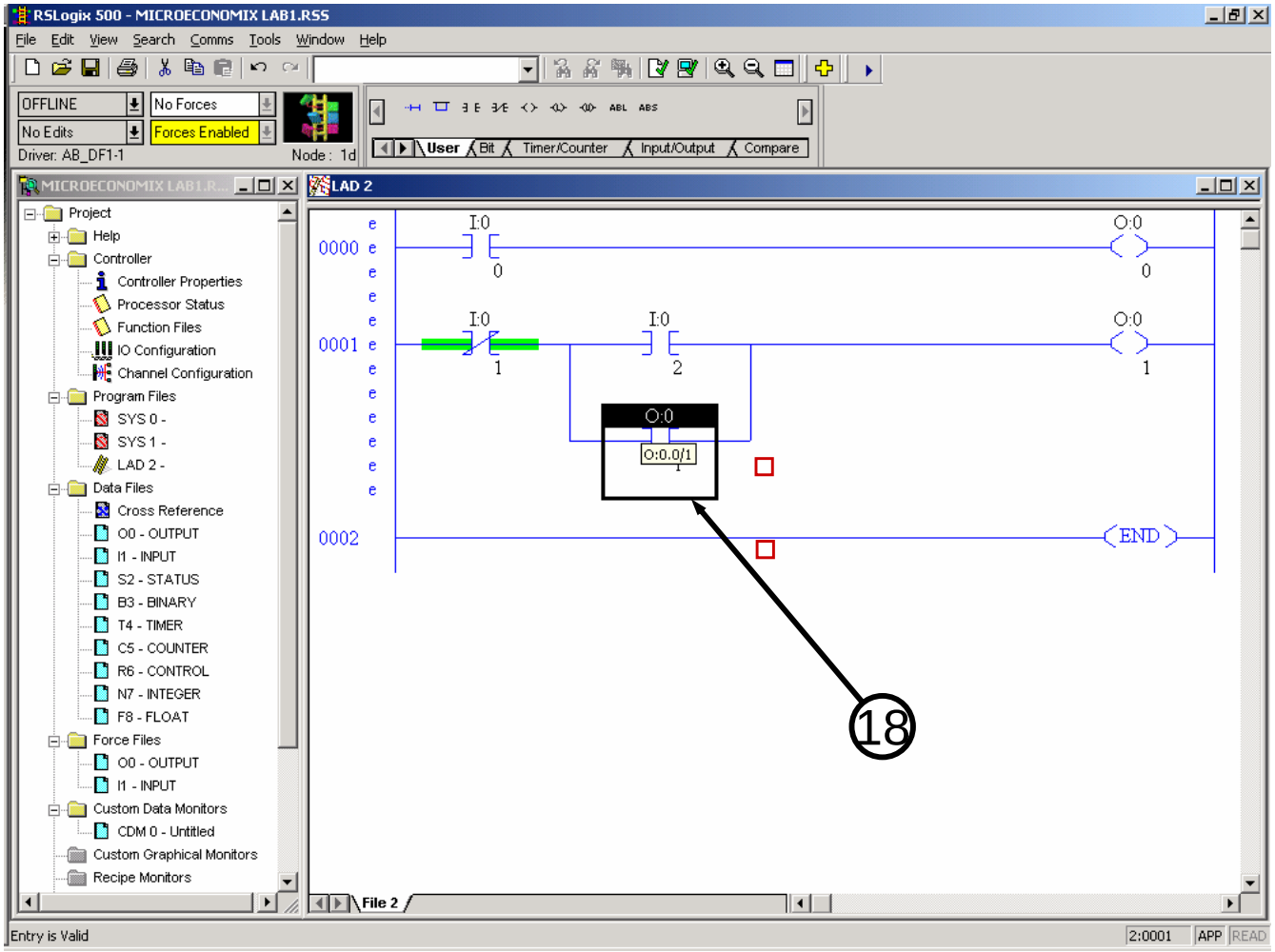


Creating the 2nd Rung of Logic

18. Add Input Instruction to the branch

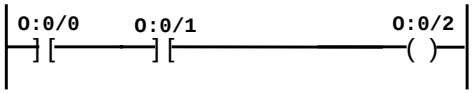
- Click, hold the left mouse button and drag the XIC (examine if closed) button onto the branch you just created. When you see a green box on the branch, release the mouse button.
- With the instruction highlighted Type O:0/1 [Enter]. This is the address of the XIC instruction .

Notice this Input instruction has the same address of the output instruction on the same rung. This is the electronic equivalent to the auxiliary contacts on a motor starter. This will allow the motor to stay on when the start button is released. This is also known as a OR statement.



Creating the 3rd Rung of Logic

Program this 3rd rung:

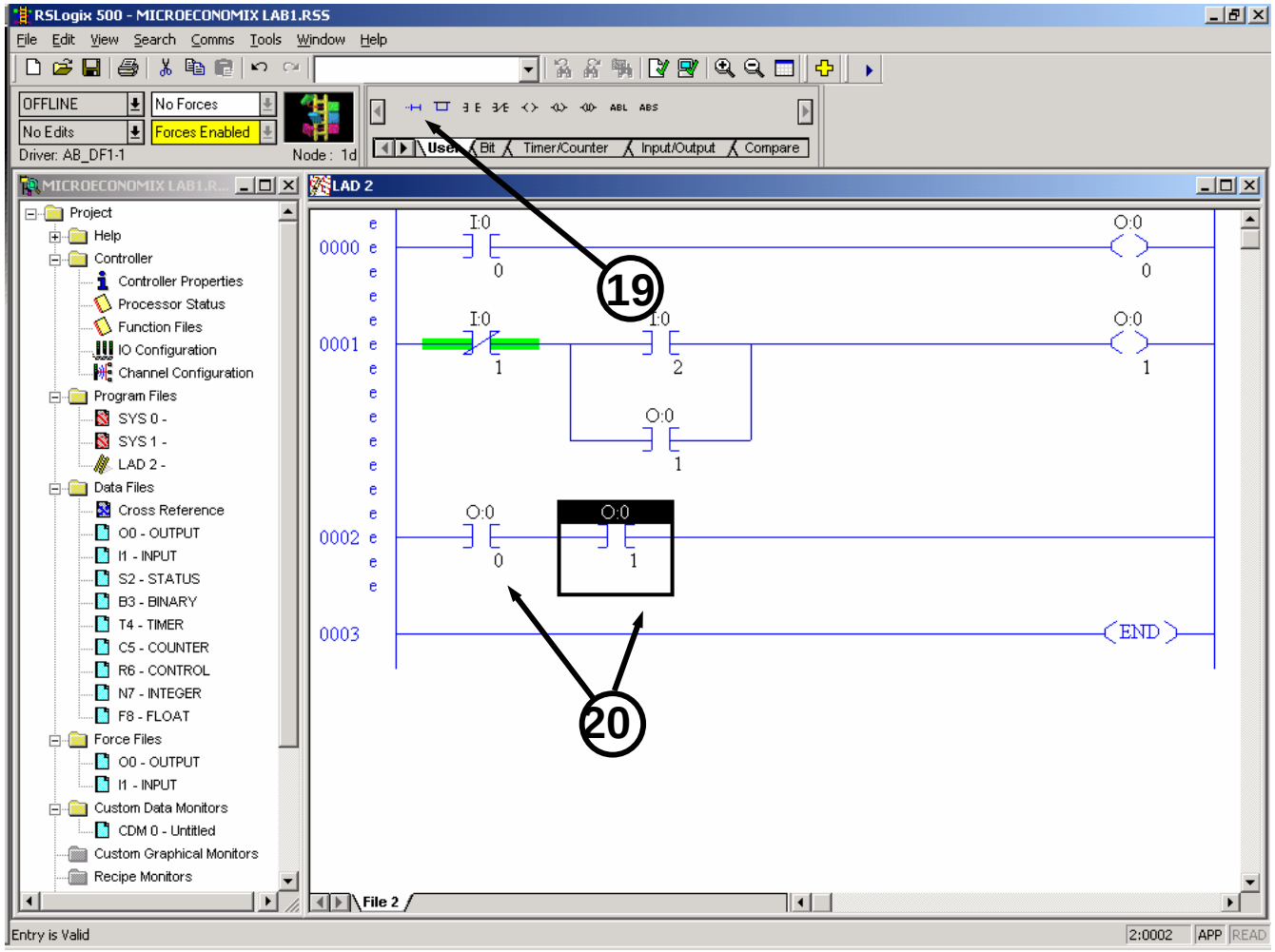


19.Create a New Rung

- **Click, hold the left mouse button and drag the "New Rung" button over "0002" until you see a green box. When you see the green box, release the mouse button**

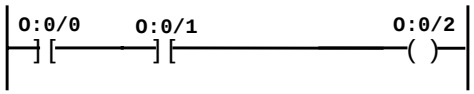
20.Add Input Instructions

- **Click, hold the left mouse button and drag the XIC (examine if closed) instruction to the left side of the rung until you see a green box. When you see the green box, release the mouse button. With the instruction highlighted Type O:0/0. This is the address of the XIC instruction.**
- **Click, hold the left mouse button and drag XIC (examine if closed) instruction to the right side of the XIC until you see a green box. When you see the green box, release the mouse button. With the instruction highlighted Type O:0/1. This is the address of the XIC instruction.**



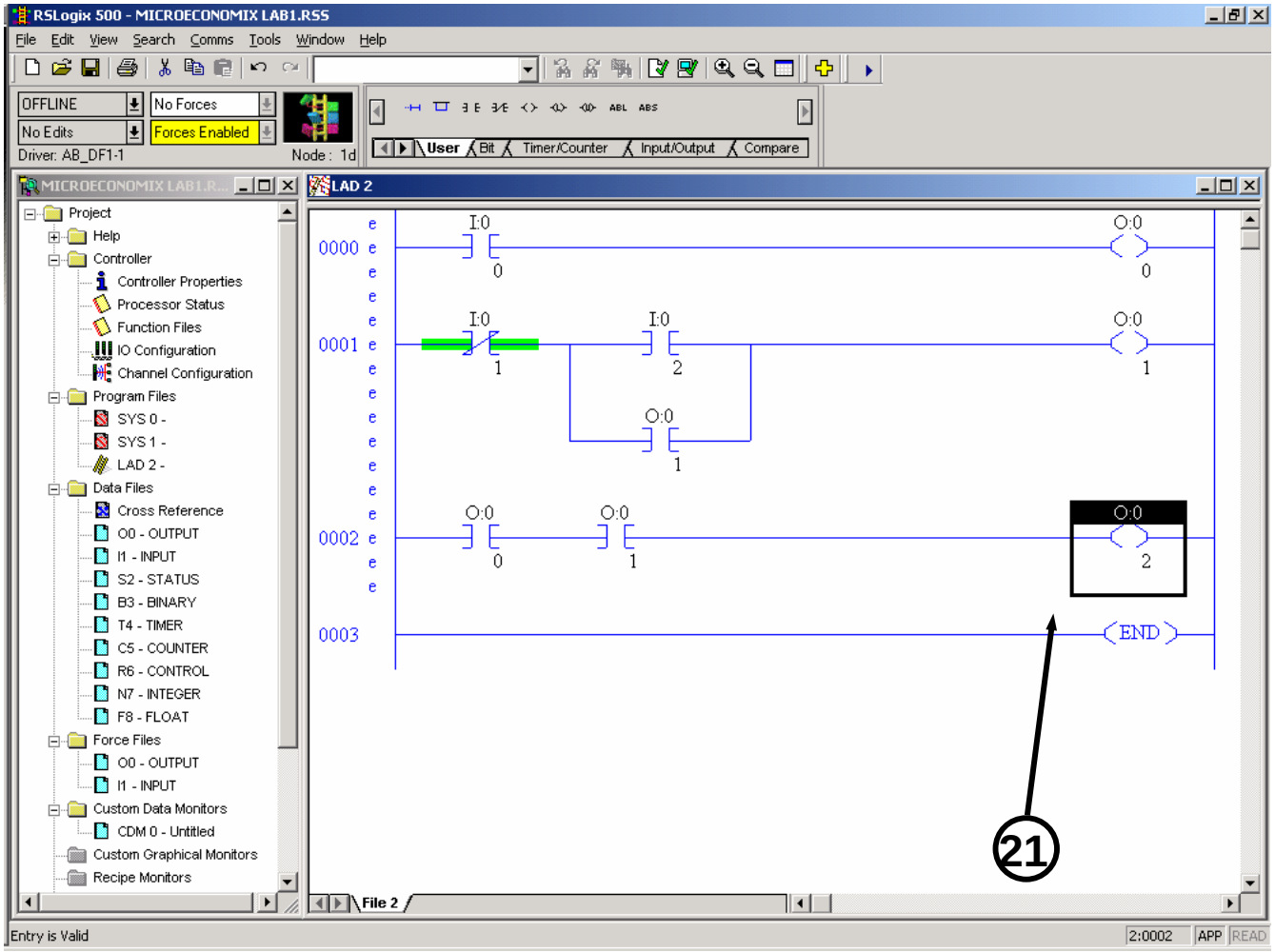
Creating the 3rd Rung of Logic

Program this 3rd rung:



21.Add Output Instruction

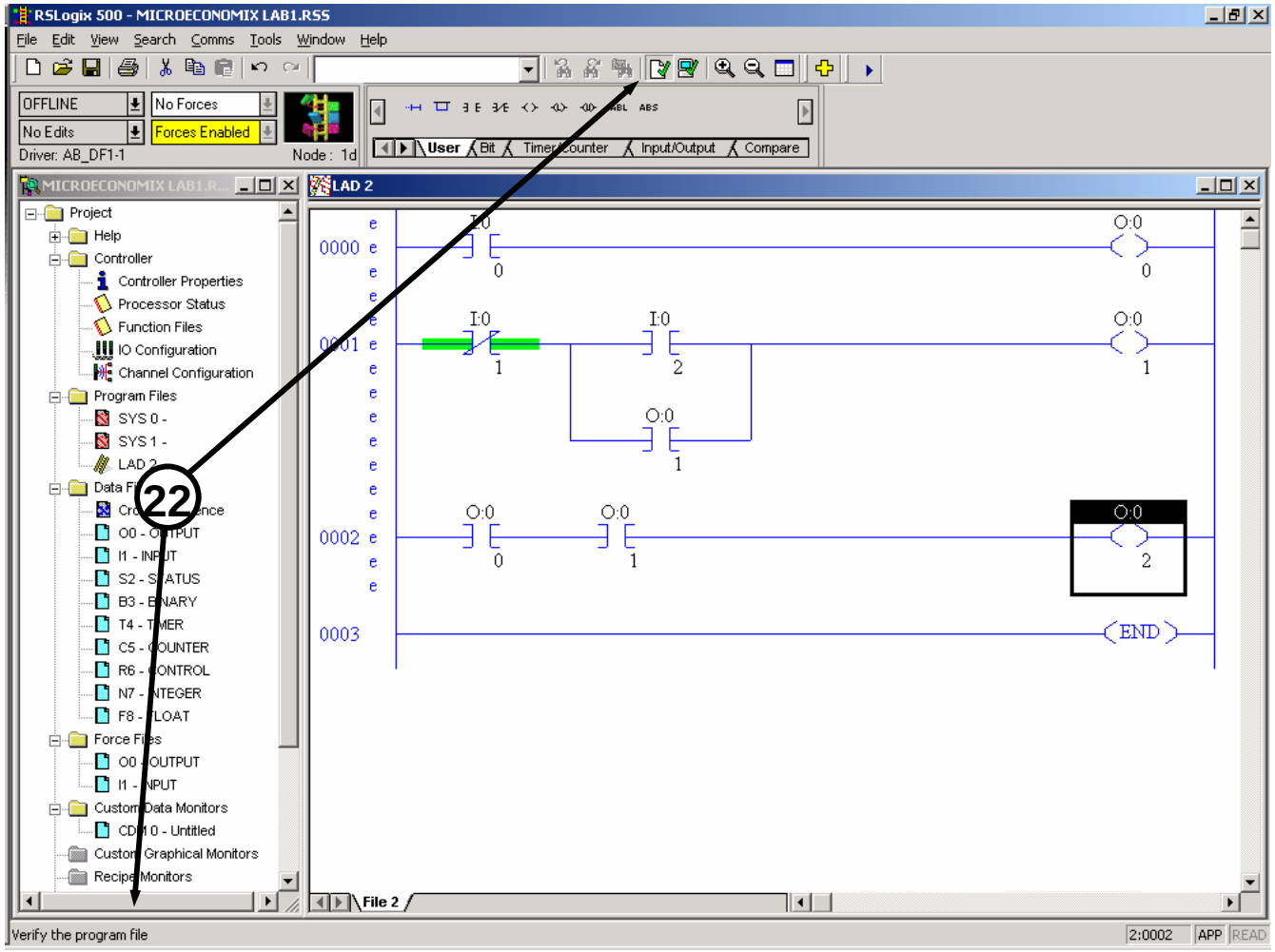
- **Click, hold the left mouse button and drag the OTE (output energized) instruction onto the right side of the rung until you see a green box. When you see the green box, release the mouse button. With the instruction highlighted Type O:0/2. This is the address of the OTE instruction.**



Verify your work

22.To verify your work

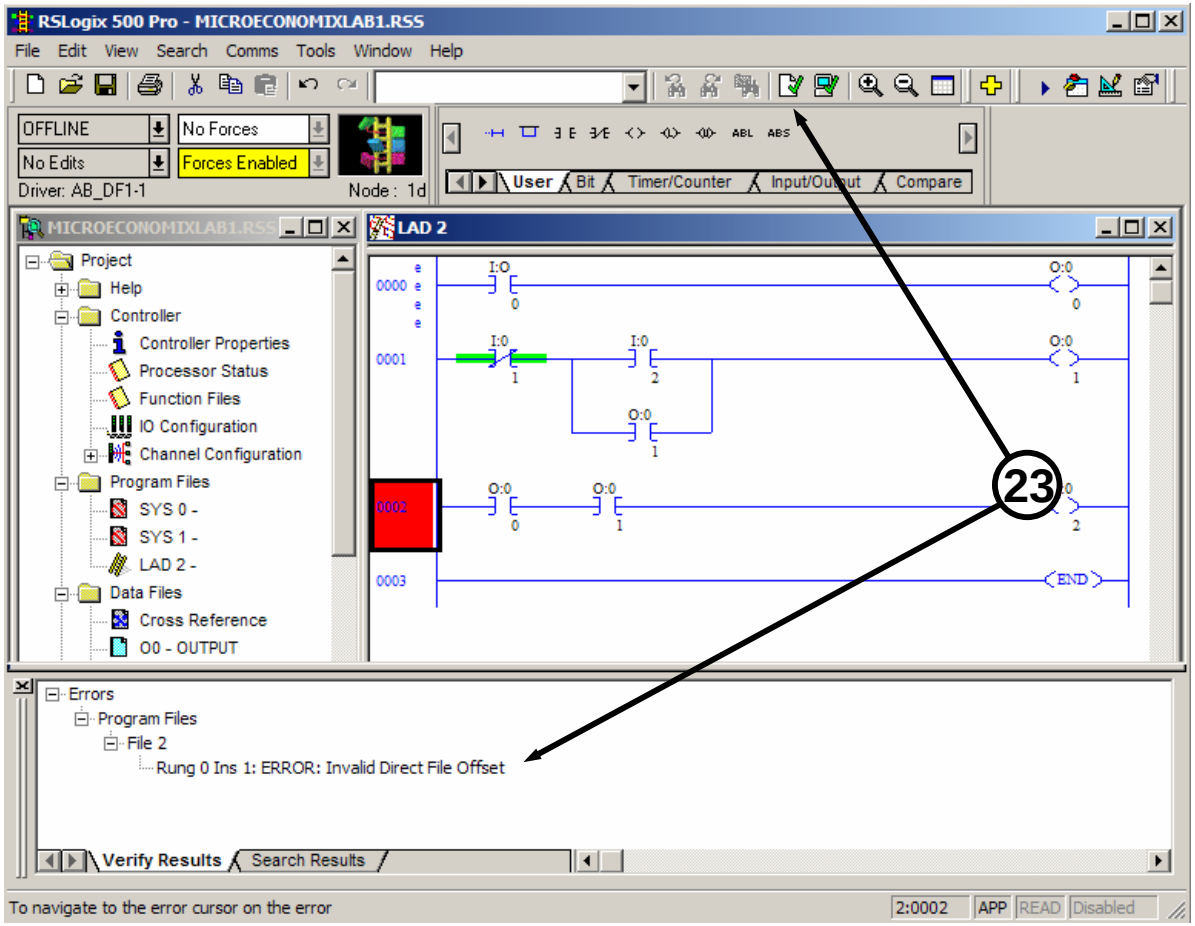
- There are two types of verify. The first one verifies the file you are in and only that file. The second verifies all the files created or the total project created. Because this program only resides in one file we will use the first one.
- Click on the “Verify file” button
- When the verify is completed and no errors are found all program edit markers will disappear and no errors found is displayed at the bottom.
- Go to next step if errors are found.



Verify your work

23.If Program has errors

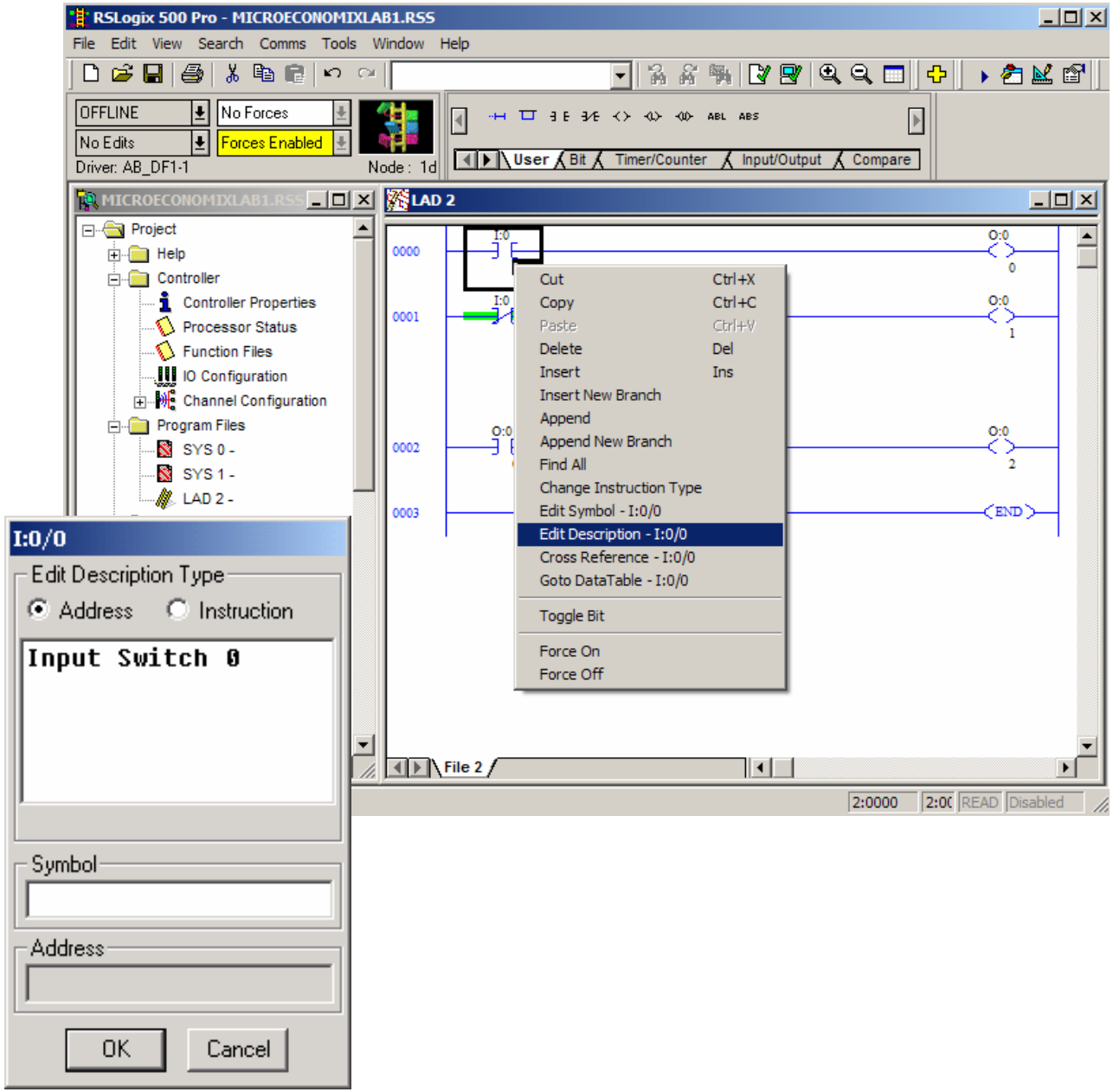
- **To find the errors in the program click on the error message in the “Verify results window” the error is then highlighted in the ladder window.**
- **Fix the error and run “Verify file” again.**
- **When all the errors are fixed you can then save and download the program.**



Documenting your Program

24.Documenting your work

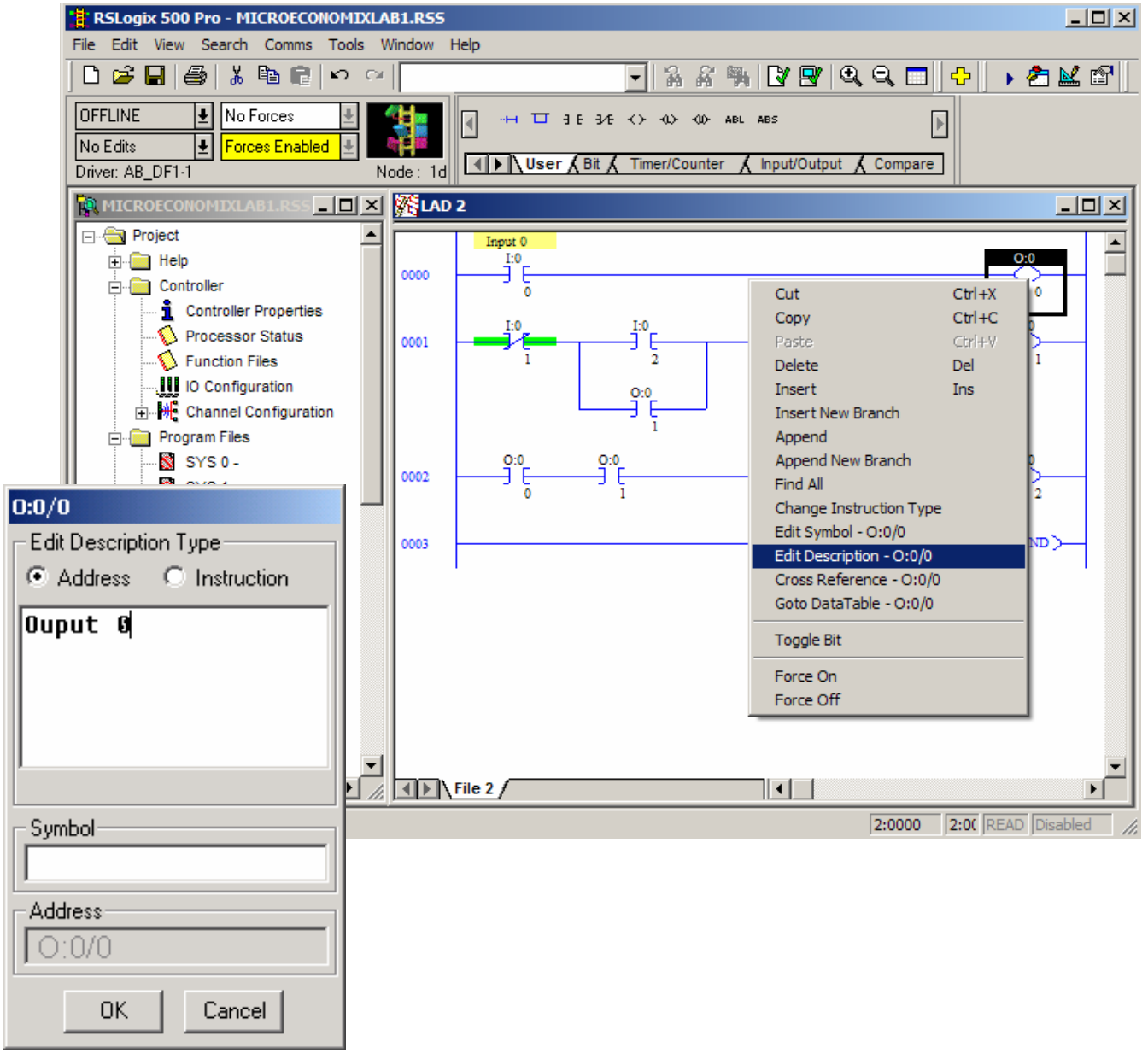
- Click on the Input I:0/0 to highlight
- Right mouse on I:0/0 and select “Edit Description- I:0/0”
- Select “Address”
- Type “Input Switch 0” in the Edit window
- Select “OK”



Documenting your Program

25.Documenting your work

- Click on the Output O:0/0 to highlight
- Right mouse on O:0/0 and select “Edit Description- O:0/0”
- Select “Address”
- Type “Output 0” in the Edit window
- Select “OK”



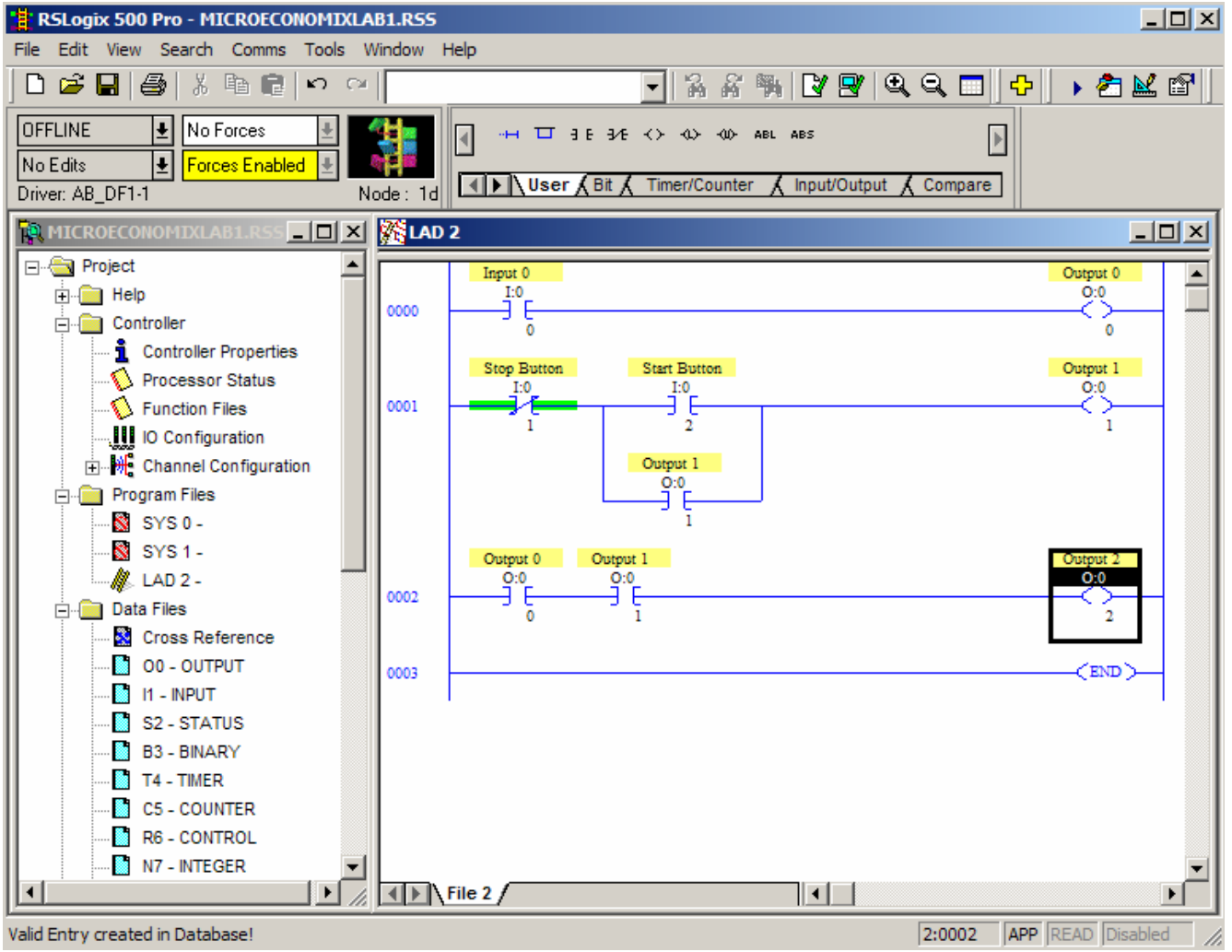
Documenting your Program

26.Documenting your work

- **Click on the Input I:0/1 to highlight**
- **Right mouse on I:0/1 and select “Edit Description- I:0/1”**
- **Select “Address”**
- **Type “Stop Button” in the Edit window**
- **Select “OK”**
- **Complete the rest of the instruction descriptions**

Start Button = I:0/2
Output 1 =O:0/1
Output 2 =O:0/2

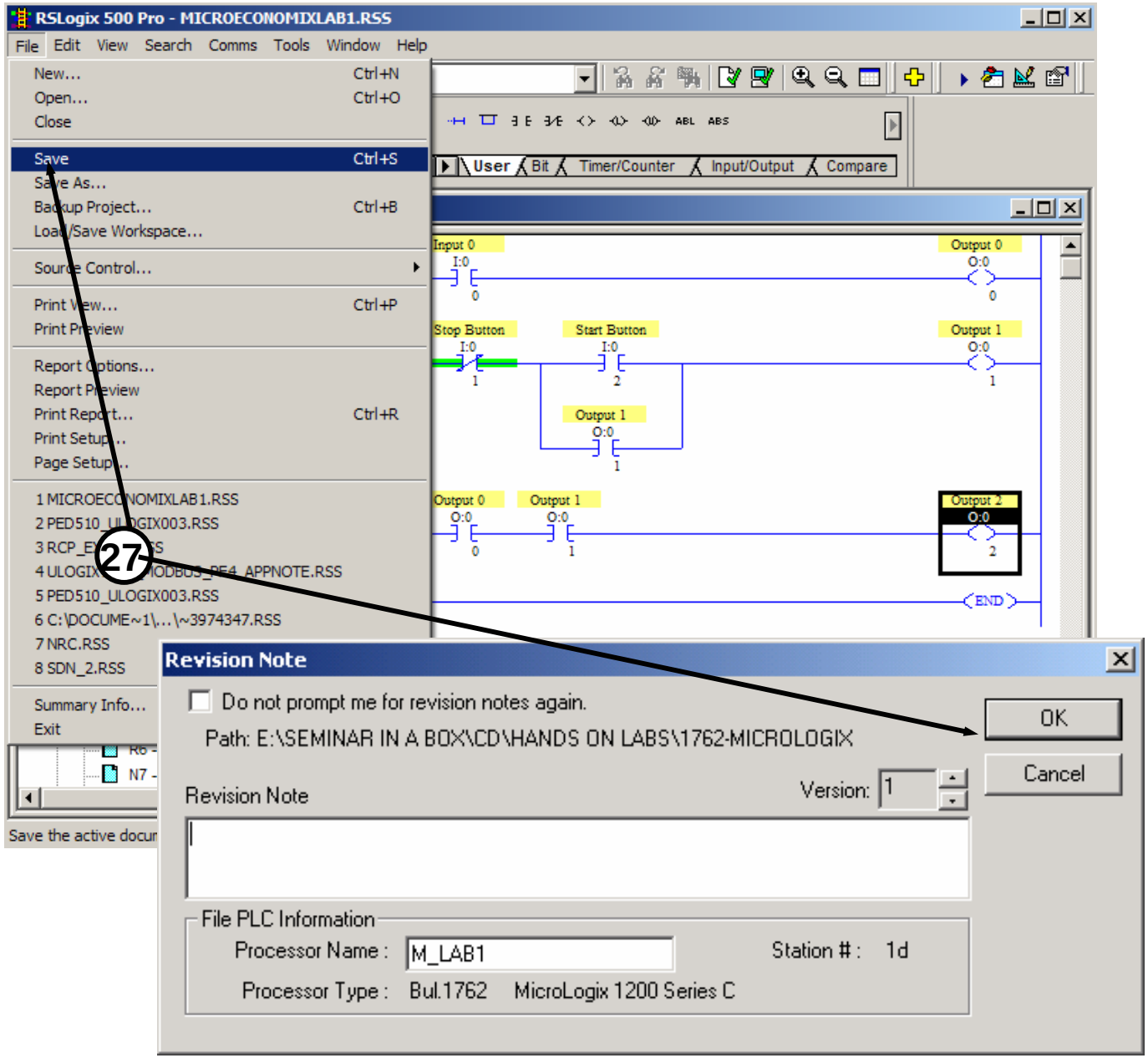
Notice that some of the instructions have the same descriptions. This is because the descriptions are link to the address of each instruction.



Save your work

27. Save your work

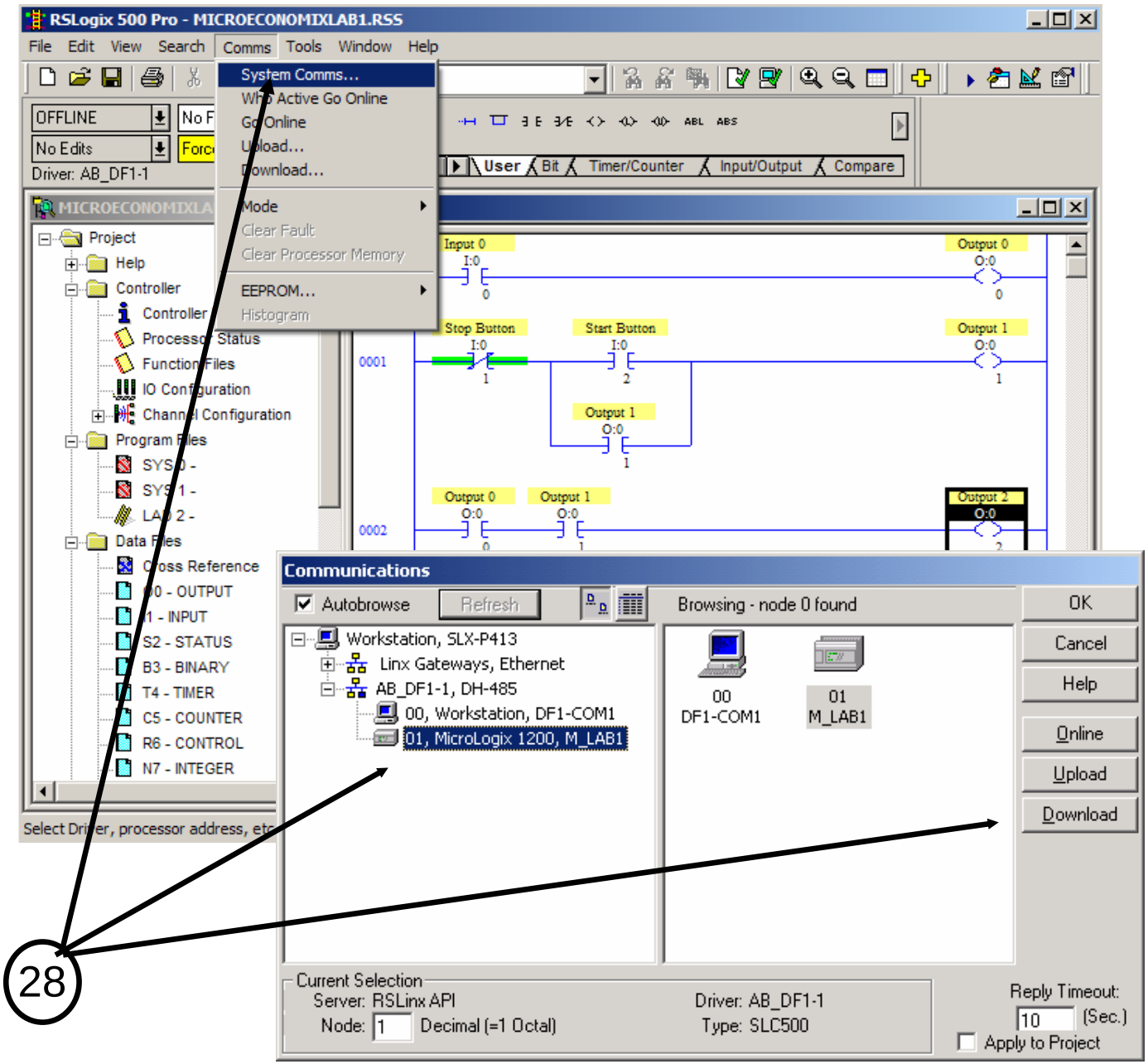
- Click on the “Save” button
- Click “Ok” for Revision note box. The revision note box is used to keep track of changes made to the existing program. You can create many revisions of the same program. This feature can be disabled if desired.



Transfer the Program to the Micro

28.Download the Program

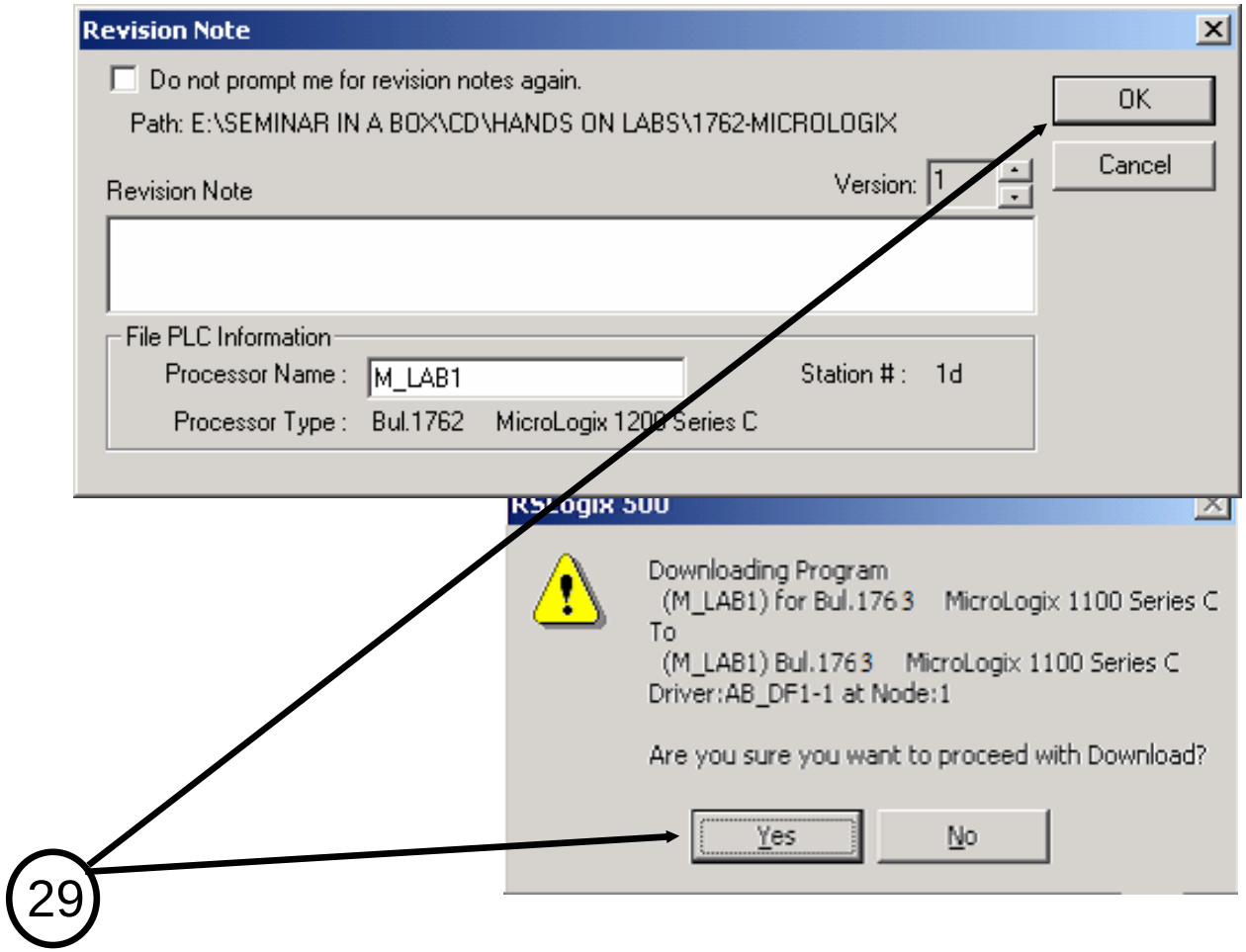
- **Select the menu item “Comms>System Comms”**
- **Three primary selections**
  - “Online” Establish the “path”
  - “Upload” Receive from the controller
  - “Download” Send to the controller
- **Highlight the device at Node 01.**
- **Select “Download”**

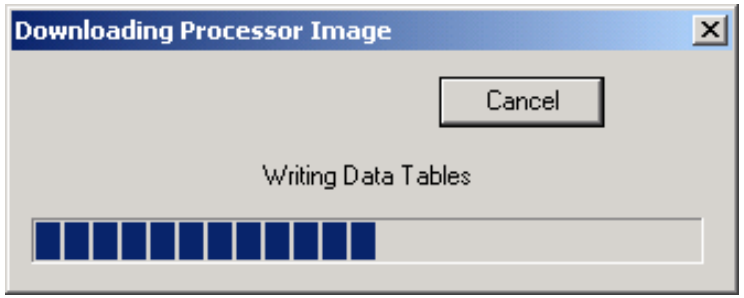


Transfer the Program to the Micro

29.Download the Program

- **Select “OK” in the Revision note window. The revision note box is used to keep track of changes made to the existing program. You can create many revisions of the same program. This feature can be disabled if desired.**
- **Select “Yes” to download your program over the existing program that resides in the processor. This window will appear when ever a program is being downloaded to the processor.**
- **Download verification window will appear when the download takes place**

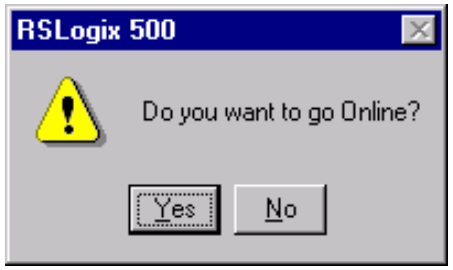




Transfer the Program to the Micro

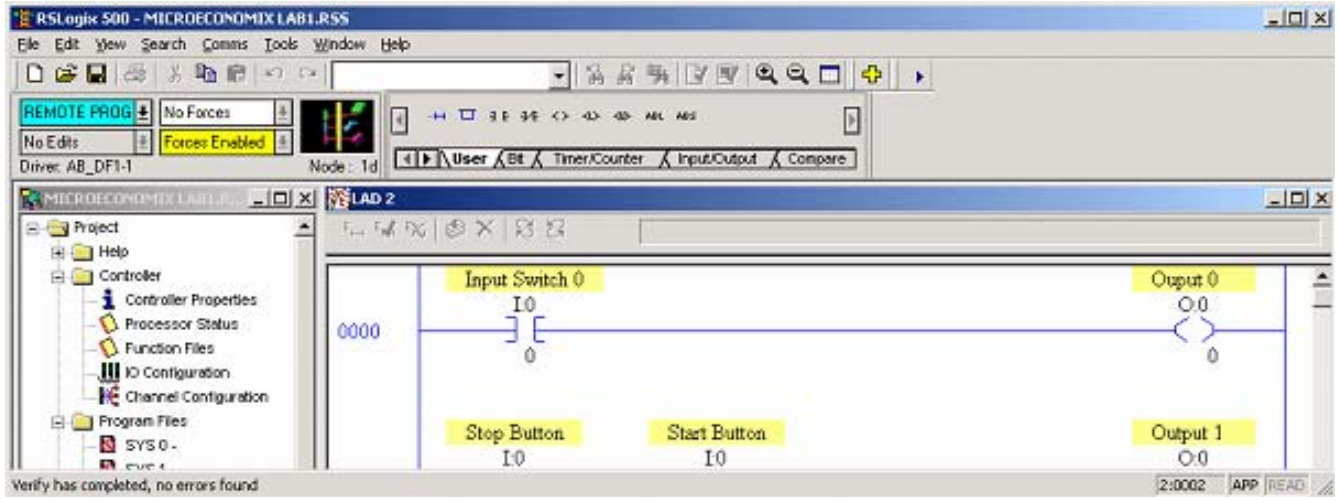
30.Download the Program

- Select “Yes” to go online. This will allow you to monitor the program that now resides in the processor.

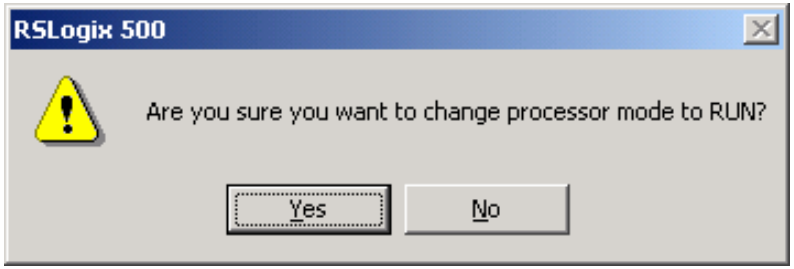


31.Put the Micro into RUN

- Click on the down arrow next to the word REMOTE PROG
- Three Run selections
  - “Run” Controller “scans” the program
  - “Test Continuos”
    - Outputs are disabled
  - “Test Single Scan”
    - One scan cycle with outputs disabled
- Select “Run”
- Select “Yes” for “Are you sure window



32.Test your program using the switches and lights. Does it work the way you expect it to?



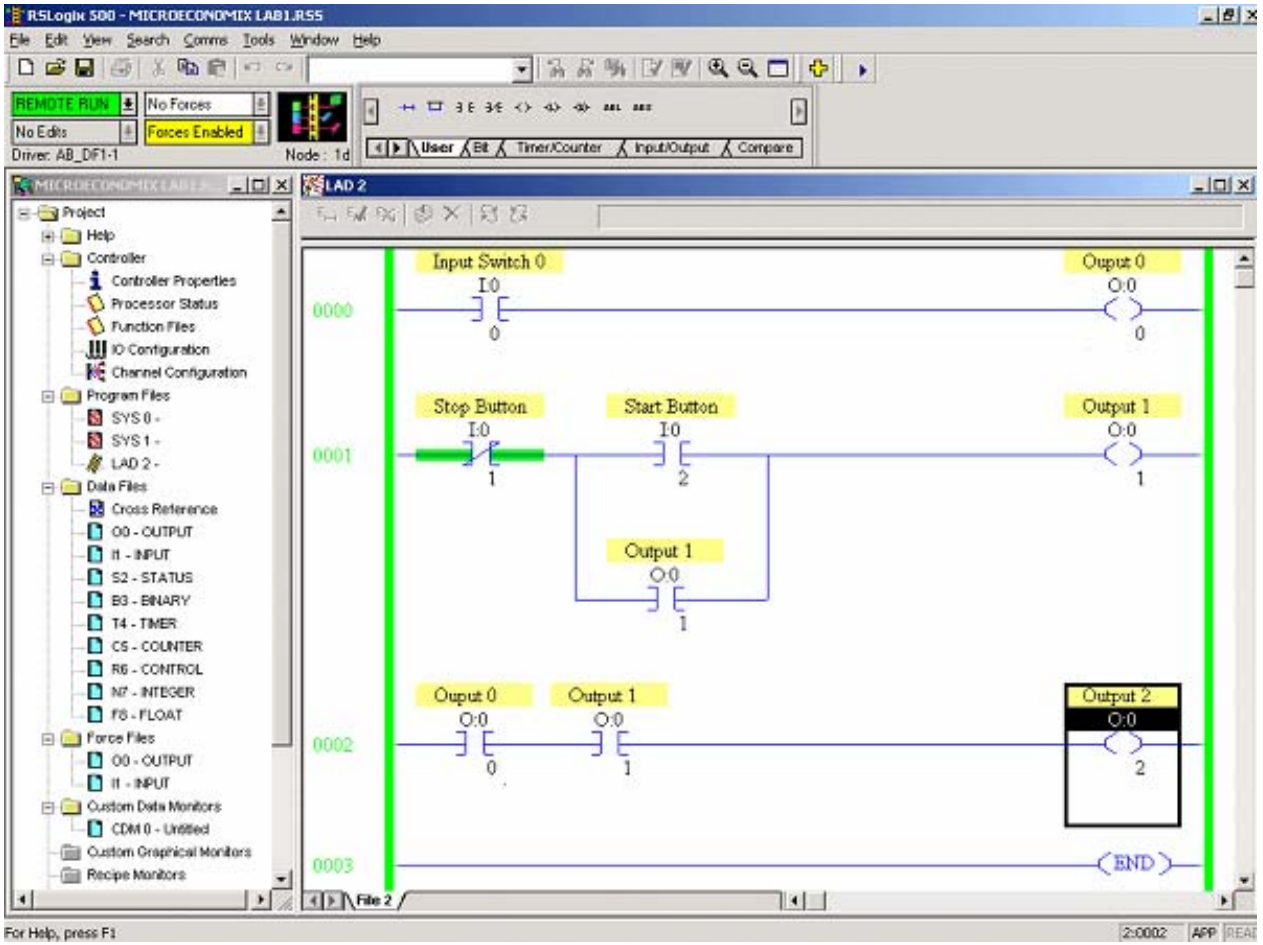
Monitor the Controller

With the controller in "Remote Run", you can monitor or edit data within the controller. This allows:

- Program debugging
- Change data variables while in run

When "Green" bars are shown on either side of logic elements, this indicates "Logical Continuity", this helps to determine how the application is operating.

This design is to help in debugging an applications logic.



Monitor the Program

PROGRAM OPERATION

RUNG 0- Press input button #0, output #0 will turn ON, disable button and output #0 will turn OFF. This output is dependent on the input condition.

RUNG 1-Press input button #2 (start button), output #1 will latch ON. Press input button #1 (stop button) will turn OFF output #1. This is a simple motor control circuit. This circuit utilizes both AND and OR placement of instructions.

RUNG 2- The two inputs on rung 2 are conditions of rungs 0 and 1. The output (output #2) is a condition of the two inputs. So each outputs of rungs 0 and 1 must be true to turn on output #2. This circuit utilizes AND placement of instructions.