# PLC200
# Module 2 Information

Created by Tom Wylie

On 10/13/16

SLC-500 chassis, power supply, processor & I/O modules
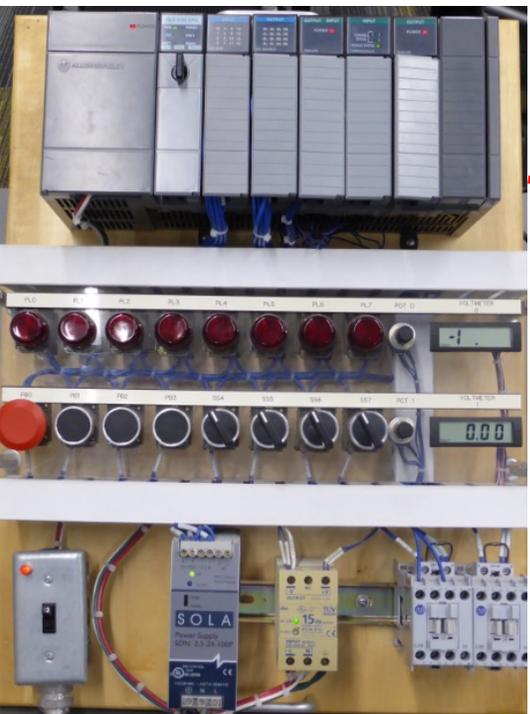
SLC-500 Training Unit used at NSCC for the PLC courses

PLC Programming Panel
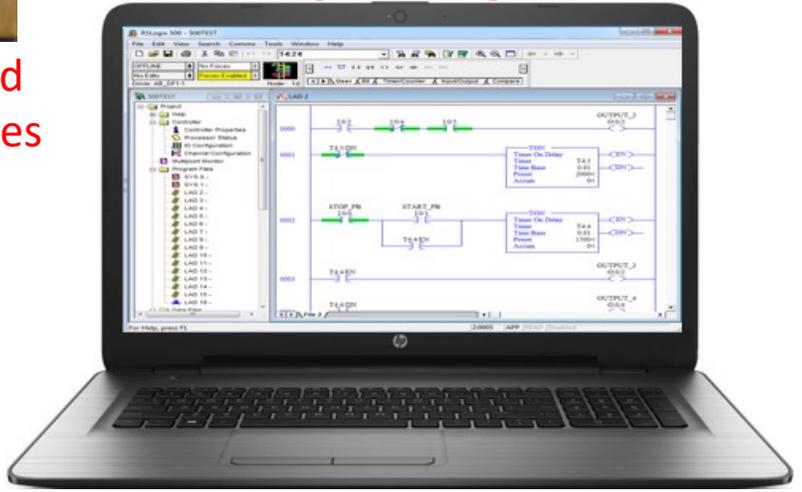
SLC-500 processor diagnostic indicators

SLC-500 processor

A Program Panel is a Windows based computer, that will have the Rockwell Software loaded that will program and troubleshoot an SLC-500 PLC, and a CompactLogix PLC. RSLinx communication software will be loaded as well. Communication cables will connect between the ports on the computer to the ports on the PLC processor.
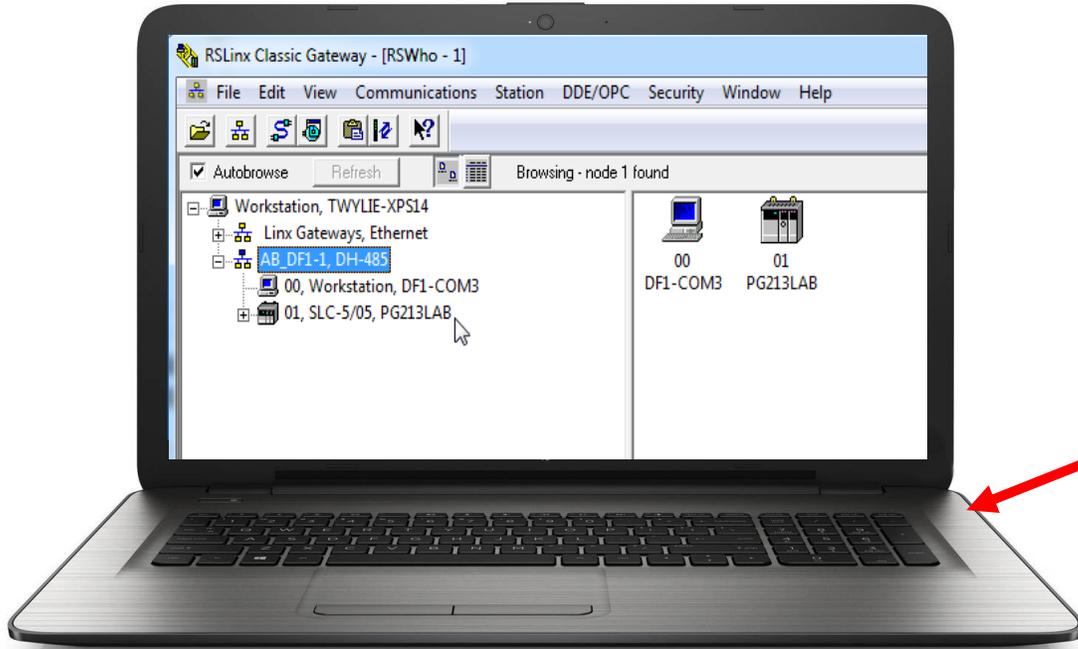
RSLinx is a communication software that is used to provide communications between an Allen Bradley PLC processor and the Windows environment of a PC based computer.
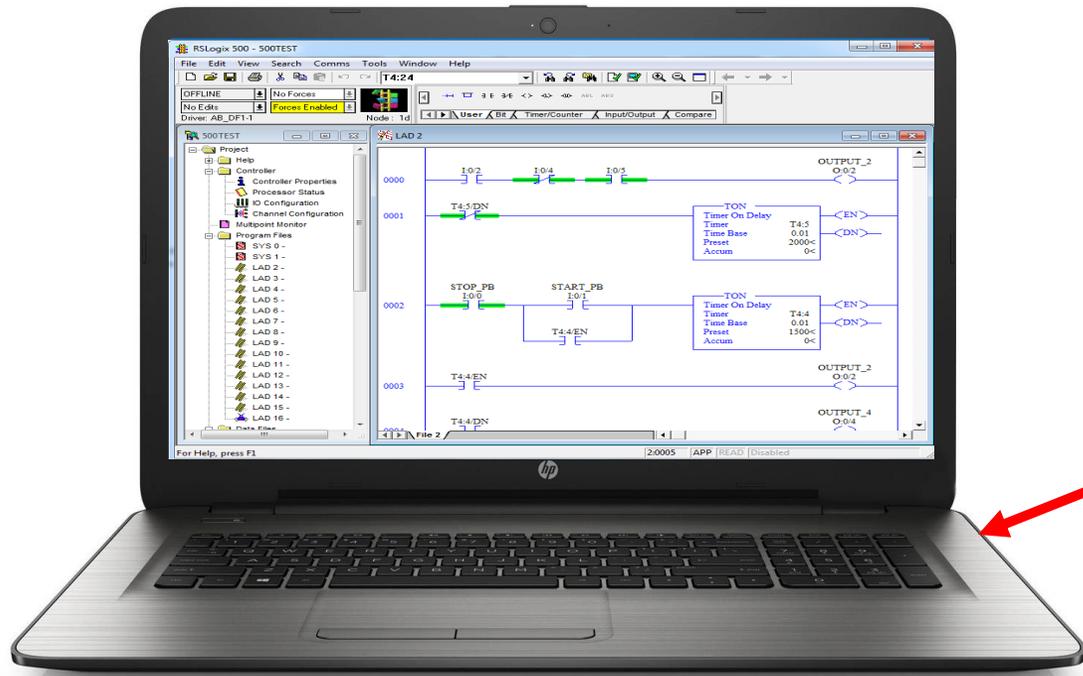
RSLogix500 is programming/trouble-shooting software used with the SLC-500/MicroLogix PLCs. The software is loaded onto a PC based computer, and must see an activation file from a FactoryTalk server in order to execute and run.
When RSLogix500 is purchased, RSLinx Lite software will come in the package, which will be used for PLC communication.

RSLinx Communication Application
PLC to Windows Applications

RSLogix500 Programming and Troubleshooting software application
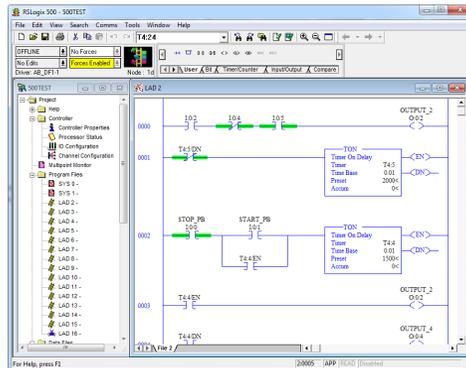
Ethernet Cable

Communication Port (Ethernet or RS-232) on the Program panel (computer)
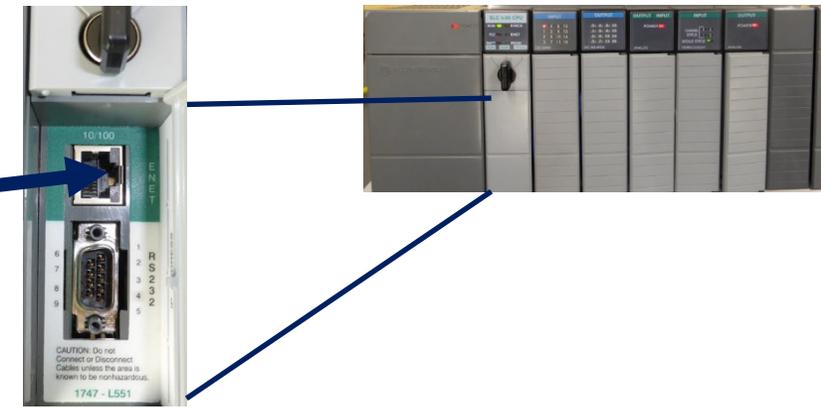
RSLinx is used to establish communication between the PLC and the Program Panel. This is done through an RSLinx driver. RSLogix500 will to through RSLinx to communicate with the PLC processor. RSLinx is required for any communication with the PLC processor, which would include: Upload, Download, Online and Read I/O configuration. The same RSLinx application will be used with the SLC-500, MicroLogix and CompactLogix processors.

RSLogix500 is in Offline mode
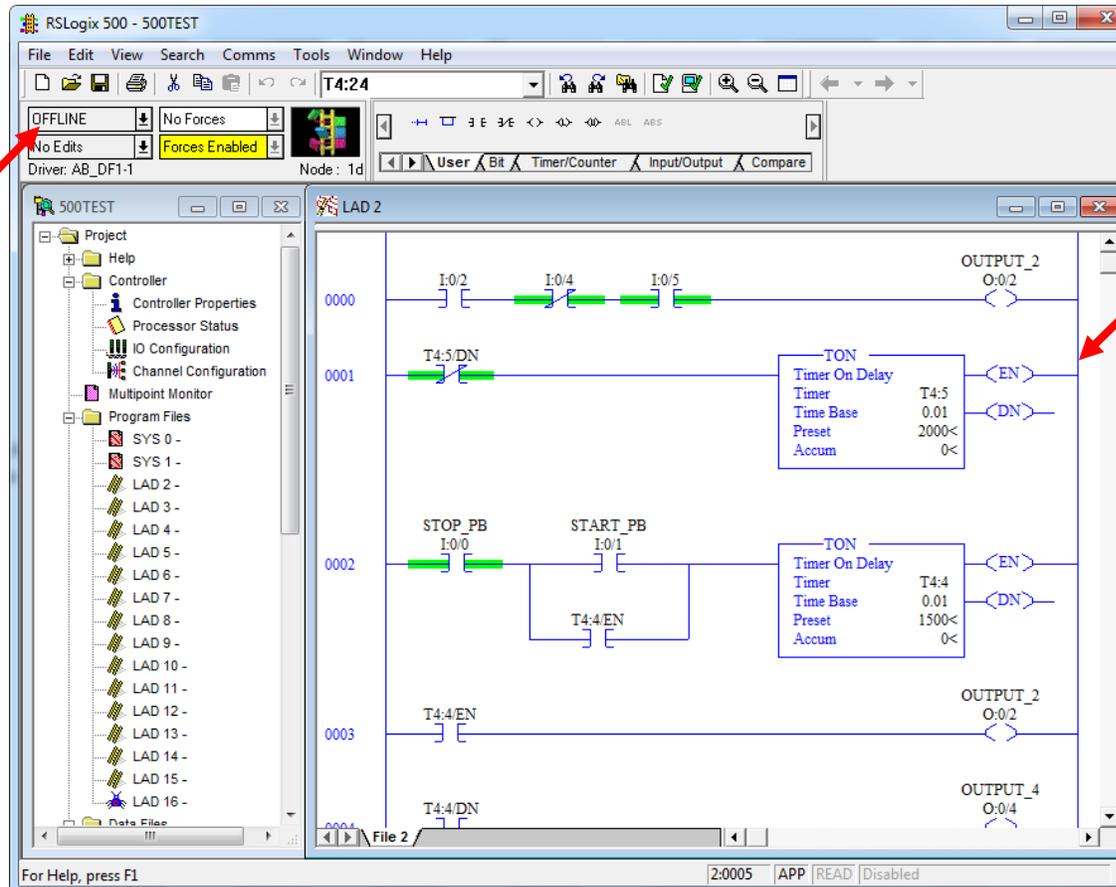
Ladder Logic Program

RSLogix500 is used to create the PLC program (ladder logic program) Offline. This means that the program will be saved to a medium on the computer (hard drive or memory stick). This will be called a PLC project that has a number of elements besides the ladder program.

The PLC project created with RSLogix500
Will be downloaded (computer to PLC) to
The PLC processor.  RSLogix500 will use
RSLinx to communicate with the PLC processor
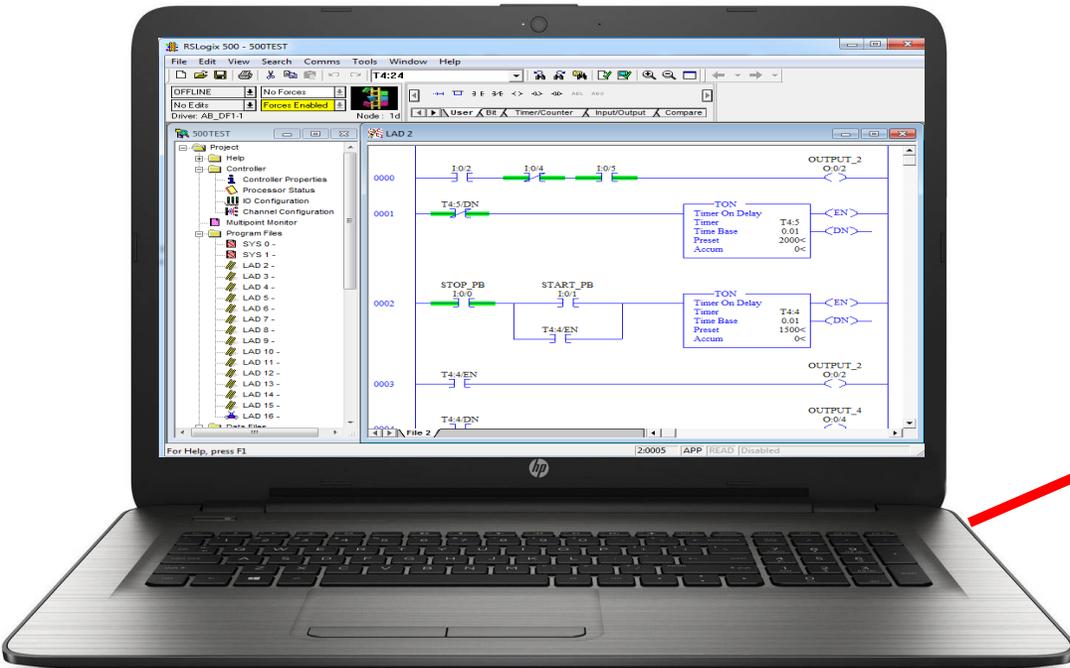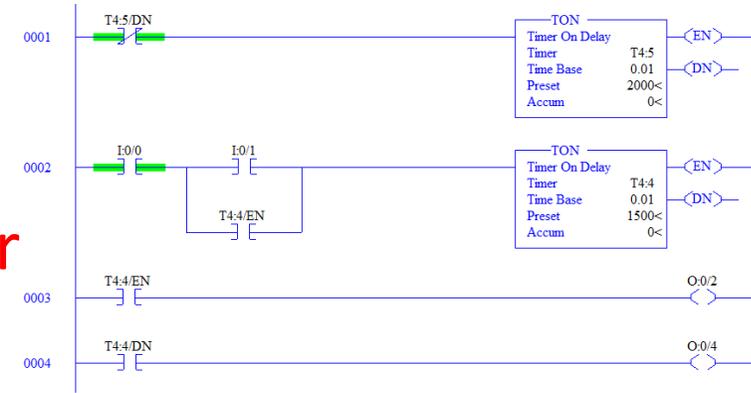


The PLC project contains the ladder logic program that will actually run the machine, based on how it was programmed.

The **Download** function in RSLogix500 will Download the ladder programs and data files, I/O configuration, and the processor name. All of these elements have a purpose in assuring the operation of a PLC based machine.
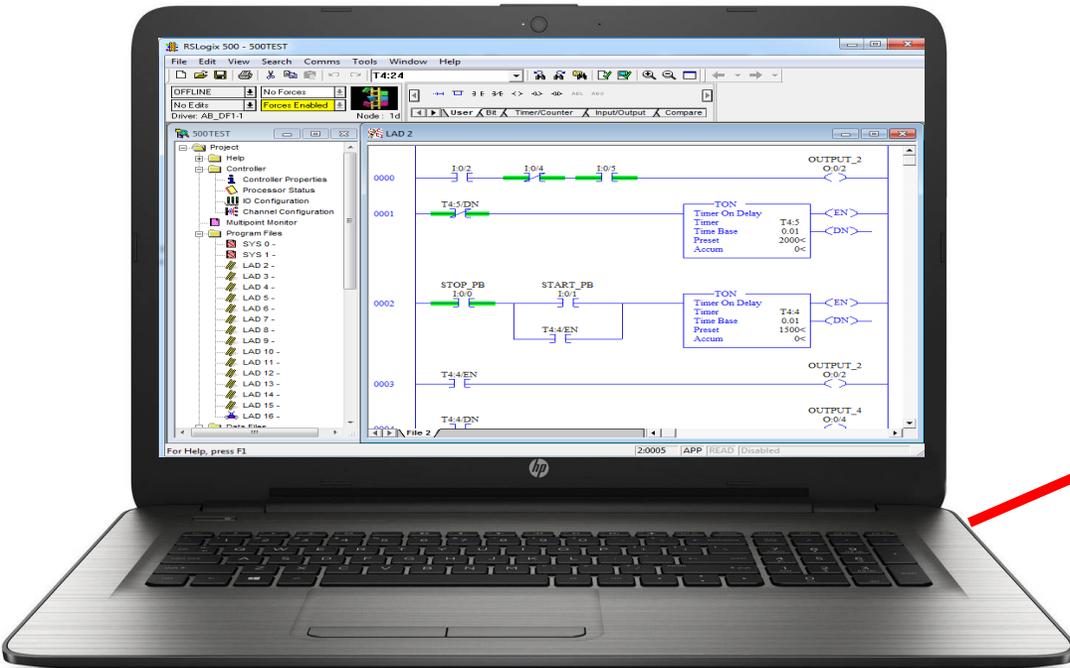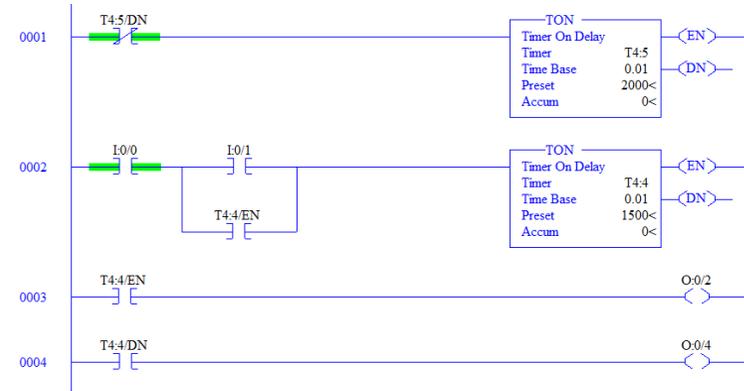


When the PLC project is downloaded, the processor must be in program mode, thus the machine will be shut down. You cannot download to a processor that is in run mode

When RSLogix500 is used to create a PLC Project, this will be done **Offline**. When a project is saved, it will be stored on the hard drive of the computer or a memory stick. When the user is Offline, the PLC operation will not be affected
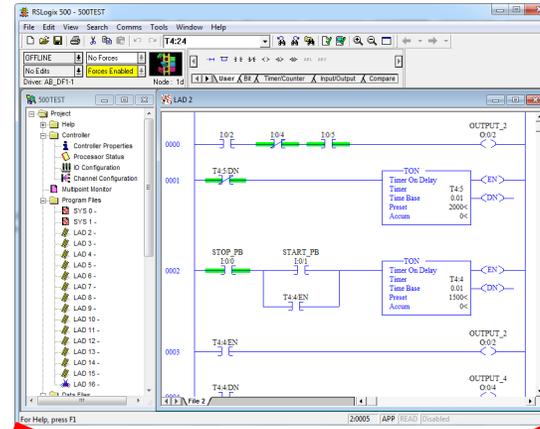




If the user is viewing a ladder logic program on the screen, the logic will be coming from the project file stored on the computer hard drive or the student's memory stick.
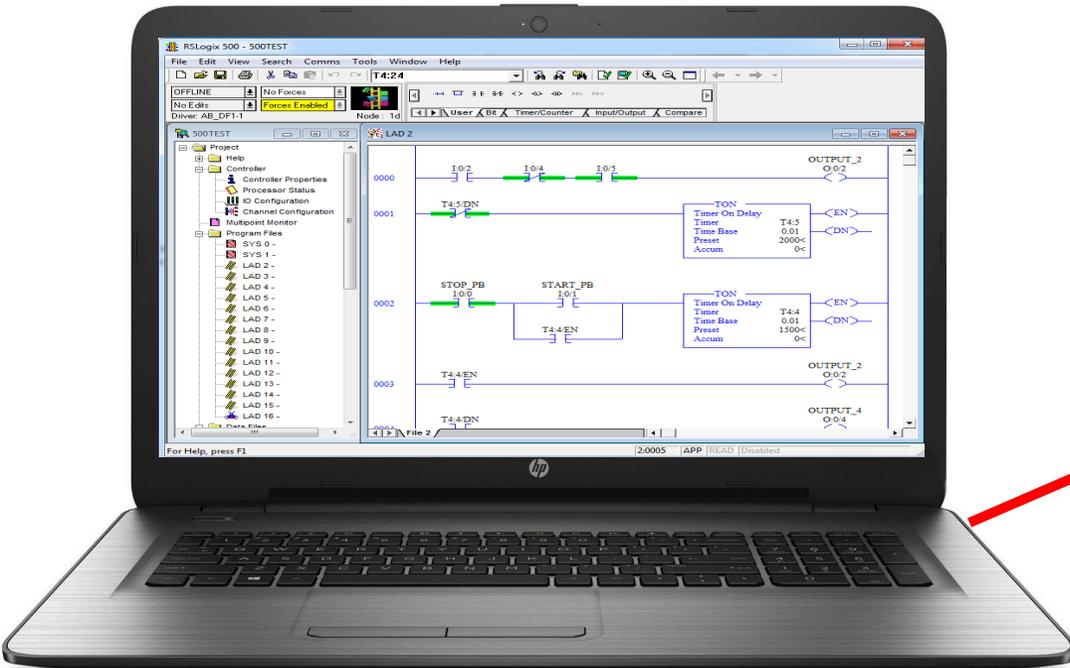
When RSLogix500 is used to view the PLC project running in the PLC, the user will go **Online** to the PLC.
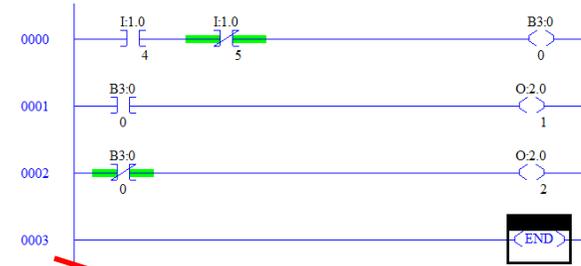


If the user is viewing a ladder logic program on the screen while online, The program will be coming from the PLC processor.
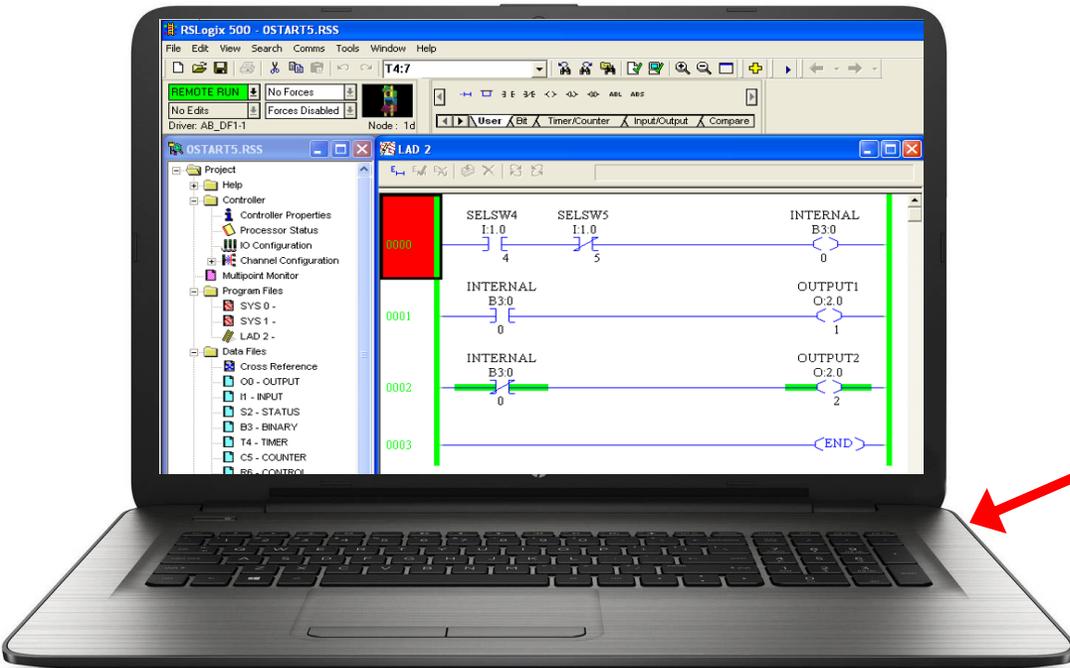
When RSLogix500 is online to the PLC processor, the ladder in the window will be spinning. The faster the communication, the faster it will spin.

The user will also see the mode of the processor in the upper left corner of the screen (lime green).
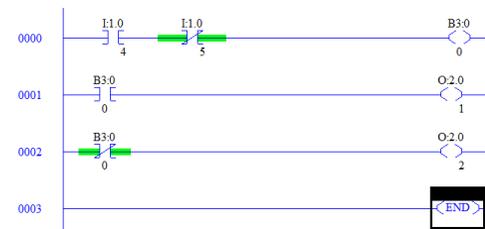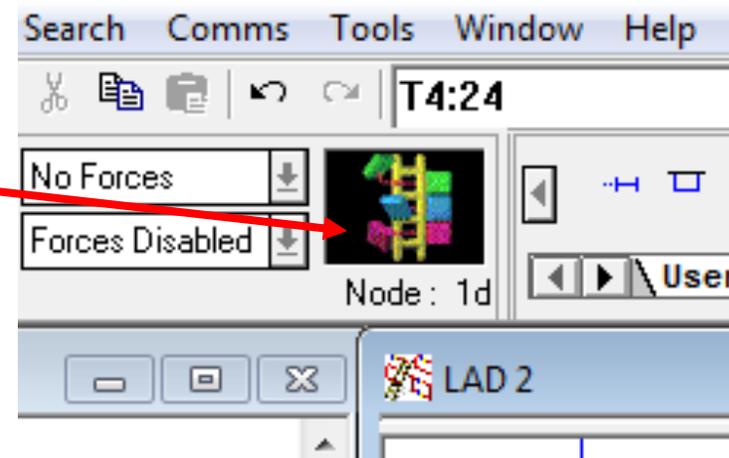
If the user is viewing a ladder logic program on the screen while online, The program will be coming from the PLC processor.
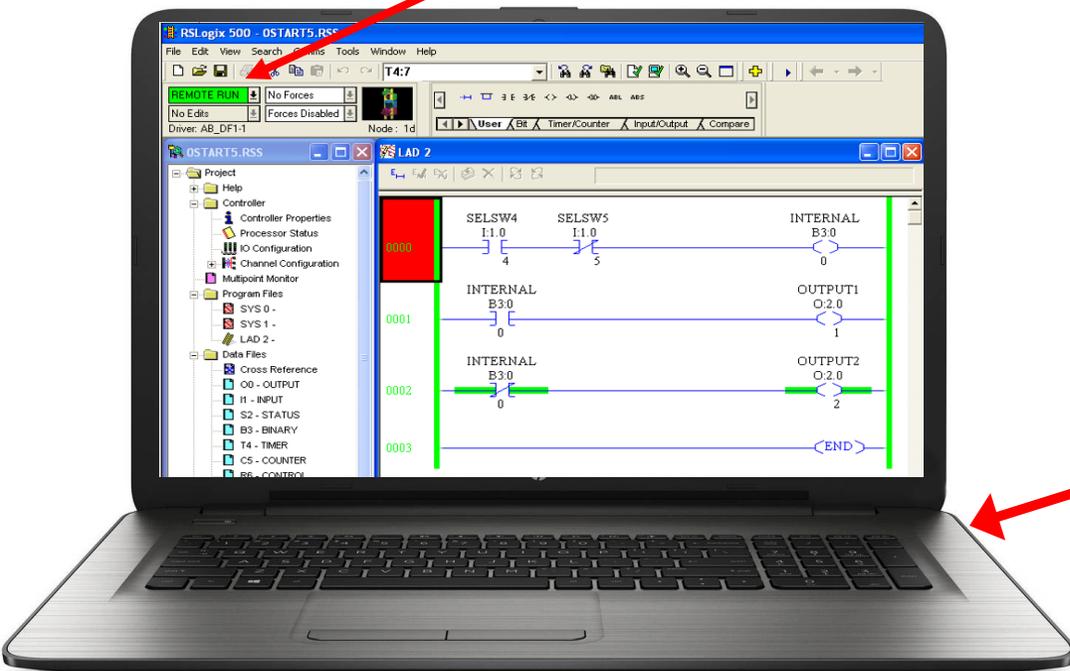
The **Download** function in RSLogix500 will Download the ladder programs and data files, I/O configuration, and the processor name. All of these elements have a purpose in assuring the operation of a PLC based machine.
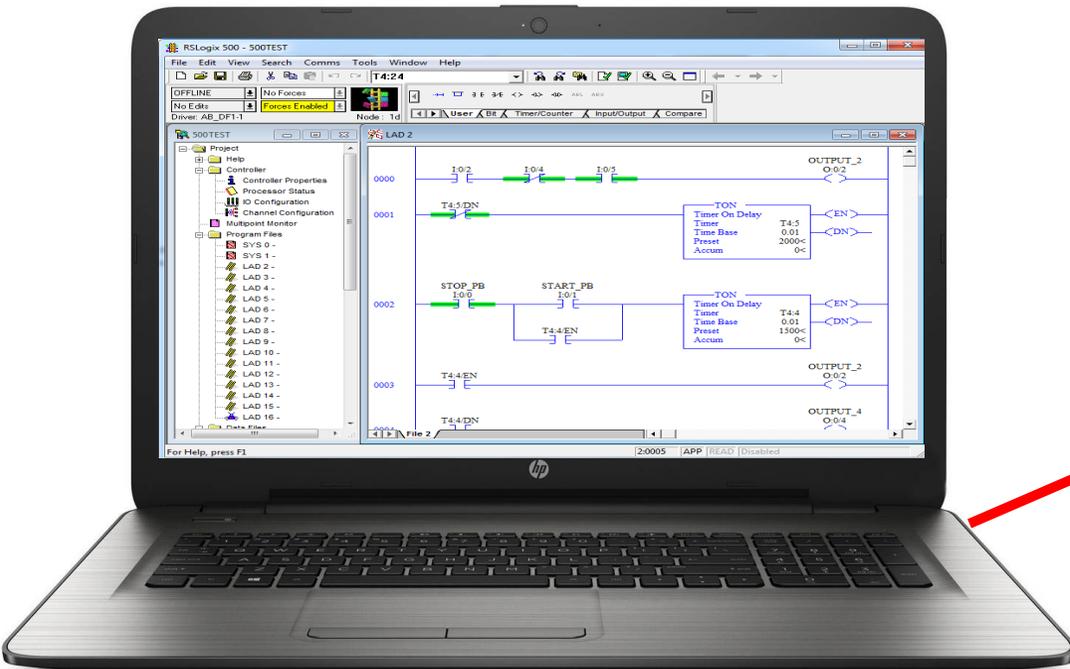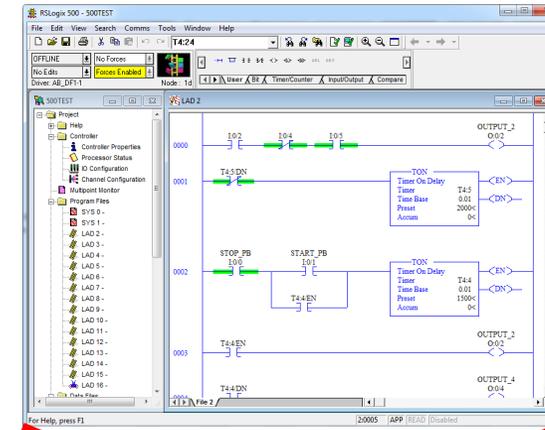


When the PLC project is downloaded, the processor must be in program mode, thus the machine will be shut down. You cannot download to a processor in run mode

The **Upload** function in RSLogix500 will copy the contents of the processor (primarily the program and data files) to the hard drive or memory stick of the computer. If a change is made in the program in the processor, the user should do an upload to save this information.
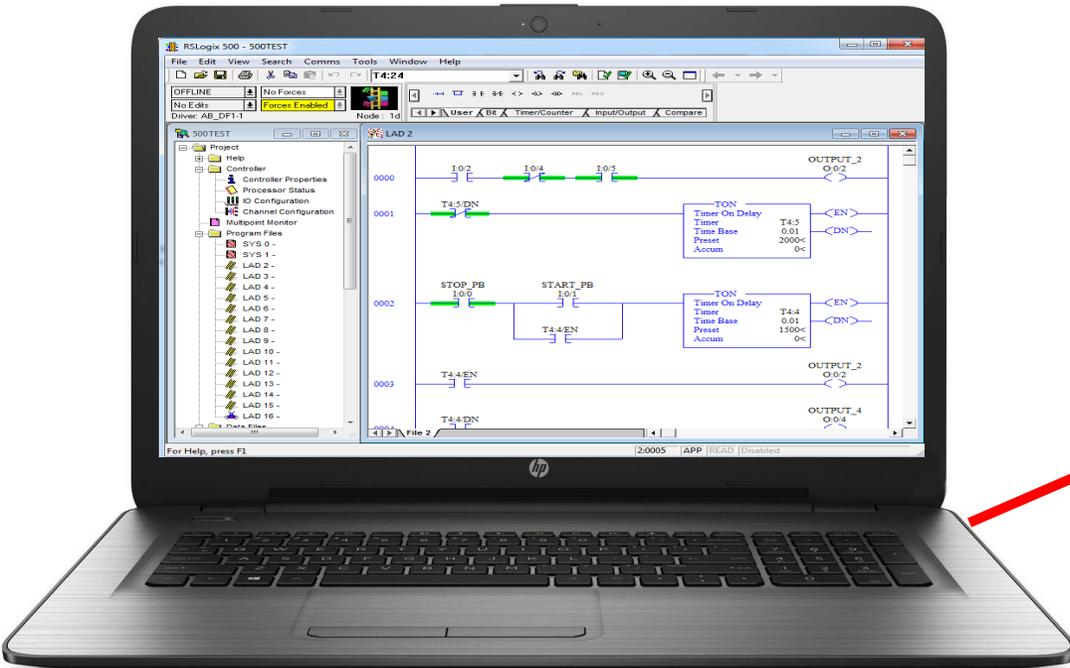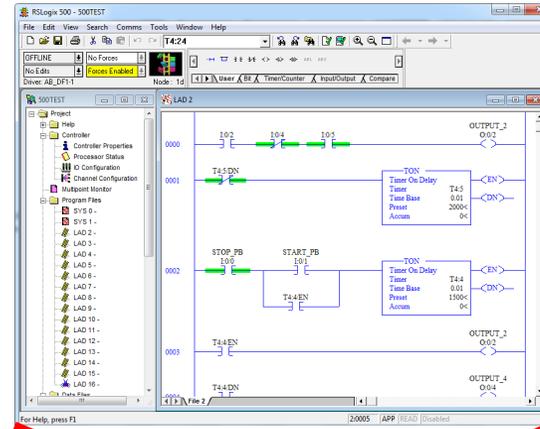


When the PLC project is uploaded, the processor can be in either the Run or Program mode. If the user is Online, click the save icon and it will do an Upload.

SLC 5/05 CPU

RUN    FORCE

FLT    ENET

BATT    RS232

RUN    REM    PROG

PROG Mode

REM Position

RUN Mode
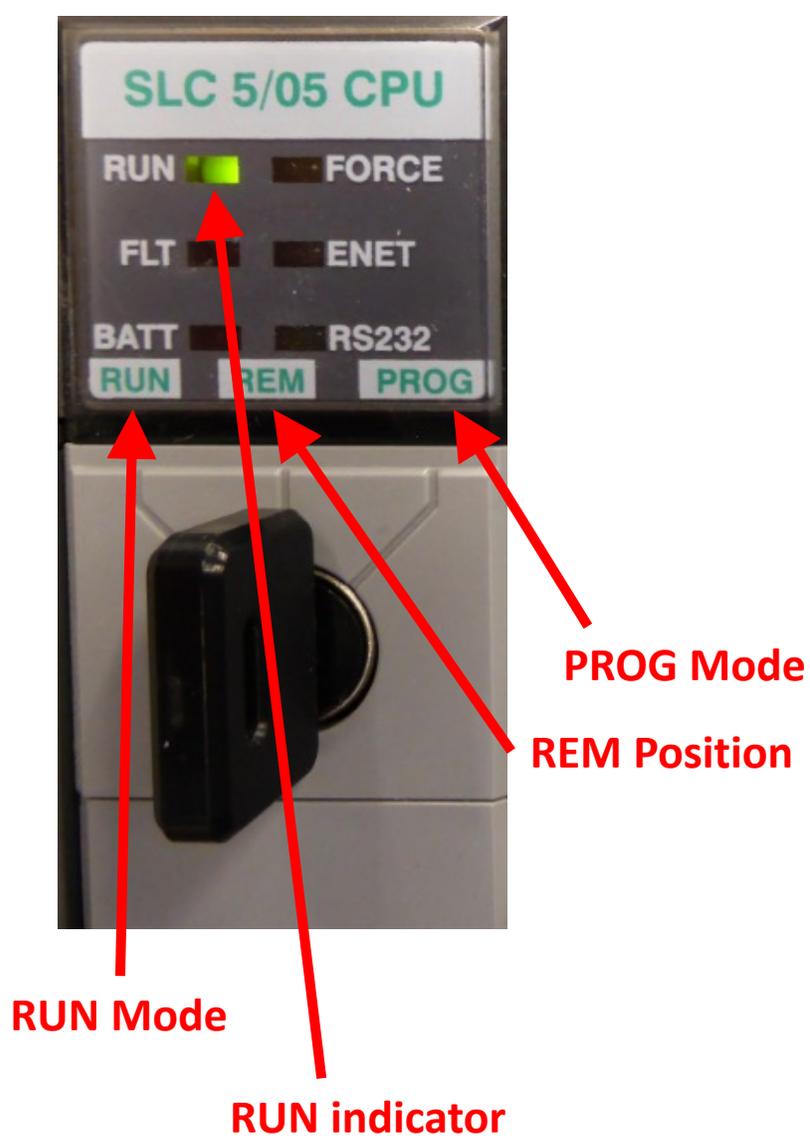
RUN indicator

When the key-switch on the processor is in the **RUN position**, the processor is in the RUN mode. The RUN indicator will be on. In this mode the outputs will be enabled, thus the ladder program will control the outputs.

When the key-switch is in the **PROG position**, the processor will go into Program mode. The RUN indicator light will go off. On an SLC-500 or Micrologix processor, this will disable the outputs, shutting down the machine the PLC is controlling.

When the key-switch is in the **REM position**, then the user can change the mode of the processor with RSLogix500 when the program panel is online to the PLC processor. In RSLogix500, if the key-switch is in remote, the processor will be in the **Remote Run mode**, or the **Remote Program mode**. There is also a Remote Test mode that will be covered later.

This slide defines what the user will see in the ladder display window. This example has part of a program (rung 0001). The **instruction** will have an address assigned to it.
*The user can also create an Address Symbol (green background) to the address (a short text designation that can be used in place of the address. It is in a capitol letters, and is a unique name for that address).
*The user can also create an Address Description for the address (yellow background). This can be an in depth description of the address and what it does.
*The symbols and descriptions can be turned on and off, through the Properties menu for the ladder display window.

B3:6
XIC
0

I:1
XIO
2

B3:4
OTE
14

O:0
OTL
34

O:0
OTU
22
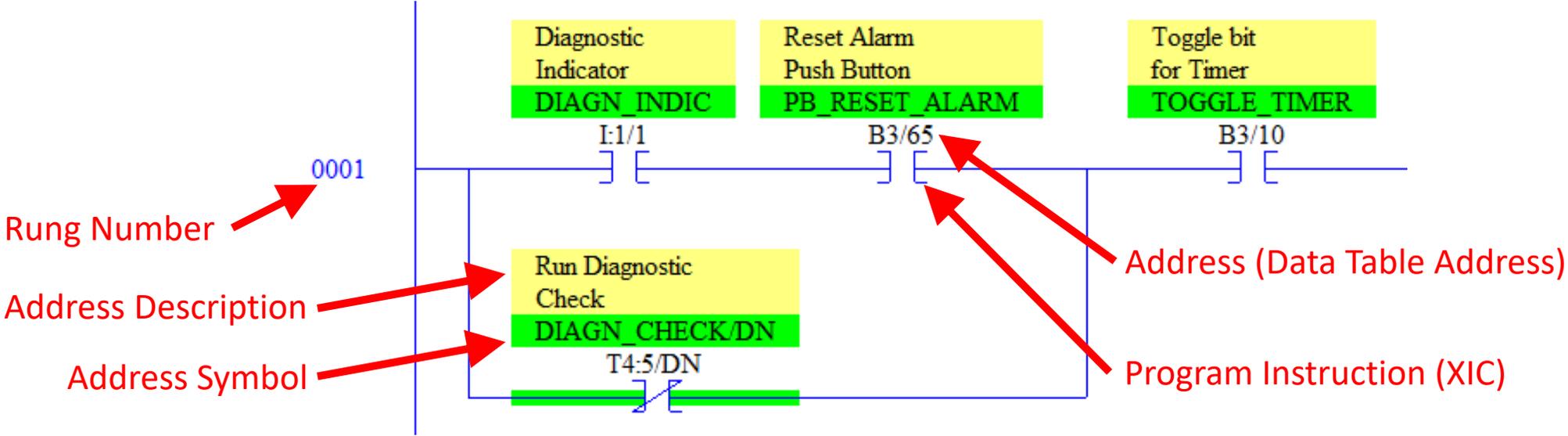
## Basic Relay Type Instruction

Each instruction in the PLC is assigned a three letter mnemonic. These are important to remember when working with RSLogix500.

XIC – Examine if Closed – is like a normally open contact

XIO – Examine if Open – is like a normally closed contact

OTE – Output Energize – is a basic coil output instruction

OTL – Output Latch – is a retentive type of output instruction

OTU – Output Unlatch – is the reset for the retentive coil (OTL)

**Memorize** the relay instruction Mnemonics with the actual symbol for the instruction that will be used in RSLogix500. Other mnemonics are self explanatory. These are not.
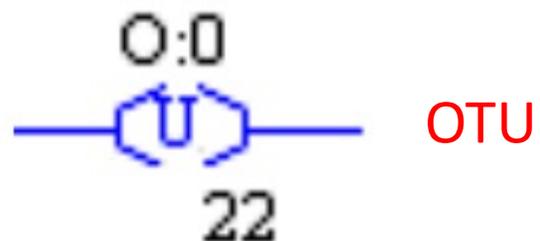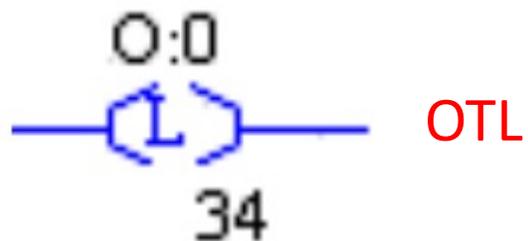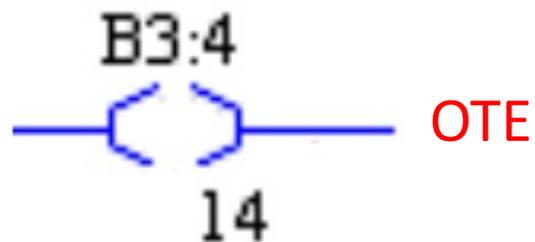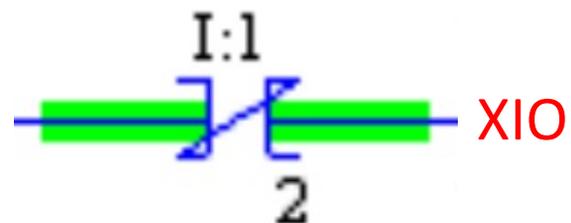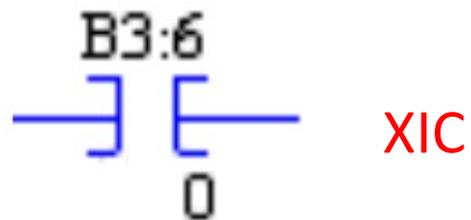
C:\RSLogix500 Projects\

Line6.RSS - Project
Processor Name
I/O Configuration
Program Files (ladder logic)
Data Files (I/O image, timer/counter data, etc.
Database
 -Address Symbols
 -Address Descriptions
 -Rung Comments

Project Files Search Path:

| C:\RSLOGIX500 PROJECTS | Browse |

This is a setting in RSLogix500 to set the Default
directory found under the Options Menu

Computer ▸ Local Disk (C:) ▸ RSLogix500 Projects

Include in library ▾    Share with ▾    New folder

| Name | Date modified | Type | Size |
|------|---------------|------|------|
| Line6.RSS | 10/14/2016 7:01 AM | RSLogix 500 SLC Project File | 48 KB |
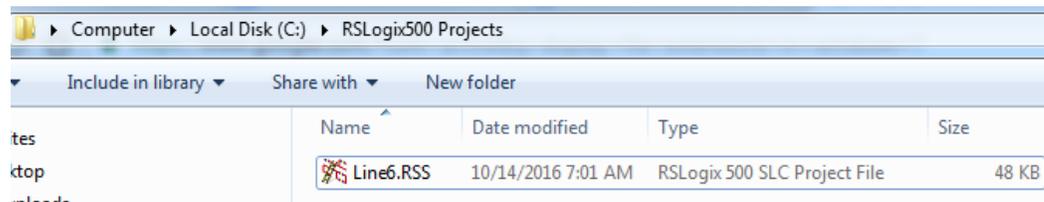
In Windows Explorer, the Line6 .RSS file is shown
in the C:\RSLogix500 Projects\ directory

The RSLogix500 projects should be stored in one common directory on the hard drive of the program panel. In this example, the projects are stored in the directory: C:\RSLogix500 Projects\. The project uses a .RSS file extension. The example shows a project named Line6.RSS. Inside the project is stored numerous elements such as ladder programs, data files, etc.

It is important that the Project Files Search Path (default directory) is set for where the project file is located, in order to bring up the symbols/descriptions from the project Database.

Viewing these symbols/descriptions on the screen is advantageous when troubleshooting.

Information in Processor after Download
Ladder Logic, Data Files
Processor Name, I/O Configuration

Program is coming from the PLC
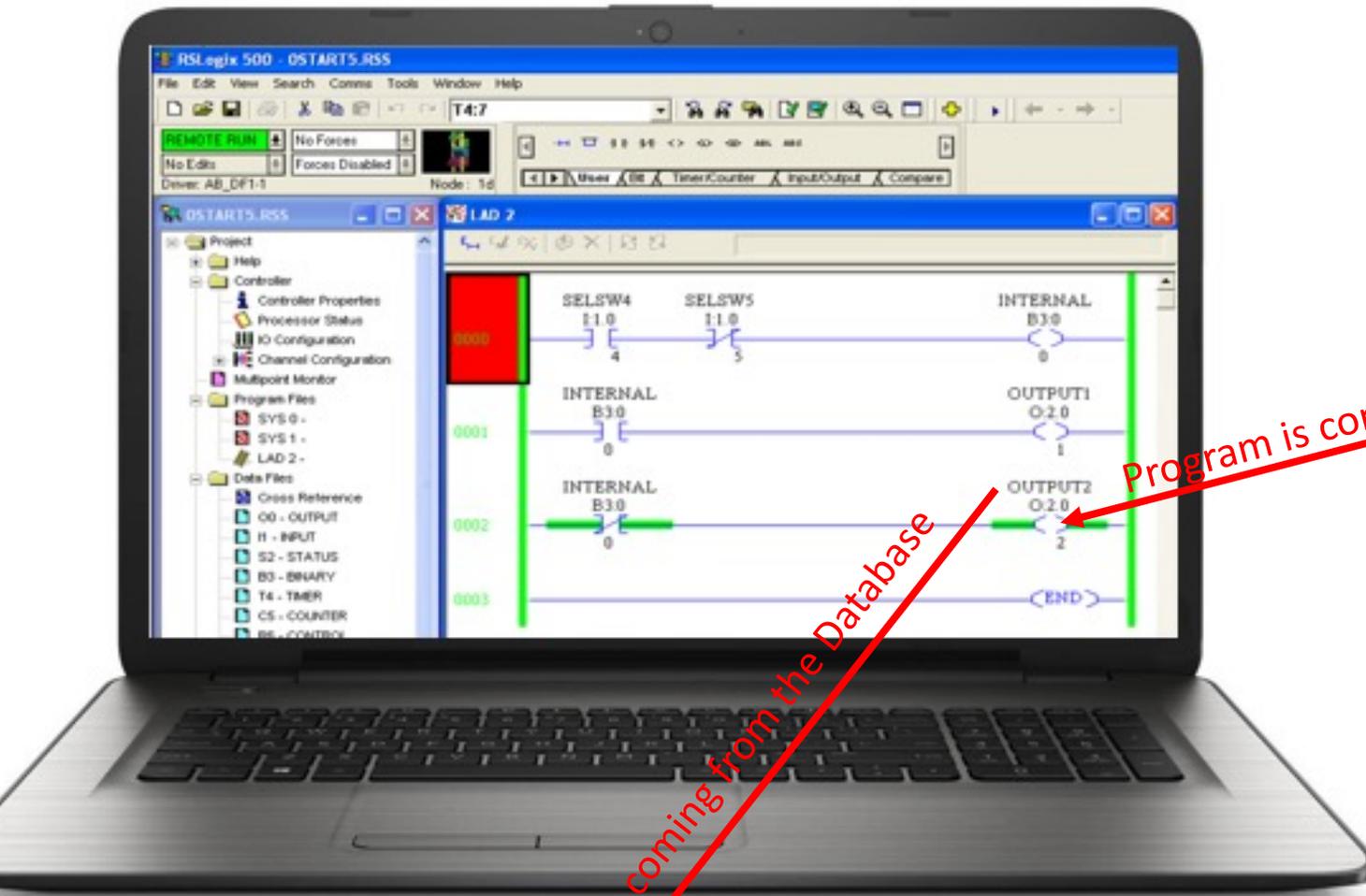
Symbol is coming from the Database

Line6.RSS - Project
Processor Name
I/O Configuration
Program Files (ladder logic)
Data Files (I/O image, timer/counter data, etc.
Database
 -Address Symbols
 -Address Descriptions
 -Rung Comments

When the user goes online, the Symbols/Descriptions come from the Database in the project file on the hard drive. The ladder logic will come from the processor.
The processor name is what ties these two together on the screen. When the user goes online, RSLogix500 looks at the processor name in the PLC, then searches for the matching processor name in each .RSS project file. It then displays the Symbols and Descriptions with the corresponding address on the screen.

**Very Important Info on the Processor Name**

Every project should have a unique processor name. If there are two PLC processors with the same name, there is a possibility that the wrong address descriptions could show up on an address in RSLogix500. This could create a major problem for the user if they are trying to troubleshoot a machine.

When a new project is created in RSLogix500, it has a default processor name of "UNTITLED". Change this name immediately. Many students use this default name, thus the software will get confused when ytry to go online, and list all the projects with that processor name for you to choose whiou ch project the online program is linked to.

In many industrial plants, the Engineer will make the file name (project) the same name as the processor name, in order to eliminate any confusion.

The processor name is limited to 8 characters.

**Data File S2 -- STATUS**

Main | Proc | Scan Times | Math | IO | Chan 0 | Chan 1 | Debug | Errors | STI | DI

First Pass S:1/15 = No
Index Register S:24 = 0
Free Running Clock S:4 = 0101-0101-1000-0001
Index Across Data Files S:2/3 = No
CIF Addressing Mode S:2/8 = 0
Online Edits S:33/11 - S:33/12 = No online edits exist

Day of Week S:53L = Monday
DD / MM / YYYY
Date S:39-37 = 7 / 9 / 1915
HH : MM : SS
Time S:40-42 = 7 : 1 : 19

Set Date & Time

Radix: Structured

S2

Properties | Usage | Help

**Processor info (scan time, errors, etc)**

**The Project View Window in RSLogix500**

Driver: AB_DF1-1

0START5.RSS

- Project
  - Help
  - Controller
    - Controller Properties
    - Processor Status
    - IO Configuration
    - Channel Configuration

**Controller Properties**

General | Compiler | Passwords | Controller Communications

Processor Type:
1747-L551B/C 5/05 CPU - 16K Mem. OS501 Series C FRN 3-

Processor Name: 0START5
Program Checksum: 8c65

Program Files: 7
Data Files: 12
Memory Used: 66 Instruction Words Used - 355 Data Table Words
Memory Left: 12222 Instruction Words Left

OK | Cancel

**Processor name and type of processor**

**User can set the IP address for Ethernet Port**

**Channel Configuration**

General | Chan. 1 - System | Chan. 0 - System | Chan. 0 - User

Driver Ethernet

Hardware Address: 00:00:BC:30:19:ED
IP Address: 0 . 0 . 0 . 0
Subnet Mask: 0 . 0 . 0 . 0
Gateway Address: 0 . 0 . 0 . 0
Default Domain Name:
Primary Name Server: 0 . 0 . 0 . 0
Secondary Name Server: 0 . 0 . 0 . 0

DHRIO Link ID 0

Pass Thru Routing Table File 0

User Provided Web Pages
Starting Data File Number: 0
Number of Pages: 1

Protocol Control
☑ BOOTP Enable   ☐ DHCP Enable
☑ SNMP Server Enable

Msg Connection Timeout (x 1mS): 15000
Msg Reply Timeout (x 1mS): 3000

**Viewing the I/O modules and processor**

**I/O Configuration**

Racks
1 1746-A7 7-Slot Rack
2 I/O Rack Not Installed
3 I/O Rack Not Installed

Read IO Config.
PowerSupply.....

Current Cards Avai

Part #
1746-I*8      A
1746-I*16     A
1746-I*32     A
1746-O*8      A
1746-O*16     A
1746-O*32     A
AMCI-153x     A
AMCI-1561     A
1746-BAS-5/01 B.
1746-BAS-5/02 B.
1746-BAS-T    B.
1746-BAS-T    B.
1747-BSN      B
1746-BTM      B
1747-DCM-1/4  N
1747-DCM-1/2  N
1747-DCM-3/4  N
1747-DCM-FULLN

| # | Part # | Description |
|---|--------|-------------|
| 0 | 1747-L551B/C | 5/05 CPU - 16K Mem. OS501 Series C FRM |
| 1 | 1746-IB16 | 16-Input (SINK) 24 VDC |
| 2 | 1746-OB16 | 16-Output (TRANS-SRC) 10/50 VDC |
| 3 | 1746-NIO4V | Analog 2 Ch In/2 Ch Voltage Out |
| 4 | 1746-NT4 | Analog 4 Ch Thermocouple Input |
| 5 | 1746-NO4I | Analog 4 Ch. Current Output |
| 6 | | |

Adv Config | Help | Hide All Cards

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