

# Rockwell Software RSLogix500 Basics

Created by Tom Wylie, 11/12/22

# Rockwell Software RSLogix500 Basics

After viewing this document, the student should be able to:

1. Explain how the copy protection works with RSLogix500 software
2. Explain the difference between a .RSS and BAK001.RSS project files
3. Explain how the Terra Virtual Machine operates within the host computer
4. Explain the terms upload, download, online and offline when working with PLC software
5. Explain the importance of the processor name when creating an RSLogix 500 project
6. Explain the different elements in the online ladder view of RSLogix 500
7. Explain what is downloaded to the SLC-500 processor during a download
8. Explain the purpose of RSLinx when going online with RSLogix 500

# Please Read This

This document is to overview the methods of data communications for legacy (MicroLogix, SLC-500 and PLC-5) and modern-day PLC and PAC (CompactLogix & ControlLogix) systems. For more in depth and accurate information on any of these topics, visit [ab.com](http://ab.com), or perform a google search with a standard internet browser.



# Overview of PLC Software:

Rockwell Software created a Windows-based software application (RSLinx) that will be used to communicate with Allen Bradley PLCs, as well as PLC programming software for all Allen Bradley PLCs:

**RSLogix 500** – MicroLogix and SLC-500s

**RSLogix 5** – PLC-5s

**Studio 5000** – CompactLogix & ControlLogix

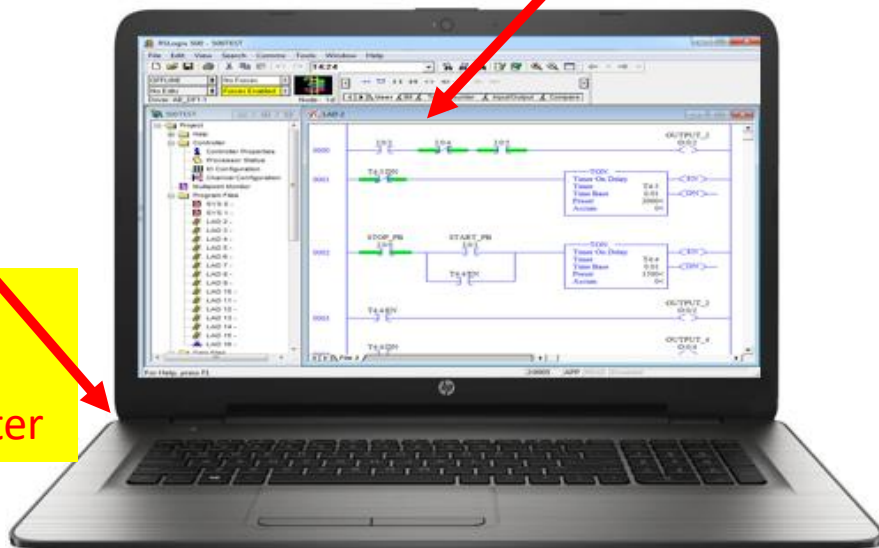
In an industrial environment these software packages are typically installed on a laptop, so the computer can be taken out to machine to connect to a PLC for troubleshooting a system.

All of these software packages will be installed on the computers in the Terra PLC lab. It is important to understand how to use the software to communicate, program and troubleshoot a PLC system. These software packages are expensive for companies to purchase (\$1,000-\$2,000 per package) and are copy protected, so students will need to come to campus to use this software. The Terra licensing agreement does not allow students to install this software on their computers at home.

**RSLogix 500 PLC  
Programming Software is  
installed on the computer**

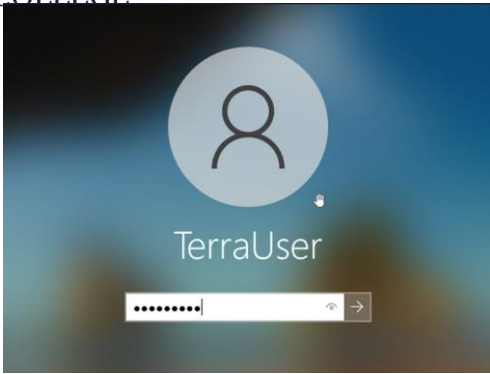
**Ethernet Connectivity  
between the SLC-5/05  
processor and the computer**

**A Windows based computer with the  
Rockwell Software loaded becomes a  
PLC Programming Panel**



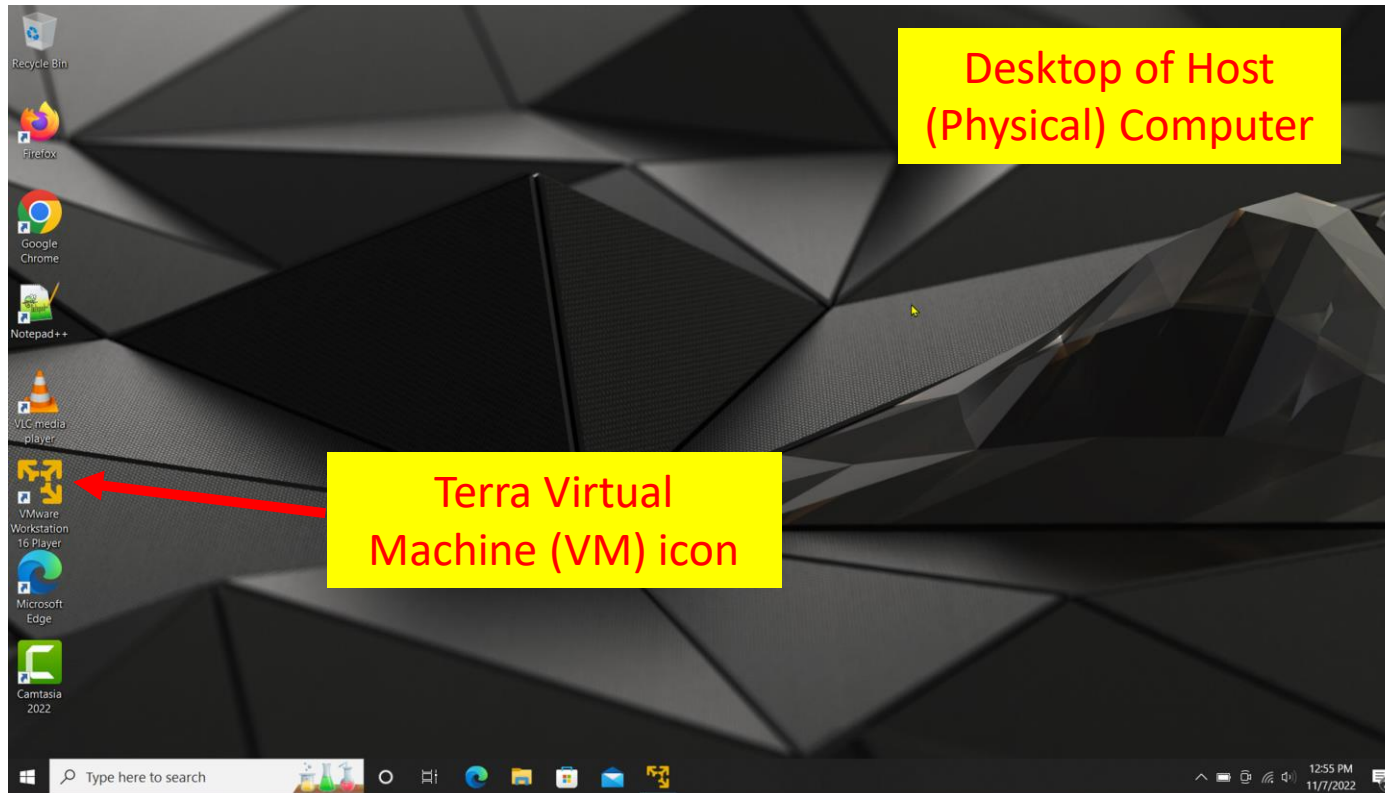


# Terra Virtual Machines (VMs):



User: TerraUser  
Pwd: T3rra@User

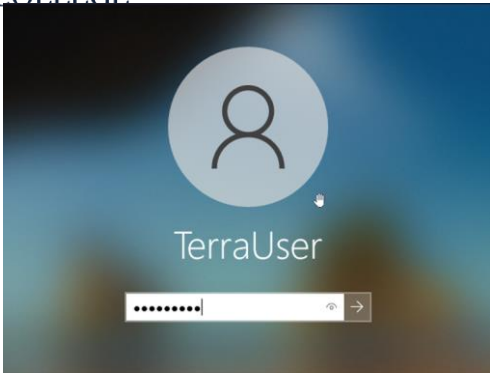
When working in the Terra PLC lab, it is important to understand that the college has the Rockwell Software PLC applications loaded on a virtual machine (virtual computer) that is actually inside of the physical (host) computer that is on desks in the PLC lab. This practice allows the Terra IT department to load the Rockwell Software on a VM, then copy it to the computers in the PLC lab, versus loading all the applications on each machine. The operation is the same using the applications on a VM, as it is using the applications that were installed on a computer.



The important thing to remember is that there are two logins, which are both the same. The student must first log into the physical computer with the username and password as shown in the upper right of this graphics (also on the white board in the PLC lab).

After logging into the physical computer, the student will then need to double click on the virtual machine icon (lower graphic), which is named: VMWare Workstation 16 Player.

# Terra Virtual Machines (VMs) cont.:



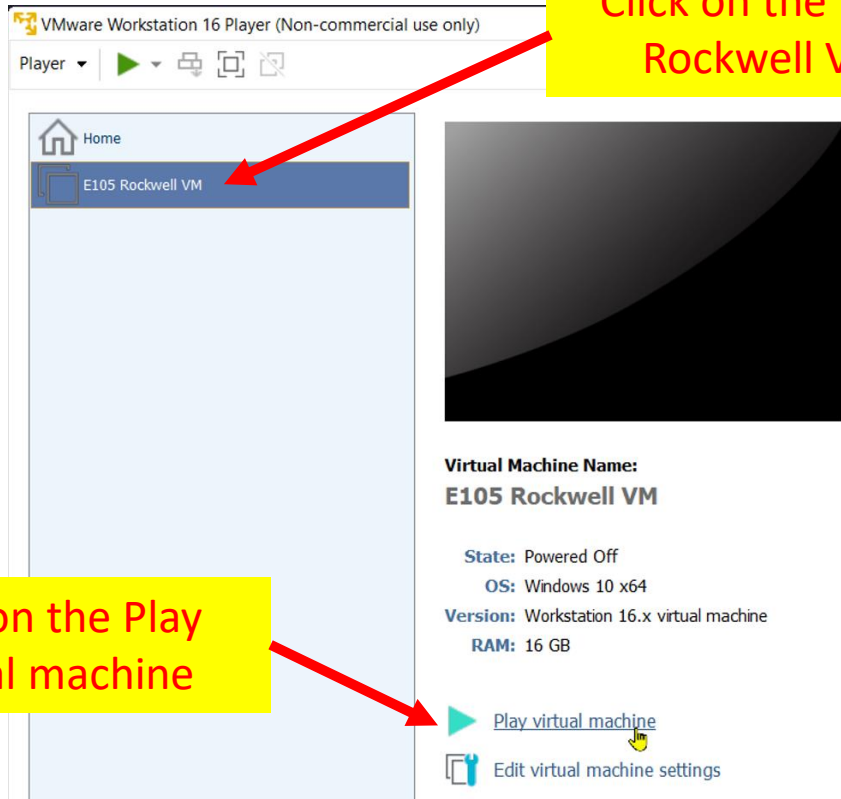
User: TerraUser  
Pwd: T3rra@User

The next step is to login to the virtual machine. It will take some time before the VM fills the desktop. A Windows screen will appear. Click on the desktop and a login box will show up as shown in the upper left of this graphic. Use the same login credentials for the VM that you did for the physical computer login.

The VM Workstation 16 Player application opens.

Click on the E105 Rockwell VM

Then click the “Play virtual machine” link (shown in the lower portion of the graphic).

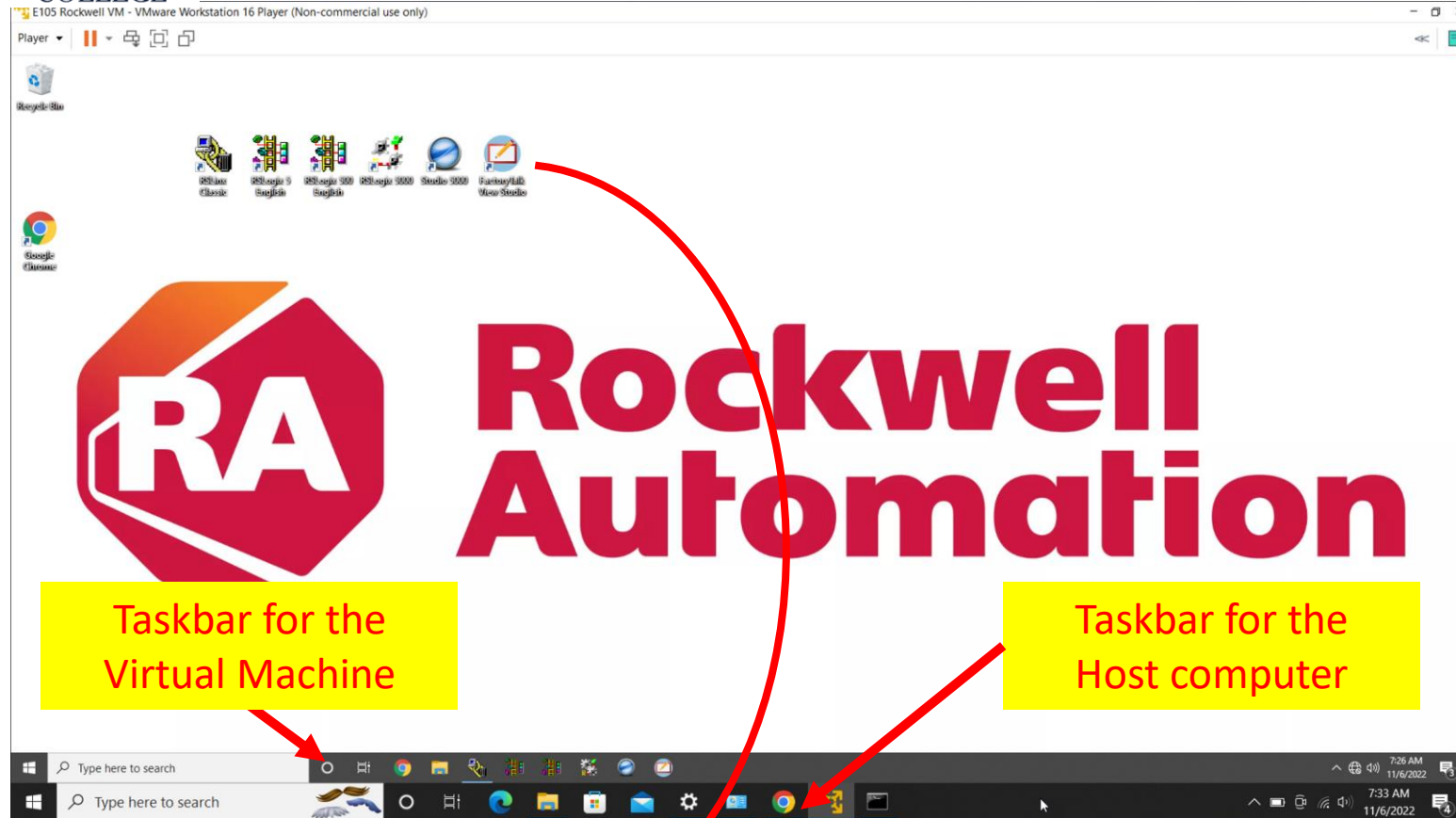


Click on the E105  
Rockwell VM

Click on the Play  
virtual machine



# Terra Virtual Machines (VMs) cont.:



Icons for the Rockwell Software applications used in the PLC courses

After the successful login to the VM, the student will see the Rockwell Automation logo for the background, and also the icons for the Rockwell Software applications. Also notice that there are two taskbars: one at the bottom for the host computer, and the one above it is for the virtual machine.

These are independent computers, thus when a USB memory stick is plugged into the USB port to save the student PLC files, the user must specify whether the memory stick will connect to the host machine or the virtual machine.

**Important:** Since the computer are not connected to the internet by default, it is easier to save files to a USB memory stick.

The student can plug in the USB wireless antenna to connect the VM to the internet, then open an internet browser and attach the PLC files to an email and send it to the student's email account.

# Opening RSLogix 500:

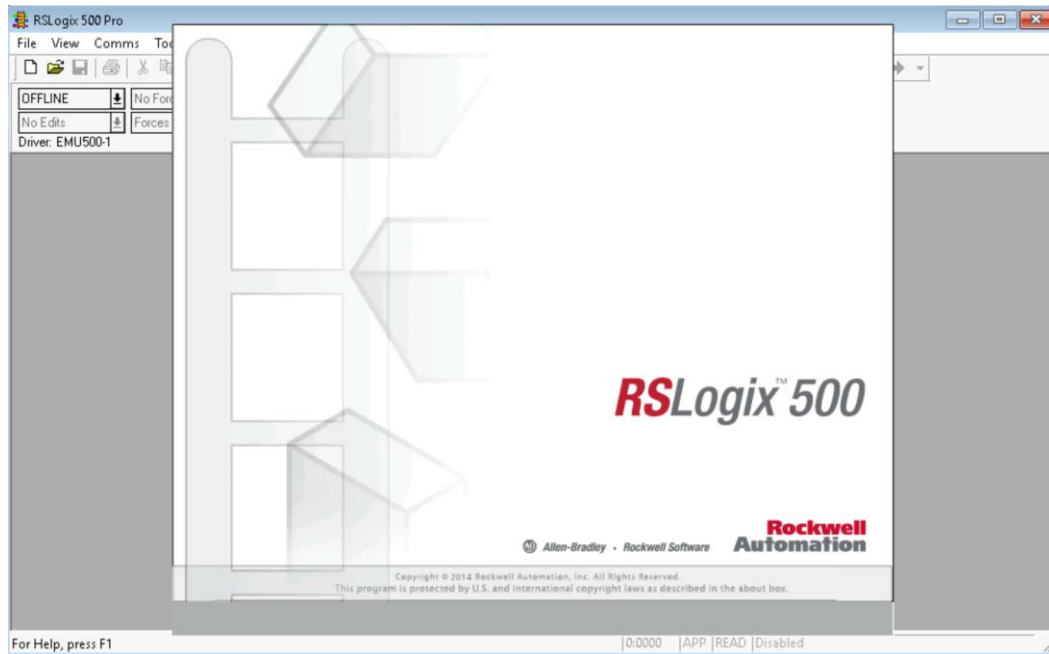
Double click on the RSLogix 500 English icon



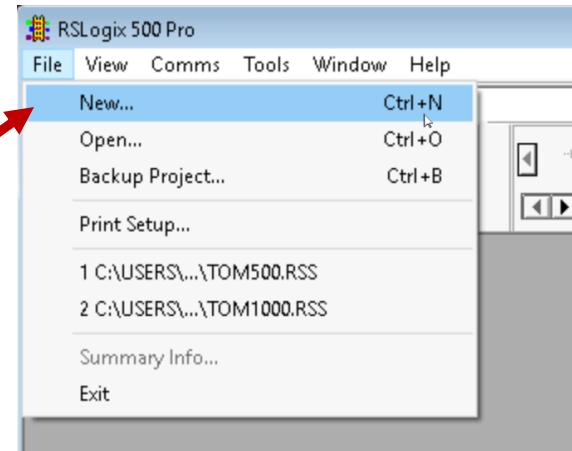
RSLogix 500 is the software developed by Rockwell Software to program and troubleshoot the Allen Bradley SLC-500 and MicroLogix PLCs. Rockwell Software is a division of Rockwell Automation.

Double click on the RSLogix 500 English icon to open the application. A splash screen should appear for a few second.

Click on the File pull down menu and choose “New” to start a new project.



Click File-New to create a new project





# RSLogix 500 Software:

Processor Name

Select Processor Type

Processor Name: TW504

1747-L553	5/05	CPU	- 64K	Mem.	OS500				
1747-L552	5/05	CPU	- 32K	Mem.	OS500				
1747-L551	5/05	CPU	- 16K	Mem.	OS500				
1747-L543C,D	5/04	CPU	- 64K	Mem.	OS401	Series C	FRN 10	and later	
1747-L542C,D	5/04	CPU	- 32K	Mem.	OS401	Series C	FRN 10	and later	
1747-L541C,D	5/04	CPU	- 16K	Mem.	OS401	Series C	FRN 10	and later	
1747-L543C	5/04	CPU	- 64K	Mem.	OS401	Series C	FRN 3-8		
1747-L542C	5/04	CPU	- 32K	Mem.	OS401	Series C	FRN 3-8		
1747-L541C	5/04	CPU	- 16K	Mem.	OS401	Series C	FRN 3-8		
1747-L543	5/04	CPU	- 64K	Mem.	OS401				
1747-L542B	5/04	CPU	- 32K	Mem.	OS401				
1747-L541	5/04	CPU	- 16K	Mem.	OS401				
1747-L542A	5/04	CPU	- 24K	Mem.	OS400				
1747-L533E,F	5/03	CPU	- 32K	Mem.	OS302	Series C	FRN 10	and later	

Communication settings

Driver: AB\_DF1-1 Processor Node: 2 Reply Timeout: 10 (Sec.)

Who Active..

RSLink driver to use for this project

The user will now select a processor. Realize that it is important to choose the processor that matches the processor on the training unit in the Terra PLC lab, especially when using the MicroLogix PLC.

When the user is going to create a project for an SLC-500, a step we will do later is "Read I/O Configuration" during which time the software will go out and look at the chassis and list the actual processor and I/O modules that are at every slot. This is the only software that does this. RSLogix 5 and Studio 5000 does not have this capability.

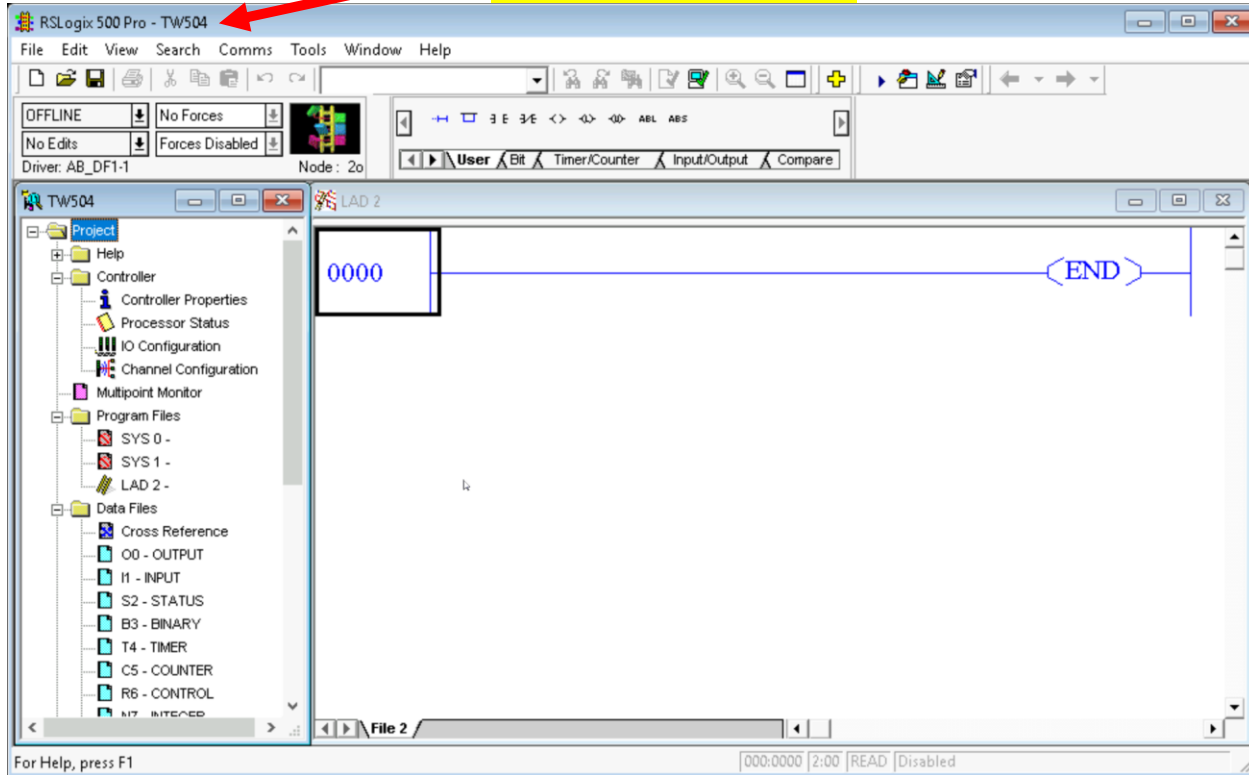
It is also important to choose the RSLink driver that will be assigned to this project (program) in RSLogix 500. Click the pull down menus and it will show the active drivers in RSLink (lower left portion of graphic).

Click the OK button.



# RSLogix 500 Software:

Processor Name

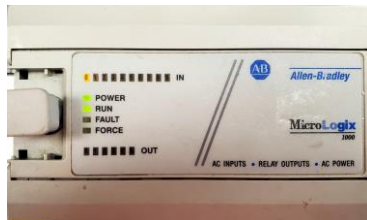


RSLogix 500 is copy protected software that uses a licensing server to allocate a license (also called an activation file) to the user when they start the software. When the student closes the software, the license goes back to the licensing server. The software will not function if there is no license. This process is managed by the IT department at Terra State.

It is also important to understand that the RSLogix500 software will save the projects as a .RSS file as shown in the lower right graphic. This file will house all of the information within the project. There is also BAK001.RSS files, which are backup files. No need to worry about these initially but realize the difference. Always open the .RSS file (that does not have the BAK listed), which will be the most current saved version of the project.

SLC-5/04

MicroLogix 1000



- TOM500\_BAK002.RSS
- TOM500\_BAK003.RSS
- Tom1000.RSS ←
- TOM1000\_BAK000.RSS
- TOM1000\_BAK001.RSS



# Some Basic PLC Terminology:

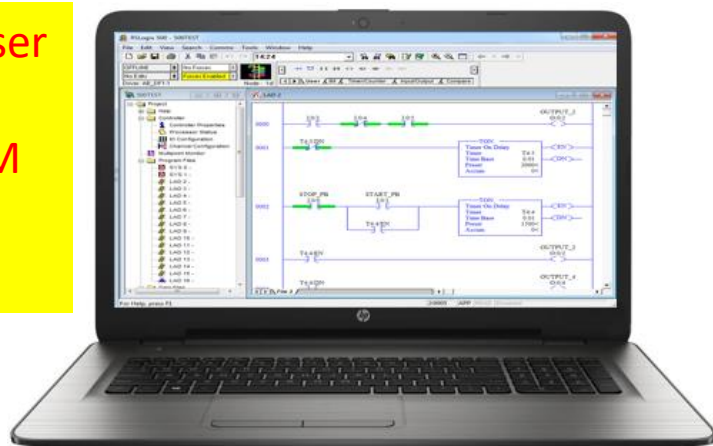
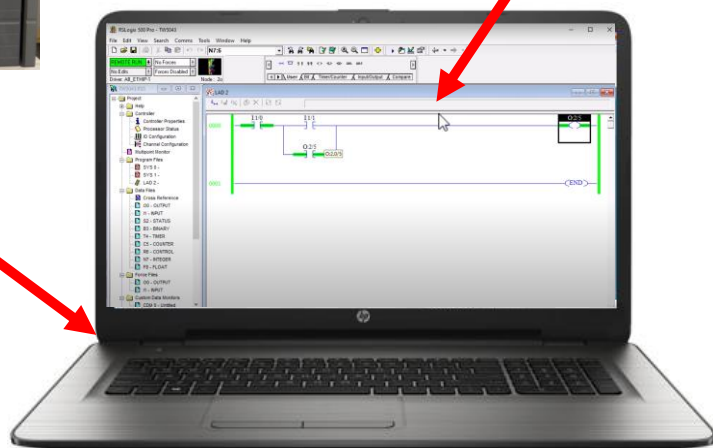
When **Online**, the user will view the PLC program that is in the PLC processor

Two of the most common terms when working with PLC programming software is **Online** and **Offline**.

When the RSLogix 500 software is online, the user will be viewing the ladder logic program that is in the PLC processor. It is important to understand that **RSLinx** must be configured with a driver with a communication path to the PLC processor that RSLogix 500 will communicate through. RSLinx connects the PLC processor to the Windows environment, and RSLogix 500 then connects to RSLinx when going online to the processor.

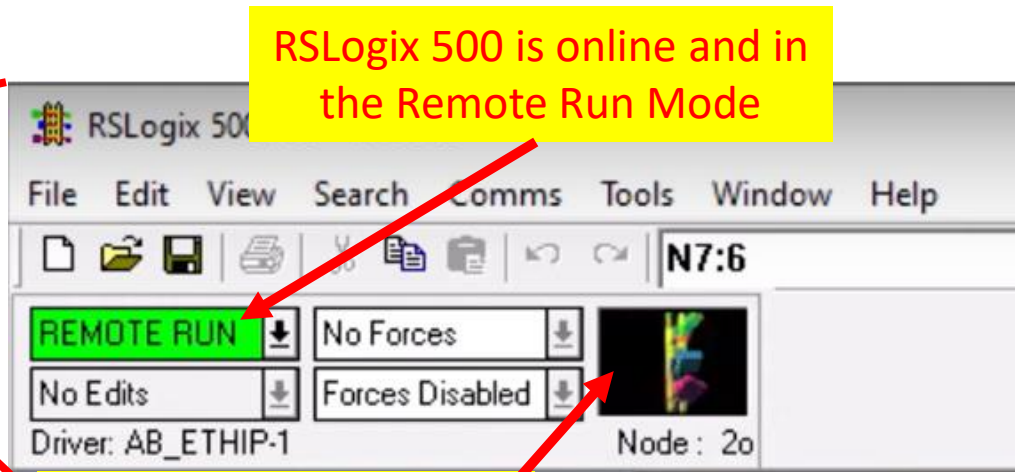
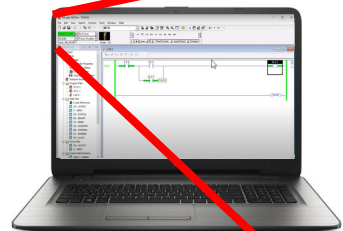
When **Offline**, the user will view the PLC program in the RAM memory of the computer

When the RSLogix 500 is offline, the user will be viewing the PLC program in the computer memory (not in the PLC processor). The PLC program (ladder logic) is created offline, then loaded into the PLC processor (this is called downloading). Then the user will go online to the PLC processor to view how the PLC program is controlling a machine.



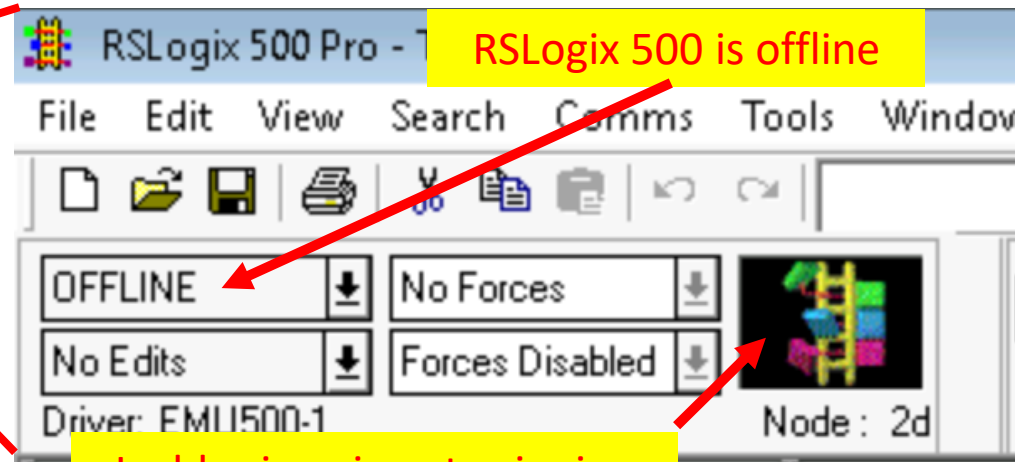
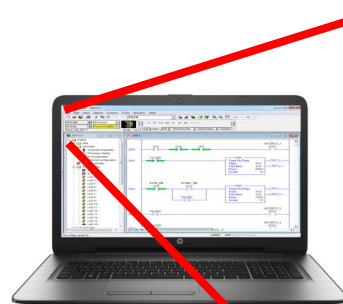


# Some Basic PLC Terminology:



Ladder icon is spinning

It is important to be able to tell if RSLogix 500 is online or offline. The top graphic shows RSLogix 500 online to an SLC-500 processor. Notice the green colored object that shows the mode of the processor. In this graphic the processor is in the Remote Run mode, which means the processor is in the Run mode and the processor key switch is in the Remote position. Also notice that ladder logic icon is spinning when RSLogix 500 is online to the processor (the ladder logic object could be configured to be another graphic, but the most important thing is that the object is active and moving).



Ladder icon is not spinning

The lower graphic shows that RSLogix 500 is offline, which means it is not communicating with the processor. When offline, RSLinx is not required. Also notice that the ladder object is not spinning.

# Practice Question #1

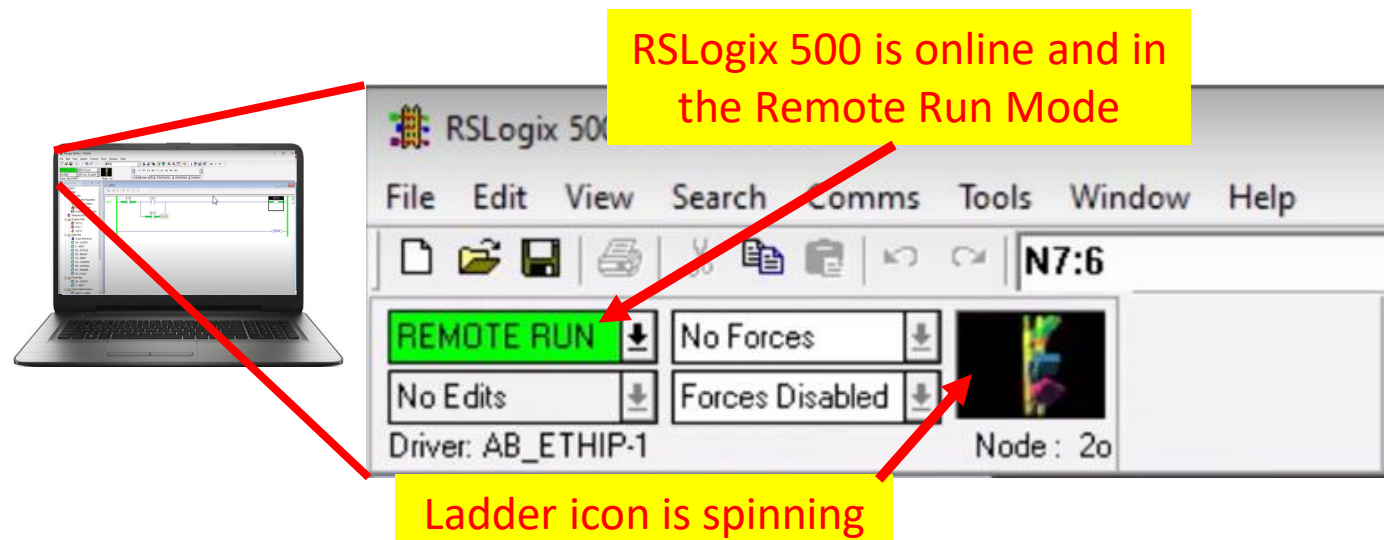
What is an easy way to verify that RSLogix 500 is online to the processor when viewing the PLC program with RSLogix 500 software?

- A. The processor Run light is on
- B. The ladder logic icon is spinning on the Online toolbar
- C. The key switch is in the REM position
- D. The RSLinx icon is flashing

# Answer to Practice Question #1

What is an easy way to verify that RSLogix 500 is online to the processor when viewing the PLC program with RSLogix 500 software?

- A. The processor Run light is on
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- C. The key switch is in the REM position
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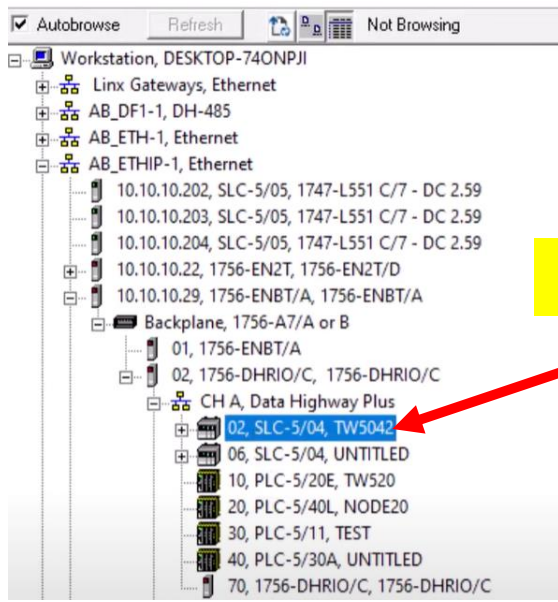
# Practice Question #2

- Which one of the following options is true if a user is using RSLogix 500 to go online to an SLC-5/04 processor?
  - A. An SLC-5/04 does not have an online option
  - B. RSLinx must be setup to communicate with the SLC-5/04
  - C. The key switch must be in the REM position
  - D. The processor must be in the Run mode

# Answer to Practice Question #2

Which one of the following options is true if a user is using RSLogix 500 to go online to an SLC-5/04 processor?

- A. An SLC-5/04 does not have an online option
- **B. RSLinx must be setup to communicate with the SLC-5/04**
- C. The key switch must be in the REM position
- D. The processor must be in the Run mode

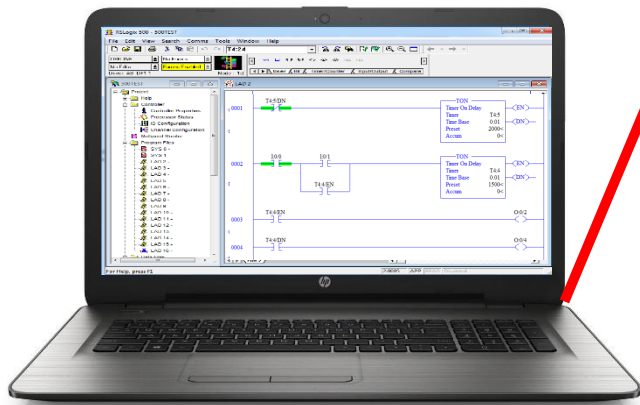
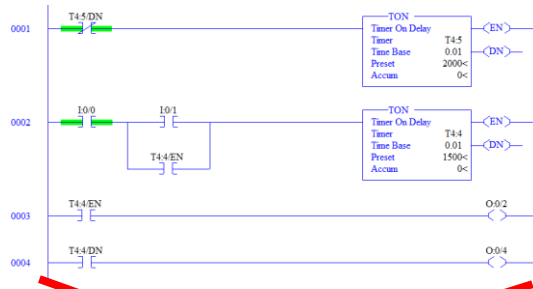


RSLinx must be setup with a configured driver that will communicate with the SLC-5/04 processor before going online to the processor with RSLogix 500.



# Download to the Processor:

PLC Ladder Logic Program



Download is the term used when RSLogix 500 software loads the PLC program into the processor. RSLinx is required for communication with the processor when downloading. **Important:** A download can only be performed if the PLC processor is in the program mode or remote program mode. If the processor key switch is in the REM position, RSLogix 500 can change the mode of the processor.

Drilling down a little deeper into the download process, RSLogix 500 downloads different information from the .RSS project file besides the PLC program. The program and data files are the main elements required in a download, but also the I/O configuration is downloaded as well as the processor name.

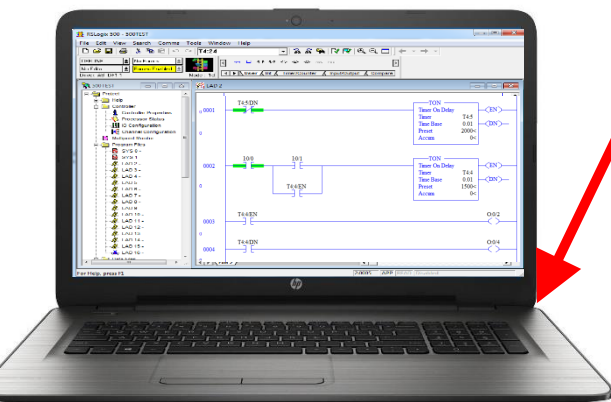
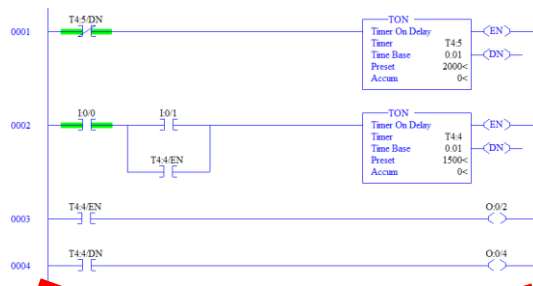
The **I/O configuration** is important to make sure that each chassis slot has the same module type as was identified in the Read IO Configuration when the project was created. If the process senses a mismatch, it will fault out the processor, shutting down the machine.

The **processor name** is important when going online with RSLogix 500. The processor name assures that the correct address symbols and descriptions show on the screen, from the correct .RSS in the default directory. Always give your SLC-500 projects a unique name.



# Upload from the Processor:

PLC Ladder  
Logic Program



Upload is the term used when RSLogix 500 software copies the PLC program files (which contains the PLC program) and data files from the processor to the .RSS project file on the computer. RSLinx is required for communication with the processor when uploading.

**Important:** An upload can be performed if the PLC processor is in either the program or run modes (which is the same as remote program or remote run).

An upload can be performed from if RSLogix 500 is offline, or if the user is online. If the user is online, the user can simply click the Save icon, and an upload will occur.

# Practice Question #3

What mode must an SLC-5/05 processor be in to do an Upload?

- A. Run Mode
- B. Program Mode
- C. Either the Run or Program Mode

# Answer to Practice Question #3

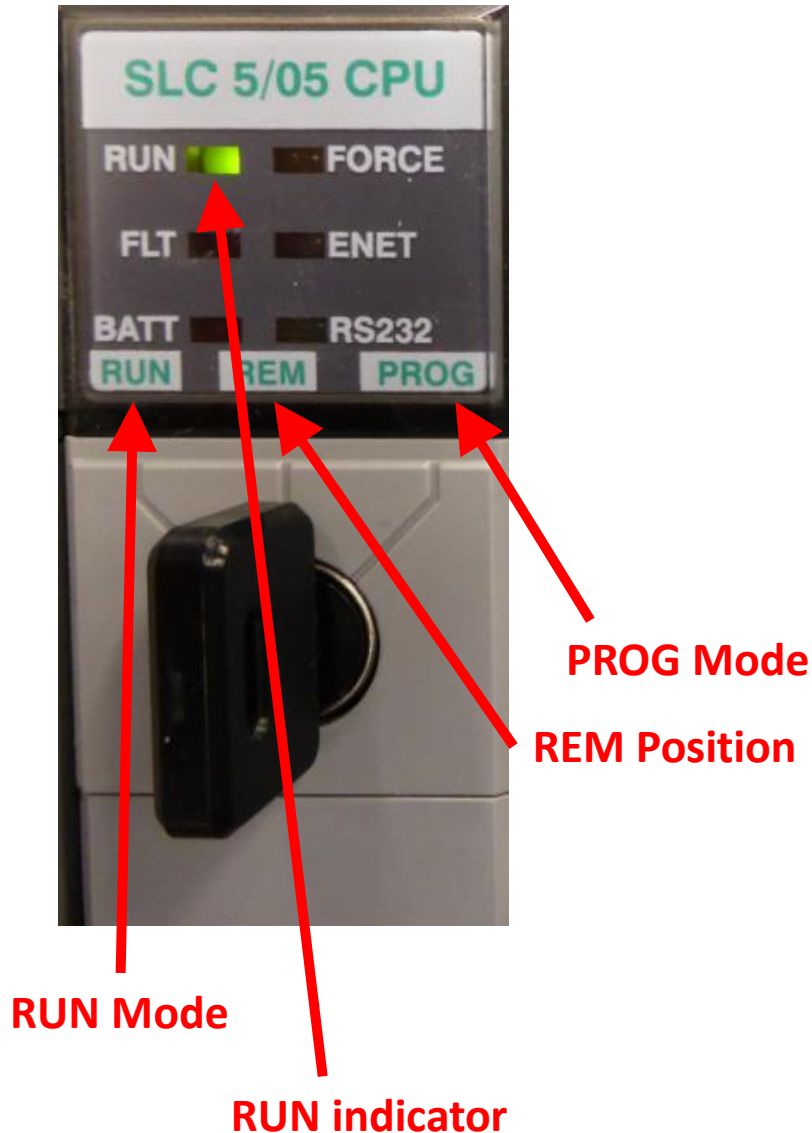
What mode must an SLC-5/05 processor be in to do an Upload?

- A. Run Mode
- B. Program Mode
- C. **Either the Run or Program Mode**

When performing an Upload, the processor can be in either program or run mode. When performing a Download, the processor can only be in the program mode.



# Review the Processor Modes & Key Switch:



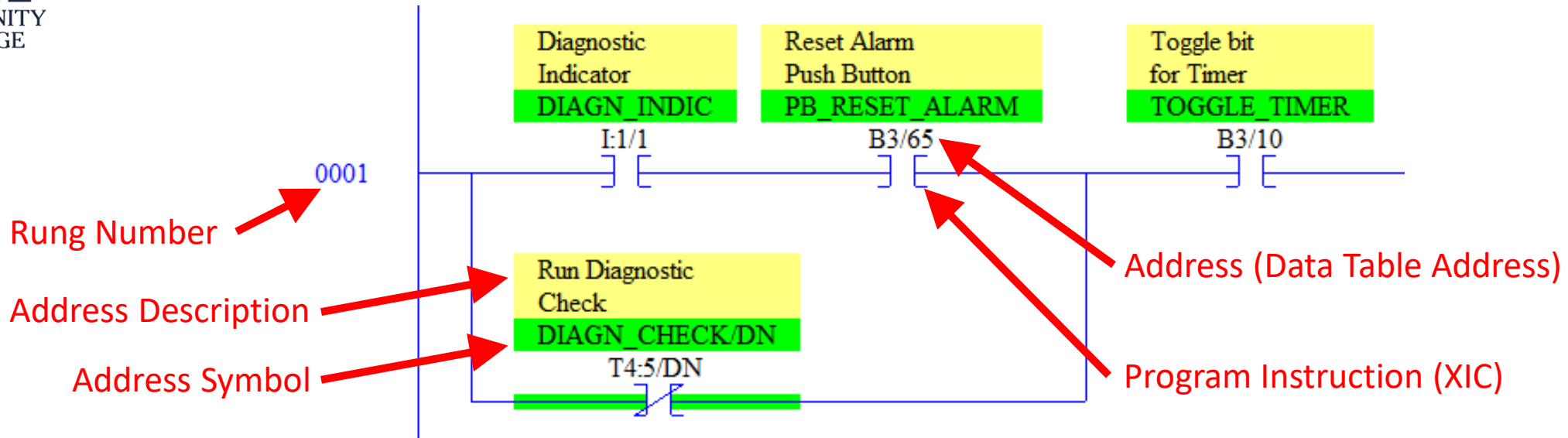
When the key-switch on the SLC-500 modular processor is in the **RUN position**, the processor is in the RUN mode. The RUN indicator will be on. In this mode the outputs will be enabled, thus the ladder program will control the outputs.

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.

# RSLogix 500 Display Information:



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.

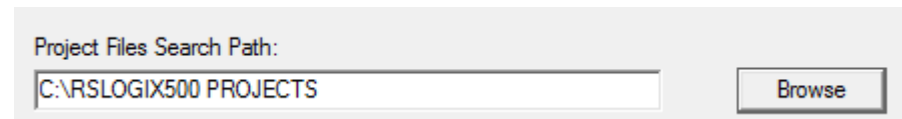
\*The user can also create an Address Symbol (green background) to the address (a short text designation that can be used in place of the address. It is in a capitol letters, and is a unique name for that address).

\*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.

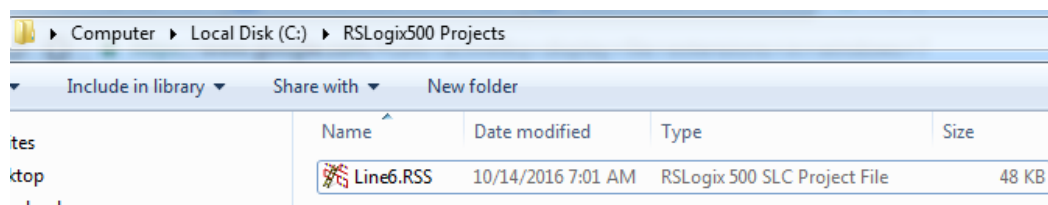
\*The symbols and descriptions can be turned on and off, through the Properties menu for the ladder display window.

# The .RSS File:

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



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



In Windows Explorer, the Line6 .RSS file is shown in the C:\RSLogix500 Projects\ directory

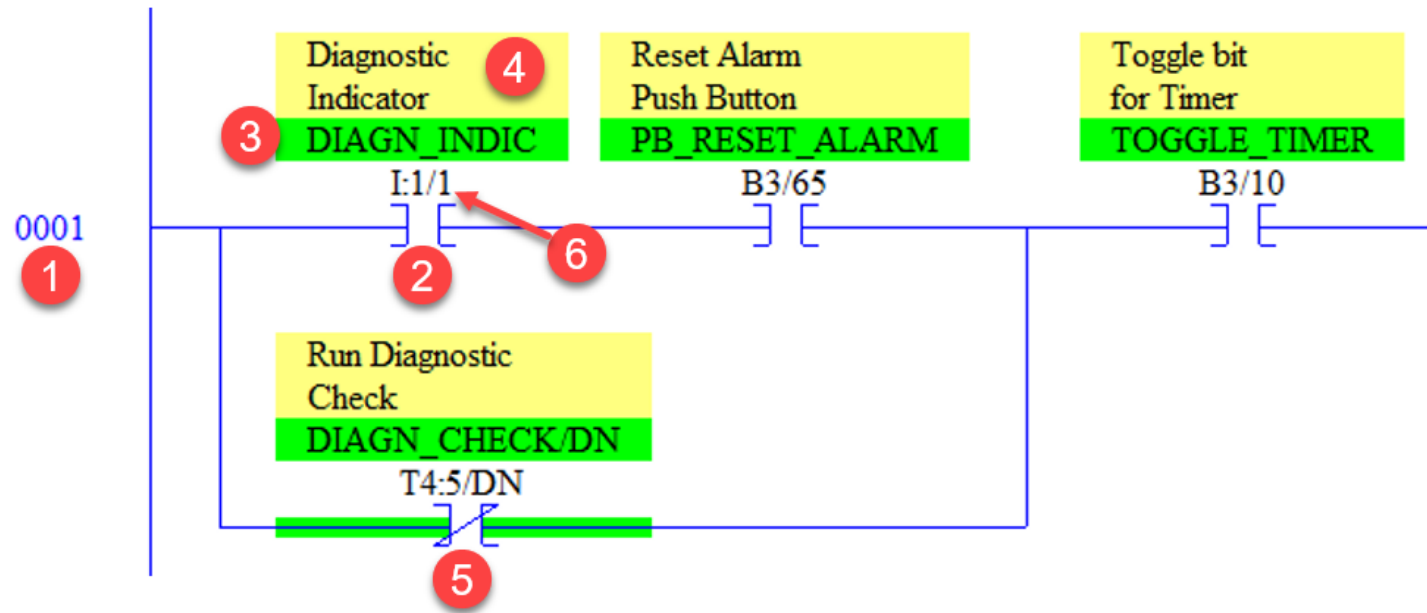
The RSLogix500 projects should be stored in one common directory on the hard drive of the program panel. In this example, the projects are stored in the directory: C:\RSLogix500 Projects\.

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.

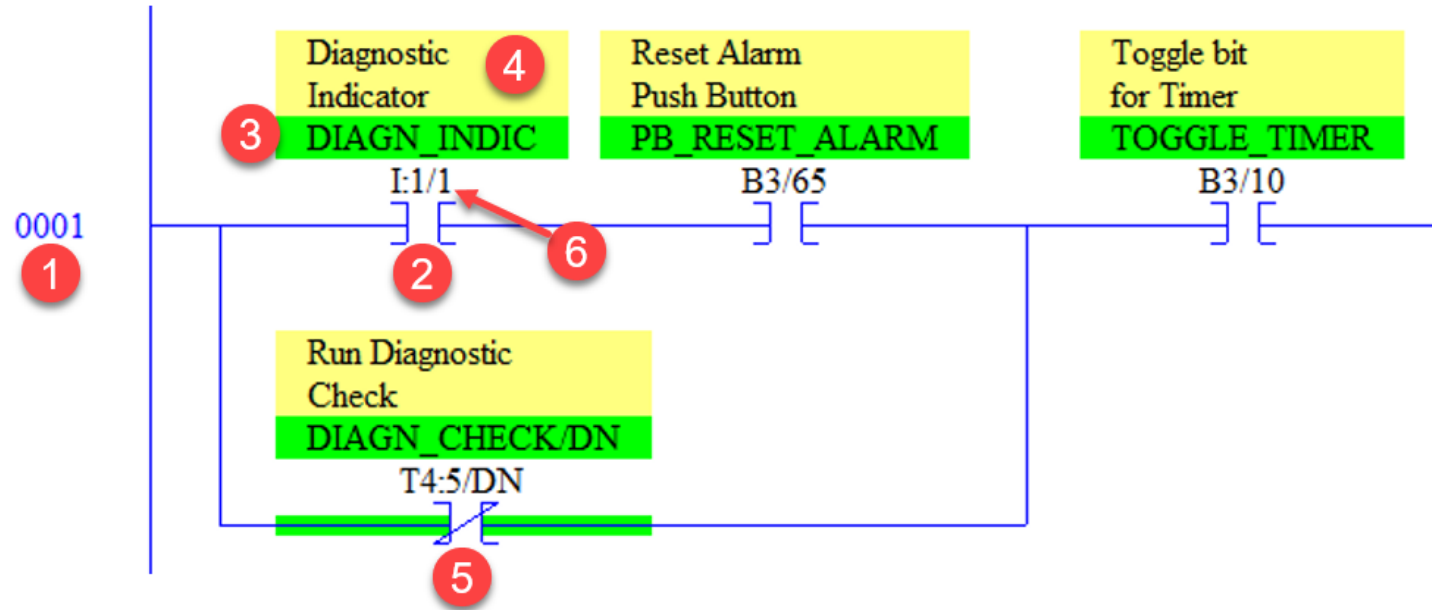
# Practice Question #4



Match the numbers to the following object types in the RSLogix 500:

- A. Symbol \_\_\_\_\_
- B. Description \_\_\_\_\_
- C. Address \_\_\_\_\_
- D. Rung number \_\_\_\_\_

# Answer to Practice Question #4

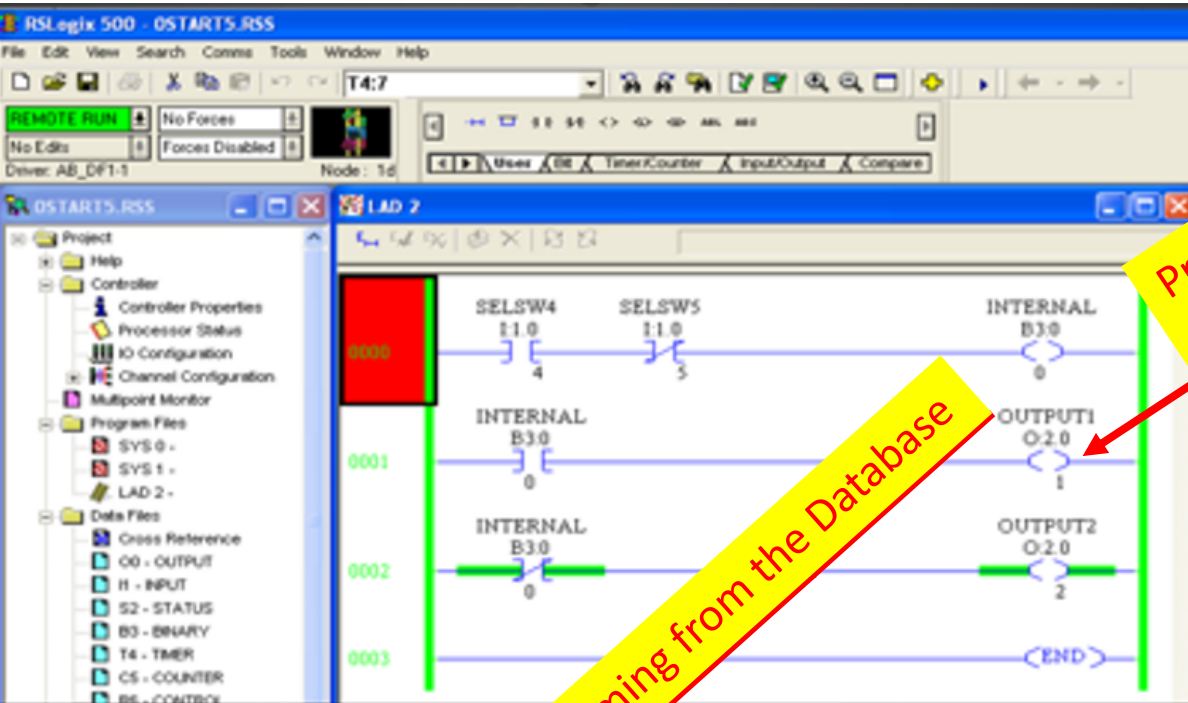


Match the numbers to the following object types in the RSLogix 500:

- A. Symbol                    \_\_\_3\_\_\_
- B. Description            \_\_\_4\_\_\_
- C. Address                 \_\_\_6\_\_\_
- D. Rung number            \_\_\_1\_\_\_

2 is an XIC instruction and  
 5 is an XIO instruction

# RSLogix 500 Online Information:



Program is coming from the PLC

Symbol is coming from the Database

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

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.

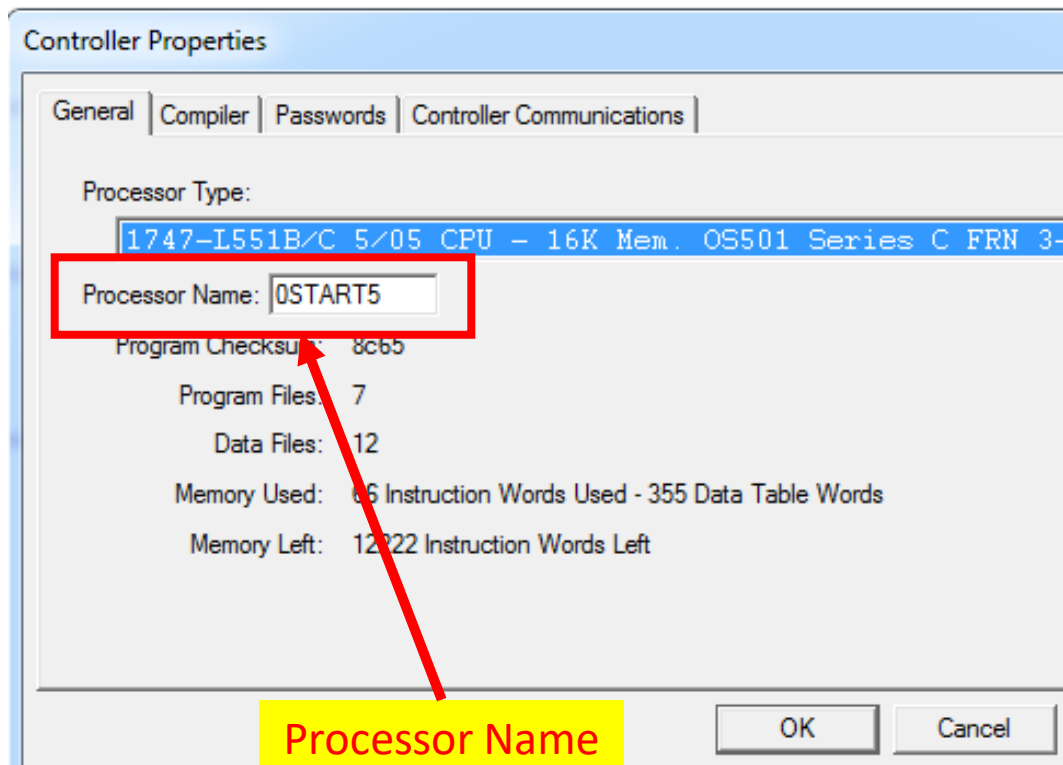
When the user goes online, RSLogix500 looks at the processor name in the PLC, then searches for the matching processor name in each .RSS project file. It then displays the Symbols and Descriptions with the corresponding address on the screen.

- 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





# Very Important Information on the Processor Name:



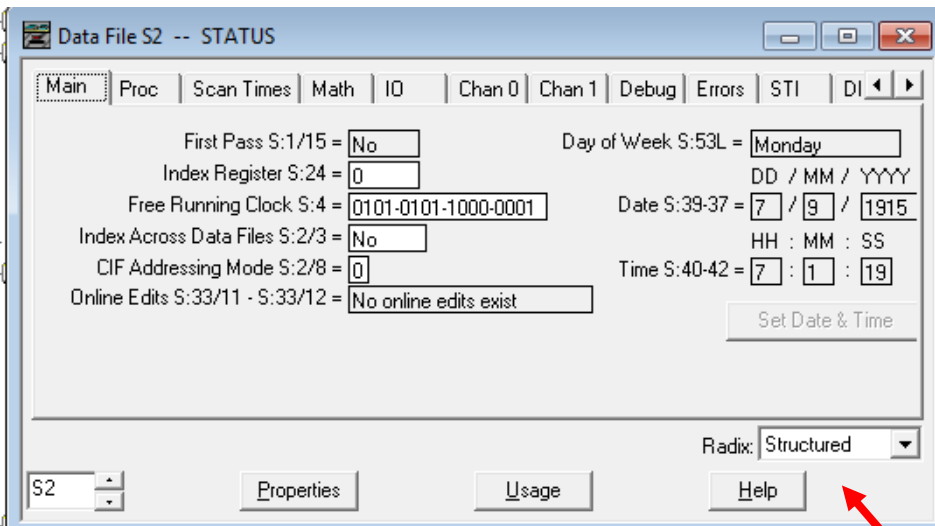
Every project should have a unique processor name. If there are two PLC processors with the same name, there is a possibility that the wrong address descriptions could show up on an address in RSLogix500. This could create a major problem for the user if they are trying to troubleshoot a machine.

When a new project is created in RSLogix500, it has a default processor name of "UNTITLED". Change this name immediately.

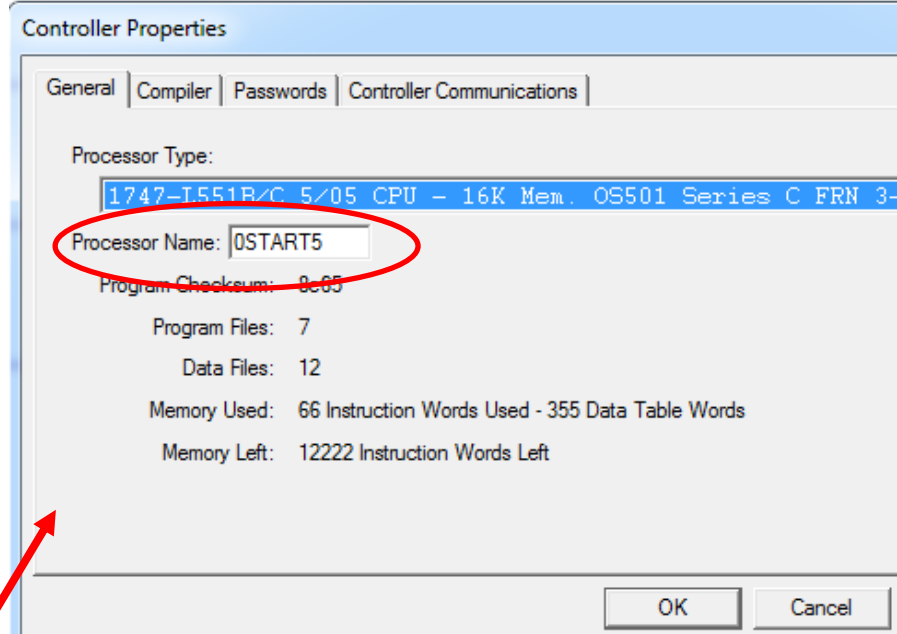
Many students use the default name (Untitled), thus the software will get confused when the user tries to go online, and list all the projects with that processor name.

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.

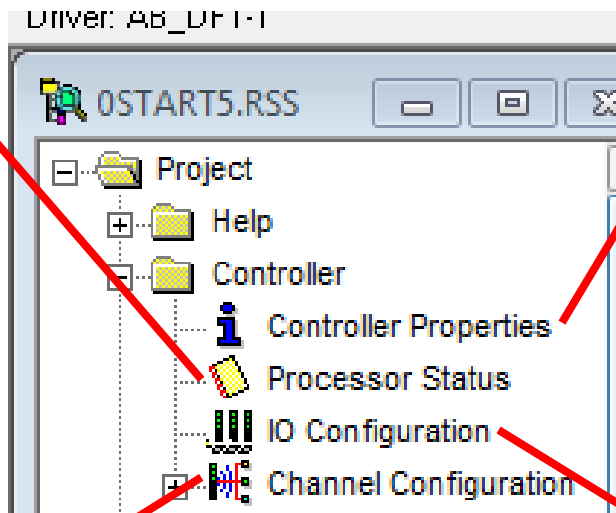
The processor name is limited to 8 characters.



Processor info (scan time, errors, etc)

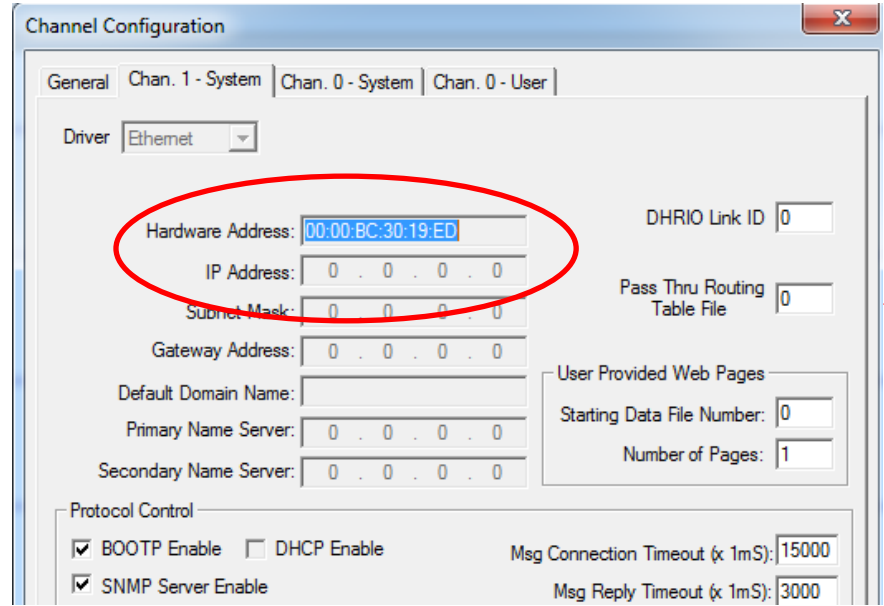


Processor name and type of processor

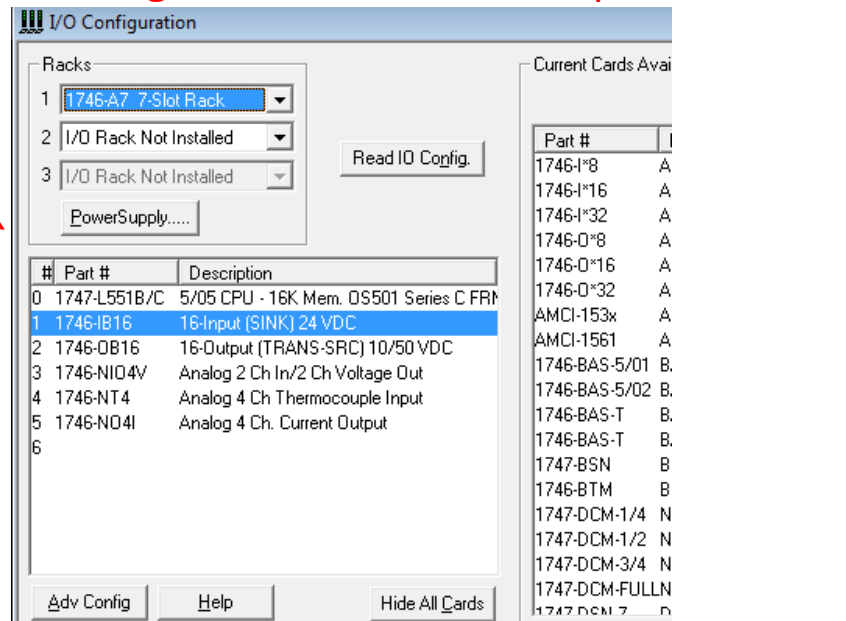


The Project View Window in RSLogix500

User can set the IP address for Ethernet Port



Viewing the I/O modules and processor



## Basic Relay Type Instruction

Mnemonics

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

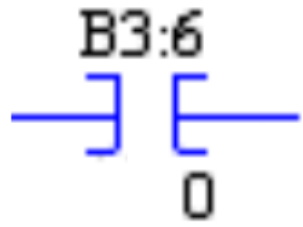
XIO – Examine if Open – is like a normally closed contact

OPE – Output Energize – is a basic coil output instruction

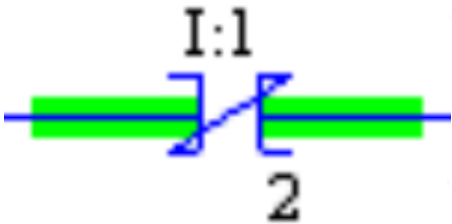
OTL – Output Latch – is a retentive type of output instruction

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

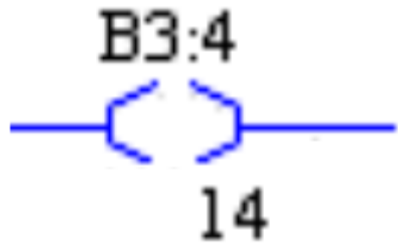
**Memorize** the relay instruction Mnemonics with the actual symbol for the instruction that will be used in RSLogix500. Other mnemonics are self explanatory. These are not.



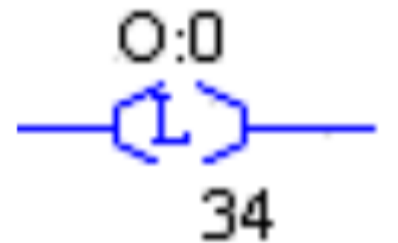
XIC



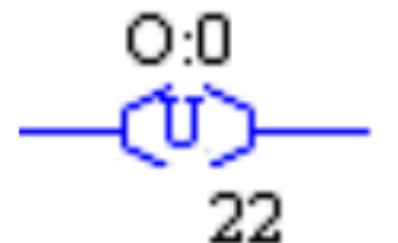
XIO



OTE



OTL

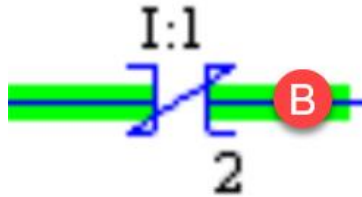


OTU

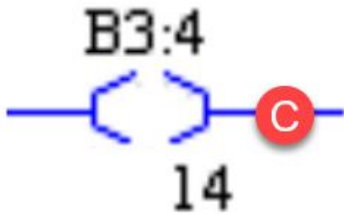
# Practice Question #5



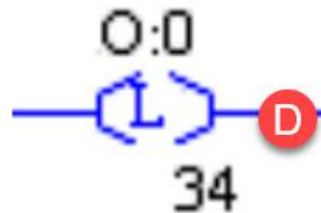
\_\_\_\_\_ 1. OTE



\_\_\_\_\_ 2. XIC



\_\_\_\_\_ 3. OTU



\_\_\_\_\_ 4. XIC



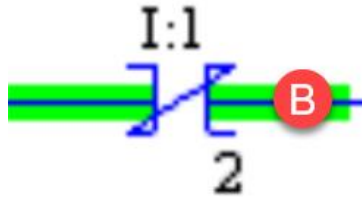
\_\_\_\_\_ 5. OTL

Match the letters on the Allen Bradley instructions to the corresponding mnemonic.

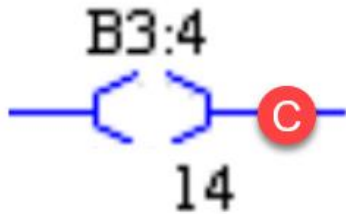
# Answer to Practice Question #5



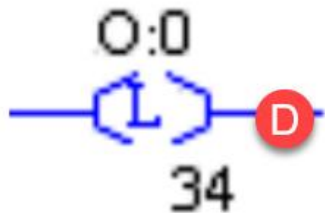
\_\_\_C\_\_\_ 1. OTE



\_\_\_A\_\_\_ 2. XIC



\_\_\_E\_\_\_ 3. OTU



\_\_\_A\_\_\_ 4. XIC



\_\_\_D\_\_\_ 5. OTL

Match the letters on the Allen Bradley instructions to the corresponding mnemonic.

# This Concludes this Instructional Document

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