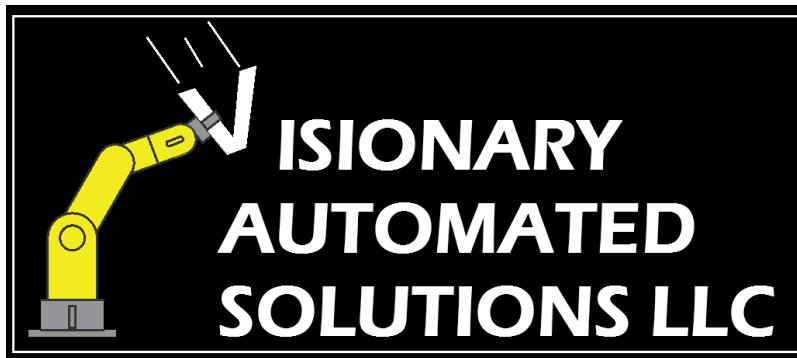


# STUDIO 5000 FOR END USERS: TROUBLESHOOTING AND INTRODUCTION TO PLC PROGRAMMING



- Training
- Upgrades
- Repairs
- Turnkey Solutions

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# Chapter 1

## How To Connect a Programming Laptop to an Allen Bradley PLC

1) **Determine what programming software is needed.** The software you need will depend on what type of PLC you are connecting to. In addition to the programming software, you will also need RSlinx Classic Lite to setup the necessary drivers.

a) ControlLogix and CompactLogix controllers use Studio 5000.



5570



5370



5380

b) MicroLogix and SLC 500 controllers use RSLogix 500



Micrologix 1200



SLC 500

c) Micro 800 Controllers use Connected Components Workbench



Micro 800



Micro 820

- 2) **Locate the programming port.** Some machines will have a programming port on the outside of the electrical enclosure. They usually consist of a small door and a latch like the first figure below. If none are available you will have to open the enclosure and plug directly into the PLC or to an open port on an ethernet switch.
- a) **Important: When opening an electrical enclosure wear proper PPE and follow your company's safety procedures.**
  - b) Many PLCs will have more than one type of programming port to choose from. If there is an ethernet port and the IP address is known, I recommend using ethernet. If there is no open ethernet port on the PLC, plug into an open port on the ethernet switch instead.
  - c) If the IP address is not known or there is no open Ethernet port, use USB. Some PLCs will only have a serial port, in that case you will have to use serial.



Panel Interface with Ethernet

Located on the outside of an electrical enclosure



Ethernet Switch

Located somewhere inside the panel



### PLC Mounted Ethernet

Located on the bottom of the PLC



### PLC Mounted USB

Located on the front of the PLC



### PLC Mounted Serial (DB9)

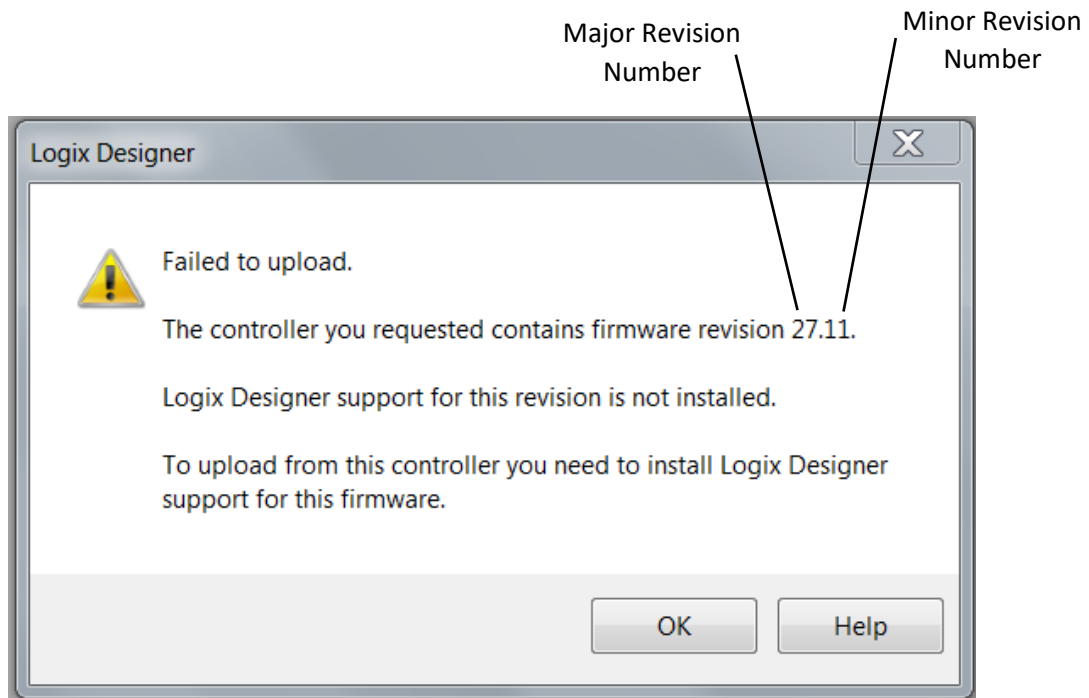
Located on the front of the PLC.  
Sometimes hidden behind a cover



### PLC Mounted Serial (Mini Din8)

Located on the front of the PLC.  
Sometimes hidden behind a cover

- 3) **Determine if the software revision installed on your programming laptop matches the firmware in the PLC.** If you are unsure what firmware is in the PLC you can just try to connect. If you do not have the right version of the software, you will get a popup similar to the one below telling you what version is needed. If this is the case you will need to purchase the correct version from Allen Bradley.
- i) It is important to note that the numbers left of the decimal indicate the major revision. They need to match. The numbers of the right of decimal are the minor revision. They can be different. So, for an example if you have version 31.2 on your programming laptop, it can connect to a PLC with firmware version 31.0, 31.2 or 31.9, but it will not connect to a PLC with firmware version 29.0 or 32.0.
  - ii) It is also important to note that you can have many different versions of the programming software installed on your programming laptop. The software will automatically switch to the correct version when you connect to the PLC, provided that the correct version is installed on the programming laptop.



4) Use the table below to find the correct procedure for the PLC you are trying to connect to.

PLC Family	Software	Connection Type	Pages
Compact/Control Logix	Studio 5000	Ethernet	7, 17
Compact/Control Logix	Studio 5000	USB	11, 17
Compact/Control Logix	Studio 5000	Serial	13, 17



# Section 1

## Setup for Connecting to an Allen Bradley PLC over Ethernet

### 1) Required software and hardware:

- a) RSlinx Classic Lite software (Free download on ab.com)
- b) Standard Ethernet Cord (not a cross over)
- c) The IP address of the PLC must be known

### 2) Physically connect the ethernet cable to the programing laptop and the PLC

- a) Plug one end of the ethernet cord into the programming laptop and the other end into any of the following locations:
  - i) Programming port on the outside of the enclosure, if available
  - ii) Directly into the PLC ethernet port, if available
  - iii) An open port on an ethernet switch that is connected to the PLC

### 3) Change Programing Laptop's IP address so it is on the same subnet as the PLC.

- a) Click the start button on the bottom left-hand corner of the windows desktop, then click the gear symbol to open up the widows settings widow.

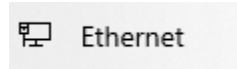
- b) Click "Network and Internet"



Network & Internet

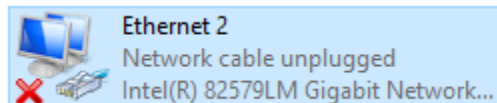
Wi-Fi, airplane mode, VPN

- c) Click "Ethernet" on the left-hand side of the window.



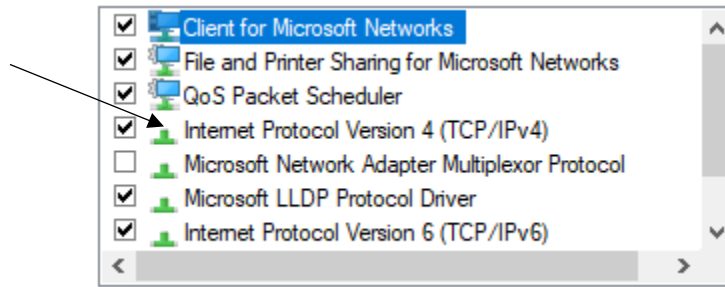
- d) Click "Change adapter options" on the right-hand side of the window.

- e) Double click "Ethernet2" This may be numbered differently on your computer. If you are unsure what option to click on, plug an Ethernet cable into any network and the other end into the Ethernet port you are using on your computer. The red X should change to a green checkmark on the correct option.





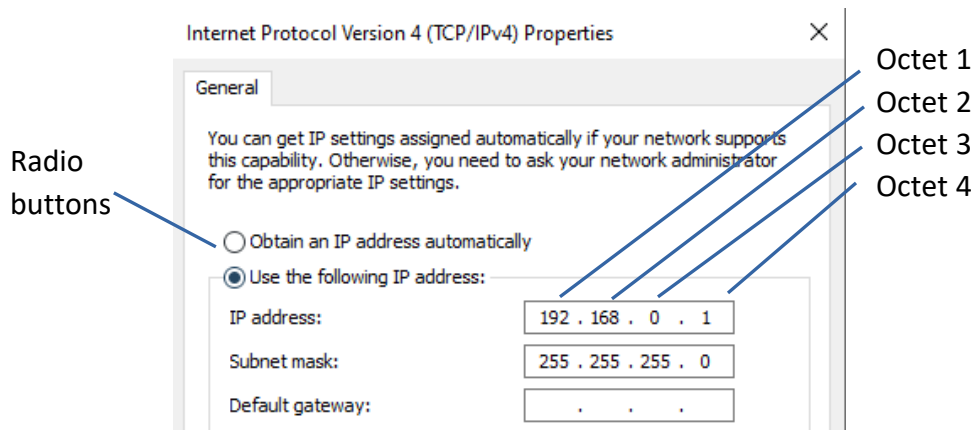
f) Double Click “Internet Protocol Version 4 (TC/IPv4)”



g) Click the radio button next to “Use the following IP Address” **Warning!!!** Your computer will most likely not be able to connect to your company’s network through the Ethernet port after this setting is changed. It should still be able to connect over Wifi though. To reconnect to your network, click on the radio button next to the “Obtain an IP address automatically” after you are finished working on the PLC.

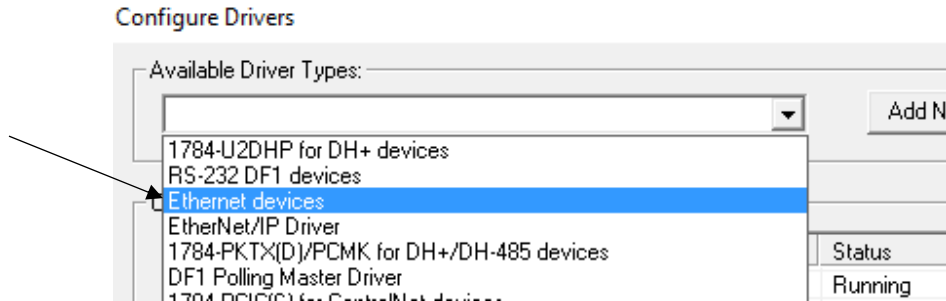
h) Enter an IP address in the box next to the IP address label. The first three octets must be the same as the PLC you are trying to connect to. The fourth octet has to be unique on the network the PLC is on. So, if a PLC has an IP address of 192.168.0.10 and is connected to an HMI with an address of 192.168.0.12 and a VFD with an address of 192.168.0.20. The fourth octet can be anything between 0 and 255 besides 10,12, and 20. So for an example you could use 192.168.0.1.

i) Enter a subnet mask in the box next to the subset mask label. The subnet mask will always be 255.255.255.0. Finally click “okay”

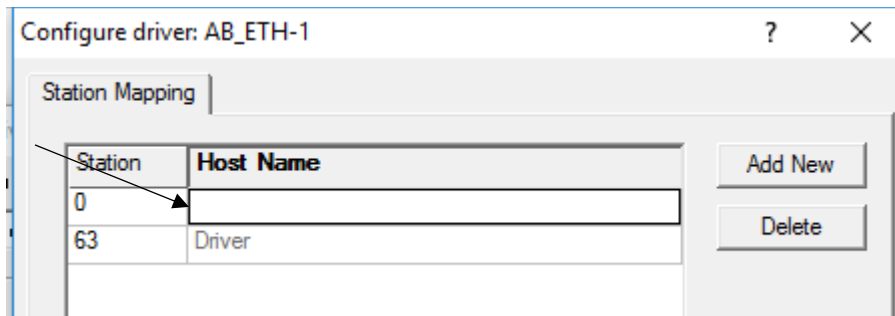


**4) Create a driver for the connection in RSlinx (This can be skipped if the driver had already been created previously)**

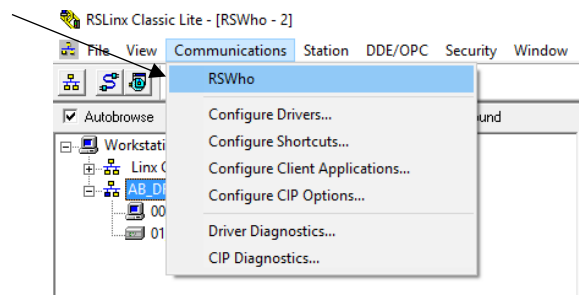
- a) Open RSLinx Classic Lite
- b) Click on “Communication”, then select “Configure Drivers”
- c) Click on the drop down box and select “Ethernet devices”



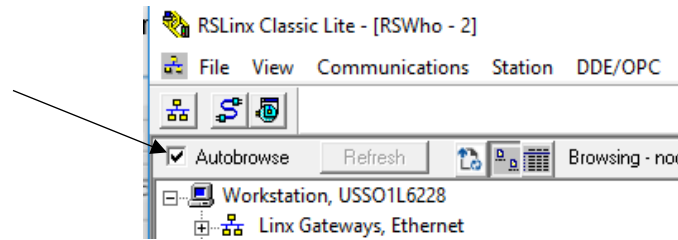
- d) Click “Add New”
- e) At this point you can rename the driver if you wish. If you choose to, use a name that describes the machine you are connecting to. Then click “OK”
- f) Type in the IP address of the PLC here. Then Click “OK” (Make sure you use enter the IP address of the PLC and not the IP address of the programming laptop)



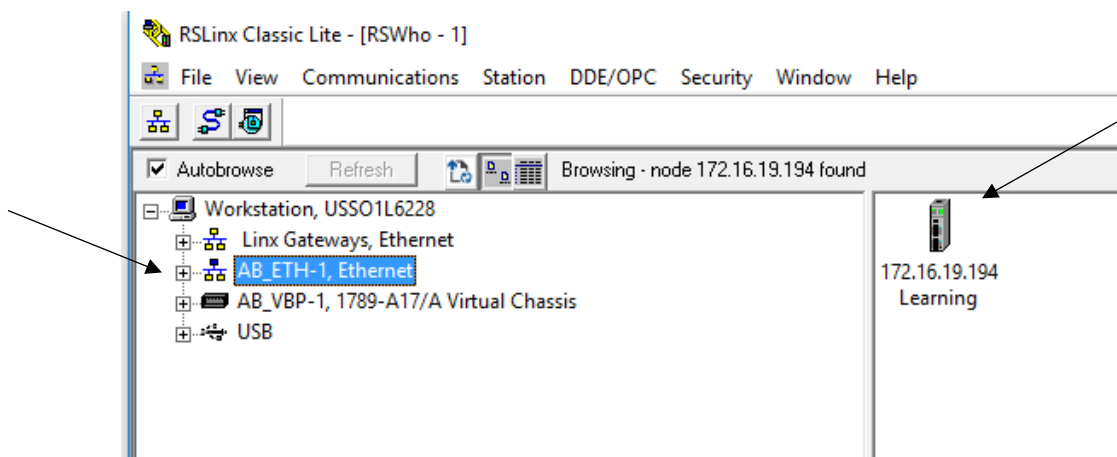
- g) Click on the “Communications” tab then Select “RSWho” from the drop down list.



h) Make sure the box next to “Autobrowse” is checked



i) Click the plus sign next to the driver you just created. The PLC should show up in the window on the right in about 15 seconds.



j) If it does not show up

i) Check cables

ii) Confirm the PLC has power

iii) Make sure the PLC and the laptop are on the same subnet. (The first three groups of number in the IP address are the same)

iv) Make sure the programming laptop does not have the same IP address as the PLC or any other device on the PLCs network. (The first three groups of numbers have to be the same, but the last group must be unique)

v) Sometimes other drives can cause problems. Try stopping and deleting any other unused drivers by opening the configure driver window again then selecting the unused drivers, then click stop, then click delete.

vi) Close RSLinx and all other Rockwell software and try again.

k) Once it appears you know the driver is setup correctly and you can close RSLinx if you wish. You do not need to create driver again unless you deleted the driver or try to connect to a different PLC that is configured differently.