Robotics, Automation, and Integration

CONCEIVING THE SMARTCART NETWORK

Name	Class/Period	Date

1. Overview

In this lab activity, you will hook up your workstation (computer) and the SmartCart PLC to the same network and test connectivity between the two devices. By doing so, you will have essentially spawned the SmartCart 4.0 Network.

2. Performance Objectives

After completing this lab activity, you will be able to:

- Discover your computer's IP address.
- Assign the computer a new static IP address.
- Assign an IP address for your PLC.
- Ping the PLC.

3. Required Materials

You need the following materials to complete the lab activity:

- SmartCart 4.0
- Computer
- Ethernet cables
- USB-B cable

4. Required Software

RSLinx classic is required for this lab activity. It is included in the Studio 5000 suite. Ensure that the software is installed on your PC and has a valid license. If you are having problems installing or licensing the software, contact your instructor or IT manager.

5. Inventory and Safety

Before beginning the lab activity, review this checklist and mark off each item as you complete it.

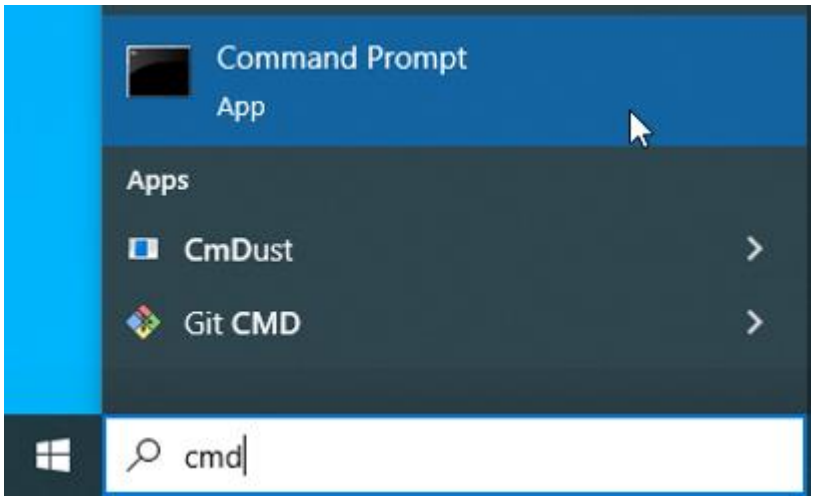
- ☐ All hardware components are available for this lab activity.
- ☐ Hands, hair, and clothing are securely away from the work area.
- ☐ The work area is clean and devoid of food or drink.
- ☐ Review the SmartCart Safety Guidelines. Pay special attention to the guidelines regarding the PLC.
- ☐ Read through the entirety of this lab activity to familiarize yourself with the requirements.

6. Lab Activity

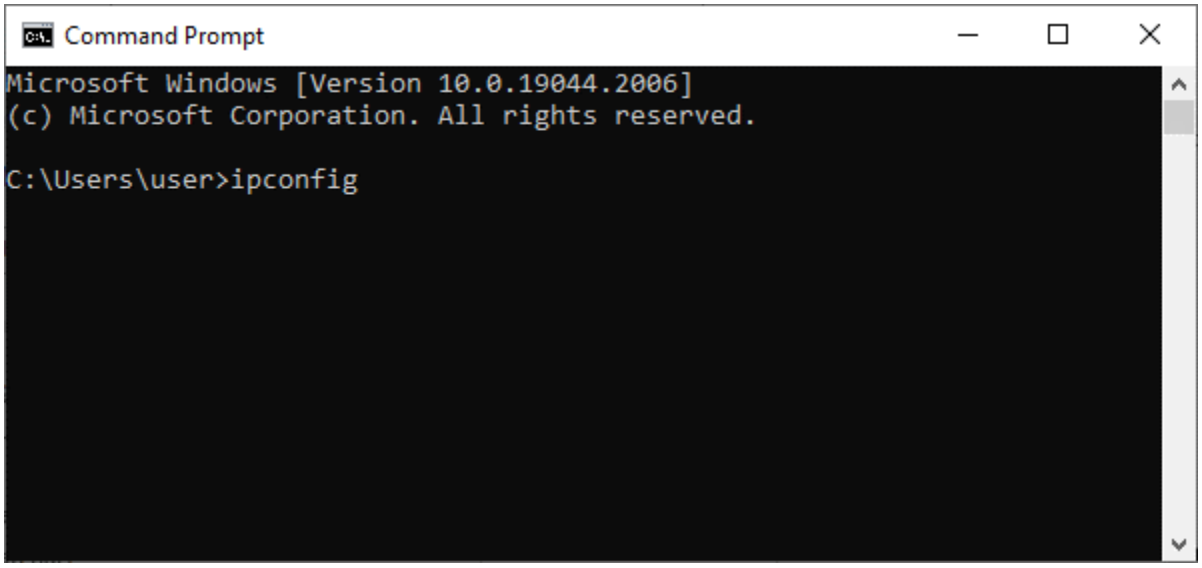
6.1. What's Your Computer's IP Address?

In this task, you will discover your computer's IP address. Perform the following steps:

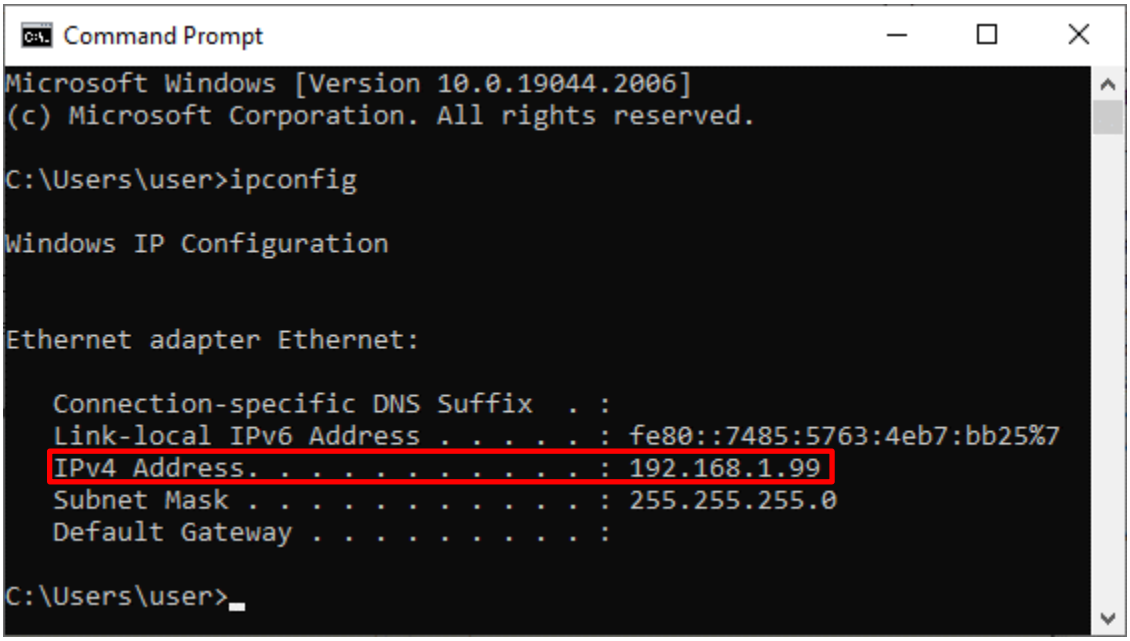
1. Ensure that your computer is connected to the switch via an Ethernet cable.
2. Open the Windows **Command Prompt**. The quickest way to do this is to go to the Windows Start area (bottom-left corner of your screen) and type **cmd** in the search field. Click the application to open it.



3. The Command Prompt window opens. In the first line, type **ipconfig**.



4. On your keyboard, press **Enter**. The computer's network information is displayed. Note your computer's IPv4 address.



6.2. Changing the Computer's IP Address

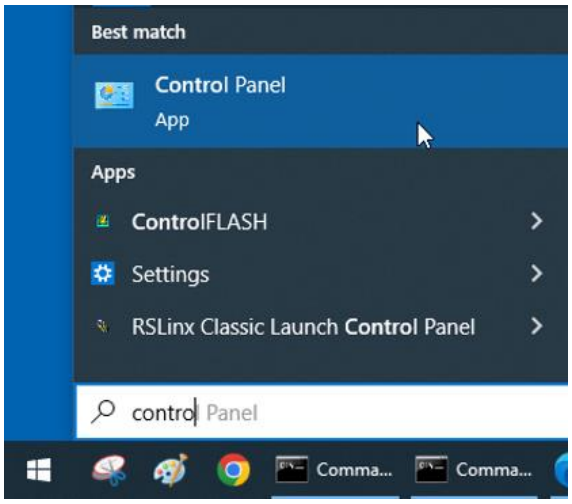
In this task, you will change the workstation's (computer's) IP address to the static IP address 192.168.0.1.

> ***Note:*** *We use 192.168.0.1 as an example IP address. If it is more convenient for you to define a different IP address, you may do so. However, keep in mind that the other devices on the network will need to be adjusted accordingly.*

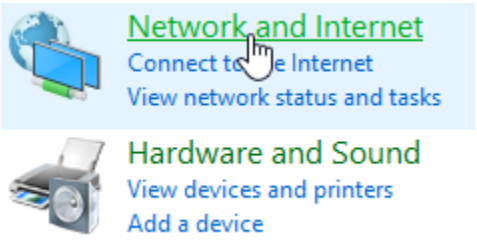
> ***Note:*** *Windows is constantly changing its interface in order to make it friendlier for users. If the steps below are no longer accurate, visit support.microsoft.com and search for* ***Change TCP/IP settings****.*

Perform these steps:

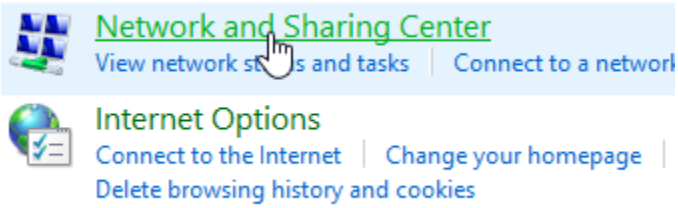
1. Using the Windows search menu, open the **Control Panel**.



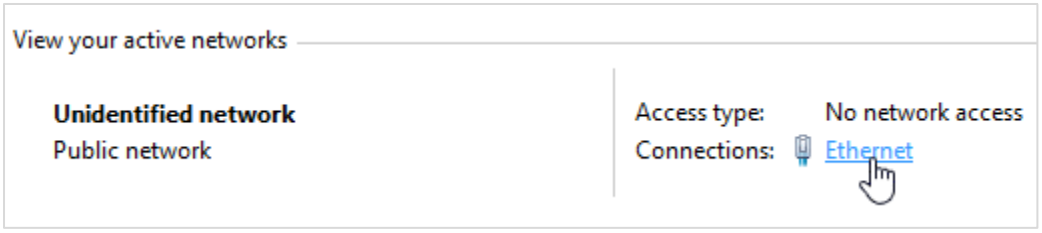
2. Select **Network and Internet**.



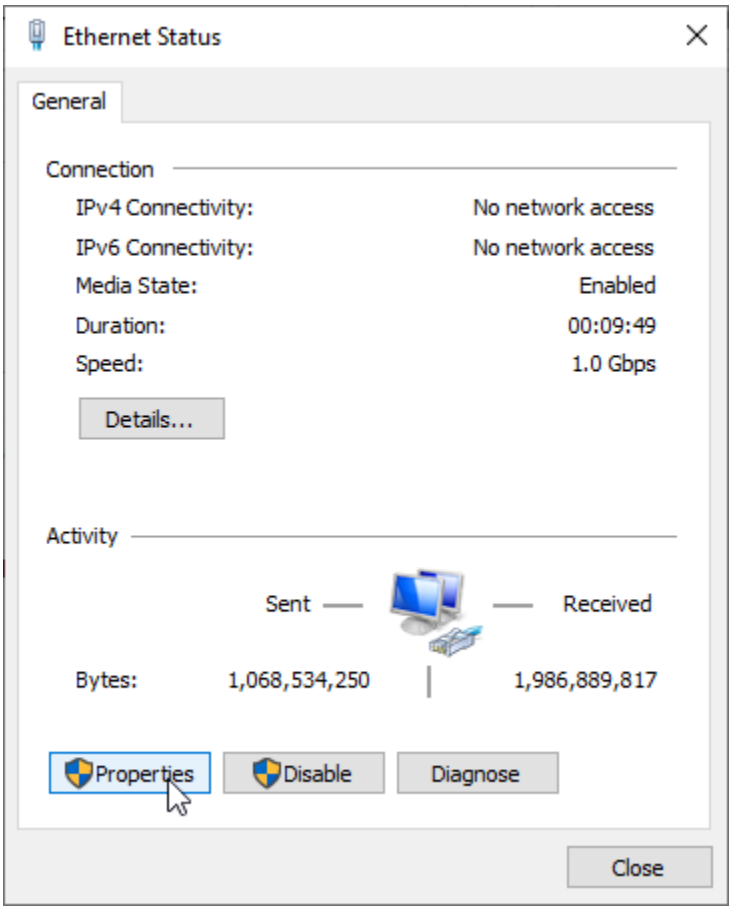
3. Select **Network and Sharing Center**.



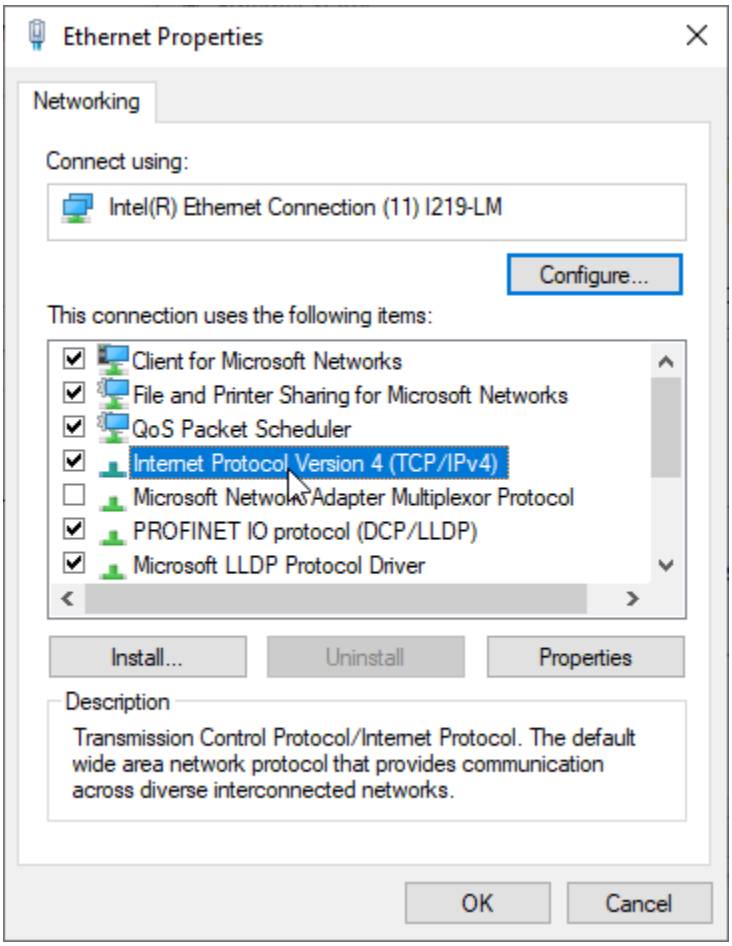
4. In the View your active networks area, select **Ethernet**.



5. The Ethernet Status window opens. Select **Properties**.

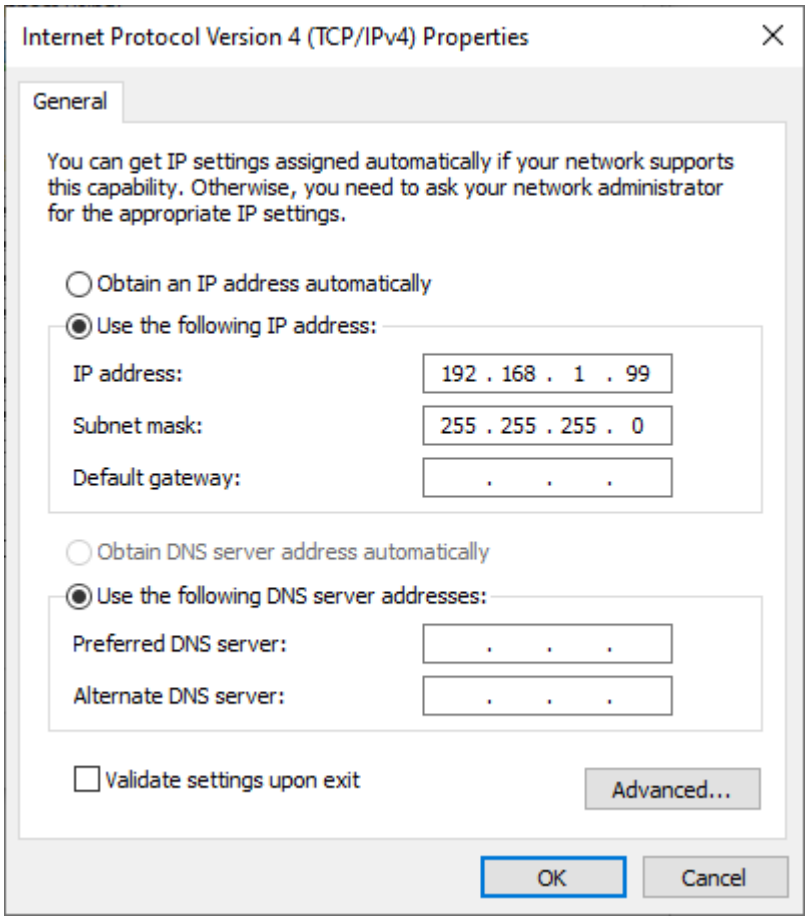


6. The Ethernet Properties window is displayed. *Double-click* **Internet Protocol Version 4 (TCP/IPv4)**.

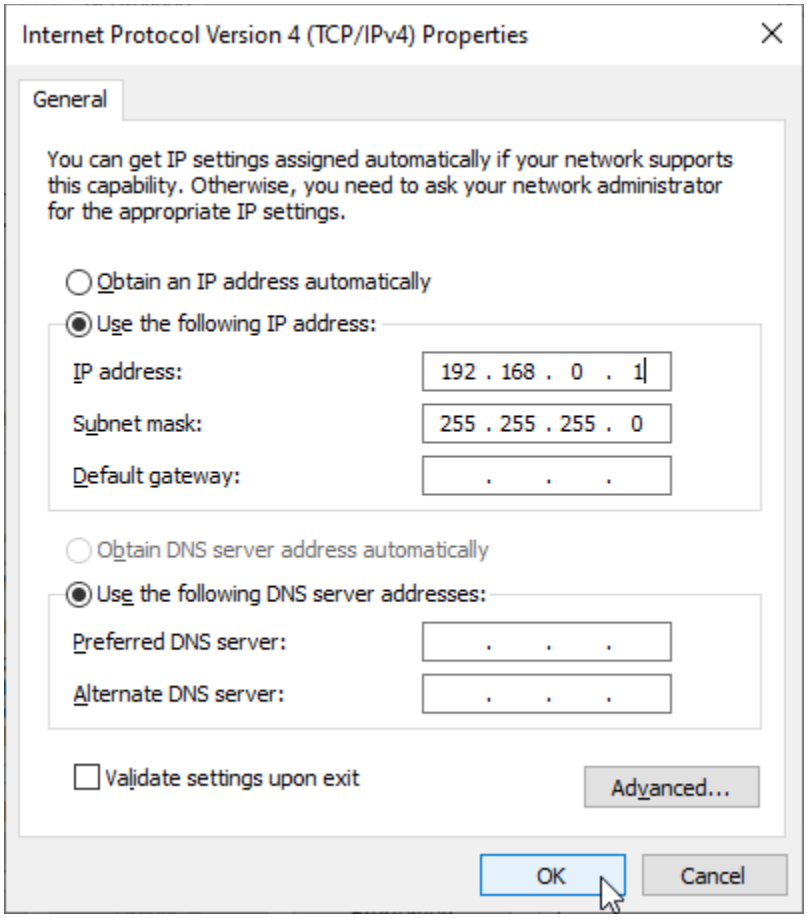


The IPv4 Properties window is displayed. There are two main options here:

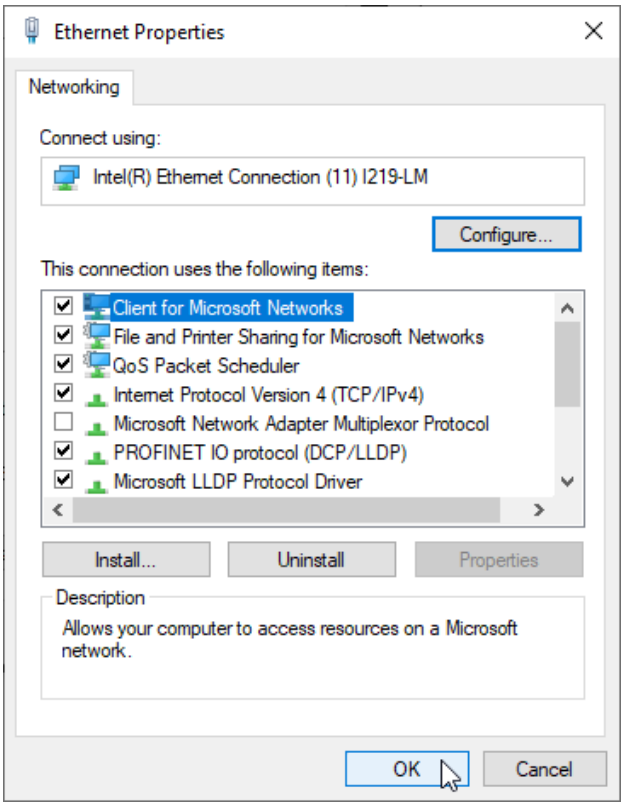
- **Obtain an IP address automatically:** for configuring a dynamic IP address.
- **Use the following IP:** for configuring a static IP address. You will configure this type of address.



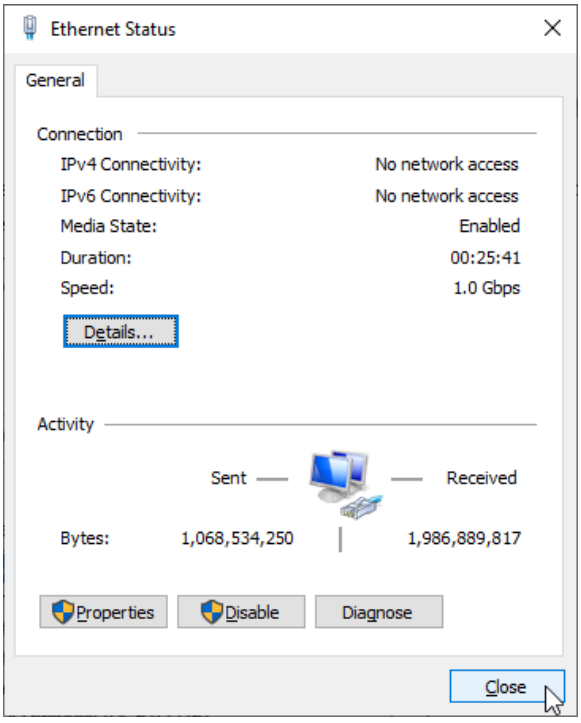
7. Ensure that **Use the following IP address** option is selected.
8. For IP address, enter **192.168.0.1**.
9. For Subnet mask, enter **255.255.255.0**.
10. Leave all other fields blank, and then click **OK**.



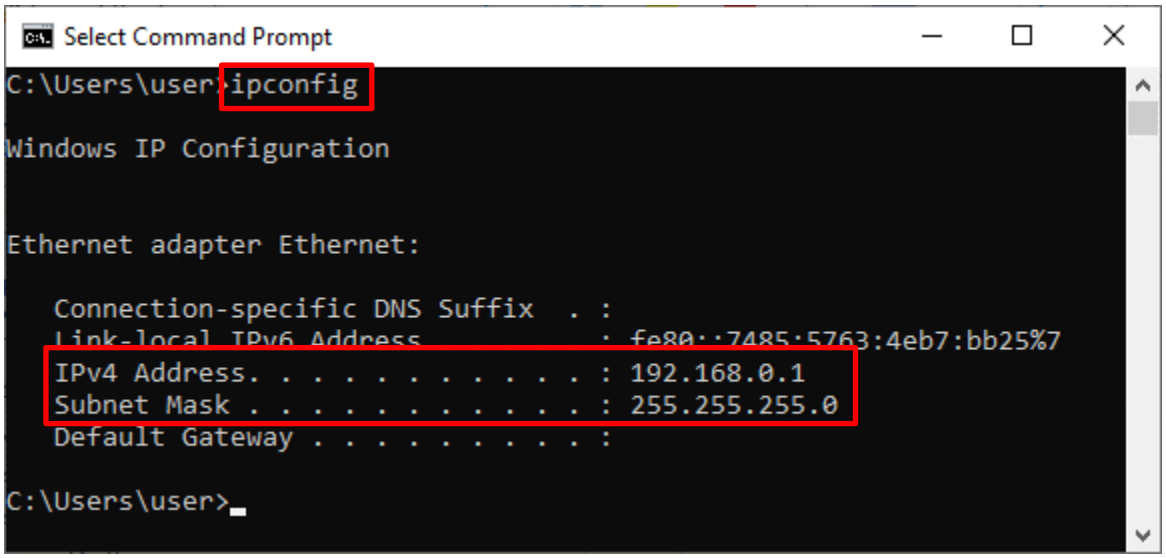
11. The IPv4 Properties window closes. Return to the Ethernet Properties window. Click **OK** to confirm the changes and close the window.



12. Close the Ethernet Status window.



13. Return to Command Prompt and enter **Ipconfig**. Ensure that the IPv4 address and subnet mask are as you set them.



14. Minimize Command Prompt.

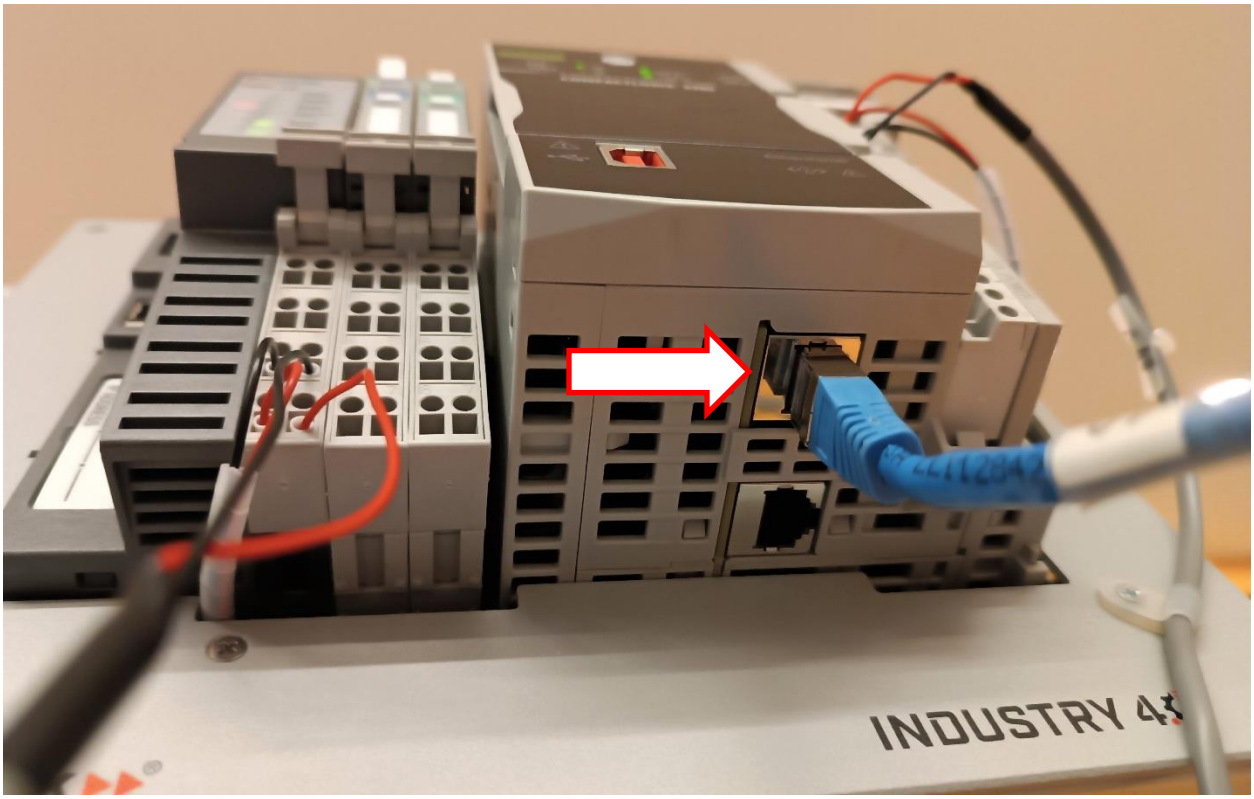
6.3. Configuring the PLC's IP Address

Recall that the CompactLogix has two Ethernet ports, and each port *can* have a different IP address, if the PLC is so configured. In this task, you will use RSLinx Classic to configure the A1 port with a static IP address.

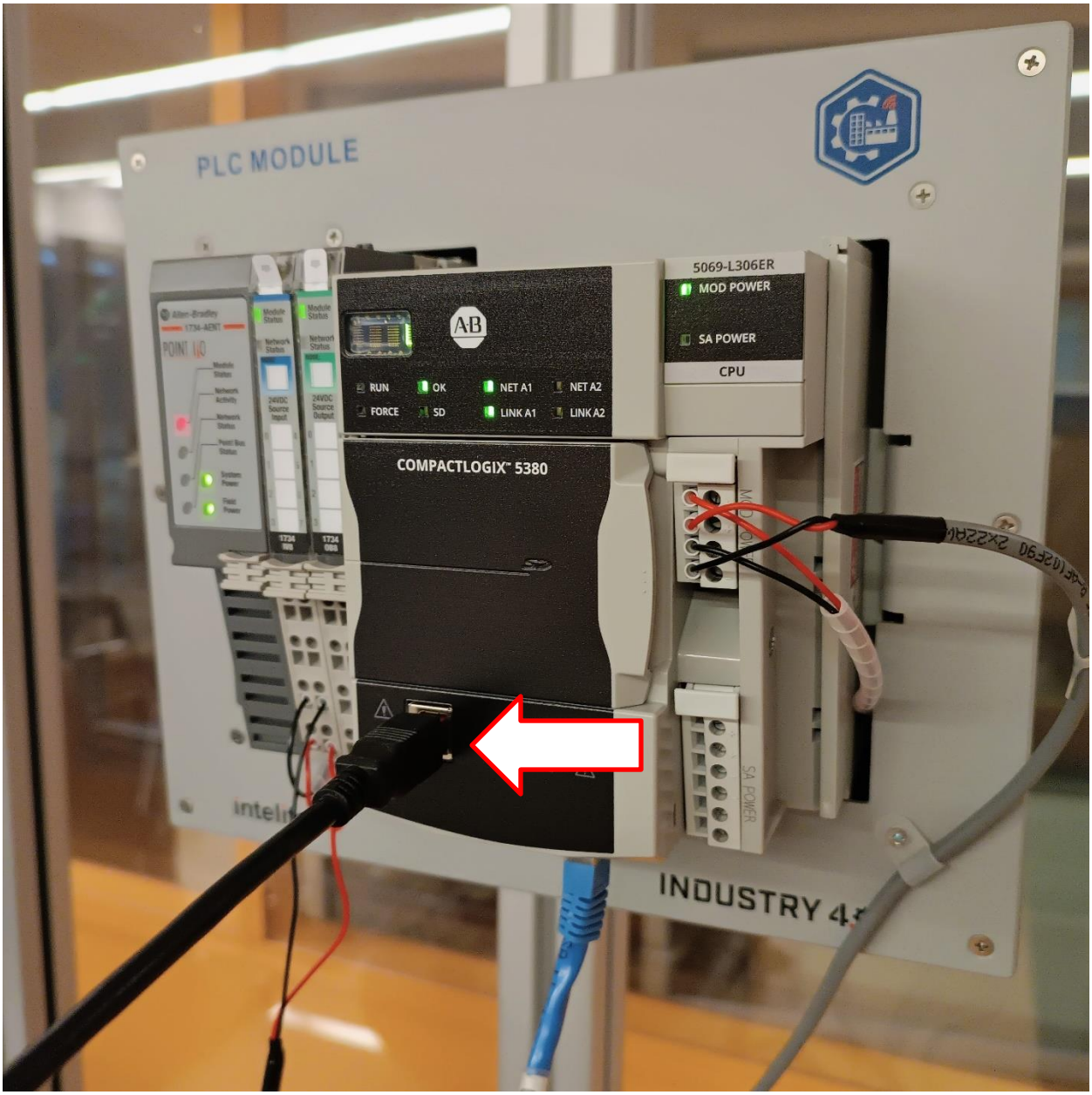
Before beginning this task, view the CompactLogix's scrolling LED screen to ensure that the controller has been reset to factory defaults. On the screen, an indicator that a firmware installation is required, and dual port mode should be active with both ports showing DHCP. If the controller has already been configured, first perform the steps in *Section 8.2: Resetting the CompactLogix to Factory Default Settings*, on page 18 of this lab activity document. Consult with your instructor before proceeding.

Perform the following steps:

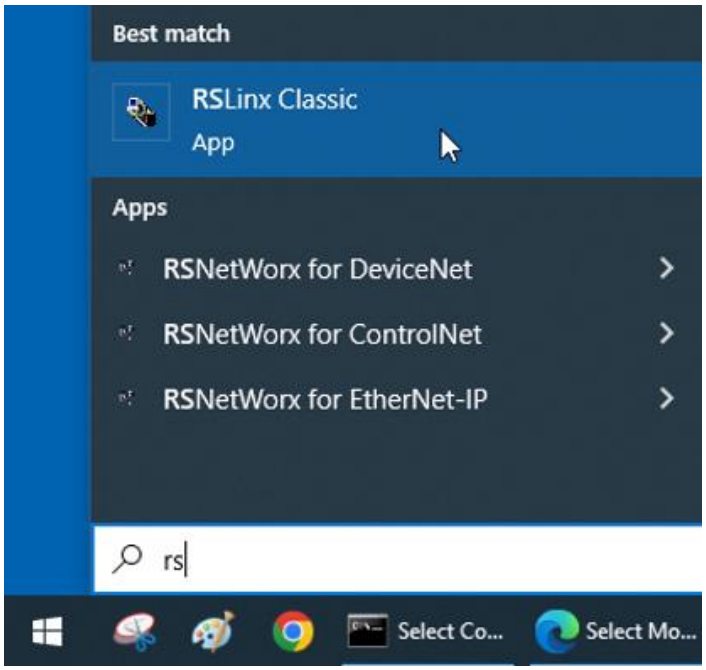
1. Ensure that the controller's A1 port (frontmost port) is connected to the network switch via an Ethernet cable.



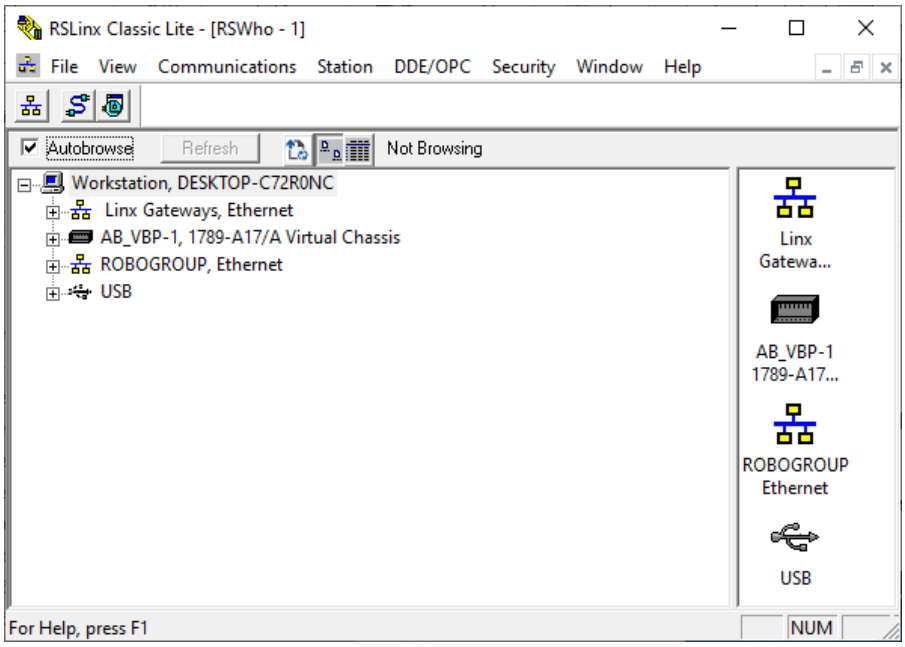
2. Turn the I/O box on and wait for CompactLogix to power up.
3. Connect the **USB-B cable** directly from your workstation (computer) to the type-B port on the front of the controller.



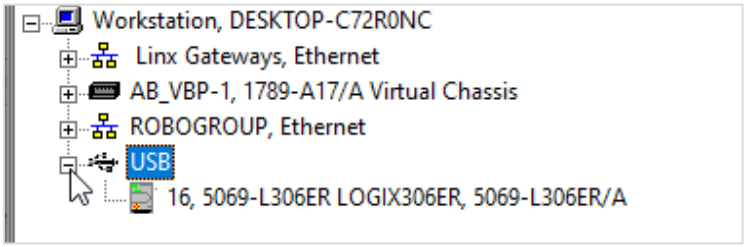
4. Use the Windows search option to open **RSLinx Classic**. This utility is included when you install Studio 5000.



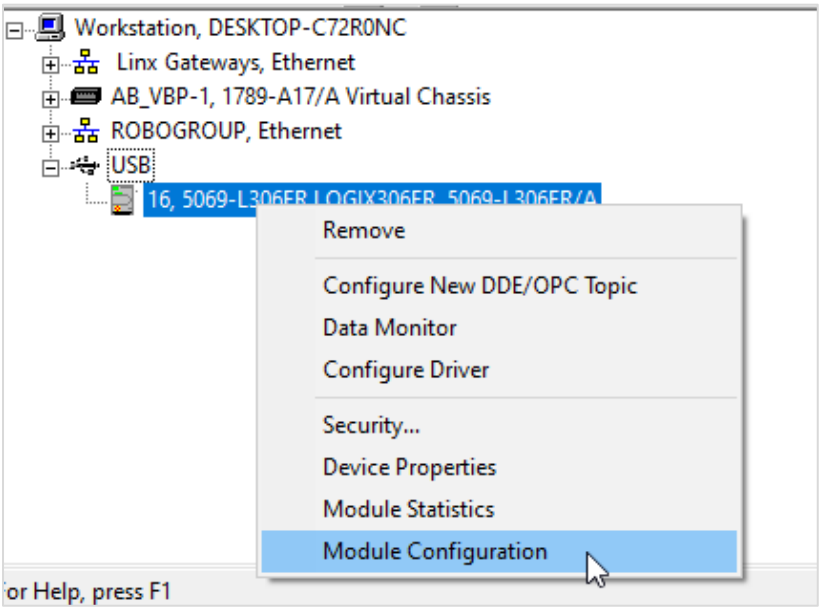
RSLinx Classic Lite opens. There is a navigation tree on the left side of the window.



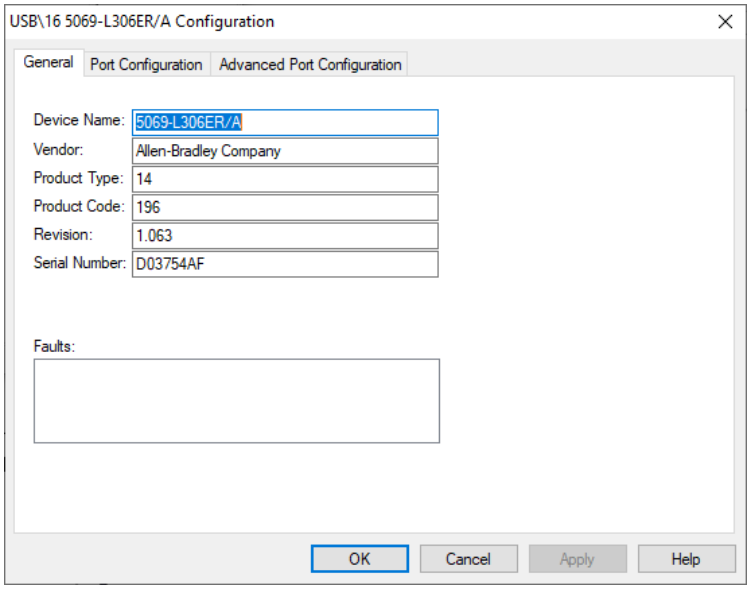
5. Click the **+** next to **USB** to expand the driver. Your CompactLogix 5069-L306ER should be displayed as a node.



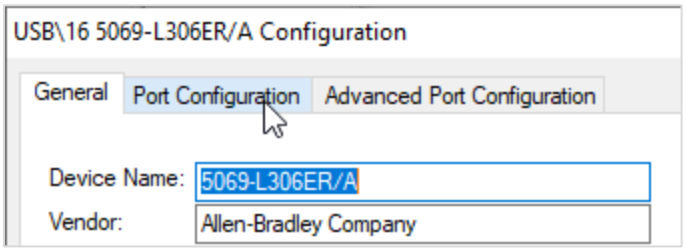
6. Right-click the CompactLogix (more accurately, the CompactLogix *node*) and in the menu, select **Module Configuration**.



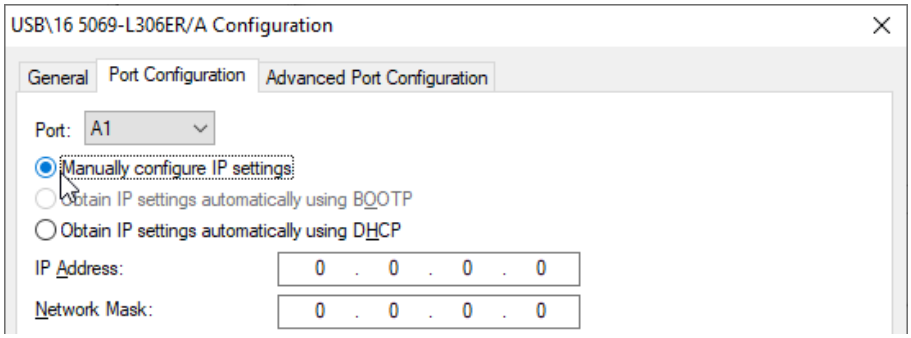
The node's configuration window opens.



7. Select the **Port Configuration** tab.



8. In the Port Configuration tab, ensure that A1 is selected as the port. Select **Manually configure IP settings**.

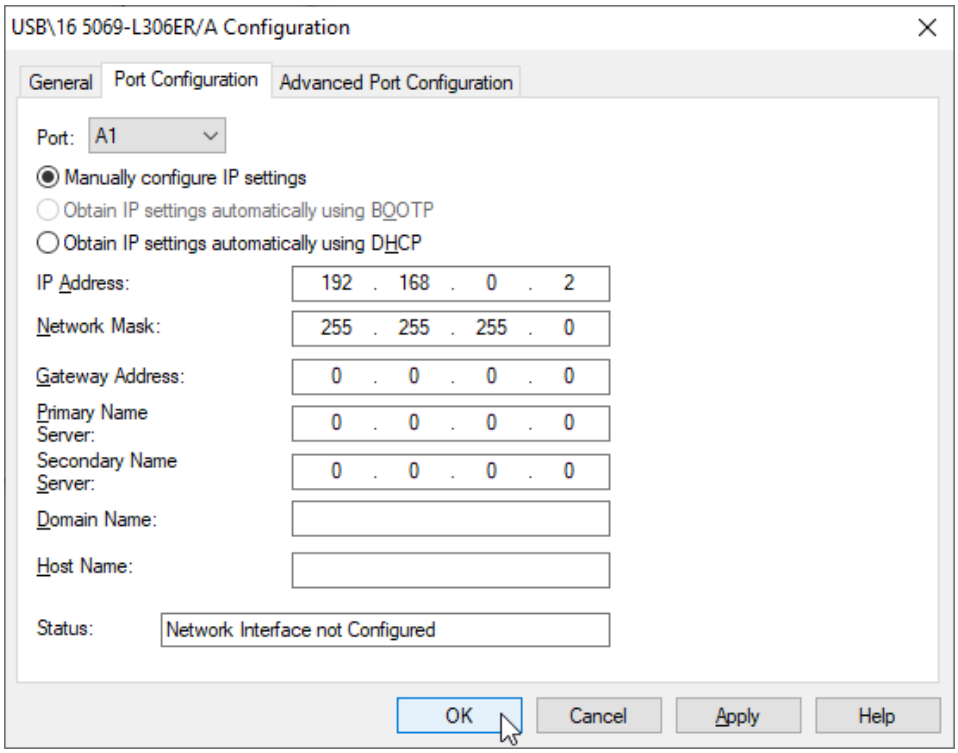


9. Set the IP address to **192.168.0.2**. This is a static IP address on the same network as your computer.

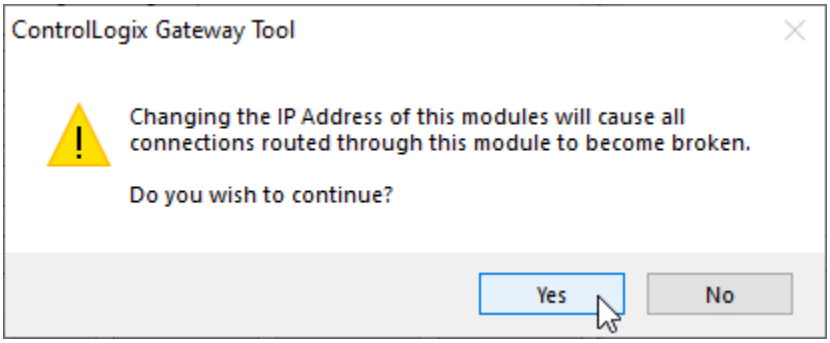
ⓘ ***Note:*** *The address must be unique. If you know of another device on the network to have an IP address of 192.168.0.2, use a different value for the final octet.*

10. Set the Network Mask (this is equivalent to a subnet mask) to **255.255.255.0**.

11. Leave all other fields as 0's or empty, and then click **OK** to confirm the changes and close the configuration window.



12. Read the warning message, and then click **Yes**.

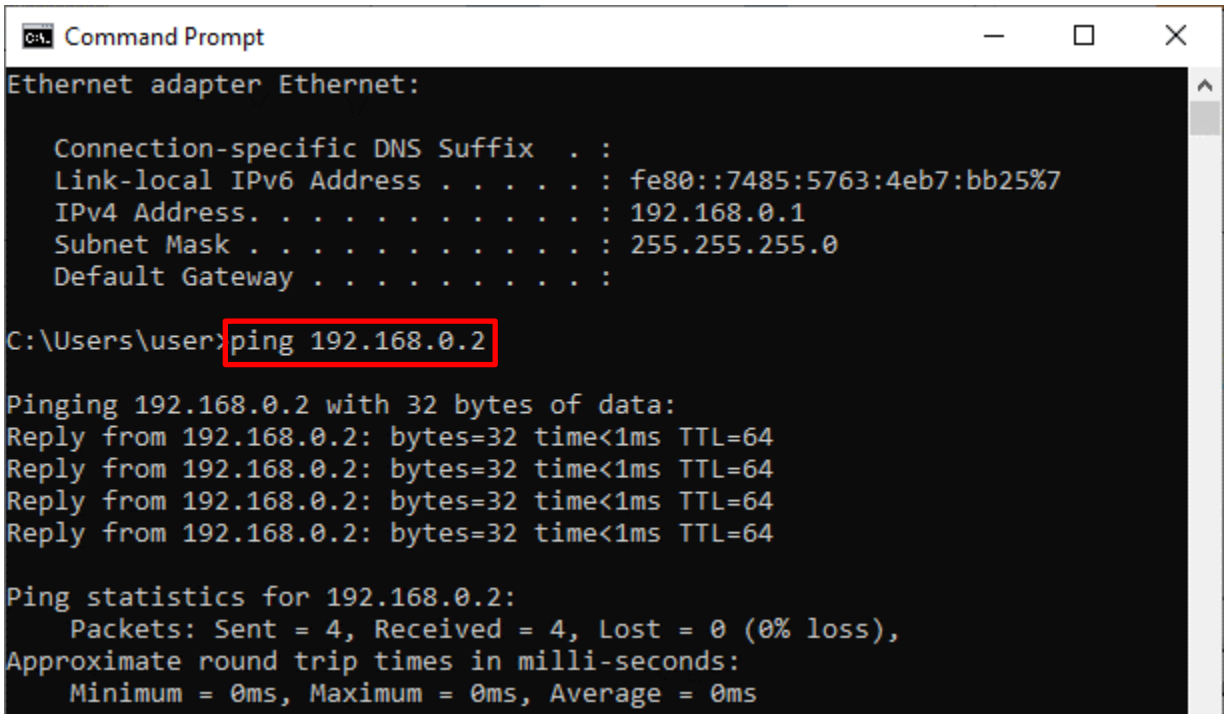


13. Observe the scrolling LED screen on the controller. Port A1 should now have an the static IPv4 address that you gave it, while A2 should still have an unconfigured DHCP address.
14. Close RSLinx Classic.
15. Remove the USB-B cable from both the computer and the CompactLogix. Return it to storage.

6.4. Pinging the PLC

In this task, you will use the Windows Command Prompt to ping the PLC and ensure that it is indeed on the same network as the computer.

1. Open Command Prompt.
2. Enter **ping 192.168.0.2**. Ensure that you have received a successful reply.



ⓘ ***Troubleshooting tip:*** *Ensure that both the computer and controller are connected to the switch via Ethernet cables.*

7. Authentic Skill Assessment

Have your instructor verify that your work meets the requirements in the performance objectives and sign below. Keep this lab activity sheet for future reference.

Instructor Signature	Date

8. Reset Steps

If someone else is going to be performing this lab activity after you, perform the reset steps below. Consult with your instructor before performing these procedures.

8.1. Resetting the Computer's IP Address

Perform this procedure to change the workstation's IP address:

1. On your Windows system, navigate to **Control Panel\Network and Internet\Network and Sharing Center**.
2. Select **Ethernet**.
3. The Ethernet Status window opens. Select **Properties**.
4. The Ethernet Properties window is displayed. Double-click **Internet Protocol Version 4 (TCP/IPv4)**.
5. The IPv4 Properties window opens. For IP address, enter **192.168.1.99**. Leave the subnet mask as **255.255.255.0**. Leave all other fields blank, and then click **OK**.
6. The IPv4 Properties window closes. Return to the Ethernet Properties window. Click **OK** to confirm the changes and close the window.
7. Close the Ethernet Status window.
8. Open the Windows Command Prompt. Type **Ipconfig** and then press Enter. Ensure that the IPv4 address and subnet mask are as you set them.

8.2. Resetting the CompactLogix to Factory Default Settings

This procedure, known as a Stage 2 Reset, resets the CompactLogix to its factory default settings. This includes:

- Clearing all user settings, including the IP addresses of the ports.
- Returning the controller to revision 1.x (out of the box) firmware. You will learn about firmware in the next activity.
- Returning the IP mode to dual-IP mode. You will learn about IP modes in the next activity as well.

Follow these steps to perform a Stage 2 Reset. You may need a partner to successfully perform these steps.

1. Turn off the I/O box to power down the PLC.

2. Open the PLC's front door.
3. Remove the SD card if there is one. On your workstation (computer), delete the files on the SD card if there are any.
4. Using a small tool with the diameter of a paper clip, press and hold the controller's reset button.

5. While pressing the reset button, turn on the I/O box to power up the controller.
6. Continue to press the reset button while the scrolling display screen cycles through *DFLT, 4, 3, 2, 1, Factory Default*. This may take several minutes. Once *Factory Default* appears, release the reset button.
7. Turn off the I/O box to power down the controller.
8. Replace the SD card.
9. Close the front door.
10. Turn on the I/O box and wait for the PLC to power up. Observe the scrolling screen to verify that both ports are DHCP enabled, and that a firmware installation required message is displayed.

9. Shutdown

Unless instructed otherwise by your instructor, review and complete each of the items on the checklist below.

- ☐ Turn off the I/O box.