

Robotics, Integration, and Automation

CONFIGURING THE ROBOT

Name	Class/Period	Date

1. Overview

In this lab activity, you will modify the robot controller's IP address and ensure that is on the SmartCart LAN by using a ping test. You will also configure the robot for communication with the CompactLogix, an EtherNet/IP device.

- Note:** In order to differentiate between the programmable logic controller and the robot controller, the two devices are referred to as the PLC and the robot, respectively.

2. Performance Objectives

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

- Find the robot controller's IP address.
- Power the robot controller on in maintenance mode.
- Change the robot controller's IP address.
- Confirm network connectivity between the workstation and the robot.
- Change the robot's EtherNet/IP board settings.
- Register an EtherNet/IP device on the robot.

3. Required Materials

You need the following materials to complete the lab activity:

- SmartCart 4.0
- Computer
- Ethernet cables

4. Required Software

No special software is required for this lab activity.

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.
- Read through the entirety of this lab activity to familiarize yourself with the requirements.

6. Lab Activity

6.1. Preliminary Steps

In this task you will return the state of your workstation (computer) to the state that it was at the end of the previous lab activity.

Confirm that:

- The workstation has a static IP address of 192.168.0.1.

For instructions on how to modify the workstation to match the above configurations, refer to [Activity 3-4 \(Lab\): Conceiving the SmartCart Network](#).

6.2. Viewing the Robot's IP Address

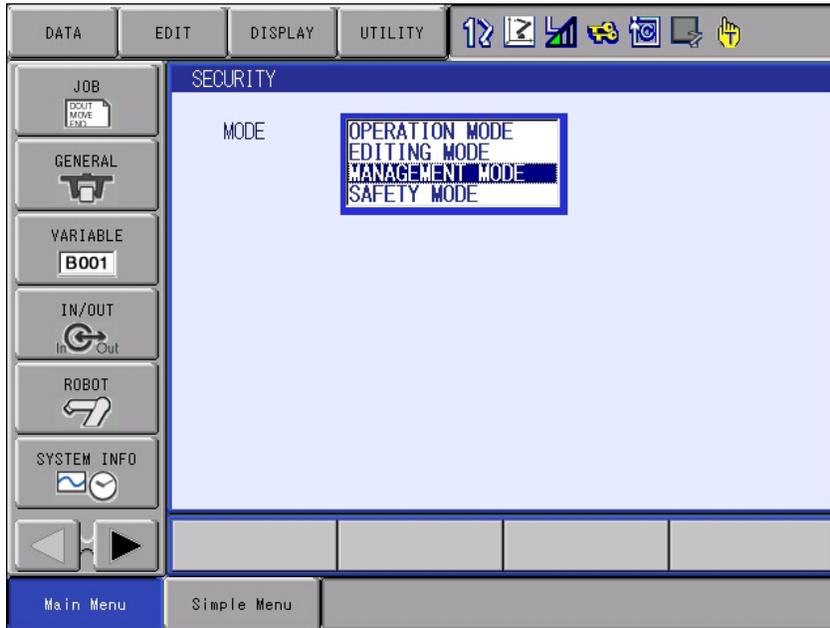
In this section, you will view the robot's current network settings. In online mode, this is done in *management mode*.

Perform these steps.

1. Turn the I/O box on.
2. Power the robot controller on (in regular online mode, not maintenance mode). Wait for the robot to boot up.
3. Ensure that the programming pendant is in Teach mode.
4. Using the pendant touch screen, navigate to **SYSTEM INFO > SECURITY**.



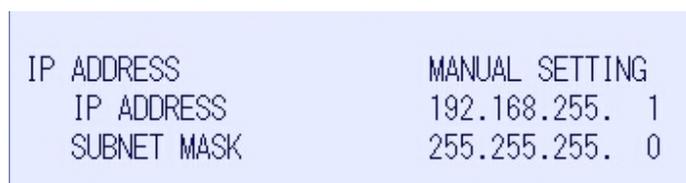
5. Select **MANAGEMENT MODE**. The default password is “99999999” (hold the 9 key until the password field is completely filled out and then press ENTER).



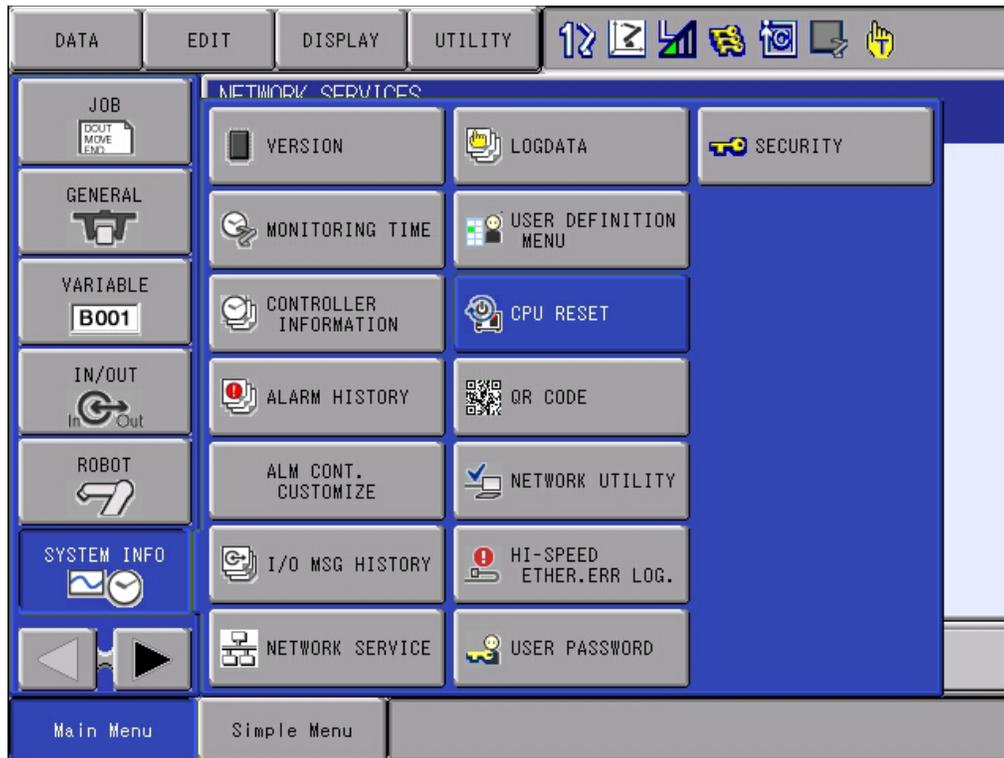
6. Navigate to **SYSTEM INFO > NETWORK SERVICE**.



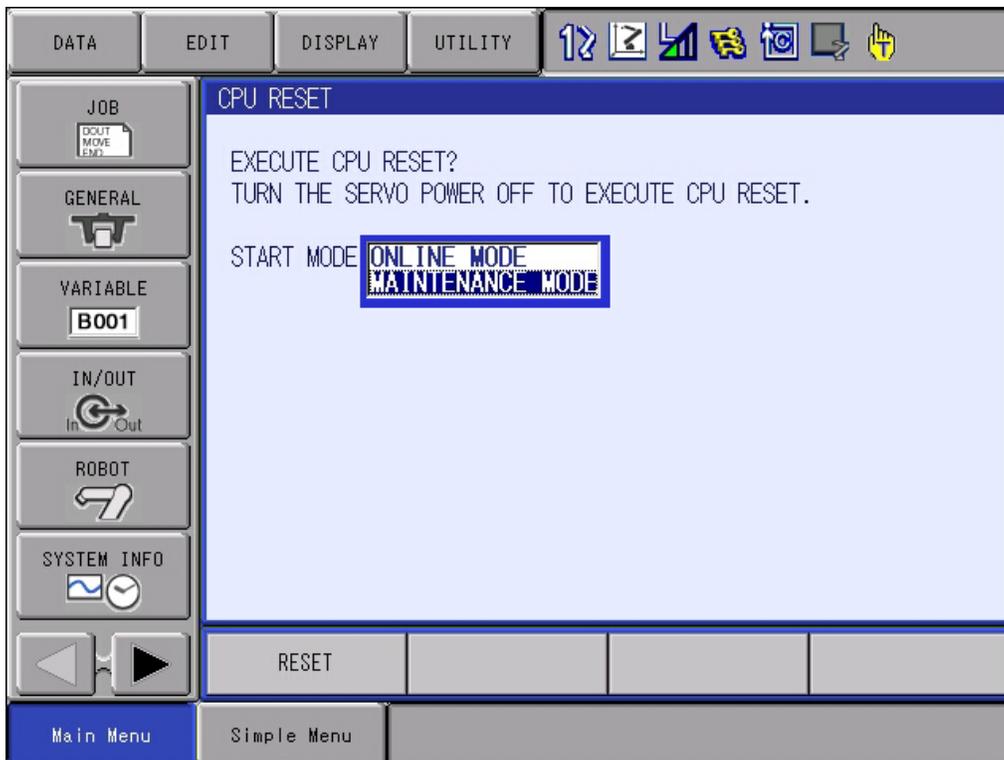
7. Find the robot's IP address. The factory default address is MANUAL SETTING (i.e., static) 192.168.255.1.



8. Navigate to **SYSTEM INFO > CPU RESET**.



9. The CPU RESET screen is displayed. In the START MODE menu, select **MAINTENANCE MODE**.



- 10. Press **RESET** or press the pendant's **ENTER** key.
- 11. Select **YES** to confirm.



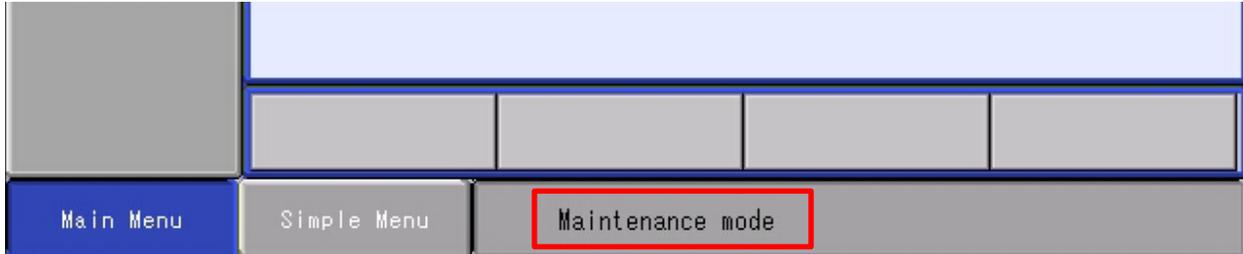
- 12. Wait for the robot to boot up in maintenance mode.

ⓘ **Did you know?** If the robot is off, you can turn the robot on in maintenance mode by holding down the **MAIN MENU** key while powering on the robot controller. Release the **MAIN MENU** key after the buttons at the top of the pendant flash, then wait for the robot to boot up.

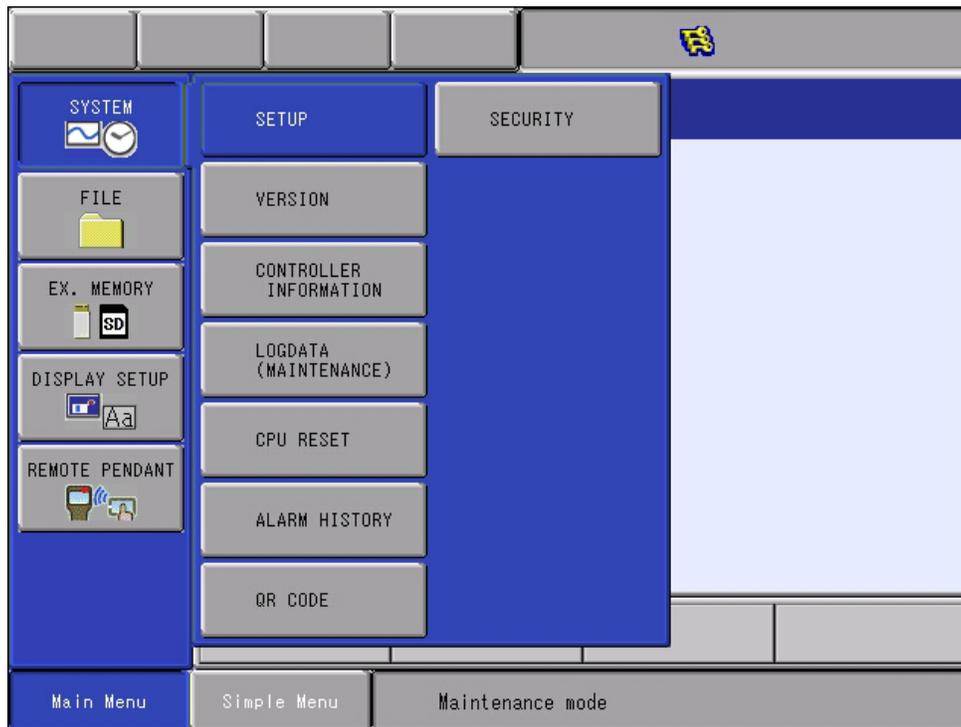
6.3. Modifying the Robot's IP Address

In this task, you will change the robot's current IP address to a static IP address on the SmartCart network. This modification is done in Management mode of Maintenance mode.

1. Ensure that **Maintenance mode** is displayed at the bottom of the pendant screen.



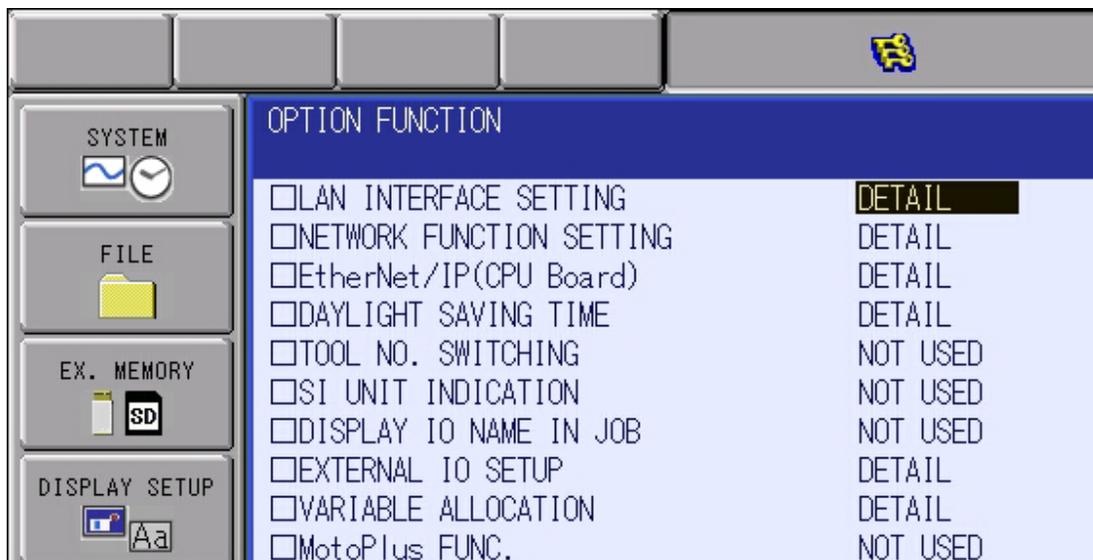
2. Navigate to **SYSTEM > SECURITY** and change the security mode to **MANAGEMENT**. The password is the same as the one you entered in the previous task.
3. Navigate to **SYSTEM > SETUP**.



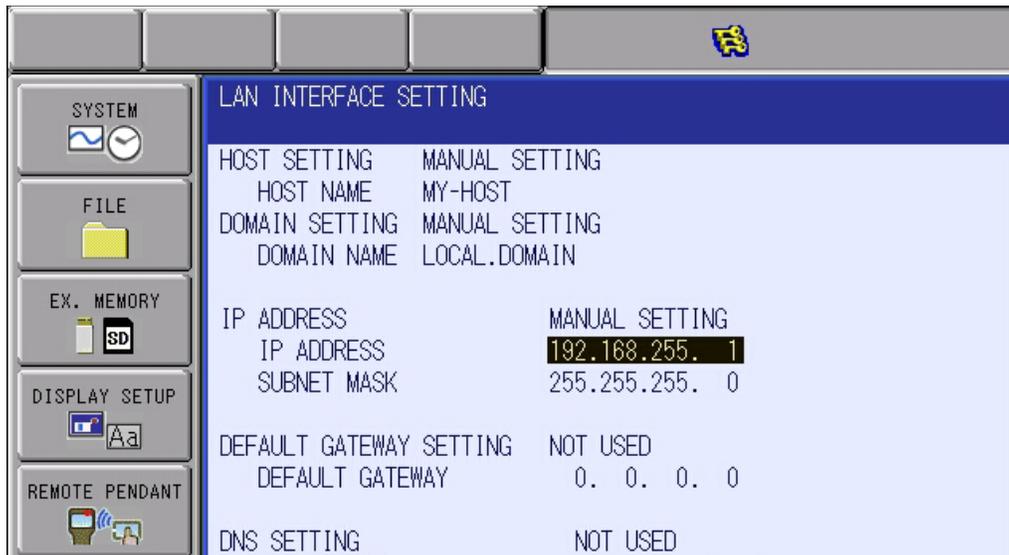
4. Select **OPTION FUNCTION**.



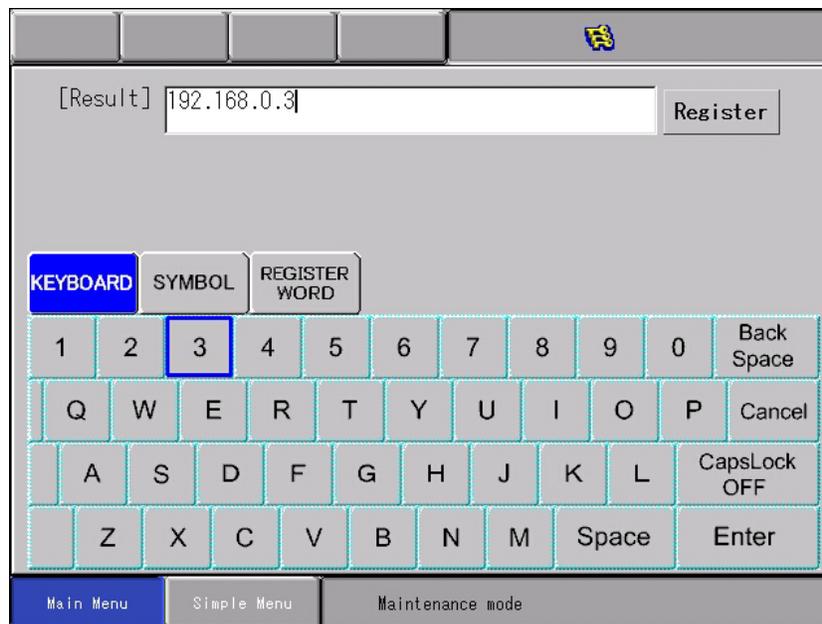
5. Select **DETAIL** next to LAN INTERFACE SETTING.



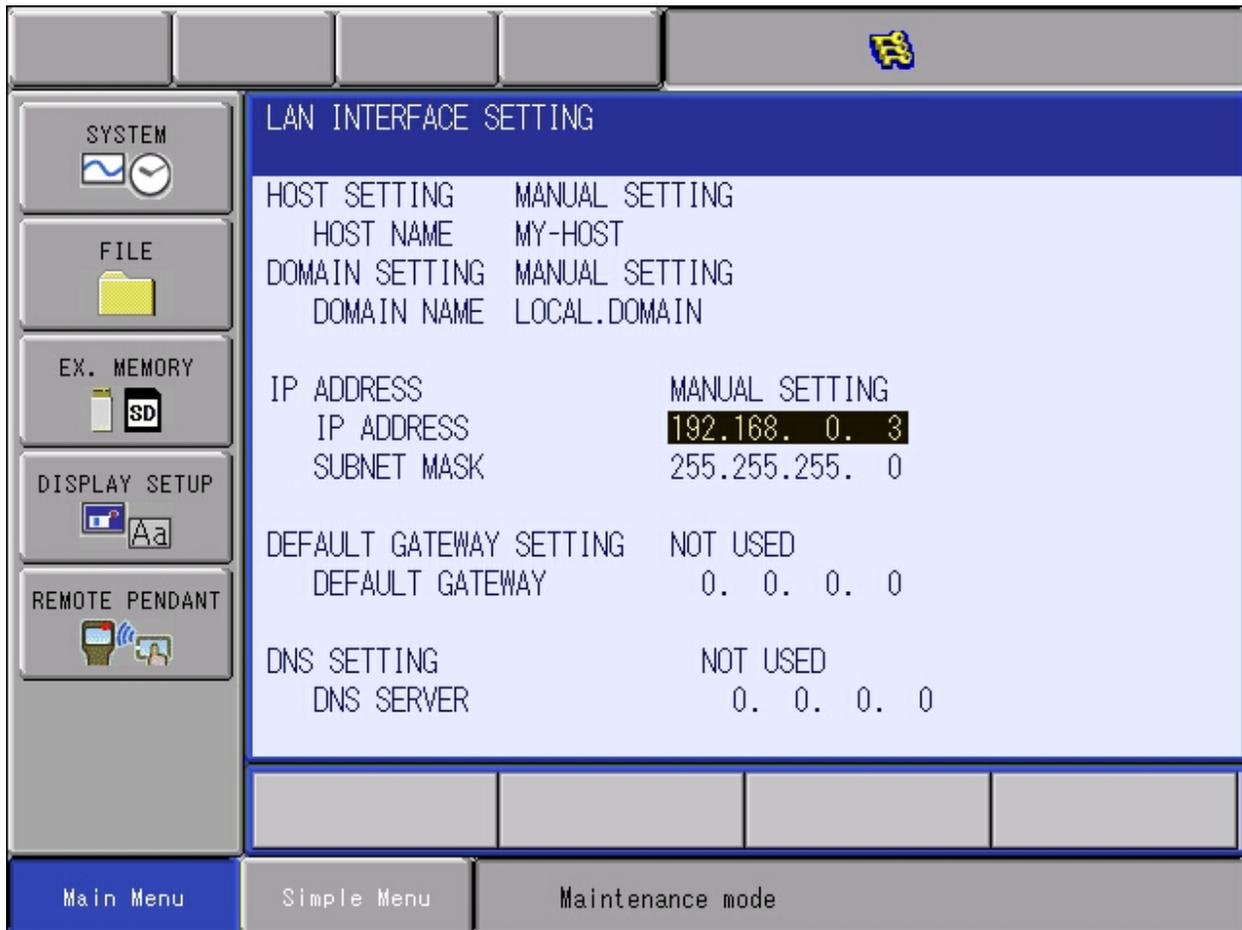
- 6. The LAN INTERFACE SETTING page is displayed. Navigate to and select the IP address.



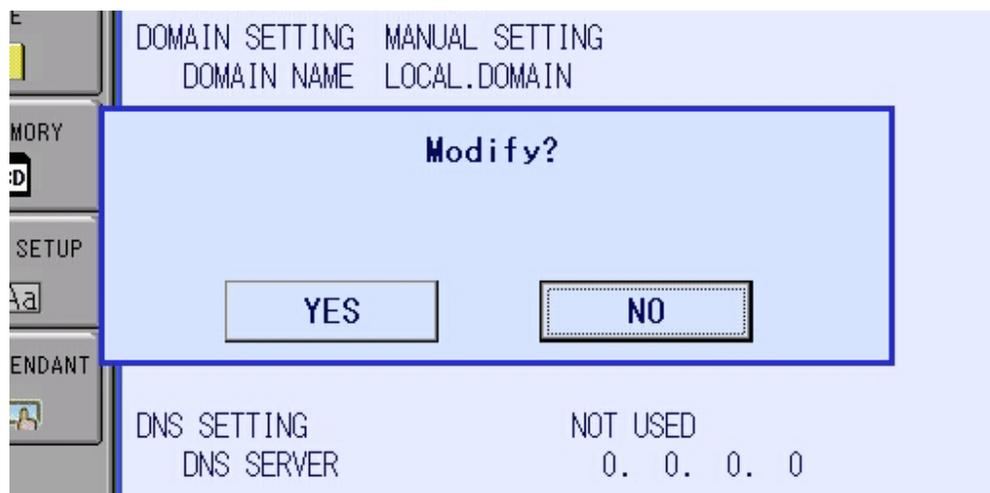
- 7. Modify the address to 192.168.0.3 and then press ENTER.



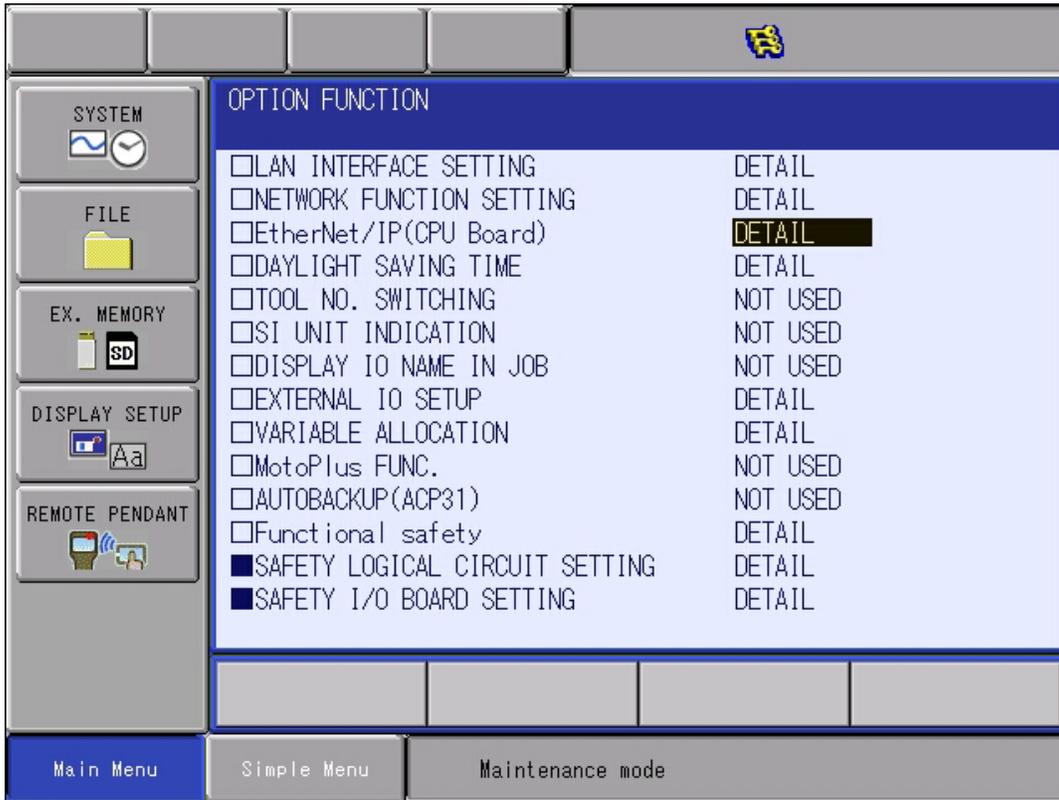
- The changed IP address is displayed in the LAN INTERFACE SETTING screen. On the pendant, press **ENTER**.



- The Modify? window is displayed. Select **YES**.



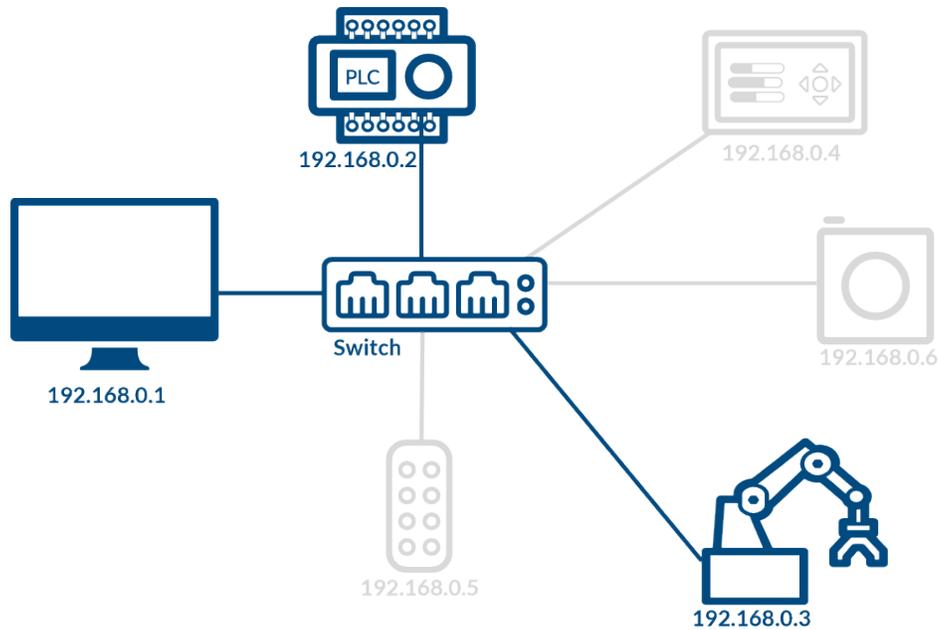
The pendant screen displays the OPTION FUNCTION screen. Do not exit this screen. You will come back to it shortly.



10. Place the pendant on its storage hook at the side of the SmartCart.

6.4. Testing Network Connectivity

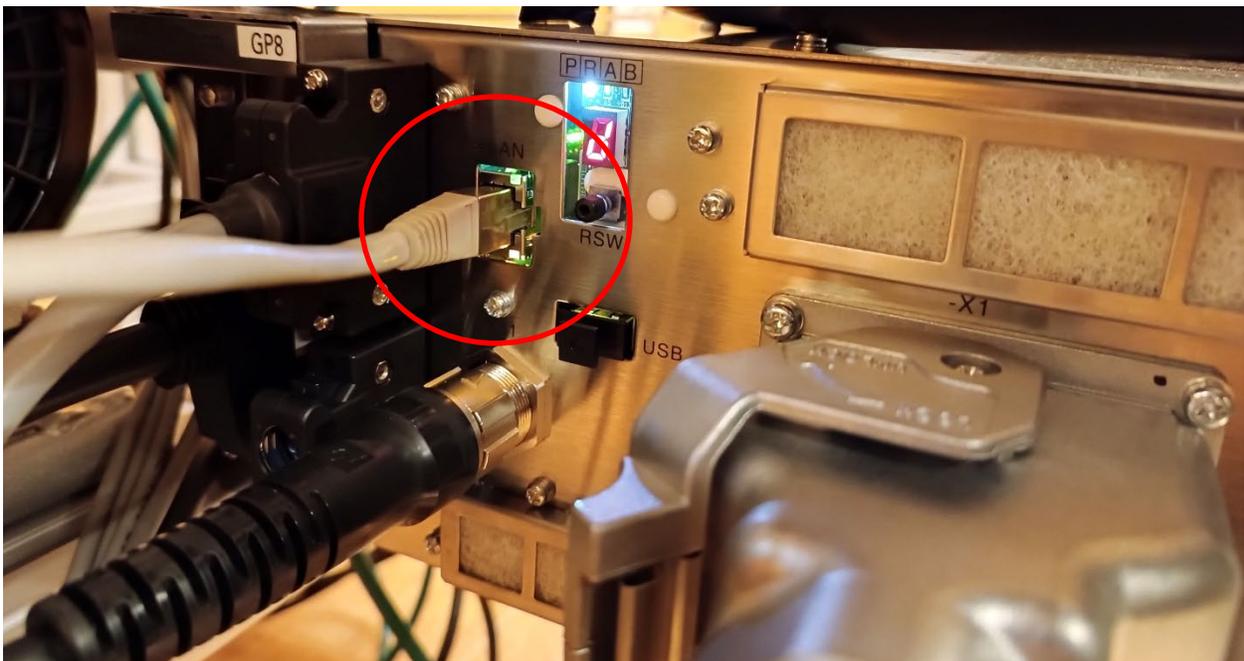
Your robot is now part of the SmartCart 4.0 Local Area Network (LAN) as illustrated in the diagram below. In this task, you will confirm network connectivity by pinging the robot.



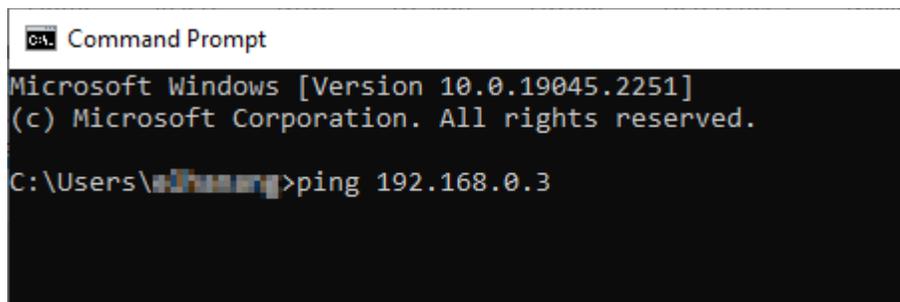
The SmartCart LAN

Perform these steps:

1. Ensure that the workstation (PC) and the robot controller are both connected to the network switch. The robot's LAN port is on the side of the controller.



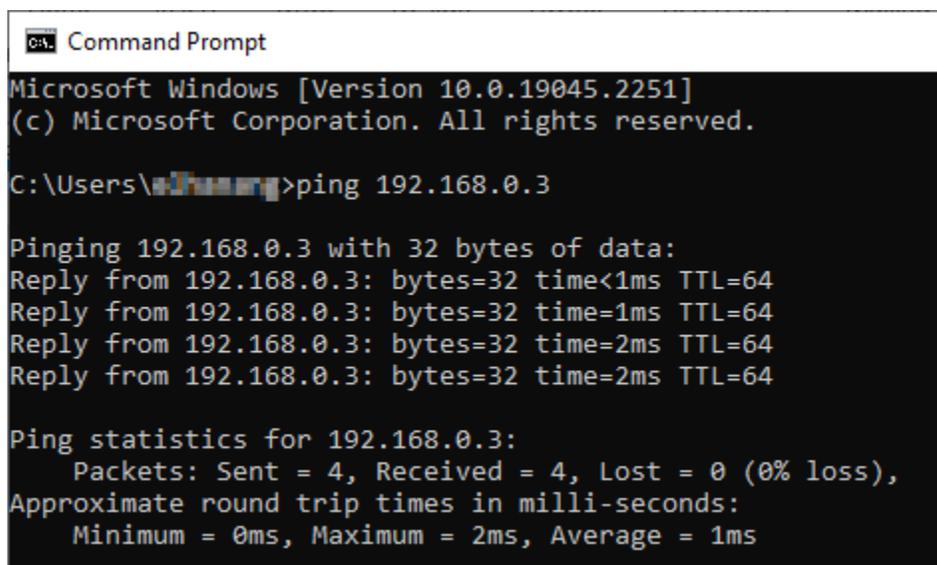
2. Open the Windows Command Prompt.
3. Ping 192.168.0.3.



```
Command Prompt
Microsoft Windows [Version 10.0.19045.2251]
(c) Microsoft Corporation. All rights reserved.

C:\Users\<blurred>>ping 192.168.0.3
```

4. Wait for a response from the robot.



```
Command Prompt
Microsoft Windows [Version 10.0.19045.2251]
(c) Microsoft Corporation. All rights reserved.

C:\Users\<blurred>>ping 192.168.0.3

Pinging 192.168.0.3 with 32 bytes of data:
Reply from 192.168.0.3: bytes=32 time<1ms TTL=64
Reply from 192.168.0.3: bytes=32 time=1ms TTL=64
Reply from 192.168.0.3: bytes=32 time=2ms TTL=64
Reply from 192.168.0.3: bytes=32 time=2ms TTL=64

Ping statistics for 192.168.0.3:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 2ms, Average = 1ms
```

If you do not get a response from the robot, try to troubleshoot the system by retracing your steps. You can also refer to the previous activities for troubleshooting and connectivity tips.

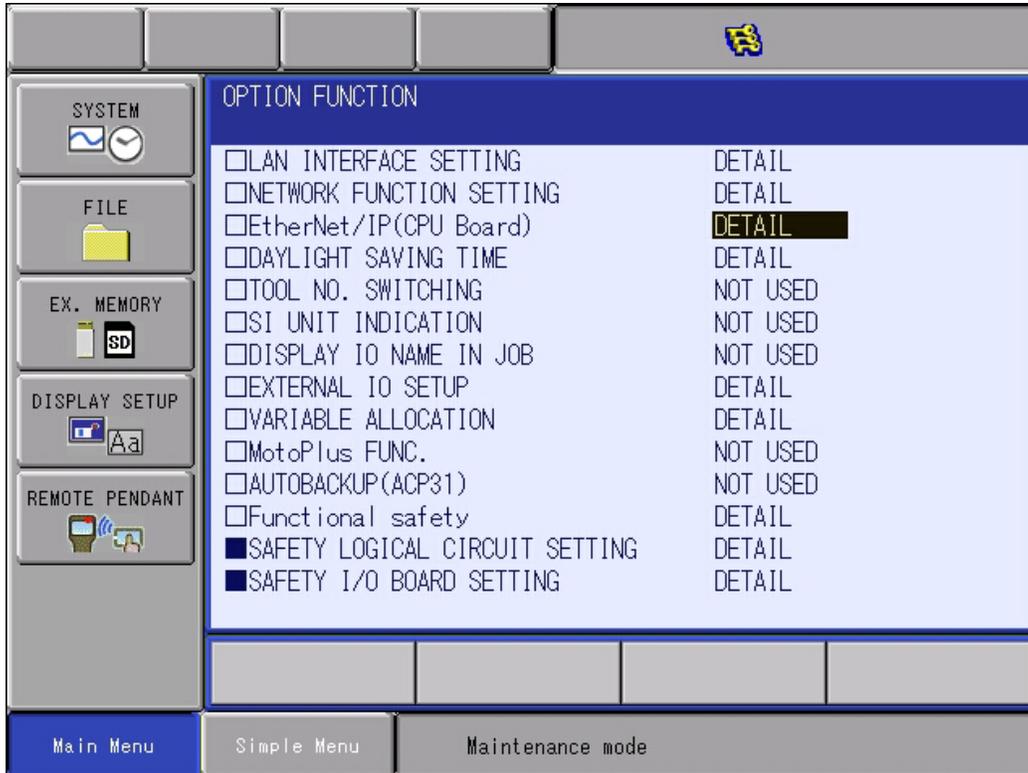
6.5. Configuring the EtherNet/IP (CPU Board)

In this task, you will configure the robot’s EtherNet/IP (CPU Board) function. Proper configuration of this function allows the robot to exchange data with the PLC.

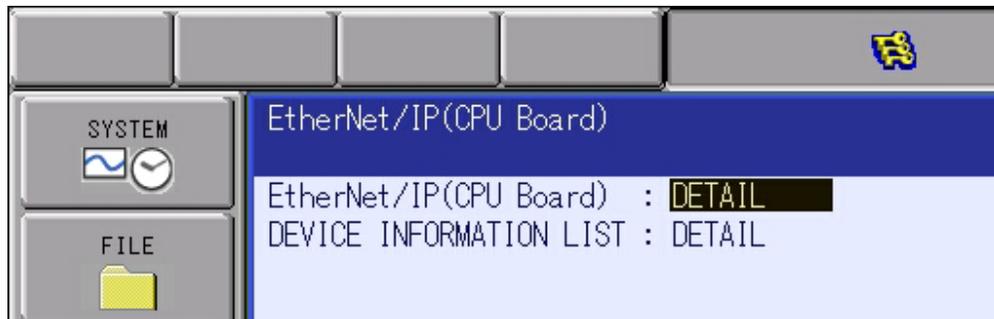
Perform the following steps:

① **Note:** The EtherNet/IP (CPU Board) can only be configured in Management mode. The pendant should already be in Management mode on the SYSTEM > SETUP > OPTION FUNCTION screen.

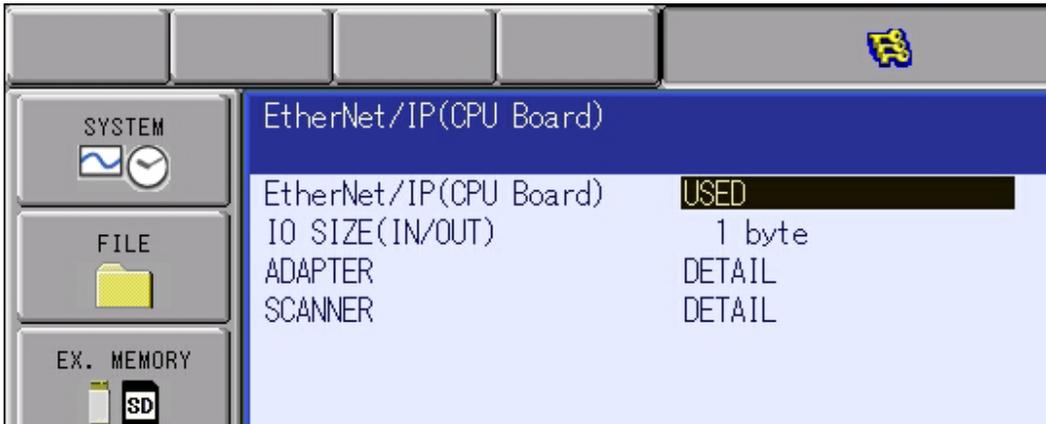
1. Pick up the pendant and hold it securely. Next to **EtherNet/IP (CPU Board)**, select **DETAIL**.



2. The EtherNet/IP (CPU Board) screen is displayed. Next to **EtherNet/IP (CPU Board)**, select **DETAIL**.

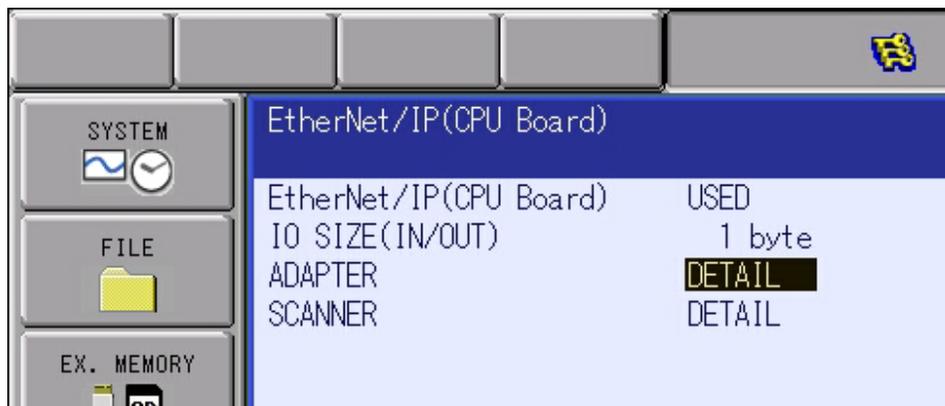


A second EtherNet/IP (CPU Board) screen is displayed. Ensure that the status of EtherNet/IP (CPU Board) is **USED**.

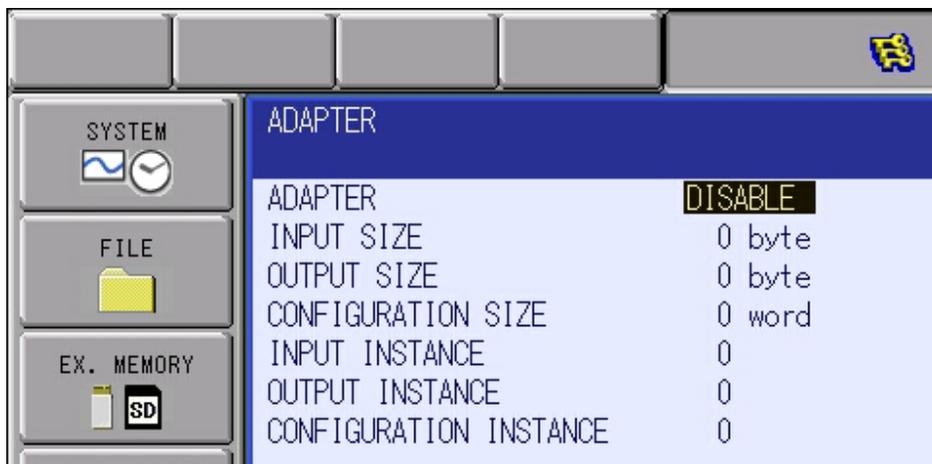


① **Note:** It is not possible for student integrators, or instructors to change the EtherNet/IP (CPU Board) status. If the status is NOT USED, contact Intelitek Technical Support.

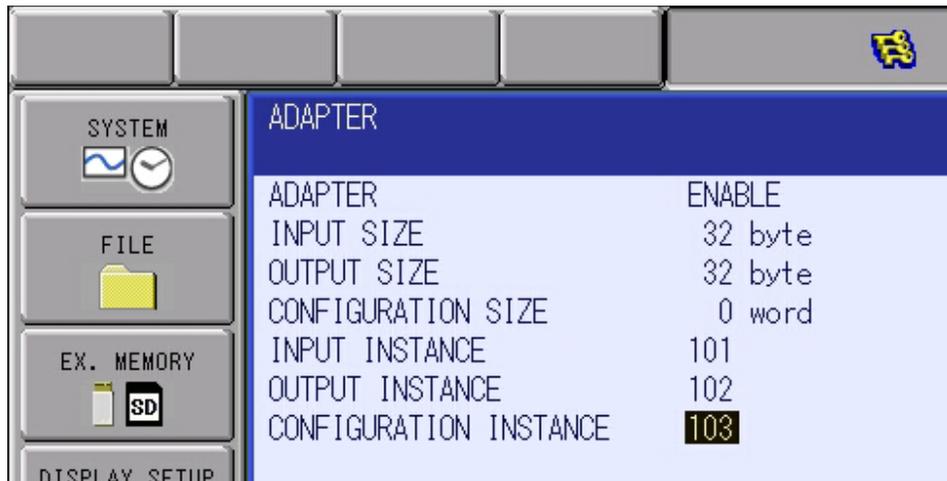
- Next to **ADAPTER**, select **DETAIL**. The ADAPTER area is for configuring settings for communication with sequencers such as PLCs.



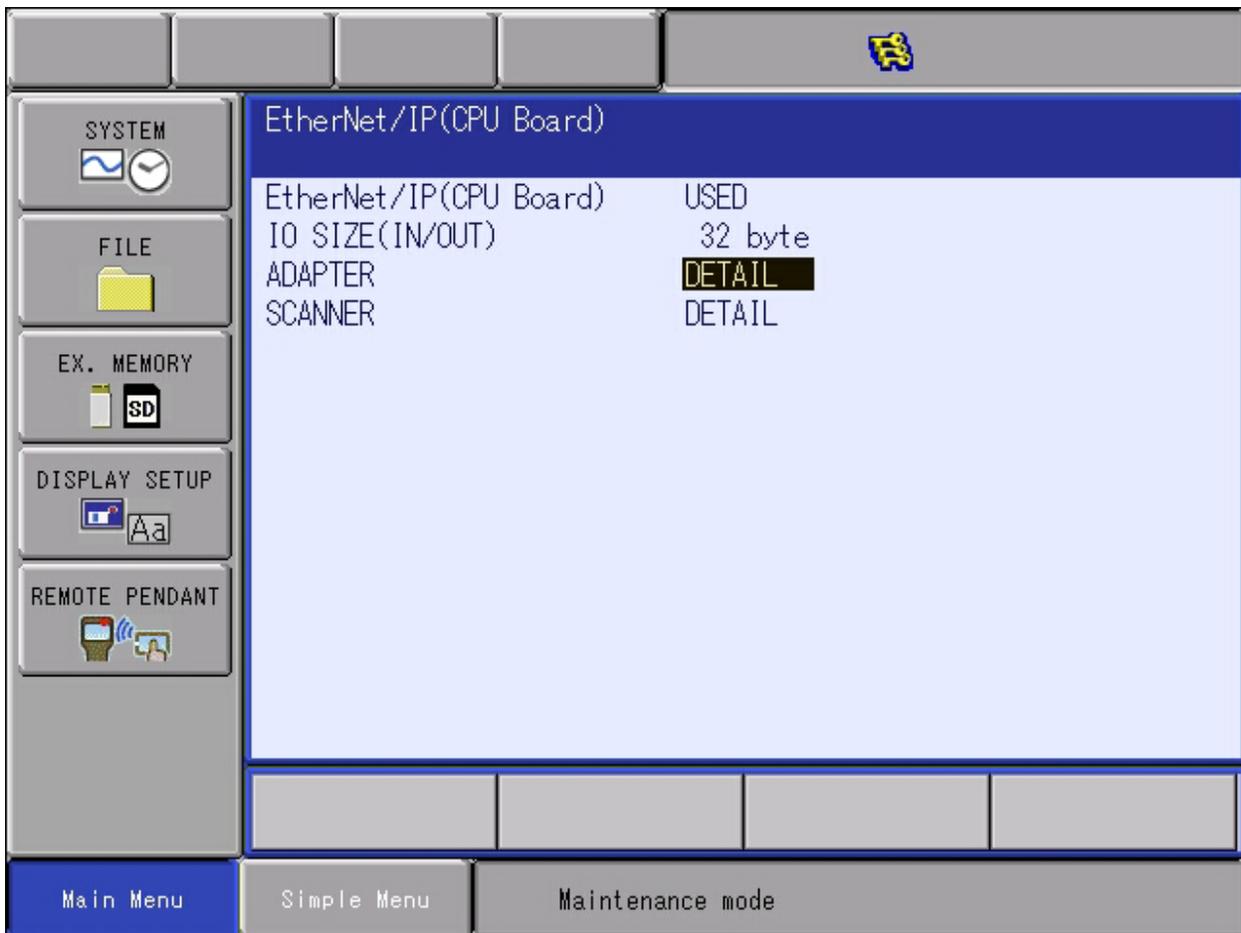
The ADAPTER screen is displayed with the default settings.



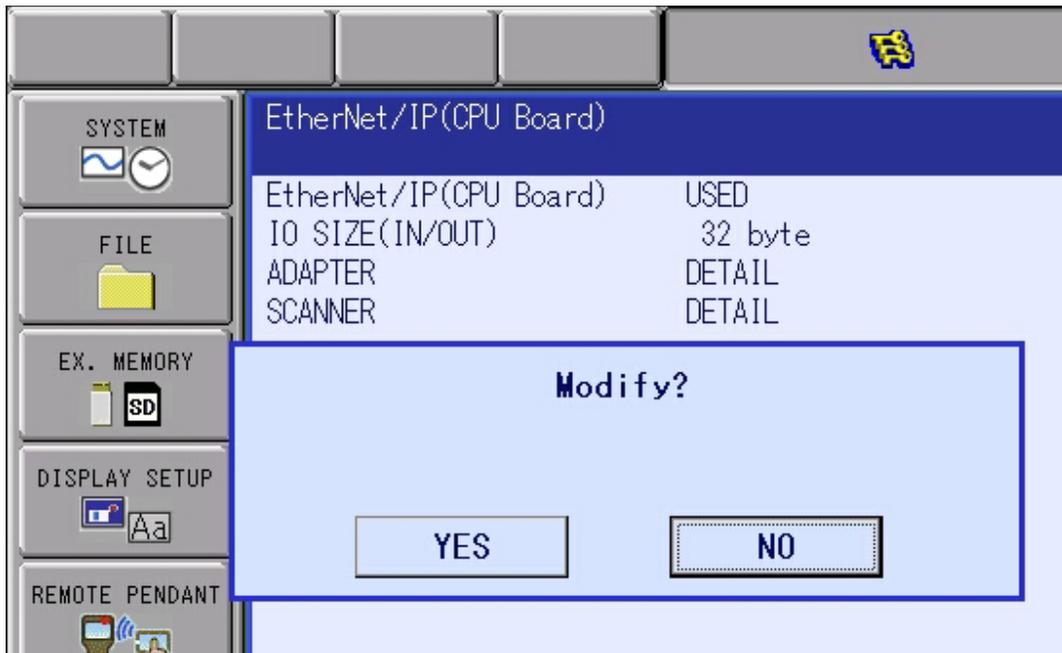
- Modify the fields to the values shown in this image:



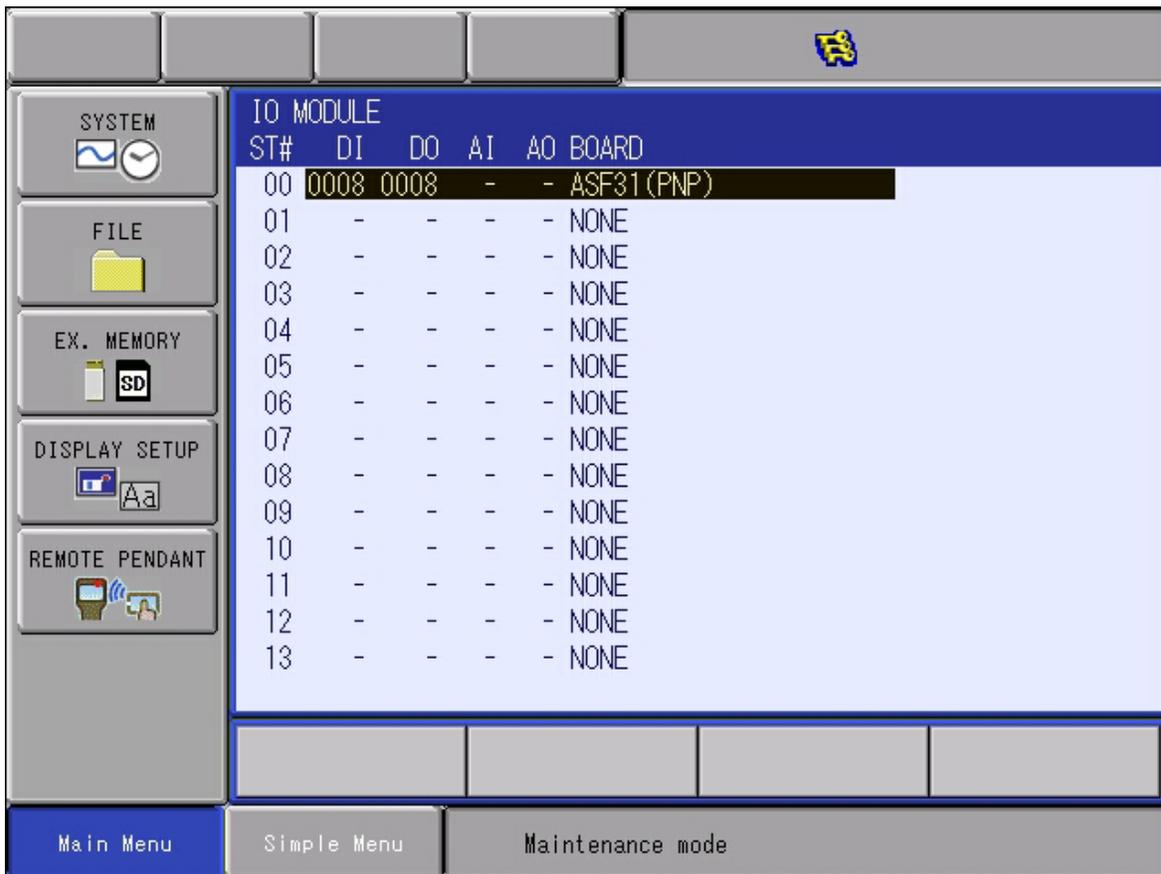
- On the pendant, press **ENTER**.
- The EtherNet/IP (CPU Board) is displayed with the ADAPTER DETAIL highlighted. Press **ENTER**.



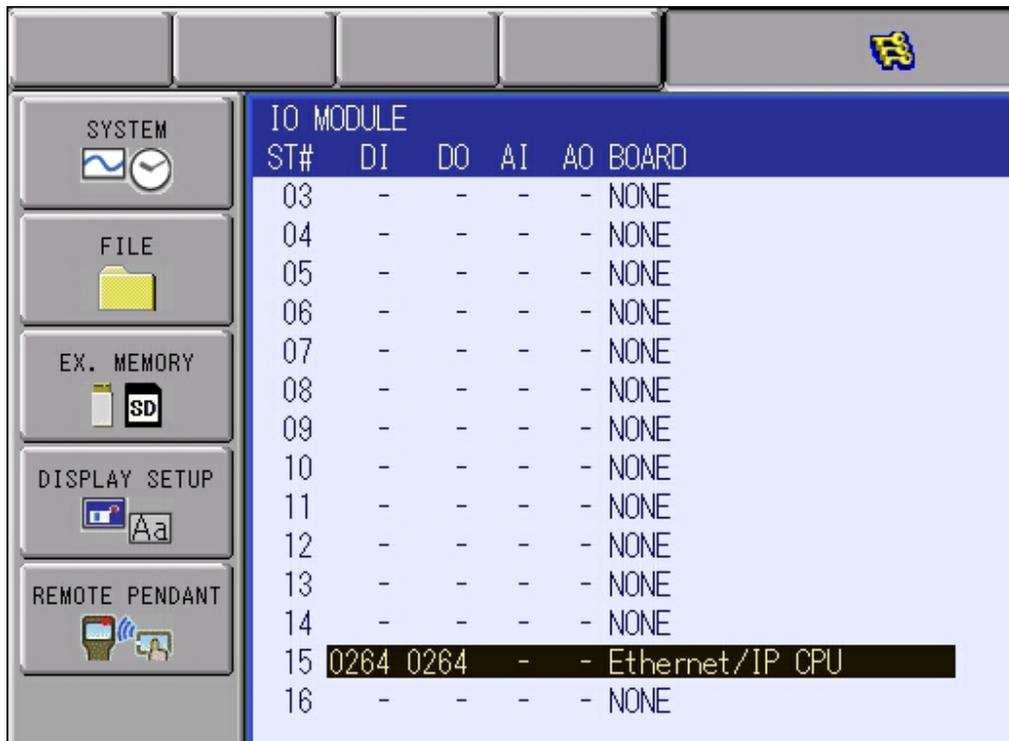
7. Confirm the change by selecting **YES**.



The IO MODULE screen is displayed.



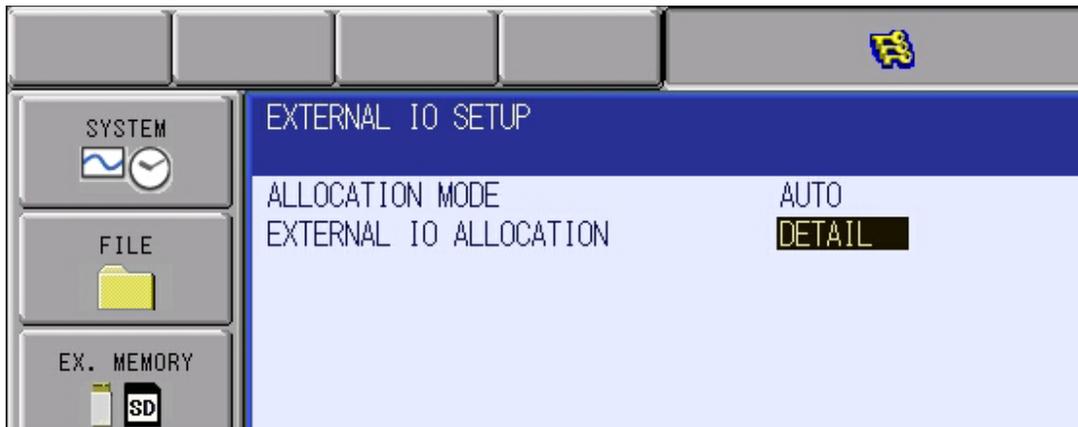
- Scroll down to row 15, where EtherNet/IP CPU is listed in the BOARD column. The 0264's in the DI and DO columns signify the number of memory bits for digital input (DI) and digital output (DO). Press ENTER.



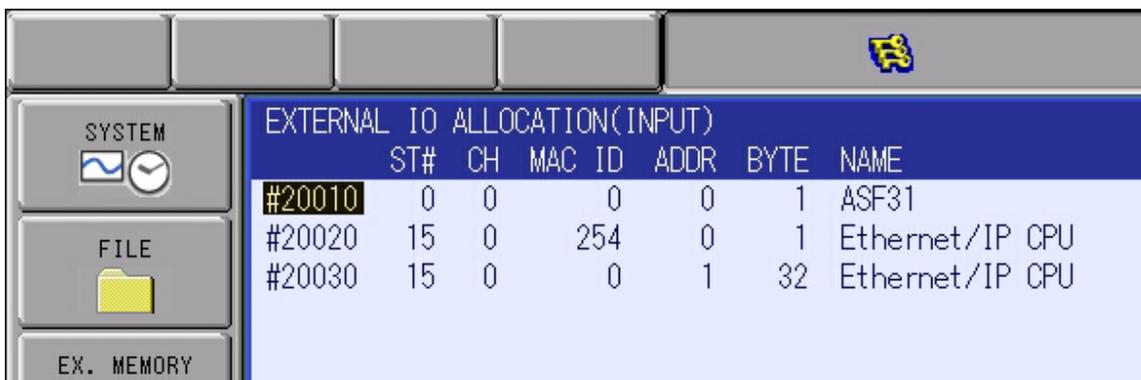
- In the Modify popup window, select YES.



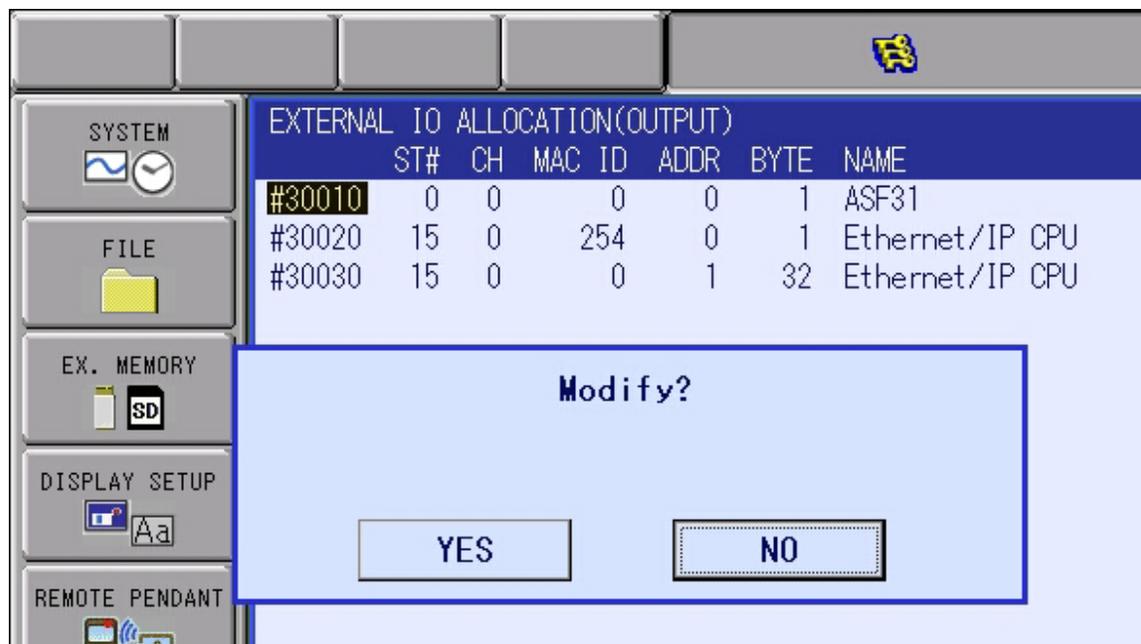
10. The EXTERNAL IO SETUP page is displayed. Select **DETAIL**.



11. Review the input IO allocation, and then press ENTER.

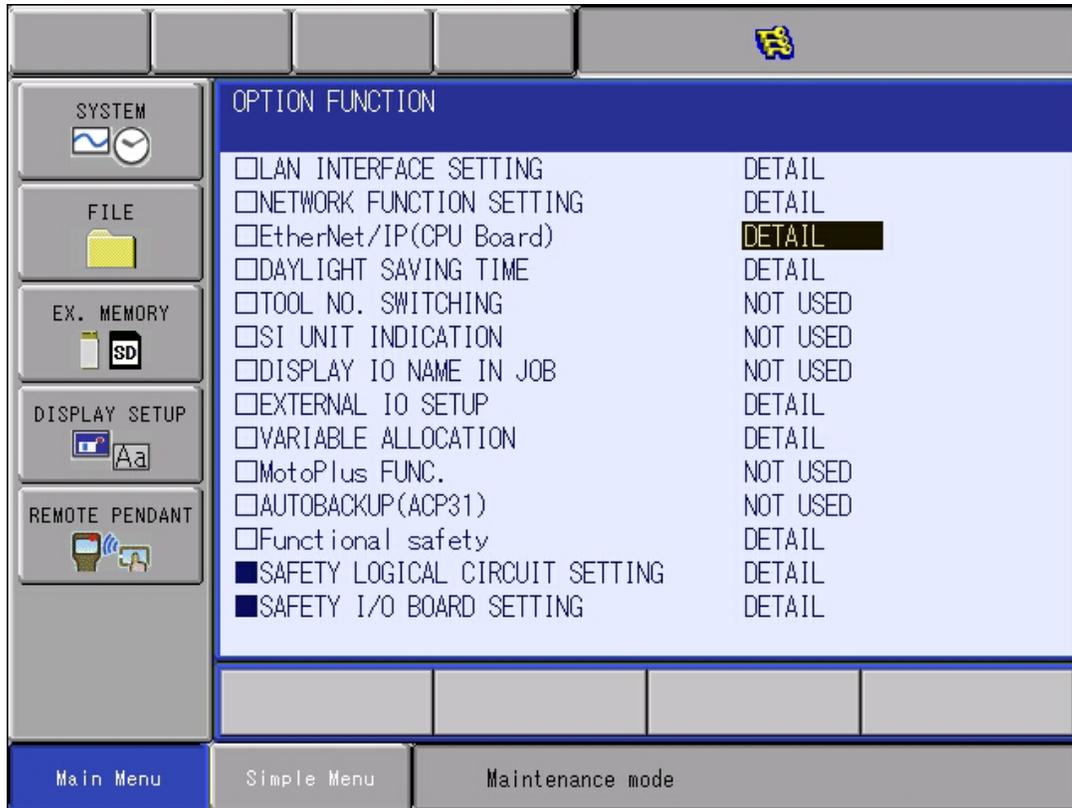


12. Review the *output* IO allocation, and then press ENTER. Confirm by selecting YES in the Modify? window.



The OPTION FUNCTION screen is displayed. You have completed the EtherNet/IP configuration. You will now register the PLC so that the robot can communicate with it.

13. Next to EtherNet/IP (CPU Board), select **DETAIL**.



14. Next to DEVICE INFORMATION LIST, select **DETAIL**.



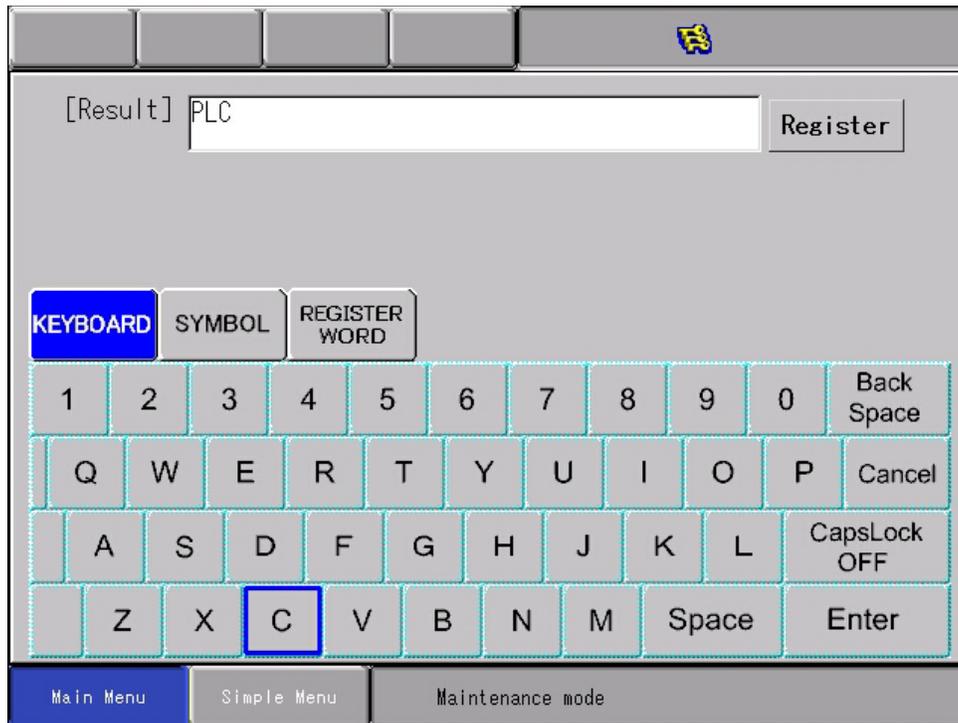
15. There are currently no devices on this list which can hold a total of 32 devices. Press **SELECT** to add a device.



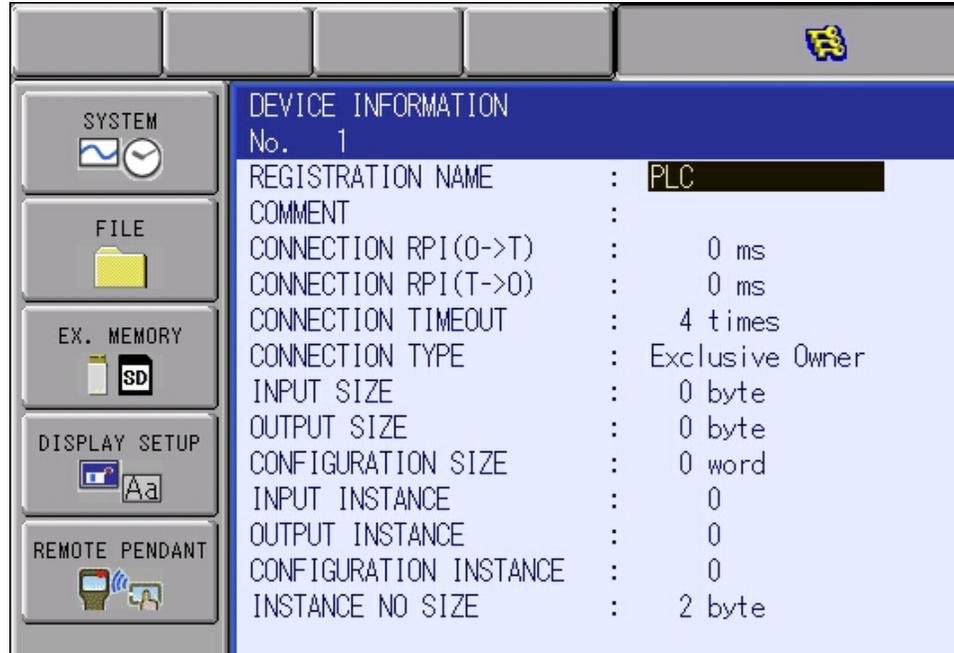
16. The **DEVICE INFORMATION** page for device number 1 is displayed. Select the blank space next to **REGISTRATION NAME**.



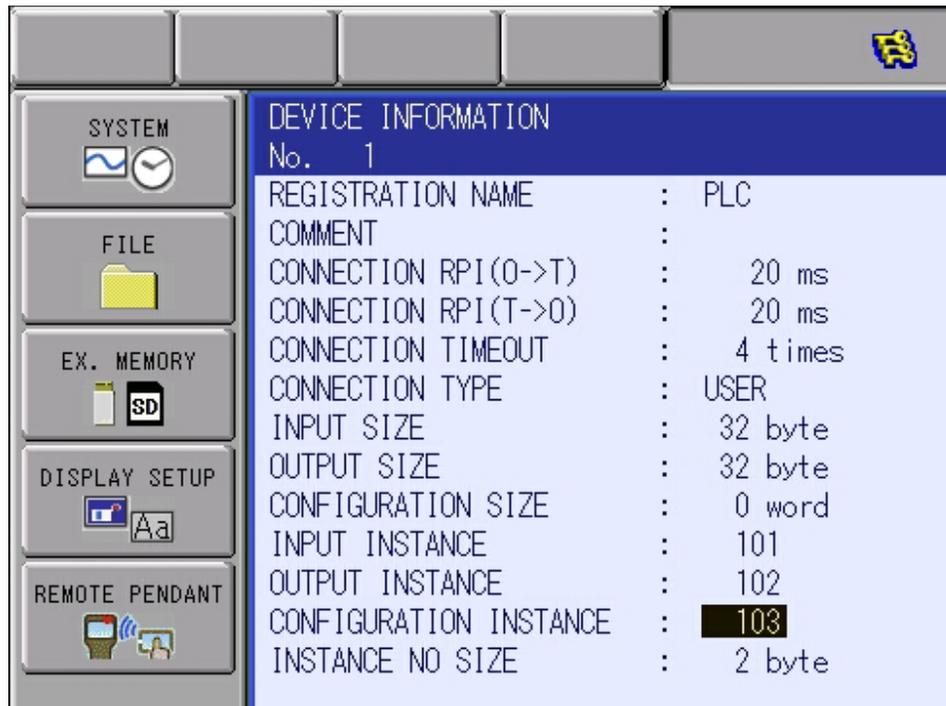
17. Enter a name for the device, such as **PLC**.



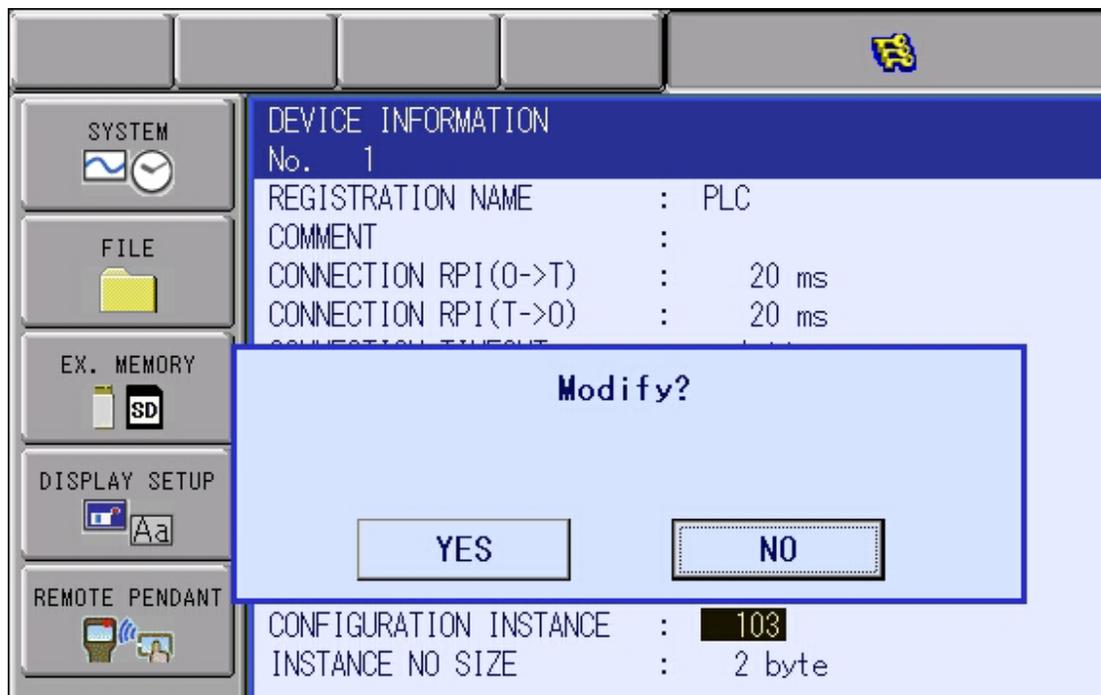
The device name is added. The parameters are still defaults.



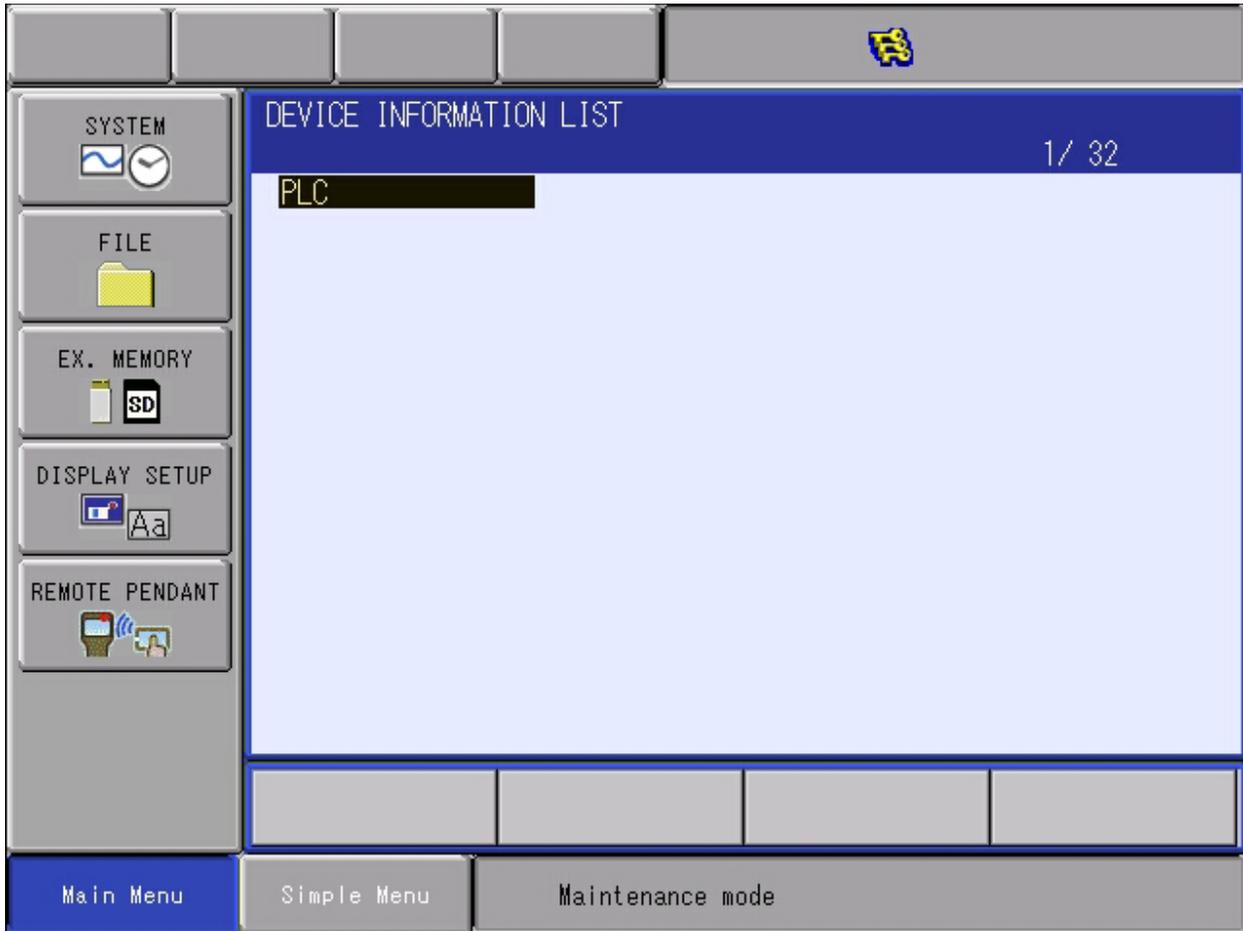
18. Complete the device information as shown in this image. When you are done, press ENTER.



19. Select YES to confirm.



The device is registered, and the name of the device is added to the list.



The robot is now configured to communicate with the PLC. In the next lab activity, you will add the robot’s hardware module to the PLC programming project and go online with the PLC.

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 IP Address

Perform this procedure to reset the robot's IP address:

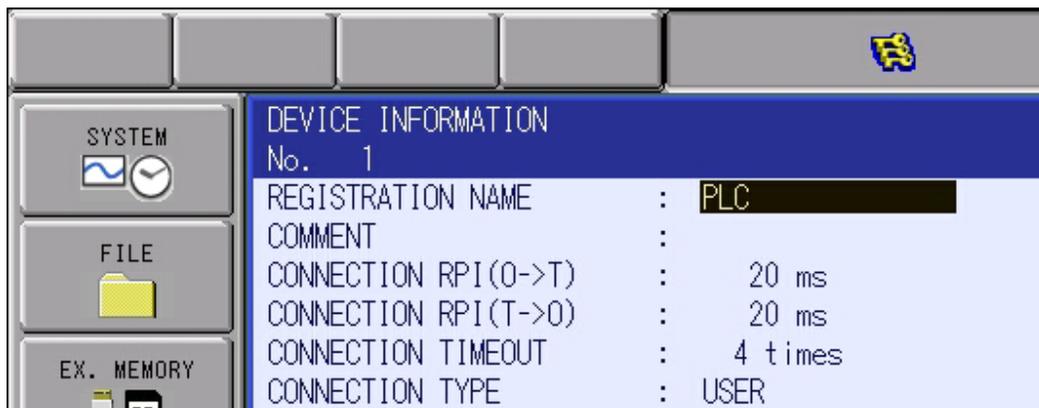
1. In Maintenance mode/Management mode, navigate to **SYSTEM > SETUP > OPTION FUNCTION > LAN INTERFACE SETTING > DETAIL**.
2. Change the IP address to **192.168.255.1**.
3. Press **ENTER**.
4. In the Modify popup, select **YES**.

8.2. Resetting the EtherNet/IP (CPU Board) Settings

Deleting the PLC Device

Perform these steps to remove the PLC from the device list:

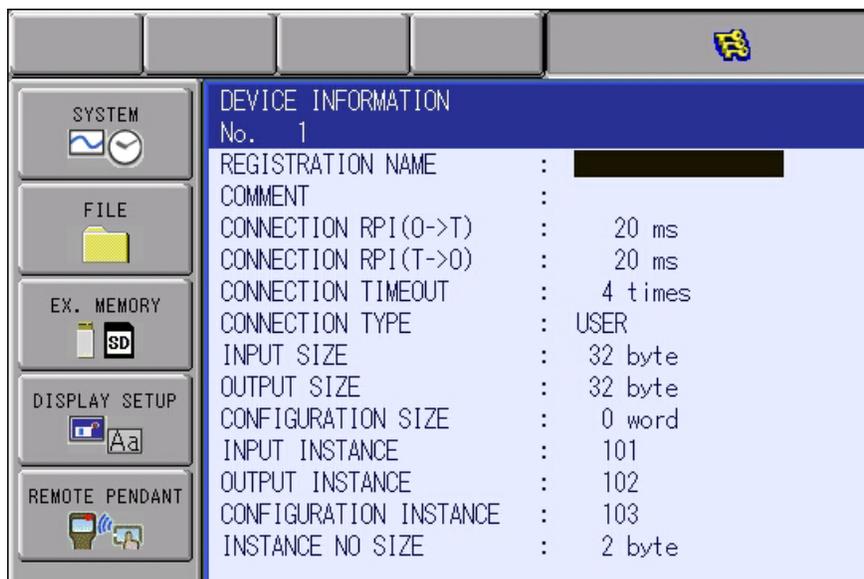
1. In Maintenance mode/Management mode, navigate to **SYSTEM > SETUP > OPTION FUNCTION > EtherNet/IP (CPU Board) > DETAIL > DEVICE INFORMATION LIST > DETAIL**.
2. Select the Device from the list.
3. Select the REGISTRATION NAME.



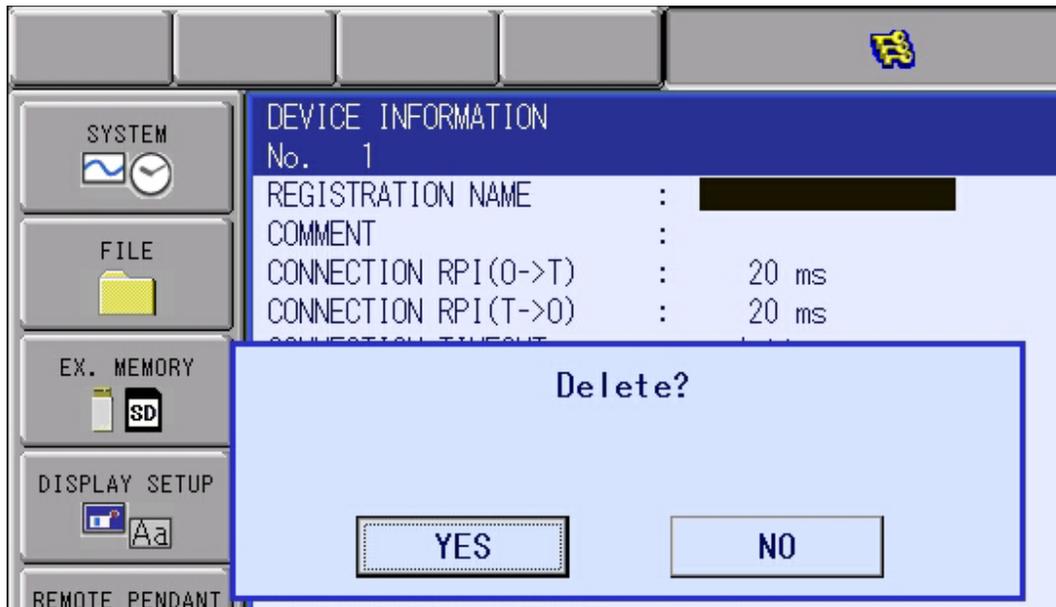
4. Delete all characters from the name and enter a blank name.



5. The REGISTRATION NAME is now blank. Press **ENTER**.



6. In the Delete? Popup dialogue, select **YES**.



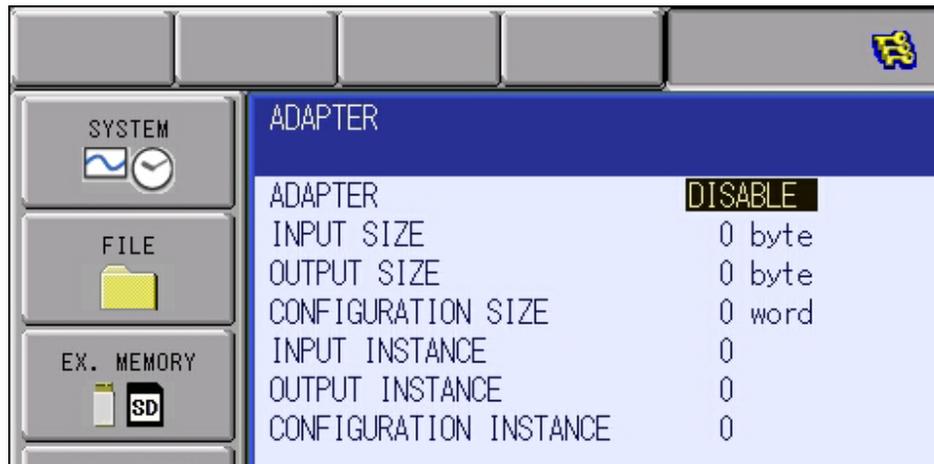
7. The device is deleted.



Resetting the EtherNet/IP (CPU Board)

Perform these steps to reset the EtherNet/IP (CPU Board) parameters.

1. In Maintenance mode/Management mode, navigate to **SYSTEM > SETUP > OPTION FUNCTION > EtherNet/IP (CPU Board) > DETAIL > ADAPTER > DETAIL**.
2. Reset the adapter to the default settings as shown in the image.



3. Press **ENTER** and then select **YES** in the Modify popup window.
4. Scroll down the list of IO modules and confirm that the EtherNet/IP CPU module is no longer present.
5. The EXTENAL IO SETUP page is displayed. Select **DETAIL**.
6. Review the input IO allocation, and then press **ENTER**.
7. Review the output IO allocation, and then press **ENTER**.

9. Shutdown

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

- Power off the robot controller.
- Ensure the pendant is in teach mode.
- Return the pendant to its storage hook on the side of the SmartCart.
- Power off the I/O box.