SPARCplug

User's Guide

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Chapter 1
Overview

About SPARCplug

Welcome to the SPARCplug from ROSS Technology. The SPARCplug transforms your x86-based, tower-style personal computer into a powerful, two-platform system.

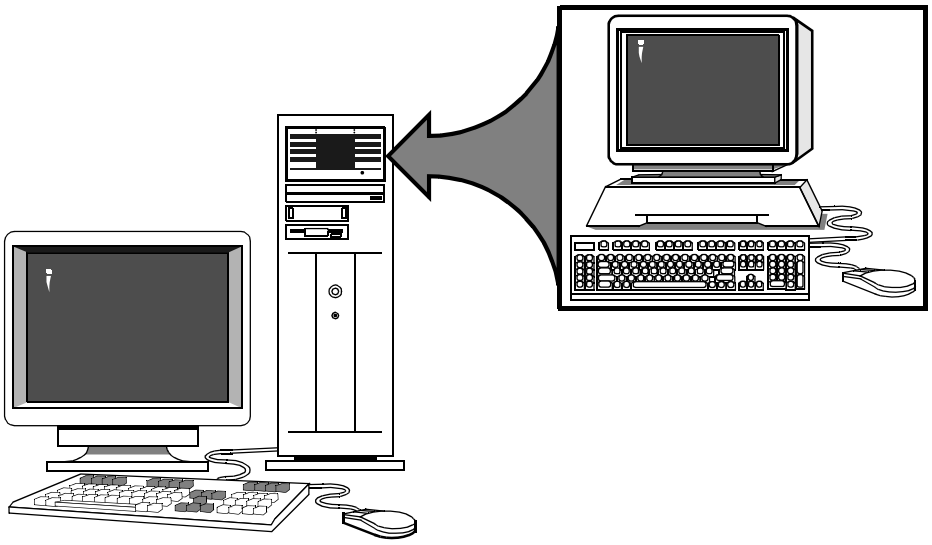
Definition

The SPARCplug is a high-performance, SPARC Version 8 workstation that

- fits inside your x86-based, tower-style personal computer
- includes its own processor module, memory, and hard disk
- provides standard I/O ports (serial, Ethernet, SCSI, keyboard/mouse, and audio)
- lets you run SunOS or Solaris applications and Windows applications simultaneously, and cut and paste information between them

Analogy

It helps to think of your SPARCplug as a stand-alone workstation that is similar to a SPARCstation 20 workstation. Although the workstation is installed in your personal computer, the only resources it shares with the computer are the power supply, the monitor, the keyboard, and the mouse.



Personal computer requirements

Computer hardware requirements

Your SPARCplug should already be installed in an x86-based, tower-style personal computer equipped with the following hardware:

- a 486 or later processor
- a serial port
- a twisted-pair (10Base-T) Ethernet port

Computer software requirements

To use your SPARCplug, you need all the following software:

- one of the following operating systems or later:
  - Microsoft Windows NT 3.5 (workstation or server)
  - Microsoft Windows 95
- a terminal emulation program, such as Microsoft HyperTerminal that comes with some versions of the Windows operating system
- an X-Window server program, such as Exceed from Hummingbird Communications Ltd.

Which chapters should I read?

There are five main steps to prepare a computer with a SPARCplug so that you can use it. Although you could do some of the steps in a different order, these steps are organized to simplify troubleshooting.

Step 1: Set up the hardware and connect the computer and workstation.

Chapter 2 explains how to set up the serial and Ethernet connections between the computer and the workstation. Before you connect the Ethernet ports, you choose a network configuration.

Step 2: Prepare the workstation console.

Chapter 3 explains how to configure the terminal emulation application program, change your workstation's default console and PROM settings, and prepare the workstation for setting up your network configuration.

Step 3: Set up the network configuration for the computer and the workstation.

The next three chapters explain how to set up the network configuration for the computer and the workstation:

Chapter	Network configuration
Chapter 4	Direct connection
Chapter 5	Standard network connection
Chapter 6	High-performance network connection through the computer

Step 4: Install and set up the X-Window server program on the computer.

Chapter 7 explains how to install and set up the X-Window server program so that you can run X-Window application programs and view them on your computer's monitor.

Step 5: Add any optional hardware.

The remaining chapters explain how to add optional hardware to increase the functionality and performance of the workstation:

Chapter	What it explains
Chapter 8	How to connect additional equipment, such as a CD-ROM drive, to the workstation
Chapter 9	How to expand the workstation, such as adding memory or an SBus module

Chapter 2
Setting Up

Follow the instructions in this chapter to connect your workstation and computer via their serial and Ethernet ports.

Before you begin

This chapter includes instructions for connecting your workstation to your computer. Before you begin, make sure that you have turned off your computer.

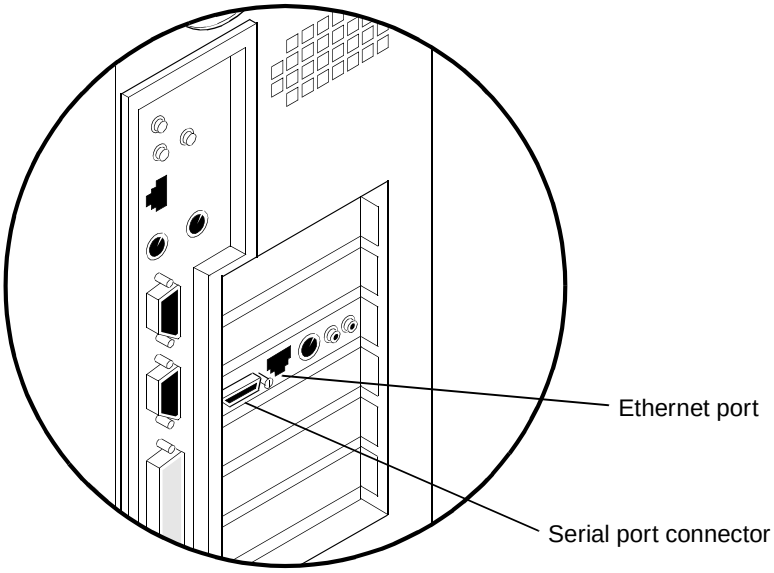
About the connections

Your SPARCplug communicates with your computer over two external interfaces:

- **Serial interface** Lets you view your workstation's console to perform system administration tasks, including:
  - changing your workstation's PROM settings
  - installing a new operating system and performing the system identification
  - running the workstation diagnostics
  - running UNIX application programs that do not require the X-Window system
- **Ethernet interface** Provides a high-speed network link to let you
  - run X-Window application programs
  - connect your workstation and computer to your organization's network

A look at your workstation's I/O card

Before following the setup instructions in this chapter, you may want to use this diagram to familiarize yourself with the connectors on your workstation's I/O card. The I/O card is installed in an expansion slot inside your computer, and the connectors are accessible through the access port for that slot (usually on the back of the computer).



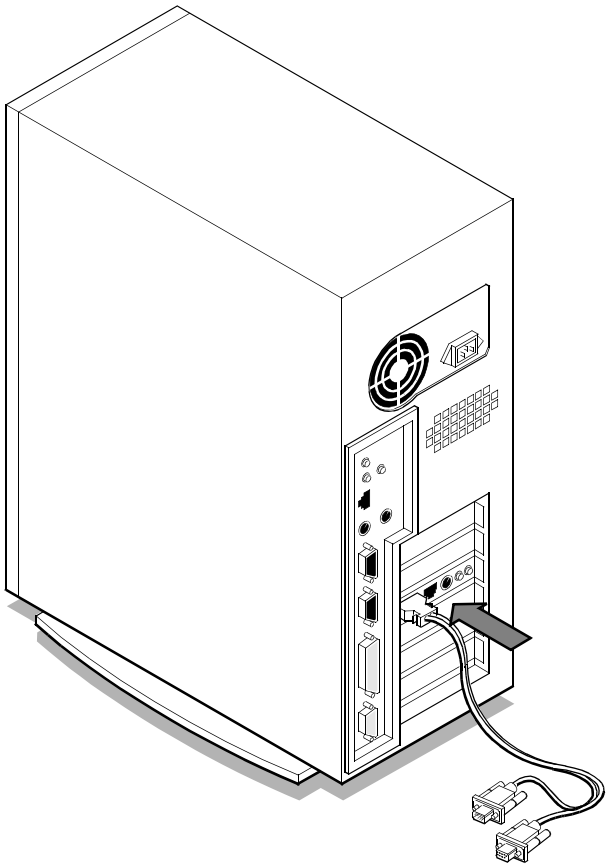
Connecting the serial ports

To connect the serial ports using the serial Y-cable, follow these steps:

1. **Attach the end of the serial Y-cable that has the 26-pin connector to the serial port connector on the workstation's I/O card.**

   Use your thumb and index finger to squeeze the clamps on either side of the cable's connector, then gently push it onto the I/O card and release the clamps.

   To see if the cable is properly attached, pull its connector gently. If it resists and stays in place, it's attached.

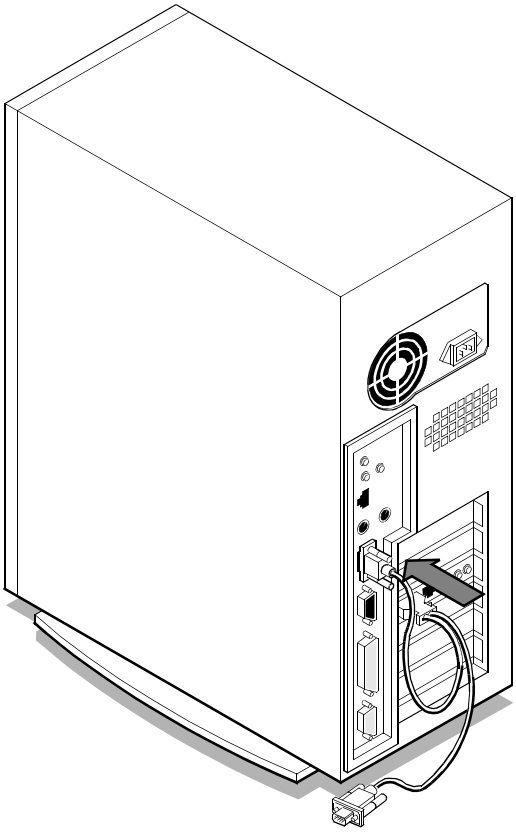


2. Attach the end of the serial Y-cable that has the 9-pin female connector to the computer's serial port, and tighten the thumbscrews.

The cable with the female connector carries the signals for the workstation's first serial port (Serial Port A). It is wired in a null-modem configuration, which allows you to connect the cable directly to the computer.

If your computer has more than one serial port, you can attach the cable to any one of them.

The remaining cable with the 9-pin male connector can be used to attach a serial peripheral to the workstation's second serial port (Serial Port B). It is not wired in a null-modem configuration.



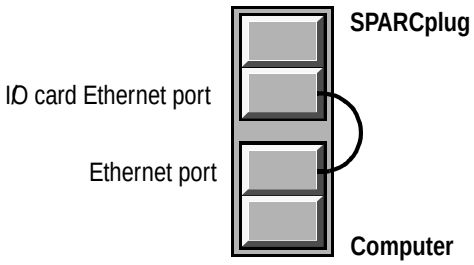
Choosing a network configuration

You connect your workstation to your computer via Ethernet so that you can run X-Window application programs. If you want, you can also connect your workstation and computer to your organization's network so that you can access files on other hosts, send and receive electronic mail, and use other network services.

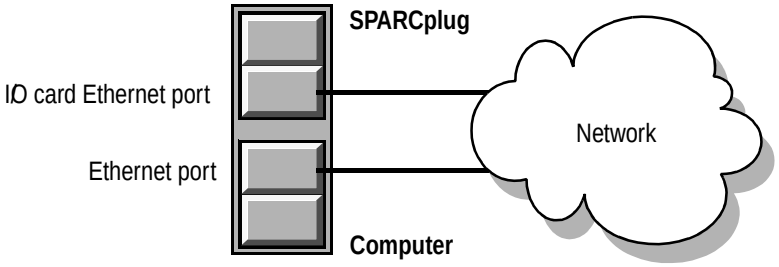
Types of network configurations

There are three ways to connect your workstation and your computer via Ethernet:

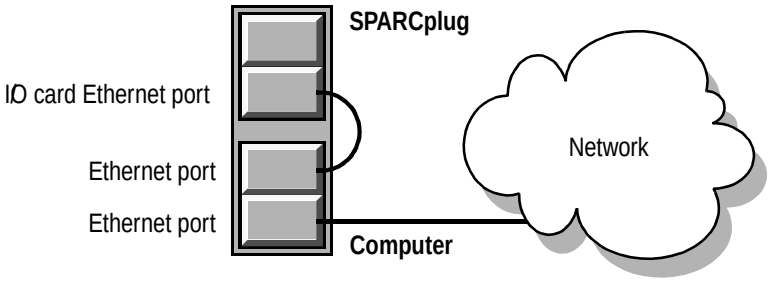
- **Configuration 1: Direct connection** Connect your workstation directly to your computer to create your own personal, two-host network.



- **Configuration 2: Standard network connection** Connect your workstation to a network, and connect your computer to the same network or another network that is accessible through a gateway.



- **Configuration 3: High-performance network connection through the computer** Connect your workstation directly to your computer, and connect your computer to a network.



Determining which configuration is best for you

The configuration that's right for you depends on how you want to use your workstation and your computer. Use this table to help you decide which configuration is most appropriate.

	Configuration		
Comparing...	**1**	**2**	**3**
Level of display performance for X-Window application programs	High	Depends on network traffic	High
Able to access other hosts and network services?	No	Yes	Yes
Able to use any Windows operating system on the computer?	Yes	Yes	No, cannot use Windows 95
Required hardware included?	Yes	Yes	No, must add an Ethernet expansion card

What's next?

When you've decided on a configuration and you're ready to make the network connections, use the table below to help you decide which section in this chapter to go to next.

If you want to make a	See
Direct connection	"Connecting the hosts directly to each other" on page 2-10
Standard network connection	"Connecting the hosts for standard network access" on page 2-12
High-performance network connection through the computer	"Connecting the hosts for high-performance network access through the computer" on page 2-16

Connecting the hosts directly to each other

Follow the procedures in this section to connect the hosts directly to each other.

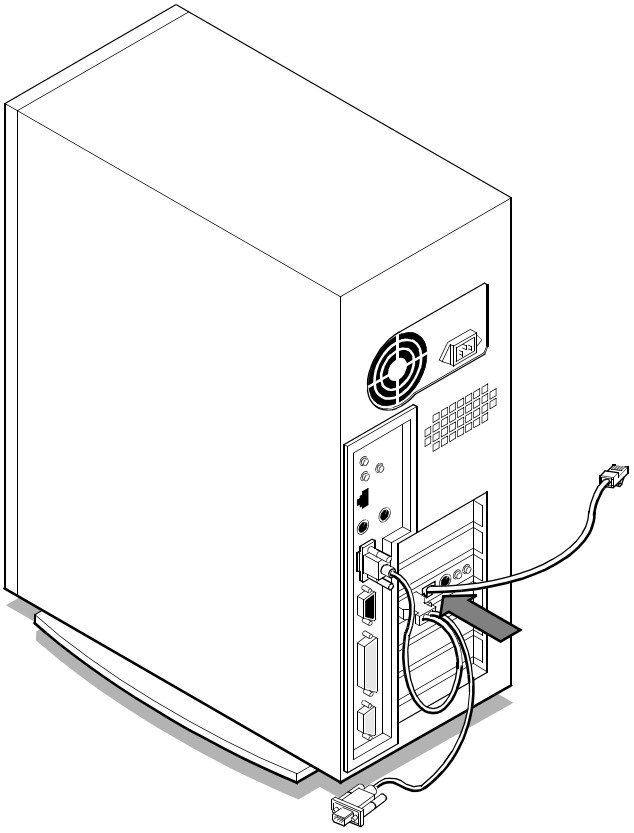
Before you connect the ports

Before you connect the Ethernet ports, make sure you have the crossover Ethernet cable that came with your workstation.

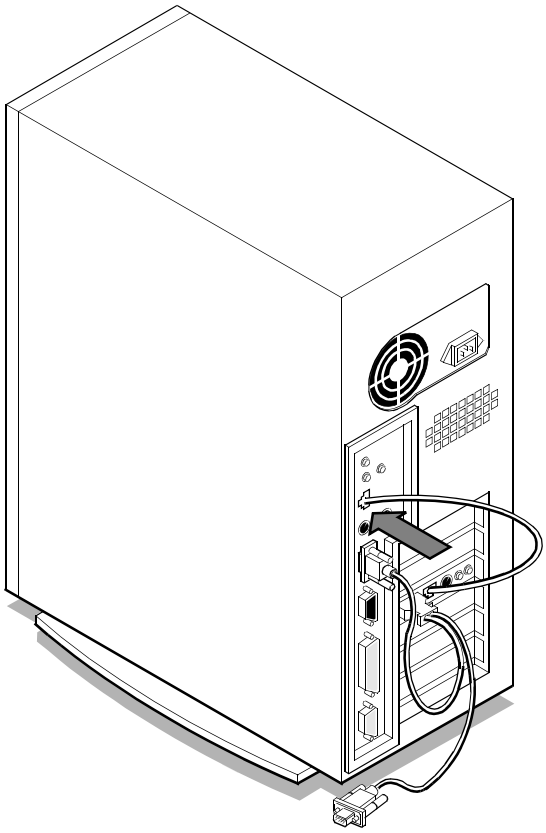
Connecting the workstation to the computer

To connect the workstation to the computer, follow these steps:

1. **Plug one end of the crossover Ethernet cable into the Ethernet port on the workstation's I/O card.**



2. Plug the other end of the crossover cable into the computer's Ethernet port.



What's next?

You've finished setting up your computer and workstation. Go to the next chapter to learn how to configure the serial communications for the computer and the workstation.

Connecting the hosts for standard network access

Follow the procedures in this section to connect the hosts for standard network access.

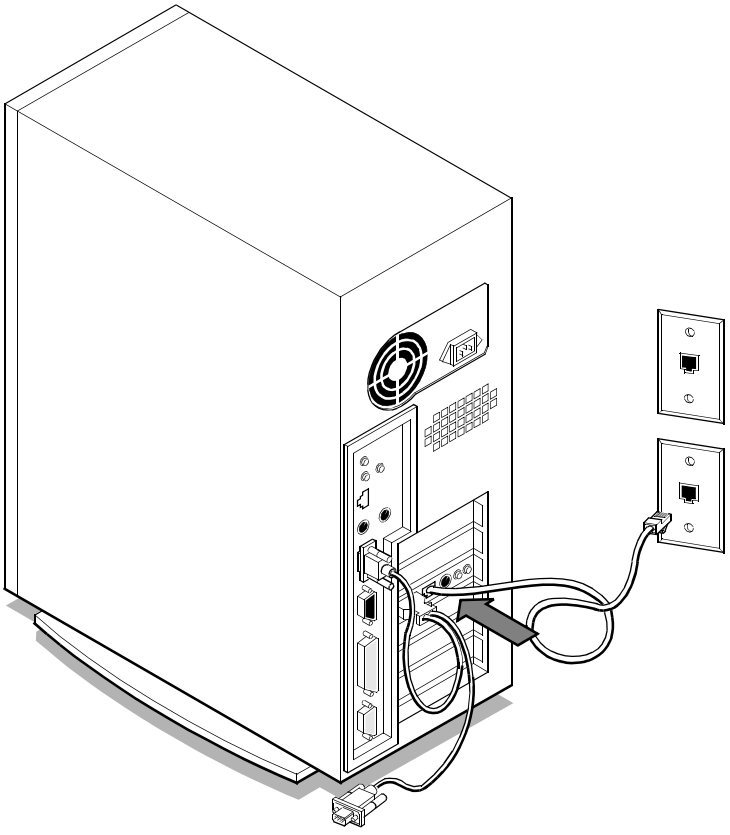
Before you connect the ports

Before you connect the Ethernet ports, make sure you have the appropriate cables for connecting your computer and your workstation to the network.

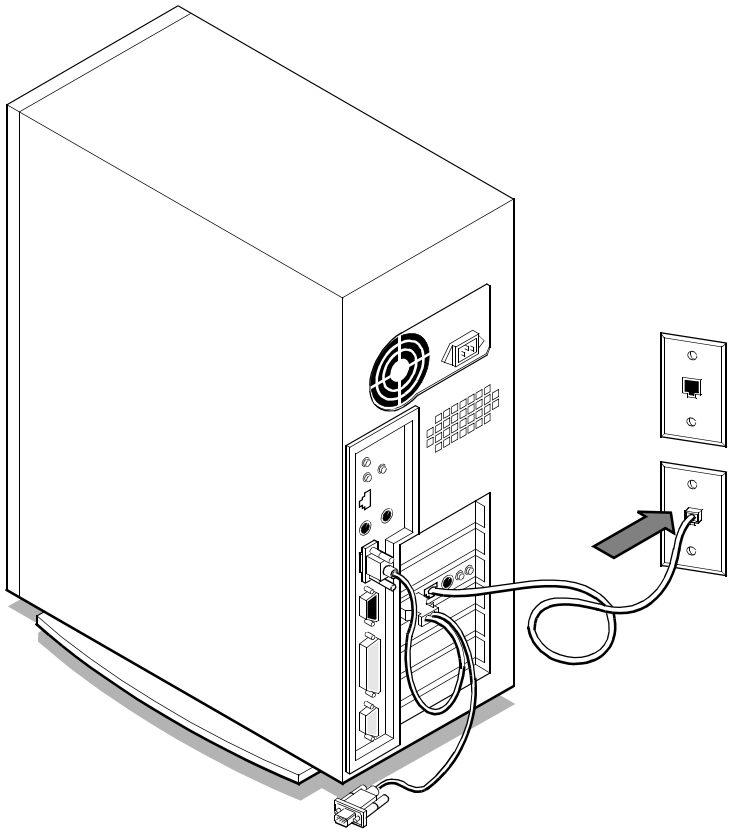
Connecting the workstation to the network

To connect the workstation to the network, follow these steps:

1. **Plug one end of a twisted-pair Ethernet cable into the Ethernet port on the workstation's I/O card.**



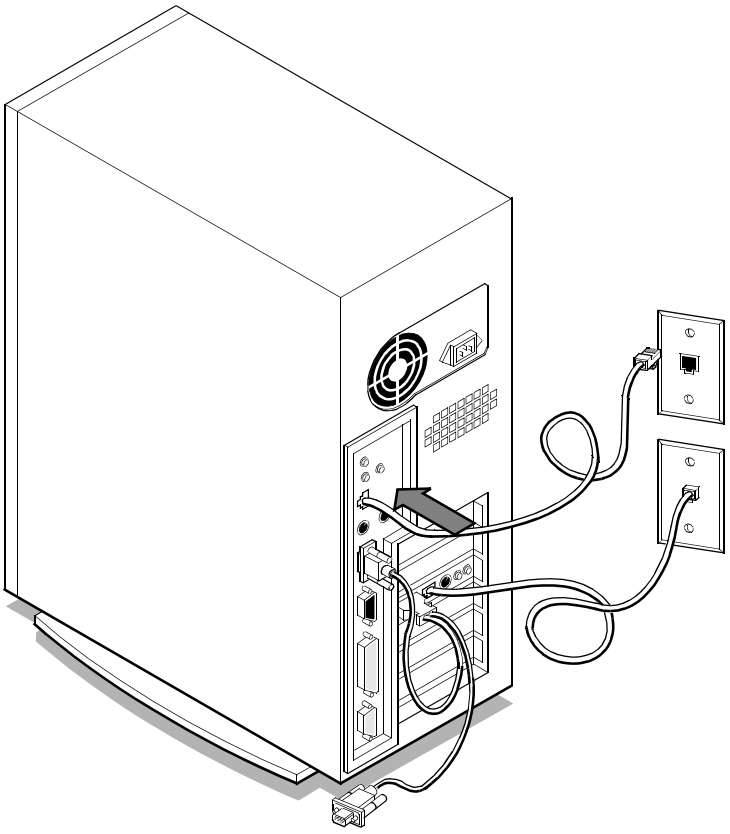
2. Plug the other end of the cable into an Ethernet wall jack.



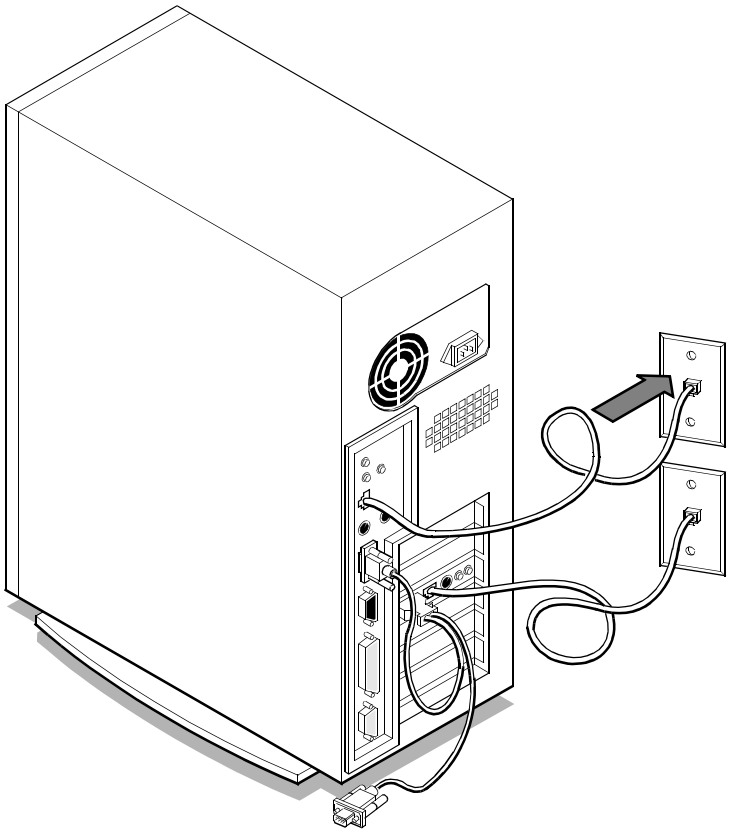
Connecting the computer to the network

To connect the computer to the network, follow these steps:

1. **Plug one end of a twisted-pair Ethernet cable into the computer's Ethernet port.**



2. Plug the other end of the cable into an Ethernet wall jack.



What's next?

You've finished setting up your computer and workstation. Go to the next chapter to learn how to configure the serial communications for the computer and the workstation.

Connecting the hosts for high-performance network access through the computer

Follow the procedures in this section to connect the hosts for high-performance network access through your computer.

Before you connect the ports

Before you connect the Ethernet ports, make sure

- you have the crossover Ethernet cable that came with your workstation
- you have the appropriate cable for connecting your computer to the network
- your computer has at least two Ethernet ports (for more information, see the following section)

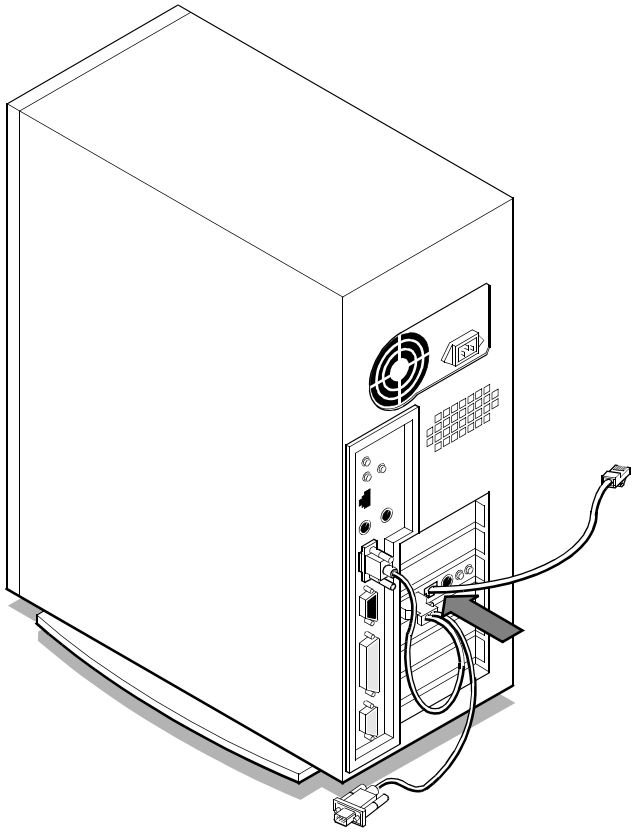
Installing an Ethernet expansion card

Using your computer as a gateway to make a high-performance network connection through your computer requires a second Ethernet port in your computer. If your computer has only one Ethernet port, you need to purchase and install an Ethernet expansion card before you can make the appropriate connections. Follow the instructions that came with the expansion card to install it in your computer. Then continue with the next section.

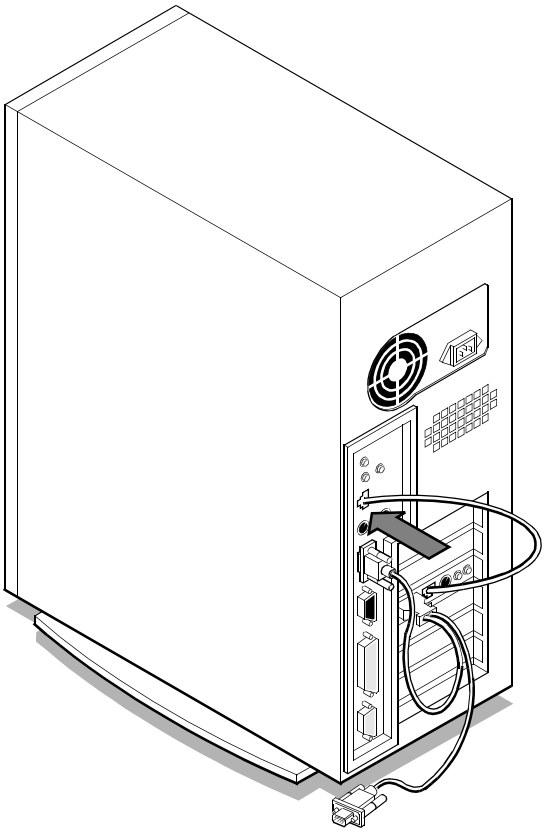
Connecting the workstation to the computer

To connect the workstation to the computer, follow these steps:

1. **Plug one end of the crossover Ethernet cable into the Ethernet port on the workstation's I/O card.**



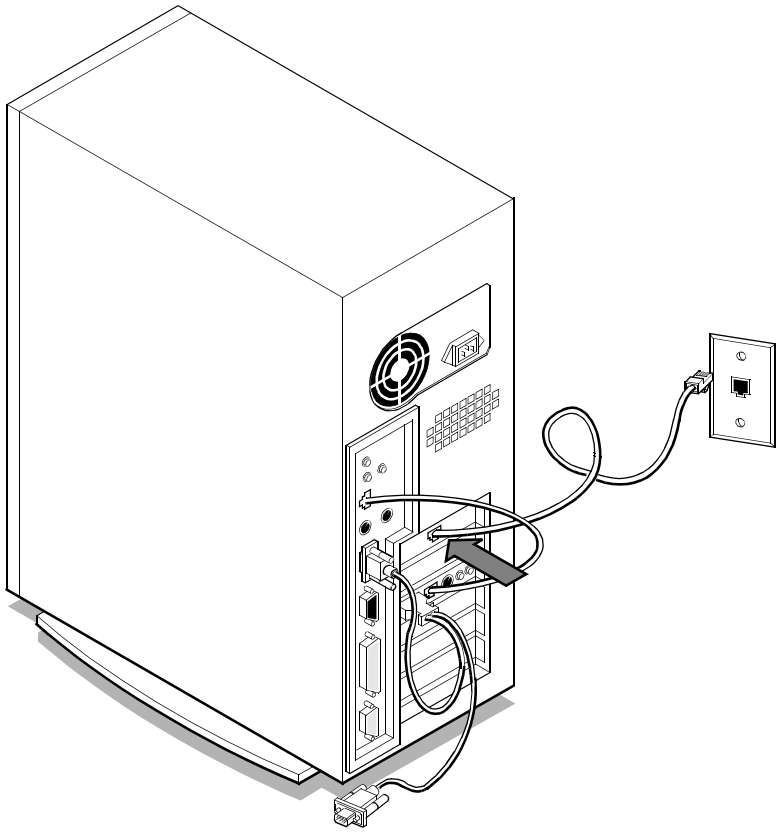
2. Plug the other end of the crossover cable into the computer's first Ethernet port.



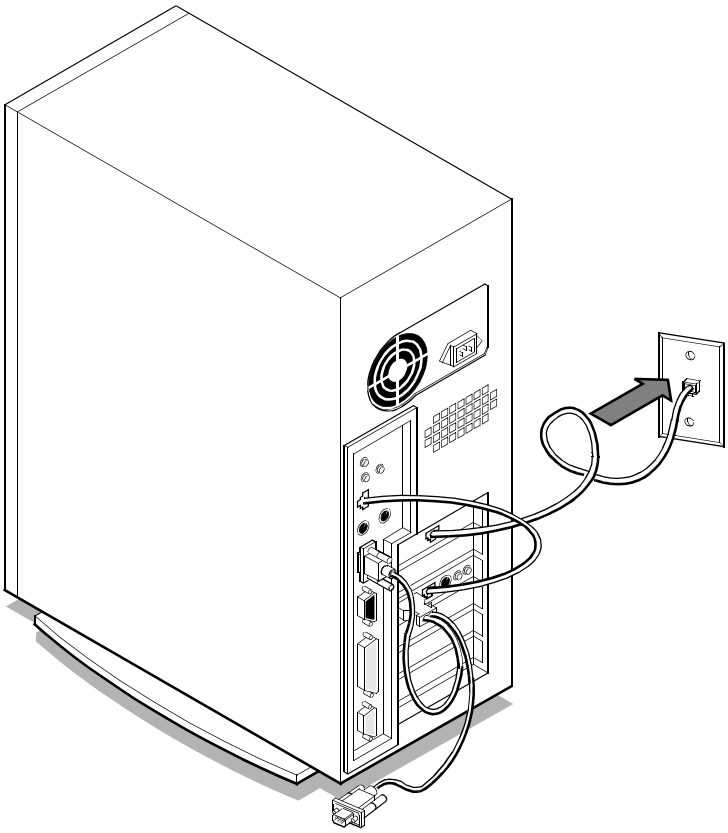
Connecting the computer to the network

To connect the computer to the network, follow these steps:

1. **Plug one end of a twisted-pair Ethernet cable into the computer's second Ethernet port.**



2. Plug the other end of the cable into an Ethernet wall jack.



What's next?

You've finished setting up your computer and workstation. Go to the next chapter to learn how to configure the serial communications for the computer and the workstation.

Chapter 3
Preparing the Console

This chapter explains how to prepare the workstation console, including:

- configuring the terminal that you use to view the workstation console
- booting the workstation so that you can change its default console and related PROM settings
- unconfiguring the workstation to prepare for setting up your network configuration

Before you begin

This chapter includes instructions for configuring the workstation console and preparing for setting up your network configuration. Before you begin, make sure you have

- installed an operating system on your computer (for a list of the supported operating systems, see “Computer software requirements” on page 1-3)
- turned on your computer and waited for the operating system to load
- logged in to your computer as the administrator, if necessary

Configuring the terminal

You use your workstation’s console to perform system administration tasks. To view your workstation’s console, you use a terminal emulation application program. The terminal emulation program simulates an alphanumeric terminal, allowing you to use your computer’s monitor and keyboard in place of a terminal connected to your workstation’s serial port. The way you configure the terminal depends on the operating system installed on your computer.

Configuring the terminal in Windows NT 4.0 or Windows 95

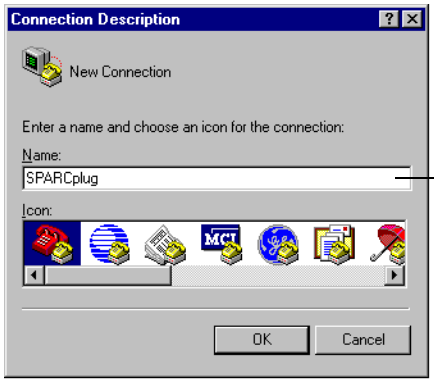
To configure the terminal in Windows NT 4.0 or Windows 95, follow these steps:

1. **Find and open the HyperTerminal program.**

   If you are opening HyperTerminal for the first time, it displays a series of dialog boxes so that you can enter information about your location, dialing properties, and modem (if you have one). It is not necessary to set up a modem to access your workstation’s console. Then the Connection Description dialog box appears.

2. **Type a name for your settings document.**

   A settings document allows you to save the correct serial port and terminal type settings in a document that you can open whenever you need to use the workstation console.



3. **Click OK.**

   The Connect To dialog box appears.

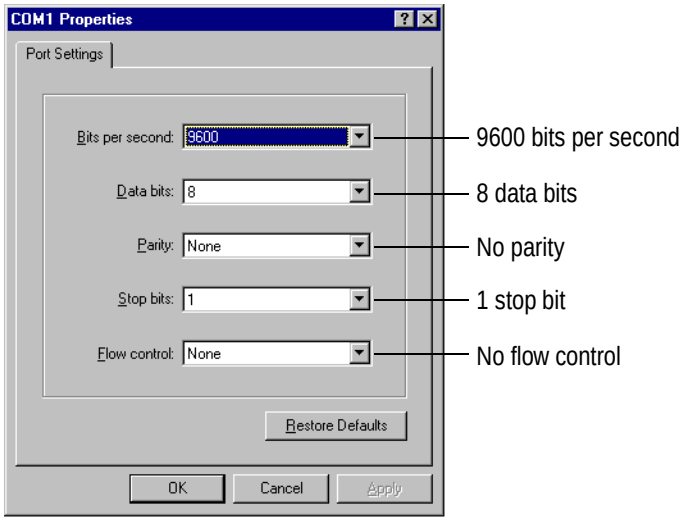
4. **Open the Connect Using pop-up menu and choose the serial port that you connected to the workstation's I/O card.**

5. **Click OK.**

   The Properties dialog box for your serial port appears.

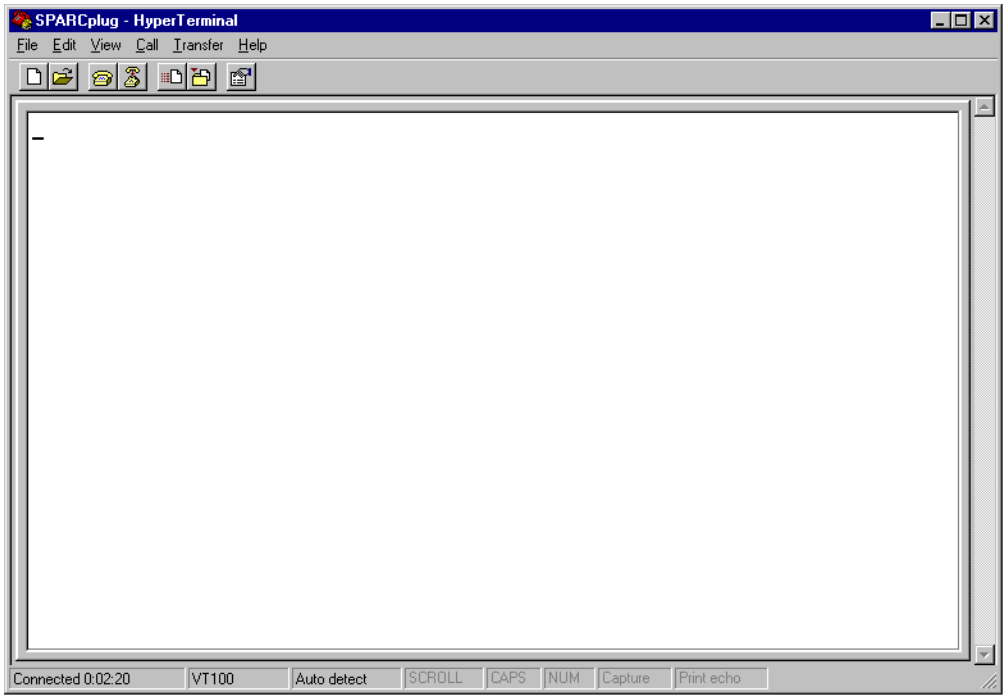
6. Specify the computer's serial port settings.

Change the settings for the serial port as follows:



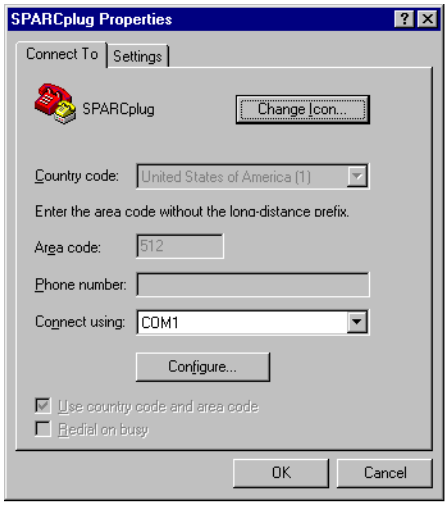
7. Click OK.

The HyperTerminal window appears.



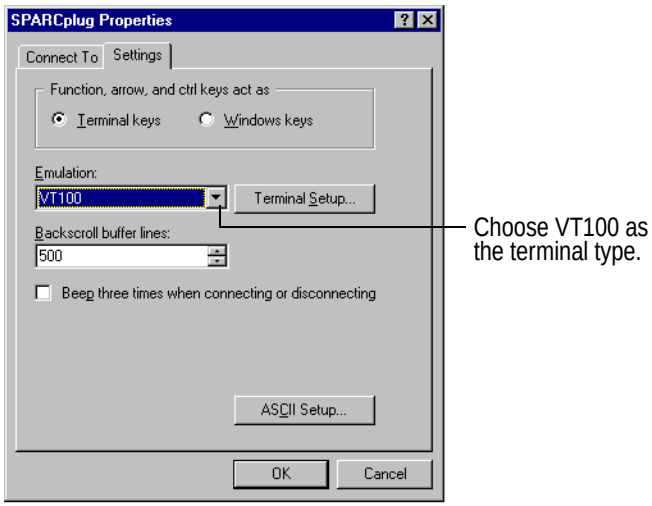
8. **Open the File menu and choose Properties.**

   The Properties dialog box for your settings document appears.



9. **Click the Settings tab.**

10. **Open the Emulation pop-up menu and choose VT100.**



11. **Click OK.**

12. **Open the File menu and choose Save.**

    The configuration changes you've made are saved in your settings document.

Booting your workstation for the first time

To boot your workstation for the first time, follow these steps:

1. **With the terminal emulation program active, press Enter.**

   This establishes a connection between the terminal and the workstation, and the workstation displays the console.

2. **If you see the PROM monitor (ok) prompt, type the following command to boot the workstation from its hard disk:**

   ```
   boot disk
   ```

3. **When the workstation finishes booting, enter the system identification information, as follows:**

   - **Terminal type** Specify that you are using a VT100 terminal.
   - **Host name** Type `sparcplug`.
   - **Networked?** For now, choose No.

   Answer any additional questions, then wait for the login prompt.

   If the cursor in the terminal emulation program appears on the wrong line, the window may not be wide enough to display an entire line. Resize the window to make it wider, or choose a smaller font for the terminal's window. If the cursor still appears on the wrong line, you may need to turn off line wrapping in the terminal emulation program.

4. **Log in as superuser (root).**

5. **Type the following command to reboot the workstation:**

   ```
   init 6
   ```

Changing the default console

The way you change the default console depends on the operating system that is installed on your workstation.

Changing the default console in Solaris 2.x

To change the default console in Solaris 2.x, follow these steps:

1. **Log in as superuser (root).**
2. **At the UNIX prompt, use a text editor, such as `vi`, to open the following file:**

   ```
   /etc/inittab
   ```

3. **Search for the following text:**

   ```
   -l console
   ```

4. **Replace the text with the following:**

   ```
   -l console3
   ```

5. **Save the file and quit the text editor.**

Changing the default console in SunOS 4.1.x

To change the default console in SunOS 4.1.x, follow these steps:

1. **Log in as superuser (root).**
2. **At the UNIX prompt, use a text editor, such as `vi`, to open the following file:**

   ```
   /etc/ttytab
   ```

3. **Search for the following text:**

   ```
   tty0a "/usr/etc/getty std 9600" unknown off local secure
   ```

4. **Replace the text with the following:**

   ```
   tty0a "/usr/etc/getty std 2400" vt100 on local secure
   ```

5. **Save the file and quit the text editor.**

Changing the PROM settings

To change the PROM settings, do this:

- **At the UNIX prompt, type the following command:**

  ```
  eeprom ttya–mode=2400,8,n,1,–
  ```

Unconfiguring the workstation

You need to unconfigure the workstation to prepare for setting up your network configuration. To unconfigure the workstation, follow these steps:

1. **At the UNIX prompt, type the following command:**

   ```
   sys-unconfig
   ```

2. **Confirm that you want to unconfigure the workstation.**

3. **Wait for the operating system to unconfigure the workstation and return to the PROM monitor (ok) prompt.**

Synchronizing the terminal and the console

Synchronizing the terminal and the console in Windows NT 4.0 or Windows 95

To synchronize the terminal and the console in Windows NT 4.0 or Windows 95, follow these steps:

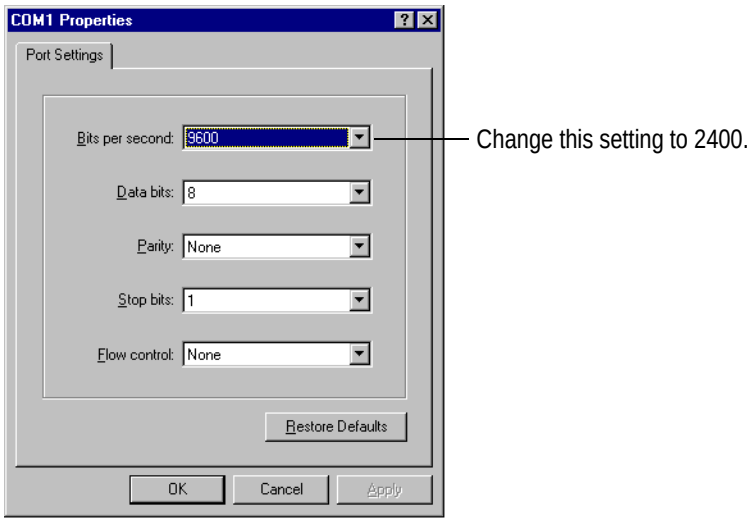
1. **With the terminal emulation program active, open the File menu and choose Properties.**

   The Properties dialog box for your settings document appears.

2. **Click Configure.**

   The Properties dialog box for your serial port appears.

3. **Open the Bits Per Second pop-up menu and choose 2400.**



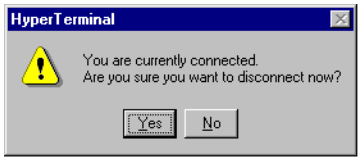
4. **Click OK.**

5. **Click OK again to close the Properties dialog box for your settings document.**

6. **Open the File menu and choose Save.**

7. **Open the File menu and choose Exit to quit the terminal emulation program.**

   A dialog box appears asking if you want to disconnect.



8. **To confirm that you want to quit, click Yes.**

9. **Shut down your computer.**

10. Turn off your computer.

You must turn off your computer—not reset it—to remove power from the workstation. This ensures that the workstation will use the new PROM settings the next time it boots.

What's next?

You've finished preparing the console. Next, you need to set up your network configuration. Use the table below to help you decide which chapter to go to next.

If you want to set up your network configuration for a	See
Direct connection	Chapter 4
Standard network connection	Chapter 5
High-performance network connection through the computer	Chapter 6

Chapter 4
Configuring a Direct Connection

Follow the procedures in this chapter to set up your network configuration for a direct connection.

Before you begin

This chapter includes instructions for setting up your network configuration for a direct connection. Before you begin, make sure that you have

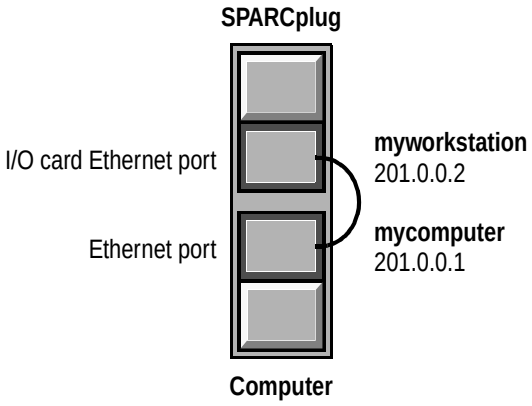
- connected your workstation to your computer, as described in “Connecting the hosts directly to each other” on page 2-10
- turned on your computer and waited for the operating system to load
- logged in to your computer as the administrator, if necessary

About the network configuration

To set up a direct connection, you create a personal network that includes both your computer and your workstation.

An example of the network configuration

Before following the configuration instructions in this chapter, use this diagram to help you understand the network configuration for a direct connection.



Gathering configuration information

To set up a direct connection, you need to configure two network interfaces:

- the Ethernet port in your computer (connected to your workstation's I/O card)
- the Ethernet port on your workstation's I/O card

The instructions in this chapter use examples to show you how to set up your network configuration. When following the steps in this chapter, replace the IP names, addresses, and subnet masks in the examples with the information for your particular configuration.

Information you'll need

You'll need the following information before setting up your network configuration for a direct connection:

For the Ethernet port in your computer

Type of Information	Example
IP name	mycomputer
IP address	201.0.0.1
Subnet mask	255.255.255.0

For the Ethernet port on your workstation's I/O card

Type of Information	Example
IP name	myworkstation
IP address	201.0.0.2
Subnet mask	255.255.255.0

Obtaining IP addresses

For your computer and workstation to function properly on your personal TCP/IP network, both Ethernet ports must be assigned unique IP addresses. You can choose the IP addresses you want to use, or use the addresses shown in the examples in this chapter. If you choose your own IP addresses, make sure they are both on the same network and use the same subnet mask.

Setting up the computer's network configuration

Determining if TCP/IP is installed

In Windows NT 4.0 or Windows 95

To determine if TCP/IP is installed on your computer, follow these steps:

1. **Click the Start icon on the Task Bar, point to Settings, and then click Control Panel.**

   The Control Panel window appears.

2. **Double-click Network.**

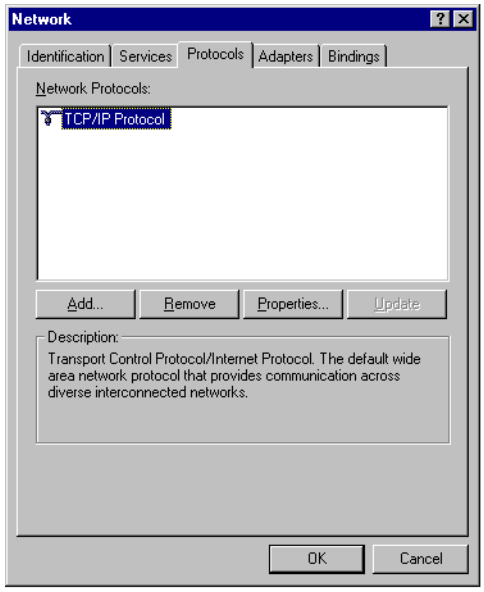
   If a dialog box appears asking if you want to install networking on your computer, click Yes, then follow the instructions on the screen to install TCP/IP. After the protocol is installed, skip to "Configuring TCP/IP" on page 4-6.

   If the Network control panel appears, continue with step 3.

3. **Click the Protocols tab.**

4. Check to see if TCP/IP Protocol appears in the Network Protocols list.

If the TCP/IP protocol is not installed, click Add, then follow the instructions on the screen to install TCP/IP. After the protocol is installed, go to "Configuring TCP/IP" on page 4-6.



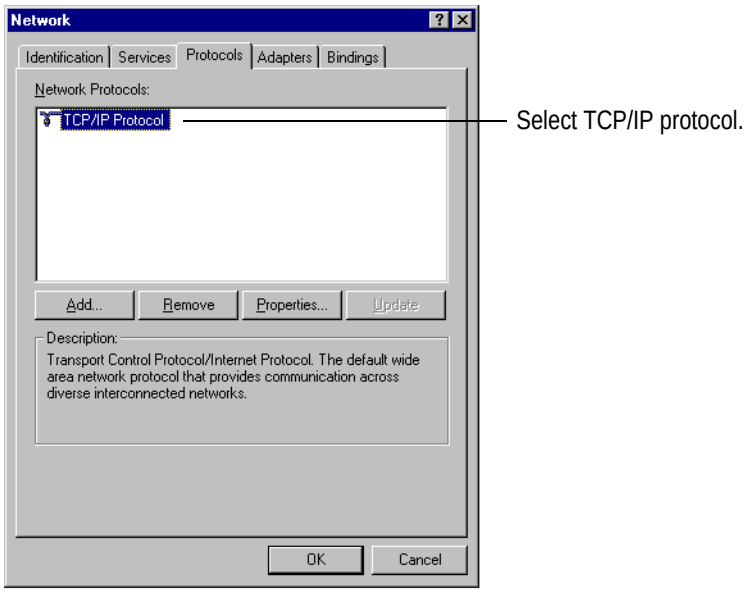
Configuring TCP/IP

In Windows NT 4.0 or Windows 95

To configure TCP/IP on your computer, follow these steps:

1. **Open the Network control panel if it isn't already open, and click the Protocols tab.**

2. **In the Network Protocols list, select TCP/IP Protocol.**

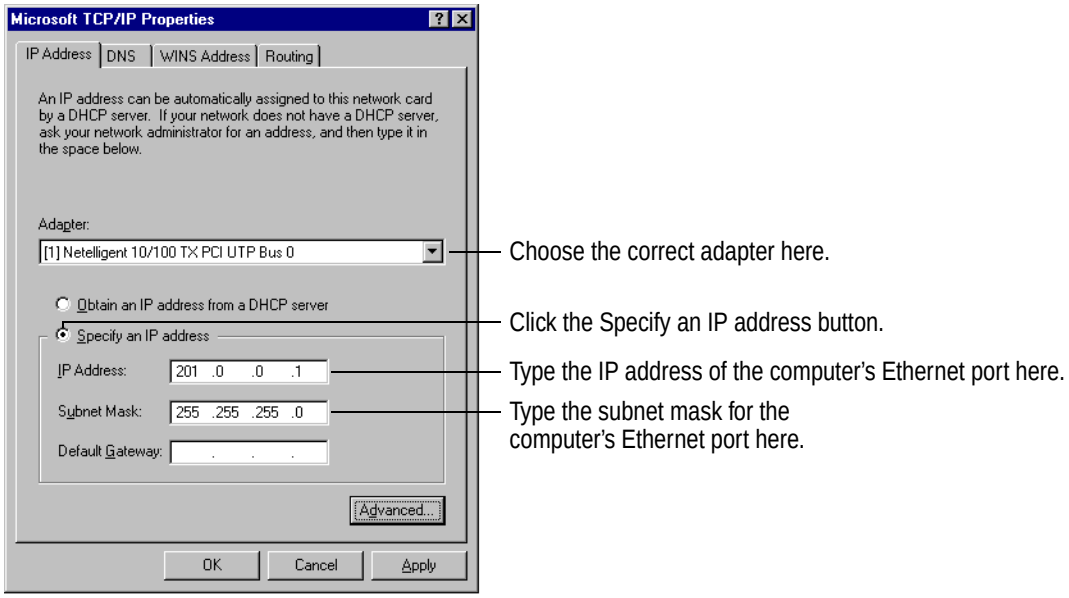


3. **Click Properties.**

   The Microsoft TCP/IP Properties dialog box appears.

4. **Open the Adapter pop-up menu and choose the adapter that you connected to the workstation's I/O card.**

   Example



5. **Click the Specify an IP Address button.**

6. **Click in the IP Address text box, and type the IP address of the computer's Ethernet port.**

7. **Click in the Subnet Mask text box, and type the subnet mask for the computer's Ethernet port.**

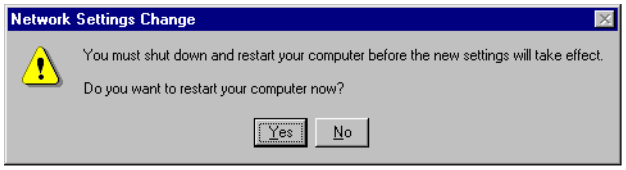
8. **Click OK.**

   If you have another network adapter in your computer that does not have an IP address, a dialog box appears telling you to assign an IP address to the adapter. If you're not using the extra adapter, assign it a unique IP address and then click OK.

   Don't use either of the IP addresses that you are assigning to the other Ethernet ports. If your personal network contains devices with duplicate IP addresses, your configuration may not work properly.

9. **Click Close to close the Network control panel.**

   A dialog box appears asking if you want to restart your computer.



10. **To confirm that you want to restart your computer, click Yes.**

11. **Log in to your computer as the administrator, if necessary.**

Adding the IP information to the computer's host table

To add the IP information to the computer's host table, follow these steps:

1. **Use a text editor, such as Notepad, to open the `hosts` file.**

   In Windows NT 4.0, the `hosts` file is located in the following folder:

   `\winnt\system32\drivers\etc`

2. **Add the IP address and name of the computer's Ethernet port to the file, using the following format:**

   computer_IP_address computer_IP_name

   Example

   ```
   201.0.0.1 mycomputer
   ```

3. **Add the IP address and name of the workstation's Ethernet port to the file, using the following format:**

   workstation_IP_address workstation_IP_name

   Example

   ```
   201.0.0.2 myworkstation
   ```

4. **Save the file and quit the text editor.**

Testing the computer's IP address and name

To test the computer's IP address and name, follow these steps:

1. **Go to the command prompt.**
2. **Use the `ping` command to verify that the computer recognizes its Ethernet port by its IP address.**

   `ping` *computer_IP_address*

   Example

   ```
   ping 201.0.0.1
   ```

3. **Use the `ping` command to verify that the computer recognizes its Ethernet port by its IP name.**

   `ping` *computer_IP_name*

   Example

   ```
   ping mycomputer
   ```

Setting up the workstation's network configuration

Performing the system identification

To perform the system identification, follow these steps:

1. **Go to the workstation console window.**
2. **If you see the PROM monitor (ok) prompt, type the following command to boot from the workstation's hard disk.**

   ```
   boot disk
   ```

3. **Enter the system identification information, as follows:**

   - **Terminal type** Specify that you are using a VT100 terminal.
   - **Host name** Use the IP name you have chosen for the workstation's Ethernet port (for example, `myworkstation`).
   - **Networked?** The workstation is connected to your personal network, so choose Yes.

- **IP address** Use the IP address you have chosen for the workstation's Ethernet port (for example, `201.0.0.2`).
- **Name service** For a direct connection, you won't be using a name service, so choose None.
- **System part of a subnet?** Choose Yes.
- **Netmask** Use the subnet mask you have chosen for the workstation's Ethernet port (for example, `255.255.255.0`).

Answer any additional questions, then wait for the login prompt.

4. **Log in as superuser (root).**

Adding the IP information to the workstation's host table

To add the IP information to the workstation's host table, follow these steps:

1. **Use a text editor, such as `vi`, to open the following file:**

   `/etc/hosts`

2. **Make sure that the IP address and name of the workstation's Ethernet port appear in the file.**

   The operating system normally adds this information to the file during system identification.

   Example

   ```
   201.0.0.2 myworkstation
   ```

3. **Add the IP address and name of the computer's Ethernet port to the file, using the following format:**

   computer_IP_address computer_IP_name

   Example

   ```
   201.0.0.1 mycomputer
   ```

4. **Save the file and quit the text editor.**

Testing the workstation's IP address and name

To test the workstation's IP address and name, follow these steps:

1. **Use the `ping` command to verify that the workstation recognizes its Ethernet port by its IP address.**

   `ping` *workstation_IP_address*

   Example

   ```
   ping 201.0.0.2
   ```

2. **Use the `ping` command to verify that the workstation recognizes its Ethernet port by its IP name.**

   `ping` *workstation_IP_name*

   Example

   ```
   ping myworkstation
   ```

Testing the network configuration

Testing the workstation's IP address and name from the computer

To test the workstation's IP address and name from the computer, follow these steps:

1. **Go to the command prompt.**

2. **Use the `ping` command to verify that the computer recognizes the workstation's Ethernet port by its IP address.**

   `ping` *workstation_IP_address*

   Example

   ```
   ping 201.0.0.2
   ```

3. **Use the `ping` command to verify that the computer recognizes the workstation's Ethernet port by its IP name.**

   `ping` *workstation_IP_name*

   Example

   ```
   ping myworkstation
   ```

Testing the computer's IP address and name from the workstation

To test the computer's IP address and name from the workstation, follow these steps:

1. **Go to the workstation console window.**

2. **Use the `ping` command to verify that the workstation recognizes the computer's Ethernet port by its IP address.**

   `ping` *computer_IP_address*

   Example

   ```
   ping 201.0.0.1
   ```

3. **Use the `ping` command to verify that the workstation recognizes the computer's Ethernet port by its IP name.**

   `ping` *computer_IP_name*

   Example

   ```
   ping mycomputer
   ```

What's next?

Your computer and workstation are now set up for a direct connection. To learn how to install the X-Window and NFS server application programs on your computer, go to Chapter 7, "Installing and Using Application Programs."

If you need to turn off your computer at any time, see "Turning off the computer" on page 7-6. It is very important to use the correct procedure for shutting down your workstation before turning off your computer.

Chapter 5
Configuring a Standard Network Connection

Follow the procedures in this chapter to set up your network configuration for a standard network connection.

Before you begin

This chapter includes instructions for setting up your network configuration for a standard network connection. Before you begin, make sure that you have

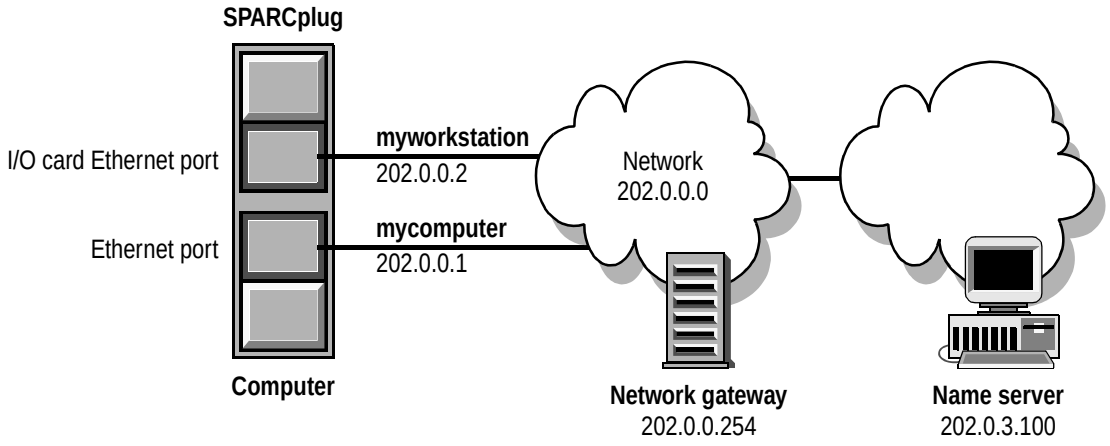
- connected your workstation and your computer to your organization's network, as described in "Connecting the hosts for standard network access" on page 2-12
- turned on your computer and waited for the operating system to load
- logged in to your computer as the administrator, if necessary

About the network configuration

To set up a standard network connection, you add both your computer and your workstation to your organization's network.

An example of the network configuration

Before following the configuration instructions in this chapter, use this diagram to help you understand the network configuration for a standard network connection.



Gathering configuration information

To set up a standard network connection, you need to configure two network interfaces (both of which are connected to your organization's network):

- the Ethernet port in your computer
- the Ethernet port on your workstation's I/O card

The instructions in this chapter use examples to show you how to set up your network configuration. When following the steps in this chapter, replace the IP names, addresses, and subnet masks in the examples with the information for your particular configuration.

Information you'll need

You'll need the following information before setting up your network configuration for a standard network connection:

For the Ethernet port in your computer

Type of Information	Example
IP name	mycomputer
IP address	202.0.0.1
Subnet mask	255.255.255.0
Default gateway	202.0.0.254

For the name server used by your computer

Type of Information	Example
IP address	202.0.3.100

For the Ethernet port on your workstation's I/O card

Type of Information	Example
IP name	myworkstation
IP address	202.0.0.2
Subnet mask	255.255.255.0
Default gateway	202.0.0.254

For the name server used by your workstation

Type of Information	Example
IP address	202.0.3.100

Obtaining IP addresses

For your computer and your workstation to function properly on your TCP/IP network, both Ethernet ports must be assigned unique IP addresses. Contact your network administrator for IP addresses for both ports.

What the network administrator must do

Before you begin setting up your network configuration, ask your network administrator to do the following:

- add the IP name and address for your computer to the name server (for example, `mycomputer` and `202.0.0.1`)
- add the IP name and address for your workstation to the name server (for example, `myworkstation` and `202.0.0.2`)

Setting up the computer's network configuration

Determining if TCP/IP is installed

In Windows NT 4.0 or Windows 95

To determine if TCP/IP is installed on your computer, follow these steps:

1. **Click the Start icon on the Task Bar, point to Settings, and then click Control Panel.**

   The Control Panel window appears.

2. **Double-click Network.**

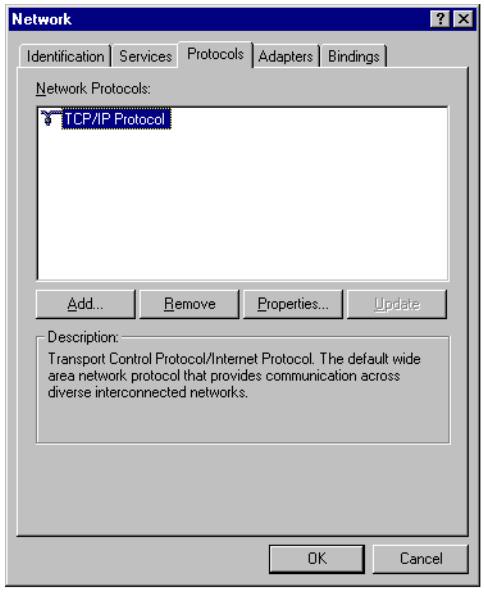
   If a dialog box appears asking if you want to install networking on your computer, click Yes, then follow the instructions on the screen to install TCP/IP. After the protocol is installed, skip to "Configuring TCP/IP" on page 5-8.

   If the Network control panel appears, continue with step 3.

3. **Click the Protocols tab.**

4. Check to see if TCP/IP Protocol appears in the Network Protocols list.

If the TCP/IP protocol is not installed, click Add, then follow the instructions on the screen to install TCP/IP. After the protocol is installed, go to "Configuring TCP/IP" on page 5-8.



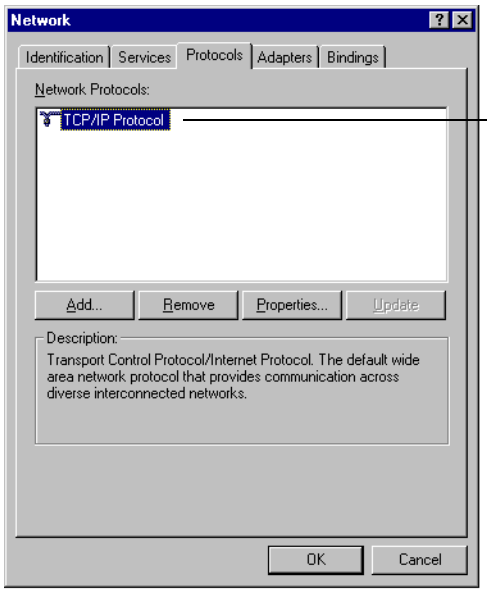
Configuring TCP/IP

In Windows NT 4.0 or Windows 95

To configure TCP/IP on your computer, follow these steps:

1. **Open the Network control panel if it isn't already open, and click the Protocols tab.**

2. **In the Network Protocols list, select TCP/IP Protocol.**

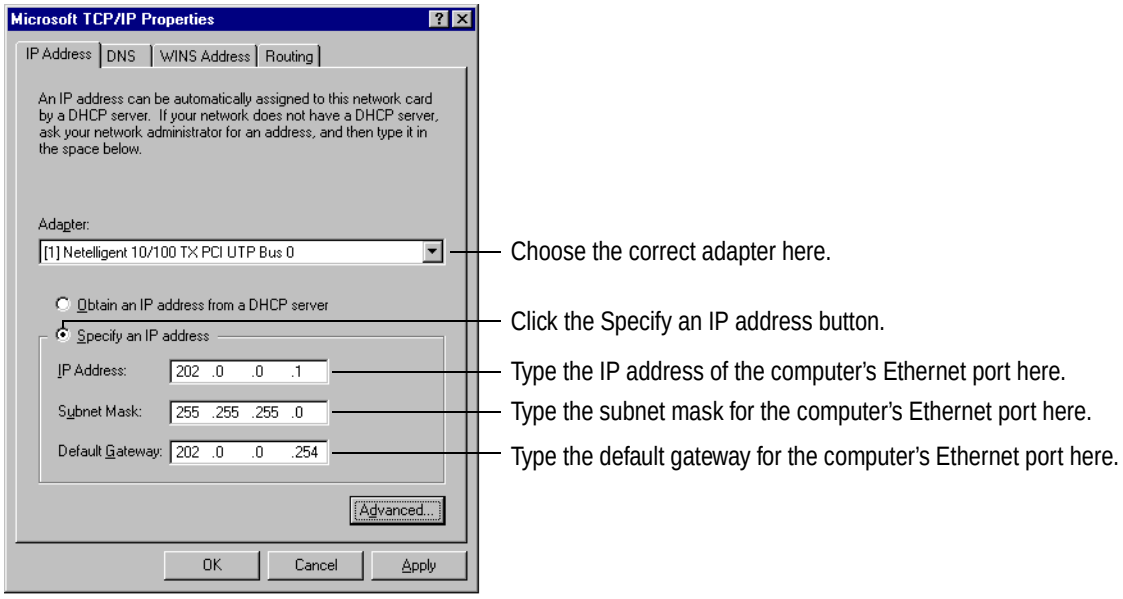


3. **Click Properties.**

   The Microsoft TCP/IP Properties dialog box appears.

4. **Open the Adapter pop-up menu and choose the adapter that you connected to the network.**

   Example



5. **Click the Specify an IP Address button.**

6. **Click in the IP Address text box, and type the IP address of the computer's Ethernet port.**

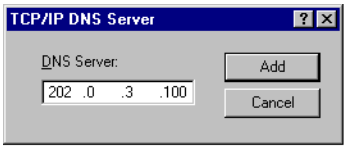
7. **Click in the Subnet Mask text box, and type the subnet mask for the computer's Ethernet port.**

8. **Click in the Default Gateway text box, and type the default gateway for the computer's Ethernet port.**

9. **Click the DNS tab.**

10. **In the DNS Service Search Order area, click Add.**

11. **Type the IP address of the name server used by your computer, and then click Add.**



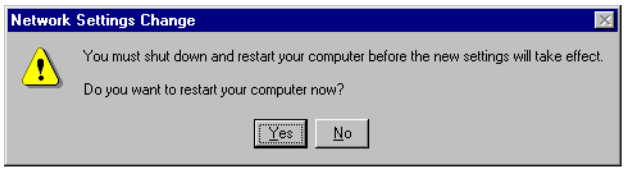
12. **Click OK.**

    If you have another network adapter in your computer that does not have an IP address, a dialog box appears telling you to assign an IP address to the adapter. If you're not using the extra adapter, assign it a unique IP address and then click OK.

    Don't use the same IP address as another device on the network. If your TCP/IP network contains devices with duplicate IP addresses, your configuration may not work properly.

13. **Click Close to close the Network control panel.**

    A dialog box appears asking if you want to restart your computer.



14. **To confirm that you want to restart your computer, click Yes.**

15. **Log in to your computer as the administrator, if necessary.**

Testing the computer's IP address and name

To test the computer's IP address and name, follow these steps:

1. **Go to the command prompt.**
2. **Use the `ping` command to verify that the computer recognizes its Ethernet port by its IP address.**

   `ping` *computer_IP_address*

   Example

   ```
   ping 202.0.0.1
   ```

3. **Use the `ping` command to verify that the computer recognizes its Ethernet port by its IP name.**

   `ping` *computer_IP_name*

   Example

   ```
   ping mycomputer
   ```

Setting up the workstation's network configuration

Performing the system identification

To perform the system identification, follow these steps:

1. **Go to the workstation console window.**
2. **If you see the PROM monitor (ok) prompt, type the following command to boot from the workstation's hard disk.**

   ```
   boot disk
   ```

3. **Enter the system identification information, as follows:**

   - **Terminal type** Specify that you are using a VT100 terminal.
   - **Host name** Use the IP name you have chosen for the workstation's Ethernet port (for example, `myworkstation`).
   - **Networked?** Choose Yes.
   - **IP address** Use the IP address you have chosen for the workstation's Ethernet port (for example, `202.0.0.2`).
   - **Name service** You are using the Domain Name System, so choose Other.
   - **System part of a subnet?** Choose Yes.
   - **Netmask** Use the subnet mask you have chosen for the workstation's Ethernet port (for example, `255.255.255.0`).

   Answer any additional questions, then wait for the login prompt.

4. **Log in as superuser (root).**

Testing the workstation's IP address and name

To test the workstation's IP address and name, follow these steps:

1. **Use the `ping` command to verify that the workstation recognizes its Ethernet port by its IP address.**

   `ping` *workstation_IP_address*

   Example

   ```
   ping 202.0.0.2
   ```

2. **Use the `ping` command to verify that the workstation recognizes its Ethernet port by its IP name.**

   `ping` *workstation_IP_name*

   Example

   ```
   ping myworkstation
   ```

Testing the network configuration

Testing the workstation's IP address and name from the computer

To test the workstation's IP address and name from the computer, follow these steps:

1. **Go to the command prompt.**
2. **Use the `ping` command to verify that the computer recognizes the workstation's Ethernet port by its IP address.**

   `ping` *workstation_IP_address*

   Example

   ```
   ping 202.0.0.2
   ```

3. **Use the `ping` command to verify that the computer recognizes the workstation's Ethernet port by its IP name.**

   `ping` *workstation_IP_name*

   Example

   ```
   ping myworkstation
   ```

Testing the computer's IP address and name from the workstation

To test the computer's IP address and name from the workstation, follow these steps:

1. **Go to the workstation console window.**
2. **Use the `ping` command to verify that the workstation recognizes the computer's Ethernet port by its IP address.**

   `ping` *computer_IP_address*

   Example

   ```
   ping 202.0.0.1
   ```

3. **Use the `ping` command to verify that the workstation recognizes the computer's Ethernet port by its IP name.**

   `ping` *computer_IP_name*

   Example

   ```
   ping mycomputer
   ```

What's next?

Your computer and workstation are now set up for a standard network connection. To learn how to install the X-Window and NFS server application programs on your computer, go to Chapter 7, "Installing and Using Application Programs."

If you need to turn off your computer at any time, see "Turning off the computer" on page 7-6. It is very important to use the correct procedure for shutting down your workstation before turning off your computer.

Chapter 6
Configuring a High-Performance Network Connection through the Computer

Follow the procedures in this chapter to set up your network configuration for a high-performance network connection through the computer.

Before you begin

This chapter includes instructions for setting up your network configuration for a high-performance network connection through the computer. Before you begin, make sure that you have

- connected your workstation to your computer, and connected your computer to your organization's network, as described in "Connecting the hosts for high-performance network access through the computer" on page 2-16
- turned on your computer and waited for the operating system to load
- logged in to your computer as the administrator, if necessary

About the network configuration

The easiest way to set up a high-performance network connection through the computer is to do the following:

- create a two-host subnet that includes both your computer and your workstation
- use the computer as a gateway to your organization's network

Background information

Every network interface on a TCP/IP network is assigned a unique 32-bit number called an IP address. IP addresses are usually written as four decimal numbers that are separated by periods, where each number represents the value of a single byte (for example, 195.30.51.84). The value of each byte can range from 0 to 255.

An IP address is divided into a network number and a host number, but the dividing line between these numbers varies depending on the class of the IP address. In a Class-C IP address, the first three bytes identify the network, and the fourth byte identifies the host on that network (for example, IP address 195.30.51.84 identifies host 84 on network 195.30.51).

In all network classes, the first and last host numbers are reserved. The first host number identifies the network itself. The last host number identifies the broadcast address, used to simultaneously address every host on the network or subnet. For example, 195.30.51.0 identifies network 195.30.51, and 195.30.51.255 identifies every host on network 195.30.51.

In some cases, a physical network may have only a few network interfaces. Rather than dedicate all 256 host numbers to a network with only several hosts, you can divide the network into smaller networks called subnets.

To divide a network into subnets, you assign a subnet mask to all the network interfaces on that network. The subnet mask modifies the standard structure of the IP addresses on the network by using some of the host address bits as additional network address bits.

Understanding the two-host subnet

A two-host subnet requires four IP addresses. You use one of the four IP addresses for each of the following:

- your computer
- your workstation
- the subnet itself
- the broadcast address, used to address every interface on the subnet

The IP addresses for the remaining subnets on the network can be assigned to other computers that have SPARCplugs installed.

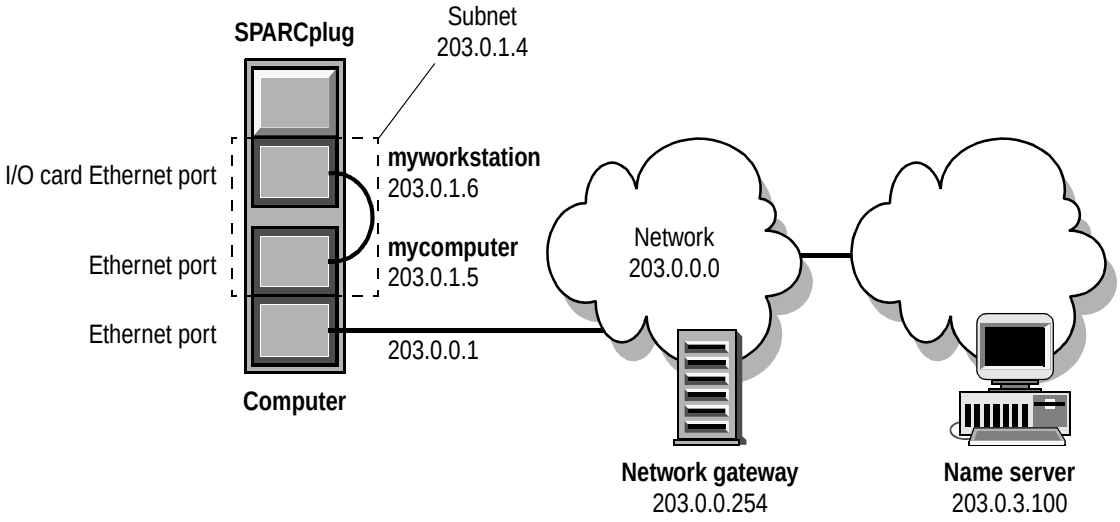
For a Class-C network, a subnet mask of 255.255.255.252 defines 64 groups of four IP addresses. For example, applying this mask to network 203.0.1.0 defines the following subnets:

Subnet	Interface A (Computer)	Interface B (SPARCplug)	Broadcast
203.0.1.0	203.0.1.1	203.0.1.2	203.0.1.3
203.0.1.4	203.0.1.5	203.0.1.6	203.0.1.7
203.0.1.8	203.0.1.9	203.0.1.10	203.0.1.11
...	...	...	...
203.0.1.244	203.0.1.245	203.0.1.246	203.0.1.247
203.0.1.248	203.0.1.249	203.0.1.250	203.0.1.251
203.0.1.252	203.0.1.253	203.0.1.254	203.0.1.255

The first subnet cannot be used because its IP address would be the same as the network number (203.0.1.0). The last subnet cannot be used because it would include the IP address used to address every host on the network (203.0.1.255).

An example of the network configuration

Before following the configuration instructions in this chapter, use this diagram to help you understand the network configuration for a high-performance network connection through the computer.



Gathering configuration information

To set up a high-performance network connection through the computer, you need to configure three network interfaces:

- the Ethernet port in your computer that is connected to your workstation's I/O card (the subnet Ethernet port)
- a second Ethernet port in your computer that is connected to your organization's network (the network Ethernet port)
- the Ethernet port on your workstation's I/O card

The instructions in this chapter use examples to show you how to set up your network configuration. When following the steps in this chapter, replace the IP names, addresses, and subnet masks in the examples with the information for your particular configuration.

Information you'll need

You'll need the following information before setting up your network configuration for a high-performance network connection through the computer:

For the network Ethernet port in your computer

Type of Information	Example
IP address	203.0.0.1
Subnet mask	255.255.255.0
Default gateway	203.0.0.254

For the subnet Ethernet port in your computer

Type of Information	Example
IP name	mycomputer
IP address	203.0.1.5
Subnet mask	255.255.255.252

For the name server used by your computer

Type of Information	Example
IP address	203.0.3.100

For the Ethernet port on your workstation's I/O card

Type of Information	Example
IP name	myworkstation
IP address	203.0.1.6
Subnet mask	255.255.255.252
Default gateway	203.0.1.5

Obtaining IP addresses

For your computer and workstation to function properly on your TCP/IP network, all three Ethernet ports must be assigned unique IP addresses. Contact your network administrator for IP addresses for each of the ports.

What the network administrator must do

Before you begin setting up your network configuration, ask your network administrator to do the following:

- add the IP name and address for your computer to the name server (for example, `mycomputer` and `203.0.1.5`)
- add the IP name and address for your workstation to the name server (for example, `myworkstation` and `203.0.1.6`)
- add an entry for the subnet gateway to the network router's table
  The router must direct information that is addressed to hosts on the subnet to the computer's network Ethernet port (for example, `203.0.0.1`).

Setting up the computer's network configuration

Determining if TCP/IP is installed

In Windows NT 4.0 or Windows 95

To determine if TCP/IP is installed on your computer, follow these steps:

1. **Click the Start icon on the Task Bar, point to Settings, and then click Control Panel.**

   The Control Panel window appears.

2. **Double-click Network.**

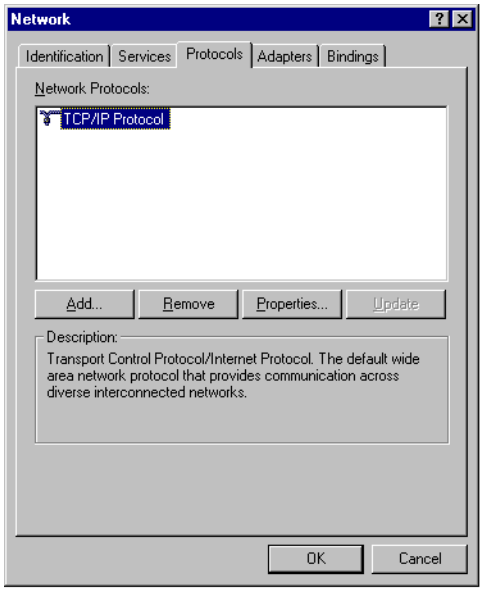
   If a dialog box appears asking if you want to install networking on your computer, click Yes, then follow the instructions on the screen to install TCP/IP. After the protocol is installed, skip to "Configuring TCP/IP" on page 6-11.

   If the Network control panel appears, continue with step 3.

3. **Click the Protocols tab.**

4. **Check to see if TCP/IP Protocol appears in the Network Protocols list.**

   If the TCP/IP protocol is not installed, click Add, then follow the instructions on the screen to install TCP/IP. After the protocol is installed, go to “Configuring TCP/IP” on page 6-11.



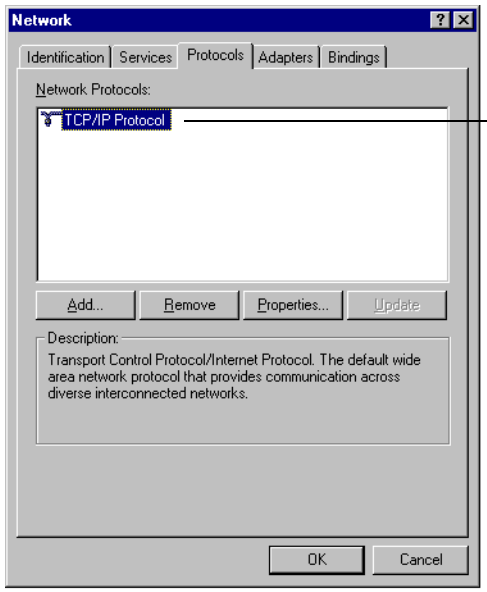
Configuring TCP/IP

In Windows NT 4.0 or Windows 95

To configure TCP/IP on your computer, follow these steps:

1. **Open the Network control panel if it isn't already open, and click the Protocols tab.**

2. **In the Network Protocols list, select TCP/IP Protocol.**

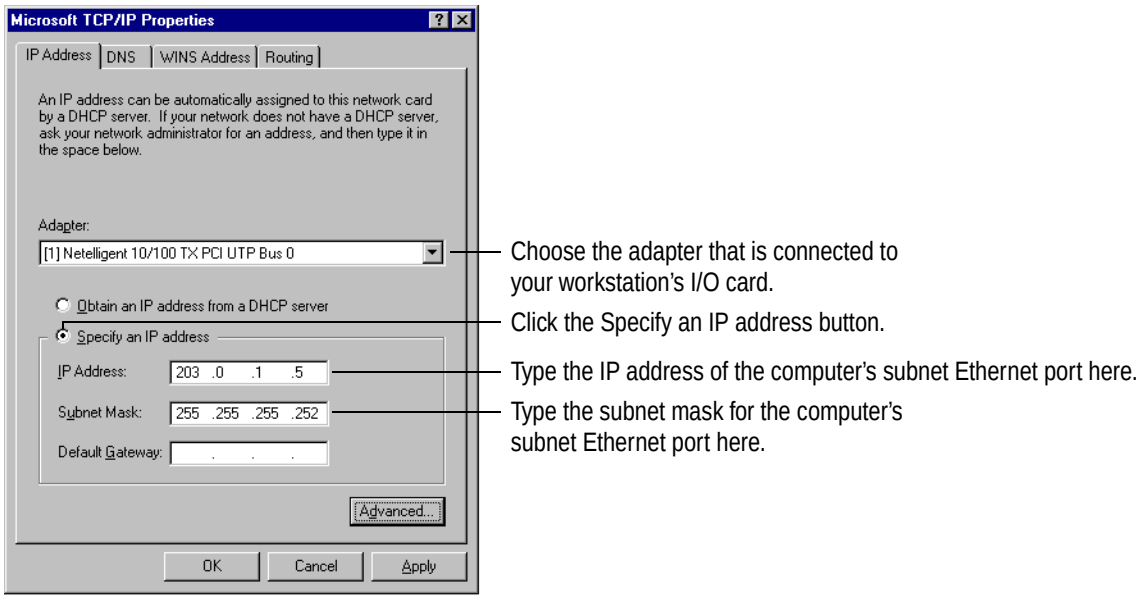


3. **Click Properties.**

The Microsoft TCP/IP Properties dialog box appears.

4. **Open the Adapter pop-up menu and choose the adapter that you connected to the workstation's I/O card (the subnet Ethernet port).**

   Example



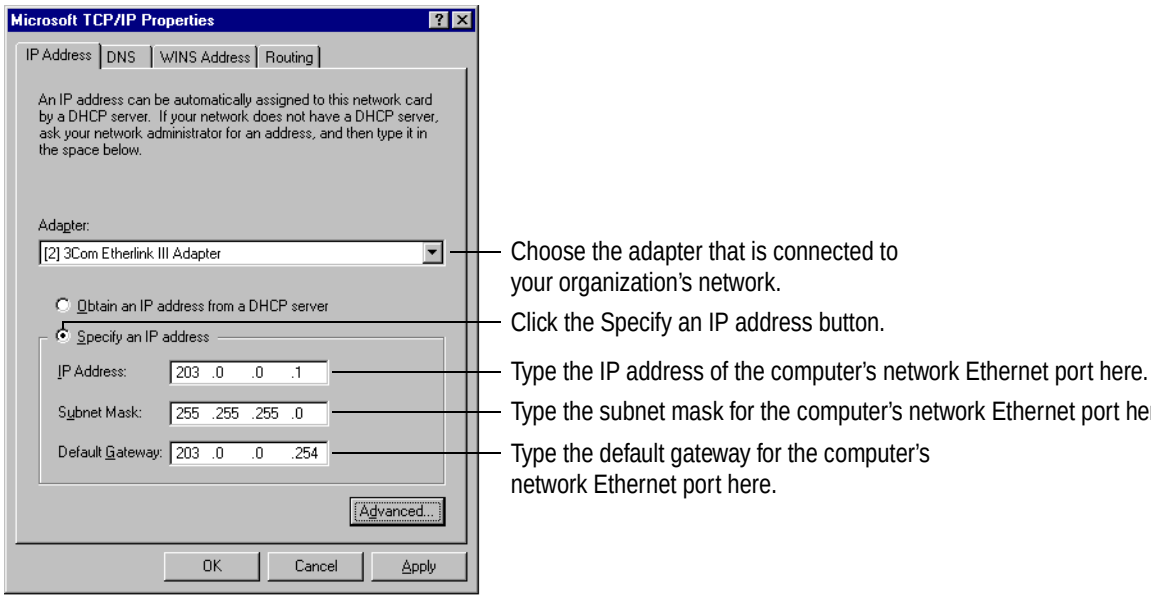
5. **Click the Specify an IP Address button.**

6. **Click in the IP Address text box, and type the IP address of the computer's subnet Ethernet port.**

7. **Click in the Subnet Mask text box, and type the subnet mask for the computer's subnet Ethernet port.**

8. **Open the Adapter pop-up menu and choose the adapter that you connected to your organization's network (the network Ethernet port).**

   Example



9. **Click the Specify an IP Address button.**

10. **Click in the IP Address text box, and type the IP address of the computer's network Ethernet port.**

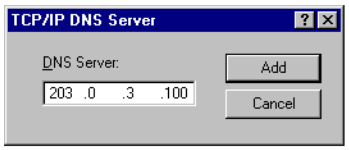
11. **Click in the Subnet Mask text box, and type the subnet mask for the computer's network Ethernet port.**

12. **Click in the Default Gateway text box, and type the default gateway for the computer's network Ethernet port.**

13. **Click the DNS tab.**

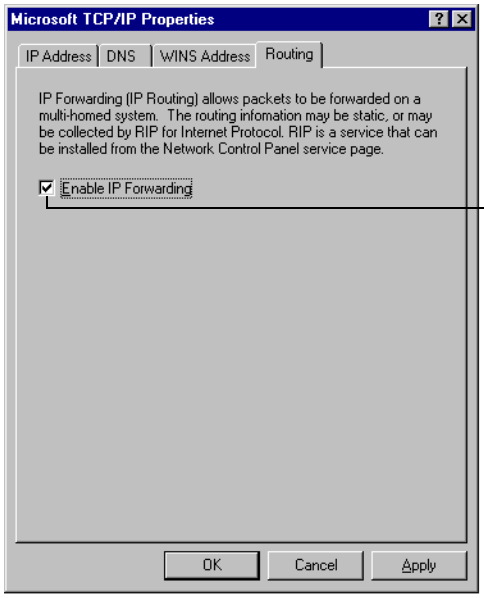
14. **In the DNS Service Search Order area, click Add.**

15. **Type the IP address of the name server used by your computer, and then click Add.**



16. **Click the Routing tab.**

17. **Click the Enable IP Forwarding checkbox to enable IP routing.**

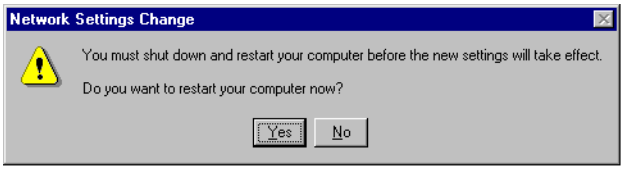


An X in the checkbox means the computer routes IP datagrams between the adapters.

18. **Click OK.**

19. **Click Close to close the Network control panel.**

    A dialog box appears asking if you want to restart your computer.



20. **To confirm that you want to restart your computer, click Yes.**

21. **Log in to your computer as the administrator, if necessary.**

Testing the computer's IP addresses and name

To test the computer's IP addresses and name, follow these steps:

1. **Go to the command prompt.**

2. **Use the `ping` command to verify that the computer recognizes its network Ethernet port by its IP address.**

   `ping` *computer_network_port_IP_address*

   Example

   ```
   ping 203.0.0.1
   ```

3. **Use the `ping` command to verify that the computer recognizes its subnet Ethernet port by its IP address.**

   `ping` *computer_subnet_ port_IP_address*

   Example

   ```
   ping 203.0.1.5
   ```

4. **Use the `ping` command to verify that the computer recognizes its subnet Ethernet port by its IP name.**

   `ping` *computer_subnet_port_IP_name*

   Example

   ```
   ping mycomputer
   ```

Setting up the workstation's network configuration

Performing the system identification

To perform the system identification, follow these steps:

1. **Go to the workstation console window.**

2. **If you see the PROM monitor (ok) prompt, type the following command to boot from the workstation's hard disk.**

   ```
   boot disk
   ```

3. **Enter the system identification information, as follows:**

   - **Terminal type** Specify that you are using a VT100 terminal.
   - **Host name** Use the IP name you have chosen for the workstation's Ethernet port (for example, `myworkstation`).
   - **Networked?** Choose Yes.
   - **IP address** Use the IP address you have chosen for the workstation's Ethernet port (for example, `203.0.1.6`).
   - **Name service** You are using the Domain Name System, so choose Other.
   - **System part of a subnet?** Choose Yes.
   - **Netmask** Use the subnet mask you have chosen for the workstation's Ethernet port (for example, `255.255.255.252`).

   Answer any additional questions, then wait for the login prompt.

4. **Log in as superuser (root).**

Specifying the default gateway

The way you specify the default gateway depends on the operating system that is installed on your workstation.

In Solaris 2.x

To specify the default gateway in Solaris 2.x, follow these steps:

1. **At the UNIX prompt, use a text editor, such as `vi`, to create and open the following file:**

   `/etc/defaultrouter`

2. **Add the IP address of the computer's subnet Ethernet port to the file.**

   computer_subnet_port_IP_address

   Example

   `203.0.1.5`

3. **Save the file and quit the text editor.**

Updating the configuration file for the name service switch

The way you update the configuration file for the name service switch depends on the operating system that is installed on your workstation.

In Solaris 2.x

To update the configuration file for the name service switch in Solaris 2.x, follow these steps:

1. **At the UNIX prompt, use a text editor, such as `vi`, to open the following file:**

   ```
   /etc/nsswitch.conf
   ```

2. **Search for the following text:**

   ```
   hosts:     files
   ```

3. **Replace the text with the following:**

   ```
   hosts:     dns files
   ```

4. **Save the file and quit the text editor.**

5. **Type the following command to reboot the workstation and load the changes you've made:**

   ```
   init 6
   ```

Testing the workstation's IP address and name

To test the workstation's IP address and name, follow these steps:

1. **Use the `ping` command to verify that the workstation recognizes its Ethernet port by its IP address.**

   `ping` *workstation_IP_address*

   Example

   ```
   ping 203.0.1.6
   ```

2. **Use the `ping` command to verify that the workstation recognizes its Ethernet port by its IP name.**

   `ping` *workstation_IP_name*

   Example

   ```
   ping myworkstation
   ```

Testing the network configuration

Testing the workstation's IP address and name from the computer

To test the workstation's IP address and name from the computer, follow these steps:

1. **Go to the command prompt.**

2. **Use the `ping` command to verify that the computer recognizes the workstation's Ethernet port by its IP address.**

   `ping` *workstation_IP_address*

   Example

   ```
   ping 203.0.1.6
   ```

3. **Use the `ping` command to verify that the computer recognizes the workstation's Ethernet port by its IP name.**

   `ping` *workstation_IP_name*

   Example

   ```
   ping myworkstation
   ```

Testing the computer's IP addresses and name from the workstation

To test the computer's IP addresses and name from the workstation, follow these steps:

1. **Go to the workstation console window.**

2. **Use the `ping` command to verify that the workstation recognizes the computer's network Ethernet port by its IP address.**

   `ping` *computer_network_port_IP_address*

   Example

   ```
   ping 203.0.0.1
   ```

3. **Use the `ping` command to verify that the workstation recognizes the computer's subnet Ethernet port by its IP address.**

   `ping` *computer_subnet_ port_IP_address*

   Example

   ```
   ping 203.0.1.5
   ```

4. **Use the `ping` command to verify that the workstation recognizes the computer's subnet Ethernet port by its IP name.**

   `ping` *computer_subnet_port_IP_name*

   Example

   ```
   ping mycomputer
   ```

What's next?

Your computer and workstation are now set up for a high-performance network connection through the computer. To learn how to install the X-Window and NFS server application programs on your computer, go to Chapter 7, "Installing and Using Application Programs."

If you need to turn off your computer at any time, see "Turning off the computer" on page 7-6. It is very important to use the correct procedure for shutting down your workstation before turning off your computer.

Chapter 7
Installing and Using Application Programs

Follow the procedures in this chapter to install the X-Window server and run X-Window clients.

Before you begin

This chapter includes instructions for installing the X-Window server and running X-Window clients. Before you begin, make sure that you have

- set up your network configuration
- turned on your computer and waited for the operating system to load
- logged in to your computer as the administrator, if necessary

Installing the X-Window server

The X-Window server program lets you run X-Window programs on the workstation and view them on your computer's monitor. To install the X-Window server program on your computer, follow these steps:

1. **Insert the *Applications* CD-ROM into your computer's CD-ROM drive.**
2. **Open the Exceed directory.**
3. **Double-click the Read1st file to view the contents of the file.**
4. **When you have finished reading the Read1st file, open the appropriate directory for your computer.**
5. **Open the Exceed directory.**
6. **Double-click the Setup file.**
7. **Follow the instructions in the Setup program, choosing the following options:**
   - **Setup type** Choose Personal.
   - **Method** Choose Express.
   - **Tune the X server for optimal graphics performance?** Choose Yes.
   - **Restart Windows?** Choose Yes.

Creating startup files and starting X-Window clients

Creating a startup file

To create a startup file, follow these steps:

1. **Click the Start icon on the Task Bar, point to Programs, point to Exceed, and then click Xstart.**

   The Xstart window appears.

2. **Open the Start Method pop-up menu and choose REXEC (TCP/IP).**

3. **Open the Program Type pop-up menu and choose X Window.**

4. **Click in the User ID text box and type your UNIX user ID.**

5. **Click in the Host text box and type your workstation's IP name.**

6. **Click in the Command text box and type the UNIX command to start an X-Window terminal and display it on your computer.**

   /path`/xterm –d` *computer_IP_name*`:0 &`

   Example

   ```
   /usr/openwin/bin/xterm –d mycomputer:0 &
   ```

7. **Click the Account Info button.**

8. **Click in the Description text box and type a description for the startup file.**

   Example

   ```
   X-Window terminal
   ```

9. **Open the File menu and choose Save.**

   The Save As dialog box appears.

10. **Click in the Filename text box and type a name for the startup file.**

    Example

    ```
    xterm
    ```

11. **Click Save.**

Starting an X-Window client

To start an X-Window client, follow these steps:

1. **Click the Start icon on the Task Bar, point to Programs, point to Exceed, and then click Xstart.**

   The Xstart window appears.

2. **Open the File menu and choose Open.**

   The Open dialog box appears.

3. **In the Files list, select the startup file you want to open.**

4. **Click OK.**

5. **Click the Run! menu.**

   The Xstart Info dialog box appears.

6. **Click in the Password text box and type your UNIX password.**

7. **Click OK.**

Installing workstation application programs

Before you begin the installation

Before you begin the installation, make sure that your workstation is connected to a network with a server that contains the software you want to install (your network administrator can provide this information), or make sure that you have connected a CD-ROM drive to your workstation. For information on how to connect a CD-ROM drive to your workstation, see “Connecting external SCSI devices” on page 8-2.

Installing an application program

To install an application program on your workstation’s hard disk, follow these steps:

1. **Insert the program’s CD-ROM into the workstation’s CD-ROM drive.**
2. **Mount the computer’s CD-ROM drive.**
3. **Install the application.**

   Follow the manufacturer’s installation instructions.

Turning off the computer

To turn off the computer, follow these steps:

1. **Go to the workstation console window or an X window.**
2. **Become superuser.**
3. **If other users share files on your workstation, send a warning message to all users who are logged in.**
4. **Type the following command to change to the root directory:**

   ```
   cd /
   ```

5. **Type the following command to shut down the workstation:**

   ```
   init 0
   ```

6. **Wait for the operating system to shut down the workstation and return to the PROM monitor (ok) prompt.**
7. **Shut down the computer.**
8. **Turn off the computer by pressing its power button.**

Installing or reinstalling the workstation operating system

Your workstation came with the operating system installed on its internal hard disk, so you don't need to install an operating system on that disk unless you encounter software problems.

If you have a new hard disk or a newly initialized hard disk that doesn't contain an operating system—or if you want to upgrade to a more recent version of the operating system—follow the instructions in "Installing the operating system" on page 7-7.

Before you begin the installation

Before you begin the installation, make sure that your workstation is connected to a network with an operating-system server (your network administrator can provide this information), or make sure that you have connected a CD-ROM drive to your workstation. For information on how to connect a CD-ROM drive to your workstation, see "Connecting external SCSI devices" on page 8-2.

Installing the operating system

To install the operating system, follow these steps:

1. **Go to the workstation console window.**
2. **Log in as superuser (root).**
3. **Type the following command to shut down the workstation:**

   ```
   init 0
   ```

4. **Wait for the operating system to shut down the workstation and return to the PROM monitor (ok) prompt.**
5. **If you are installing from a CD-ROM, insert the CD-ROM into the workstation's CD-ROM drive.**
6. **Boot your workstation from the network or the CD-ROM that contains the operating system.**

   To boot your workstation from the network, contact your network administrator. To boot your workstation from the CD-ROM, type the following command:

   ```
   boot cdrom
   ```

7. **Follow the installation instructions on the screen.**

8. **If you installed the new operating system by overwriting the old one, prepare the console and set up your network configuration again.**

   To prepare the console, go to Chapter 3, "Preparing the Console." Then go to one of the following chapters to set up your network configuration:

Chapter	Network configuration
Chapter 4	Direct connection
Chapter 5	Standard network connection
Chapter 6	High-performance network connection through the computer

Chapter 8
Connecting Additional Equipment

Connecting external SCSI devices

Your workstation has a SCSI port for connecting devices that use the Small Computer System Interface (SCSI). The SCSI port permits high-speed communication between the workstation and the device. The SCSI port is installed in an expansion slot in your computer, and the connector is accessible through the access port for that slot (usually on the back of the computer).

You can connect SCSI devices to the SCSI port in a chain. You plug the first device into the SCSI port, the second device into the first device, and so on. SCSI devices frequently used with the workstation include CD-ROM drives, hard drives, and tape backup drives.

You can attach up to six external SCSI devices to the SCSI port. However, if you have a second hard disk installed in the computer and connected to your workstation's SCSI chain, you can attach only five external SCSI devices to the port. All devices on the SCSI chain must have unique ID numbers.

Before you connect a device

Before you connect a SCSI device to your workstation, be sure to complete these tasks:

- Make sure each SCSI device connected to your workstation has its own, unique ID number. You can use ID numbers 1, 2, and 4 through 7. In SunOS and Solaris, the standard ID number for a CD-ROM drive is 6. See the instructions that came with each SCSI device for information on checking and setting its SCSI ID number.
- Make sure you have the appropriate cable for attaching the SCSI device to your workstation. The workstation's SCSI port uses a high-density, 50-pin SCSI connector.
- Make sure that the last device in the SCSI chain has a terminator, and that no other device on the chain has a terminator. Your workstation's logic board has a built-in terminator, and the SCSI port has a terminator that you must remove to attach the first external SCSI device.

Connecting a SCSI device

To connect a SCSI device to your workstation, use these instructions in combination with the instructions that came with your SCSI device:

1. **Turn off your computer.**

   It is very important to use the correct procedure for shutting down your workstation before turning off your computer. For details, see "Turning off the computer" on page 7-6.

2. **Make sure the SCSI device is plugged into its power source and turned off.**

3. **Use a SCSI cable to connect the device to the workstation's SCSI port or to the last device already in the chain.**

4. **Turn on all devices in your SCSI chain.**

5. **Turn on your computer and wait for the operating system to load.**

6. **Log in to your computer as the administrator, if necessary.**

7. **Go to the workstation console window.**

8. **Log in as superuser (root).**

9. **Reconfigure the workstation, if necessary, so that it recognizes the new device.**

   For example, in Solaris 2.x, you must shut down the workstation (`init 0`), wait for the PROM monitor (ok) prompt, and then boot the workstation using the `boot -r` command.

Chapter 9
Expanding the Workstation

This chapter includes instructions for expanding the workstation. Expanding the workstation includes any of the following tasks:

- replacing the workstation's hard drive
- replacing the MBus module
- adding an SBus module
- adding memory

Removing the logic unit

Before you can expand the workstation, you must remove the logic unit from the computer. To remove the logic unit from the computer, follow these steps:

1. **Turn off the computer and all attached peripherals.**

   Make sure the computer is turned off but plugged in. This protects the computer by providing a path for static to discharge to ground.

2. **Unplug all peripherals from the computer.**

3. **Remove the cover from the computer.**

   Follow the instructions that came with the computer.

4. **Touch the metal part of the power supply case inside the computer to discharge any static electricity from your clothes or body.**

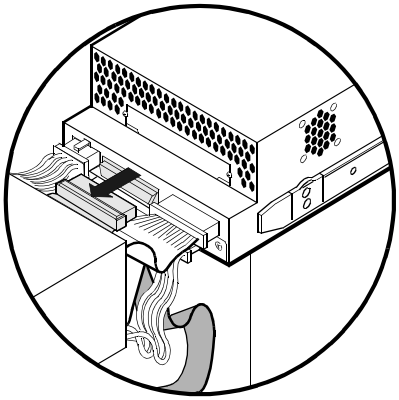
   Always do this before you touch any parts or install any components inside the computer.

5. **Unplug the computer from its power source.**

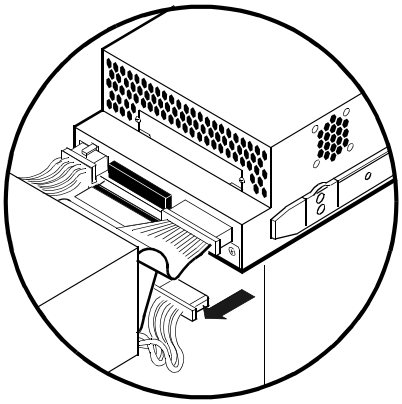
6. **Unfasten the logic unit from the drive bay.**

   Follow the instructions that came with the computer.

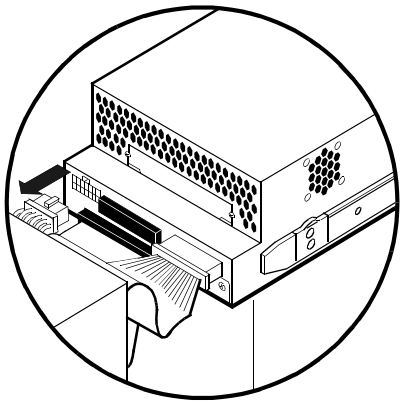
7. **Detach the I/O cable from the logic board's I/O connector on the back of the logic unit.**



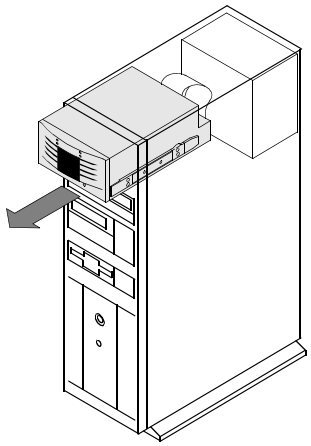
8. **Unplug the power cable from the hard disk's power socket on the back of the logic unit.**



9. **Unplug the power cable from the logic board's power socket on the back of the logic unit.**



10. **Slide the logic unit out of the drive bay.**



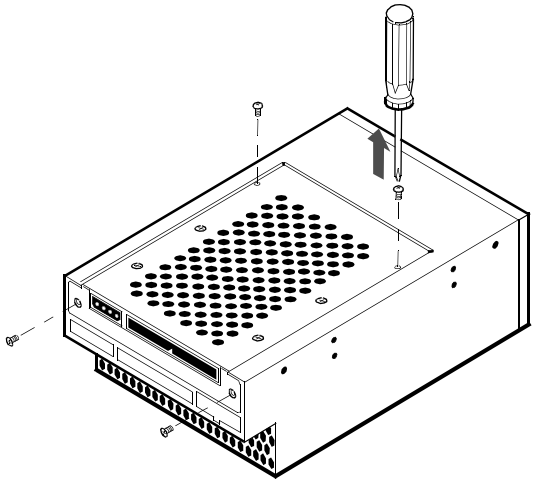
Replacing the internal hard drive

To replace the internal hard drive, follow these steps:

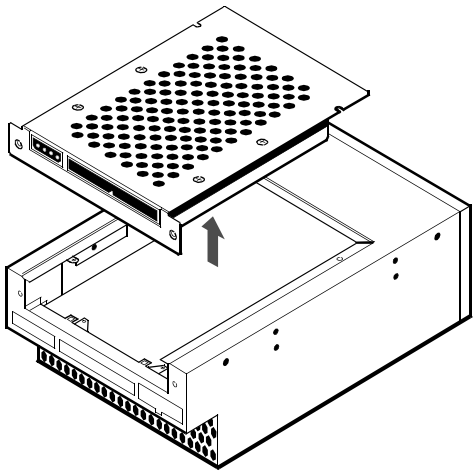
1. **Position the logic unit upside down with the back facing you.**

2. **Unfasten the hard drive assembly from the logic unit.**

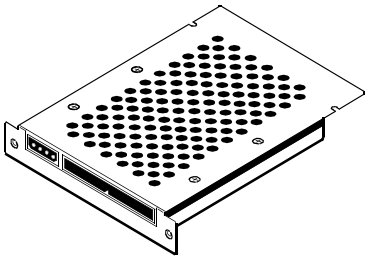
   Use a Phillips screwdriver to remove the four flat-head screws. There are two screws located in the bottom, and two screws in the back of the logic unit. Save the screws. You will use them later to install the new hard drive assembly.



3. **Lift the assembly out of the logic unit.**

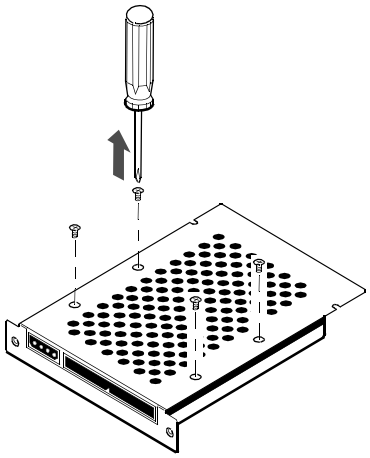


4. **Position the hard drive assembly with the bracket on top.**

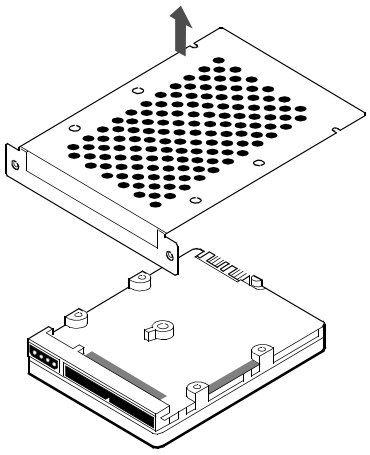


5. Unfasten the bracket from the hard drive.

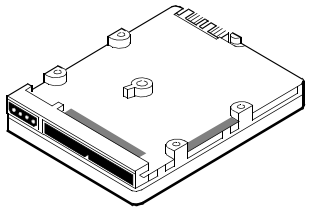
Use a Phillips screwdriver to remove the four flat-head screws from the hard drive. Save the screws. You will use them later to fasten the bracket to the new hard drive.



6. Lift the bracket and set it aside.

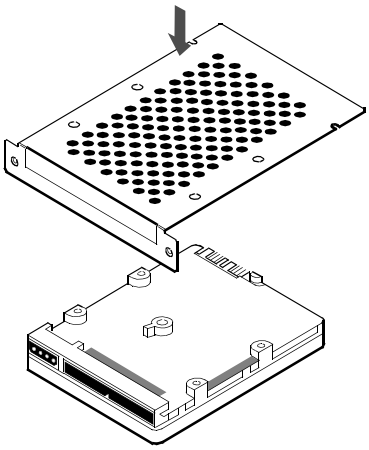


7. **Position the new hard drive upside down with the connectors facing you.**



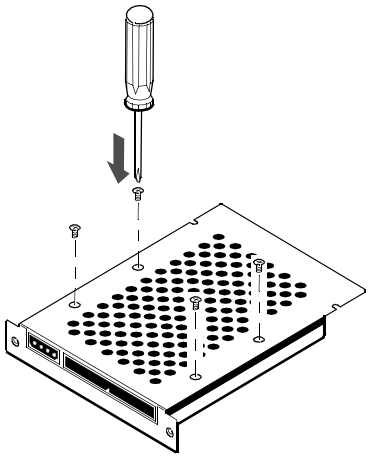
8. **Place the bracket over the new hard drive.**

   The fold in the bracket should point down, covering the connectors on the hard drive.



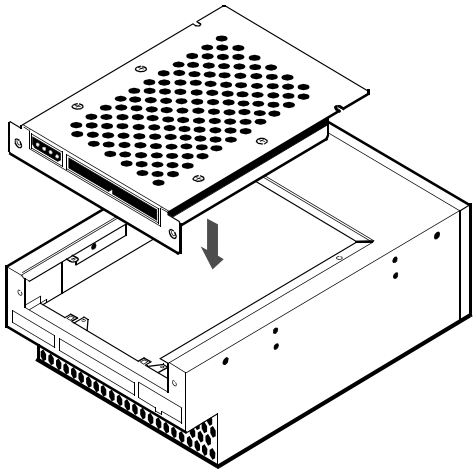
9. Fasten the bracket to the new hard drive.

Use a Phillips screwdriver to install the four flat-head screws supplied with the drive through the bracket and into the hard drive.



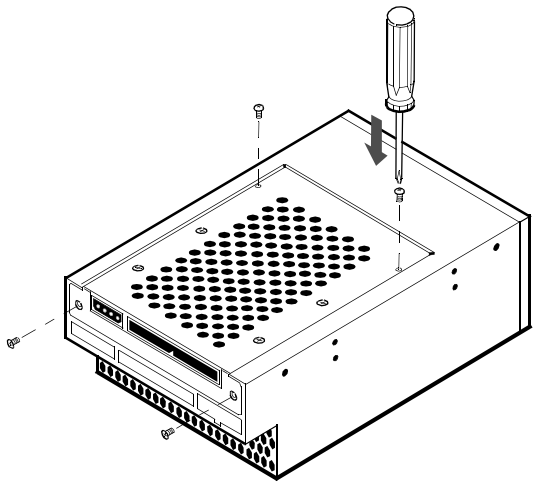
10. Place the hard drive assembly in the logic unit.

When the assembly is placed correctly, the bracket rests in the well in the bottom of the logic unit and the fold in the bracket is flush with the back of the logic unit.



11. Fasten the assembly to the logic unit.

Use a Phillips screwdriver to install the four flat-head screws. There are two screws located in the bottom, and two screws in the back of the logic unit.



Opening the logic unit

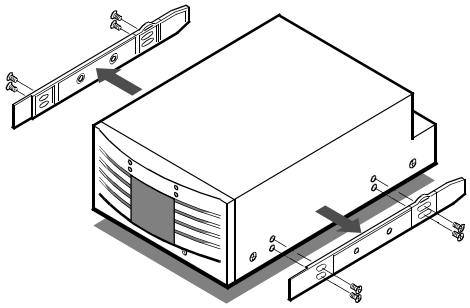
You must open the logic unit before you can perform any of the following tasks:

- replacing the MBus module
- adding an SBus module
- adding memory

To open the logic unit, follow these steps:

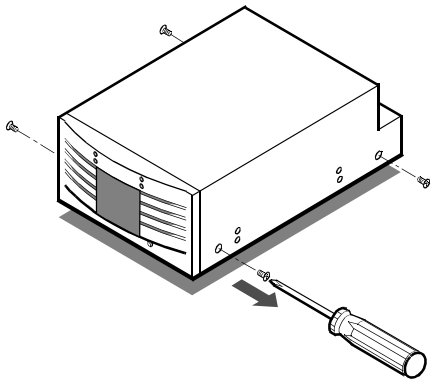
1. **Remove the mounting hardware from the logic unit.**

   Follow the instructions that came with the computer.

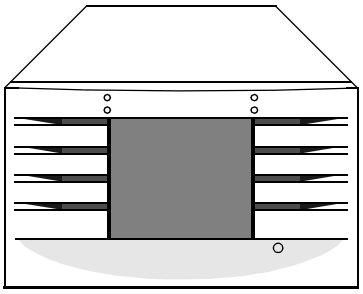


2. **Remove the four screws from the cover of the logic unit.**

   Use a Phillips screwdriver to remove the four flat-head screws.

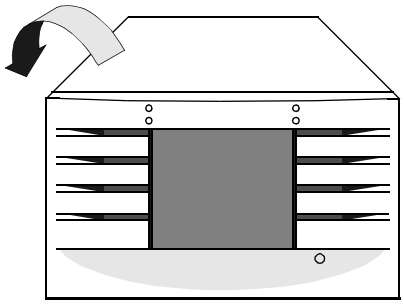


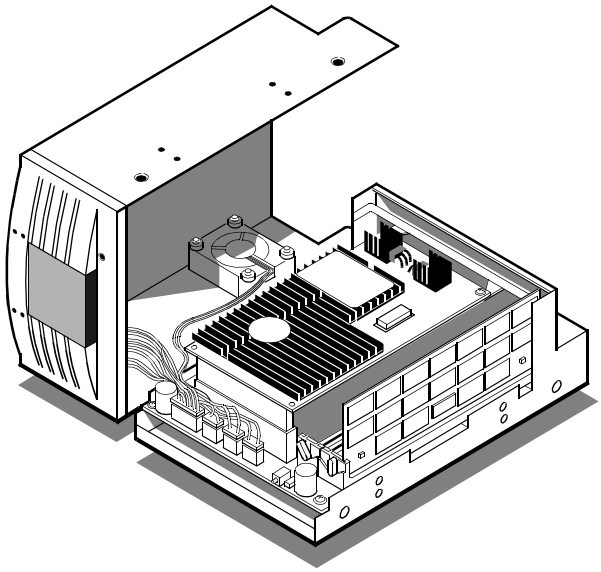
3. Position the logic unit with the front facing you.



4. Remove the cover from the logic unit.

Lift the cover until it clears the logic unit, then tilt the cover to the left and set it on its side next to the logic unit. Be careful not to disconnect the fan and LED cables from the logic board.





Replacing the MBus module

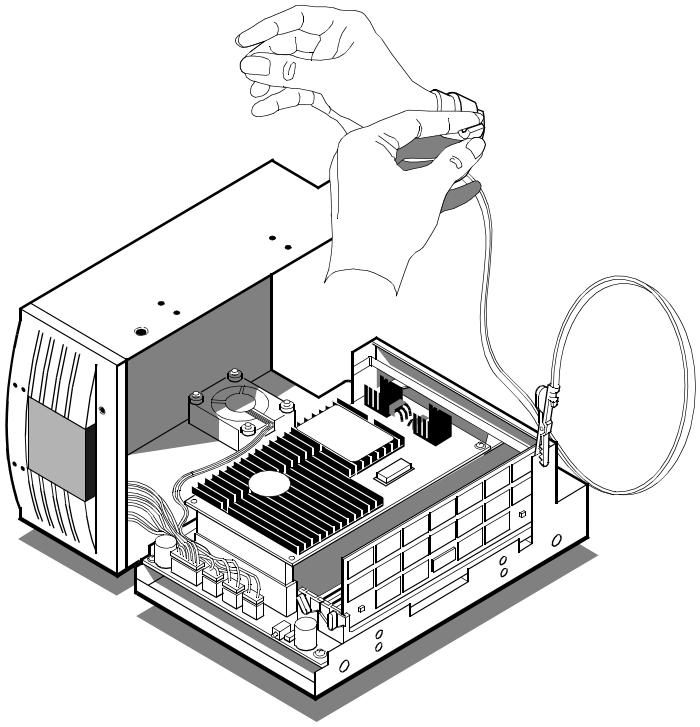
The workstation accommodates single-width MBus modules.

To replace the MBus module in the logic unit, follow these steps:

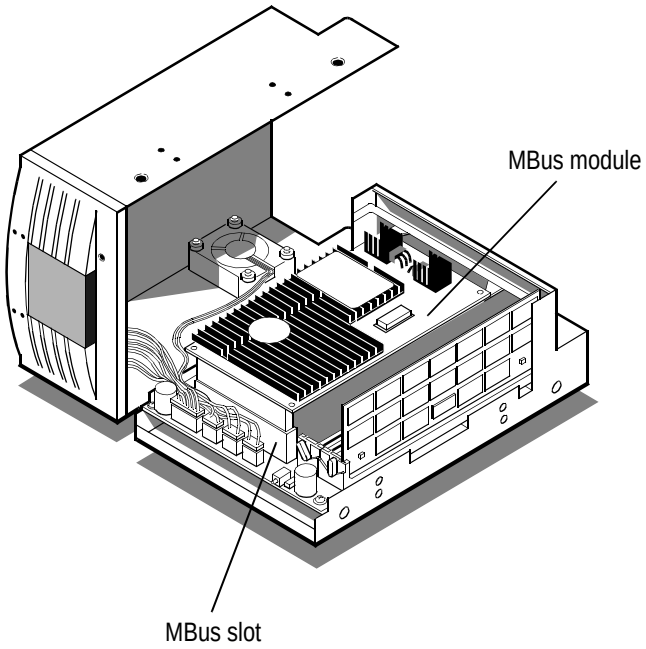
1. **Open the logic unit.**

   For details, see “Opening the logic unit” on page 9-11.

2. **Attach one end of a grounding strap to one of your wrists and the other end to the metal base of the logic unit.**

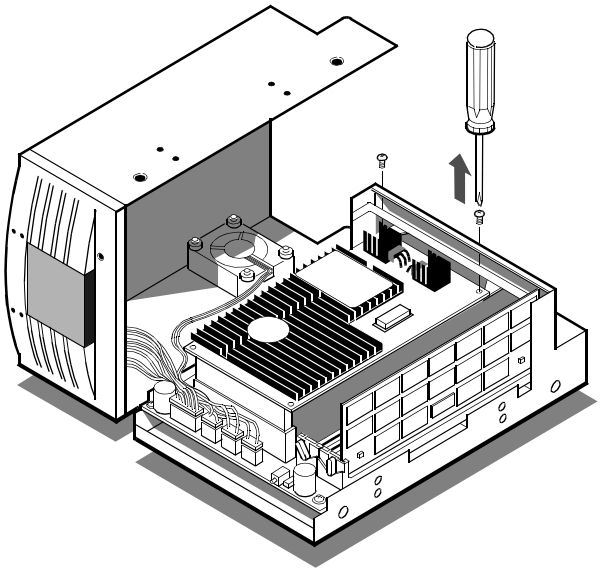


3. Locate the MBus slot on the logic board.



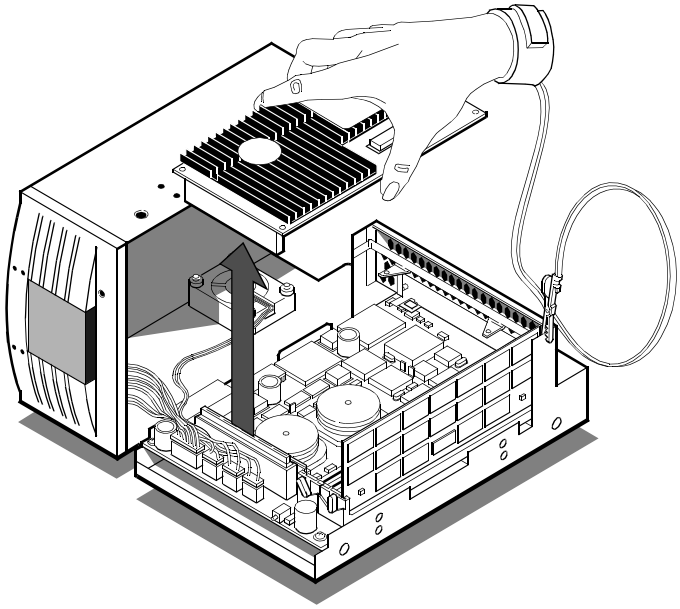
4. Unfasten the existing MBus module from the support bracket.

Use a Phillips screwdriver to remove the two screws that hold the module to the bracket. Save the screws. You'll use them later to fasten the new MBus module to the bracket.



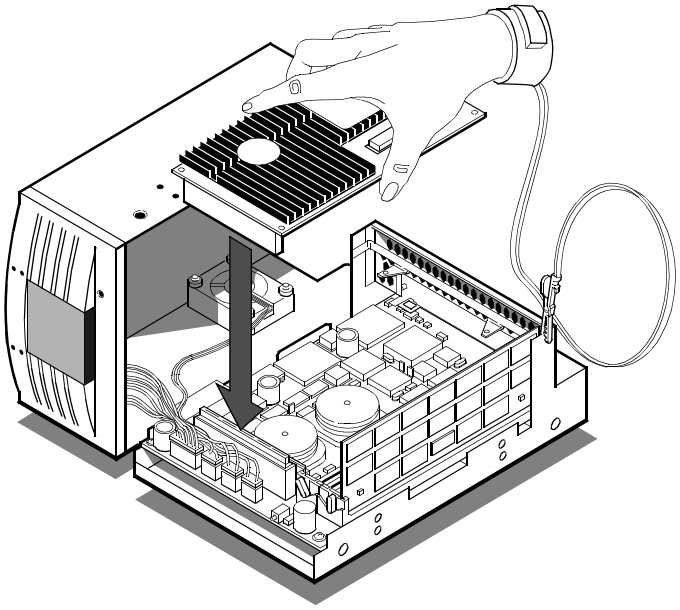
5. Remove the MBus module from the MBus slot.

Hold the module by its edges and lift it straight up.

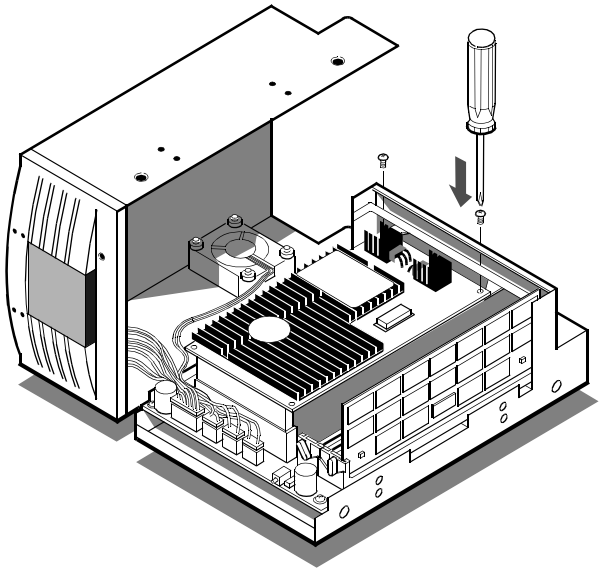


6. Insert the connector on the new MBus module into the MBus slot.

Handle the module by its edges only.



7. **Fasten the other end of the new MBus module to the support bracket.**



Adding an SBus module

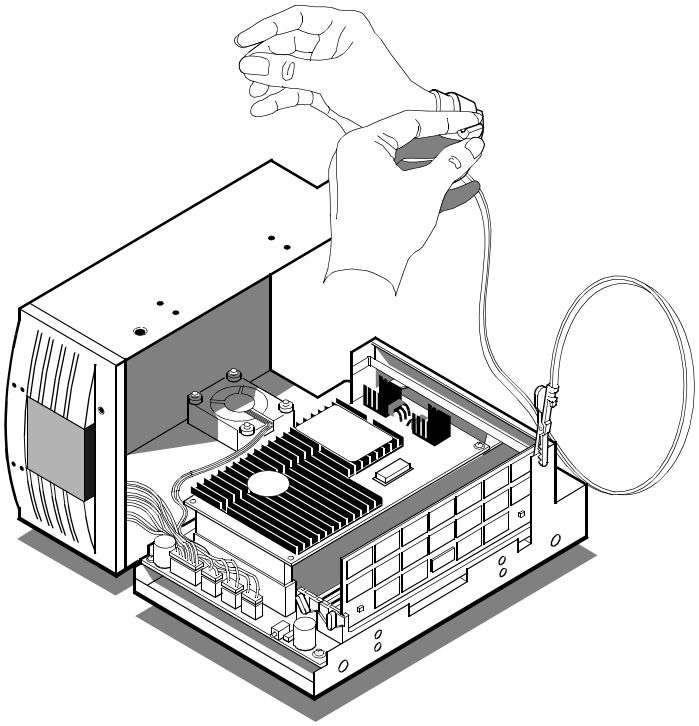
The workstation accommodates single-width SBus modules.

To add an SBus module to the logic unit, follow these steps:

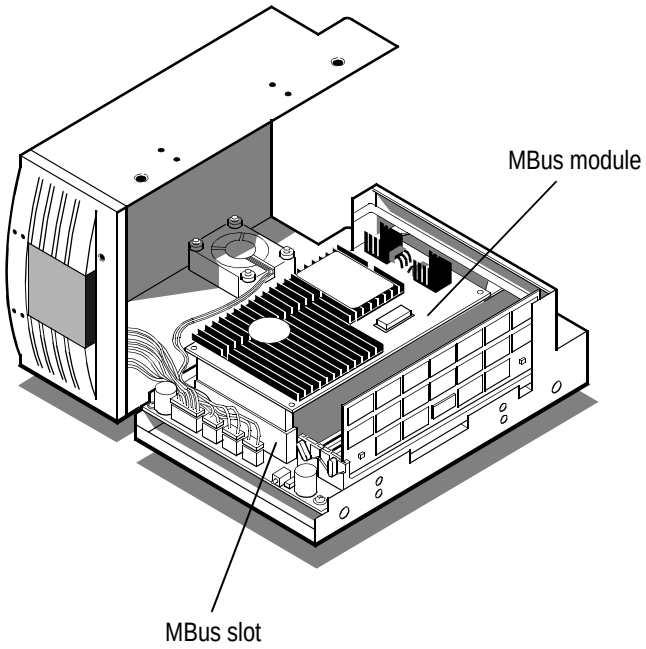
1. **Open the logic unit.**

   For details, see “Opening the logic unit” on page 9-11.

2. Attach one end of a grounding strap to one of your wrists and the other end to the metal base of the logic unit.

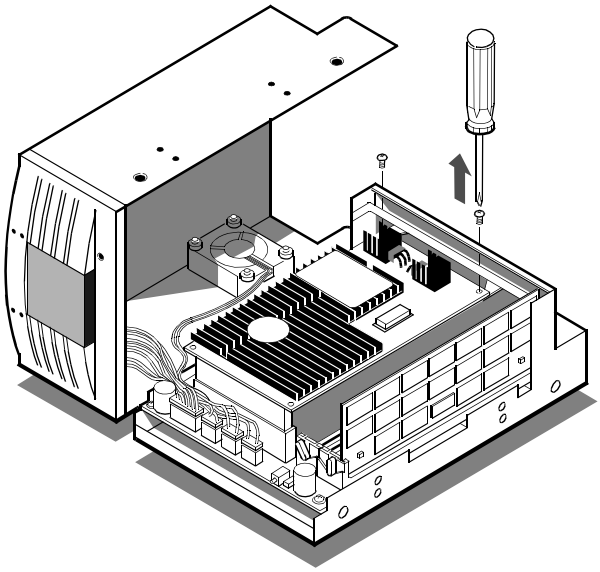


3. Locate the MBus slot on the logic board.



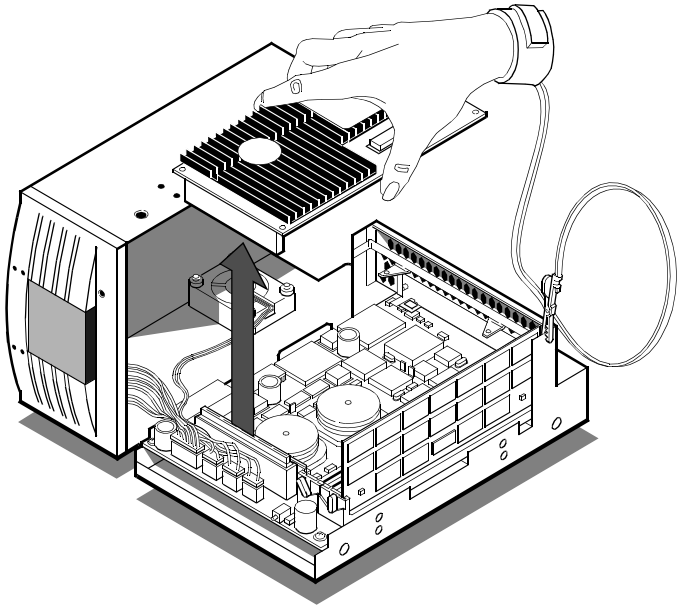
4. Unfasten the MBus module from the support bracket.

Use a Phillips screwdriver to remove the two screws that hold the module to the bracket. Save the screws. You'll use them later to fasten the MBus module to the bracket.



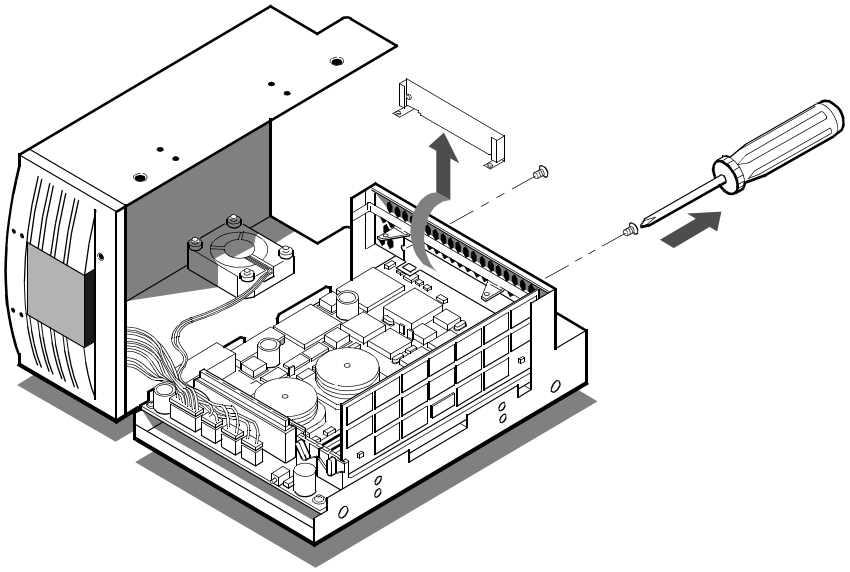
5. Remove the MBus module from the MBus slot.

Hold the module by its edges and lift it straight up.



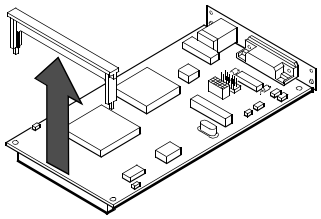
6. Remove the cover from the SBus slot's access port.

Save the screws. You'll use them later to secure the SBus module in the access port.

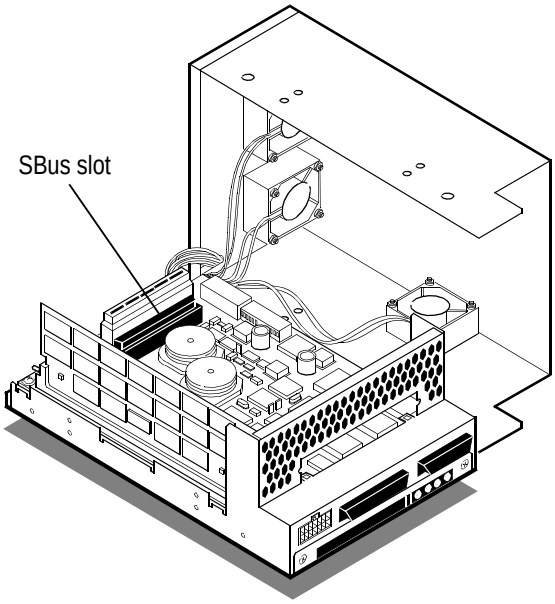


7. Remove the retainer clip from the SBus module.

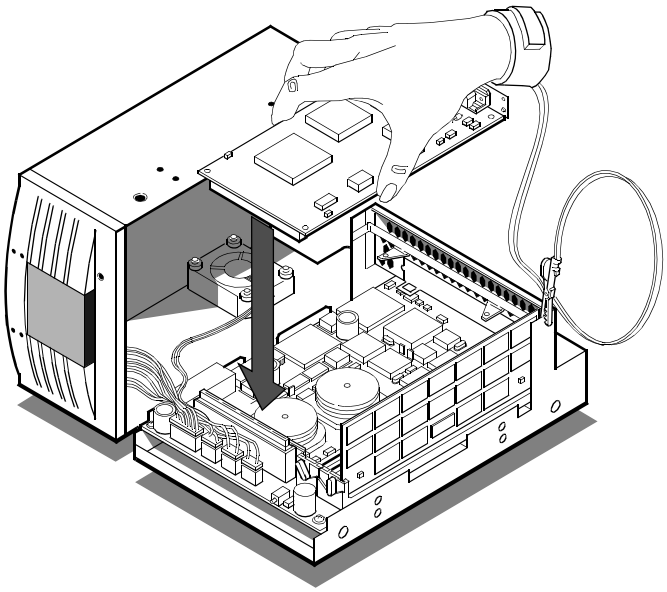
Follow the instructions that came with the module.



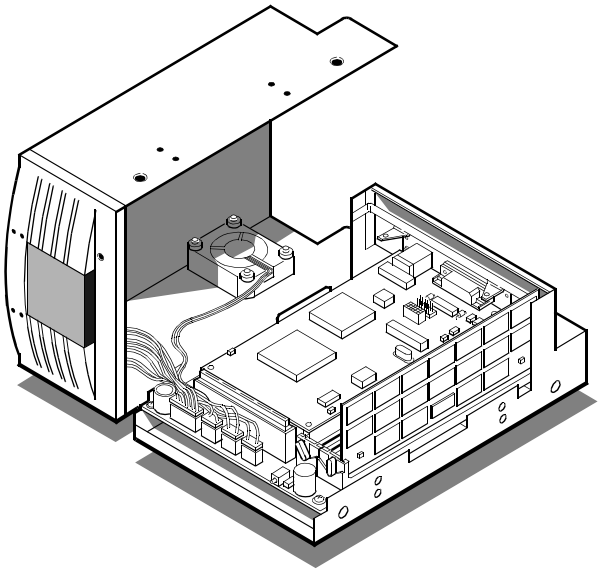
8. Locate the SBus slot on the logic board.



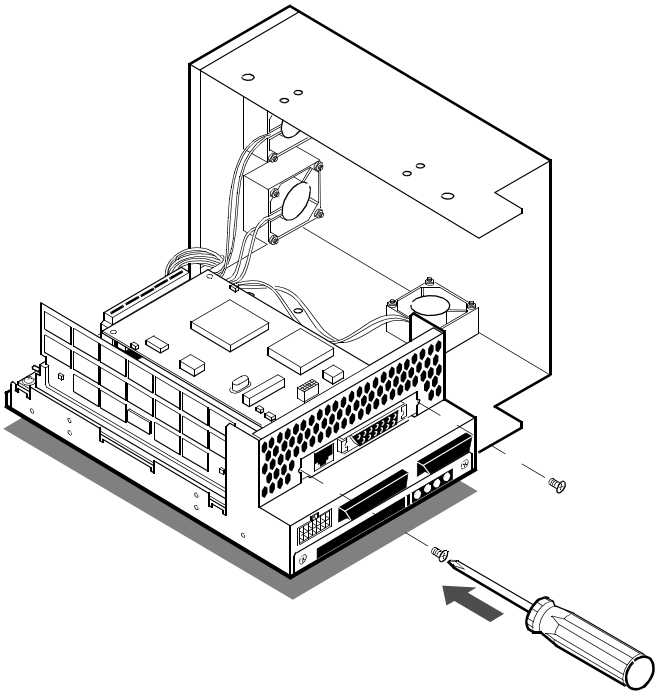
9. Insert the connector on the SBus module into the SBus slot.



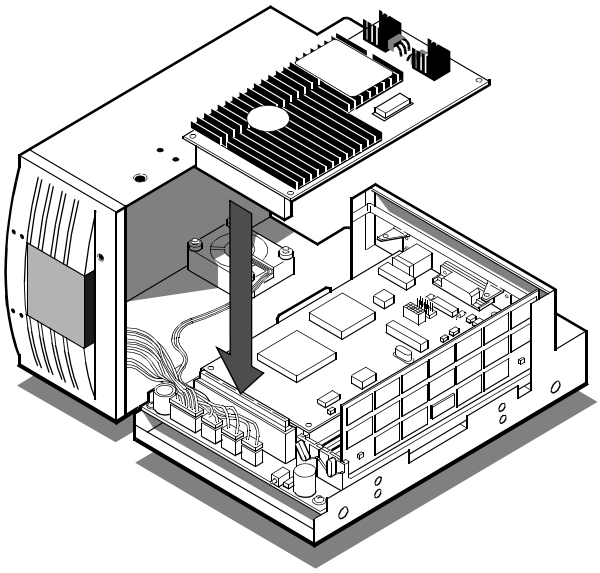
10. Rest the other end of the SBus module in the support bracket.



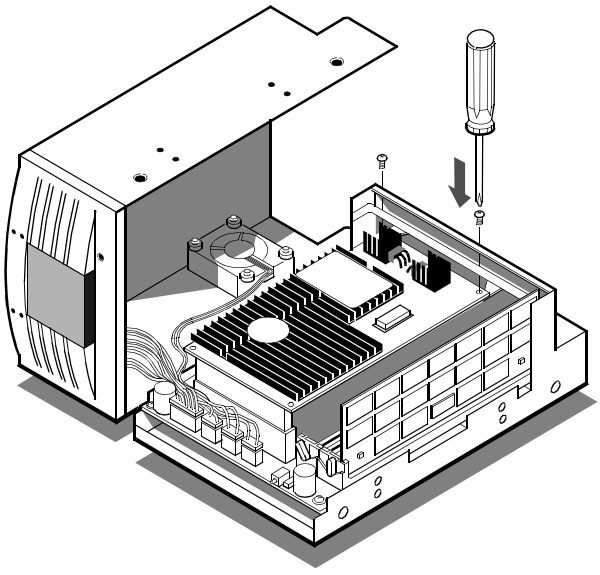
11. Secure the SBus module to the back of the logic unit.



12. Reinsert the connector on the MBus module into the MBus slot.



13. Fasten the other end of the MBus module to the support bracket.



Increasing the workstation memory

Memory restrictions

Your SPARCplug accommodates the following types and sizes of memory:

- 16-, 32-, and 64-Mbyte DIMMs
- A maximum of 256 Mbyte of RAM
- A combination of fast-page-mode and extended-data-out (EDO) DRAM DIMMs
- 2-K refresh only

Memory installation guidelines

Follow these guidelines to prevent damage to the DIMMs and logic board:

- Ensure that the DIMM is facing the correct direction.
- Fill the DRAM DIMM slots in the following order:
  - Slot 0 (outermost slot)
  - Slot 1
  - Slot 2
  - Slot 3

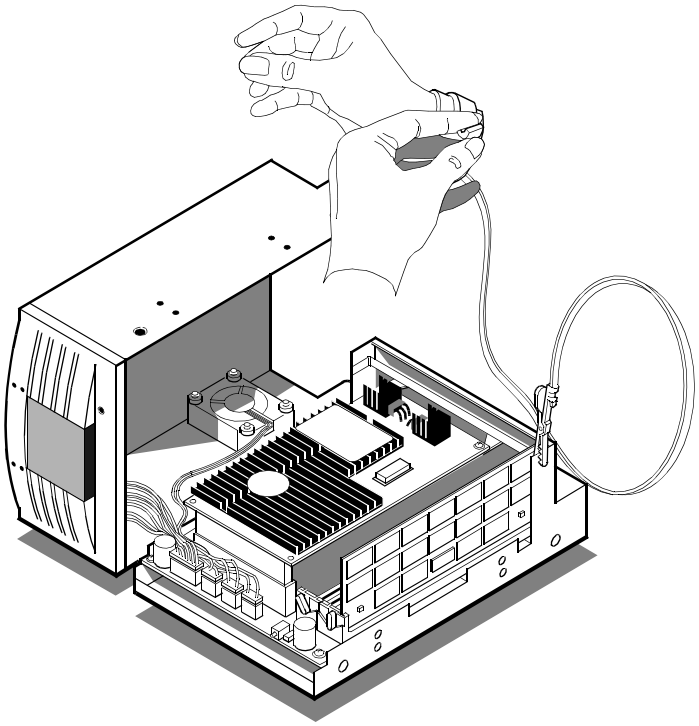
Installing memory

To install memory in the logic unit, follow these steps:

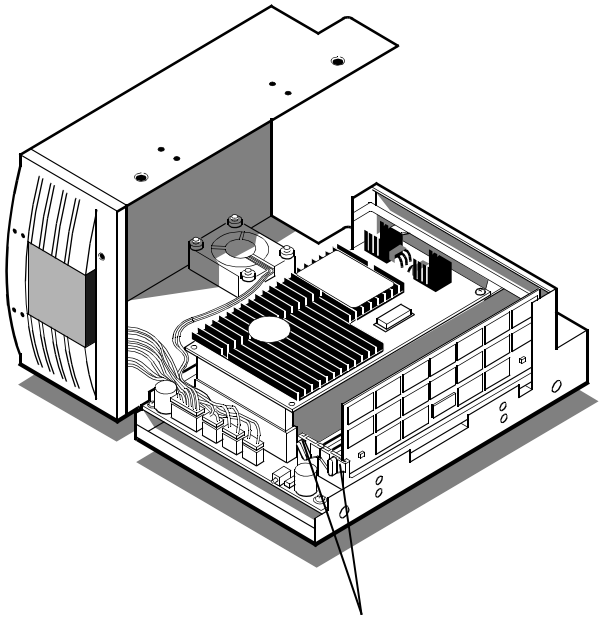
1. **Open the logic unit.**

   For details, see “Opening the logic unit” on page 9-11.

2. Attach one end of a grounding strap to one of your wrists and the other end to the metal base of the logic unit.

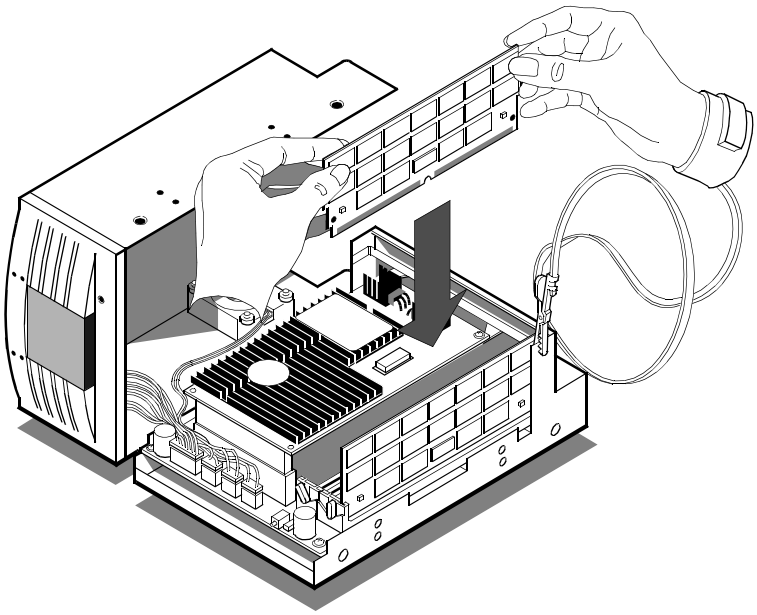


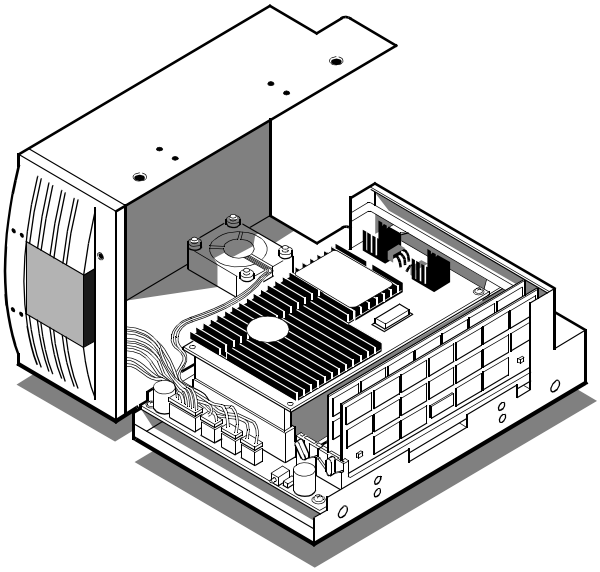
3. Locate the DRAM DIMM slots on the logic board.



4. Insert the connector on the DIMM into the DRAM DIMM slot.

– Align the connector with the slot. Then press firmly on the DIMM until the connector is completely inserted.



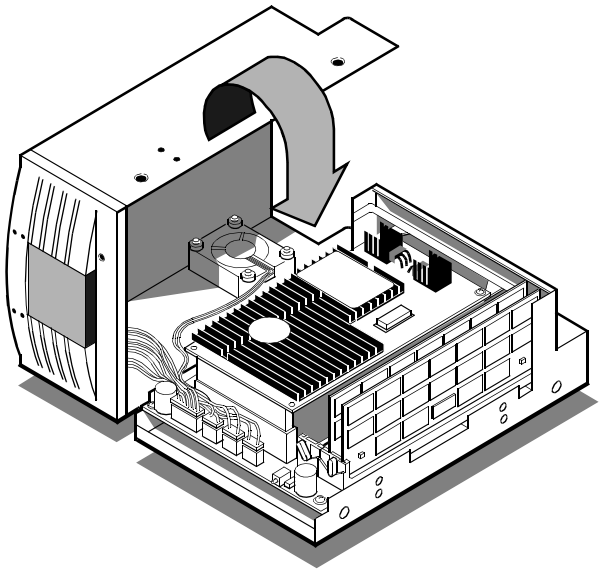


Closing the logic unit

To close the logic unit, follow these steps:

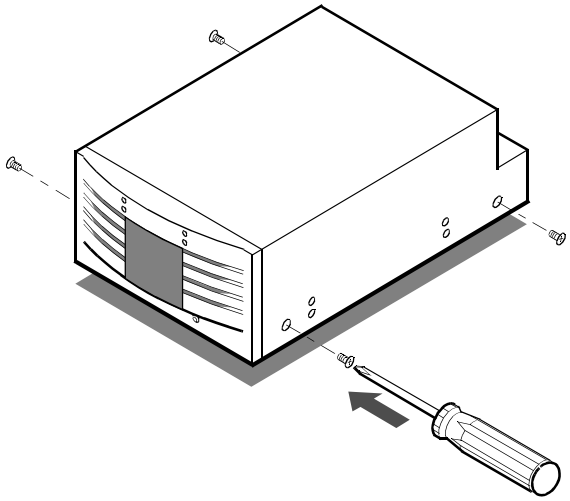
1. **Replace the cover on the logic unit.**

   Lift the cover until it clears the logic unit, then lower the cover onto the logic unit. Be careful not to disconnect or crimp the fan and LED cables.

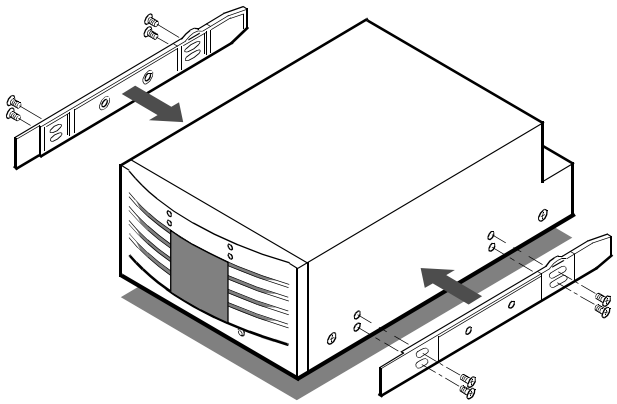


2. Install the four screws.

Use a Phillips screwdriver to install the four flat-head screws.



3. Reinstall the mounting hardware.



Appendix A
Resources

Overview

As you set up and use the SPARCplug, you can utilize many sources for help. In addition to this manual, ROSS offers technical support and other resources designed to help you use the workstation as effectively as possible. You also may want to know about other ROSS products that were designed to work with the SPARCplug.

Obtaining technical support

ROSS Technology provides free technical support for ROSS products. When you need support, you can telephone or send electronic mail to ROSS Technical Support.

To telephone ROSS Technical Support

ROSS Technical Support is available Monday through Friday from 8 AM to 7 PM Central time.

- In the United States or Canada, call (800) ROSS-YES.
- Outside the United States and Canada, call (512) 436-2061.

To send electronic mail

You can reach ROSS Technical Support via electronic mail.

- Send Internet electronic mail to **techsupport@ross.com**.

Ordering ROSS products

ROSS Technology offers SPARC workstations and upgrade products, SPARC components that other companies use in the products they design, and related publications.

To order ROSS publications

ROSS Technology offers marketing literature and product documentation to help you evaluate and use its products. ROSS publications are available directly from ROSS Technology. Representatives are available to accept your order Monday through Friday from 8 AM to 5 PM Central time.

- In the United States or Canada, call (800) ROSS-YES.
- Outside the United States and Canada, call (512) 349-3108.

To order ROSS OEM components

ROSS Technology supplies SPARC components, such as integrated circuits and processor modules, to original-equipment manufacturers (OEMs)—companies that design their own products—through ROSS Direct Sales and independent sales offices. A Direct Sales representative can direct you to your nearest sales office or can accept your order directly.

- In the United States and Canada, call (512) 436-2557.
  ROSS Direct Sales is available Monday through Friday from 8 AM to 5 PM Central time.
- In Europe, call +32 2 652 1014.

To order ROSS workstations and upgrade products

ROSS workstations and upgrade products are available through value-added resellers (VARs). A ROSS Customer Relations representative can direct you to your nearest ROSS reseller. ROSS Customer Relations is available Monday through Friday from 8 AM to 5 PM Central time.

- In the United States or Canada, call (800) ROSS-YES.
- Outside the United States and Canada, call (512) 349-3108.

Obtaining information on ROSS products and services

ROSS Technology provides information on ROSS products and services via marketing literature, a World Wide Web site, and electronic mail. For information on ordering ROSS marketing literature, see “To order ROSS publications” on page A-3.

To reach ROSS on the World Wide Web

ROSS Technology maintains a World Wide Web site on the Internet that allows you to read and download information on ROSS products and services.

- Using your World Wide Web browser, open the following uniform resource locator (URL) site:
  http://www.ross.com

To request information via electronic mail

You can request information on ROSS Technology or any of our products via electronic mail.

- Send Internet electronic mail to **ross_info@ross.com**.
  Be sure to include your E-mail address, your mailing address, and a brief description of the type of information you would like to receive.

Appendix B
Specifications

Power

Power requirements

Voltage	+5 V DC ± (5%)
	+12 V DC ± (5%)
	–12 V DC ± (5%)

Power consumption (maximum)

+5 V DC	15 A
+12 V DC	1 A
–12 V DC	–0.25 A