SPARC Workstation-20Light

SPARC Workstation-20I

WS-20L, WS-20I
Installation and User Guide

Table of Contents

Safety Agency Compliance

This preface describes safety precautions to follow when installing your system.

For system safety, observe the following precautions when setting up your equipment:

- Follow all warning and instructions marked on the equipment and in this manual.
- Be sure the voltage and frequency of your power matches what is inscribed on the equipment's electrical rating label.
- Do not insert objects of any type through the openings in the equipment. Dangerous voltage may be present. Electric shock or damage to your equipment could result from the short circuit inducted by foreign objects.

Product Placement

It is important to follow the instructions on product placement as outlined in Chapter 1.

Openings in the equipment should not be blocked, or there may be reliability problems with your WS-20L, WS-20I. A system product should never be placed near a radiator or heat register.

Power Cord Connection

WS-20L, WS-20I product is designed to work with single-phase power systems having a grounded neutral conductor. Do not plug your WS-20L, WS-20I into any other type of power system or electrical shock may result. If you are unsure of the type of power supplied to your building, contact a qualified electrician or your facilities manager.

All power cords do not have the same current ratings. Household extension cords are not meant to be used with your WS-20L, WS-20I equipment because they do not have sufficient current ratings. Therefore, do not use household extension cords.

WS-20L, WS-20I is shipped with grounding-type power cords. Always plug the cord into the grounded power outlet to reduce the risk of electric shock.

Lithium Battery

The lithium battery found on the main logic board is not customer replaceable. Do not disassemble or attempt to recharge it.

System Unit Cover

In order to add memory, boards, cards or internal storage devices, you must remove the system unit cover. Be sure to replace the cover before powering on your system unit.

It is not safe to operate the WS-20L, WS-20I without the system unit cover in place. Failure to comply with this precaution can result in personal injury and system damage.

Manual Preface

WS-20L, WS-20I Installation and User Guide provides instructions for installing and using the WS-20 and WS-20I. The guide is divided into two parts, part 1 describes the installation of the system and part 2 gives useful guidelines for operating the system, part 3 describes the installation of memory modules and new CPU modules.

If not otherwise specified, WS-20Light is identical to WS-20I.

Chapter Descriptions

This manual contains the following chapters:

Chapter	Description
Manual Preface	Lists the required tools and documentation for installing the WS-20 system. It also describes how to use this book.
Part 1: Installation Guide	
Chapter 1: WS-20 Installation Overview	Gives an overview of the WS-20 system, safety information and environment concerns, and how to unpack the system. It also includes a task map of steps required to completely set up the system.
Chapter 2: Installing the WS-20 Hardware	Provides instructions for setting up the standard WS-20 hardware.
Chapter 3: Powering On the WS-20	Gives the initial power-on instructions and explains what you will need to have ready to configure the system.
Chapter 4: Installing External Devices	Describes the I/O ports on the rear panel and how to connect external devices

Chapter	Description
Part 2: User Guide	
Chapter 5: Using Diskettes	Explains how to handle and use diskettes with the floppy disk drive.
Chapter 6: Using CD-ROM	Explains how to handle and use the CD-ROM drive.
Chapter 7: Powering Off the System	Describes what to do before turning power off.
Chapter 8: Opening/ Closing the System Unit	Describes how to open the chassis, where to find useful jumpers.
Part 3: Internal Options	
Chapter 9 Installing Memory Modules and SX Graphics Module	Describes how to change memory modules. Describes how to install SX Graphic modules.
Chapter 10: Changing or Adding CPU MBus Modules	Describes the installation of CPU MBus modules
Chapter 11: Changing the Serial Port Jumpers	Describes how to change serial port jumpers.
Appendixes:	
Appendix A: Configuring System Software for a Terminal	Gives the settings and instructions for configuring a terminal for the system.

Manual Audience

This manual is intended for all levels of users. You should be familiar with the parts of the computer system and basic computer terminology. Installing the WS-20 system will require you to install the workstation hardware and configure the system software.

Related Software

Other manuals that may be required for reference include:

- *Getting Started with Solaris*
- *Solaris Open Window Installation and Start-Up Guide*
- Installation guides for peripheral devices connected to your system

Differences Workstation 20Light and 20I

The only difference between Workstation 20Light and 20I is the usage of SX Graphics modules.

On Workstation 20Light, no SX graphics moduls can be used. Only standard SBus graphics boards like GX, TGX or ZX can be used.

On Workstation 20I SX graphics modules as well as standard SBus graphics moduls can be used.

SX graphic moduls is a 24bit true color module plugged in instead of a DRAM SIMM module and does not occupy a SBus slot.

SX moduls are specificly designed for image processing.

The expression WS20 is used for 20Light and 20I. As long as not otherwise mentioned there is no difference between the two modells.

How to Use This Book

This guide gives instructions for installing the standard system and describes peripheral device ports on the rear panel. You should refer to the peripheral device manuals for specific installation instructions. If you will be adding internal options, refer to part 3 of this manual for installation instructions.

The installation task map in "Installing the WS-20 Hardware" guides you through the complete sequence of installation steps. It may be helpful to read all the chapters in order before you begin to follow specific instructions.

It is essential that your read and understand the safety precautions and "Safety Agency Compliance". These safety precautions and instructions explain how to work safely with the components of your system.

In addition to the manuals listed above, each chapter includes a section entitled "Tools Required" that lists what tools you will need for the procedures it contains.

Notes, Cautions and, Warnings

The notes, cautions, and warnings notify you of situations where special attention is required to prevent damage to the equipment or to avoid personal injury.

NOTE: **Notes are used to provide additional information or to emphasize important information.**

CAUTION: **Cautions explain situations where damage to the equipment or personal injury could result.**

WARNING: **Warnings indicate that hazardous voltages are present and that there is a risk of electric shock.**

Need More Information? **Refers you to other sections of this guide or to other documents for more information.**

Typographic Conventions

This book uses the following typographic conventions:

- *This font* is used for titles of books or to give special emphasis to key words. For example:
  Refer to *Getting Started with Solaris* for more information.
- This font indicates system messages that display on the screen or command names. For example:
  Configuration successfully completed.
  Log in as root.
- **This font** shows what you should type. For example:
  type: **/bin/su <RETURN>**
- Bracketed text indicates a key to press. For example:
  <RETURN>

Part 1

Installation Guide

Chapter 1

WS-20 Installation Overview

This chapter will prepare you for installing the WS-20. The installation task map in this chapter gives an overview of steps required to set up your complete system. This chapter also includes information on selecting a suitable location for your workstation.

System Overview

The WS-20 is a high-performance workstation, based on SuperSPARC™ MBus and multimedia technology, and is fully compatible with the SPARCstation™20. The standard WS-20 includes:

- One or two MBus SuperSPARC™ or HyperSPARC™ CPU modules
- 32 Mbytes of standard memory that can be expanded to 512 MBytes with 16 Mbytes or 64 MBytes DSIMM modules, to 448 Mbytes for the WS-20I if the SX modul ist used.
- Color monitor and SBus frame buffer board
- Keyboard and 3-button mechanical mouse
- An internal hard disk drive with Solaris operating system preinstalled
- Optional internal 3.5-inch floppy disk drive and/or internal CD-ROM drive
- Two serial ports and a Centronics-compatible parallel port
- Four SBus expansion slots (one may be used for the frame buffer)
- ISDN dual basic-rate interface
- Cables and power cords and Hardware Documentation
- Solaris documentation with CD-ROM and Desktop license

NOTE: **Do not reformat the hard disk drive. Reformating will remove the Solaris operating system that is already installed on your system.**

Safety Information

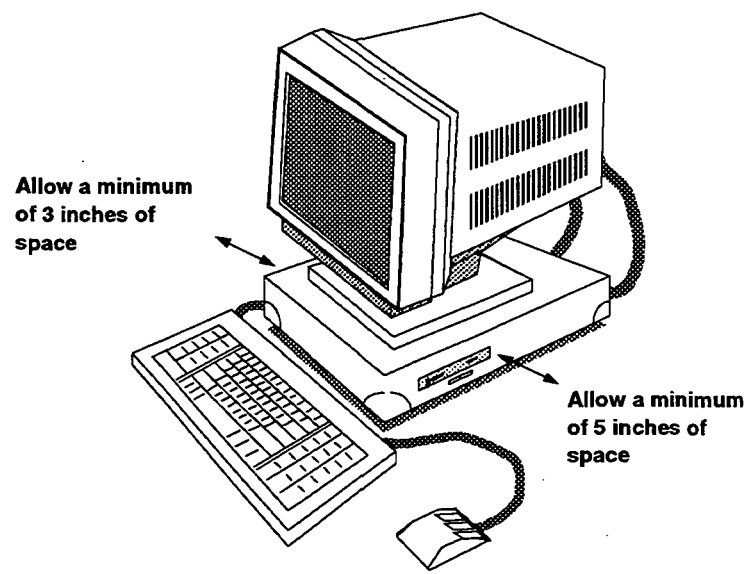
For your protection, observe the safety precautions given in the preface, "Safety Agency Compliance" when setting up your equipment.

Planning the Workstation Site

Space Requirements

When selecting a location for your workstation, be sure to allow space for the system unit, keyboard and mouse, and any external devices to be installed. The WS-20 system unit has vents on the left and right panel that require a minimum of 3 inches of unobstructed space for airflow. The system unit also has a floppy disk drive that requires space to insert and remove diskettes.

Figure 1
Placing the Workstation



Power Outlets

The workstation site must also provide access to enough power outlets for the system unit, and any external devices, such as printers, disk or tape drives, that you install with your system. See "Cable Requirements" later in this chapter for more information.

Network and Standalone?

There are two ways to set up the WS-20: *networked*, where two or more systems communicate and share software and files with other systems, or *standalone*, a single system with its own software and files.

Setting up a system on the network requires assistance from your system administrator. For network use, an Ethernet tap must be installed at your site, and you must have a transceiver cable to connect your system to the Ethernet tap. The Ethernet tap is set either in the wall or the floor, or it is descend from the ceiling. The procedure you follow depends on how you plan to use the system. There are three ways a system in a network can be set up:

- Networked System: As part of a network, your system is one of multiple workstations communicating and sharing resources like data, files, and printers. For this installation, the system administrator must prepare the network to accept a new system by first setting up the system information on the server.
- Server: This is a system that provides basic services to other systems on the network. It must be the first system set up on a new network.
- Client: These are all systems installed after the master server.

Need More Information?

For more information about networks and installing systems in a network, see *Getting Started with Solaris*.

Environmental Concerns

The WS-20 electronics require a dust-free, well-ventilated or air-conditioned work environment to run properly. Acceptable environmental conditions are listed in Table 1.

Table 1 **Environmental Specifications**

Specification	Range
Temperature	0 and 35 degrees Celsius
Humidity	5% to 80% relative noncondensing
Altitude	0 to 3,000 m above sea level

Power Requirements

The WS-20 and related equipment use nominal input voltages of 115 VAC or 230 VAC. These products are designed to work with single-phase power systems that have a grounded conductor.

The WS-20 system unit contains a self-selecting power supply that senses the input voltage and selects the appropriate voltage setting automatically. Other components, such as the monitor and/or disk or tape drives, may require that a switch be set to the correct voltage setting.

Contact a qualified electrican or facilities manager if you are not sure what type of power is supplied to your building.

Cable Requirements

Appropriate cables must be used to ensure safety and a high level of performance. Cables supplied with your equipment meet the needs of most installations. Some of the cables are specific lengths to conform with engineering and safety standards. Using other cables can be hazardous and can degrade system performance.

If your find the cables supplied with your workstation are too short for your installation, ask your sales representative about the availability of alternate cables.

WARNING: **Do not use household extension cords with the WS-20 system or related equipment. Household extension cords do not have the same current ratings or overload protection, and are not meant for use with computer equipment.**

Unpacking the Equipment

If the shipping cartons or equipment were damaged, notify the shipping company representative and save the shipping cartons for inspection.

CAUTION: **Use care when unpacking the system unit and monitor. They are packed tightly in protective foam molds and are quite heavy.**

Save the shipping cartons and packing material in case you need to ship the workstation in the future.

Description of Delivered Cables

Standard Cables

Each WS-20 system unit comes with the cables shown in Figures 2 to 4.

Figure 2a
Power Cable for Workstation-20

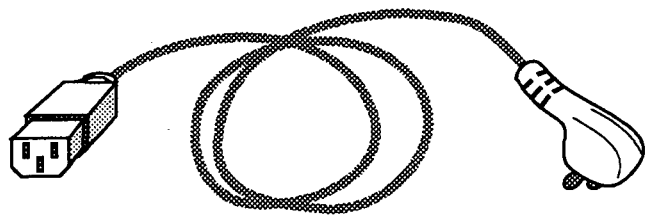


Figure 2b
Power Cable for Monitor

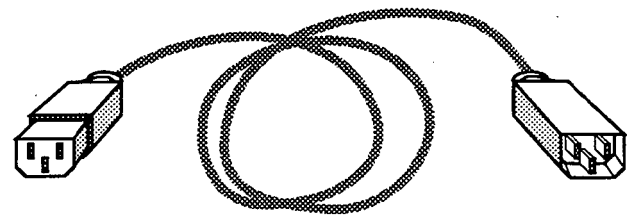


Figure 3
Keyboard Cable

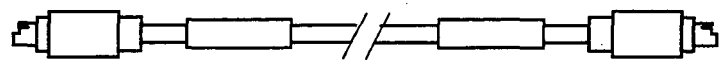
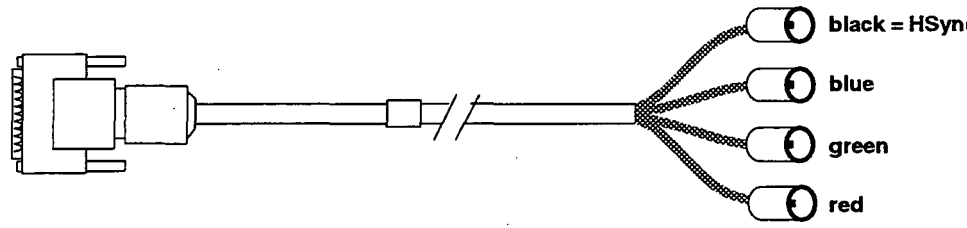


Figure 4
Video Cable



NOTE: **Some of the cables shipped with your system have plastic caps to protect the connectors. Remove the protective caps before using the cables.**

Optional (Extra) Cables

The cables shown in Figures 5 to 10 do not come packed with your WS-20 system, and must be ordered separately for use with peripheral devices (for example, printers and external disk drives) and networks (for example, thick Ethernet) that require them.

Figure 5
Twisted-Pair Ethernet Cable

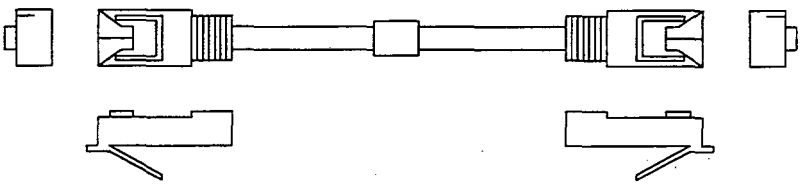


Figure 6
Parallel Interface Cable ,
IBM Interface

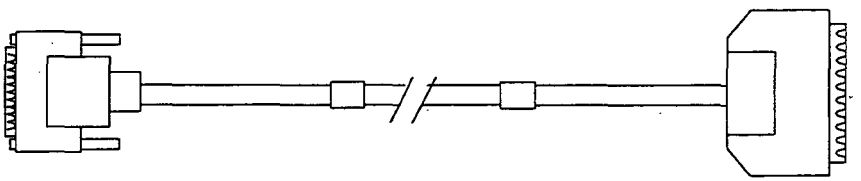


Figure 7
Parallel Interface Cable,
Centronics™ Interface

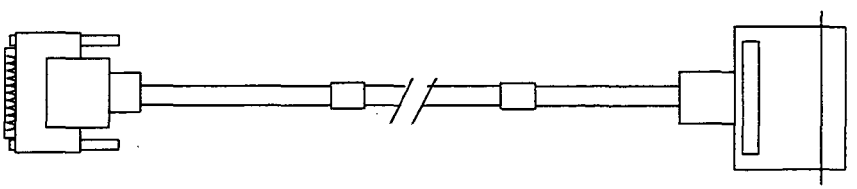


Figure 8
Small Computer System Interface (SCSI) Cable High Density to Centronics

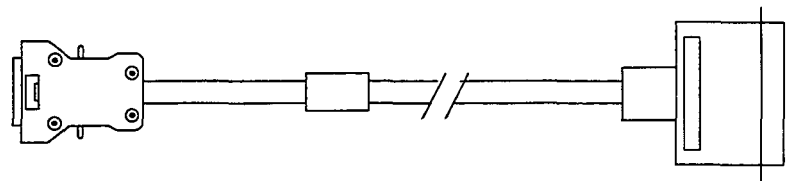


Figure 9
Attachment Unit Interface (AUI) and Audio Adapter Cable

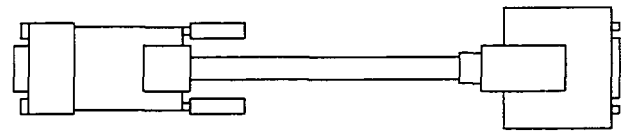
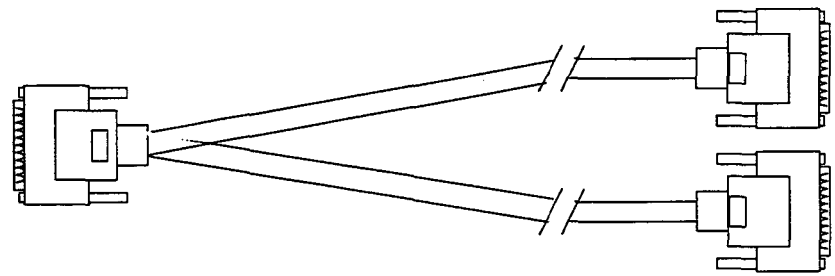


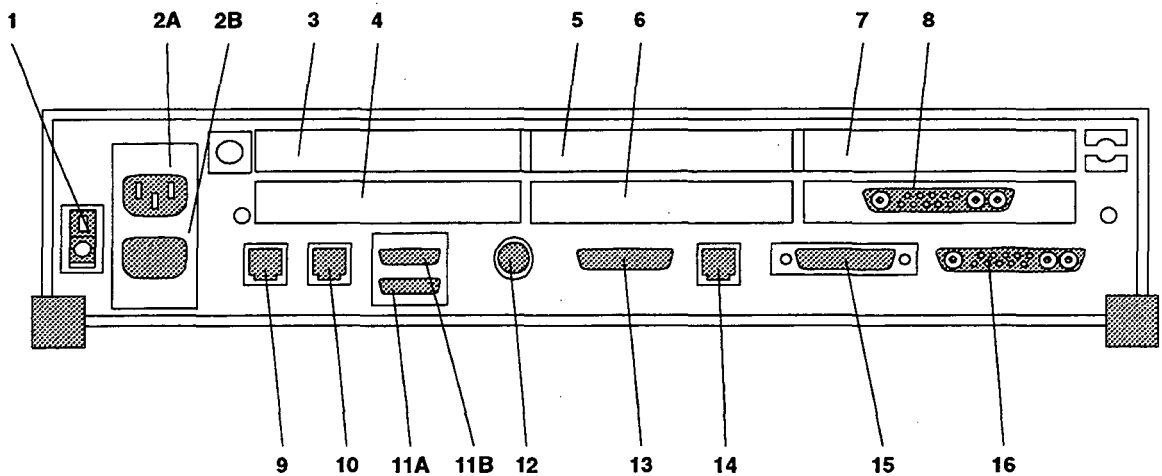
Figure 10
Serial Interface Y-Cable (Split Cable)



Back Panel

The back panel has a power switch, a power receptable, connector openings, and ports. These are shown in the following figure to help you to locate them as you connect the rest of the system.

Figure 11
Back Panel



Legend:

1	AC On/Off switch	6	SBus (Slot 0)	11B	Parallel port
2A	AC power receptacle	7	SBus (Slot 3)	12	Keyboard port
2B	AC power outlet	8	13W3 video connector (SBus Slot 2)	13	Serial connector
3	MBus filler panel (Slot 1)	9	ISDN port	14	Twisted-pair Ethernet connector
4	Mbus filler panel (Slot 0)	10	ISDN port	15	SCSI port
5	SBus(Slot 1)	11A	AUI/Audio port	16	13W3 video connector for SX module

Installation Task Map

The standard system installation consists of:

Setting up the standard system hardware

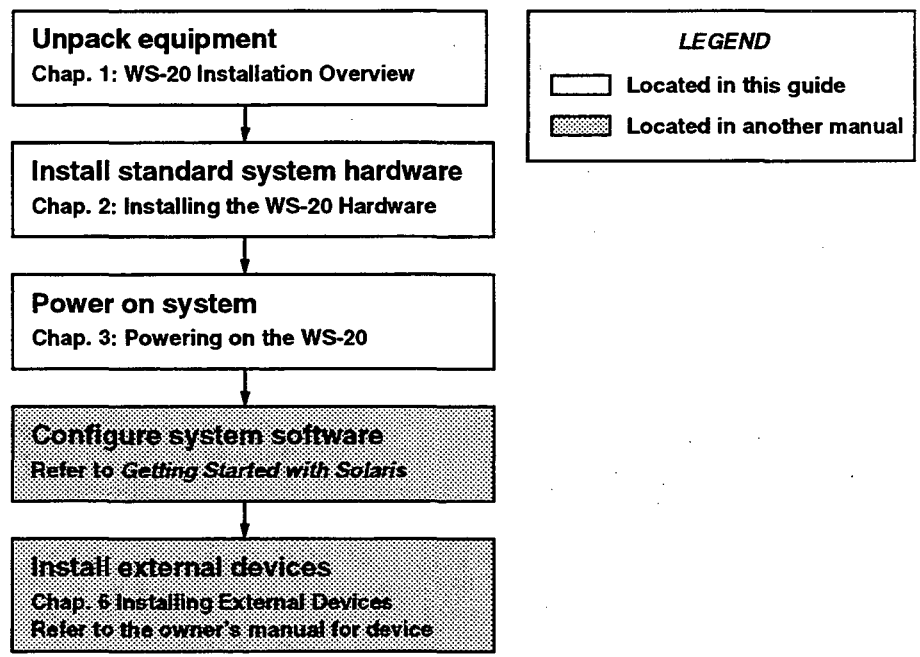
Configuring the operating system for your workstation

Connecting peripheral devices, such as an external storage device, a printer, or a scanner, to the rear panel of the system unit

If you are adding options, such as DSIMMs, SBus cards, or a hard disk drive, that need to be installed inside the system unit, they must be installed before you set up the system hardware (see chapter 7).

The task map below shows the sequence of the installation steps and whether the installation instructions are provided in this guide or another manual.

Figure 12
Installation Task Map

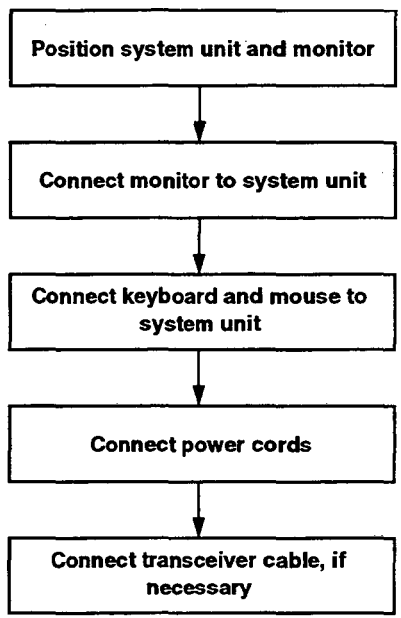


Chapter 2

Installing the WS-20 Hardware

This chapter covers installation of the standard WS-20 hardware. It may be helpful to read through this chapter before you start the installation. Hardware installation requires these tasks:

Figure 13
Hardware Installation Task Map



Before You Start

Before you install the standard system hardware, you should have installed any internal options. Refer to the Installation Task Map in the chapter "WS-20 Installation Overview" for more information about the sequence of installation steps.

To prepare for system installation, position the system unit in the workspace and place the monitor on top of the system unit.

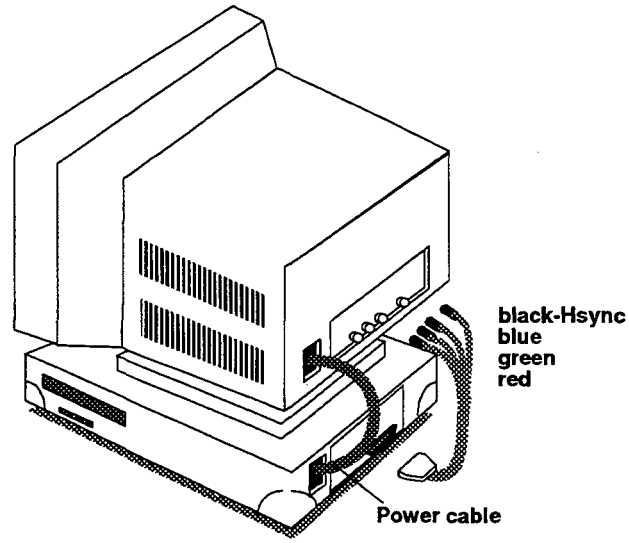
Tools Required

The procedure in this chapter do not require any tools. However, if you are connecting the system to a network, you will need to obtain an Ethernet cable from your system administrator.

Installing the Color Monitor

This section contains instructions for installing a color monitor. The rear panel of the color monitor is shown in Figure 14 for reference during the installation.

Figure 14
Color Monitor Cabling

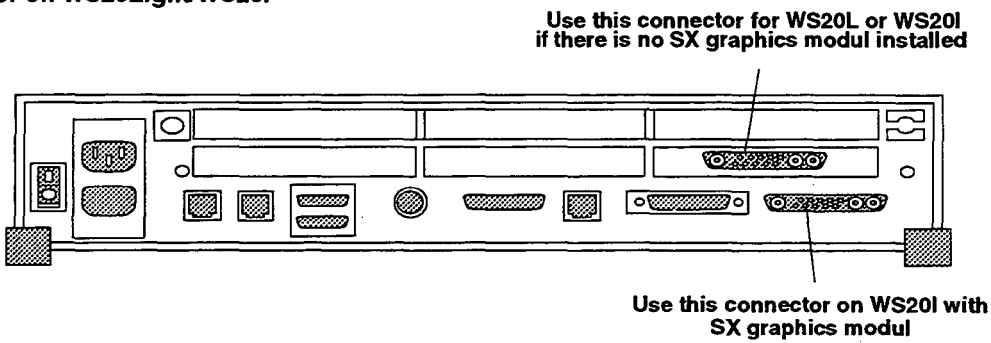


To install the color monitor:

1. Connect the cable with the four BNC connectors to the connectors on the monitor rear panel labelled Red, Green, Blue, and Sync.
2. Turn the BNC connectors one-quarter turn clockwise to tighten.
3. Connect the other end of this cable to the connector port on the system unit rear panel and tighten the thumbscrews.

4.Connect the monitor power cord to the connector on the monitor rear panel and the outlet of your WS-20 as in Figure 14

Figure 15
Installing the color monitor on WS20Light/WS20I



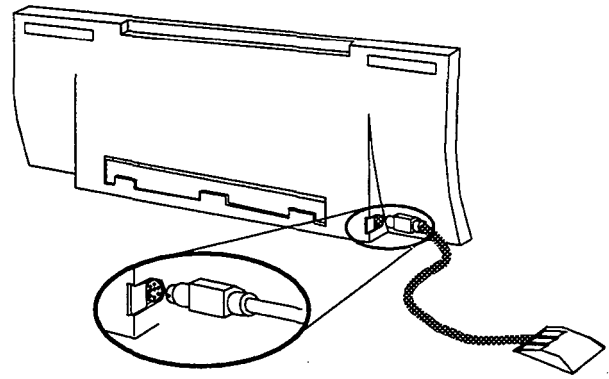
Connecting the Mouse and Keyboard

In this procedure, you will connect the mouse to the keyboard, then connect the keyboard to the system unit.

To install the mouse and keyboard:

1. Connect the mouse cable into one of the keyboard jacks, depending on where you want to locate the mouse on your desktop. See Figure 16.
   - To use your right hand to move the mouse, connect the mouse cable into the jack on the tight side of the keyboard.
   - To use your left hand to move the mouse, connect the mouse cable into the jack on the left side of the keyboard.

Figure 16
Connecting the Mouse Cable

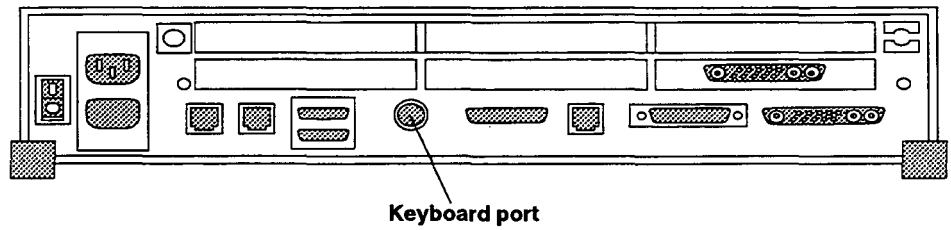


2. Press the loose cable into the groove underneath the keyboard, as shown in Figure 16.
3. Connect one end of the keyboard cable into the free keyboard jack.

   For example, if you connected the mouse into the right keyboard jack, use the left keyboard jack for the keyboard cable.
4. Connect the keyboard cable into the keyboard port on the rear panel, shown Figure 17.

   Align the key groove on the cable connector with the slot on the port and push the connector firmly into the port.

Figure 17
Connecting the Keyboard Cable



Connecting the Power Cords

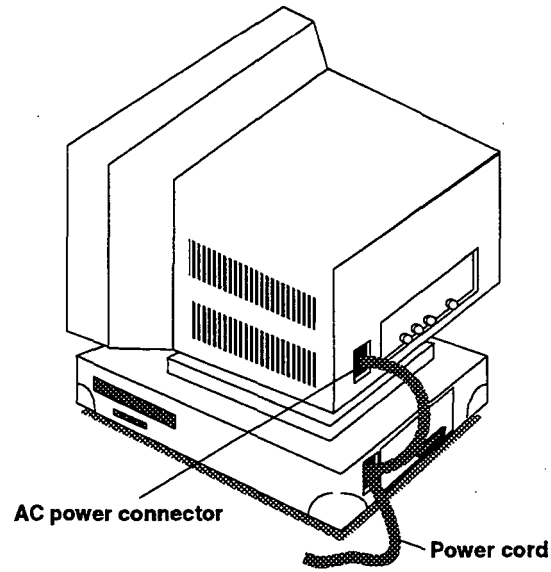
In this procedure, you will connect the monitor and system unit power cords.

◗ To connect the power cords:

1. Connect the female end of the power cord into the power connector on the monitor rear panel, shown in Figure 18.

NOTE: **Make sure the monitor power switch is in the OFF position. The switch can be located in different places depending on the monitor, but the most common locations are on front or rear panels.**

Figure 18
Monitor Power Connector



2. Connect the male end of the power cord into a power outlet.
3. Plug the female end of another power cord into the power connector on the system unit rear panel.

NOTE: **Make sure the system unit power switch is in the OFF position. The power is off when the 0 side of the rocker switch is pressed.**

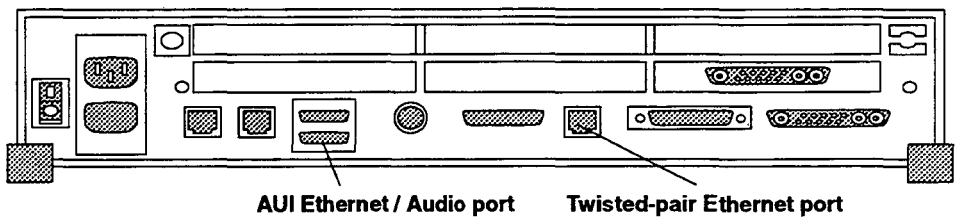
4. Plug the male end of the system unit power cord into a power outlet.

Connecting the Transceiver Cable

If the system is being connected to a network, you will need an Ethernet transceiver cable. This cable is not supplied with your system, but can be obtained form the person in charge of the network.

The rear panel has two Ethernet ports, the AUI Ethernet and twisted-pair Ethernet (TPE) which are shown in Figure 19.

Figure 19
Ethernet Ports



NOTE: **If your system will be connected to an AUI Ethernet network and you plan to install the loudspeaker and/or microphone, refer to: AUI/Audio Port" in "Installing External Devices" before connecting to the network.**

To connect to a TPE network:

- Connect the twisted-pair Ethernet cable to the twisted-pair Ethernet port.

To connect to an AUI Ethernet network:

1. Connect one end of the AUI adapter cable provided to the micro high-density port connector on the AUI Ethernet port.
2. Connect the DB15 connector end to either the thick network cable or a BNC (10base2) transceiver.
   Only one of the two interfaces can be used at the same time. If only one interface is connected, software determines automatically which one is to be used.

Chapter 3

Powering On the WS-20

This chapter gives instructions on powering on your system for the first time and how to set up your system configuration.

Before You Start

The system should be at room temperature before you power it up. If the equipment was shipped when outdoor temperatures were significantly above or below room temperature, it is best to wait several hours before powering on the system.

Tools Required

The procedure in this chapter do not require any tools.

Confirming the System Installation

Before powering on your system for the first time, check that all the parts of the system have been connected properly. Loose cables are a common source of failures,. The rear panel connections of an WS-20 are shown in a network set up in Figure 20 and in standalone set up with an external SCSI device in Figure 21.

Figure 20
Network System Set Up for WS20L

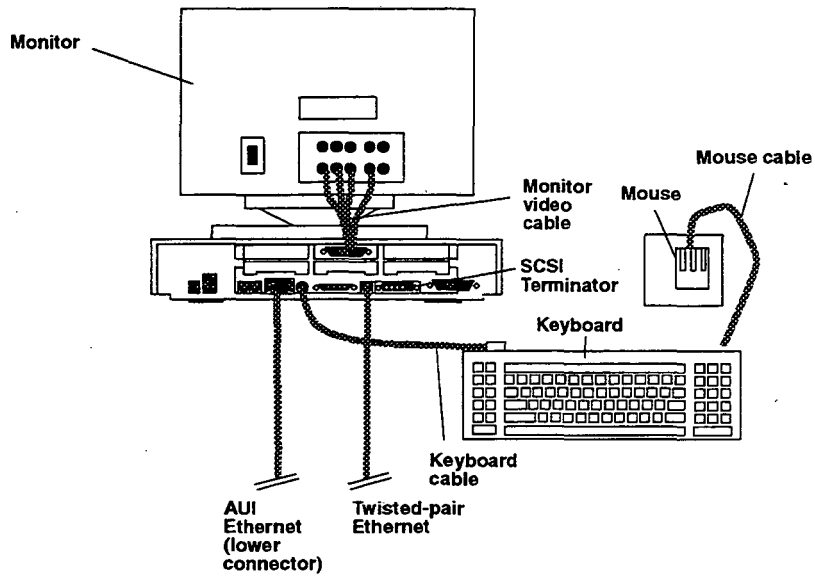
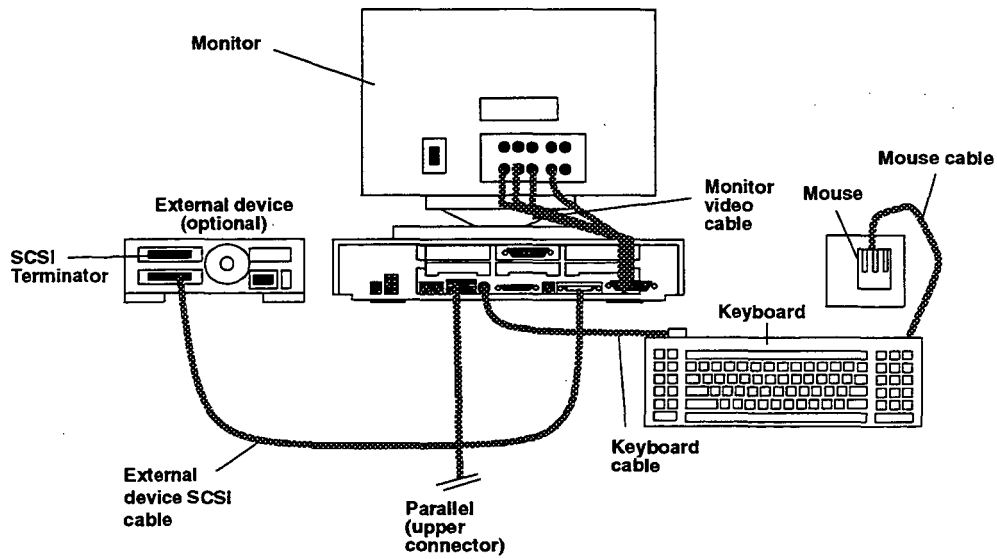


Figure 21
Standalone System Set Up for WS20l with SX modul



Powering On the System

This procedure explains how to power on the WS-20 for the first time.

◗ To power on the system for the first time:

1. Turn on the monitor power switch:
2. Turn on power to any external SCSI devices connected to the system.

   When you have multiple external SCSI devices in a daisy-chain, begin with the last device in the daisy-chain.
3. Turn on the power switch on the system unit rear panel.
4. The LED on the front panel of the system unit will light and the monitor LED as well. The system will then run power-on tests. While the tests are running, additional messages will display on the screen.

   If you do not see the banner screen within 40 seconds when you turn on the power, the system may have failed a power-on test. Call your authorized service representative for assistance.

NOTE: **When the system fails a power-on test, it sends failure messages to serial port A on the back panel. If you have a terminal connected to serial port A, test failure messages display on the terminal screen. A monitor is different from a terminal, and is not connected to port A.**

WARNING: **Don't attempt to switch off before reading chapter 6. To do so without taking care will dstroy your installed operating system**

◗ To power on the system:

1. Turn on power to any external SCSI devices connected to the system.

   When you have multiple external SCSI devices in a daisy-chain, begin with the last device in the daisy-chain.
2. Press the power on button of your system keyboard (upper right button).
3. See step 4 above.

Configuring the System

The next step in the installation is to configure the operating system. There are two ways to set up the WS-20 in a network or as a standalone.

Need More Information?

For more information about installing a system in a network or as a standalone, see "Planning the Workstation Site" in Chapter 1.

◗ To set up a system on the network:

1. Consult your system administrator to do the following:
   - Set up a user account and password on the server
   - Agree on a hostname
   - Obtain an Internet address
2. Set up your system configuration with the instructions in "Configuring Your Workstation in *Getting Started with Solaris.*

Need More Informations?

More information about network addresses domain names, and adding systems to a network can be found in "Connecting to the Network" in *Getting Started with Solaris.*

◗ To set up a standalone system:

- Set up your system configuration with the instructions in "Configuring Your Workstation" in *Getting Started with Solaris.*

Chapter 4

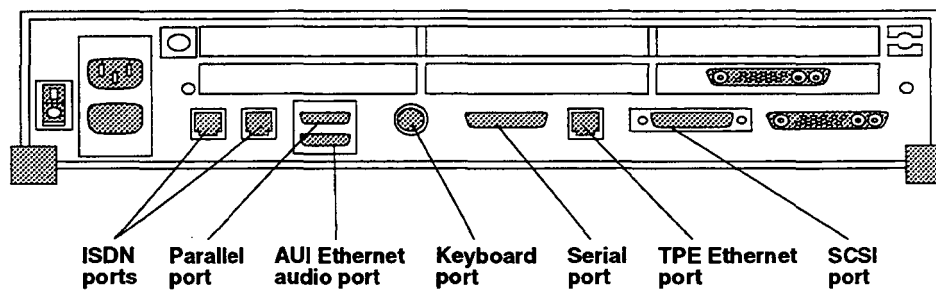
Installing External Devices

This chapter describes the I/O (input/output) ports contained in the WS-20 rear panel. For specific instructions for installing an external device, such as a printer, terminal, or external storage device, refer to the owner's manual for the device.

The rear panel I/O ports covered in this chapter include:

- ISDN ports
- Bidirectional parallel port (BPP)
- AUI/audio port
- Serial port for serial A / B cable
- SCSI port

Figure 22
WS-20 I/O Ports



Before You Start

Before any procedures are performed, you will need:

- The system up and running
- The correct cable
- The manual for the peripheral device
- A power cord and outlet for each device

Tools Required

The procedures in this chapter require these tool:

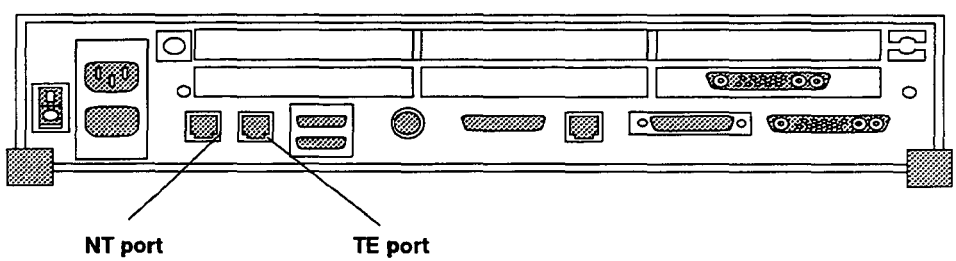
- Philips screwdriver
- Needlenose pliers

ISDN Ports

The two ISDN (integrated services digital network) ports on the rear panel allow fully digital end-to-end connection with telecommunications devices across public networks. These ports implement four-wire network termination (NT) and terminal (TE) interfaces.

To avoid damage to system components, it is important that only the proper cables are used with these ports. The ISDN port locations are shown in Figure 23

Figure 23
ISDN Ports



◗ To connect to the ISDN ports:

1. Connect your digital phone cable to the rear panel NT port.
2. Connect the ISDN service to the TE port.

Need More Information?

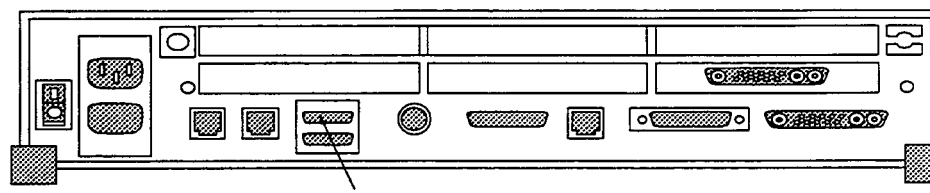
For more information, see at Sunlink ISDN Software from Sun. ISDN Software is not supplied with Solaris.

Bidirectional Parallel Port

The parallel port on the WS-20 rear panel is bidirectional and, therefore, supports standard external parallel devices, such as a printer (an output device) or a scanner (an input device). The port is Centronics compatible.

To connect a parallel device to the parallel port, you will need the parallel cable provided with the workstation. Refer to the owner's manual for the device for system configuration instructions. The rear panel parallel port location is shown in Figure 24.

Figure 24
Parallel Port



◗ To connect a parallel device:

1. Connect the high-density DB-25 connector end of the parallel cable to the rear panel parallel port.
2. Connect the other end of the parallel cable to the parallel device.

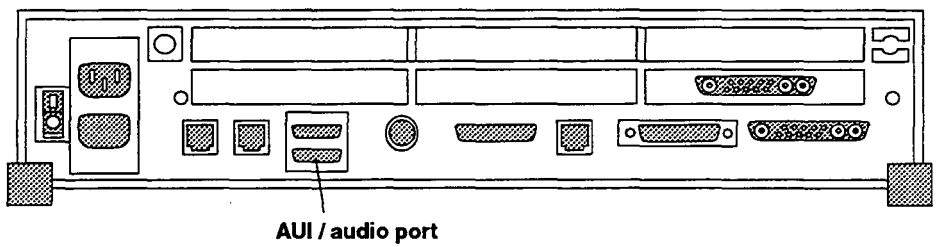
   Check the device manual for configuration instructions, if necessary.

AUI/Audio Port

The AUI (Attachment unit interface) / audio port on the rear panel is used for connecting audio devices, such as the speakerbox which can be obtained as an option. The speakerbox integrates an active loudspeaker and four audio jacks, microphone input, headphone output, line input and output to interface with other audio components.

Some configurations share this port to connect to the Ethernet network by means of AUI / audio cable. The AUI / audio port location is shown in Figure 25.

Figure 25
AUI/Audio Port



Connecting the Speakerbox

There are two ways to connect the speakerbox to the audio port, depending on your system set up, described below. Install your audio devices with the procedures that follow theses descriptions.

1. Your system uses an AUI Ethernet cable connected to the AUI port to connect to the network, and you want to install the speakerbox. An AUI/audio adapter cable can be provided with your workstation for this set up.
2. The AUI port is not used for connection to the network, and you want to install the optional speakerbox.The speakerbox cable can be connected directly to the AUI/audio port.

◗ To connect audio devices with an AUI Ethernet connection:

1. Connect the AUI/audio adapter cable to the AUI/audio port connector on the rear panel.
2. Connect the AUI Ethernet cable to the DB15 connector on the multiple-connector end of the AUI cable adapter cable.
3. Connect the speakerbox cable to the high-density 26-pin connector on the multiple-connector end of the AUI/audio adapter cable.

The ports on the cable are labelled with symbols for audio and network.

◗ To connect audio devices directly to the AUI/audio port:

1. Connect the speakerbox cable to the AUI/audio port connector on the system unit.

Serial Port

The WS-20 rear panel contains one serial port. An optional serial dual-port cable allows you to connect two serial devices. The cable ports are labelled A, which is synchronous/asynchronous, and B, which is asynchronous only. The serial port is shown in Figure 26, and the dual-port cable is shown in Figure 27.

Figure 26
Serial Port

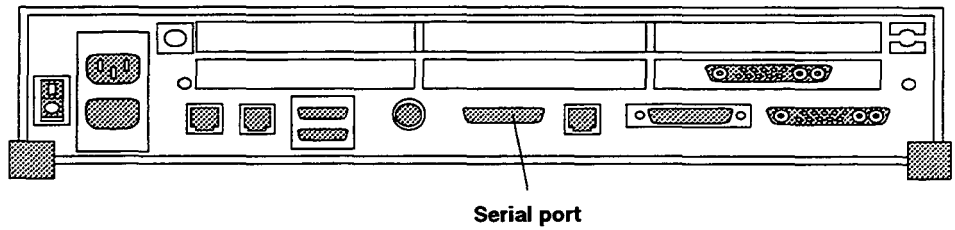
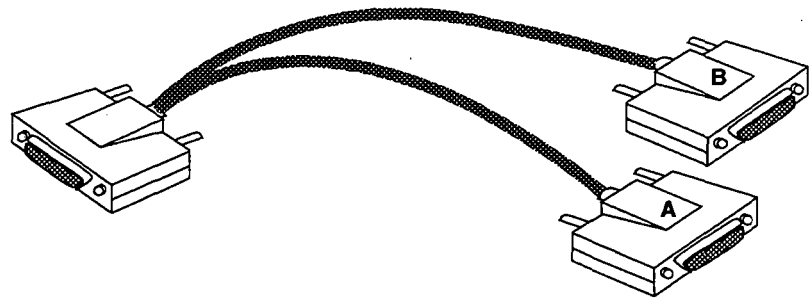


Figure 27
Dual-Port Serial Cable



To connect the serial A/B port cable:

1. Connect the A/B end of the cable to the system unit.
2. Connect either the port A or port B connector to your device, as appropriate.

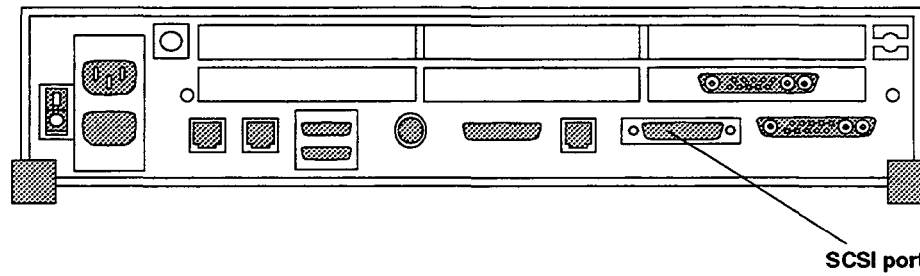
   Cable port A is synchronous / asynchronous, and cable port B is asynchronous only.

SCSI Port

The WS-20 supports all standard external SCSI (small computer system interface) devices, such as hard disk drives, tape drives, and CD-ROM drives.

SCSI devices connected to the WS-20 can be daisy-chained or connected directly to the SCSI port. In a daisy-chain, a cable connects the first device to a second device and is repeated for additional devices. A maximum of six external SCSI devices can be connected. Refer to the SCSI device manual for SCSI bus and termination requirements.

Figure 28
SCSI Port



Part 2

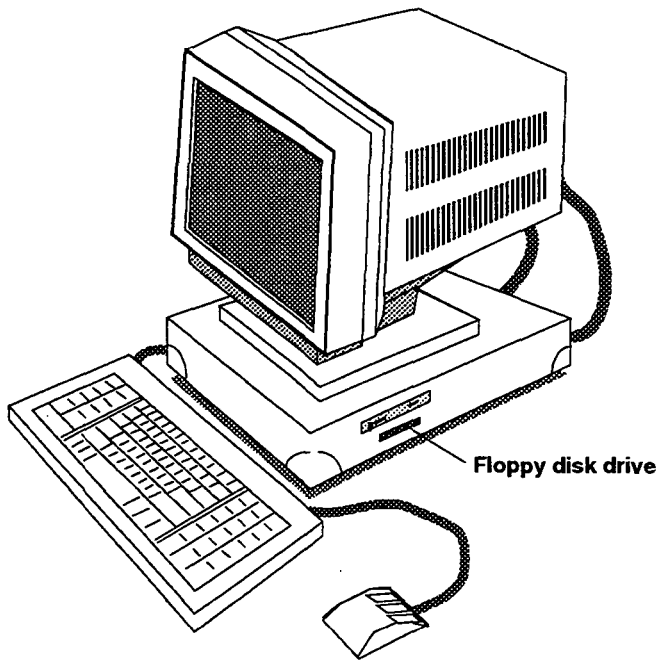
User Guide

Chapter 5

Using Diskettes

This chapter discusses the use of diskettes with the floppy disk drive on your WS-20. The format for diskettes used with the system is 3.5-inch, 1.44 Mbyte. The floppy disk drive is located on the WS-20 side panel, shown in Figure 29

Figure 29
Floppy Disk Drive Location



Handling Diskettes

Use the following guidelines when handling and storing diskettes:

- Store the diskettes in a clean, dry environment
- Keep diskettes away from direct sunlight and extremes of hot or cold
- Keep diskettes away from magnetic sources

Inserting and Ejecting Diskettes

The steps for inserting and ejecting diskettes from the floppy disk drive are given below.

Need More Information?

Before using a new diskette, it must be formatted using Solaris commands. For more information on formatting diskettes and using other Solaris commands, refer to *Getting Started with Solaris*.

◗ To insert a diskette into the floppy disk drive:

- With the label side up, insert the diskette into the drive.

  You will feel some resistance when the diskette is about to lock into place. Push firmly yet gently until you hear the diskette click into the correct position.

◗ To eject a diskette using the floppy disk drive:

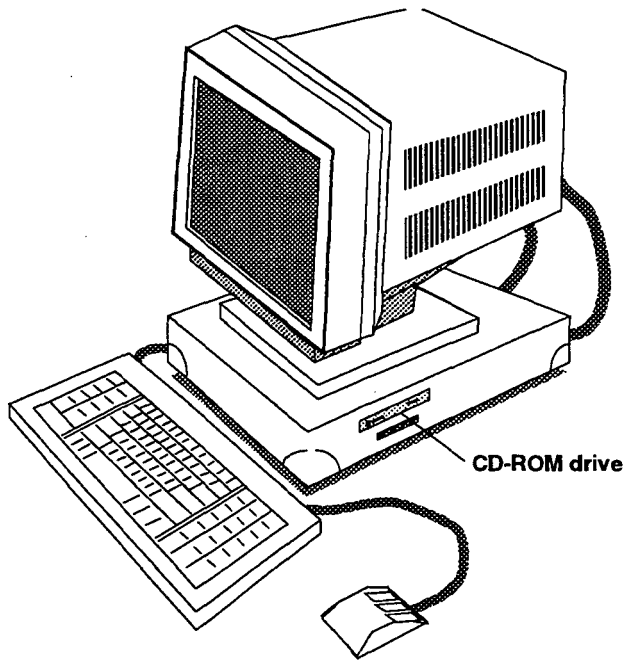
- Type the eject command at the system prompt shelltool:
  eject

Chapter 6

Using CD-ROM

This chapter discusses the use of the CD-ROM drive on your WS-20L, WS-20I. The optional avaiable double-speed CD-ROM drive operates on the industry standard SCSI-2 interface and twice the existing spindle speeds of most CD-ROM drives. The CD-ROM drive uses 4.76-inc (120-millimeter), 644 Mbyte compact discs. It is located on the WS-20L, WS-20I side panel, shown in Figure 30.

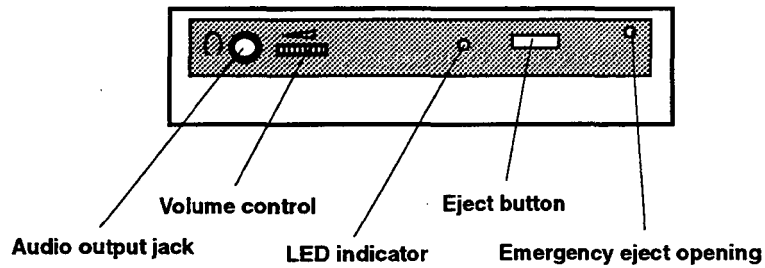
Figure 30
CD-ROM Drive Location



The CD-ROM Front Panel

The front panel connections and controls of the CD-ROM are shown in Figure 31:

Figure 31
CD-ROM Front Panel



Audio output jack - used with speakers or headphones when playing CD

- Volume control - adjusts sound level for the audio output jack
- LED indicator - shows the CD drive operative status
- Eject button - allows manual ejection of a loaded disc
- Emergency eject opening - allows a disc to be ejected in an emergency (if software or manual ejection fails)

Audio Output Jack

You can plug the following devices into the miniature audio output jack:

- Headphones (30 ohms to 100 ohms impedance)
- External amplifer and loudspeaker

Caution: Prolonged exposure to high audio signal levels can be harmful to human hearing and can result in permanent and irreversible hearing loss !

Chapter 7

Powering Off the System

This appendix explains how to safely power off your system. The WS-20 is designed to be left running continuously. Turning the power on and off too frequently can damage the systems's electrical components.

When turning the Power Off

Turn off the power only if you want to:

- Remove or install a part inside the system unit.
- Install an external drive unit.
- Unplug the system unit power cord, for example, when moving the system to a new location.
- Recover from a "hung" or "frozen" system that does not respond to the keyboard or the mouse.
- Prepare for an expected power outage in your building.

NOTE: **You cannot plan for unexpected power outages. When one occurs, turn off the power switches on all your equipment. Doing this protects your equipment from possible power surge damage when power is restored to your building.**

Powering Off Procedures

◗ To power off when the system is working normally:

1. Save all your work.
2. Open a shelltool and, at the system prompt, type:

   /bin/su <RETURN>
3. Enter your superuser password.
4. At the system prompt, type:

   /usr/etc/halt <RETURN>

   The system responds with the following message:

   Syncing file systems ... done
   Halted

   ok
5. When this appears, you can either type:

   power-off <RETURN>

   and the power supply will switch off your system and monitor or you can safely turn off the power of the system unit. Turn off the power in the following sequence:

   - External drive units (if any)
   - System unit
   - Monitor

Need More Information?

For additional information about superuser passwords, see "Working with User Accounts", in Getting Started with Solaris.

◗ To power off when the system doesn't respond to the mouse:

1. Press <L1> <a> at the same time.
   The **ok** prompt will appear.
2. Type: **sync <RETURN>**

   The sync command will attempt to save your data.
   When the **ok** prompt returns, you can turn off the power as described in step 5 above.

Chapter 8

Opening and Closing the System Unit

To install SBus cards, MBus modules, DSIMMs, or an internal disk drive; or to change the serial port jumper settings on the main logic board, you must open the system unit.

Opening the System Unit

The top cover of the system unit attaches to the chassis at the back with two screws. Shift the cover approximately 5 cm to the front and remove the cover (see Figure 32).

◗ To remove the cover from the system unit:

1. Place the system unit on a work table.
2. Remove the top cover from the system unit.
   - Use a screwdriver to fully loosen the screw holding the cover to the back panel.
     The screw will remain attached to the back panel after it is fully loosened from the cover.

Figure 32
Screw Location, Back Panel

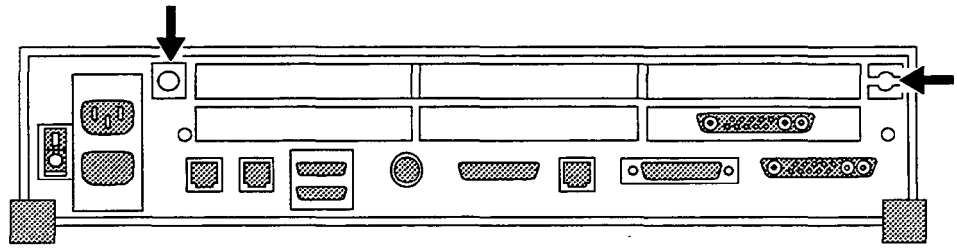
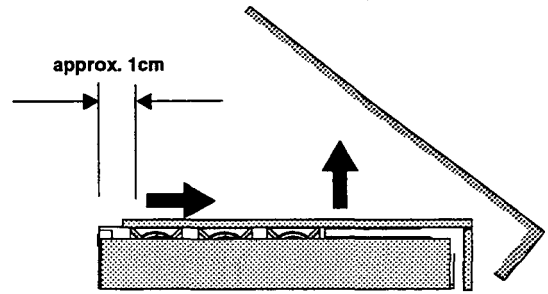


Figure 33
Removing the System Unit Cover, Side View



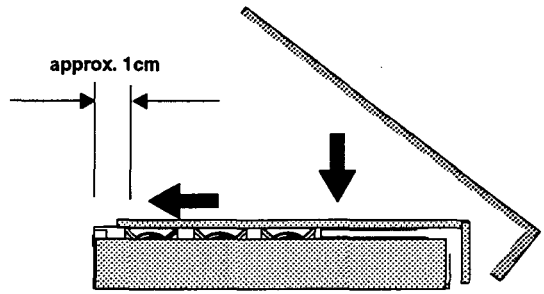
WARNING: **Before powering up your system again, be sure to replace the cover using the procedure in the next section. it is not safe to operate the WS-20 without its top cover in place.**

Closing the System Unit

◗ To replace the system unit cover:

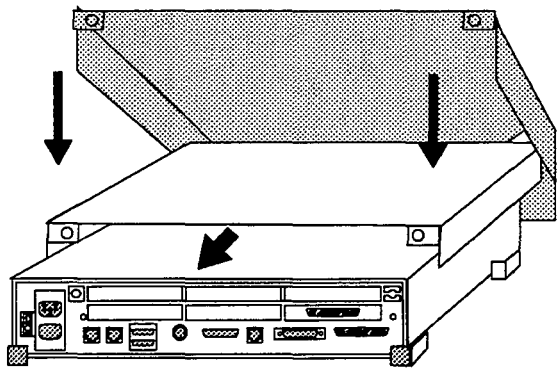
1. Hold the cover at a 60 degree angle in relation to the system unit, and gently guide the hinge hooks on the cover into the tab slots on the front of the system unit. Continue to hold the cover with your hands.

Figure 34
Replacing the System Unit Cover, Side View



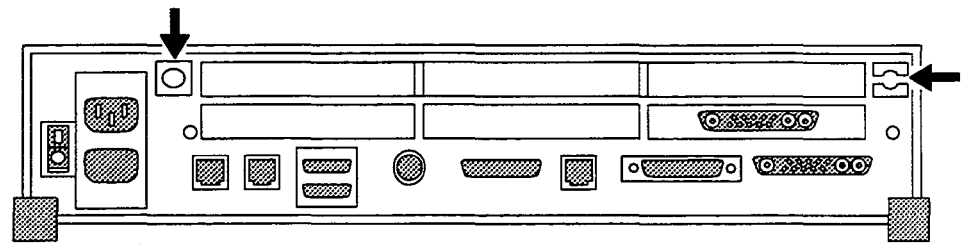
2. Slowly lower the cover onto the system unit.
3. Push on the cover's left and right sides.

Figure 35
Pushing Down on the Cover's Sides, Back Panel View



4. Guide the cover downwards so that the plastic tab snaps the cover to the back panel.
5. Using a screwdriver, tighten the screw on the back panel to the cover.

Figure 36
Captive Screw Location, Back Panel



Part 3

Internal Options

Chapter 9

Installing Memory Modules and SX Graphics Module

About WS-20 DSIMMs Memory Module Installation

WS-20 system units are equipped with a minimum of 32 megabytes of random access memory (RAM). Physically, RAM chips are grouped together in single inline memory modules. The acronym "DSIMM" refers to the type of memory module used with the WS-20 and stands for:

- Dynamic random access memory (DRAM)
- Single
- Inline
- Memory
- Module

Each DSIMM contains 16, 32 or 64 megabytes of memory and plugs into a memory slot located on the main-logic board of the system unit. Additional DSIMMs may be added to your system unit as needed in 16-, 32- or 64-megabyte increments, up to a maximum of 8 DSIMMs (512 megabytes).

DSIMMs installed in your WS-20 must have been specifically designed to operate it. Do not remove DSIMMs from a different workstation and install them in a WS-20.

How to Turn the Power Off

To turn the power off to your system:

1. Save all your work.

   See your software documentation for instructions on ending a work session and saving your files. If you do not save your work, you could lose it when you switch off the power.

2. Return to the operating system environment.

   If you are in a windowing environment, exit from it and wait for the system prompt to appear. See chapter 6 - Powering off the System.

3. Turn off the power in sequence to:

   a. Monitor
   b. External drive unit (if any)
   c. WS-20 system unit

CAUTION: **Do not disconnect the power cord from the power outlet on your system or from the wall outlet. This connection provides the ground path necessary to remove and install the printed circuit board and components without damaging them with static electricity.**

◗ Opening the System Unit

Refer to chapter 8 Opening/ Closing the System Unit.

About WS 20I SX Graphics Module Installation

WS 20I models can be equipped with a SX graphics module. SX modules look like a DSIMM-Module but they are somewhat longer (refer to Figure 37).

Only one SX Module can be used on a workstation 20I at location J202. Two versions of the SX modules are currently avaiable with either 4MByte or 8MByte of video RAM. The 4MByte version is populated on one side only. The 4MByte version can be used with the Sun resolutions 1150 x 900 x 66/76Hz. The 8Mbyte version can be used with Sun resolutions and 1280 x 1024 x 76Hz.

Installing and removing of SX modules is done the same way as DSIMM modules. To do so, refer to the following chapter.

Table 2 **Sense Line Chart.**

Code	Scan Rate	Pin3 Sense	Pin8 Sense	Pin 9 Sense
7 (no Mon.)	1152x900 @ 66Hz	N/C	N/C	N/C
6	1152x900 @ 76Hz	N/C	N/C	GND
5	1024x768 @ 60Hz	N/C	GND	N/C
4	1152x900 @ 76Hz	N/C	GND	GND
3	1152x900 @ 66Hz	GND	N/C	N/C
2	1280x1024 @ 76Hz	GND	N/C	GND
1	1600x1280 @ 76Hz	GND	GND	N/C
0	1024x768 @ 60Hz	GND	GND	GND

Note: Additional resolutions and refresh rates not supported by the sense lines can be utilized by the setenv command (see Page 56)

Warning: **Check the owners manual to your monitor. Some monitors may not support the higher resolutions or refresh rates. Improper settings could result in damage to your monitor**

Using Sense LInes

The default setting of the SX module is to use the sense lines to identify the resolution and refresh rate for the monitor connected. These lines are usually built into the cable and can either be force jumpered by use of a special cable (TRITEC part # KV-13-BNC-UNI) or reconfigured through the Open Boot Software of your SPARCstation. The Table 2 shows the possible sense line configurations.

Using the OpenBoot Prom

By using the *setenv* command through the Boot PROM, it is possible to override the sense code bus in order to change the resolution and refresh rate. The following procedure is an example of how to use the *setenv* command to change the refresh rate and resolution of the SX Module to adjust it on to the monitor.. The NVRAM command *setenv* will only affect the primary display adapter.

All commands below are entered from the Boot PROM ***ok*** prompt. Enter Open Boot Prom command mode when turning the power on by pressing <L1> <a> at the time the monitor displays the boot message. If the system is running unix, refer to chapter 7 "Powering off the System" to get the ***ok*** prompt.

Text in the `plain courier` font is on screen output generated by the computer. Text in the **`bold courier`** font is what you type into the computer.

setenv command usage:

`setenv output-device screen:rh_resolutionxv_resolutionxrefresh_rate`

`h_resolution` being the horizontal resolution of your monitor, **`v_resolution`** being the vertical resolution to your monitor and **`refresh_rate`** being the refresh rate to your monitor.

Once *setenv* is run, it is neccesarry to reset the system for changes to take effect.

Table 3 shows the possible resolutions and refresh rates that are supported by the *setenv* command with the SX module.

Table 3 **Supported SX resolutions and refresh rates for true color mode**

Resolutions and refresh rates	4 MB Version	8 MB Version
1024 x 768 @ 60 Hz	X	X
1024 x 768 @ 66 Hz	X	X
1024 x 768 @ 70 Hz	X	X
1152 x 900 @ 66 Hz	X	X
1152 x 900 @ 76 Hz	X	X
1280 x 1024 @ 66 Hz		X
1280 x 1024 @ 76 Hz		X

Examples to the use of *setenv* are shown below.

At the `ok` prompt, type:

```
setenv output-device screen:r1024x768x70
```

This sets the resolouting to 1024x768 at a 70Hz refresh rate.

To return to the factory default condition, at the `ok` prompt, type:

```
setenv output-device screen
```

This sets the default condition, resolution and refresh set by the monitor sense line

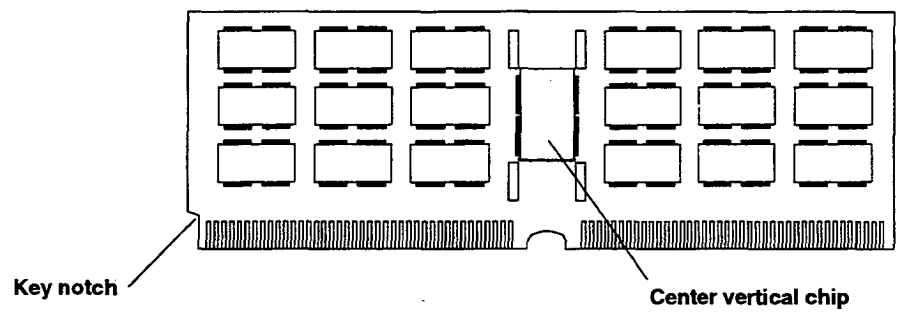
Identifying DSIMMs

A DSIMM comes in special packaging to protect it from harmful electrical charges.

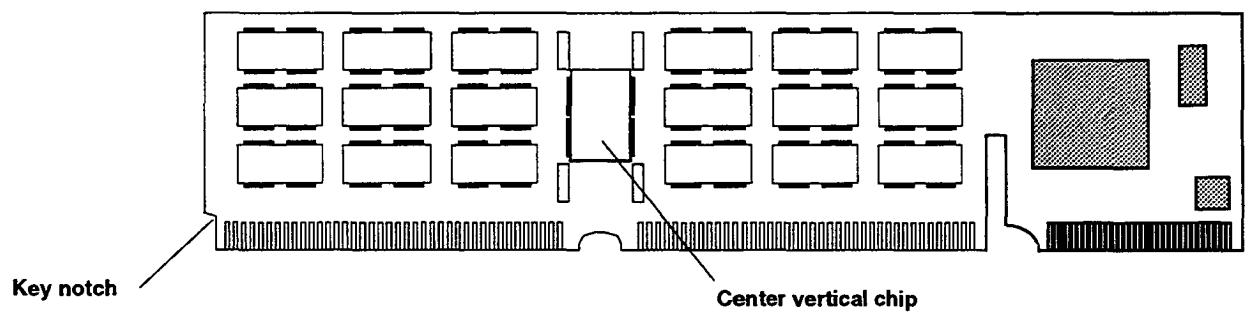
Before you attempt to install a new DSIMM or replace a defective one, make sure that you have the right item. Each DSIMM consists of a small card mounted with 18 horizontally-mounted chips on each side (36 chips, total). The part of the card that plugs into the memory slot has "gold fingers" - a scalloped edge with a conductive surface.

Figure 37 shows a WS-20 DSIMM and a SX module. The surface with the center vertical chip should face the system unit back panel when installed.

Figure 37
WS-20 DSIMM, Back Panel View



WS-20I SX Module, Back Panel View

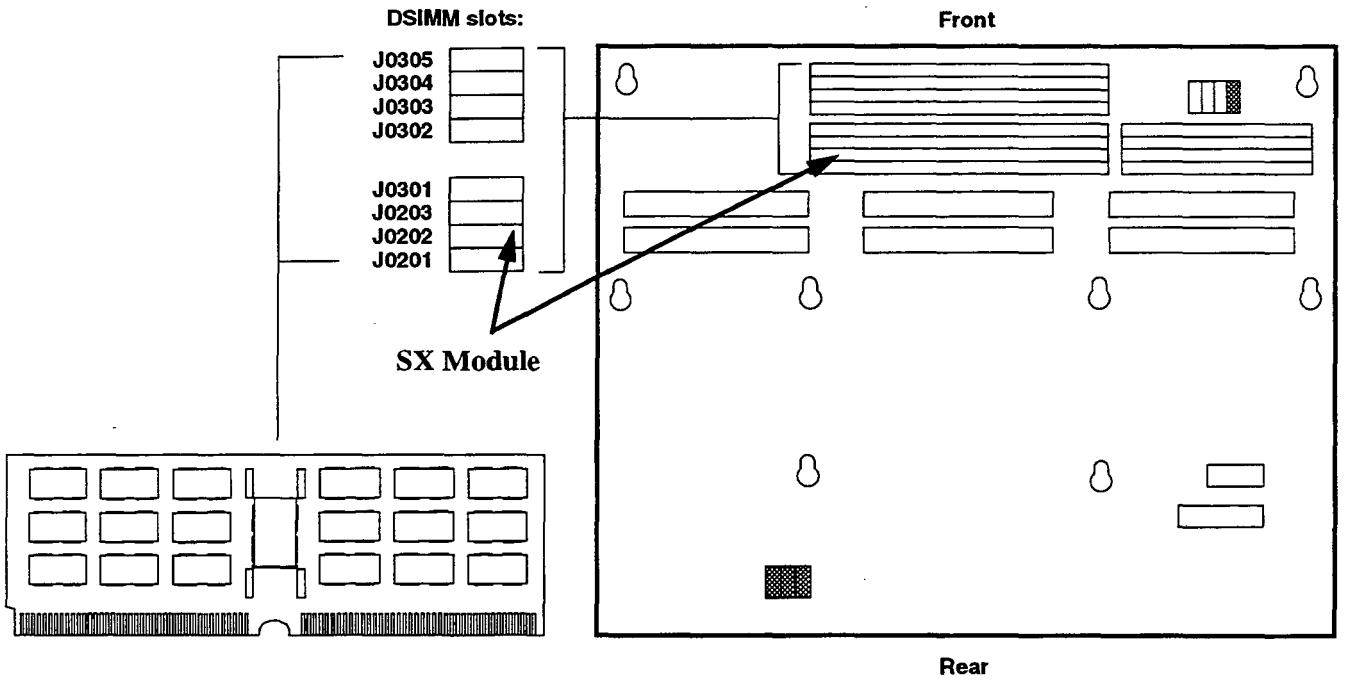


Inserting a DSIMM

To install a DSIMM/SX Module:

1. Locate the DSIMM/SX Module slots on the main-logic board.

Figure 38
DSIMM Slot Locations
on Main-Logic Board



NOTE: **Slot J0201 always must have a DSIMM installed.**

NOTE: **When installing a mixture of 64 MB, 32MB and 16 MB DSIMMs, slot J0201 must be used for the first 64 MB DSIMM. If a 16 MB or 32 MB DSIMM is already installed in slot J0201, you must remove it from slot J0201 and install it in one of the other unused DSIMM slots. Refer to the section DSIMM removal for DSIMM removal procedure. See Table 4 for the DSIMM installation sequence.**

2. Open the protective packaging and take out the DSIMM.
3. Place the DSIMM on the static shielding bag.
4. See Table 4 for the proper sequence.

Table 4 **DSIMM Installation Sequence**

Installation Sequence	Slot
1	J0201
2	J0203
3	J0302
4	J0304
5	J0301
6	J0305
7	J0303
8	J0202 if not used for SX SIMM

NOTE: **Slot J0201 must always have a DSIMM installed in order for your system to function properly. In any WS-20, it is the first slot to be filled with a DSIMM. Each additional DSIMM should be installed in the sequence shown in Table 2.**

5. Holding a DSIMM at its edges, place it into the DSIMM plastic guides. The surface without a center vertical chip must face the system unit front panel. See Figure 37 for proper DSIMM orientation. Be sure the center vertical chip is visible and that the key notch is as shown in Figure 38.
6. Place the heel of each hand on each side of the DSIMM, and press firmly with both hands on the module until the DSIMM snaps into place.

Figure 39
Heel of Each Hand

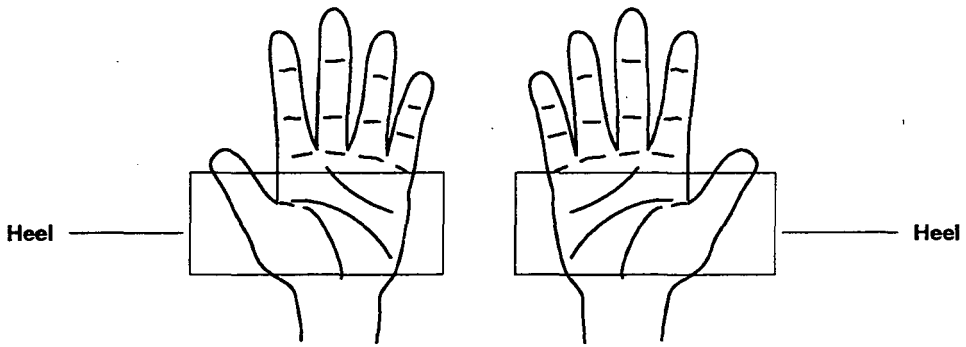
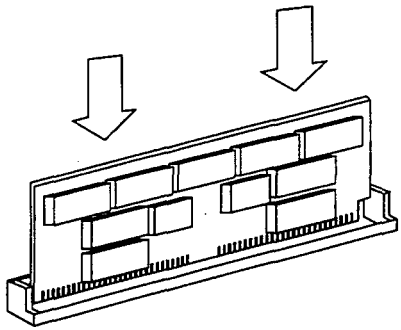


Figure 40
Inserting the Module



WARNING: **Before powering on your system again, be sure to replace the top cover using the procedure described in chapter 8 Opening/ Closing the System Unit. It is not safe to operate the WS-20 without its top cover in place.**

Removing DSIMMs

Perform the following procedures in Chapter 8 before removing a DSIMM:

- Halting the System
- Opening the System Unit
- Attaching the Wrist Wrap

Removal Procedure

Each DSIMM is mechanically removed by first pulling on an ejector lever, lifting one corner of the DSIMM and then the other, until the DSIMM is completely removed.

To remove a DSIMM from a WS-20:

1. Inspect both ends of the DSIMM socket.
   You will find a small ejector lever on the side towards to power supply assembly.

   Pull the lever in the opposite direction of the DSIMM you wish to remove.

Figure 41
Using the DSIMM Ejector Lever

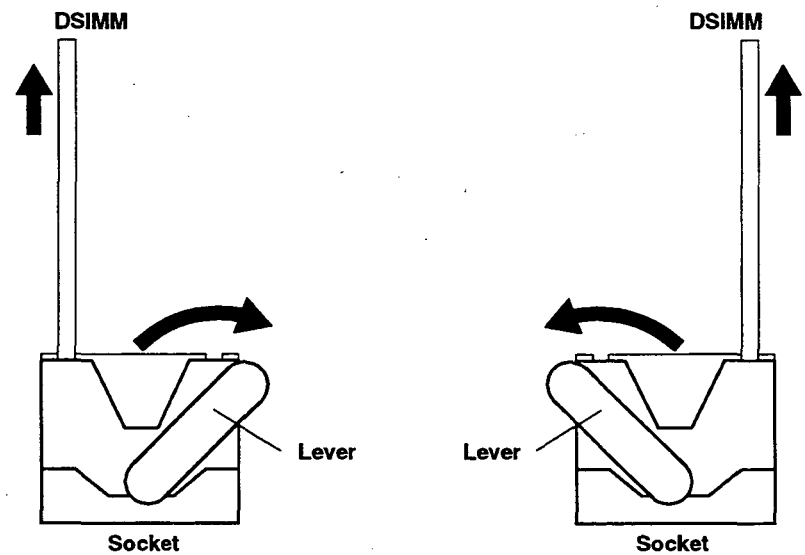
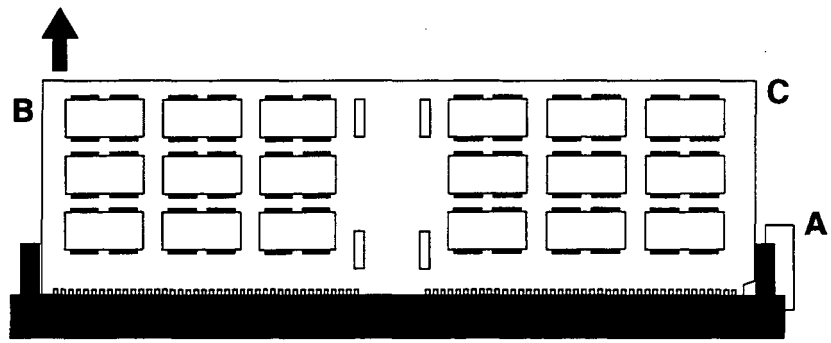


Figure 42
Removing a DSIMM



2. Pull the ejection lever (A) in the opposite direction of the DSIMM you want to eject.
3. Pull up on the other side (B) of the DSIMM.
4. Pull up on both corners (B and C) of the DSIMM until the board clears the socket.
5. Close the system unit using the procedure in Chapter 7.

Chapter 10

Changing or Adding CPU MBus Modules

Your WS-20 workstation can be extended to a maximum of two MBus CPU modules with a maximum of four CPU chips in total (two per module).

If you are upgrading or adding CPU Moduls, use always two modules of the same speed and cache size from the same manufacturer (SuperSPARC or Hyper SPARC).

Upgrading or adding a CPU MBus module

This section describes how to change or add MBus modules.

1. Open the system unit as described in chapter 8.
2. If you add a module go to step 4.
3. If you upgrade a module, remove the two screws at the back panel of the lower module. Unplug the module.

Figure 43

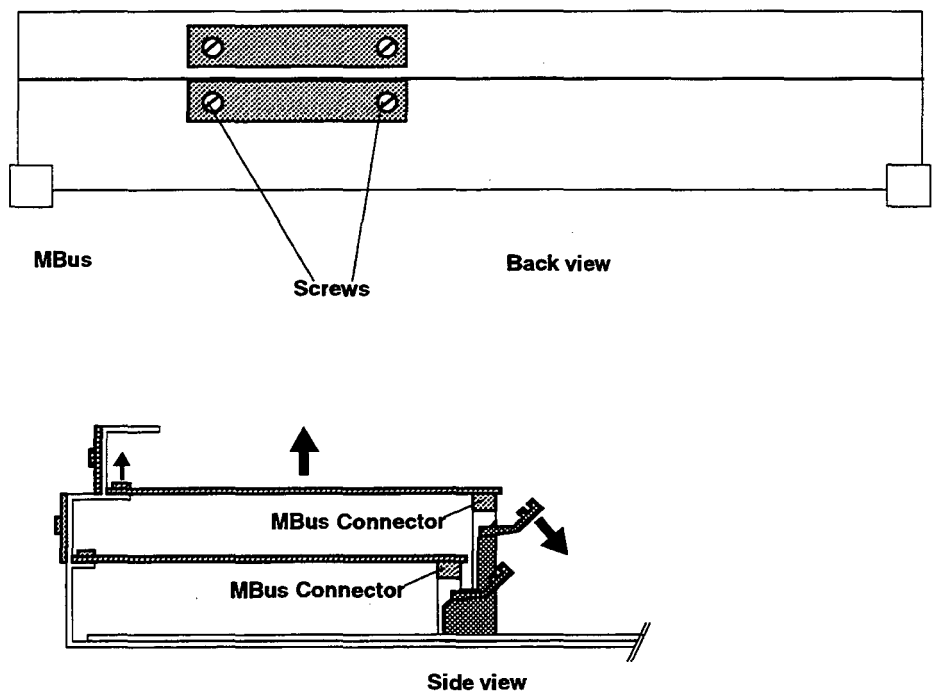


Figure 44

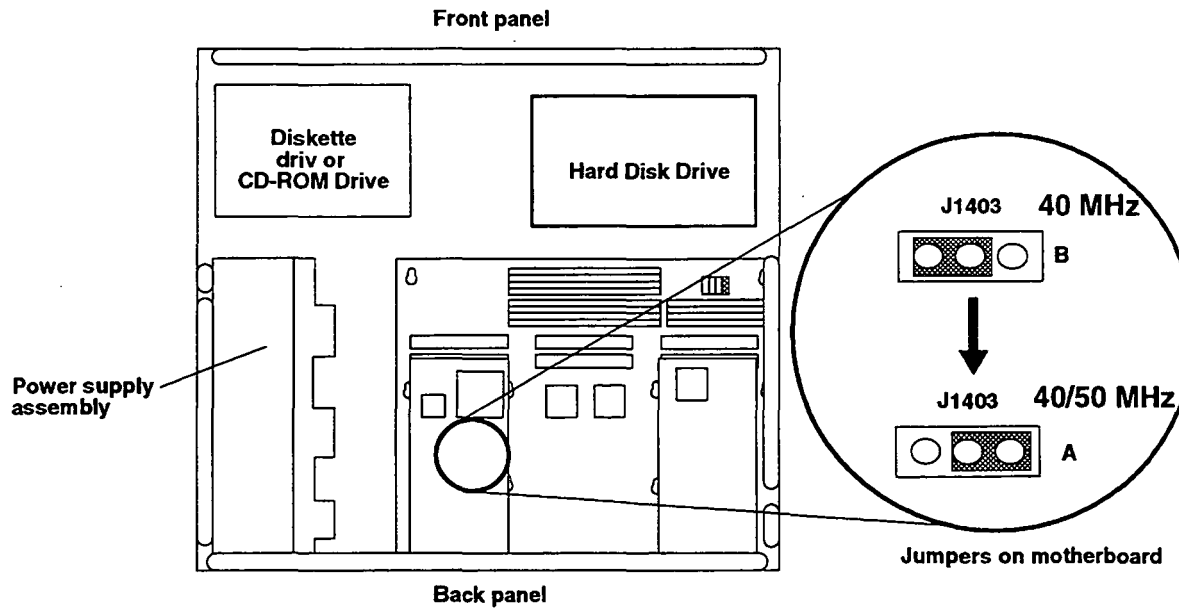


Table 5

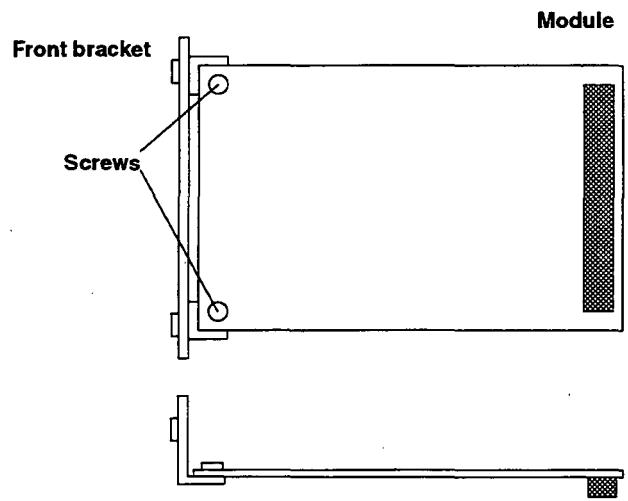
Jumper positions can be found at Figure 44

Position	MBus	SBus	Frequenze Fix
A	40/50MHz	20/25MHz	depends on CPU Module
B	40MHz	20MHz	

For standard CPU configuration no change of jumper position is necesaary. On the default position A the clock is outo-configured by the CPU Module.

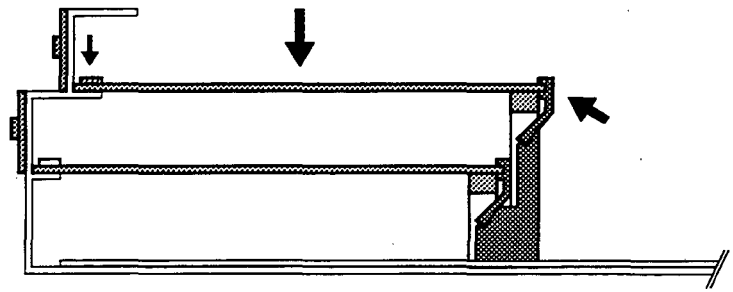
4. Mount the front panel of the old module, or the upper module to the new module.

Figure 45



5. Plug in the new module and fix the screws at the panel.

Figure 46



6. Close the system unit as described in chapter 8

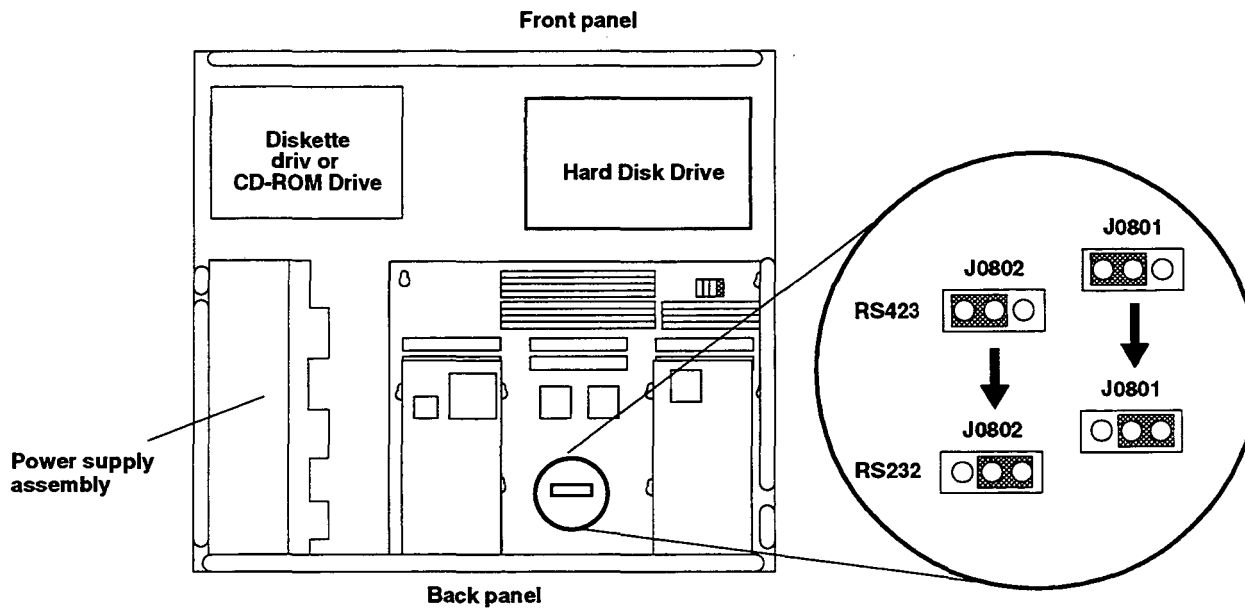
Chapter 11

Changing the Serial Port Jumpers

To change the serial port mode jumpers for both ports A and B on the main logic board to RS232 mode:

1. Open the system unit.
2. Locate the jumpers on the main logic board.

Figure 47
Locating the Jumpers



3. Change the jumpers on both J0801 and J0802.
4. Close the system unit.

Appendix A

Configuring System Software for a Terminal

This appendix describes how to configure your system for a Digital VT-100 or Wyse Wy-50 or compatible terminal. You should have already connected the terminal to the WS-20 serial port with the instructions in the chapter "Installing External Devices".

Configuring a Terminal

The Wy-50 and VT-100 terminals have setup menus that allow you to define the terminal operation. Adjustments of the control features in the setup options need to be adjusted only when you change the defined terminal operation parameters. The terminal operation manual will describe the setup menu and how to use it.

Once you are in the setup menu, the options are as follows:

- Wyse Wy-50 - Set a TV1925 emulation mode.
- 8 data bits per character
- 1 stop bit
- No parity
- 9600 baud
- XON/ XOFF enabled

Once the terminal has been connected, powered on, and the software configured, your system is ready to be configured for the terminal.

◗ To configure the system software for a terminal:

1. At the system prompt, type the following command:

   /bin/grep -l *terminal name abbreviation* **/etc/termcap <RETURN>**

   For *terminal name abbreviation*, the abbreviation for a VT-100 or compatible terminal is **vt100**. For a Wyse WY-50 or compatible terminal, the abbreviation is **wyse50**.

NOTE: **If your is not of type VT-100 or WY-50, you must add a line in the /etc/termcap file for your terminal type, as described in the termcap(5) Man Page online.**

2. At the system prompt, type:
   /bin/su <RETURN>
3. At the system prompt, type:
   /usr/ucb/vi
4. Edit the **/etc/ttytab** file to specify the baud rate, terminal type, and status of your terminal as follows:

   If you have attached your terminal to serial port A on your system unit, edit the line beginning **ttya**. The same applies if you are connected to serial port B.

   - The number just after std. is the baud rate. Replace the default baud rate of 9600 with the appropriate value for your terminal.
   - The terminal type is under the column headed type. Replace the default terminal type unknown with your terminal type, such as vt100.
   - The terminal status setting is under the column status. Replace the default status off with on.
   - Since this is not a local line, remove the local token. See ttysoftcar(8).
5. Save the file and quit vi.
6. At the system prompt, type:
   /bin/kill -HUP 1 <RETURN>

   This step causes the system to reread the /etc/ttytab file.

Appendix B

Back Panel Serial Connector Specification

Table B-1

Back Panel Serial Connector Specifications

Pin	Circuit	Signal	Direction	Description
1	none	none	none	Not connected
2	BA	TD	output	Transmit Data: Port A.
3	BB	RD	input	Receive Data: Port A.
4	CA	RTS	output	Request To Send: Port A.
5	CB	CTS	input	Clear To Send: Port A.
6	CC	DSR	input	Data Set Ready: Port A.
7	AB	SG	none	Signal Ground
8	CF	DCD	input / output	Data Carrier Detect: Port A.
9	none	none	none	Not connected
10	none	none	none	Not connected
11	SCD	SDTR	input	Secondary Data Terminal Ready: Port B.
12	SCF	SDCD	input	Secondary Data Carrier Detect: Port B.
13	SCB	SCTS	input	Secondary Clear To Send: Port B.
14	SBA	STD	output	Secondary Transmit Data: Port B.

Pin	Circuit	Signal	Direction	Description
15	DB	TC	input	Transmit Clock: Port A, DCE source.
16	SBB	SRD	input	Secondary Receive Data: Port B.
17	DD	RC	input	Receive Clock: Port A.
18	SDB	STC	input	Secondary Transmit Clock: Port B.
19	SCA	SRTS	output	Secondary Request To Send: Port B.
20	CD	DTR	output	Data Terminal Ready: Port A.
21	none	none	none	Not connected
22	none	none	none	Not connected
23	none	none	none	Not connected
24	DA	TC	output	Transmit Clock: Port A, DTE source
25	DA	TC	output	Transmit Clock: Port B, DTE source

Table B-2 **Serial Interface Y-Cable Port A Specifications**

Pin	Circuit	Signal	Direction	Description
2	BA	TD	output	Transmit Data
3	BB	RD	input	Receive Data
4	CA	RTS	output	Request To Send
5	CB	CTS	input	Clear To Send
6	CC	DSR	input	Data Set ready: Signal from other devices indicating its status.
7	AB	SG	none	Signal Ground: Provides reference level for other signals.
8	CF	DCD	input / output	Data Carrier Detect
15	DB	TC	input	Transmit Clock: DCE source.
17	DD	RC	input	Receive Clock
20	CD	DTR	output	Data terminal Ready
24	DA	TC	output	Transmit Clock: DTE source.

Table B-3 **Serial Interface Y-Cable Port B Specifications**

Pin	Circuit	Signal	Direction	Description
2	BA	TD	output	Transmit Data
3	BB	RD	input	Receive Data
4	CA	RTS	output	Request To Send
5	CB	CTS	input	Clear To Send
7	AB	SG	none	Signal Ground
8	CF	DCD	input / output	Data Carrier Detect
20	CD	DTR	output	Data Terminal Ready