Read Me First

Hardware READ ME FIRST
for Sun-3/60™ Systems

Introduction

The following information applies only to Sun-3/60 systems. Please read all applicable information before installing and using the system.

VME-SCSI Board Cable Pinout

Table B-5 in Appendix B of the Installation Manual incorrectly calls out pin 26 as being grounded. The pin is open and not grounded. The signal line TERMPWR now permits the SCSI device to feedback +5V through the connector without overloading internal fuses.

Sun-3/60 Color Systems

All 3/60s ordered as color systems will come without monochrome circuitry on the CPU board. To convert a color system to monochrome, it will be necessary to order and install a monochrome P4 "daughter" board.

Hardware Installation Manual for the Sun-3/60 Workstation

WARNING

There is a Lithium Battery (BBCV2), Matsushita Electric Type No. BR2325, located on the Sun CPU Board. This battery is NOT a customer replaceable part. The battery is marked as follows: "Warning— Replace battery with MATSUSHITA ELECTRIC or PANASONIC Part No. BR2325 only."

The battery may explode if mistreated. Do not dispose of the battery in fire. Do not disassemble it or recharge it.

CAUTION

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

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Preface

This manual gives unpacking and set-up directions for the Sun-3/60 Workstation and presents basic information about the hardware configuration. This installation manual consists of four chapters and two appendices:

Chapter 1	Unpacking and Inspection
Chapter 2	Setting Up the Sun-3/60
Chapter 3	Power-Up and Self-Test
Chapter 4	Ethernet and Thin Ethernet Cabling
Appendix A	Environmental and Electrical Specifications
Appendix B	Cable and Connector Pin Assignments

Reference Publications

The publications listed in the following table supplement data contained in this manual and provide additional information concerning the integration and operation of the Sun-3/60 Workstation.

Part Number	Description
800-1133	Complete Set of Sun Manuals
800-1521	Installing UNIX on a Sun Workstation — *(included in 800-1133)*
813-1000	Series of Sun Hardware Options Manuals
813-2000	Series of Sun Configuration Guides

1

Unpacking and Inspection

Unpacking and Inspection

This chapter describes how to unpack and inspect your Sun-3/60 workstation. It is recommended that two people lift, unpack and set up the system.

1.1. Unpacking

Select a suitable area with ample room to move while unpacking. Place a protective pad or cushion down to prevent scratching or damage to the components. It is recommended that two people lift, unpack and set up the system. You will need a razor or sharp knife to complete the unpacking procedures.

Refer to the graphic unpacking instructions printed on the top panel of each shipping container.

Immediately inspect the shipping containers for evidence of physical damage. If a shipping carton is damaged, request that the carrier's agent be present when the carton is opened. Keep all of the contents and packing material for the agent's inspection.

You will receive three shipping containers:

□ The largest container holds the video monitor and video monitor power cord.

□ The medium sized container holds the base, base power cord, Thin Ethernet cable, and the installation manual.

□ The smallest container is the accessory pack which includes the keyboard, mouse, mouse tablet, video monitor cleaner spray, and any other accessories that you may have ordered.

1.2. Inspection

After unpacking the shipping containers, inspect the components for possible damage sustained during shipment, and do the following:

□ Verify that the components received match the shipping list.

□ Check the identification marking on the rear of the base and video monitor to ensure your workstation is configured to the proper voltage.

1.3. Preparing for Shipment or Storage

Be sure to use the shipping containers and packing materials provided when you received your workstation. Follow (in reverse) the graphic unpacking instructions which are printed on the top panels of each of the shipping containers.

2

Setting Up the Sun-3/60

2

Setting Up the Sun-3/60

This chapter explains how to set the Ethernet/Thin Ethernet jumper, how to select the input voltage on the base, and how to connect the following workstation components and peripherals:

□ Keyboard

□ Mouse

□ Video Monitor (Monochrome, High Resolution Monochrome, Color and Grayscale)

□ Mcdem

□ Video Terminal (asynchronous)

□ Printer

Connection to the Small Computer Systems Interface (SCSI) is also described at the end of this chapter.

2.1. Safety Precautions

For your protection, use the following safety precautions when setting up your workstation:

□ **Do not connect any cables until instructed to do so.**

□ **Ensure the voltage and frequency of the power outlet you will use matches the electrical rating labels on the base and the video monitor.**

□ **Only use three-prong (grounded) power outlets.**

□ **Refer servicing to qualified personnel.**

2.2. Setting the Ethernet/Thin Ethernet Jumper

The Ethernet/Thin Ethernet jumper is factory set to the Thin Ethernet position. You will need to reposition this jumper if you intend to operate the Sun-3/60 using an Ethernet network.

Use the following steps and Figure 2-1 to set the Ethernet/Thin Ethernet jumper:

1. Remove the four screws securing the back panel to the chassis using a 2mm hex wrench.

2. Push the two extraction levers outward to unseat the CPU board.

3. Slide the back panel and the CPU board outward and locate the Ethernet/Thin Ethernet jumper.

4. The Ethernet/Thin Ethernet jumper is factory positioned onto a single post for Thin Ethernet operation.

5. Pull the jumper up and off the single post using a pair of needle nose pliers.

6. Connect the two posts with the jumper. The jumper is now set for Ethernet operation.

7. Slide the CPU board back into the chassis until seated.

8. Secure the back panel to the chassis with the four screws removed in Step 1.

Figure 2-1   *Ethernet/Thin Ethernet Jumper*

**ETHERNET/THIN
ETHERNET AND
MEMORY JUMPERS
(DO NOT MOVE
MEMORY JUMPERS)**

4MB   8MB   12MB   16MB   20MB   24MB   EXTXUR   HIGHRES

MEMORY JUMPERS

JUMPER POST

JUMPER IN THE THIN ETHERNET POSITION
(FACTORY CONFIGURED)

4MB   8MB   12MB   16MB   20MB   24MB   EXTXUR   HIGHRES

MEMORY JUMPERS

JUMPER IN THE ETHERNET POSTION
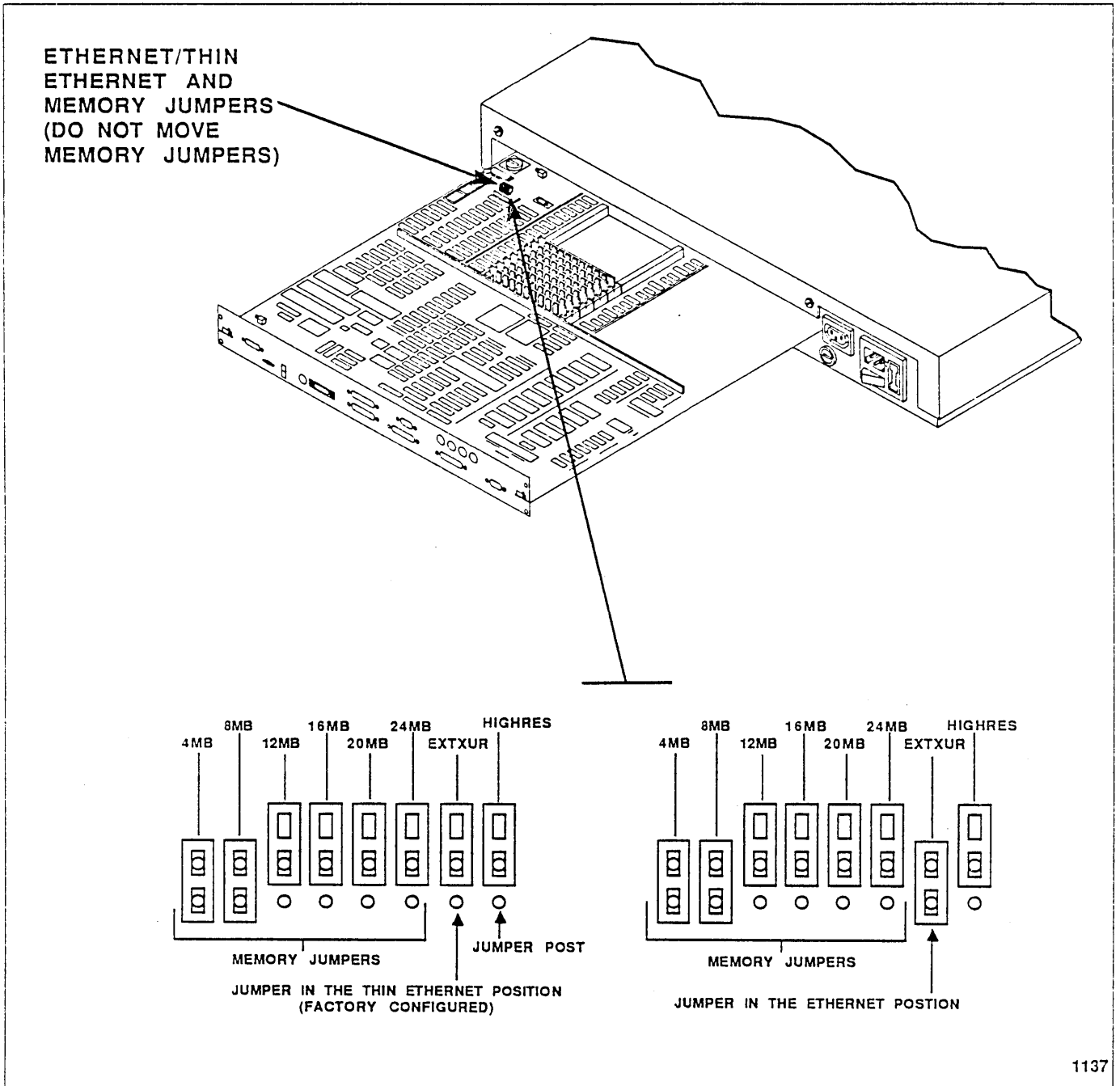
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2.3. Base Voltage Selection

The base voltage selection procedure should only be performed if the base is not already properly configured. Check the electrical ratings label on the back of the base and make sure it matches your AC input voltage. You may select either 115 volts or 230 volts (for 240 volt operation) using the voltage selector switch. The voltage selector switch, labeled **LINE SELECT**, is located on the rear of the base and is shown in Figure 2-2.

CAUTION

Before attempting to reset the base voltage, make sure the base power switch is OFF ("0" pushed in), and the AC power cord is disconnected.

To reset the voltage selector switch:

1. Insert a flat-blade screwdriver inside the slot on the voltage selector switch.

2. Twist the screwdriver until the arrow is aligned with the voltage marking on the top outer edge of the voltage selector switch.

3. Check the fuse in the fuseholder (7.0 A for 115 volt operation, and a 4.0 A for 240 volt operation).

4. Check the video monitor fuseholder and make sure that the proper fuse is used.

Figure 2-2   *Base Voltage Selector Switch*

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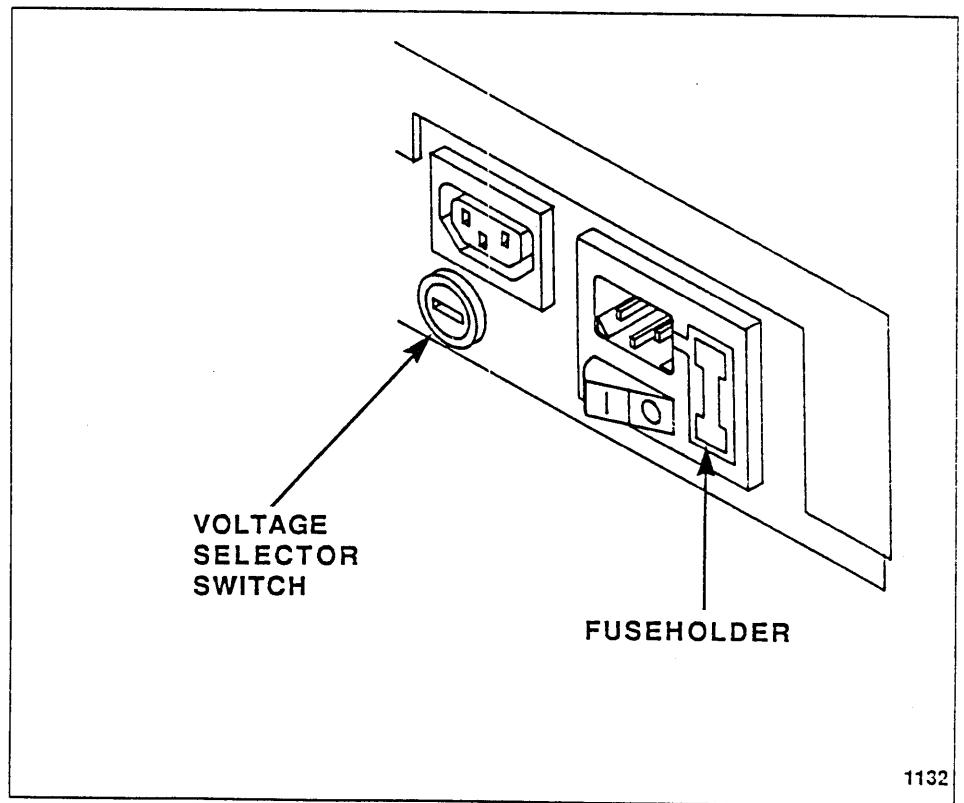
2.4. Connecting Workstation Cables

The following sections describe how to connect the Sun-3/60 Workstation cables. The cables will be attached to the rear of the base and are shown in Figure 2-3. Some of the openings on the back panel may have a removable cover plate over them. For example, if you have a monochrome video monitor, the openings for the color video monitor, labeled S, B, G, and R, will be covered.

CAUTION   The video power outlet, labeled AC OUTPUT, is to be used to provide power to the video monitor only. Do not connect the video monitor power cable to any other AC power source.

Figure 2-3   *Base Connectors*
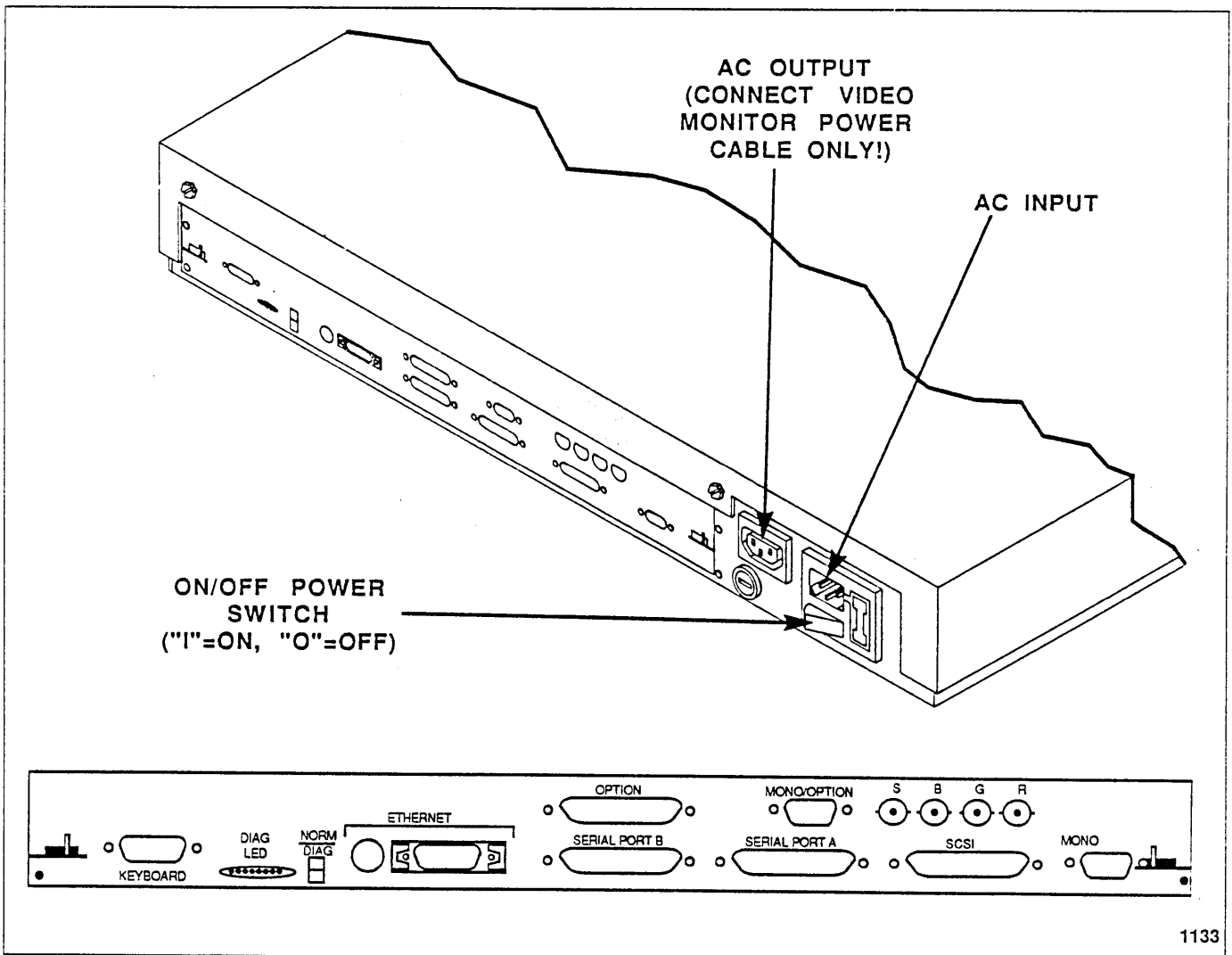
Connecting the Keyboard and Mouse

Use the following steps to connect the keyboard and mouse:

CAUTION

Make sure your workstation is not connected to a power source when connecting or disconnecting the keyboard or mouse. Doing so may cause permanent damage to the keyboard circuitry.

1. Connect the keyboard cable to the receptacle labeled **KEYBOARD** at the rear of the base.

2. Connect the mouse cable to the receptacle located at the rear of the keyboard.

3. Place the mouse tablet on a flat surface with the grid markings up. The mouse tablet must be oriented so its length is horizontal in relation to the mouse as shown in Figure 2-4.

Figure 2-4   *Mouse and Mouse Tablet*
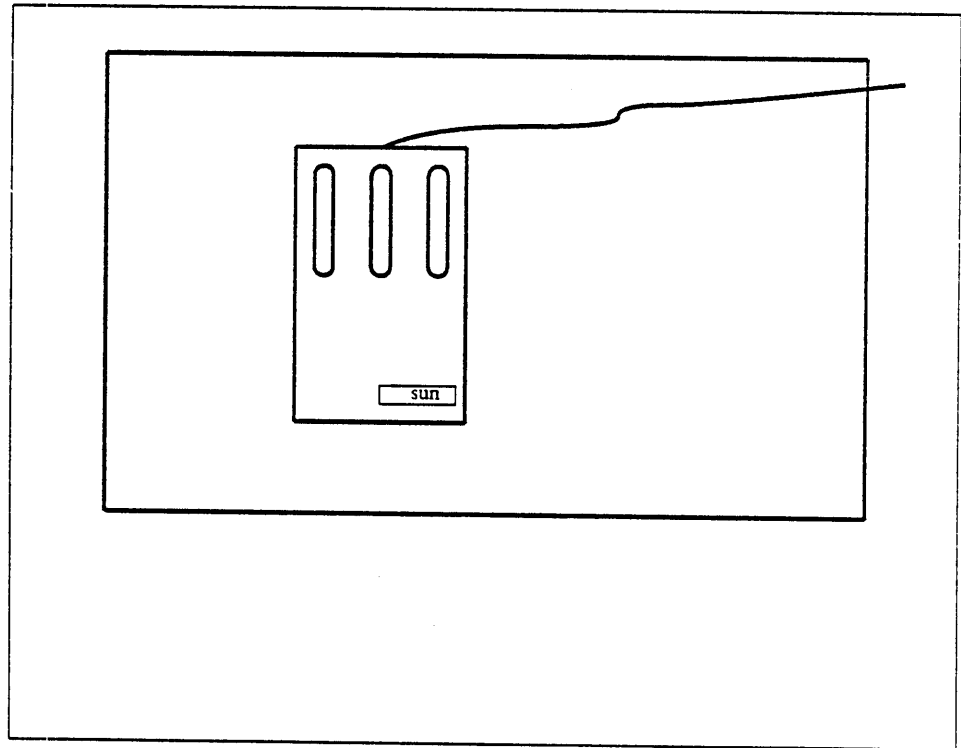
After setting your system up and logging into SunWindows™, moving the mouse across the mouse tablet will cause the arrow to move across the display.

Connecting the Video Monitor

The video monitor that you connect depends on which type is supplied with your workstation. There are four types of video monitors:

- Monochrome

- High Resolution Monochrome

- Color

- Grayscale

NOTE

Some Sun-3/60 Workstations are shipped with CPU boards that have no monochrome video circuitry on them. If you have purchased one of these workstations, there will be no D-connector on the chassis backpanel for the monochrome video signal cable.

The following paragraphs describe how to connect each of these video monitors.

Monochrome and High Resolution Monochrome Video Monitor

The monochrome and high resolution monochrome video monitors require a signal cable and a power cable. The signal cable has nine-pin D-connectors at each end. One connector has pins (male) and the other connector has pin sockets (female). The power cable has a three-pronged connector (male) at one end and a three-slot receptacle (female) at the other end.

CAUTION

Ensure the AC power switch on the video monitor and the base power switch are both OFF ("0" pushed in) before proceeding.

Signal Cable:

1. Connect the male D-connector to the receptacle labeled MONO/OPTION on the base and tighten the screws.

2. Connect the female D-connector to the receptacle labeled VIDEO on the video monitor and tighten the screws.

Power Cable:

1. Make certain the video monitor is OFF ("0" pressed in).

2. Connect the male end to the video monitor power outlet labeled AC OUTPUT on the base.

3. Connect the female end to the power connector on the rear of the video monitor.

4. Place the video monitor's power switch to the ON position ("1" pressed in).

Color Video Monitor

The color video monitor requires a power cable and a signal cable. The signal cable is a jacketed bundle of four lengths of coaxial cable, with four BNC connectors at each end. The power cable has a three-prong connector (male) at one end and a three slot (female) connector on the other end.

NOTE

Some color video monitors have four impedance switches labeled "75Ω/High" on the rear panel. Make sure these switches are set to the "75Ω" position.

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Signal Cable:

1. Connect the cable with the red marking to the connector labeled **R** (red) on the back of the video monitor and on the back of the base.

2. Connect the cable with the green marking to connector labeled **G** (green) on the back of the video monitor and on the back of the base.

3. Connect the cable with the blue marking to the connector labeled **B** (blue) on the back of the video monitor and on the back of the base.

4. Connect the remaining cable to the connector labeled either **S**, **SYNC**, **HD**, or **HV/H** (this marking will vary depending on the color monitor supplied).

Power Cable:

1. Make certain the video monitor is OFF ("0" pressed in).

2. Connect the female end to the power receptacle on the rear of the video monitor.

3. Connect the male end to the video monitor power outlet labeled **AC OUT-PUT** on the base.

4. Place the video monitor's power switch to the ON position ("1" pressed in).

Grayscale Video Monitor

The grayscale video monitor has a power cable and a signal cable. The signal cable consists of a jacketed bundle of two coaxial cables terminated with two BNC connectors at each end. The power cable has a three-pronged connector (male) at one end and a three-slot receptacle (female) at the other end.

Signal Cable:

1. Connect the cable with the red marking to the connector labeled **R** (red) on the back of the video monitor and the base.

2. Connect the other cable to connector labeled **SYNC** on the back of the video monitor and to the connector labeled **S** (synchronous) on the back of the base.

Power Cable:

1. Make certain the video monitor is OFF ("0" is pressed in).

2. Connect the female end to the power receptacle on the rear of the video monitor.

3. Connect the male end to the video monitor power outlet labeled **AC OUT-PUT** on the base.

4. Place the video monitor power switch to the ON position ("1" pushed in).

2.5. Asynchronous Serial Ports

You may connect modems, printers, plotters, or other serial devices that use the RS-232-C or RS-423 interface, to the serial ports. These two ports are located on the rear of the base and are labeled **SERIAL PORT A** and **SERIAL PORT B**.

Each serial port provides a 25-pin connector compatible with RS-232-C equipment and operate with the RS-423 standard. Each port provides Data Terminal Ready (DTR), Request To Send (RTS), and clock signals. Each port also receives Data Set Ready (DSR), Clear To Send (CTS), and Data Carrier Detect (DCD) signals.

The serial ports are wired as Data Terminal Equipment (DTE) to allow direct connection of Data Communications Equipment (DCE). Computers, video terminals, printers, and other DTE devices can be connected to either port by using a null modem cable. The output lines may be driven up to 19.2 kilobaud and the input lines may be driven up to 9.6 kilobaud. Serial port and the null modem cable pin assignments are listed in Appendix B.

For more detail, refer to the *System Administration for the Sun Workstation* manual (part number 800-1150), and the *Installing UNIX on the Sun Workstation* manual (part number 800-1521).

NOTE

The following paragraphs which describe connecting modems, video terminals, and printers to the serial ports, are guidelines only. Specific devices may require more detailed information contained in the System Interface Manual for the Sun Workstation (part number 800-1173).

Modems

Since the signals on each serial port are identical, you may connect your modem to either port. The signals on pins 2, 3, 4, 5, 6, 7, 8, and 20 at the output of the cable should be the same as those signals on corresponding pins of the serial port. Do not use a null modem cable to connect your modem to a serial port.

Refer to the manual provided with your modem and check which signals you will need for proper operation.

Video Terminal (Asynchronous)

Before connecting a video terminal to a serial port, verify it accepts the RS-232-C or RS-423 protocol. If it does, you may connect it to either serial port with a null modem cable (part number 530-1056). The null modem cable pin assignments are shown in Appendix B.

Printers

To connect a printer to a serial port it must have a DB-25 connector and use the RS-232-C standard. Refer to the manual provided with your printer and make certain your printer signals match the serial port pins.

You may connect the printer to either serial port with the null modem cable (part number 530-1056). You cannot connect a parallel interface printer to a Sun-3/60 unless you use a serial-to-parallel converter.

2.6. SCSI Connection

The Sun-3/60 has a Small Computer Systems Interface (SCSI). Connections are made to the 50-pin female connector on the base labeled **SCSI**. You may connect SCSI compatible disk and tape drive controller boards to the interface with a round 50-conductor cable terminated at each end with a 50-pin D-connector.

The *Sun-3 Mass Storage Subsystem Installation* manual (part number 813-1010), provides information on setting up SCSI type peripherals designed for use with the Sun-3/60.

3

Power-Up and Self-Test

Power-Up and Self-Test

This chapter describes the power-up and diagnostic procedures for the Sun-3/60 Workstation.

3.1. Workstation Power-Up

You may power-up your workstation if you have:

□ Connected the video monitor power cable.

□ Connected the video signal cable.

□ Connected the keyboard and mouse cables.

□ Placed the diagnostics switch in the NORM position.

To power-up your workstation:

1. Make certain the AC power switch on the base is in the OFF position ("0" pushed in).

2. Place the monitor power switch in the ON position ("1" pushed in).

3. For safety reasons, first connect the female end of the base power cord to the connector labeled **AC INPUT** on the rear of the base.

4. Connect the male end of the AC power cord to an AC power outlet.

5. Place the base power switch in the ON position ("1" pushed in).

The eight diagnostic LEDs will begin flashing (see *Power-On Self-Test*) and the video monitor screen will slowly come on. Rotate the brightness control if the video monitor screen does not come on within three minutes.

When the Self-Test is successfully completed, the following message will appear on the video monitor screen:

```
Self Test completed successfully.

        Sun Workstation, Model Sun-3/60, Sun-3 Keyboard
   ◈    ROM Rev --, xMB Memory installed, Serial # - - - -
        Ethernet address --:--:--:--:--:--

Autoboot in progress.
```

For further information on how to bring up UNIX see the *Installing UNIX on the Sun Workstation* manual (part number 800-1521). Procedures for changing the optional banner which includes the Sun logo, workstation model number and keyboard type are also in this manual.

Color Video Monitor Adjustment

Some color video monitors have vertical, horizontal and centering control knobs labeled **V-STAT**, **H-STAT**, and **V-CENT** respectively. You may adjust these control knobs to suit your preference.

Color Video Monitor Degaussing

During shipment, portions of the color video monitor can build up magnetic fields which may interfere with its operation. A symptom of this is lack of color purity (the screen may be unevenly colored). If this symptom cannot be corrected by changing the position of the system, you should try degaussing. If the degaussing procedure does not correct the color distortion, notify your Sun Service Representative.

NOTE   *Not all color video monitors have the degaussing button.*

To degauss the color video monitor:

1. Power the color video monitor ON for at least twenty minutes before continuing to the next step.

2. Press and hold the degaussing button on the rear of the video monitor until the image stops shimmering (about five seconds).

3.2. Power-On Self-Test

The single board computer has a programmable read-only memory (PROM) integrated circuit containing a program known as the "monitor." The monitor is a program that allows command execution and controls the operation of the system before the UNIX kernel takes control. When the system power is first turned on, the PROM monitor invokes a quick Self-Test procedure. The status of the Self-Test is displayed by the eight LEDs on the rear of the base.

A hardware problem may be indicated if the LEDs keep the same pattern for more than a couple of minutes during the Self-Test, or if the sequence restarts from the beginning. If this occurs, copy down the pattern of the LEDs (as well as you can) and contact Sun Microsystems Field Service or your local Field Service organization.

3.3. Diagnostic LEDs

The following list describes the function of the LEDs. Refer to Figure 3-1 and Table 3-1.

□ LEDs 0 through 4 display the hexadecimal number of the test in progress during the Self-Test.

□ LED 5 is called the heartbeat. It will start flashing after the conclusion of the Self-Test to indicate the CPU is receiving clock interrupts and the monitor is in quiescent state and/or UNIX is in boot state.

□ If LED 6 lights during the Self-Test, an exception class failure is indicated (bus error trap, address error trap, unexpected interrupt, etc.).

□ If LED 7 lights, LEDs 0 through 4 will freeze, indicating which test failed. If LED 7 is not lit, the tests are proceeding without error.

□ When all eight LEDs light up in sequence from 0 to 7 then back to 0 again (walking ones pattern), you have exited the Self-Test and UNIX is running successfully.

Figure 3-1   *Diagnostic LEDs*
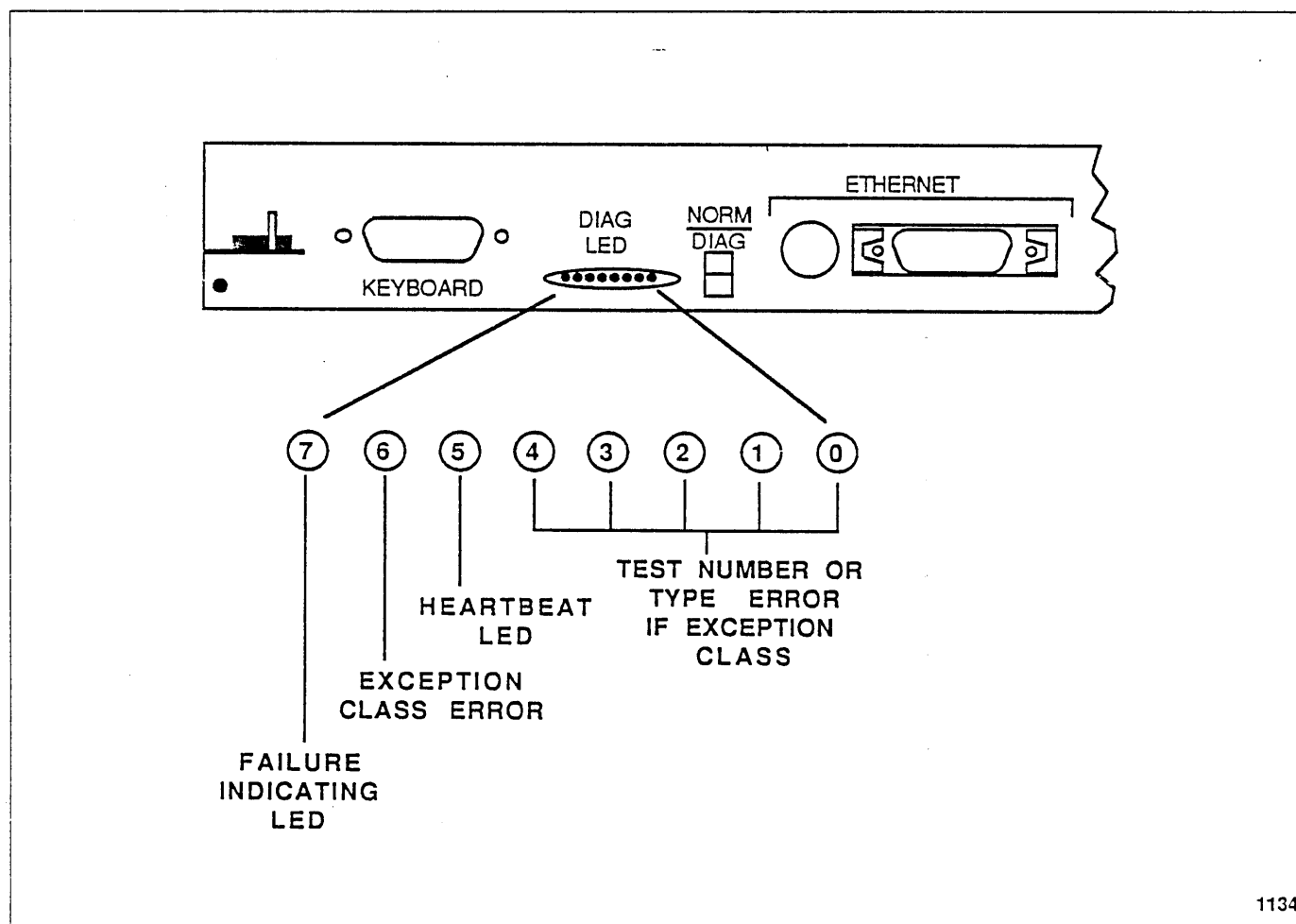
Table 3-1   *Diagnostic LED Test Descriptions*

Test	LEDs (A lighted LED = ●)							
	7	6	5	4	3	2	1	0
PROM Checksum Test	o	o	o	o	o	o	o	●
Context Register Test	o	o	o	o	o	o	●	●
Segment Map Rd/Wr Test	o	o	o	o	o	●	o	o
Segment Map Address Test	o	o	o	o	o	●	o	●
Page Map Test	o	o	o	o	o	●	●	o
Memory Path Data Test	o	o	o	o	o	●	●	●
NXM Bus Error Test	o	o	o	o	●	o	o	o
Interrupt Test	o	o	o	o	●	o	o	●
TOD Clock Interrupt Test	o	o	o	o	●	o	●	o
MMU Protection/Status Tests	o	o	o	o	●	o	●	●
Parity Error Test (#1)	o	o	o	o	●	●	●	o
Parity Error Test (#2)	o	o	o	o	●	●	●	●
Memory Test	o	o	o	●	o	o	o	o
Error Found	●	o	o	o	o	o	o	o
Exception Class Error Found	o	●	o	o	o	o	o	o
Self-Test Done (LED Flashing)	o	o	●	o	o	o	o	o
Reset	●	●	●	●	●	●	●	●
UNIX Running Properly (Walking Ones Pattern)	●	⇒o	⇒o	⇒o	⇒o	⇒o	⇒o	⇒o

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3.4. Diagnostics Switch

The diagnostics switch determines how the Sun-3/60 will be tested during initialization and the Self-Test. When in the NORM (normal) mode, a short self-test is executed to determine if UNIX will be booted. When in the NORM mode, all memory will be tested unless otherwise specified by the EEPROM. By default, the EEPROM is set to test all memory, however, you may modify this setting.

If the diagnostics switch is in the DIAG (diagnostic) mode, a more extensive self-test is executed to determine if a more comprehensive diagnostic will be loaded. When in the DIAG mode all memory is tested regardless of the EEPROM setting.

If the diagnostics switch is in the DIAG position, the power-on Self-Test messages are sent to PORT A, so a video terminal must be connected to PORT A in order to see them. The video terminal must have the following parameters:

Data Bits: Eight

Stop Bits: One

Parity: None

Baud Rate: 9600

Data Transmission: Full-Duplex

Flow Control: XON/XOFF

□ If you want to enable extended diagnostics when you power-up the system, set the switch to the DIAG position.

□ If you do not want to enable extended diagnostics when you power-up, set the switch to the NORM position. Ordinarily, the diagnostics switch is in the NORM position when booting or running the system.

NOTE   *If the diagnostics switch is accidentally placed in the DIAG position, nothing will appear on the monitor screen while the power-on Self-Test is running. When the Self-Test is successfully completed, you will be prompted to press any key on the workstation keyboard or on a terminal connected to PORT A within 10 seconds. This action will bring up a menu of extended tests.*

To exit the monitor program (identified by the ">" monitor prompt) and reboot the system:

1. Set the diagnostics switch to the NORM position

2. Type "b" and the argument which represents the boot device and program you wish to boot.

3. Press the RETURN key and the system will automatically begin to reboot.

4

Ethernet and Thin Ethernet Cabling

Ethernet and Thin Ethernet Cabling

This chapter describes how to connect the Sun-3/60 to an Ethernet or Thin Ethernet network using a Sun ETHKIT and appropriate accessories.

CAUTION   **To avoid Ethernet jamming, do not connect the Ethernet and Thin Ethernet cables at the same time. The Sun-3/60 is not intended to operate while connected to both network types.**

Ethernet Transceiver Cable Connection

The Ethernet cable is the thick cable with a 15-pin D-connector at each end. The male end of the Ethernet transceiver cable has a pair of metal studs that fit into the slide lock assembly attached to the Ethernet connector on the base.

1. Secure the male end of the transceiver cable to the Ethernet connector by pushing the slide lock over the studs.

2. The female end of the transceiver cable also has a slide lock assembly attached to the D-connector. Connect the female end to the Ethernet transceiver and lock it securely.

If you ordered an Ethernet kit, you have received a 15-meter length of transceiver cable and either "vampire tap" or N-type connectors. The coaxial cable and terminators necessary to connect multiple workstations to a network may be purchased separately.

Ethernet Cable Connection

Use the following steps and Figure 4-1 to connect the Ethernet cable:

1. Screw the 50-ohm coaxial cable to one of the transceiver N-connectors.

2. Attach a 50-ohm terminator to the end of the coaxial cable. This may be done by attaching the 50-ohm terminator to the transceiver's vacant N-connector or by connecting a barrel connector to the end of the coaxial cable.

3. For each workstation, connect the female end of the workstation's transceiver cable to the 15-pin D-connector on the transceiver, and the male end of the workstation's transceiver cable to the connector labeled ETHERNET on the rear of the base.

Figure 4-1   *Linking Up to Ethernet*

Key	Description
1	Terminator
2	Female N-connector to transceiver
3	Male N-connector to transceiver
4	Ethernet transceiver D-connector
5	Sun workstation to Ethernet D-connector on back panel
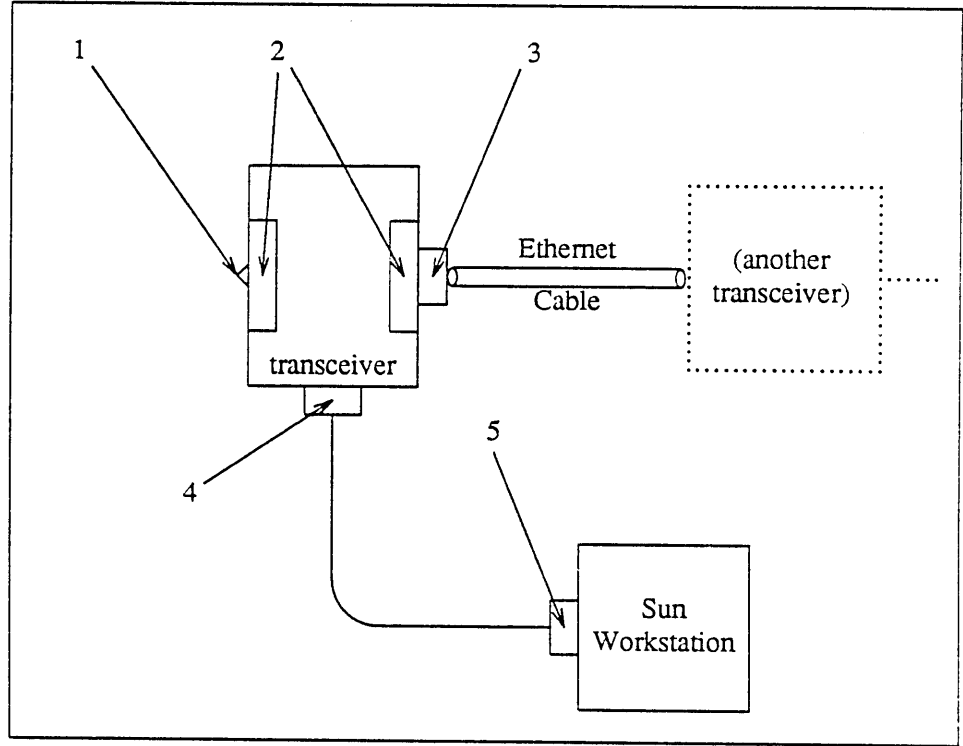
Ethernet Cable Limitations

Please note that there are certain cabling limitations that must be observed for proper Ethernet implementation. Refer to Table 4-1 and Figure 4-2.

Table 4-1   *Ethernet Cabling Limitations*

Maximum contiguous cable segments	500.0 meters
Distance between transceivers	2.5 meters multiples*
Maximum length of transceiver cable	50.0 meters

*The Ethernet cable should be marked every 2.5 meters. Make certain the transceivers are attached on a mark and to cut the cable ends on a mark.

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Figure 4-2   *Ethernet Cabling Lengths*
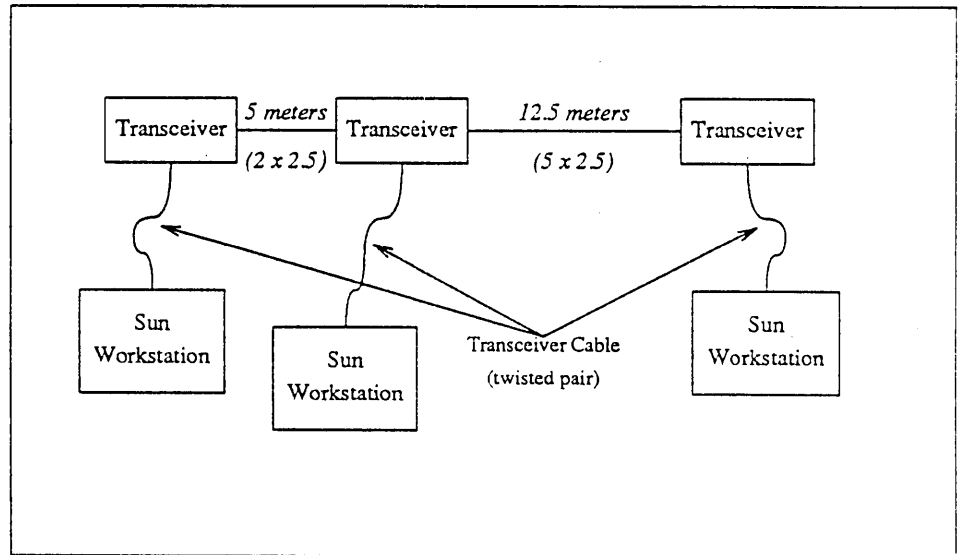
The female N-connector on the transceiver connects to the male N-connector on the Ethernet cable.

NOTE   *If you combine the Ethernet network with a Thin Ethernet network, you must observe cabling limitations described under the Combining Thin Ethernet and Ethernet Networks heading.*

4.1. Connecting the Thin Ethernet Cable

This section is for those who need to connect the Sun-3/60 directly to a network with 50-ohm, ¼-inch, RG58 coaxial cable.

The Thin Ethernet coaxial cable is connected to the BNC connector on the rear of the base. This connects the Thin Ethernet coaxial cable to the integrated Ethernet controller/transceiver. The Thin Ethernet cable replaces the heavier standard Ethernet cable and eliminates the need for external transceivers and drop cables. A Thin Ethernet configuration may be used alone or linked with a standard Ethernet through the use of adapters, described later in this chapter.

This procedure assumes that you are using the T-connector and Thin Ethernet cable shipped with the system to link Sun-3/60 Workstations, and you have ordered the appropriate accessories to complete your configuration.

NOTE   *All Thin Ethernet configurations use the BNC T-connector to link the Sun-3/60 to the Ethernet; some configurations may use adapters to link the Thin Ethernet cable to a standard Ethernet. Figure 4-4 illustrates possible configurations.*

Figure 4-3 describes various Thin Ethernet accessories available through your Sun sales office. One T-connector and a 15-meter length of Thin Ethernet cable is provided with each system.

Figure 4-3   *Thin Ethernet Connectors*
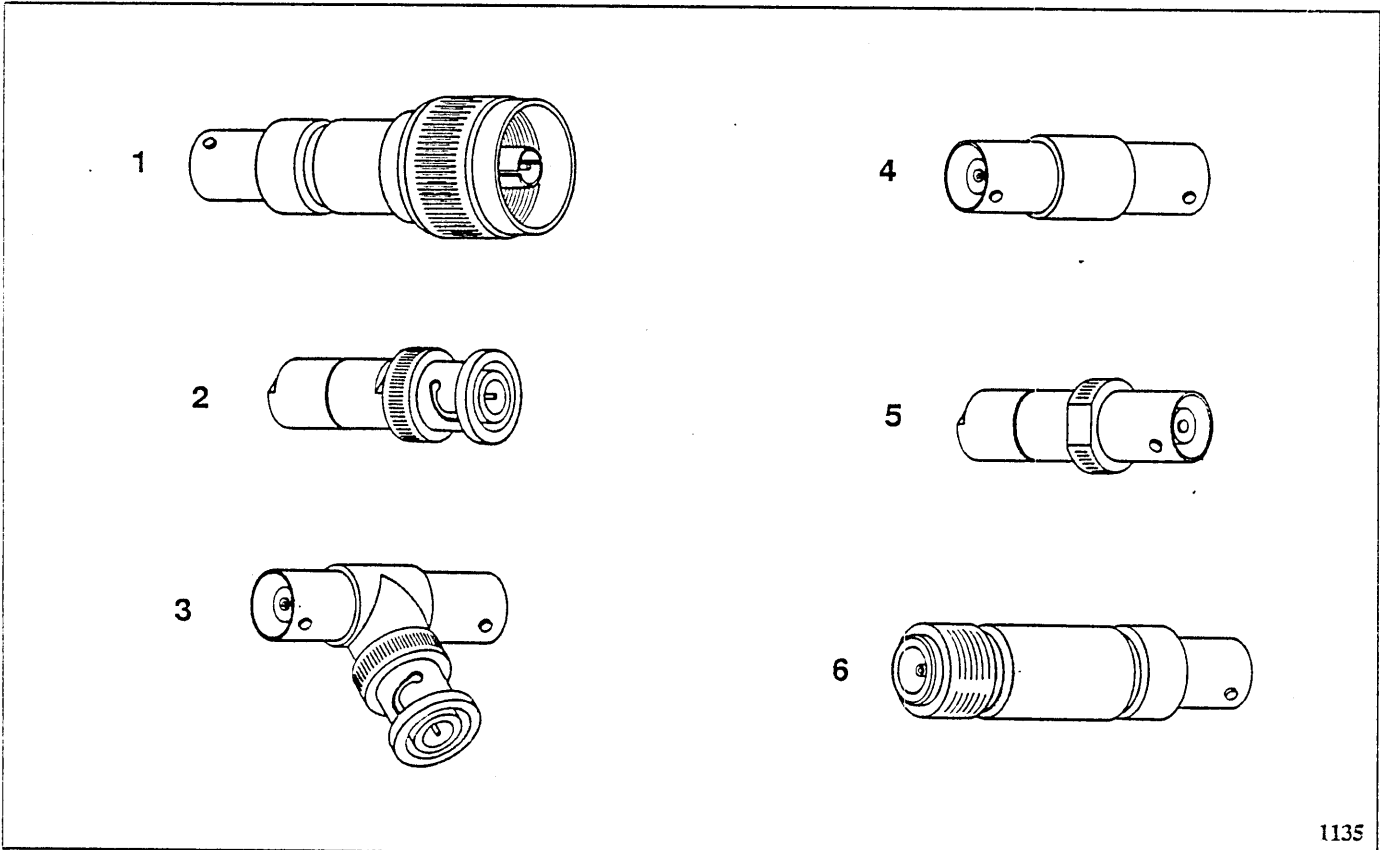
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Key	Sun Order Number	Description	Purpose
1	TA-M	Adapter, BNC female to "N" male	Connects thin cable to transceiver port
2	TT-M	50-ohm terminator, BNC male	Terminates a "T"
3	TTC	BNC "T" (F,M,F)	Daisy-chains workstations on thin cable
4	TBC	Barrel, BNC female to BNC female	Extends/connects thin cables
5	TT-F	50-ohm terminator, BNC female	Terminates a thin cable
6	TA-F	Adapter, "N" female to BNC female	Connects fat cable to thin cable

4.2. Combining Thin Ethernet and Ethernet Networks

You will need to use the adapters shown in Figure 4-3 to connect a Thin Ethernet to a standard Ethernet. Any "T" connection or length of Thin Ethernet cable not connected to a workstation, transceiver or another cable must be terminated with the appropriate terminator. Use Sun order number TS-15M for an additional 15-meter length of Thin Ethernet cable, or TS-5M for a five-meter length.

Figure 4-4   *Thin Ethernet/Ethernet Topology Example*

Key	Description
1	Adapter, BNC female to Type N male
2	Terminator, 50 ohm BNC male
3	BNC T, (F,M,F)
4	Barrel Connector, BNC female to BNC female
5	BNC terminator, 50 ohm female
6	Adapter, Type N female to BNC female
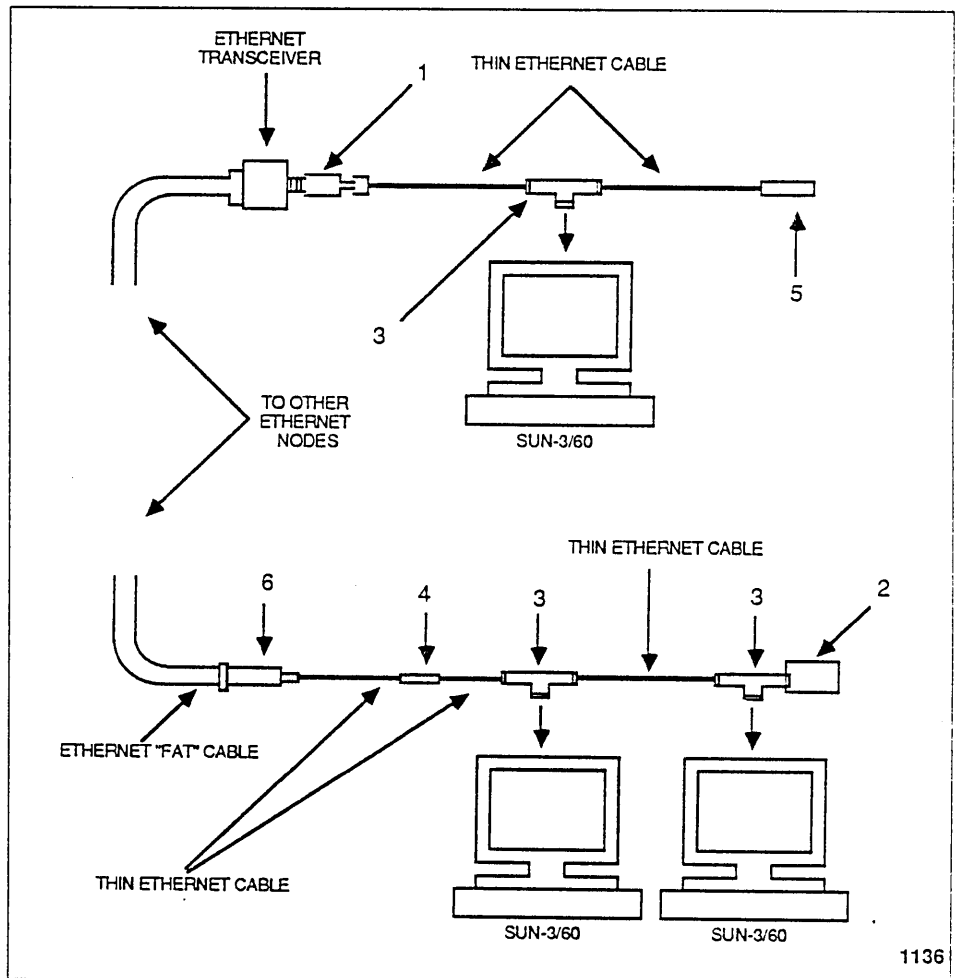
NOTE   *There are special cable length limitations that apply if you plan to combine Thin Ethernet and Ethernet networks. Table 4-2 and the paragraphs that follow it explain these considerations.*

To connect the Thin Ethernet cable to the Ethernet cable:

1.   Connect the male connectors on the ends of Thin Ethernet cable lengths to the female ends of the T-connector (No. 3 in Figure 4-3). If you only use one side of the T-connector, you should terminate the other side with a terminator (No. 2 in Figure 4-3).

Table 4-2   *Thin Ethernet Cabling Limitations*

Maximum contiguous length of a coaxial cable segment	185.0 meters
Maximum length of Thin Ethernet network	5 segments*
Maximum number of stations per segment	30
Minimum distance between two stations	0.5 meters

*Requires repeater sets

2. Match the male BNC connector to the female BNC connector by aligning the pin in the male connector with the hole in the female connector. Push in and twist the outer housing until it locks in place.

3. To connect the T-connector to the base, match the male portion of the T-connector to the female BNC connector on the computer base. Push in and twist the outer housing until it locks in place.

When you add a Thin Ethernet network to a standard Ethernet network, each Thin Ethernet segment must be counted as three times its actual length in calculating the maximum length that the combined networks can be. The maximum length of one standard Ethernet segment is 500 meters, and the maximum length of a standard Ethernet network is 2.5 Kilometers.

So, if you combine a 200-meter standard Ethernet segment with a Thin Ethernet segment, the maximum Thin Ethernet segment would be 100 meters (counted as 300 meters). This would bring the total combined segment length to the 500-meter limit.

Ethernet Segment Length + Thin Ethernet Segment Length $\times$ 3 < 500 Meters

In order to add a Thin Ethernet to an existing one kilometer Ethernet network, the total length of your Thin Ethernet network must be no more than 500 meters (⅓ of what is left of the 2.5 Kilometer Ethernet limit).

Ethernet limit - Actual total Ethernet length = Remainder of Ethernet limit

Remainder of Ethernet limit ÷ 3 = Maximum length of Thin Ethernet when added to "Actual total Ethernet length"

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A

Environmental and Electrical Specifications
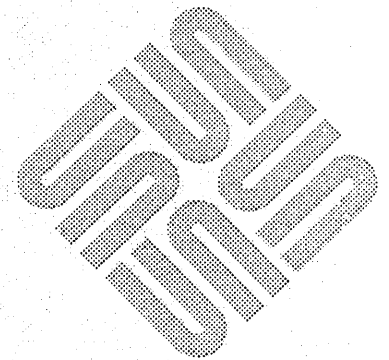
Environmental and Electrical Specifications

This section describes the environmental and electrical requirements for the Sun-3/60.

A.1. Physical Environment

The Sun-3/60 is manufactured for the following physical environment:

Table A-1   *Physical Environment Specifications*

	Operating	Non-Operating
Ambient Temperature	10°C to 40°C	−20°C to 75°C
	(50°F to 104°F)	(−4°F to 167°F)
Humidity (non-condensing)	5% to 80%†	5% to 95%†
Altitude	0m to 2,300m	0m to 12,192m
	0 to 7,000 feet	0 to 40,000 feet

A.2. Electrical Specifications

Table A-2   *Sun-3/60 Power Supply Specifications*

Nominal AC Input Voltage	Operating Range	Frequency Range
115 VAC	90-132 VAC	47-70 Hz
230 VAC	180-264 VAC	47-70 Hz

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† at 40° Centigrade

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Table A-3   *Sun-3/60 Power Supply DC Output Ratings*

Output	Voltage	Max Current
Output 1	+5 VDC	15 A
Output 2	+12 VDC	1.3 A
Output 3	−5.2VDC	2.0 A

Table A-4   *Sun-3/60 PC Board Power Consumption*

Configuration	Max Amps @ +5.25V	Max Amps @ −5.2V	Max Amps @ +12V	Max Total Watts
Fully Configured	13.5	0.5	0.5	78.6
Typical	11	0.3	0.3	60.1

Table A-5   *Total System Power Consumption*

Computer Base	Video Monitor	Total System
145 Watts	150 Watts	295 Watts (1010 BTU/hr)

Table A-6   *Fuses*

Base AC Fuse size	Video Monitor Fuse
7.0 A, Slo-Blo (for 115V) 4.0 A, Slo-Blo (for 230V)	1.5 A (Slo-Blo)/125 VAC, 1.5 A/230 VAC (Moniterm) 1.5 A/125 VAC, 1.5 A/230 VAC (Phillips) 4.0 A/125 VAC, 3.4 A/230 VAC (Sony)

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B

Cable and Connector Pin Assignments

B

Cable and Connector Pin Assignments

This appendix contains the cable and connector pin assignments for the following:

□   Keyboard/Mouse Connector

□   Serial Port(s)

□   Ethernet Connector

□   Video Monitor Connector

□   Null Modem Cable

□   SCSI Connector

The serial port signal descriptions are also included in this appendix.

Table B-1   *Pinout of Keyboard/Mouse Connector*

Pin	Signal	Pin	Signal
1	RXD0†	8	GND
2	GND	9	GND
3	TXD0†	10	VCC
4	GND	11	VCC
5	RXD1†	12	VCC
6	GND	14	VCC
7	TXD1†	15	VCC

Table B-2   *Pinout of Serial Ports A and B*

Pin	Signal	Pin	Signal
2	TXD	8	DCD
3	RXD	15	DB
4	RTS	17	DD
5	CTS	20	DTR
6	DSR	24	DA
7	GND	25	-5V

Table B-3   *Pinout of Ethernet Connector*

Pin	Signal	Pin	Signal
1	chassis ground	7	VCC
2	E.COL+	9	E.COL-
3	E.TXD+	10	E.TXD-
4	chassis ground	12	E.RXD-
5	E.RXD+	13	+12V
6	GND		

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†RXD0 and TXD0 are the keyboard serial lines; RXD1 and TXD1 are the mouse serial lines.

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Table B-4   *Video Monitor Connector Pinouts†*

Pin	Signal	Pin	Signal
1	VIDEO+	6	VIDEO-
3	HSYNC	7	GND
4	VSYNC	8	GND
		9	GND

Figure B-1   *Null Modem Cable Pin Arrangement*
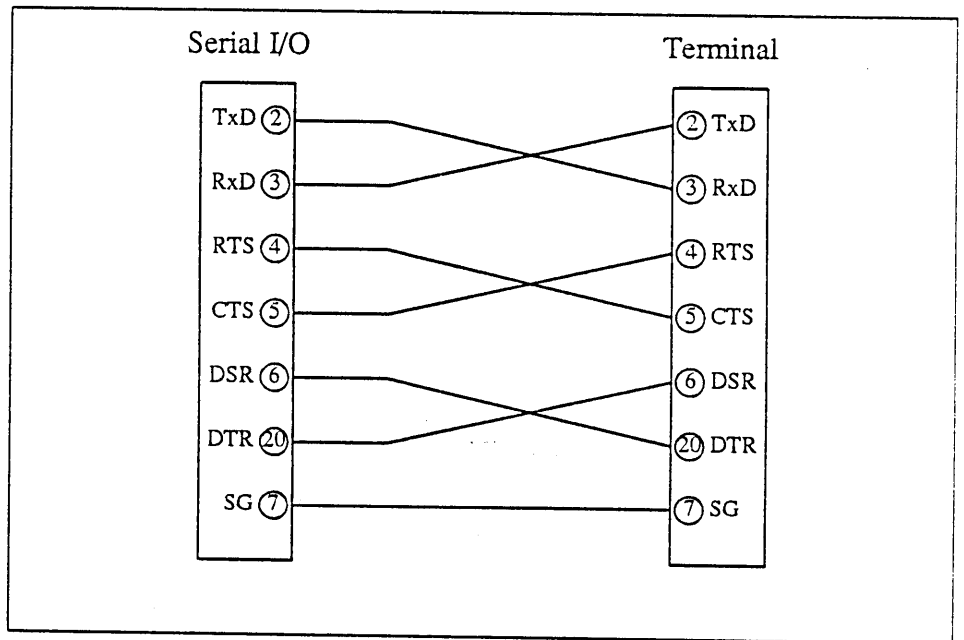
Table B-5   *VME-SCSI Board Cable Pinout*

Signal	Pin	Signal	Pin
-DB(0)	2	GND	1
-DB(1)	4	GND	3
-DB(2)	6	GND	5
-DB(3)	8	GND	7
-DB(4)	10	GND	9
-DB(5)	12	GND	11
-DB(6)	14	GND	13
-DB(7)	16	GND	15
-DB(P)	18	GND	17
GND	20,22,24	GND	19
GND	26	GND	21
GND	28,30	GND	23
-ATN	32	GND	25
GND	34	GND	27
-BSY	36	GND	29
-ACK	38	GND	31
-RST	40	GND	33
-MSG	42	GND	35
-SEL	44	GND	37
-C/D	46	GND	39
-REQ	48	GND	41
-I/O	50	GND	43
		GND	45
		GND	47
		GND	49

B.1. Description of Serial Port Signals

The data communications equipment (DCE) may be a printer, a plotter, a modem, or any other device which uses an RS-232-C or an RS-423 interface. Pins not mentioned are not used on the Sun-3/60.

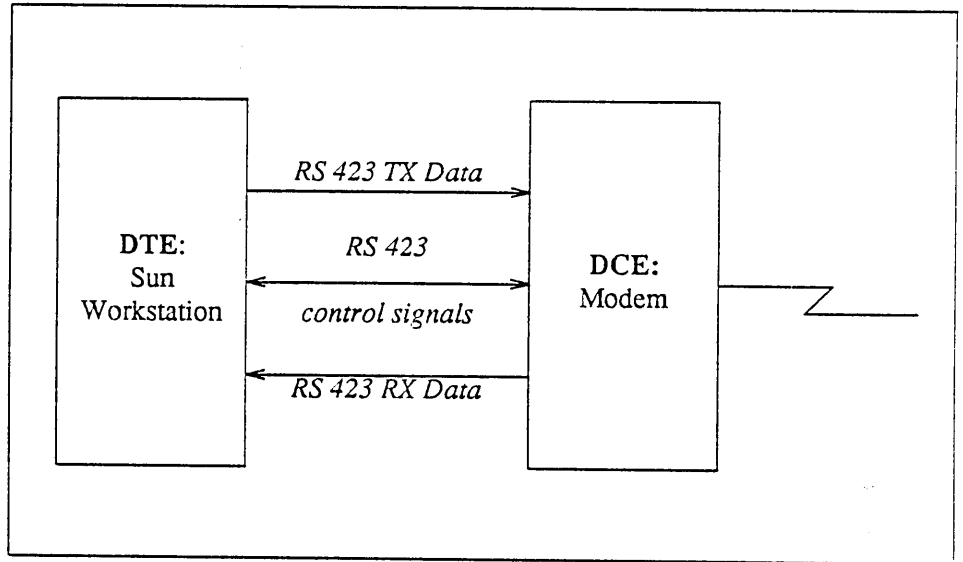Figure B-2   *Typical DTE/DCE Configuration*

Table B-6   *Serial Port Signal Description*

Pin	Signal	Signal Name	Direction	Description
2	TXD	Transmit Data	output	The actual data transmitted to the DCE.
3	RXD	Receive Data	input	The actual data received from the DCE.
4	RTS	Request to Send	output	Signal sent to the DCE, asking if it is ready to start accepting data.
5	CTS	Clear to Send	input	Signal from the DCE saying it is ready to accept data.
6	DSR	Data Set Ready	input	Signal from the DCE indicates the status of the local data set (a peripheral connected to the Sun-3/60).
7	GND	Signal Ground	none	Signal Ground provides a reference level for the signal voltages.
8	DCD	Data Carrier Detect	input	The DCE has detected "carrier," for example, a modem senses tones sent to it by another modem over phone lines.
15	DB	Transmit Clock from DCE	input	Transmit clock from the modem. This signal is usually not used for asynchronous devices (most terminals, printers, modems, etc.).
17	DD	Receive Clock from DCE	input	Receive clock from the modem. This signal is usually not used for asynchronous devices (most terminals, printers, modems, etc.).
20	DTR	Data Terminal Ready	output	Indicates workstation is powered on and able to communicate as the locate data terminal with the DCE.
24	DA	Transmit Clock from DTE	output	Provides transmit clock from the workstation. DA is usually not used for asynchronous devices.
25	VERR	reference -5V level	none	This signal is used by some modems to sense connection to the workstation.

Revision History

Revision	Date	Comments
01	9 February 1987	Alpha Review
02	8 May 1987	Beta Review
03	29 June 1987	Final Review
04-50	17 July 1987	Engineering Release
05-50	14 August 1987	Revision History Page Included
05-A	19 April 1988	Production Release