Optimum V8 System/WorkStation
Installation Manual

An NBI
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Integrated Solutions

Optimum V8 System/WorkStation
Installation Manual

FCC WARNING

Class A Computing Devices

This equipment generates, uses, and may emit radio frequency energy. The equipment has been type 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 radio frequency interference when operated in a commercial environment. Operation of this equipment in a residential area may cause interference in which case the user at his own expense may be required to take measures to correct the interference.

PREFACE

The *Optimum V8 System/WorkStation Installation Manual* describes how to unpack, install, and boot your new computer system. The procedures in this manual apply to these eight-slot Optimum V products: the Optimum V8 System and the Optimum V8 WorkStation.

Who Should Read This Manual?

You should read this manual if you are responsible for the installation or maintenance of your system. Casual users, people who log in with user accounts to do normal work, do not ordinarily need this manual.

This manual assumes a basic knowledge of computer systems and some basic mechanical skills.

What Does This Manual Cover?

This manual explains how to install and boot your system. Use this manual in one of two ways:

- Installing a system—start at "Section 1: Introduction" and follow all procedures in order. Use the Installation Checklist in Section 1.2.

- Changing system configuration—turn to the appropriate section. Update "Appendix B: Configuration Log."

NOTE

Failure to follow the instructions and observe the CAUTION,
WARNING, and NOTE messages in this manual may void your warranty.

This manual contains five sections and two appendixes:

Section 1 provides introductory material and an Installation Checklist that tells how to install the system using information in the rest of the manual.

Section 2 tells how to unpack and inspect the system before installation.

Section 3 describes how to position the system, prepare it for operation, and connect the system console (or WorkStation monitor).

Section 4 tells how to connect peripheral devices to the system.

Section 5 gives procedures for bringing the system to full operation.

Appendix A shows specifications of the Optimum V8 System and WorkStation.

Appendix B is a system configuration log.

Some Naming Conventions for This Manual

This is a brief glossary of references you will see in this manual:

IS Integrated Solutions.

Optimum V8 System is the Optimum V8 system based on the VME bus.

Optimum V WorkStation is the special graphics display system, largely the same as the Optimum V8

System, but with a special graphics terminal and controller.

The word "system" applies generically to both the Optimum V8 System and the Optimum V WorkStation.

You will see these uses of **boldface** and *italics:*

Boldface

- Section headings.

- Commands that you type to UNIX exactly as printed (e.g., "Enter **root** and press RETURN").

- Messages that UNIX prints on your screen (e.g., **login:**).

- User account names (e.g., the **root** login account).

- References to UNIX commands (**tar** (1) refers to the command **tar**; the "(1)" shows that you can find a description of **tar** in Section 1 of the *UNIX Programmer's Manual*, Volume I).

Italics

- Names of manuals (e.g., the *UNIX Programmer's Manual*).

- Parts of commands that you must replace with real values (e.g., *yymmddhhmm*) refers to the format used to enter the date.

Related Documents

You should have these documents:

- *UNIX Programmer's Manual*, three volumes

- *UNIX 4.2BSD System Administrator Guide*

These manuals document the Optimum V8 WorkStation:

- *Optimum V WorkStation Monitor Installation Manual*

- *Optimum V WorkStation Programmer's Manual*

- *Desktop Manager User's Guide*

- *UNIX Programmer's Manual Supplement Graphics Software Manual*

- *Paint Program User's Guide*

- *Browse User's Guide*

- *Color VME-Graphics Subsystem Hardware Reference Manual*

- *Monochrome VME-Graphics Subsystem Hardware Reference Manual*

These manuals document the VME boards of your system:

- *VME-68K10 Hardware Reference Manual*

- *VME-68K20 Hardware Reference Manual*

- *VME-HSMEM High Speed Memory Hardware Reference Manual*

- *VME-SCSI Host Adapter Hardware Reference Manual*

- *VME-ICP16/8 Intelligent Communications Processor Hardware Reference Manual*

- *VME-QIC2/R Specification/Configuration Summary*

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SECTION 1: INTRODUCTION

If you have not yet done so, please read the preface at the beginning of this manual.

Integrated Solutions offers the Optimum V8 series of products:

- The Optimum V8 System, a high-performance general purpose computer system.

- The Optimum V8 WorkStation, an Optimum V8 System with graphics capabilities.

This manual contains installation procedures for both models.

This section contains the following subsections:

      1.1   General Steps to Installation

      1.2   Installation Checklist

1.1 General Steps to Installation

Installation takes three major stages:

1. Unpacking and inspecting

2. Setting up

3. Turning on power

Section 1.2 provides an Installation Checklist that moves step-by-step through installation. Each step tells where to find more detailed information in this manual. Read and perform all procedures in order, and check off each step as you complete it.

Since this manual supports all Optimum V8 configurations, you may find that some steps in the Installation Checklist do not apply to you. Mark the non-applicable steps with a dash and ignore them.

For your first installation, read all sections of this manual. After several installations, you may want simply to use the Installation Checklist as a quick reference for procedures.

1.2 The Installation Checklist

Use the checklist in Table 1-1 to install an Optimum V8 System or WorkStation.

Table 1-1. Installation Checklist

Step	Action	See . . .
☐ 1.	Check that you have a properly prepared location for the system.	Section 2.1
☐ 2.	Check that you have the proper tools for installation.	Section 2.2
☐ 3.	Remove the packing list from the top of the packaging and set it aside.	Section 2.3
☐ 4.	Check that the packing list matches the system configuration you ordered.	Section 2.3
☐ 5.	Remove the system from its packing materials. Do not yet unpack the graphics monitor (WorkStation only).	Section 2.3
☐ 6.	Inspect the system for shipping damage.	Section 2.3
☐ 7.	Position the system in accordance with site requirements.	Section 2.3
☐ 8.	Unpack the documentation and any software tapes.	Section 2.5
☐ 9.	Read the installation safety information.	Section 3.1
☐ 10.	Connect the Console terminal (Optimum V8 System only).	Section 3.3
☐ 11.	Unpack and install the graphics monitor (WorkStation only).	Section 3.4
☐ 12.	Connect a terminal to Port 0 (Optimum V8 System only).	Section 4.1
☐ 13.	Connect any additional terminals.	Section 4.2
☐ 14.	Connect the modem.	Section 4.3
☐ 15.	Connect any serial printers.	Section 4.4.1
☐ 16.	Connect a parallel printer.	Section 4.4.2
☐ 17.	Install other options.	Section 4.5
☐ 18.	Check controls and indicators.	Section 5.1
☐ 19.	Connect to AC power.	Section 5.2
☐ 20.	Turn on system power.	Section 5.2
☐ 21.	Check that the system autoboots correctly.	Section 5.3
☐ 22.	Record your system configuration in "Appendix B: Configuration Log."	Appendix B

SECTION 2: PREPARING FOR INSTALLATION

This section provides procedures to perform before system installation. Mark the Installation Checklist appropriately (see Section 1.2) after completing each task. This section contains the following subsections:

2.1 Site Requirements

2.2 Tools Needed

2.3 Unpacking and Inspecting the System

2.4 Repacking Instructions

2.5 Checking System Documentation and Software

2.1 Site Requirements

The system requires a minimum amount of site preparation. To ensure the proper operation and maintainability of the system, locate the system on a site that meets the Optimum V8 physical and environmental requirements.

2.1.1 Physical Requirements

The system requires a floor space capable of supporting 75 pounds and measuring 30 inches wide by 45 inches deep with the clearances shown in Figure 2-1. These clearances ensure that there is adequate room on either side and at the rear of the system for the required air flow. The indicated clearances also provide the space needed to insert a tape cartridge and utilize the front panel controls and indicators. The height clearance required for the Optimum V8 is 25.5 inches.

For an Optimum V8 System, choose a location with available space for the console terminal. For an Optimum V8 WorkStation, see Section 2.2, "Site Requirements," of the *Optimum V WorkStation Monitor Installation Manual* to choose a location for the WorkStation monitor.

In addition to these operational requirements, Figure 2-1 also shows the room needed to allow access to the system for maintenance purposes.

2.1.2 Environmental Requirements

The Optimum V8 has two fans for cooling and to prevent dust accumulation. The system functions properly in a standard office environment without any special cooling requirements. However, it is good practice to avoid positioning the system in the path of dust-laden currents of air, such as near a door.

The system specification calls for proper operation at ambient temperatures up to 45°C (113°F). Operating above 35°C (95°F) is not recommended, however, because it puts more stress on the disk components.

The system requires a common 3-prong 115 VAC grounded receptacle capable of handling at least 400 watts, the AC power required by the system at maximum configuration.

Finally, it is strongly recommended that a static electricity mat be installed in front of the system to prevent the buildup of electrostatic charges.
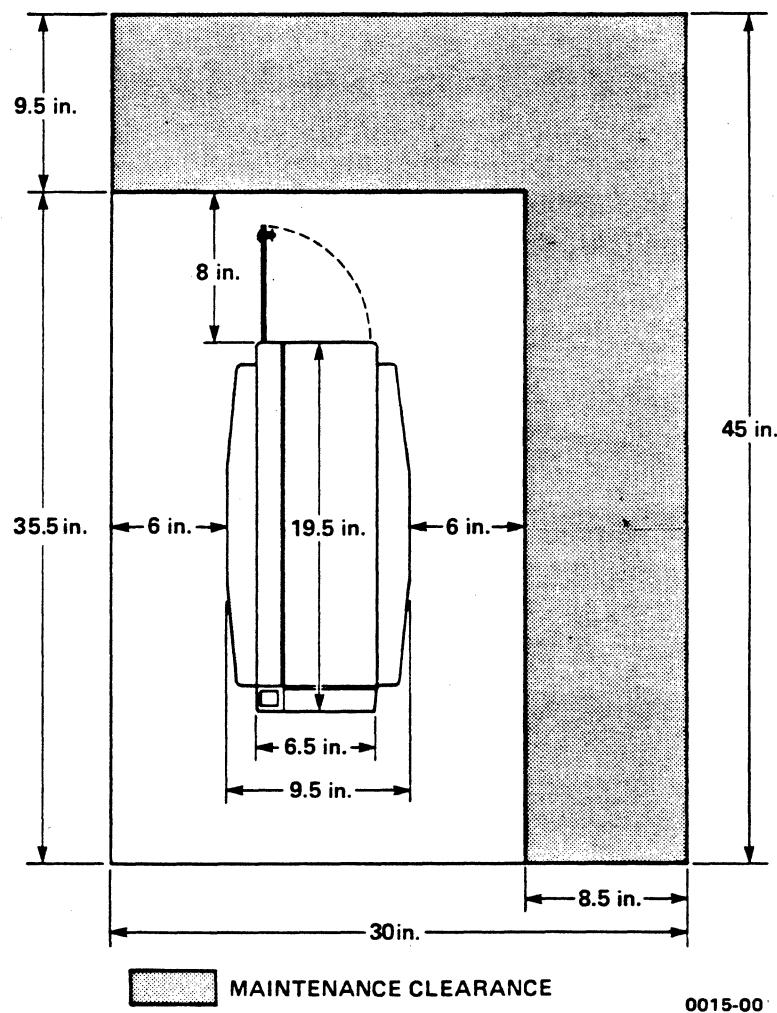
Figure 2-1. System Space Requirements

2.2 Tools Needed

For unpacking and inspecting the system, you will need

1. a box cutter

2. a flat head screwdriver

3. a Phillips head screwdriver

2.3 Unpacking and Inspecting the System

This subsection describes how to unpack and inspect your system. You will minimize your start-up time if you follow the instructions in this section.

The system is tested and examined prior to shipping. Nevertheless, mishandling that affects its appearance or operation can occur during shipment. Thus, carefully unpack and inspect the system before installing it.

NOTE

Any shipping damage must be reported to the carrier's agent within 48
hours, and the original packing material must be retained to support
damage claims. Save the original packing material anyway, for repacking
or relocating the system. Repacking instructions are given in Section 2.4.

A shipment can involve up to three packages:

- The system itself, wrapped with a plastic bag and shipped in a foam-lined box, which also contains the system power cord.

- The system documentation, along with a cartridge tape that contains the software distribution.

- In the case of the Optimum V8 WorkStation, a third box contains the graphics monitor, keyboard, and mouse.

If you must unpack the WorkStation monitor now, use the procedure in Section 2.3, "Unpacking and Inspecting the Monitor," of the *Optimum V WorkStation Monitor Installation Manual*. Otherwise, wait until later to unpack the monitor; it is best to locate and unpack the WorkStation first.

To unpack the system, follow these steps:

WARNING

**It takes two persons to lift the system without undue
strain. Request assistance to avoid personal injury.**

1. Remove the packing list from the shipping box. Check the packing list to verify that everything ordered has been shipped.

2. Inspect the shipping box for signs of damage.

3. If there is visible damage to the shipping box (or to the system once it is unpacked and inspected), fill out a shipping damage report. Note the damage on the packing list and insist that the shipping agent sign the packing list. Make three copies of the damage report and the packing list: for the shipping agent carrier, for Integrated Solutions, and for your records. Send a copy of each to the shipping agent carrier and to Integrated Solutions Customer Support; keep a copy for your records.

4. Remove the power cord and set it aside.

5. With one person standing near the top of the system and another person standing at the bottom of the system, carefully remove the system from the shipping box and set it upright.

6. Remove the plastic bag and inspect the system cabinet for obvious signs of shipping damage. Again, fill out a damage report, if necessary.

7. Turn the fastener on the back door; open the door.

8. Using a Phillips screwdriver, remove the screw that secures the right panel to the chassis (see Figure 2-2, item A).

9. At the rear of the system, use your right hand to grip the top of the system; use your left hand to slide the left panel (as viewed from the rear of the unit) back. Remove the panel and set it aside. Refer to Figure 2-2.

10. Inspect the major system assemblies (card cage, disk drive, tape drive, and power supply) for obvious signs of shipping damage.

11. Examine the internal cables. Check that they are securely fastened to their mating connectors.

12. If your system has a Breakout Serial Port Panel for additional serial ports, check the 50-pin cable connections between the system rear panel port (PORTS 1-8 and/or PORTS 9-16) and the Breakout Serial Port Panel.

13. If the system has not been damaged in shipping, proceed to the next step. If the system has incurred shipping damage, complete the necessary paperwork, replace the side panel and repack it for return to Integrated Solutions, as described in Section 2.4.

14. Replace the side panel. Place the panel in the groove, align the tabs on the panel with the tab cutouts on the system chassis and slide in the panel. Ensure the tabs at the front of the panel slide inside the chassis so the panel fits securely. Reinstall the screw that secures the side panel into position (see Figure 2-2).

15. Position the system for installation, taking into account the site requirements discussed in Section 2.1.
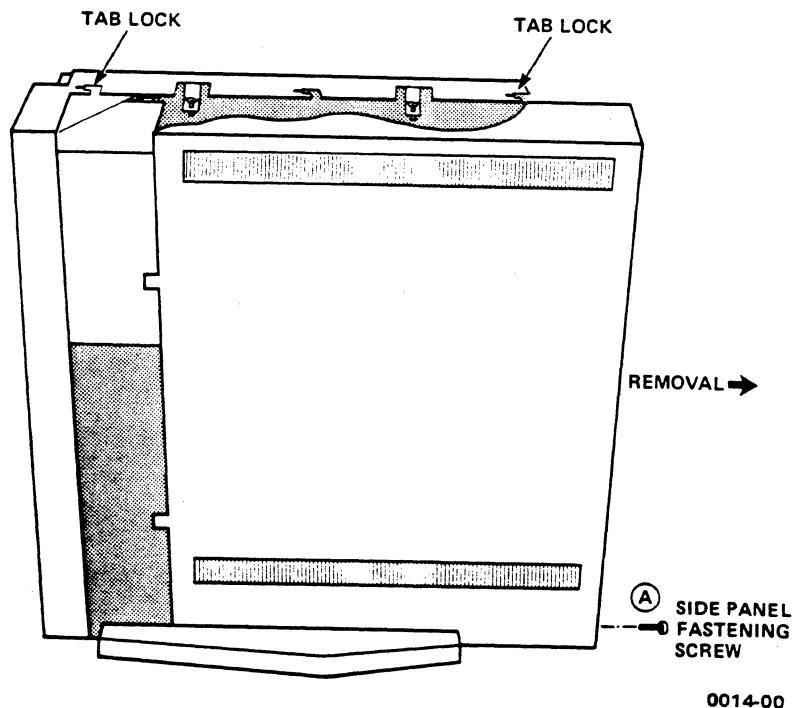
Figure 2-2. Side Panel Removal

2.4 Repacking Instructions

Should it be necessary to repack a system damaged in shipping, follow the instructions in this section. These instructions can also be used when the system must be relocated. In the latter case, be sure to take a full tape dump of the system (including the root (/), /usr, and any other user-created file systems as appropriate) before bringing it down and moving it. See the *Unix 4.2BSD System Administrator Guide* for details on tape dumps.

1. If the system was damaged in shipping and is to be returned to Integrated Solutions, first call IS to get a Returned Material Assignment (RMA) number for the system. *Do not return the system without this number on the outside of all packages.*

2. Prepare the original packing materials by positioning the foam inserts in the shipping box.

3. Place the system in the shipping box with the chassis side to which the major assemblies are attached *down*. Distribute the loose packing material ("popcorn") over the system.

4. Close the shipping box and retape it.

5. Address the box to Customer Support, Integrated Solutions, 1140 Ringwood Court, San Jose, CA 95131.

6. Insure the system for its purchase price with the common carrier of your choice.

2.5 Checking System Documentation and Software

One of the most important parts of your new Optimum V8 system is the documentation to support daily operations and other informational needs. These manuals occupy a box separate from the system itself.

Unpack the manuals and place them in a convenient location. Also, unpack the software tape cartridge provided in the documentation box.

SECTION 3: INSTALLING THE SYSTEM

This section describes how to install the system hardware. The system's major subassemblies are interconnected and the appropriate software is loaded on the disk at the factory per your order. As you complete each task, mark the Installation Checklist appropriately (see Section 1.2).

This section contains the following subsections:

3.1 Safety Precautions

3.2 The System Console

3.3 Installing the Optimum V8 System Console

3.4 Installing the Optimum V8 WorkStation Console

3.1 Safety Precautions

Some of the procedures in this section and in the remainder of the manual require you to work close to potentially hazardous voltages. Read each procedure thoroughly before performing any installation activities. Pay special attention to WARNING, CAUTION, or NOTE statements.

Observe these guidelines when installing the system:

- Do not turn on power until the system is completely installed and all peripheral devices have been connected.

- When servicing the system, first bring down UNIX in an orderly manner (see the *UNIX 4.2BSD System Administrator Guide*. Then, turn off the power and unplug the power cord before opening the rear door and removing the side panel (see Section 5.1 "Turning On Power" and Section 2.3, "Unpacking and Inspecting the System").

- Do not wear cuff links, rings, metallic tie clasps, or other jewelry any time the rear door is opened or the side panel is removed.

CAUTION

Static electrical charges can accumulate quickly on clothing
and synthetic materials, particularly in carpeted offices. When
these materials are brought in contact with or close proximity
to system components, electro-static discharge (ESD) can occur,
causing component degradation or destruction. Discharge yourself
by periodically touching the chassis ground prior to and during
system installation procedures. If you remove or replace boards,
handle them by their extractors or edges only.

3.2 The System Console

The console is a terminal connected to the CONSOLE port of your system. Although a system console is not required at power-up because UNIX 4.2BSD can autoboot itself, you should attach a console during the initial power-on in order to watch the progress of the UNIX 4.2BSD autoboot and to log in to the system to perform necessary system administration procedures. The console must be used for

most system administration procedures and may be used in day-to-day operations.

The Optimum V8 System uses a normal ASCII terminal as the console. The cable connecting to the CONSOLE port is slightly different from those connecting to normal serial ports; see Section 3.3 for details.

The Optimum V8 WorkStation uses the graphics monitor as the console. See Section 3.4 to make this connection.

If the graphics monitor does not come up properly, you can connect a normal ASCII terminal to the Optimum V8 WorkStation as a console. See Section 5.3.3, "What to Do if the Autoboot Fails."

3.3 Installing the Optimum V8 System Console

This section describes how to connect a console to the Optimum V8 System.

The CONSOLE port is a 25-pin connector on the rear panel (see Figure 3-1).

Figure 3-2 shows the physical layout of the 25-pin female console connector. The CONSOLE port can accept a variety of terminals; however, it is not intended for a printer or a modem. Figure 3-3 shows the pin layout for the CONSOLE port and for PORT 0, which can take other types of devices.

In preparation for connecting a terminal to the CONSOLE port, have the following items available:

- Terminal to be used as the console (not supplied)

- A standard RS232C interface cable (not supplied)

PORTS 1-8

PORTS 9-16

E
*
N
E
T

CONSOLE PORT0

PRINTER

ON

I

6.0 AMP SLO BLO

O
OFF

AC
115V
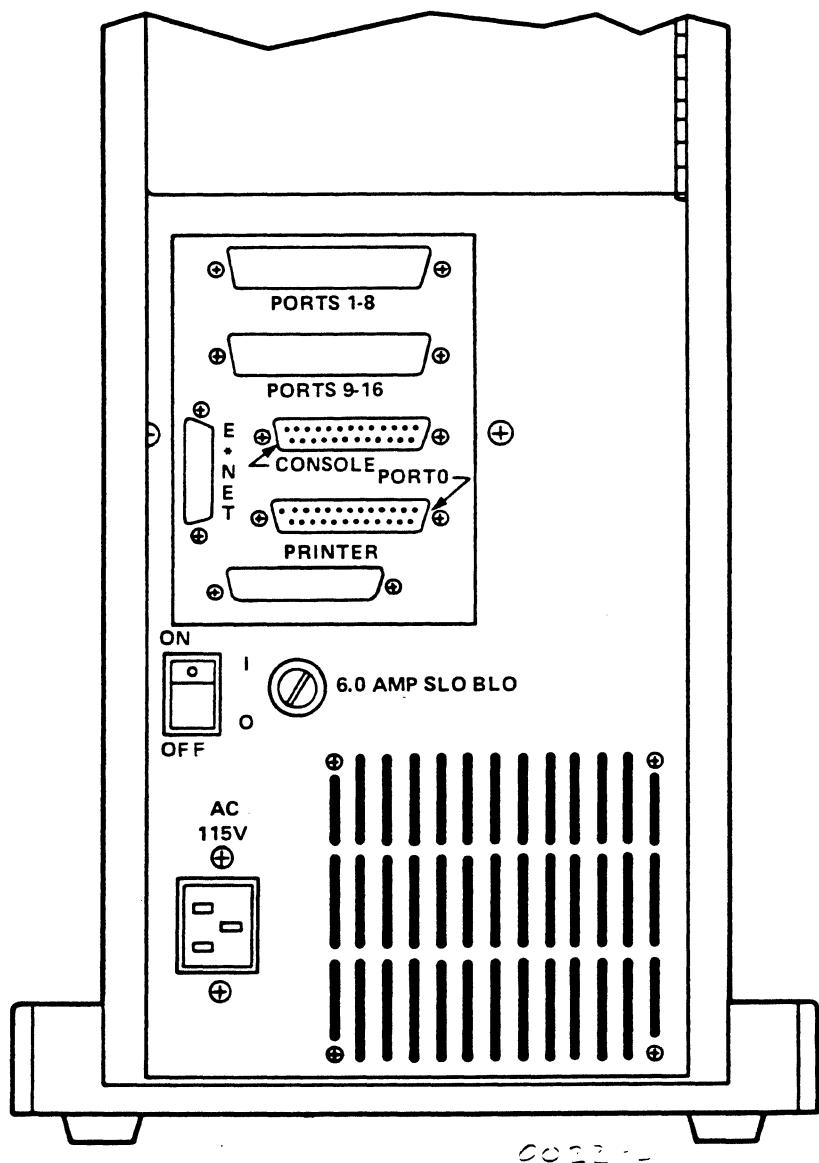
Figure 3-1. Optimum V8 Rear Panel
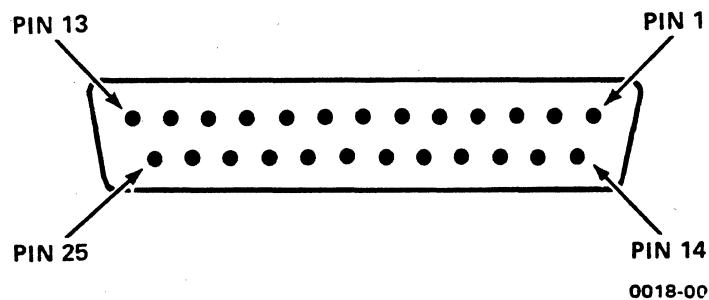
Figure 3-2. 25-Pin D Female Connector Pin Layout
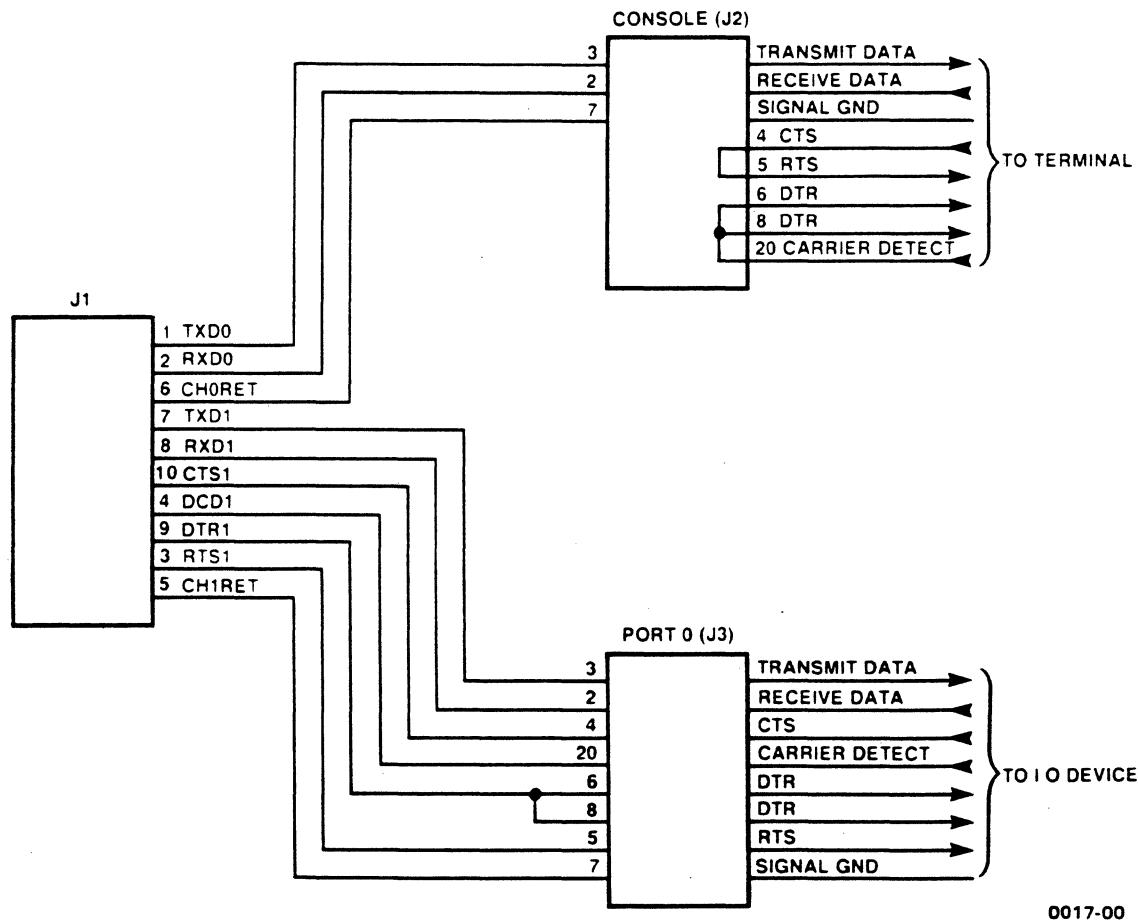
Figure 3-3. Console Port and Port 0 Wiring Diagram

To install the console, perform the following steps:

1. Check that the RS232C interface cable is connected to the console in accordance with the manufacturer's instructions.

2. Plug the console in, but do not turn on the power yet.

3. Locate the 25-pin connector labeled CONSOLE on the system's rear panel. Connect the terminal interface cable (RS232C ribbon or shielded cable) between the rear panel connector and the console.

4. Set the console baud rate to 9600. Refer to the vendor's terminal manual, if necessary.

NOTE

If it is not possible to set your console's baud rate to 9600, you can reset the VME-68K10 CPU console port baud rate by reconfiguring jumpers E39 and E40 located on the VME-68K10 board to match your console's baud rate. Refer to Table 3-1.

Table 3-1. VME-68K10 Baud Rate Jumpers for Console Port

Baud Rate	E39	E40
9600	1	1
19200	1	0
1200	0	1
300	0	0

0 = jumper to E38 (common ground)   1 = no jumper

3.4 Installing the Optimum V8 WorkStation Console

The CONSOLE port connector on the WorkStation is a dual function port. The port provides the system console function and the graphics display function.

See the *Optimum V WorkStation Monitor Installation Manual* to unpack and install the graphics monitor.

Complete all procedures in these sections of the *Optimum V WorkStation Monitor Installation Manual:*

• "Section 2: Preparing for Installation"

• Section 3.1, "Installing the Monochrome Monitor"

Do not yet turn on power for the monitor.

3.5 Installing an ASCII Terminal as a Console on the WorkStation

In some instances, you may not want to boot off of the graphics monitor. To use an ASCII terminal as a console on your Optimum V8 WorkStation follow these steps. Note that this procedure disables graphics.

1. Power down the WorkStation (see Section 5.4, "Shutting Down the System").

2. Turn off monitor power.

3. Disconnect either end of the cable between the monitor and the CONSOLE port on the Optimum V8 rear panel (see Figure 3-1). Set the monitor aside.

4. Open the system's back door to expose the cardcage. Locate the graphics boards which reside in slots 7 and 8. Slide the boards out about one inch. You do not need to uncable the boards. Close the system's back door as much as possible.

5. Connect an ASCII terminal RS232C cable to PORT 0 on the Optimum V8 rear panel.

6. Set the terminal's baud rate to 1200 baud.

7. Manually bring up the system in single-user mode. First, flip the ON/OFF switch to the ON position. Note that after the system is powered on and these messages appear on the ASCII terminal

    Integrated Solutions
    VME 4.2 boot x.x: date

    the colon ":" prompt appears. At the ":" prompt, enter **sd(0,0)vmunix** and press RETURN.

8. The console displays information about available devices and file systems. For further information on bringing up the system, see the *UNIX 4.2BSD System Administrator Guide*.

9. Log in as the superuser by entering **root** as your login name. The original password is **orange**. After logging in, you should see the # prompt.

10. The file /etc/ttys defines terminal lines with this format: *EBname*

    where

    E is the first digit which enables or disables the terminal line and

    0 disables the terminal line.
    1 enables the terminal line.
    2 is used only for the Optimum V WorkStation graphics monitor.

    B is the second digit which defines the baud rate. In the following baud rates, the first speed is the speed a terminal starts at and BREAK switches speeds:

0	300-1200-150-110
2	9600
3	1200-300
5	300-1200

    name is the name of the terminal such as console or ttyw0.

Edit the /etc/ttys file to enable the ASCII terminal (console) and disable the graphics monitor (ttyw0). Also, check that the baud rate for the console is set to 1200 baud. The correct /etc/ttys entries are listed in the To column of Table 3-2.

Table 3-2. Changing Terminal Setup

From	To
03console	13console
22ttyw0	02ttyw0

11. Edit the file /etc/ttytype. This file defines the type of terminal connected to the lines in /etc/ttys with this format:

    termtype name

    where

    name is the name of the terminal line (such as ttyw0 or console).

    termtype is the terminal type, as defined in /etc/termcap (**termcap(5)**). Some common types are

    dumb when you do not know the terminal type
    vt100 for the DEC VT100
    f100 for the Freedom 100
    dialup for modems (**ttydX**)
    network for pseudo-terminals (**ttypX**)
    tws for the Optimum V WorkStation graphics monitor (**ttywX**).

12. Change to the /dev directory and check that each terminal line enabled in /etc/ttys has an associated special file in /dev. For example, if /etc/ttys contains the line 13console than /dev must contain the file console. This gives UNIX a way of communicating with the terminal on that line. If /dev does not contain the necessary tty files, see the section on making new devices in /dev in the *UNIX 4.2BSD System Administrator Guide*.

13. Perform a file system check using the -p option (fsck -p) on all file systems. For further information, see the *UNIX 4.2BSD System Administrator Guide* and fsck(8) in Volume I of the *UNIX Programmer's Manual*.

14. Lastly, change to multiuser mode by pressing CTRL + D.

3.6 Reconnecting the WorkStation Monitor

1. To reconnect the graphics monitor, first power down the system (see Section 5-4 "Shutting Down the System").

2. Turn off monitor power.

3. Disconnect either end of the cable between the ASCII terminal and PORT 0 on the Optimum V8 rear panel (see Figure 3-1). Set the ASCII terminal aside.

4. Open the system's back door to expose the card cage. Slide the graphics boards back into the card cage. Check that the boards are seated properly and engage the boards' extractors. Close the system's back door.

5. To install the graphics monitor see the *Optimum V WorkStation Monitor Installation Manual*.

6. Manually bring up the system in single-user mode (see steps 7-9 in Section 3.5 "Installing an ASCII Terminal as a Console on the WorkStation").

7. Edit the console and ttyw0 entries in /etc/ttys to the FROM column in Table 3-2.

8. Repeat steps 11 through 15 in Section 3.5 "Installing an ASCII Terminal as a Console on the WorkStation".

SECTION 4: INSTALLING PERIPHERALS

This section describes how to install peripheral hardware. Mark the Installation Checklist appropriately (see Section 1.2) as you complete each task.

This section contains the following subsections:

.NOTE

The RS232C interconnect cable requirements vary, depending upon whether a terminal or modem is connected to one of the system's standard serial ports or to an optional serial port on the Breakout Panel. The exact requirements are noted in the following sections which describe the interconnection of the various peripherals.

4.1 Connecting a Terminal to Port 0

The Optimum V8 WorkStation uses the PORT 0 circuitry to control the mouse for the graphics monitor, even though nothing plugs into PORT 0. If you have a WorkStation, you cannot use PORT 0; disregard this subsection.

In preparation for connecting a terminal to PORT 0, have the following items available:

- Terminal to be used (not supplied).

- A standard RS232C interface cable (not supplied).

Perform the following steps to install a terminal to your Optimum V8 System:

1. Check that the RS232C interface cable connects to the terminal in accordance with the manufacturer's instructions.

2. Plug the terminal in, but do not turn on the power yet.

3. Locate the 25-pin connector labeled PORT 0 on the system's rear panel. Connect the terminal interface cable (RS232C ribbon or shielded cable) between the system PORT 0 connector and the terminal.

4.2 Connecting Additional Terminals

There are two 50-pin D connector ports labeled PORTS 1-8 and PORTS 9-16 on the Optimum V8 rear panel (see Figure 3-1). These ports can connect to a Breakout Serial Port Panel, allowing additional serial ports for the system. To use these additional ports, your system must be equipped with the optional Optimum V8 intelligent communications processor (VME-ICP8 or VME-ICP16). If your system was ordered with the ICP8 or ICP16 option, you receive the Breakout Serial Port Panel complete with 50-pin connector cable(s). There are two types of Breakout Serial Port Panels. Each has the same capability (see Figure 4-1).
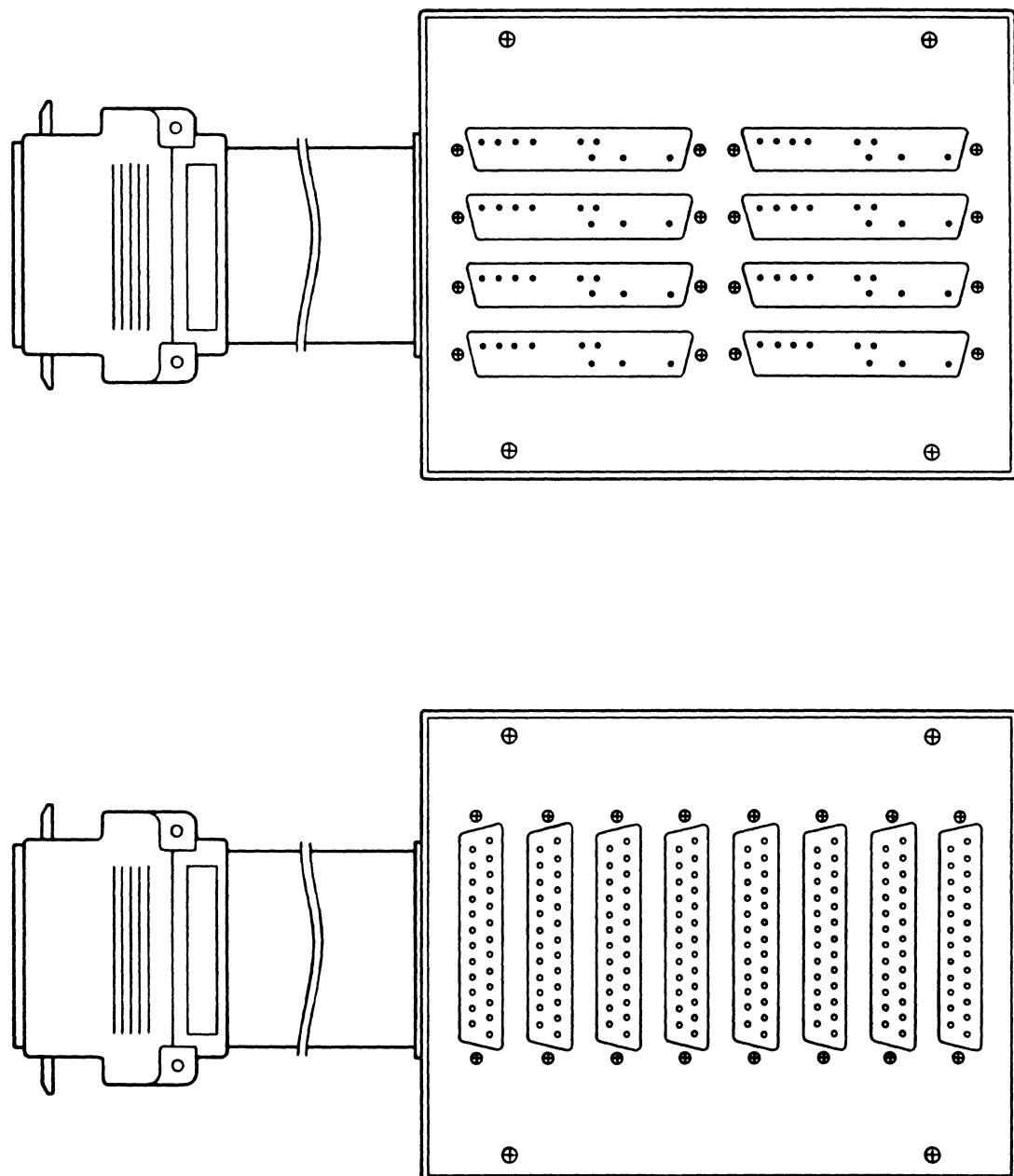
0033-00

Figure 4-1. Breakout Serial Port Panel

The VME-ICP16/8-supported additional serial ports require "twisted" RS232C interface cables for the terminals. These cables have pins 2 and 3, 4 and 5, and 8 and 20 *reversed*. See Figure 4-2.

Host Signal Name	Breakout Port Connector Pin	Terminal Connector Pin	Terminal Signal Name
Transmit Data (TD)	2	2	Transmit Data
Receive Data (RD)	3	3	Receive Data
Request To Send (RTS)	4	4	Request To Send
Clear To Send (CTS)	5	5	Clear To Send
Carrier Detect (CD)	8	8	Carrier Detect
Data Terminal Ready (DTR)	20	20	Data Terminal Ready
Signal Ground (SG)	7	7	Signal Ground

Figure 4-2. Cable Requirements: Optional Serial Ports to Terminals

To install the additional terminals, perform the following steps:

1. Install the 50-pin Breakout Serial Port Panel cable connector into the connector on the Optimum V8 rear panel that is labeled PORTS 1-8. Check that the cable connector fasteners on the rear panel hold the Breakout Serial Port Panel cable connector securely (see Figure 4-3). If you have an ICP8, go to Step 3. If you have an ICP16, go to Step 2.

2. Repeat the procedure described in Step 1 with the second cable connector on the ICP16. Install the cable connector into the connector labeled PORTS 9-16.

3. Connect a 25-pin cable between the Breakout Serial Port Panel connectors and the additional terminals, as appropriate.

4.3 Connecting a Modem

A modem can be connected to the system in either of two ways: it can be connected to the standard serial port, labeled PORT 0, or it can be connected to one of the optional serial ports on the Breakout Serial Port Panel.

4.3.1 Connecting a Modem to Port 0

Use a "null modem" cable to connect a modem to the standard serial port, PORT 0. The null modem cable from PORT 0 to the modem *reverses* pins 2 and 3, 4 and 5, and 8 and 20. Figure 4-4 shows the pin assignments for the null modem cable. For further modem installation requirements and instructions, refer to the manual that comes with the modem.
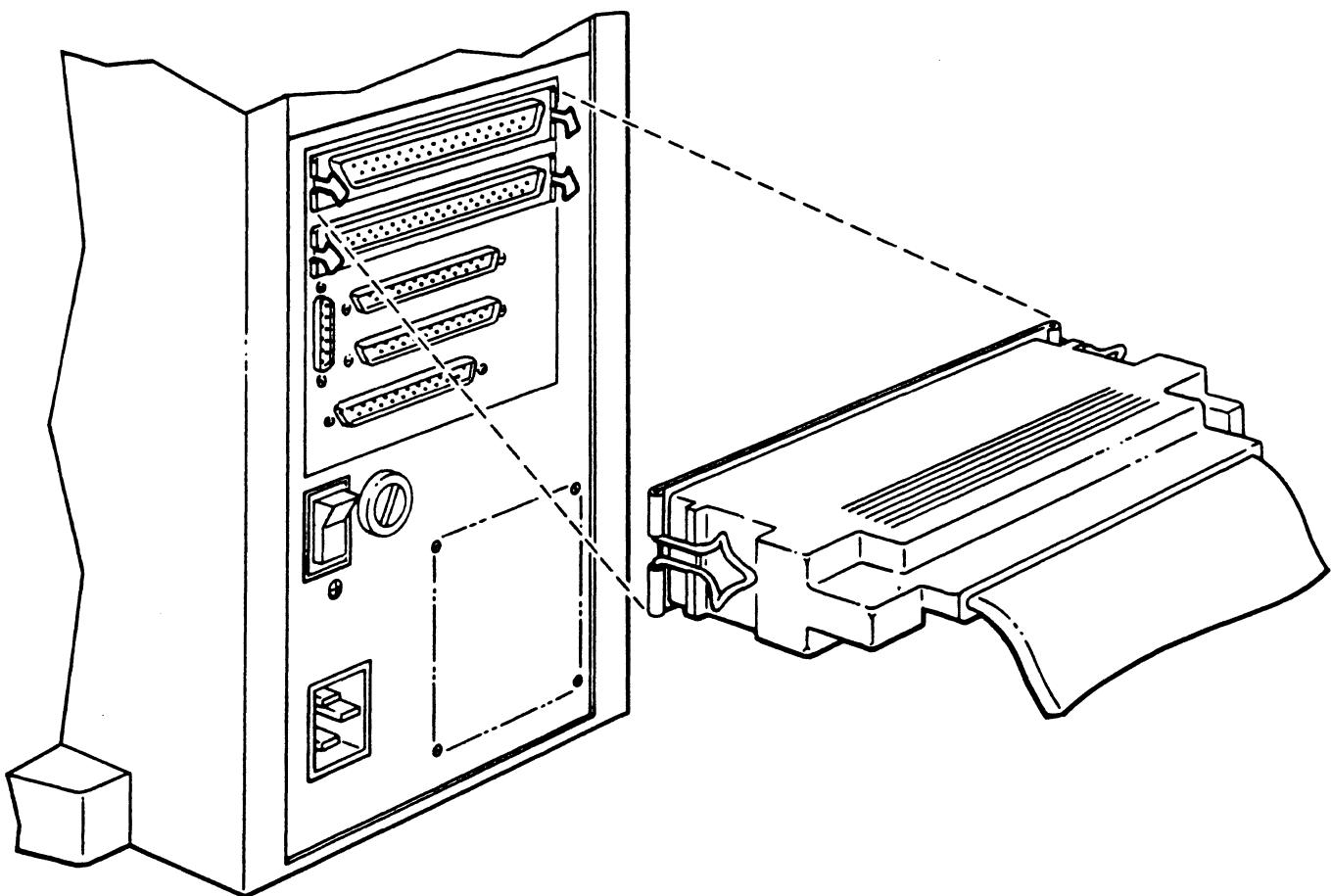
Figure 4-3. Connecting the Breakout Serial Port Panel

Host Signal Name	Optimum Serial Port Connector Pin	Modem Connector Pin	Modem Signal Name
Transmit Data (TD)	3	3	Transmit Data
Receive Data (RD)	2	2	Receive Data
Request To Send (RTS)	5	5	Clear To Send
Clear To Send (CTS)	4	4	Request To Send
Carrier Detect (CD)	20	20	Carrier Detect
Data Terminal Ready (DTR)	8	8	Data Terminal Ready
Signal Ground (SG)	7	7	Signal Ground

Figure 4-4. PORT 0 Null Modem Cable Requirements

4.3.2 Connecting a Modem to Another Serial Port

A modem can connect to one of the serial ports available on an intelligent communications processor supported Breakout Serial Port Panel (if installed). The cable connection is "straight through"; *do not* use a null modem cable. The cable from the serial port to the modem does *not* have reversed pins.

For further modem installation requirements and instructions, refer to the manual that comes with the modem.

**4.4 Connecting a Printer**

The system accommodates both serial interface and parallel interface printers. Connect serial printers to PORT 0 (on Optimum V8 Systems only) or to one of the optional intelligent communications processor-supported serial ports (if installed). A parallel interface printer requires an intelligent communications processor board (ICP16/8). The parallel port on all VME-ICP16/8 boards can be set for a Centronics interface or for a Dataproducts interface; see the *VME-ICP16/8 Hardware Reference Manual*.

4.4.1 Connecting a Serial Printer

On Optimum V8 Systems, connect a serial printer to PORT 0 or to one of the ports on the breakout serial port panel if the ICP16/8 board is installed. On Optimum V8 WorkStations, connect a serial printer to one of the ports on the breakout serial port panel.

NOTE

You cannot connect a serial printer to PORT 0 with Optimum
V8 WorkStations because PORT 0 is used for mouse circuitry.

Generally, serial interface printers follow the interconnect conventions of terminals. Refer to the printer manual for interface specifications.

Thus, a serial printer connects to PORT 0 in the same manner as a terminal: with a standard 25-pin "straight through" RS232C cable (*no* reversed pins). Refer to Section 4.1, "Connecting a Terminal to Port 0". Likewise, a serial printer connects to the Breakout Serial Port Panel in the same manner as a terminal: with a 25-pin "twisted" RS232C cable (pins reversed as shown in Figure 4-2). Refer to Section 4.2, "Connecting Additional Terminals."

4.4.2 Connecting a Parallel Printer

The parallel PRINTER port on all VME-ICP16/8 boards can be set for a Centronics interface or for a Dataproducts interface. The factory default setting is Centronics. For information on changing the default setting, see the *VME-ICP16/8 Hardware Reference Manual*.

Connect the parallel printer cable connector to the 25-pin D connector, labeled PRINTER on the rear panel (see Figure 3-1). The pin assignments for the 25-Pin and 36-Pin Centronics interface PRINTER port are defined in Table 4-1; pin assignments for the 25-Pin Dataproducts interface PRINTER port are defined in Table 4-2.

NOTE

On Optimum V8 systems manufactured prior to October 1, 1985, the
PRINTER port was a Centronics 36-Pin D Connector. See Table 4-1.

Table 4-1. Centronics Interface Connector Pin Assignments

Pin	Signal	Pin	Signal
25-Pin Parallel Printer Connector			
1	Strobe	14	Reserved (n/c)
2	Data 0	15	Fault
3	Data 1	16	Input Prime
4	Data 2	17	Reserved (n/c)
5	Data 3	18	Reserved (n/c)
6	Data 4	19	Reserved (n/c)
7	Data 5	20	Reserved (n/c)
8	Data 6	21	Reserved (n/c)
9	Data 7	22	Reserved (n/c)
10	Acknowledge	23	Ground
11	Busy	24	Ground
12	Paper Empty	25	Ground
13	Select		
36-Pin Parallel Printer Connector			
1	Datastrobe *	19	Ground
2	Data 1	20	Ground
3	Data 2	21	Ground
4	Data 3	22	Ground
5	Data 4	23	Ground
6	Data 5	24	Ground
7	Data 6	25	Ground
8	Data 7	26	Ground
9	Data 8	27	Ground
10	Acknowledge *	28	Ground
11	Busy	29	Ground
12	Paper Empty	30	Ground
13	Select	31	Input Prime *
14	Ground	32	Fault *
15	(n/c)	33	Ground
16	Ground	34	Reserved (n/c)
17	Reserved (n/c)	35	Reserved (n/c)
18	(n/c)	36	Reserved (n/c)

Note: (n/c) = not connected   * = active low

Table 4-2. Dataproducts Interface Connector Pin Assignments

25-Pin Parallel Printer Connector			
Pin	Signal	Pin	Signal
1	Strobe	14	Interface In
2	Data 0	15	Ready
3	Data 1	16	Buffer Clear
4	Data 2	17	Interface Out
5	Data 3	18	Reserved (n/c)
6	Data 4	19	Reserved (n/c)
7	Data 5	20	Reserved (n/c)
8	Data 6	21	Reserved (n/c)
9	Data 7	22	Reserved (n/c)
10	Acknowledge	23	Ground
11	Reserved (n/c)	24	Ground
12	Reserved (n/c)	25	Ground
13	On Line		

Note: (n/c) = not connected

4.5 Installing Other Options

After interconnecting terminals, modems and printers, as desired, install any other hardware that your site requires. If your system has an Ethernet controller, you must install the transceiver and cables. The transceiver cable plugs into the 15-pin connector on the Optimum rear panel labeled E*NET (see Figure 4-5). The Ethernet connector pin assignments are supplied in Figure 4-6 and Table 4-3.
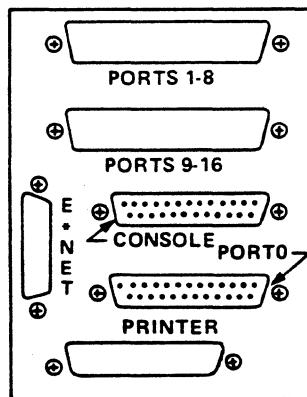
Figure 4-5. Rear Panel Ethernet Connector Locations

PIN 8   PIN 1

PIN 15   PIN 9

0036-00
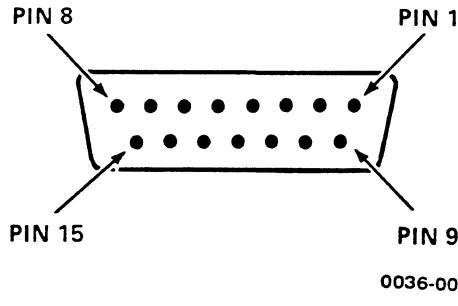
Figure 4-6. Ethernet I/O Port

Table 4-3. Ethernet Port Pin Assignments

Pin	Signal	Pin	Signal
1	Shield	9	Collision Presence -
2	Collision Presence +	10	Transmit -
3	Transmit +	11	Reserved (n/c)
4	Reserved (n/c)	12	Receive -
5	Receive +	13	Power
6	Power Return	14	Reserved (n/c)
7	Reserved (n/c)	15	Reserved (n/c)
8	Reserved (n/c)		

Note: (n/c) = not connected

SECTION 5: BOOTING THE SYSTEM

After installing all system hardware, follow the procedures in this section to turn on power and bring up the system. Mark the Installation Checklist appropriately (see Section 1.2) as you complete each task. This section contains the following subsections:

5.1 Checking Controls and Indicators

5.2 Turning On Power

5.3 Autobooting the System

5.4 Shutting Down the System

5.1 Checking Controls and Indicators

Before connecting power and bootstrapping the system, observe the front panel controls and indicators (see Figure 5-1). Table 5-1 defines their functions.

0021-00
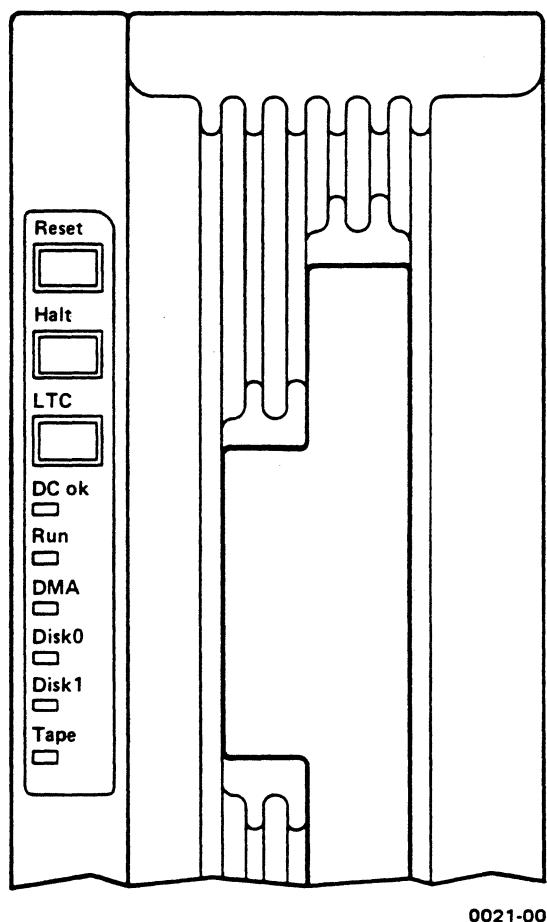
Figure 5-1. Optimum V8 Front Panel Controls and Indicators

Table 5-1. Controls and Indicators

Control	Function
Reset	The Reset switch is a momentary contact switch. When pressed, the entire system is reset and control is transferred to the VME-68K10 processor on-board PROMs. The PROM prompt ":" appears on the console, if one is connected.
Halt	The Halt switch is a momentary contact switch. When pressed, a level 7 priority non-maskable interrupt is sent to the VME-68K10. The action taken depends upon what state the system is in and which operating system, if any, is running. Refer to the descriptions of the Indicators below.
LTC	Not Used.

Indicator	Function
DC ok	Lit when AC and DC supply voltages are within acceptable ranges. The light should be solidly on at all times when the system is powered.
Run	Lit when VME bus cycles are occuring. It goes out when ADDRESS STOBE* is released.
DMA	Lit when a data transfer is occuring on the bus. The operation may or may not be DMA.
Disk 0	Lit when disk 0 is selected.
Disk 1	Lit when disk 1 is selected.
Tape	Lit when the cartridge tape drive is selected. The cartridge tape drive is selected whenever a cartridge is away from the Beginning of Tape (BOT). The cartridge should not be removed from the drive when this indicator is lit unless a non-rewinding UNIX tape device is being used, which can leave the tape away from BOT at the completion of an operation. UNIX 4.2BSD uses the rewinding device as the default.

5.2 Turning On Power

Use the following step-by-step procedure to turn on power to the system.

WARNING

**Many of the procedures described in this section require
you to perform tasks inside the system cabinet while
115 VAC is applied to the system. While performing such work,
follow all safety guidelines in Section 3.1 of this manual.**

1. Turn ON the console terminal (or WorkStation monitor) and let it warm up.

2. Check that the console baud rate is set correctly: 9600 baud for the System or 1200 baud for the WorkStation. If your terminal has some other baud rate setting, check that the VME-68K10 baud rate jumpers match your console's baud rate (see Table 3-1).

3. At the rear of the system, locate the ON/OFF switch. This switch is located at the rear of the system near the power plug (see Figure 3-1). Check that it is in the OFF position.

4. Locate the power cord supplied with the system.

5. Locate the power plug, labeled 115 VAC. Take the power cord supplied with the system and plug it into the system receptacle. Plug the other end into the main power receptacle.

6. Turn on the power at the system by flipping the ON/OFF switch to the ON position. The DC ok indicator on the front panel should be on, indicating that AC and DC supply voltages are within acceptable levels.

7. After power is turned on, the RUN light will remain off and nothing will appear on the terminal for about ten seconds. During this time, the first disk in the system is powering-up. After ten seconds or so, the RUN light will come on and the appropriate power-up message will appear on the console.

8. If you ordered your system with a disk, proceed to Section 5.3, "Autobooting the System". If you installed your own disk, refer to the *VME-SCSI Hardware Reference Manual*, for information on disk formatting and the *UNIX 4.2BSD System Administrator Guide* for instructions on bootstrapping from the Distribution Tape.

5.3 Autobooting the System

This subsection contains two procedures to autoboot your system. Refer to Section 5.3.1, "Autobooting the Optimum V8 System" or Section 5.3.2, "Autobooting the Optimum V8 WorkStation". If the WorkStation monitor does not display boot messages, refer to Section 5.3.3 "What to Do if the Autoboot Fails".

5.3.1 Autobooting the Optimum V8 System

The Optimum V8 System (with the UNIX 4.2BSD UNIPS PROMs) has an autobootstrap capability. After power is turned on, the system is brought to a multiuser state in approximately 45 seconds without user intervention.

If you encounter trouble in the following autoboot procedure, refer to the *UNIX 4.2BSD System Administrator Guide*.

Follow these steps to autoboot the system.

1. Complete the power-up procedure in Section 5.2 "Turning On Power." After you turn on power, you should see this message on the console:

   Initialize all memory.....

2. After a short wait, this message should appear on the console:

   Integrated Solutions
   VME 4.2 boot x.x date
   :

   The colon ":" is a prompt from the UNIX PROMs on the VME-68K10 CPU. This message indicates the version number and the creation date of the 4.2BSD bootstrap PROMs. It also indicates that a cursory check of memory and a memory sizing routine have completed successfully.

3. The system is booted automatically after a 30-second delay. To avoid the 30-second delay, enter the character "@" and press RETURN in response to the prompt character ":". This action tells the PROMs to continue the autoboot. Pressing any other keys on the console interrupts the autoboot. If you accidentally pressed an incorrect key and the boot stops, you can restart it by pressing Reset on the front panel and entering

   sd(0,0)vmunix

   in response to the prompt character ":". This sequence brings the system up in single-user mode. If this does not restart the autoboot, see the section explaining what to do if the autoboot doesn't work in the *UNIX 4.2BSD System Administrator Guide*.

   The following message, indicating a successful bootstrap of the kernel, appears on the console:

   :AUTOBOOT: sd(0,0)vmunix

   The console now displays some boot messages:

   4.2BSD UNIX
   real mem= *(physical memory)*
   avail mem= *(memory available for user programs)*
   Using buffers containing . . . . . .

   (information about available devices and file system configuration on the disk is displayed)

4. The message

   new date/time:

   asks for the new date and time. Enter it in the following format:

   yymmddhhmm

   For example, to enter September 19, 1985 at 2:30 p.m., enter

   8509191430

and press RETURN. If no date is entered within 30 seconds, the system uses the last known date and time, and continues the bootstrap procedure.

5. After displaying several messages, the console shows this prompt:

   IS68K 4.2 BSD

   login:

   This is the UNIX login prompt.

6. Log in as the superuser by entering **root** as your login name. The original password is **orange**. For security reasons, promptly change the password with **passwd(1)**[†]. Logging in to UNIX gives you access to a working C shell (UNIX command processor).

   You can now issue UNIX commands to the shell prompt (#).

7. If the bootstrap procedure is successful, refer to the *UNIX 4.2BSD System Administrator Guide*, for further instructions on setting up your system. The system administrator should now perform some software set-up procedures, including

   • Setting up terminal lines

   • Setting up a line printer or modem

   • Adding users

   • Setting up a network

   More complex procedures, such as generating a new kernel if you reconfigure your hardware, may be required or desired. Refer to the *UNIX 4.2BSD System Administrator Guide*, for additional information on configuring your system.

5.3.2 Autobooting the Optimum V8 WorkStation

The Optimum V8 WorkStation has an autobootstrap capability. After power is turned on, the system is brought up to the Desktop Manager state in approximately 45 seconds without user intervention (with the exception of entering the date and time).

If you encounter trouble in the following autoboot procedure, refer to the *UNIX 4.2BSD System Administrator Guide*.

Follow these steps to autoboot the system.

1. Complete the power-up procedure in Section 5.2 "Turning On Power." After you turn on power, you should see the following message on the console:

   Integrated Solutions
   VME 4.2 boot x.x: date
   :

   The colon ":" is a prompt from the UNIX PROMs on the VME-68K10 CPU. This message

---

[†] References of the form **name**(X) refer to a subsection named **name** in Volume I, Section X of the *UNIX Programmer's Manual*.

indicates the version number and the creation date of the 4.2BSD bootstrap PROMs.

2. The system is booted automatically after a 30-second delay. To avoid the 30-second delay, enter the character "@" and press RETURN in response to the prompt character ":". This action tells the PROMs to continue the autoboot.

Pressing any other keys on the console interrupts the autoboot. If you accidentally pressed an incorrect key and the boot stops, you can restart it by pressing Reset on the front panel and entering

sd(0,0)vmunix

in response to the prompt. If this does not restart the autoboot, see the section explaining what to do if the autoboot doesn't work in the *UNIX 4.2BSD System Administrator Guide.*

3. A window appears on the display screen with the following message and prompt in the lower left corner:

Automatic boot in progress...
Set the date and time
new date/time

4. Enter the date and time in the following format:

yymmddhhmm [.ss]

For example, to enter January 27, 1985 at 2:30 p.m., enter

8501271430

and press RETURN. The date and time must be entered for the bootstrap procedure to continue.

5. After several messages, the UNIX 4.2 login prompt is issued at the console:

4.2bsd Unix
UNKNOWN login:

6. Log in as the superuser by entering **root** as your login name. The original password is orange. For security reasons, promptly change the password with **passwd(1)**[†]. Logging in to UNIX gives you access to a working C shell (UNIX command processor). After you have successfully logged in, the monitor shows the desktop display with several icons on the screen.

7. If the bootstrap procedure is successful, refer to the instructions on setting up your system in the *UNIX 4.2BSD System Administrator Guide*. The system administrator should now perform some software set-up procedures, including

   - Setting up terminal lines

   - Setting up a line printer or modem

   - Adding users

   - Setting up a network

   More complex procedures, such as generating a new kernel if you reconfigure your hardware, may be required or desired. Refer to the intructions in the *UNIX 4.2BSD System Administrator Guide*, on how to configure your system.

5.3.3 What to Do if the Autoboot Fails

If your Optimum V8 WorkStation does not display boot messages, the VME Graphics Subsystem may be at fault. You may want to connect a normal ASCII terminal as a temporary console, rather than using the graphics monitor. Follow these steps to connect an ASCII terminal as a temporary console.

<div align="center">

NOTE

Use the following procedure while in single-user mode.
To connect an ASCII terminal as a console and run
multiuser UNIX, see Section 3.5 "Installing an ASCII
Terminal as a Console on the WorkStation."

</div>

1. Power down the WorkStation (see Section 5.4 "Shutting Down the System").

2. Turn OFF monitor power.

3. Disconnect either end of the cable between the monitor and the Console port on the Optimum V8 rear panel (see Figure 3-1).

4. Open the system's back door to expose the cardcage. Locate the graphics boards which reside in slots 7 and 8. Slide the boards out about one inch. You do not need to uncable the boards. Close the system's back door as much as possible.

5. Connect the ASCII terminal RS232C cable to PORT 0 on the Optimum V8 rear panel. This terminal will now act as the system console.

6. Manually bring up the system in single-user mode (refer to steps 7 through 9 in Section 3.5 "Installing an ASCII Terminal as a Console on the WorkStation"). This procedure should bring up the system with the alternate console, without using the VME Graphics subsystem.

For other boot failures with Optimum V8 Systems or WorkStations, see the *UNIX 4.2BSD System Administrator Guide*.

[†] References of the form **name** (X) refer to a subsection named **name** in Volume I, Section X of the *UNIX Programmer's Manual*.

5.4 Shutting Down the System

CAUTION

Failure to shut down the system in an orderly fashion
may result in lost data. In particular, simply turning off
power without an orderly shutdown will probably result in
data loss.

If UNIX is running and users are logged in, the recommended method to bring the System or
WorkStation down is with the **shutdown** command. This command notifies all logged-in users that the
system is coming down, kills all processes, and gives you the single-user prompt (#) at the console.
After **shutdown** is issued, unmount the file systems with **umount** and update the superblock with
reboot. Then power OFF the system. To shutdown the system, follow these steps:

1. Login as the superuser, **root**, at the system console. If you are running multiuser UNIX, use the
   command **shutdown** (8) in Step 2. If you are running single-user UNIX (the console shows the
   single-user prompt (#)), skip to Step 3.

2. Enter this command:

   shutdown +*n* Please logout -- system coming down in *n* minutes

   where *n* is the time in minutes.

   This action notifies users of shutdown, waits for the specified time, and then kills all processes.
   When shutdown is complete, the console shows the single-user prompt (#).

3. Enter these commands:

   umount -a
   reboot

   The **umount** command unmounts the file systems; the **reboot** command updates the superblock.
   This protects the disks from accidental erasure when power goes off. Wait until the PROM
   prompt ":" appears.

   If you get an error message:

   umount: device busy

   enter the command **cd /** and try again.

4. Turn OFF the power and unplug the power cord.

APPENDIX A: SPECIFICATIONS

This appendix contains both the Optimum V8 System and WorkStation specifications. These subsections include

A.1 General Specifications

A.2 Electrical Specifications

A.3 Physical Characteristics

A.4 Input/Output Connectors

A.5 Power Requirements

A.6 Cardcage Configuration

A.7 Cartridge Tape Drive Specifications

A.8 Disk Drive Specifications

A.1 General Specifications

Table A-1. General Specifications for the Optimum V8 System

Operation	Description
Processor	68010 or 68020-based
CPU clock frequency	11.2 MHz (68010); 16.67 MHz (68020)
Bus	Dual bus architecture VME Bus/High Speed Memory Bus for memory access with no wait states (68010) VME Bus/High Speed Memory Bus for memory access with one wait state on reads and no wait states on writes (68020).
Input/output (standard)	One 25-pin D female connector for CONSOLE port (V8 System) One 10-pin/3-coaxial D female connector for CONSOLE port (V8 WorkStation) One 25-pin D female connector for PORT 0 (V8 System only)
Input/output (options)	Two 50-pin D female connnectors for 16 optional serial ports One 15-pin D female connector for Ethernet option One 25-pin D female connector for a parallel PRINTER port
Baud rate	300 to 19200 (9600 System standard; 1200 WorkStation standard)
Controls/indicators	Front panel has switches for Reset and Halt LEDs are for DC ok, Run, DMA, Disk 0, Disk 1, and Tape

A.2 Electrical Specifications

The Optimum V8 has a 250 watt, 4-output switching supply, delivering +5 volts @ 35 amps, +12 volts @ 5 amps (8 amps peak), -12 volts @ 4 amps, and +24 volts @ 3 amps. AC Input is 90-132 VAC (standard) and 180-264 VAC (optional) with a frequency range of 47 to 440 Hz.

A.3 Physical Characteristics

The physical characteristics of the Optimum V8 computer systems include

- Physical dimensions and weight (see Table A-2)

- Space requirements (see Table A-3)

- Environmental specifications (see Table A-4)

Table A-2. Physical Dimensions and Weight

Characteristic	Dimension
Height	25.5 inches
Width	6.5 inches
Tower base width	9.5 inches
Depth	19.5 inches
Weight	75 pounds (fully configured)

Table A-3. Space Requirements

Dimension	Amount
Front to rear	45 inches total
Side to side	30 inches total

Table A-4. Environmental Specifications

Characteristic	Specification
Operating temperature (ambient)	0°C to 45°C
Storage temperature (do not leave cartridge tape in drive when system is in storage)	-40°C to 65°C
Relative humidity	10% to 95% (non-condensing)

A.4 Input/Output Connectors

The Optimum V8 computer system has six I/O connectors located on the rear panel. The CONSOLE connector can be a 25-pin D-type female subminiature connector (Optimum V8 System) or a D-type 10-pin/3-coaxial female connector (WorkStation). PORT 0 employs a 25-pin D-type female subminiature connector. There are several optional connectors including two 50-pin D female connectors, a 25-pin D female connector, and one 15-pin D female connector. Table A-5 provides additional information regarding the I/O ports.

Table A-5. Input/Output Connectors

Port	Connector Type
CONSOLE	25-pin D female connector (System) or 10-pin/3-coaxial (WorkStation)
PORT 0	25-pin D female connector (System)
PORTS 1-8[†]	50-pin D female connector
PORTS 9-16[†]	50-pin D female connector
PRINTER[†]	25-pin D female connector
E*NET[†]	15-pin D female connector

[†] = Options (connector is not installed unless associated option is ordered)

The pin assignments for PORT 0 and the Optimum V8 System CONSOLE Port are shown in Figure A-1. These serial ports can be used in asynchronous communications. Refer to the *VME-68K10 Hardware Reference Manual* or the *VME-68K20 Hardware Reference Manual* for details.

A.5 Power Requirements

The Optimum V8 computer system requires 115 VAC, 400 Watts, 60 Hz input power. The DC power requirements for the board, disk, and tape subassemblies are shown in Tables A-6 and A-7.

Table A-6. Board DC Power Requirements

Board	+5V	+12V	-12V
VME-68K10	4.0 amps	1.0 amp	
VME-68K20	4.6 amps	0.05 amp	0.05 amp
VME-HSMEM one Mbyte	3.0 amps		
VME-HSMEM two Mbyte	4.0 amps		
VME-SCSI	3.1 amps		
VME-QIC2	2.65 amps	0.07 amp	
VME-EC (Excelan)	5.6 amps	0.5 amp	
VME-Display Controller	8.0 amps		0.6 amp
(Monochrome WorkStation only)			
VME-Display Memory	3.5 amps		
(Monochrome WorkStation only)			
VME-ICP8	2.65 amps	0.07 amp	
VME-ICP16	2.8 amps	0.5 amp	0.5amp

Table A-7. Disk/Tape Drive DC Power Requirements

Drive	Characteristic	Specification +5VDC	+12VDC	+24VDC
VDS/VED106 Disk	Regulation	+/- 5%	+/- 10%	
	Ripple	120 mV	120 mV	
	Maximum operating current	1.5 amps	2.8 amps	
	Typical operating current	1.5 amps	2.0 amps	
	Maximum starting current	1.5 amps	4.5 amps	
VTS25/R ¼-inch Tape	Regulation	+/- 5%		+/- 10%
	Typical operating current	1.2 amps		.8 amp
	Maximum starting current	2.7 amps		2.5 amps

A.6 Cardcage Configuration

The Optimum V8 cardcage back plane is composed of two circuit boards P1 and P2. These boards correspond closely to the VME specifications as described in the *VMEbus Specification Manual*, Motorola part number MVMEBS/D1.

The following boards may be installed as options in the Optimum V8 system: VME-SCSI, VME-EC, VME-QIC2/R, VME-ICP16/8, VME-FFP, and VME-Graphics Subsystem (WorkStation only). Table A-8 describes rules for installing boards in your system. Figure A-1 illustrates the board placement in the Optimum V8 System; figure A-2 illustrates the board placement in the the Optimum V8 WorkStation.

Table A-8. Rules for Board Placement

Rule	Why
Put the CPU board at the far left of the card cage.	This is the first position in the card cage. The CPU, as bus master, must occupy this slot.
Put all memory boards next to the CPU.	While the memory boards do not use interrupts, keep them near the CPU for easy identification.
Put the SCSI disk adapter board next to the memory board(s).	Distance from the CPU determines interrupt response time. When possible, put the disk adapter next to the CPU for fastest response.
Leave no empty slots between the CPU and all boards requiring interrupts (VME-QIC2/R, VME-ICP16/8, VME-EC, and VME-FFP).	Empty slots disrupt the propagation of interrupts. All disk, tape, serial, and network controllers must be in direct line with the CPU with no intervening spaces.
Put the Ethernet board(s) (VME-EC) in the last slots of the bus request daisy chain (after the QIC2/R and ICP16/8).	The VME-EC should be the last board(s) of its bus request daisy chain.
Put the VME-FFP in the slot after the VME-EC.	Because the VME-FFP does not use DMA, it can be placed after the VME-EC.
Put the graphics subsystem (two-board set) in slots 7 and 8. Put the display controller board in slot 7 and the display memory board in slot 8.	The graphics subsystem does not require interrupts; therefore, there can be empty slot(s) before the graphics subsystem.

Slot

1	2	3	4	5	6	7	8
↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑
$68K_n0$ †	HS MEM	SCSI	QIC2/R	ICP16/8	EC	FFP ‡	OPTION
↓↓↓	↓↓↓	↓↓↓	↓↓↓	↓↓↓	↓↓↓	↓↓↓	↓↓↓

Figure A-1. Optimum V8 System Board Placement

Slot

1	2	3	4	5	6	7	8
↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑	↑↑↑
$68K_n0$ †	HS MEM	SCSI	QIC2/R	EC	FFP ‡	GRAPHICS	GRAPHICS
↓↓↓	↓↓↓	↓↓↓	↓↓↓	↓↓↓	↓↓↓	↓↓↓	↓↓↓

† $n = 1$ or 2.   ‡ The FFP board does not work with the 68K20.

Figure A-2. Optimum V8 WorkStation Board Placement

A.7 Cartridge Tape Drive Specifications

Table A-9 shows the cartridge tape drive specifications.

Table A-9. Cartridge Tape Drive Specifications

Characteristic	Specification
Storage capacity	75 Mbyte (with 600-foot cartridge tape) 45 Mbyte (with 450-foot cartridge tape)
Read/write speed	90/72[†] inches per second (ips)
Recording density	8000/10000[†] bits per inch (bpi)
Data transfer rate	90 KBytes per second
Error rates (non-recoverable read errors after 16 retries)	No more than 1 in 10^{10} bits

A.8 Disk Drive Specifications

Table A-10 shows the specifications for the VDS/VED106.

Table A-10. Disk Drive Specifications

Characteristic	VDS/VED106
Storage capacity	86 (unformatted Mbytes)
Storage capacity	106 (formatted Mbytes)
512-byte blocks/track	25
Number of heads	9
Number of cylinders	917
Data transfer rate	0.78 (Mbytes per second)
Encoding method	RLL
Average access time	30 milliseconds

[†] When the drive detects a DC600A tape in the drive, tape speed is reduced to 72 ips and recording density is increased to 10000 bpi.

APPENDIX B: CONFIGURATION LOG

After installing your system, take the time to fill out this configuration log. You may want to copy some of this information to the *UNIX 4.2BSD System Administrator Guide,* "Appendix C: Configuration Worksheet."

Model: Optimum V8   (circle one)   System   Monochrome   WorkStation

Serial Number: _____

Memory: _____ Mbytes (8 Mbytes maximum), implemented as follows:

_____ on first expansion memory board

_____ on second expansion memory board

_____ on third expansion memory board

Disk(s):

Drive 0: _____ Mbytes

Drive 1: _____ Mbytes

Tape Drive: (circle)   ¼-inch   none

Other:

Additional serial ports, supported by

____ VME-ICP8 for ___ ports

____ VME-ICP16 for ___ ports

Total serial ports, including two standard: _____

Ethernet: _____

Fast Floating Point: _____

Parallel printer: _____ (circle)   Centronics   Dataproducts

Serial printer: _____
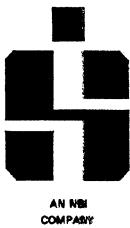
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| Manual Title: | *Optimum V8 WorkStation Installation Manual* | Part Number: | *490007 Rev. B* |

Name: _____ Title: _____

Company: _____ Phone: (   ) _____

Address: _____

City: _____ State: _____ Zip Code: _____

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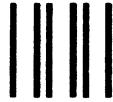
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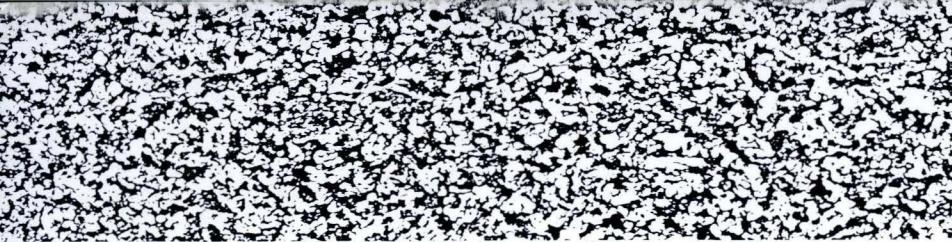
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