HP Apollo 9000 Series 400 Workstation Domain/OS Owner's Guide

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Apollo Systems Division
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Emissions Regulations

Federal Communications Commission (FCC)

The Federal Communications Commission of the U.S. government regulates the radio frequency energy emanated by computing devices through published regulations. These regulations specify the limits of radio frequency emission to protect radio and television reception. All HP Apollo nodes and peripherals have been tested and comply with these limits. The FCC regulations also require that computing devices used in the U.S. display the agency's label and that the related documentation include the following statement.

WARNING: This equipment generates, uses, and may emit radio frequency energy and, if not installed and used in accordance with these instructions, 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.

Compliance to these regulations requires the use of shielded cables.

Canadian Department of Communications (DOC)

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the Radio Interference Requirements of the Canadian Department of Communications.

Compliance to these regulations requires the use of shielded cables.

Verband Deutscher Elektrotechniker (VDE)

Herstellerbescheinigung

Hiermit wird bescheinigt, daß der dieses Gerät in Übereinstimmung mit den Bestimmungen der Postverfügung 1046/84 funkentstört ist. Der Deutschen Bundespost wurde das Inverkehrbringen dieser Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

Die Einhaltung dieser Grenzwerte schreibt den Gebrauch abgeschirmter Kabel vor.

Hewlett-Packard GmbH

VCCI Class 1 ITE Equipment (A1421)

　この装置は，第一種情報装置（商工業地域において使用されるべき情報装置）で商工業地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）基準に適合しております。

　従って，住宅地域またはその隣接した地域で使用すると，ラジオ，テレビジョン受信機等に受信障害を与えることがあります。

　取扱説明書に従って正しい取り扱いをして下さい。

ＶＣＣＩ基準に適合する為に、シールドされたケーブルをご使用下さい。

VCCI Class 2 ITE Equipment (A1630)

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しかし，本装置をラジオ，テレビジョン受信機に近接してご使用になると，受信障害の原因となることがあります。

取扱説明書に従って正しい取り扱いをして下さい。

VCCI基準に適合する為に、シールドされたケーブルをご使用下さい。

Emissions Regulations Compliance

Any third-party I/O device installed in HP Apollo system(s) must be in accordance with the requirements set forth in the preceding Emissions Regulations statements. In the event that a third-party noncompliant I/O device is installed, the customer assumes all responsibility and liability arising therefrom.

Compliance to these regulations requires the use of shielded cables.

Electrostatic Discharge (ESD) Precautions

Electrostatic charges can damage the integrated circuits on printed circuit boards. To prevent such damage from occurring, observe the following precautions during board unpacking and installation:

- Stand on a static-free mat.
- Wear a static strap to ensure that any accumulated electrostatic charge will be discharged from your body to ground.
- Connect all equipment together, including the static-free mat, static strap, routing nodes, and peripheral units.
- Keep uninstalled printed circuit boards in their protective antistatic bags.
- Handle printed circuit boards by their edges, once you have removed them from their protective antistatic bags.

Warnings and Cautions

WARNING:

Removing device cover may expose sharp edges in equipment chassis. To avoid injury, use care when installing customer add-on devices.

WARNUNG:

Das Entfernen der Geräteabdeckung legt die scharfen Kanten im Inneren des Gerätes frei. Um Verietzungen zu vermeiden, seien Sie vorsichtig beim Einbau von zusätzlichen Bauteilen, die vom Kunden selber eingebaut werden können.

ADVERTISSEMENT:

Des bords tranchants du châssis de l'équipement peuvent être exposés quand le cache de l'unité n'est pas en place. Pour éviter des blessures, faire très attention lors de l'installation de modules supplémentaires par le client.

WARNING:

To avoid personal injury and to prevent possible equipment damage, ensure that the ac power is off and the ac power cord is disconnected.

WARNUNG:

Um Verletzungen und mögliche Ausrüstungsschäden zu verhindern, muß die Wechselstrmoquelle ausgeschaltet sein und das Wechselstromzuführungskabel aus der Steckdose entfernt sein.

ADVERTISSEMENT:

Pour éviter les risques de blessures et de dommages au matériel, s'assurer que le système n'est pas sous tension et que le fil d'alimentation électrique c.a. est débranché.

WARNING:

Disconnect power plug from wall outlet or source power before moving or removing the device, or installing add-on components.

WARNUNG:

Entfernen Sie die Stromzuführung von der Steckdose oder der Stromquelle bevor Sie das Gerät bewegen, abbauen, oder zusätzliche Bauteile installieren.

ADVERTISSEMENT:

Débrancher la fiche de las prise de courant ou de la source d'alimentation électrique avant de déplacer ou de retirer l'unité, ou avant d'installer des modules supplémentaires.

Warnings and Cautions

WARNING:

Lifting the 19-inch monitor requires more than one person because the unit weighs more than 40 pounds (18 kilograms).

WARNUNG:

Der-19-inch (48 cm) Bildschirm muß von mehreren Personen angehoben werden, da die Einheit über 40 Pfund (18 kilogramm) wiegt.

ADVERTISSEMENT:

Il faut plus d'une personne pour soulever le moniteur de 48 cm (19 pouces) étant donné qu'il pèse plus de 18 kg.

CAUTION:

Monitor input voltage must be the same as the system's input voltage.

VORSICHT:

Die Bildschirm-Eingangsspannung muß genauso groß sein wie die Eingangsspannung des Systems.

ATTENTION:

La tension d'entrée du moniteur doit être la même que la tension d'entrée du système.

CAUTION:

Do not unplug the monitor video cable while the system unit is powered on.

VORSICHT:

Ziehen Sie nicht das Stromzuführungskabel zum Bildschirm aus der Steckdose, solange das Gerät eingeschaltet ist.

ATTENTION:

Ne pas débrancher le câble vidéo du moniteur pendant que l'unité est alimentée.

Warnings and Cautions

CAUTION:

System power cord must be plugged into an accessible dedicated ac mains receptacle.

VORSICHT:

Das System-Netzanschlußkabel muß an eine zugängliche spezielle Wechselstrom-Hauptzuführungssteckdose angeschlossen werden.

ATTENTION:

Le fil d'alimentation électrique du système doit être branché dans une prise de courant c.a. spécialisée accessible.

CAUTION:

Monitor screen damage will occur if the monitor is left on for extended periods of time with the same image on the screen at high intensity.

VORSICHT:

Bildschirmschaden ist unvermeidlich, falls der Bildschirm über längere Zeit und mit demselben Bild auf dem Schirm bei hoher Intensität angeschaltet bleibt.

ATTENTION:

L' écran du moniteur sera endommagé si le moniteur est laissé pendant une période prolongée avec la même image sur l' écran à haute intensité.

Preface

The *HP Apollo 9000 Series 400 Domain/OS Owner's Guide* describes how to use your Series 400 workstation with Domain/OS.

We've organized this guide as follows:

Chapter 1	Introduces this guide.
Chapter 2	Describes the Series 400 workstation's controls, connectors, and indicators.
Chapter 3	Describes how to start up a disked system.
Chapter 4	Describes how to start up a diskless system.
Chapter 5	Describes how to use a cartridge tape drive with the Model 400s or 433s workstation.
Chapter 6	Describes some troubleshooting techniques to use with a Series 400 workstation.
Chapter 7	Describes how to recover from a system crash or a system hang.
Chapter 8	Describes how to check the operation of an 802.3 (ETHERNET) network.
Chapter 9	Describes how to check the operation of an Apollo Token Ring Network.
Chapter 10	Describes how to check the operation of an 802.5 (IBM Token Ring) network.
Chapter 11	Describes how to start up a Series 400 workstation in Service mode.
Appendix A	Describes how to use the cartridge tape drive.

Audience

This guide is intended for use by technically qualified personnel and computer-knowledgeable customers to install and use their Series 400 workstation.

Installation Notice

Products designated in the HP Apollo applicable price list as customer-installable can be installed by computer-knowledgeable customers who carefully read and follow the instructions provided. Customers who elect to have the product installed by our field personnel will be charged the applicable Field Installation Charge (FIC), as covered under the standard terms and conditions. For more information, please contact your designated sales representative.

Release Document(s)

Please refer to the *Release Document(s)* you received with your system and/or system software for additional information that we may not have been able to include in this guide at the time of its publication.

Related Manuals

The file **/install/doc/apollo/os.v.** *latest software release number*__**manuals** lists current titles and revisions for all available manuals. For example, at SR10.2 refer to **/install/doc/apollo/os.v.10.2__manuals** to check that you are using the correct version of manuals. You may also want to use this file to check that you have ordered all of the manuals that you need. (If you are using the Aegis environment, you can access the same information through the Help system by typing **help manuals**.)

Refer to the *Domain Documentation Quick Reference* (002685) and the *Domain Documentation Master Index* (011242) for a complete list of related documents. For more information on the Series 400 workstation, refer to the following documents:

- *HP Apollo 9000 Series 400 Model 400t, 400dl, 425t Installation Guide* (A1630–90001)
- *HP Apollo 9000 Series 400 Model 400s, and 433s Installation Guide* (A1421–90001)
- *Installing the Winchester Disk into the HP Apollo 9000 Model 400t and 425t Workstation* (A1630–90003)
- *HP Apollo 9000 Model 400dl, 400t, and 425t Technical Reference Manual* (A1630–90002)
- *Installing Software with Apollo's Release and Installation Tools* (008860)
- *Getting Started with Domain/OS* (002348)
- *Using Your SysV Environment* (011022)
  Using Your BSD Environment (011020)
  Using Your Aegis Environment (011021)

- *Managing SysV System Software* (010851)
  Managing BSD System Software (010853)
  Managing Aegis System Software (010852)

- *SysV Command Reference* (005798)
  BSD Command Reference (005800)
  Aegis Command Reference (002547)

- *Writing Device Drivers with GPIO* (000959)

- *Domain Hardware Utilities Reference* (014881)

- *ADUS Free Software Library Catalog* (This catalog is free to ADUS members. Call your designated HP Apollo sales office for membership information.)

You can order Apollo documentation by calling **1–800–225–5290**.

Problems, Questions, and Suggestions

If you have questions or problems with our hardware, software, or documentation, please contact either your HP Response Center or your local HP representative.

Alternatively, you may use the Reader's Response Form at the back of this guide to submit comments about this guide.

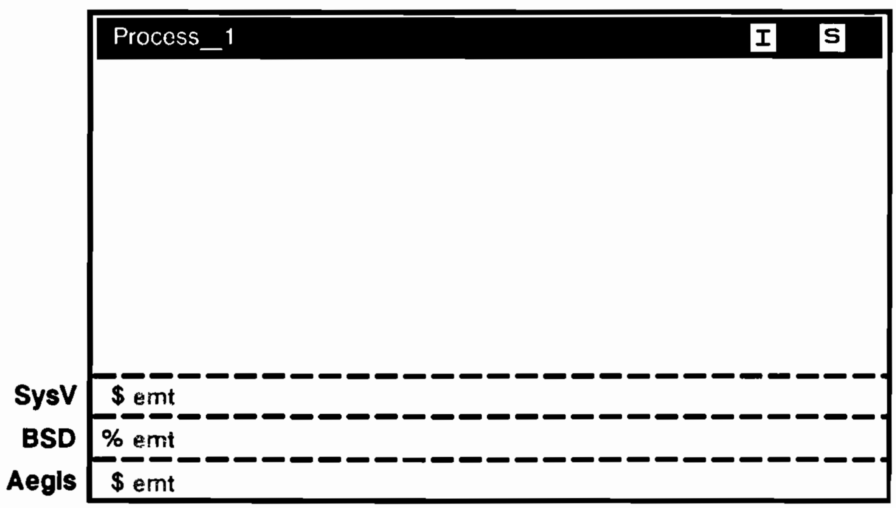
Documentation Conventions

Unless otherwise noted in the text, this manual uses the following symbolic conventions.

literal values	Bold words or characters in formats and command descriptions represent commands or keywords that you must use literally. Pathnames are also in bold.
user–supplied values	Italic words or characters in formats and command descriptions represent values that you must supply.
sample user input	In samples, information that the user enters appears in color.
< >	Angle brackets enclose the name of a key on the keyboard.
CTRL/Z	The notation CTRL/ followed by the name of a key indicates a control character sequence. Hold down <CTRL> while you press the key.
. . .	Horizontal ellipsis points indicate that you can repeat the preceding item one or more times.
. . .	Vertical ellipsis points mean that irrelevant parts of a figure or example have been omitted.
——— ⊞ ———	This symbol indicates the end of a chapter or part of a manual.

Domain/OS Operating Environments

After your system is installed, the system administrator can change the default operating system environment to any of three environments: SysV, BSD, or Aegis. To assist you in entering commands illustrated in the text, we provide a visual display of all three operating environments. The screen displays in the text are similar to the following example:



When there is no difference among the three environments, we show one command line only.

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Part 1 – Introducing the Series 400 Workstation

Chapter 1 How to Use This Guide

Chapter 2 Controls, Indicators, and Connectors

Part 2 – Starting Up

Chapter 3 Starting Up a Series 400 Workstation

Chapter 4 Starting Up a Diskless Series 400 Workstation

Part 3 – Troubleshooting

Chapter 5 Troubleshooting

Chapter 6 Recovering from a System Crash

Chapter 7 Checking the 802.3 Network

Chapter 8 Checking the Apollo Token Ring Network

Chapter 9 Checking the 802.5 Network

Chapter 10 Starting Up in Service Mode

Appendix A Using the Cartridge Tape Drive

Glossary

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Part 1 — Introducing the Series 400 Workstation

Chapter 1
How to Use This Guide

This chapter tells you how to use this owner's guide. This guide provides instructions for using the HP Apollo 9000 Series 400 Model 400dl, 400t, 425t, 400s, and 433s workstations running the Domain/OS operating system. This chapter describes:

- Which chapters you need to read to use your workstation
- The documentation shipped with your workstation

Using This Guide

This guide tells how to start up your system. Use this guide after you have installed your system, using the *HP Apollo 9000 Series 400 Workstation Installation Guide.*

This guide is divided into three parts.

Part 1 contains general information about your workstation.

Part 2 contains instructions for getting started with the HP Apollo Series 400 workstation running Domain/OS.

- Go to Chapter 3 if your system is equipped with an internal Winchester disk drive.
- Go to Chapter 4 if your system is diskless (not equipped with an internal Winchester disk drive).

Part 3 contains contains troubleshooting information. Consult the tables at the beginning of Chapter 5 if you have a problem with your system. The tables point you to the correct troubleshooting procedure.

Appendix A contains information you'll use when operating the optional cartridge tape drive in the Model 400s and 433s.

You may refer to this guide at a later date if you need to troubleshoot a problem or restart the system.

Figure 1–1 shows the documentation that comes with your workstation.

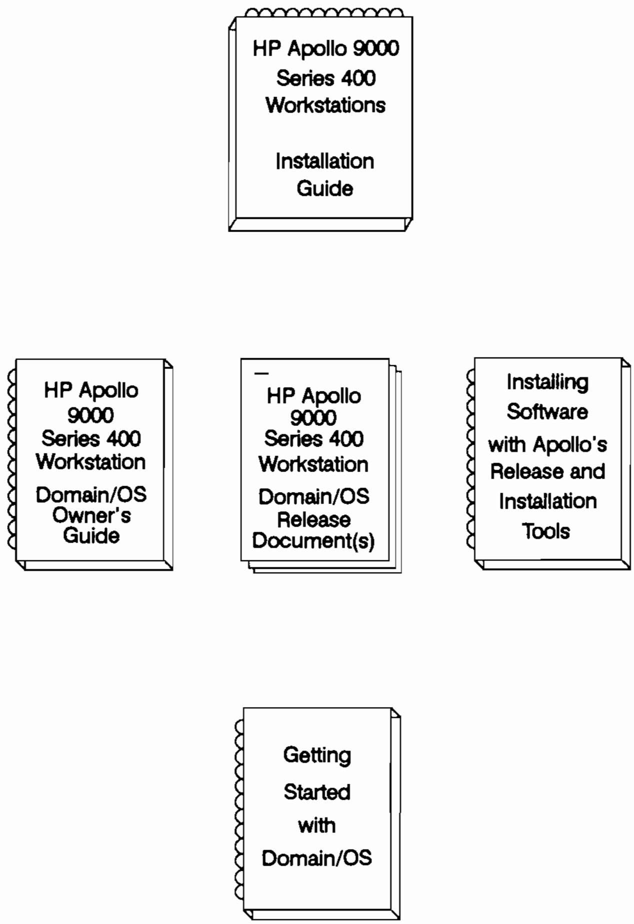


Figure 1–1. Domain/OS Documentation for Series 400 Workstations

Chapter 2
Controls, Indicators, and Connectors

This chapter introduces the Series 400 workstation. It describes the following:

- System unit controls
- System unit LED indicators
- System unit connectors
- Monitor controls

System Unit Controls

Before powering on your system, you should become familiar with the system unit controls.

Figure 2–1 shows the Power, Reset, and Service mode switches. Use the Power switch to power the system unit on and off. The Power switch also controls power to the monitor ac connector when connected to the Model 400dl, 400t, or 425t workstations.

Do not use excessive force when you press the Reset or Service mode switches; you need only press them gently.

You can press the Service mode switch to set the system to Service mode. The Service LED on the front panel lights when the system is in Service mode. You will *only* use Service mode when instructed to do so for diagnostic purposes. *Do not* use Service mode for everyday computing activities. Refer to Chapter 10 for information on how to use Service mode.

Press the Reset switch to restart the workstation (reset the operating system) only when you are in Service mode. Do not press the Reset switch when the operating system is up and running. Chapter 6 describes how to use the Reset switch to handle a system hang.

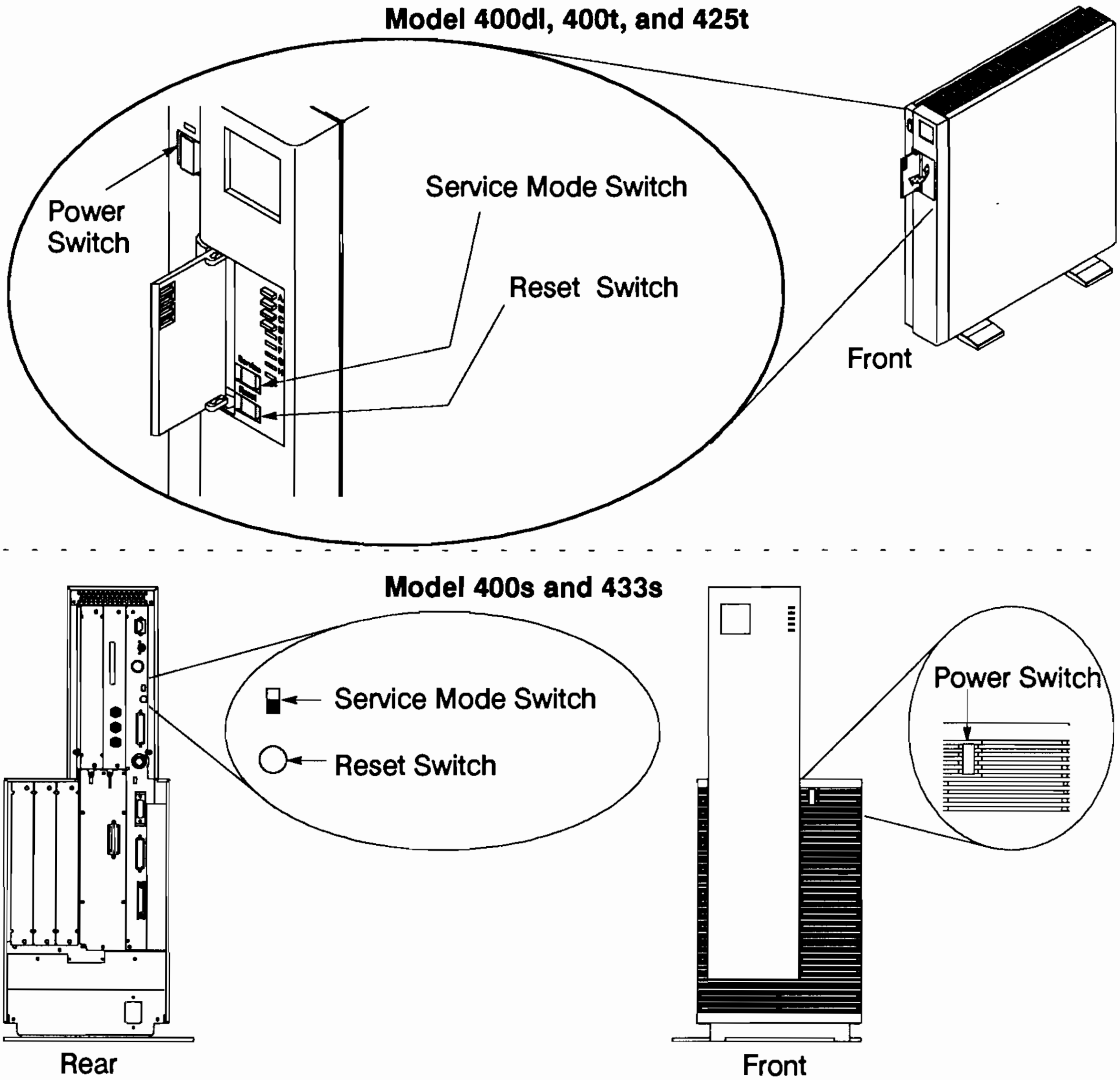


Figure 2–1. System Unit Controls

Understanding the LEDs

There are 10 LEDs located on the front of the system unit, as shown in Figure 2–2. The first four amber LEDs (labeled A, B, C, and D) show that the system is running the operating system and communicating over the network. Along with the next four amber LEDs (E, F, G, and H) they also help you to troubleshoot the workstation by coming on in certain patterns during system failures (see Chapter 5).

The Service LED lights when the system is running and placed in Service mode. It goes off when the system is running in Normal mode (for everyday operation).

The green Power LED lights when the system unit power is on.

Table 2–1 lists how the LEDs report during normal Domain/OS system activity. Note that the green Power LED remains lit while the system is powered on.

Table 2–1. LED Display During Normal System Activity

LED Display (A Through D Flashing)	Message
P A B C D E F G H S	
▮ ▯ ▯ ▯ ▯ ▯ ▯ ▯ ▯ ▯	Operating System Running
▮ ▯ ▯ ▯ ▯ ▯ ▯ ▯ ▯ ▯	Disk Access In Progress
▮ ▯ ▯ ▯ ▯ ▯ ▯ ▯ ▯ ▯	Network Receive In Progress
▮ ▯ ▯ ▯ ▯ ▯ ▯ ▯ ▯ ▯	Network Transmit In Progress
S = Service Mode Indicator On = Service Mode Off = Normal Mode	**P** = Power–On Indicator ▯ ▮ = LED On

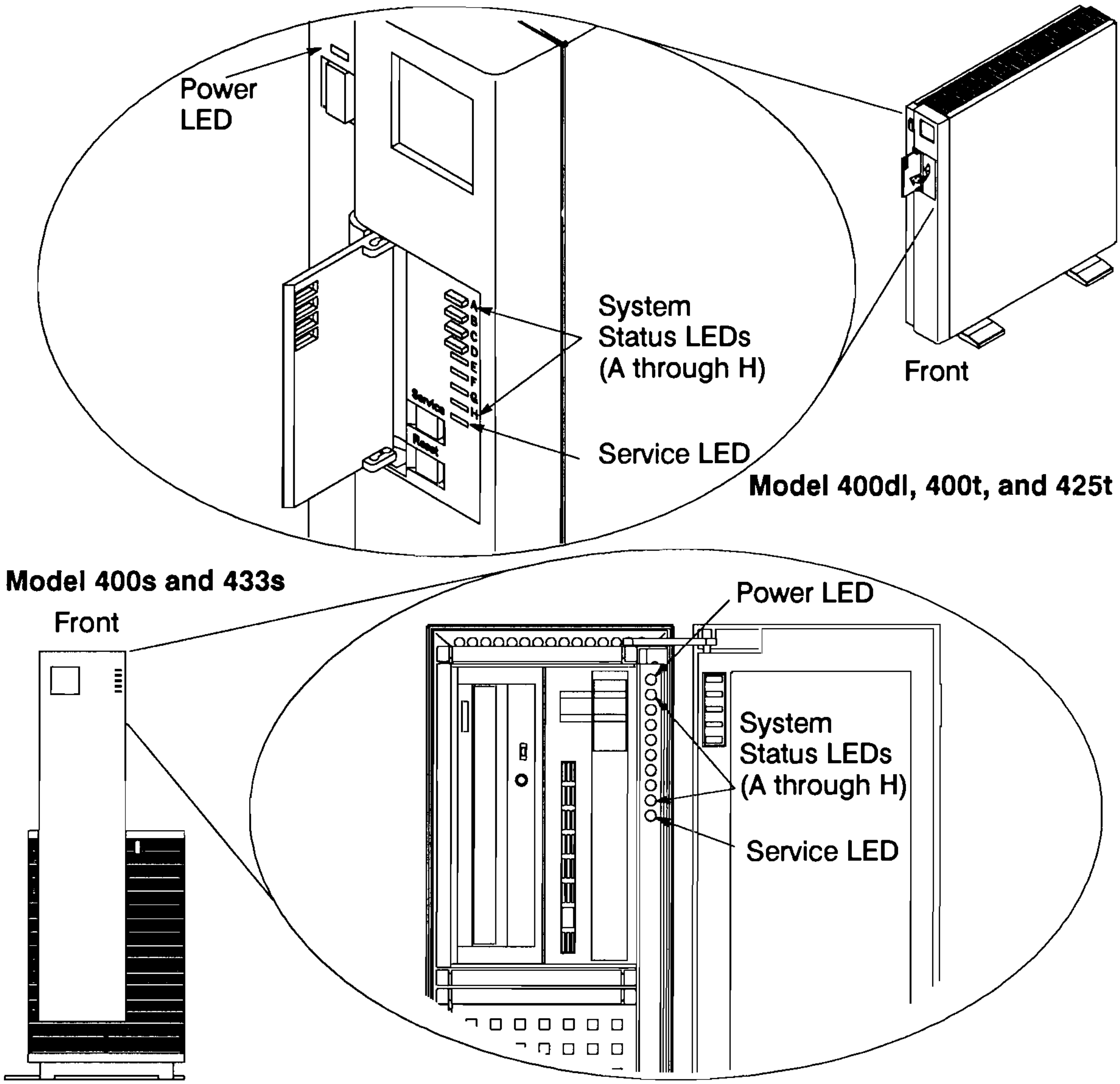


Figure 2–2. Front Panel LEDs

System Unit Rear Panel Connectors

This section describes the connectors on the system unit's rear panel. They are:

- Graphics Board Connector
- SCSI Connector (not available on Model 400dl)
- Parallel I/O Connector (not available on Model 400dl)
- Domain Keyboard Connector
- Monitor ac Connector (available only on Models 400dl, 400t, and 425t)
- Token Ring Network Connector for Apollo Token Ring Network or IBM 802.5 Token Ring Network (not available on Model 400dl)
- Audio Connector (not used with workstations running Domain/OS)
- RS–232 Connector
- 802.3 Network Connectors (ThinLAN and AUI)
- System ac Connector
- HP–IB Connector (not available on Model 400dl, and not used with workstations running Domain/OS)
- HP–HIL Connector (not used with workstations running Domain/OS)

See Figure 2–3 for the locations of these connectors on the rear panel of the Model 400dl, 400t, and 425t workstations.

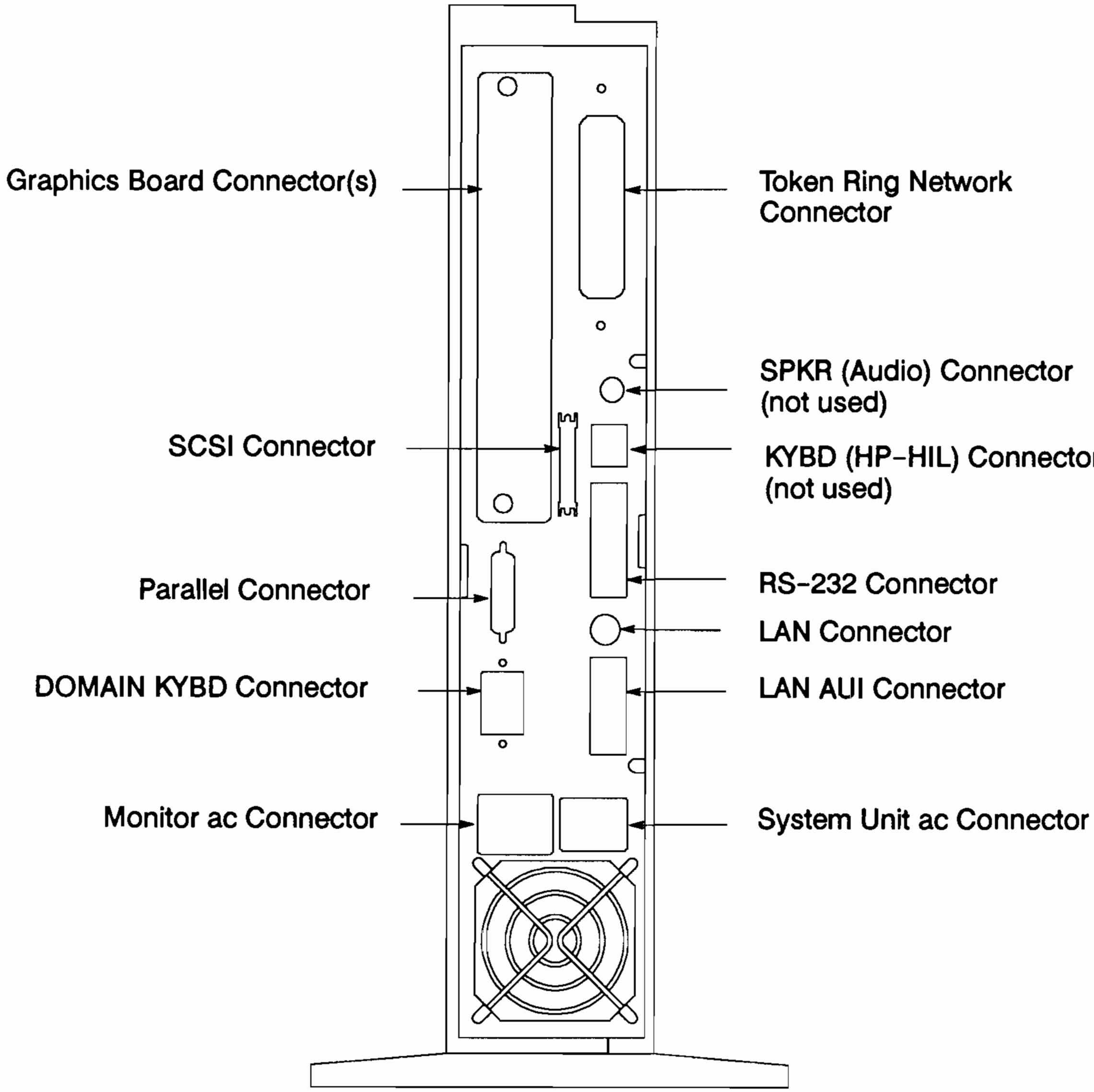


Figure 2–3. Model 400dl, 400t, and 425t Workstations Rear Panel Connectors

There are two different card cages available for the Model 400s and 433s workstations. One card cage contains four optional slots, which can be used for four ISA boards (including Token Ring Network boards). The other card cage contains three optional slots, which can be used for three DIO II boards.

Figure 2–4 shows the rear panel connectors on the Model 400s and 433s workstations with the four optional ISA slots.

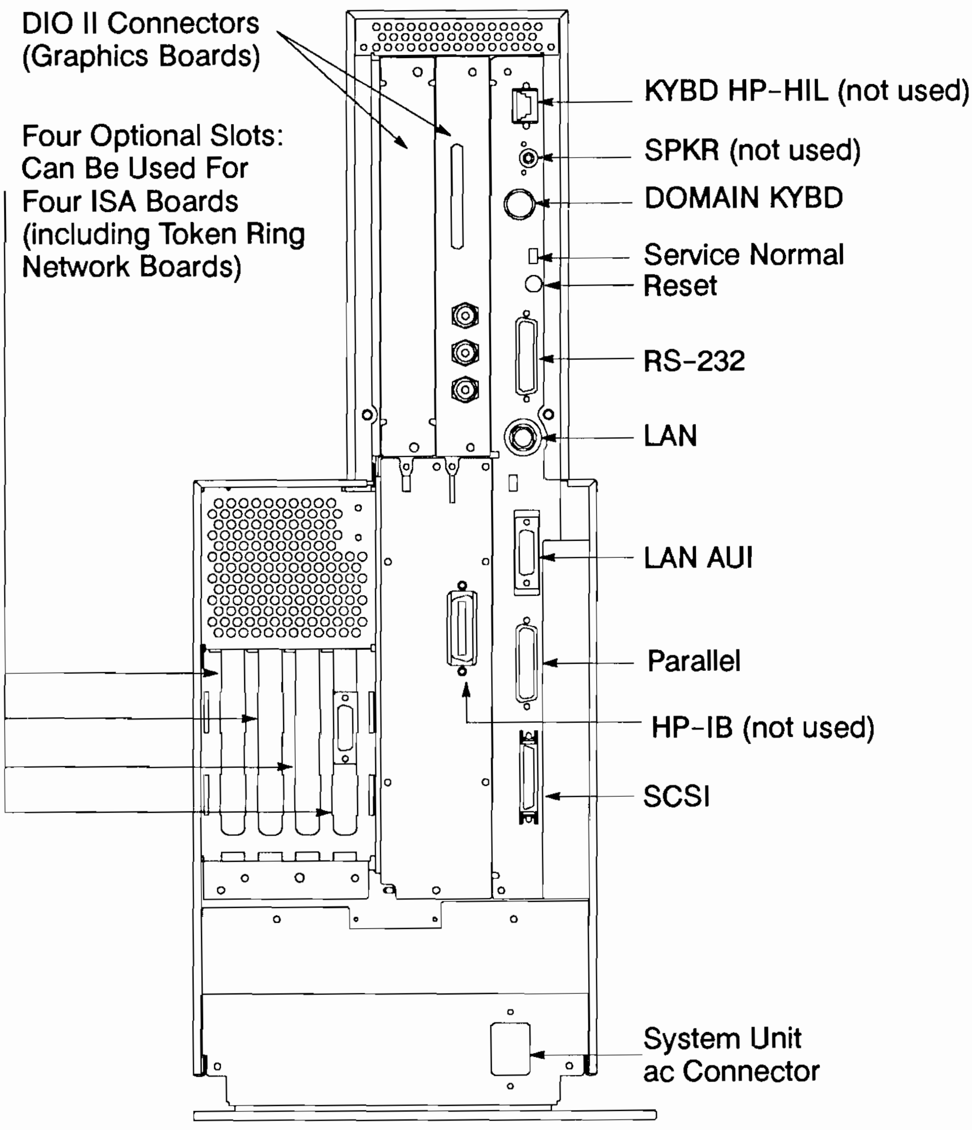


Figure 2–4. Model 400s and 433s Workstations Rear Panel Connectors (4–Slot ISA Card Cage)

See Figure 2–5 for the locations of the rear panel connectors on the Model 400s and 433s workstations with the three optional DIO II boards.

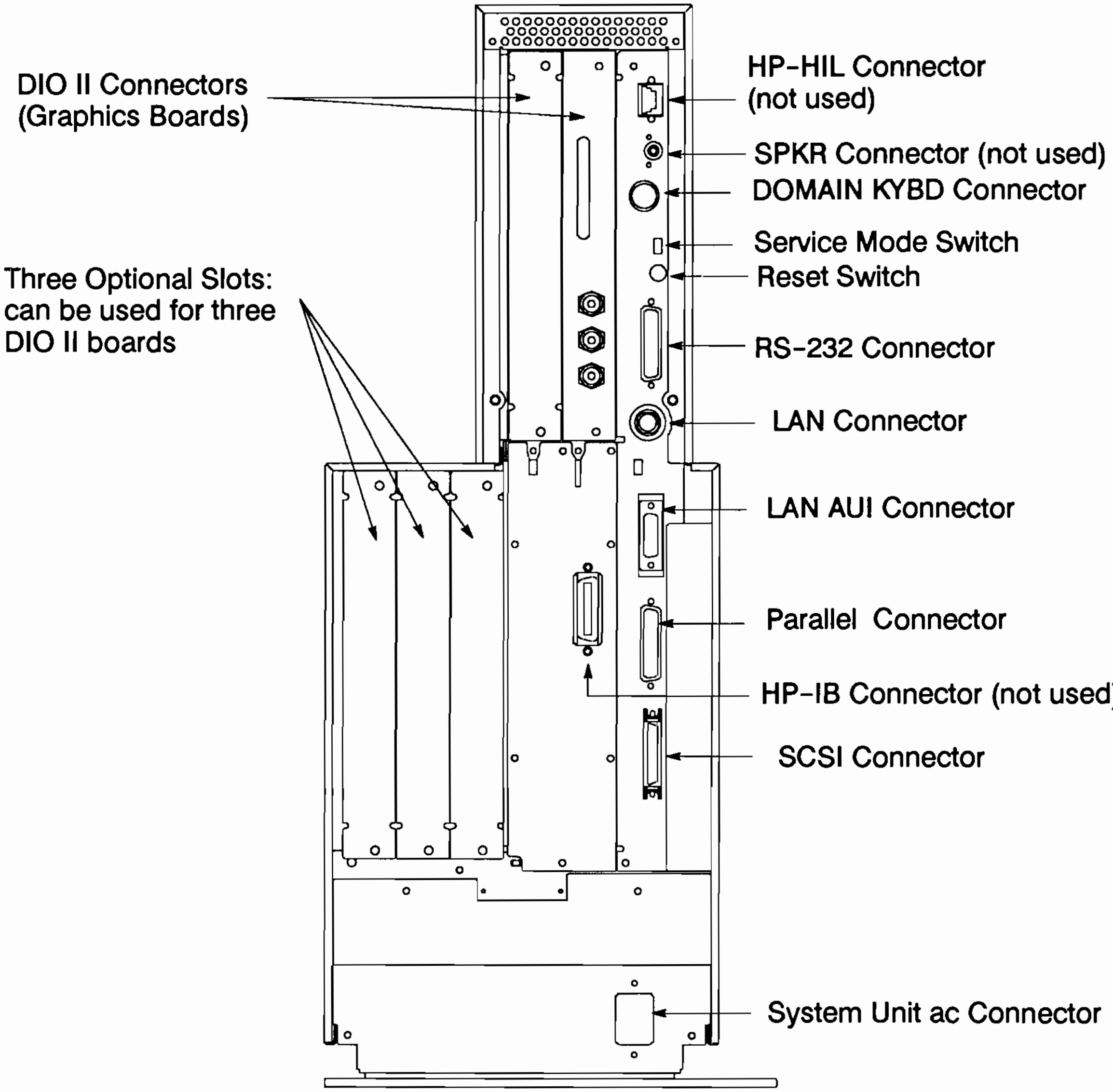


Figure 2–5. Model 400s and 433s Workstations Rear Panel Connectors (3–Slot DIO II Card Cage)

Keyboard Connector

Figure 2–6 shows the location of the Domain keyboard connector on the Series 400 workstations.

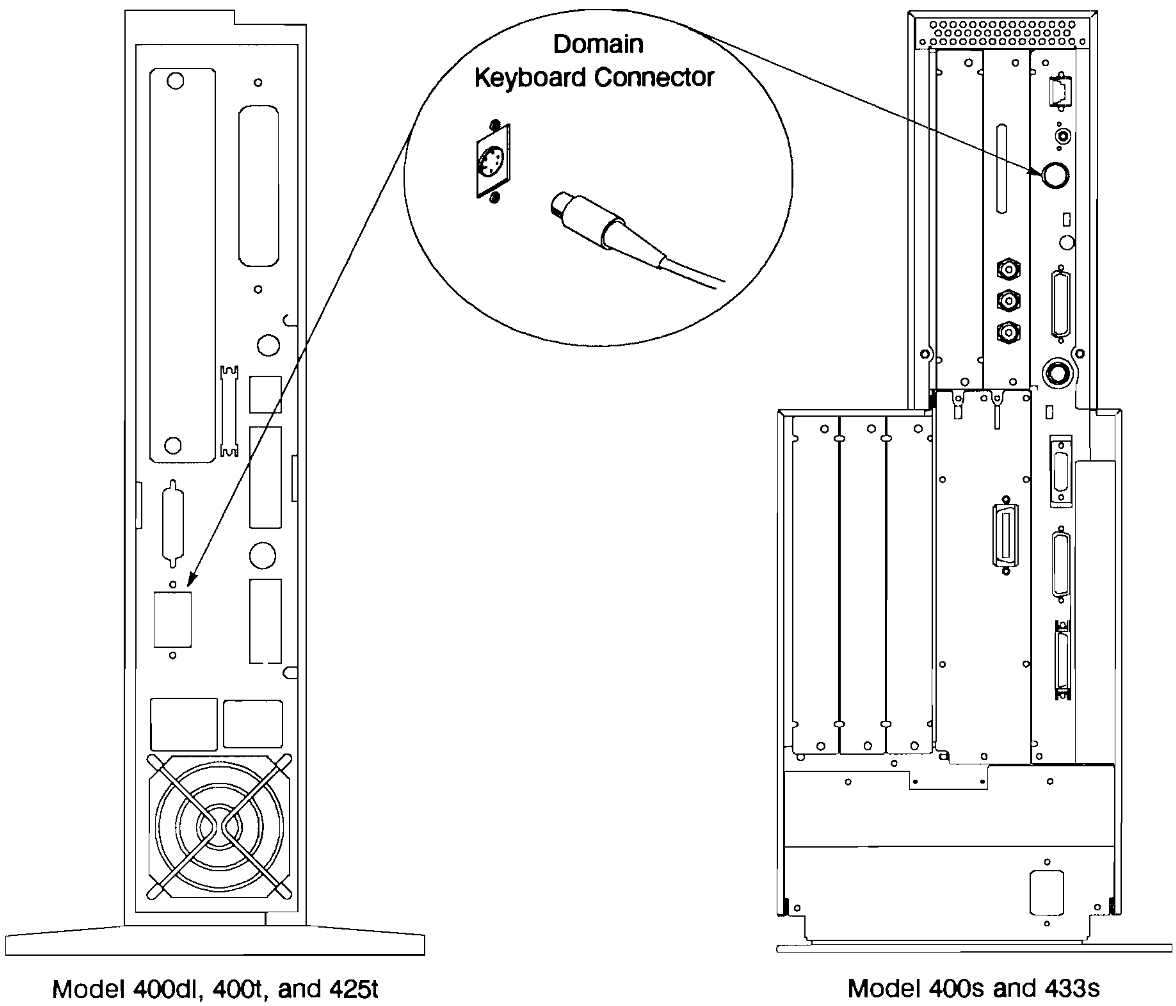


Figure 2–6. Domain Keyboard Connector

Parallel I/O Connector

Figure 2–7 shows the location of the parallel I/O connector on the Series 400 workstations.

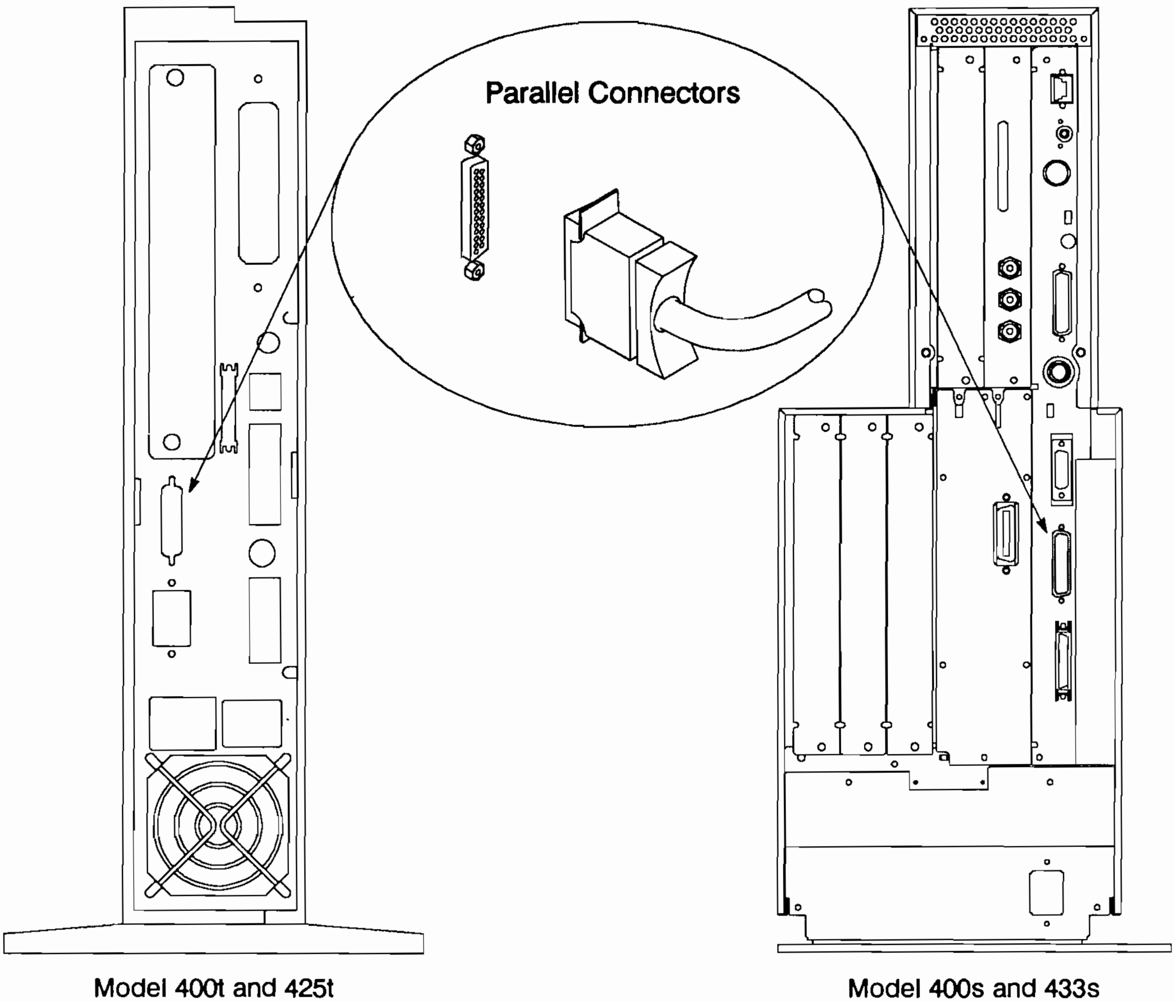


Figure 2–7. Parallel I/O Connector

SCSI Connector

Figure 2–8 shows the location of the SCSI connector on the Series 400 workstations.

NOTICE: HP Apollo does not provide maintenance for SCSI devices not sold by HP Apollo. For a list of SCSI devices that are sold by HP Apollo, contact your sales representative.

The *HP Apollo 9000 Series 400 Model 400dl, 400t, and 425t Technical Reference* manual contains hardware information about the SCSI port on the Model 400t and 425t workstations, including:

- Target IDs
- Cable length
- Terminators
- Synchronous transmission
- Cable pinouts
- Parity

If you are connecting a SCSI device for which HP Apollo has not provided a driver you can refer to *Writing Device Drivers with GPIO* for information on how to write a device driver.

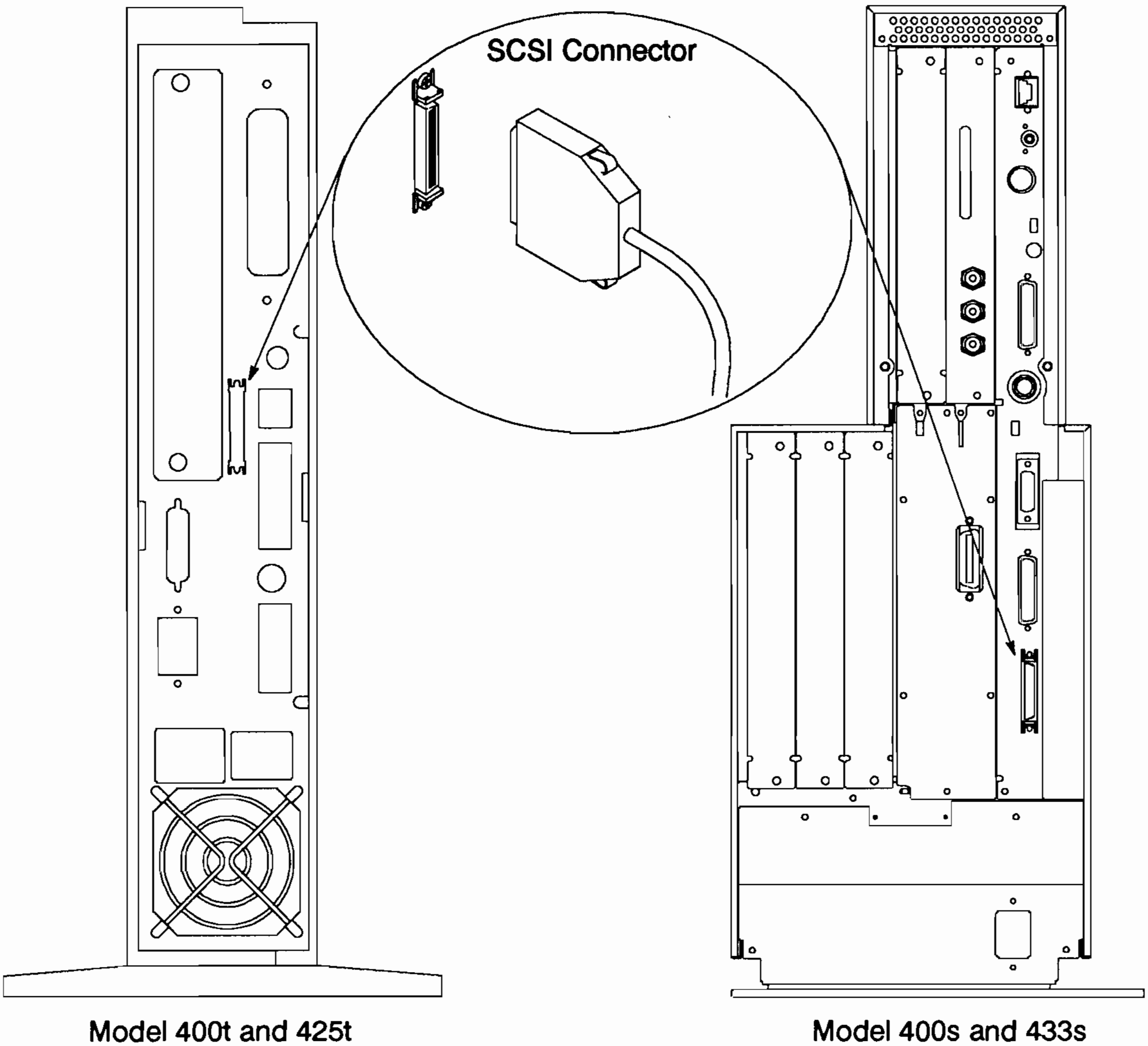


Figure 2–8. SCSI Connector

Keep in mind that 6 meters (19.6 feet) is the maximum length of SCSI cabling that can be used with the Series 400 workstations. Table 2-2 shows the external SCSI cables that are available from Instant Apollo (1-800-225-5290) for use with Series 400 workstations running Domain/OS and their HP Apollo SCSI peripheral storage devices.

Table 2-2. SCSI Cables for Series 400 Workstations and Their SCSI Peripherals

Connecting From: **To:**	**Series 400 Workstations:** **Model 400t** **Model 425t** **Model 400s** **Model 433s**	**SCSI Device:** **A-EX*** **AADDESTC*** **AADDSFLP*** **A-660E***	**SCSI Device:** **C2212A (with options)** **C2213A (with options)** **C1701A** **7980S (xc)** **C1512A**
SCSI Device: **A-EX*** **AADDESTC*** **AADDSFLP*** **A-660E***	**Use Cable:** K2288 — 0.9 meter (3 feet) K2287 — 1.5 meter (5 feet)	**Use Cable:** K2207 — 0.4 meter (1.3 feet) K2208 — 0.9 meter (3 feet) K2209 — 1.5 meter (5 feet) K2210 — 2.6 meter (8.5 feet) K2211 — 3.0 meter (10 feet)	**Use Cable:** K2284 — 0.9 meter (3 feet) K2283 — 1.5 meter (5 feet)
SCSI Device: **C2212A (with options)** **C2213A (with options)** **7980S (xc)** **C1512A** **C1701A**	**Use Cable:** K2286 — 0.9 meter (3 feet) K2285 — 1.5 meter (5 feet)	**Use Cable:** K2284 — 0.9 meter (3 feet) K2283 — 1.5 meter (5 feet)	**Use Cable:** 92222A — 0.5 meter (1.6 feet) 92222B — 1.0 meter (3.2 feet)

* Refer to the HP Apollo Products Price Guide for the specific Country Kit code number suffix.

With the information from Table 2-2 use Table 2-3 to determine the total SCSI cabling used for your workstation and its SCSI peripheral storage devices.

Table 2–3. Series 400 SCSI Device Cabling Configurations

SCSI Device Drives		**Cable Lengths Internal meters (feet)**	**External meters (feet)**
Model 400t and 425t — all internal SCSI drives (if present)		0.6 (2)	N/A
Model 400s and 433s — all internal SCSI drives (if present)		1.6 (5.5)	N/A
A-660E	See Note 1 and 2	0.6 (2)	______
AADDSFLP	See Note 1 and 2	0.6 (2)	______
AADDESTC	See Note 1 and 2	0.6 (2)	______
A-EX	See Note 1 and 2	0.6 (2)	______
C1701A	See Note 3	0.15 (0.6)	______
C1512A	See Note 3	0.9 (3)	______
7980S (XC)	See Note 3	0.0 (0.0)	______
C2212A	See Note 3	0.9 (3)	______
C2213A	See Note 3	0.9 (3)	______
Internal + External not to exceed Total of 6 meters (19.6 feet)	Subtotals:	______ +	______
		Total =	

Note	Meaning
1	Refer to the HP Apollo Products Price Guide for the specific Country Kit code number suffix.
2	Ships with one external cable K2209 (1.5 meter — 5.0 feet)
3	Ships without external cable. Cable must be ordered as separate item.

802.3 Network Connector

Figure 2–9 shows the location of LAN and AUI LAN connectors for the 802.3 (ETHERNET) network on the Series 400 workstations.

You will use only one of these connectors on the workstation. Which connector you use depends on the type of cabling used at your location.

The controller board was installed in the system unit during manufacturing, and was set for an *on–board (internal) transceiver* to use the EtherLAN LAN connector on the rear of the workstation.

However, you may have changed the setting on the controller board during your system's installation to operate the 802.3 network with the external transceiver and to use the LAN AUI connector

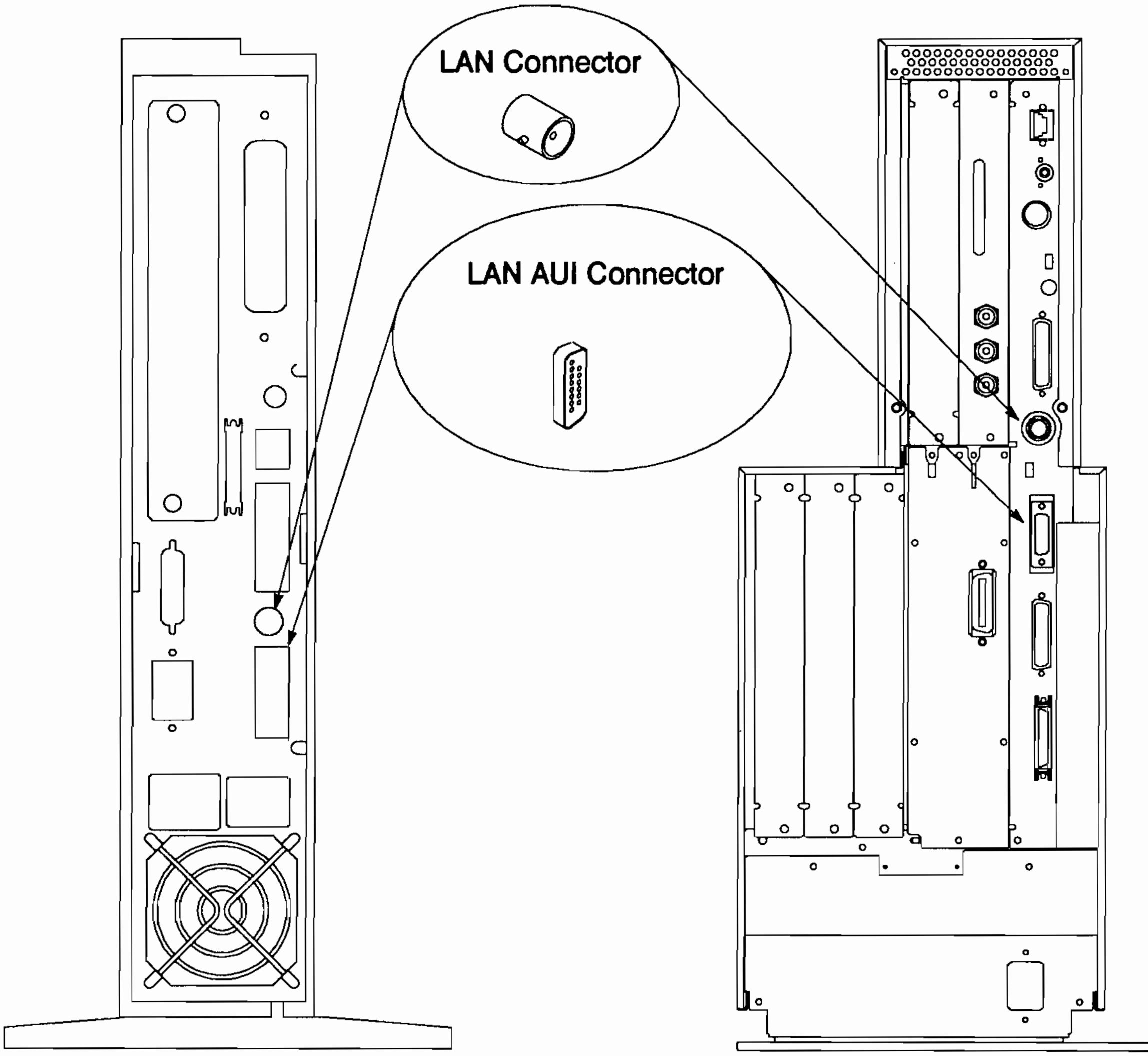


Figure 2–9. 802.3 Network Connectors

RS–232 Serial Input/Output Connectors

You can attach a variety of peripheral devices to the RS–232 Serial Input/Output (SIO) port on the workstation. These peripheral devices include printers, plotters, modems, and scanners. Consult the documentation that accompanies each peripheral device for specific information concerning its use.

See the *HP Apollo 9000 Series 400 Model 400dl, 400t, and 425t Technical Reference* manual for more information about using the SIO port(s) with Domain/OS.

Table 2–4 shows the P2 SIO connector pin listings. Signal names are as specified in the EIA RS–232 standard.

Table 2–4. Serial I/O Pins

Pin No.	Signal	Pin No.	Signal
1	Ground	14	SIO2_RTS
2	SIO1_TXD	15	SIO2_CTS
3	SIO1_RXD	16	SIO2_DCD
4	SIO1_RTS	17	Spare
5	SIO1_CTS	18	SIO2_DTR
6	SIO1_DSR	19	SIO3_DTR
7	Inline Resistor	20	SIO1_DTR
8	SIO1_DCD (not supported in Domain/OS)	21	SIO3_TXD
		22	SIO1_RI (not supported in Domain/OS)
9	SIO3_RXD		
10	SIO3_CTS	23	SIO3_RTS
11	Spare	24	Spare
12	SIO2_TXD	25	SIO3_DCD
13	SIO2_RXD		

Figure 2–10 shows the location of the SIO RS–232 connector on the rear of the Series 400 workstations. It also shows the optional SIO break–out connector that allows the single SIO connector on the system to support up to three SIO devices at a time.

There are three full–duplex serial ports on the workstation. All ports are programmable. You can set functions such as bit rate, character length, parity, and stop bits. Ports 1, 2, and 3 are used as interfaces for serial asynchronous devices to the CPU. All ports operate at up to a 19.2K baud rate.

To save space on the system's rear panel, three serial ports are implemented in one 25–pin D connector. You can use just one port by attaching a standard serial cable to the rear panel connector. Attaching the optional break–out connector allows you to use up to three SIO ports.

The interface to SIO1, 2, and 3 is via RS–232 drivers and receivers.

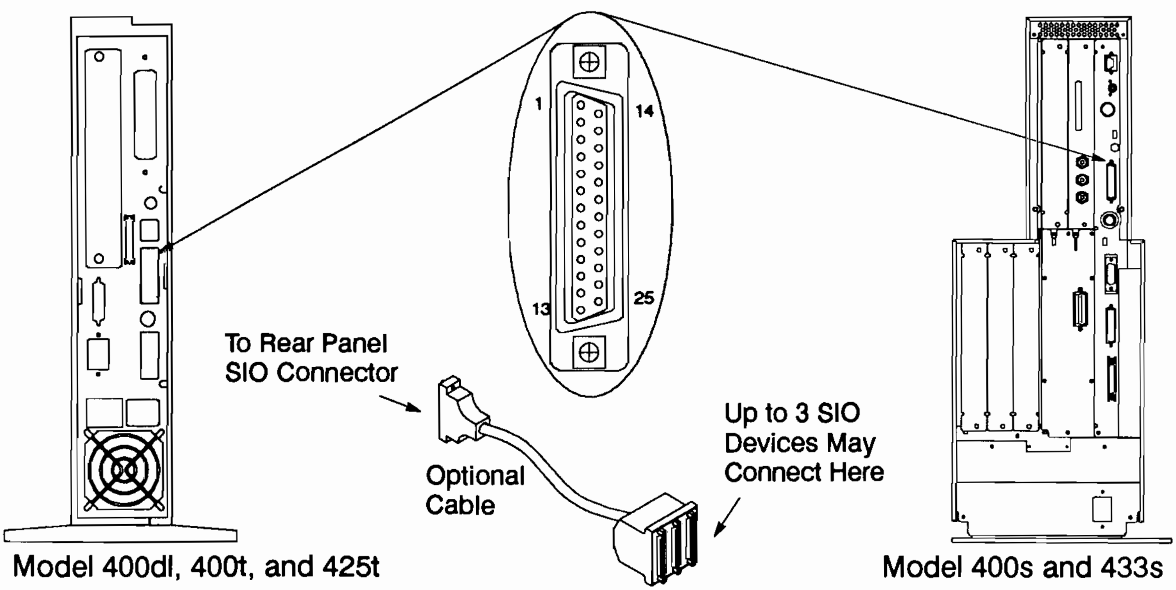


Figure 2–10. RS–232 SIO Connector

Token Ring Network Connectors

You have a choice of two token ring networks: the Apollo Token Ring Network, or the 802.5 (IBM) Token Ring Network.

The Model 400s and 433s workstations can connect to both token ring networks. The Model 400t and 425t workstations can connect to one of the two token ring networks.

Figure 2–11 shows the token ring network connectors for the Series 400 workstations.

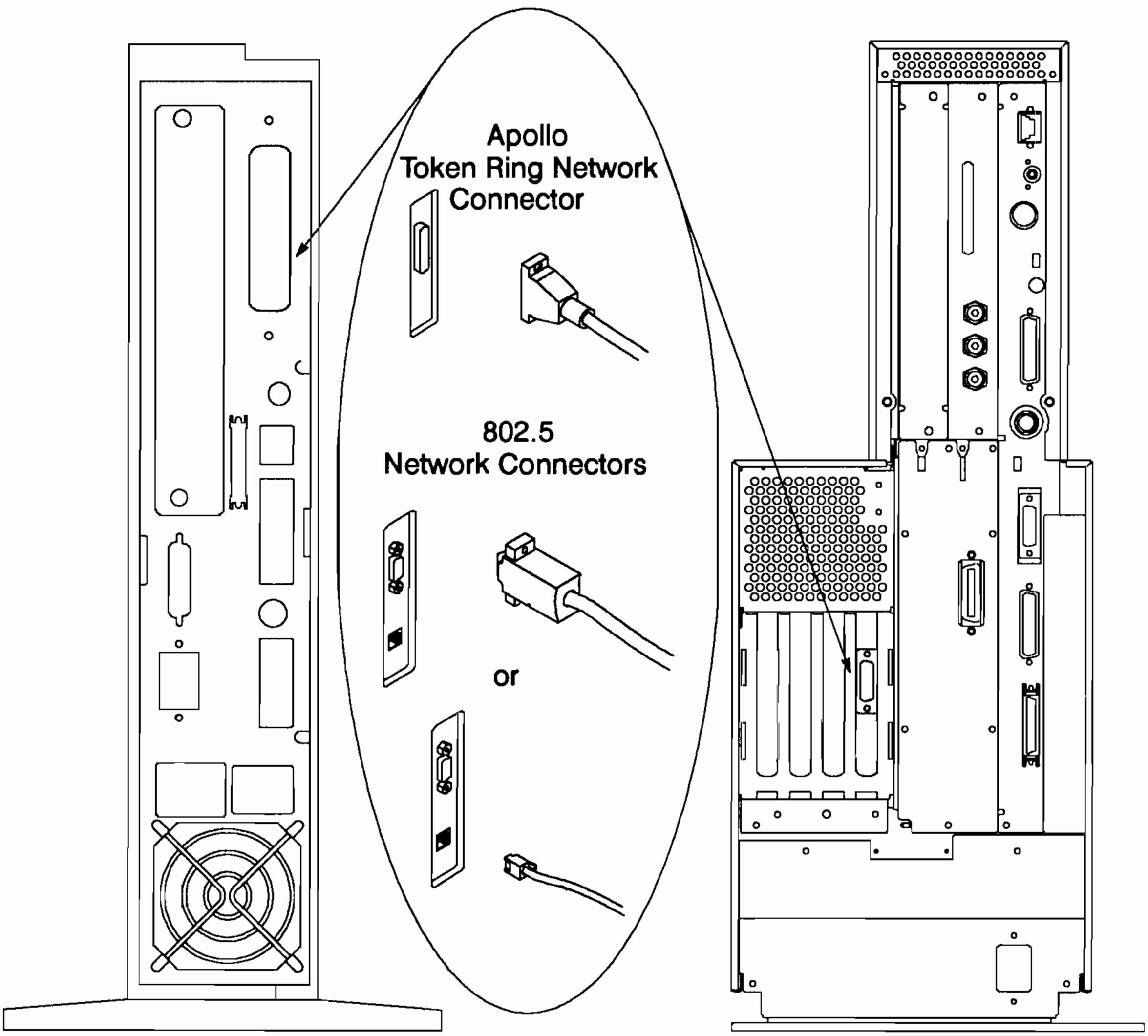


Figure 2–11. Token Ring Network Connectors

ac Connectors

Figure 2–12 shows the ac connectors on the Series 400 workstations.

There is no monitor ac connector on the Model 400s or 433s workstations. Monitors used with the Model 400s or 433s workstations have their own connection to the ac power source.

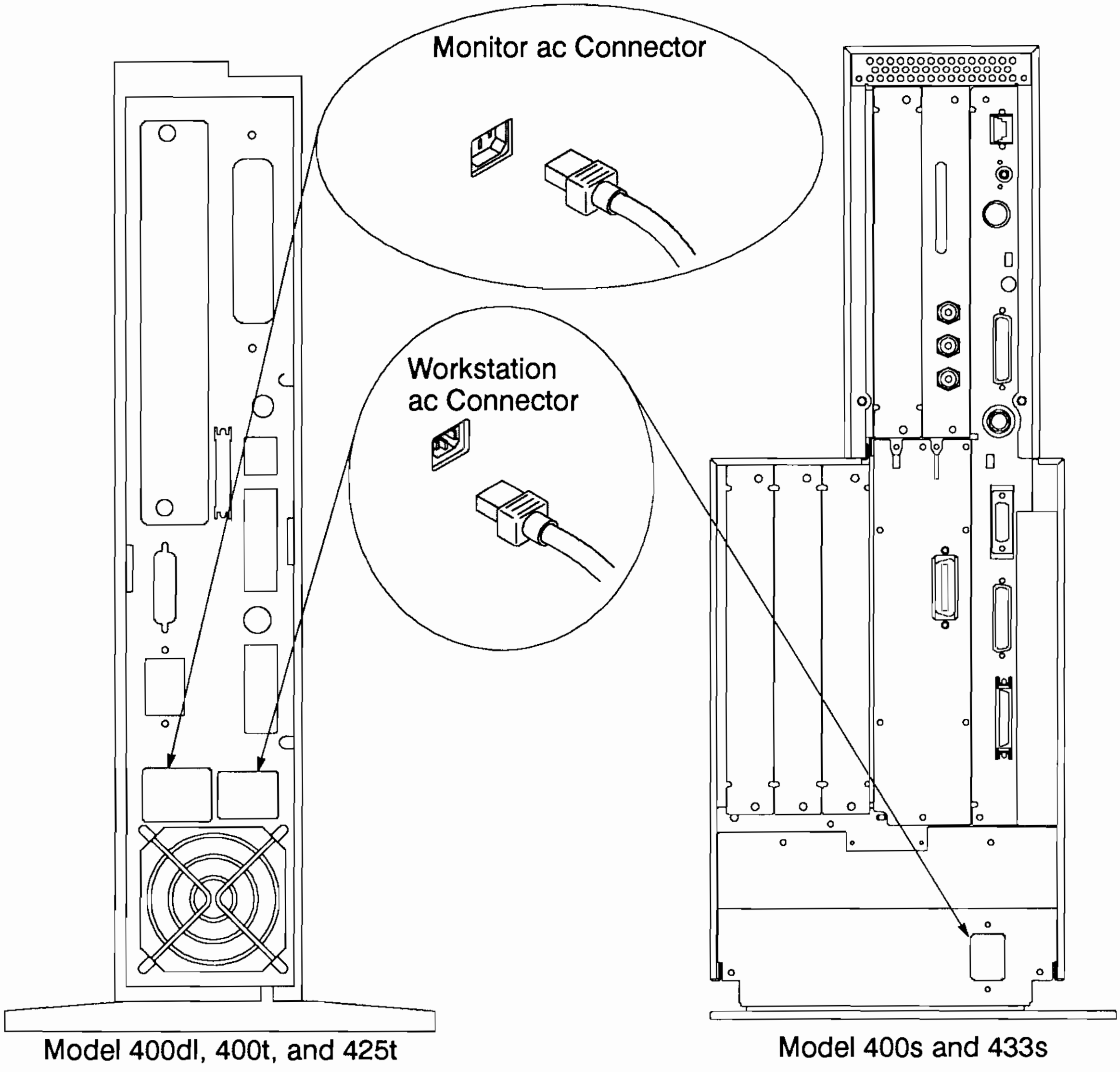


Figure 2–12. ac Connectors

Graphics Connector

Figure 2–13 shows the location of the graphics connector on the Series 400 workstations.

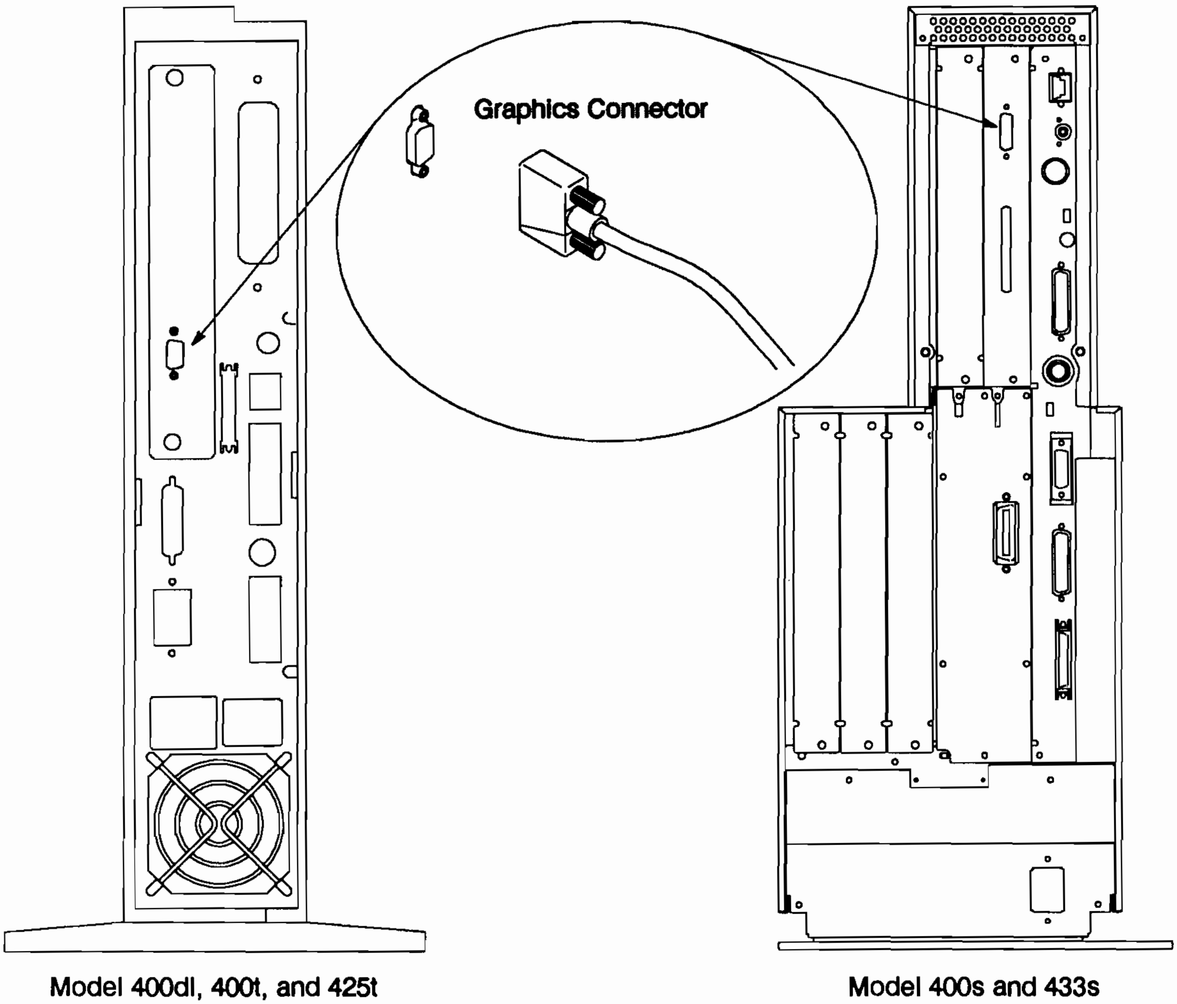


Figure 2–13. Graphics Connector

Monitor Controls, Connectors, and Indicators

Before using your monitor, you should become familiar with its controls, connectors, and indicators.

The Power–On LED, when lit, indicates that the monitor has ac power applied.

For monitors connected to the Model 400dl, 400t, or 425t workstation, use the workstation's Power switch to power the monitor on or off. If you leave the monitor Power switch in the ON position, the monitor is automatically powered on or off when you power the system unit on or off (the monitor ac cable is plugged into the system unit).

For monitors connected to the Model 400s or 433s workstation, use the monitor's Power switch to power the monitor on or off independently. The Model 400s and 433s system unit Power switch does not control power to the monitor.

- Use the Brightness control to adjust the brightness of the display.
- Use the Contrast control to adjust the light–to–dark and dark–to–light contrast of the display.
- Use the Static Convergence Controls to adjust the horizontal and vertical stability of the display.

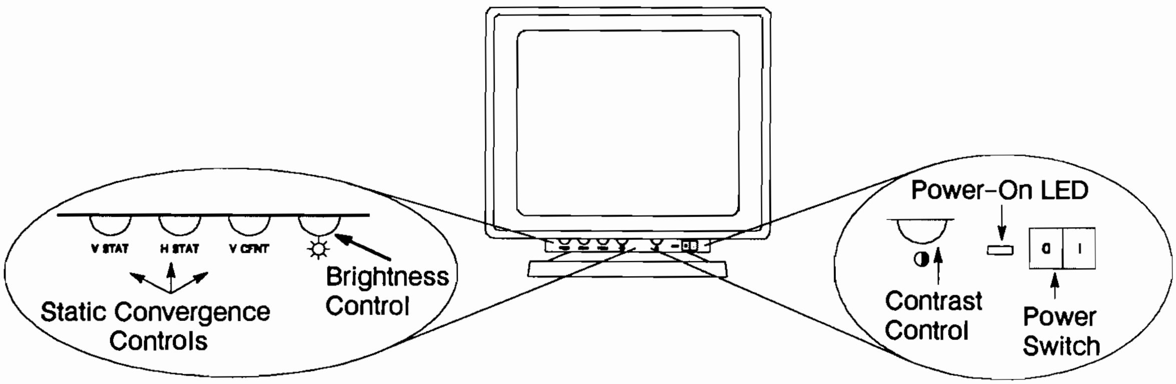
The following three figures illustrate Series 400 workstation monitors.

Figure 2–14 shows the 19–inch color monitor.

Figure 2–15 shows the 19–inch monochrome monitor.

Figure 2–16 shows the 16–inch color monitor.

19-Inch Color Monitor (Front)



19-Inch Color Monitor (Rear)

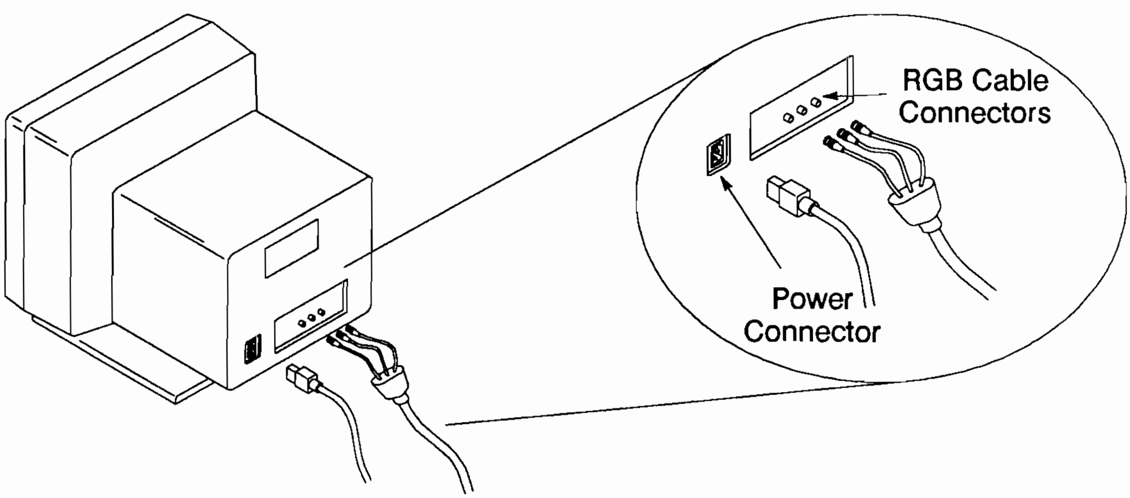
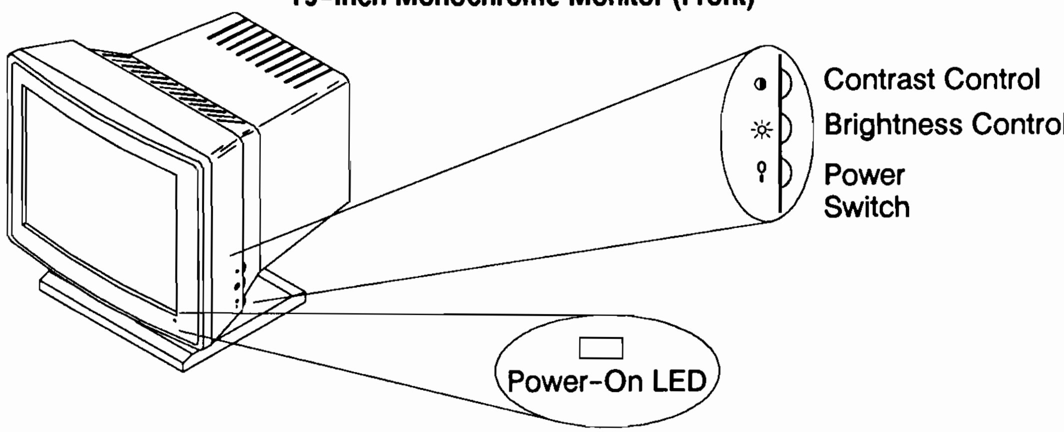


Figure 2–14. 19–Inch Color Monitor Controls, Indicators, and Connectors

19-Inch Monochrome Monitor (Front)



19-Inch Monochrome Monitor (Rear)

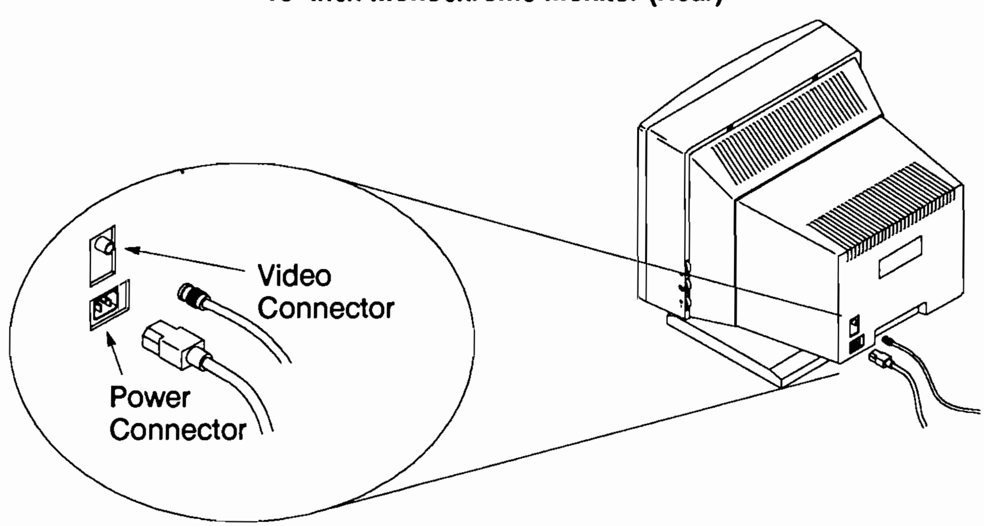


Figure 2–15. 19–Inch Monochrome Monitor Controls, Indicators, and Connectors

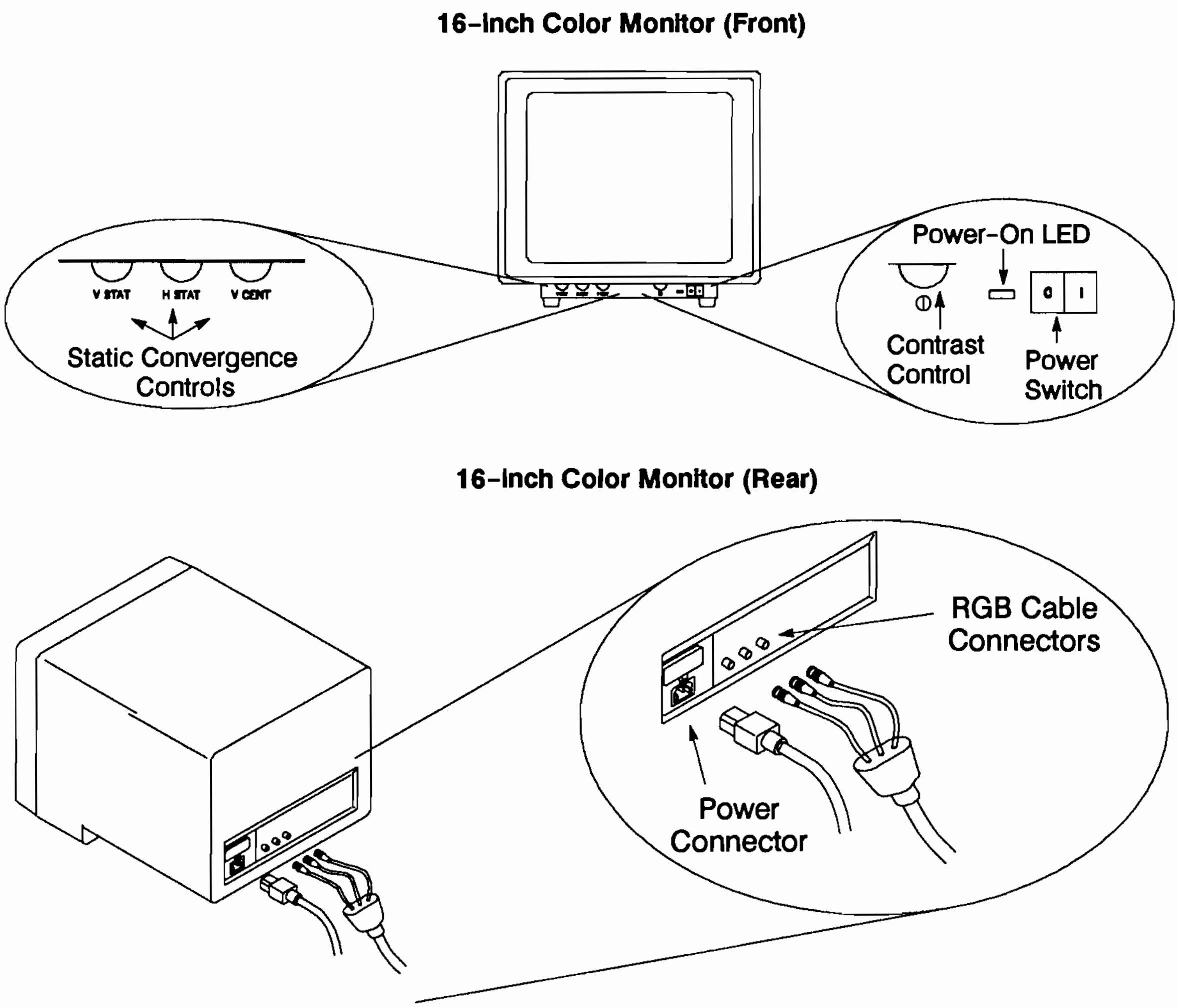


Figure 2-16. 16-Inch Color Monitor Controls, Indicators, and Connectors

What to Read Next

After familiarizing yourself with your workstation's controls, indicators, and connectors you are ready to start up the workstation.

If your workstation has an internal Winchester disk drive, go to Chapter 3 for instructions on how to start up the system.

If your workstation does not have an internal Winchester disk drive, go to Chapter 4 for instructions on how to start up the system.

Part 2 — Starting Up

Chapter 3
Starting Up a Series 400 Workstation

This chapter describes how to start up a Series 400 workstation (with one or more internal disk drives) running Domain/OS. It includes the following information:

- Preparing for start up
- Selecting the workstation's primary network
- Starting up in Normal mode
- Setting the system's calendar
- Logging in and logging out
- Shutting down
- Using the multiple disk option

NOTICE: Chapter 4 describes how to start up a diskless workstation.

Starting Up

Use the procedures in this chapter to start up a workstation that contains a Winchester disk drive. In order to start up a workstation with Domain/OS, your system must include a Domain keyboard.

You can start up (boot) your system in either Normal or Service mode. You will use Normal mode for everyday computing activities. Normal mode is the default mode when you power up the system.

In this chapter you will use Service mode only to select the workstation's primary network.

Chapter 10 describes starting up in Service mode to troubleshoot or reconfigure the workstation.

Preparing to Start Up

Before starting up your workstation, make sure that it has been installed according to the instructions in the *HP Apollo 9000 Series 400 Workstation Installation Guide* that you received with your system.

Make sure that you have correctly set the voltage selection switch on the 16–inch monitor as shown in Figure 3–1. The correct position for the U.S. and Canada is 100 to 120 V ac (labeled 115 V on some monitors).

The 19–inch monitors and the system unit do not have voltage selection switches. The internal power supplies on these devices have voltage sensing circuitry that automatically adjusts to the correct voltage.

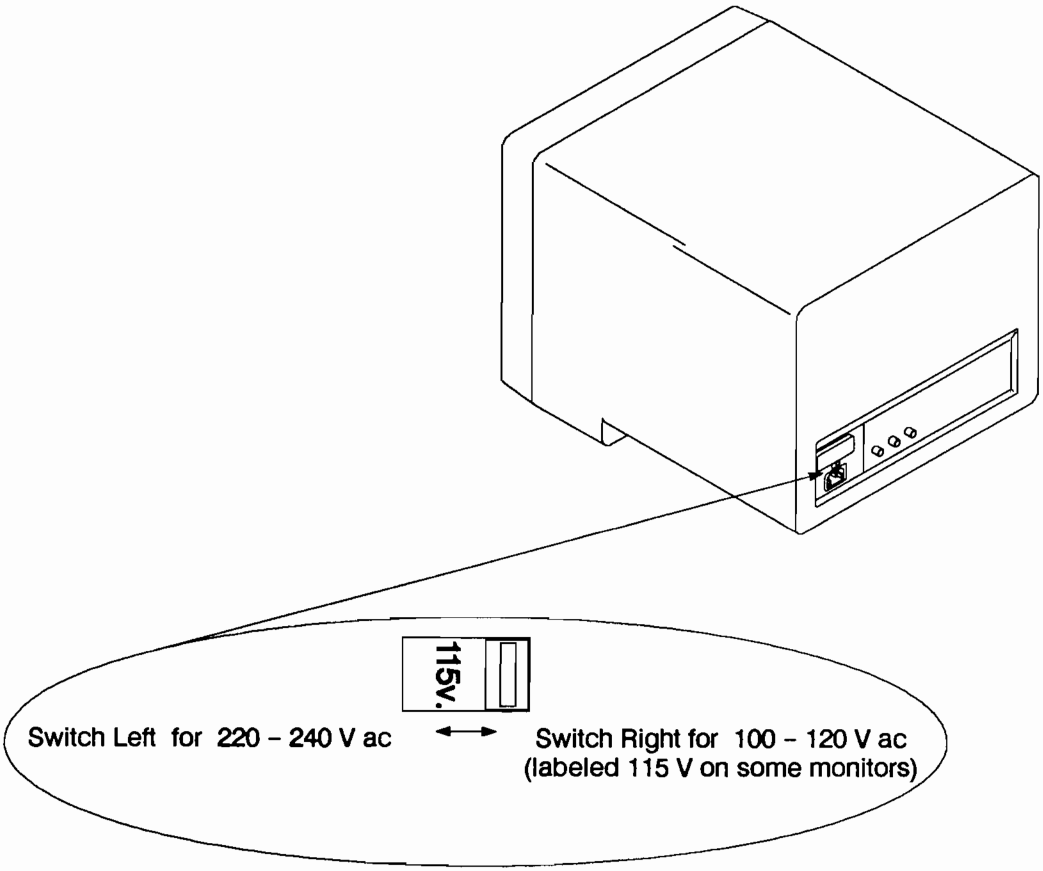


Figure 3–1. 16–Inch Monitor Voltage Selection Switch

Selecting the Primary Network in Service Mode

Follow these steps to start up your workstation in Service mode so that you can select the primary network. These steps assume that the system is powered on in Normal mode (Service LED is off).

1. Power on the monitor and the system unit.

   The workstation now runs a series of internal self tests.

2. Before the system finishes the self tests, press the Service mode switch to set the system to Service mode (the Service LED on the system's front panel lights). Then press the Reset switch as shown in Figure 3-2. Press the <RETURN> key until the screen displays the Mnemonic Debugger (MD) ">" prompt.

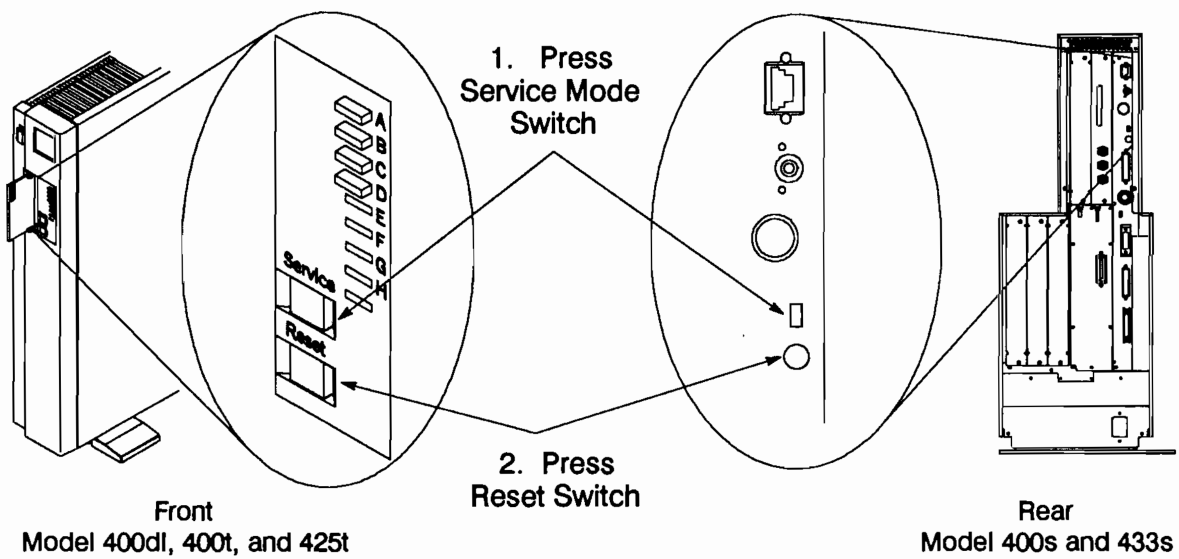


Figure 3–2. Starting a Workstation in Service Mode

Starting Up

The screen prompt appears as shown in Figure 3-3.

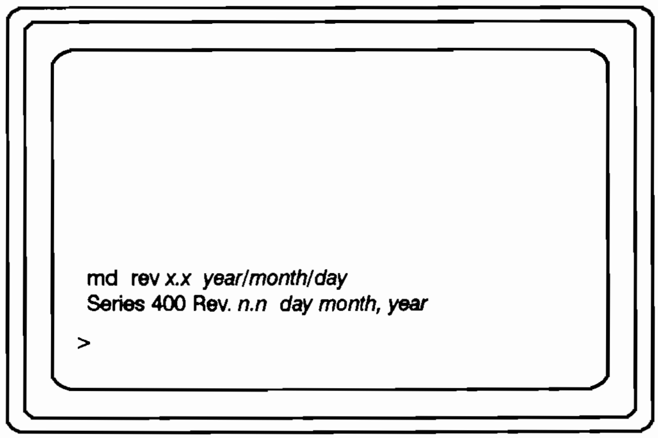


Figure 3–3. Sample Screen Prompt

3. Use the **pnet** command to select the primary network for the workstation. You have a choice of three networks: the 802.3 network, the Apollo Token Ring network, or the 802.5 network. In addition, if you have a Model 400s or 433s you may have up to two network controllers to choose from for each of the token ring networks (Apollo Token Ring and 802.5).

4. Enter the **pnet** command as shown in Figure 3–4. Substitute one of the following values for *x*:

pnet e <RETURN>	(for the 802.3 network)
pnet r <RETURN>	(for the Apollo Token Ring network)
pnet t <RETURN>	(for the 802.5 network)

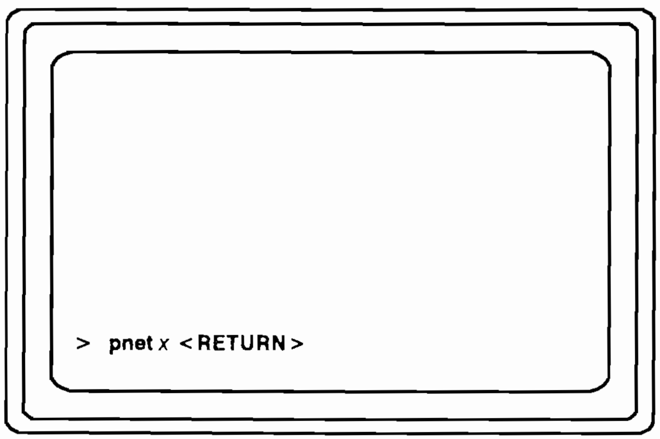


Figure 3–4. Selecting the Primary Network

5. If you are selecting either the Apollo Token Ring network or the 802.5 network and the workstation has more than one controller board for that network, then you must also indicate which is the primary network controller board when you enter the **pnet** command.

   Enter 0 or 1 for *n*, as shown in Figure 3–5. (If you do not enter 0 or 1, the default value is 0.)

```
> pnet rn <RETURN>
  (For the Apollo Token Ring network)

> pnet tn <RETURN>
  (For the 802.5 network)
```

Figure 3–5. Selecting the Primary Network Controller Board

6. Use the **pnet** command to confirm the workstation's current primary network.

   Figure 3–6 is an example showing the **pnet** command to confirm that the primary network was previously set to controller 1 for the Apollo Token Ring network.

```
> pnet r1 <RETURN>
  (For the Apollo Token Ring network)

> pnet <RETURN>
  Apollo Token Ring: Controller = 1
```

Figure 3–6. Confirming the Primary Network

Figure 3–7 shows using the **pnet** command to confirm that the primary network was previously set to the 802.3 network. Because there is never more than one 802.3 network controller board in a Series 400 workstation the default confirmation is for controller 0.

When there is only one network controller board installed for either the Apollo Token Ring network or the 802.5 network the default confirmation is for that network's controller 0.

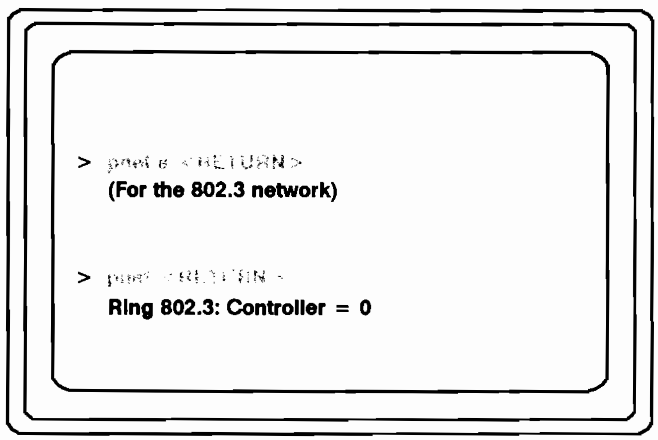


Figure 3–7. Confirming the Primary Network

7. Press the Service mode switch to set the system to Normal mode (Service LED goes off). Press the Reset switch to reboot the system.

   The workstation now runs a series of internal self tests. The workstation LEDs display the number of each test as the workstation performs it, and the monitor lists the hardware the workstation finds as it is tested. These tests, stored on the CPU board and on the Winchester disk, check the functionality of each major workstation subsystem.

Starting Up in Normal Mode

1. Following the internal tests, the workstation starts up the operating system. When the operating system is loaded, you will see the “login:” prompt.

   If you receive the “login:” prompt, go to Step 6.

   If you receive a message concerning the system’s calendar, go to Step 2 and run the **calendar** program.

   If you receive an error message, check for possible solutions in Table 5–6.

Running the Calendar Program

2. If you receive one of the messages shown in Figure 3–8, you need to set the system's calendar. Respond to either of these screen prompts as shown in Figure 3–8.

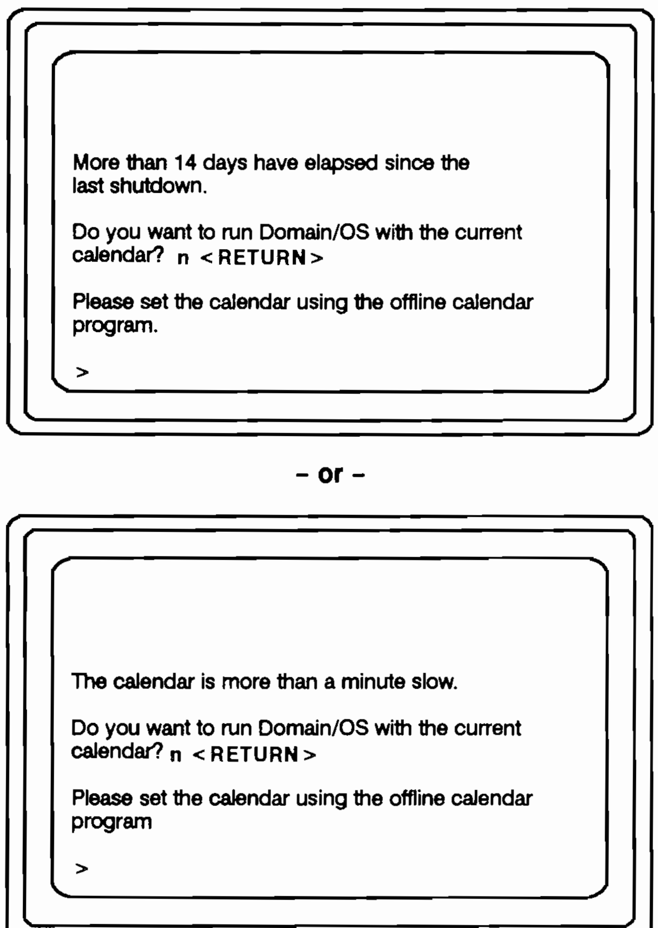


*Figure 3–8. Running the **calendar** Program*

3. Use the commands shown in Figure 3-9 to start the **calendar** program.

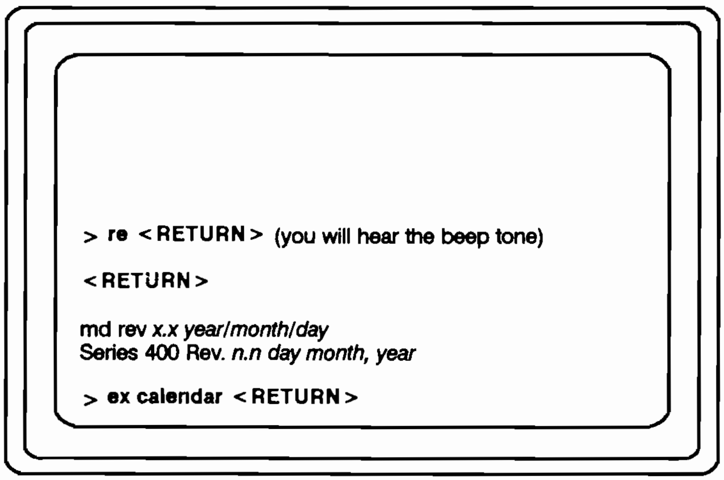


*Figure 3-9. Starting the **calendar** Program*

4. Your screen now displays the SCSI disk controller and unit numbers and a series of prompts. Answer the question about disk type as shown in Figure 3–10. Press <RETURN> after answering each question.

```
Found disk device: SCSI Disk ctrl 6, unit 0
low: nnnnnnnn high: nnnnnnnn start: nnnnnnnn

Calendar - Offline, revision n.n, date, time
Please select the disk [w=Winch|s=Storage mod|
f=Floppy|q=Quit] [ctrl#:] [unit#] [,lvno].
If you do not have a disk, enter none (N): w6:0 <RETURN>
                time-zone query
                calendar date/time query
                Is the above information correct?

If running online, you should now shutdown and reboot the
system to run with the new calendar setting.

Done.
>
```

Figure 3–10. Specifying the Disk Type

Note that when running **calendar** and other utility programs, you are prompted for the disk type. You must enter the disk type (**w** = Winchester), controller number, and unit number. The controller and unit numbers are separated by a colon (:). In the Series 400 workstations, a single Winchester system disk is designated as controller number **6**, unit number **0**. This designation is shown in Figure 3–10.

If you need to run **calendar** at a later time, you can do so by shutting down the system and repeating this procedure. Follow the instructions in "Shutting Down" and "Running the Calendar Program" in this chapter.

5. When "Done" appears on your screen, type the command shown in Figure 3–11 to start up the system software.

At initial system startup, this command starts up the Hardware Acceptance Program (HAP) software. Once you load Domain/OS software, typing the command shown in Figure 3–11 executes (boots) Domain/OS.

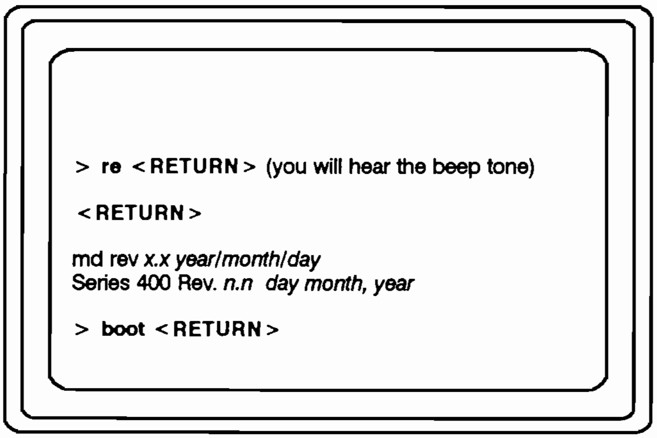


Figure 3–11. Loading Domain/OS

NOTICE: If you see the following message, ignore it:
"user_data/startup_dm.1280bw – name not found"

When the system starts up successfully, LED "D" on the system unit's front panel flashes continuously. If the software does not load, check for possible solutions in Table 5–6.

6. Log in (type your username) as shown in Figure 3–12. If you don't have a username account yet, you may log in as **user**. If you log in as **user**, press <**RETURN**> at the "Password:" prompt.

When you log in as **user**, the operating system sets the working directory to the entry directory on the workstation. Ask your system administrator to assign you a personal username account. When you log in with your own log–in name, the operating system sets the working directory to your home directory.

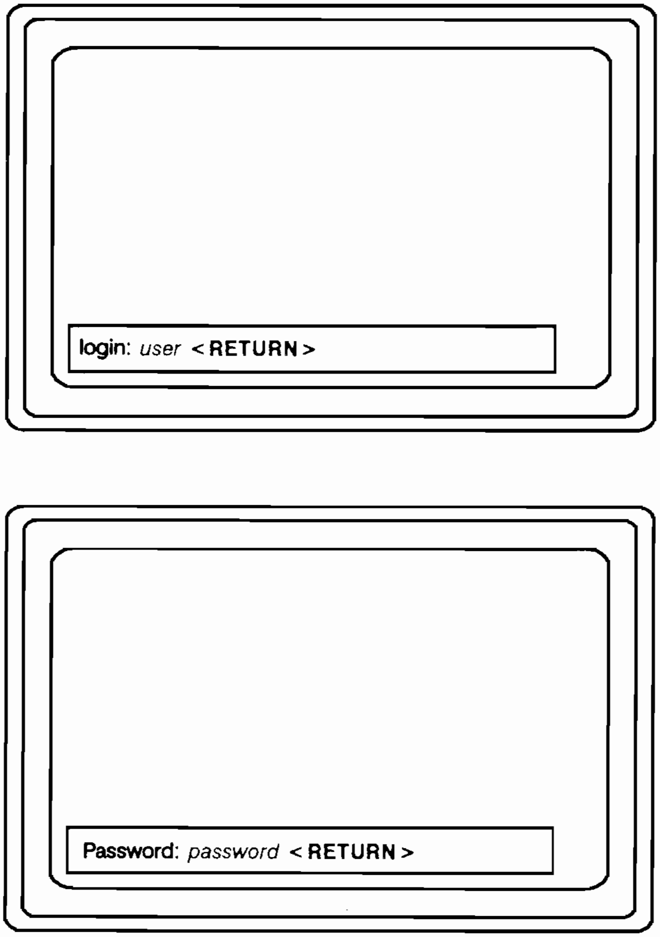


Figure 3–12. Logging In

7. Your screen will come up with a blank process window as shown in Figure 3–13. You will see only one system prompt, although Figure 3–13 and other process windows in this book show three prompts (and command lines) to indicate the three different environments of Domain/OS.

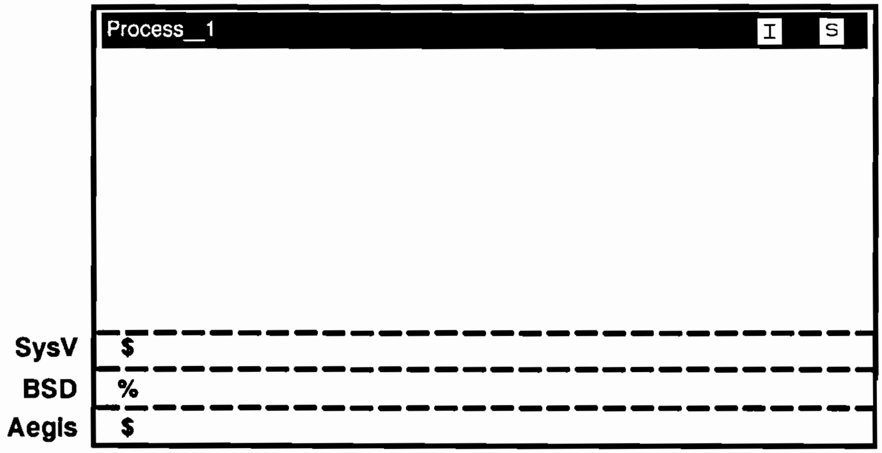
   If you have already loaded your system software, you are now ready to work on your system. Go to the "Logging Out" section of this chapter if you want to log out, or refer to the *Getting Started with Domain/OS* manual if you need assistance to continue working. See the Preface of this guide for a complete list of related manuals and order numbers. Refer to the appropriate *Using Your Environment* manual for information about using directories and files.

   If you have not loaded your system software yet, go to Step 8.

8. At initial system startup, the HAP banner instructs you to load the operating system software (Domain/OS), using the procedures in the *Software Release Document* that you received with your system software.

NOTICE: If you have multiple disks in your system, and intend to set them up as striped volumes, do not load your system software. Go to the section entitled "Creating a Multidisk Set" later in this chapter before loading your system software.

If you do not have multiple disk drives, or if you have them and do not intend to set them up as striped, load your system software now, using the procedures in the *Software Release Document* that you received with your system software. When you have finished the procedures in the *Software Release Document*, return to "Starting Up" at the beginning of this chapter to start up your system.



NOTICE: You will see one of these prompts, depending on which shell you use.

Figure 3–13. Process Window Showing Default Shell Prompts

Logging Out

When you are done working on your system, you may want to log out. Logging out prevents anyone else from working under your username account.

To log out, press <CMD> and type lo as shown in Figure 3–14.

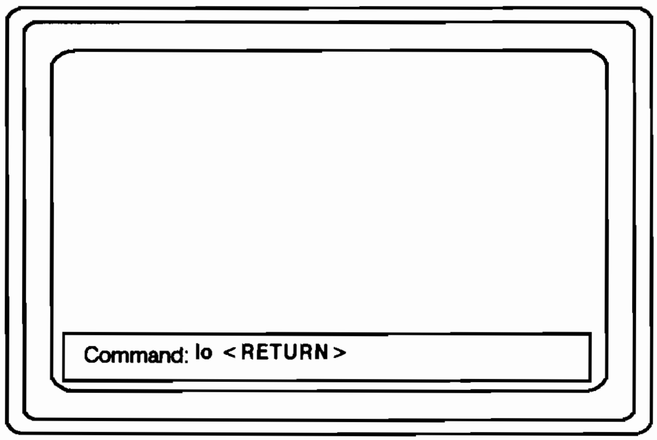


Figure 3–14. Logging Out

Shutting Down

You only need to shut down your workstation if you need to remove power from your system. If you have to shut down your workstation for any reason (for example, to install additional memory), use the following steps to avoid damaging the Winchester disk.

NOTICE: If your system has a cartridge tape drive, make sure the cartridge tape is not in the drive. If there is a cartridge tape in the drive, remove it and store it in its plastic case.

1. Log out of the system by pressing <CMD> and entering the lo command as shown in Figure 3-15.

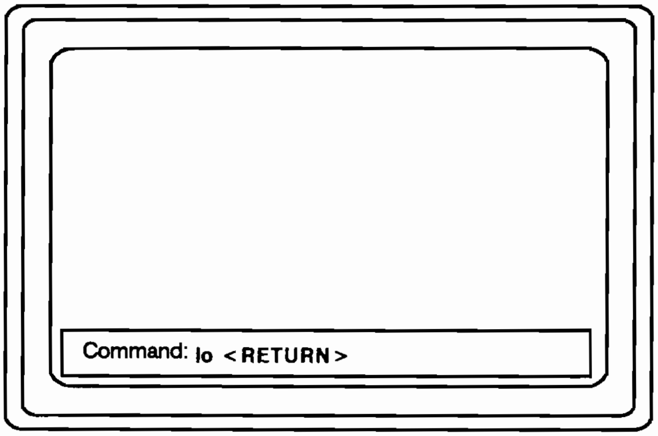


Figure 3-15. Logging Out

2. Stop all processes by pressing **< CMD >** and entering the **shut** command as shown in Figure 3–16.

If you are not currently logged onto your system, you may type **shut** and press **< RETURN >** at the "login:" prompt to shut down the system.

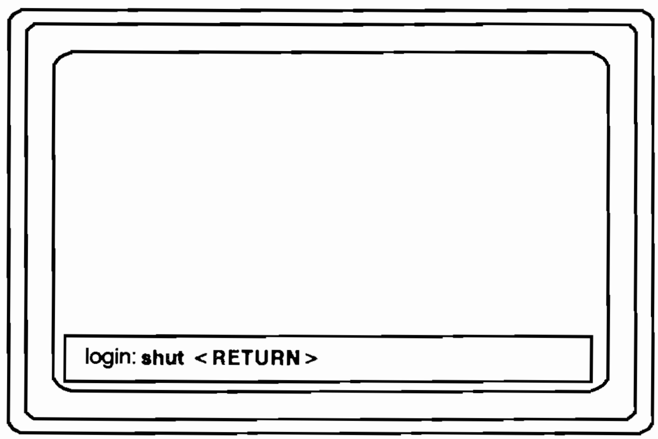


Figure 3–16. Shutting Down

3. When you see the message shown in Figure 3–17, shut off both the monitor and the system unit power switches.

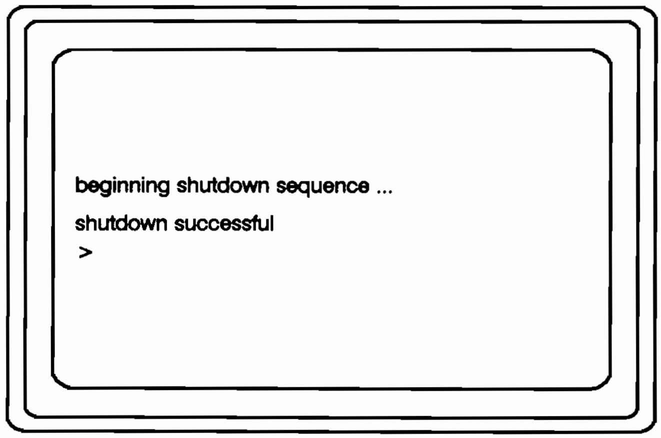


Figure 3–17. Successful Shutdown Sequence

Using the Multiple Disk Option

When you have two (or more) Winchester disk drives in a system, you can mount the second (or successive) drive each time you need to use it by using the following procedure. Winchester disk drives set up to function this way operate independently of one another.

To set up multiple disk drives to function as a single logical volume (disk striping), follow the procedure in “Creating a Multidisk Set” later in this chapter. Winchester disk drives set up to function this way are dependent on one another during operation. If one disk drive experiences a problem that causes it to function improperly, the other drive(s) cannot be used until the problem is corrected.

In this section we will use the second disk as our example. The procedures are similar for successive disk drives, but the controller and logical volume numbers (explained later in this chapter) that you would specify are different.

Using Multiple Winchester Disk Drives

This subsection assumes that you have already run **invol** on your primary (first) disk drive and loaded your operating system software. Use the command shown in Figure 3–18 to see the help files for more information about the **invol** utility.

Before you can use the second (or successive) Winchester disk drive, you need to initialize it (them) using the **invol** utility. Perform Steps 1 through 6 in this subsection to run **invol** on the second disk drive.

NOTICE: In the process of initializing the disk, the **invol** utility also destroys any data on the disk. Be sure to archive any data you want to keep before you use the **invol** utility.

1. Use the command shown in Figure 3–19 to start the **invol** utility from an Aegis, BSD, or SysV command shell.

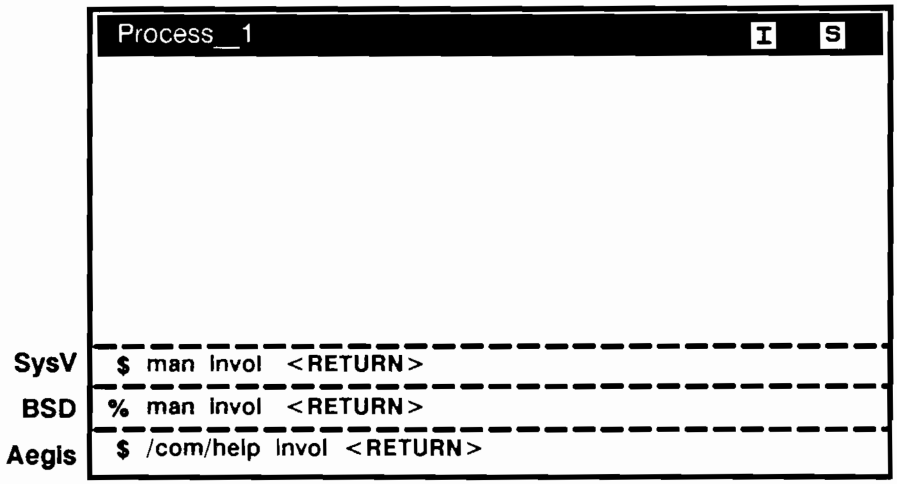


*Figure 3–18. Calling **invol** Help Files*

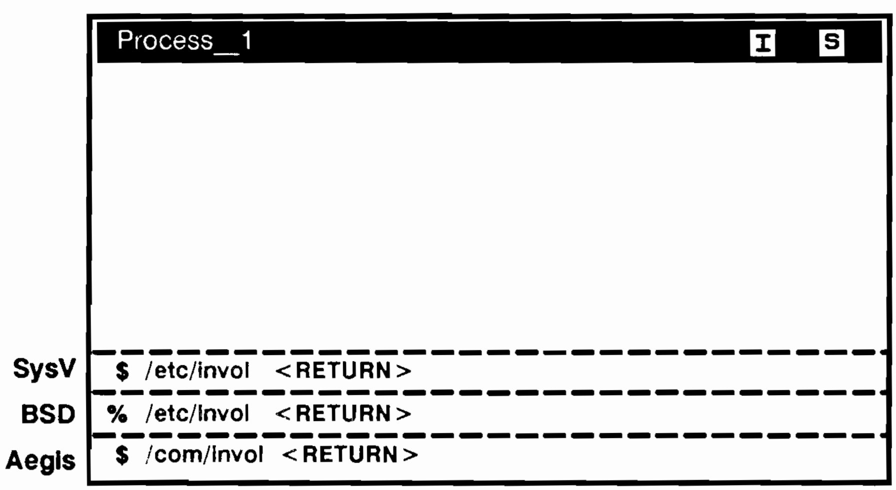


*Figure 3–19. Starting the **invol** Utility*

2. The **invol** utility returns the information shown in Figure 3–20. If this is a new disk, use **invol** without the **–f** flag (number 7 in Figure 3–20) to initialize the physical badspot list on each drive before you go to Step 3.

   If this is not a new disk drive (already formatted using **invol**), go directly to Step 3.

3. The **invol** utility queries you for the option to perform. Enter the option as shown in Figure 3–21 to initialize the physical volume.

   If this is a new disk drive (never been formatted) do not use the **–f** flag as shown in Figure 3–21. Not using the **–f** flag increases initialization time, as the disk is formatted.

```
Process_1                                                    I   S
Options are:
0 - EXIT.
1 [-fnb5uom] - initialize virgin physical volume.
2 [-fnb5u]   - add a logical volume.
3 [-fnb5] - re-initialize an existing logical volume.
    The following flags apply to options 1 thru 3, as indicated:
        f: don't re-format disk      u: don't prompt user - use defaults
        o: make sr9 format disk      n: make non-bootable volume
        b: apply bsd unix acls       5: apply sys5 unix acls
        m: build a multidisk (e.g., striped) group
4    - delete a logical volume.
5    - list logical volumes.
6 [-e]    - list badspots on disk or volume ... -e: list in decimal.
7 [-f]    - initialize physical badspot list.
8    - create or modify an os paging file.
9    - add to existing badspot list.
10   - display/change sector interleave factor.
11   - remove from existing badspot list
```

*Figure 3–20. Options for **invol** Utility*

```
Process_1                                                    I   S

SysV    Option: 1 -f <RETURN>
BSD     Option: 1 -f <RETURN>
Aegis   Option: 1 -f <RETURN>
```

*Figure 3–21. Specifying Options for **invol** Utility*

4. The **invol** utility prompts for the identity of the disk drive volume to be initialized, as shown in Figure 3–22.

   The drive that you specify (**w5:0**) will be used as the second disk of the set. Specify this drive when you want to mount, dismount, **invol**, or **salvol** the second of the multiple drives in your system.

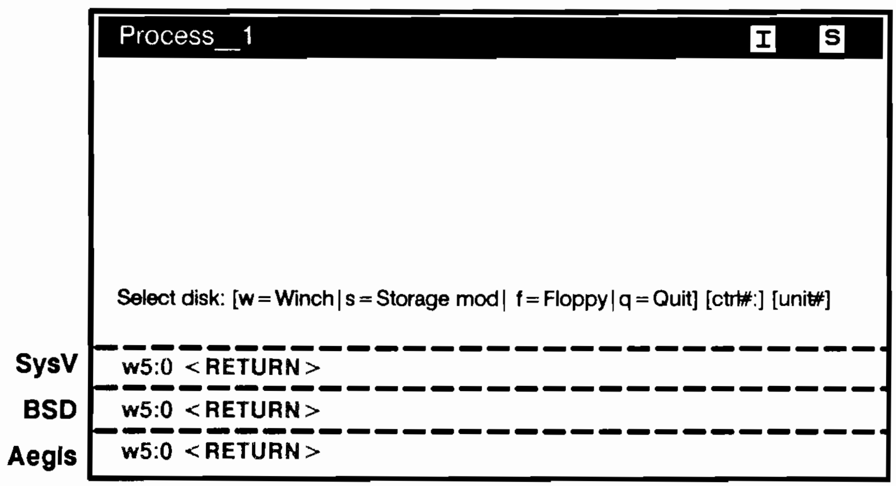


Figure 3–22. Specifying the Disk Drive Volume

5. The **invol** utility then prompts for the name of the physical volume as shown in Figure 3–23. In later examples **w5** is used as the volume name.

```
Process__1                                   I   S

SysV    Physical volume name:  w5  <RETURN>
BSD     Physical volume name:  w5  <RETURN>
Aegis   Physical volume name:  w5  <RETURN>
```

Figure 3–23. Specifying the Name of the Disk Drive Volume

6. When the **invol** utility asks if you have any more requests, as shown in Figure 3–24, type **n** to exit to the shell prompt.

If you are administering (or running) your system in a UNIX environment, you must perform Steps 7 and 8 before you can mount the second Winchester disk drive. If you are running your system in the Aegis environment, you do not have to perform Steps 7 and 8; go to Step 9.

7. At system start–up, the operating system automatically creates the device file for the first disk drive (highest target ID). If you have two Winchester drives, you must use the following commands to set up the device file for the second disk drive. To run the commands in Steps 7 through 9, you must be logged in as **root**. If you do not have a **root** login account, see your system administrator. Notice that the **root** account always has a **#** prompt.

   Figure 3–25 shows the command that instructs the operating system to create a device file. Select from the following abbreviations when you enter the command.

   ctrl# = SCSI target ID
   7 = SCSI host
   6 = first Winchester disk
   5 = second Winchester disk
   0 = seventh Winchester disk/cartridge tape drive

   drv# = unit number (only 0 is valid)
   lvol# = logical volume number

Process_1 I S

SysV	Anything more to do? n <RETURN>
BSD	Anything more to do? n <RETURN>
Aegis	Anything more to do? n <RETURN>

Figure 3–24. Exiting the ***invol*** *Utility*

Process_1 I S

SysV	**# /etc/mkdsk W** *ctrl# drv# lvol#* <RETURN>
BSD	**# /etc/mkdsk W** *ctrl# drv# lvol#* <RETURN>
Aegis	**$** *(not applicable)*

Figure 3–25. Creating a Device File in a UNIX Environment

Figure 3–26 shows an example of a command line using **ctrl# 5**, **drv# 0**, and **lvol# 1** to specify the second disk drive. Note the system's response.

NOTICE: Our examples in this section are for mounting and using the second disk drive. The procedure is similar for successive disk drives, but the controller and logical volume numbers you would specify would be different.

8. The next step is to create a logical volume entry directory corresponding to the physical drive. In our example it is to create a **/w5** directory as shown in Figure 3–27.

	Process_1
SysV	# /etc/mkdsk W 5 0 1 <RETURN> /etc/mknod /dev/dsk/W5d0s1 b 0 193
BSD	# /etc/mkdsk W 5 0 1 <RETURN> /etc/mknod /dev/wn80a b 0 193
Aegis	*(not applicable)*

Figure 3–26. Specifying a Second Disk Drive in a UNIX Environment

	Process_1
SysV	# /bin/mkdir /w5 <RETURN>
BSD	# /bin/mkdir /w5 <RETURN>
Aegis	*(not applicable)*

Figure 3–27. Creating a Logical Volume Entry Directory for the Drive in a UNIX Environment

9. Figure 3–28 shows the command to mount the second disk volume. Note that you do not have to be logged in as **root** in the Aegis environment to perform this step.

For the remainder of our examples, we will use SCSI target ID **5** and unit number **0**.

The disk is now mounted as **/w5**.

Logical volume entry directories may appear anywhere in the naming tree, with one exception: if a logical volume entry directory is also the node's entry (top-level) directory, it *must* appear just below the network root directory (//).

Do not omit the pathname argument when using **mount** (**mtvol** in the Aegis environment) because the command searches the file system (naming tree in the Aegis environment) for it. If **mount** finds the entry directory, it mounts the volume and prints the full entry directory pathname.

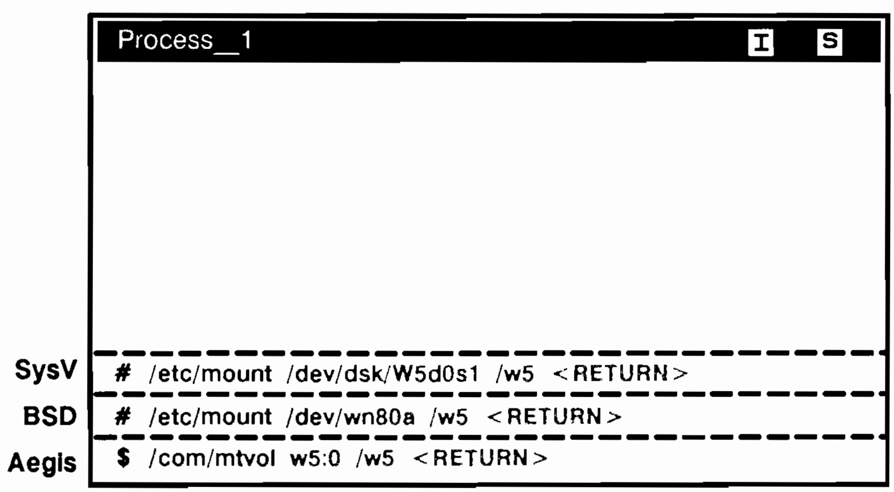


Figure 3–28. Mounting the Second Disk Volume

In the Aegis environment, if **mtvol** does not find the entry directory, it prints an error message, and does not mount the volume. The search may fail for any of the following reasons:

- The entry directory was never cataloged.
- The entry directory was uncataloged when the volume was last dismounted.
- The entry directory pathname exists on another node, for which directory information is currently unavailable.

An unsuccessful search does not mean you cannot mount the volume. It simply means that the volume entry directory pathname does not exist on your node. To mount the volume, issue the **mtvol** command and supply an entry directory pathname.

Even if the **mtvol** command finds the entry directory pathname, the mount may fail if the volume is corrupt for some reason and needs salvaging. In this case, **mtvol** asks permission to mount the volume. You usually respond **n** (no) to this request, then run the salvaging utility called **salvol**. (See "Salvaging Multiple Disks" later in this chapter.) Once the volume has been salvaged, you may try to mount it again. If you mount a corrupt volume without salvaging it first, damage to files in that volume could occur.

Dismounting Multiple Disks

The command shown in Figure 3–29 dismounts the second Winchester volume. Note that you must be logged in as **root** in either UNIX environment, but don't need to be in the Aegis environment.

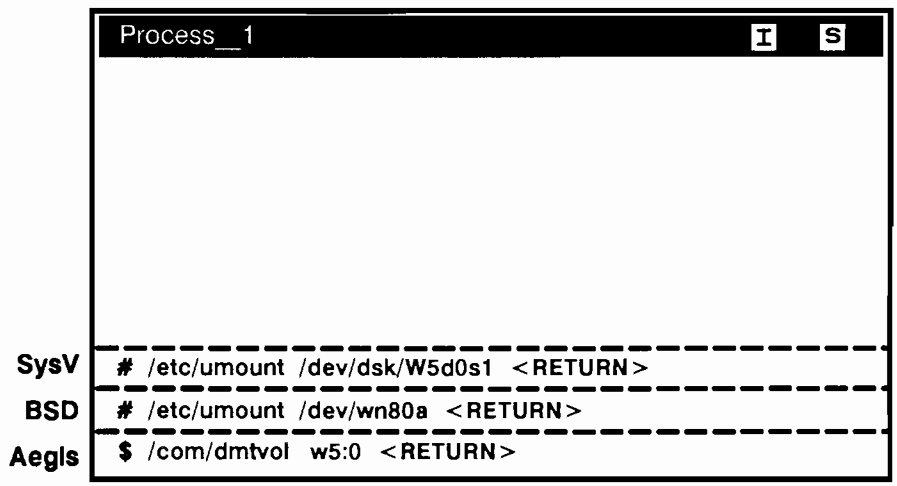


Figure 3–29. Dismounting Multiple Disks

Using the Second Disk

Once the second disk is mounted, the system sees it as part of the directory structure. You can copy and move files and trees to the second disk as you would to any disk in your network. You can access and list the directories and files of the second disk. You can also edit, read, and execute files on it.

The command shown in Figure 3–30 sets the current directory (working directory in the Aegis environment) to **//node_name/w5**.

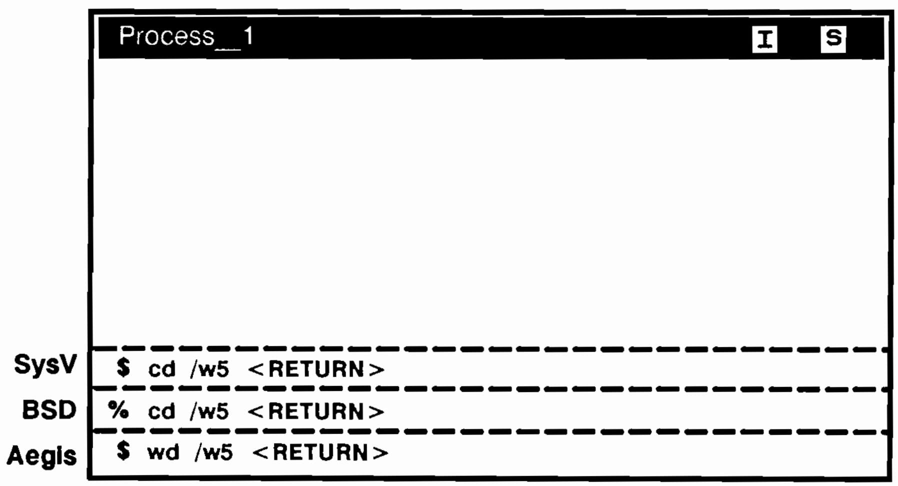


Figure 3–30. Setting the Current (Working) Directory

The command shown in Figure 3–31 lists the contents of the working directory with all of its attributes.

The second Winchester disk drive can be accessed as the **/w5** directory for other operations. Refer to the appropriate *Using Your Environment* manual for information about how to use directories.

Refer to *Getting Started with Domain/OS* if you need assistance to continue working. See the Preface of this guide for a list of related manuals and order numbers.

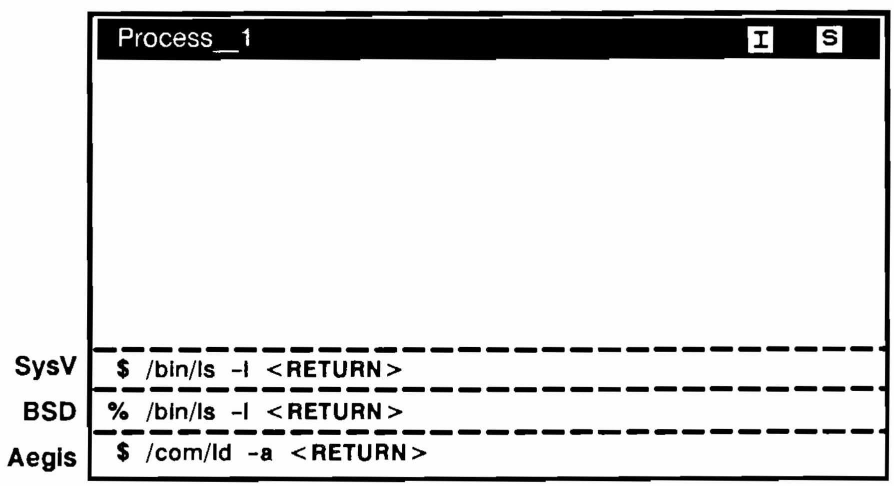


Figure 3–31. Listing the Current (Working) Directory

Salvaging Multiple Disks

In the event of a node crash, the first bootable Winchester disk drive is automatically salvaged. Once the first disk has been salvaged by the system, you can salvage the other disk(s).

Mounting a corrupt volume without salvaging it first could damage files (including operating system files) in that volume.

Type the command shown in Figure 3–32 to select the second disk as the target of the salvage operation.

When you see the prompt, the salvage operation is complete.

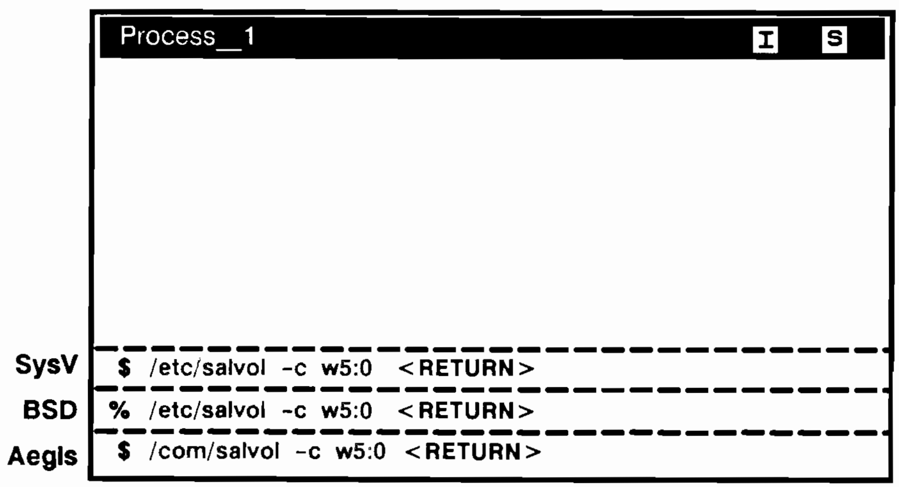


Figure 3–32. Salvaging a Second Disk Drive

Creating a Multidisk Set

When you have two (or more) Winchester disk drives in a system, you can set up the drives to function as a single logical volume. This is known as disk striping. Winchester disk drives set up to function this way are dependent on one another during operation. If one disk drive experiences a problem that causes it to function improperly, none of the disk drives can be used until the problem is corrected.

Use the following procedure to set up your disk drives to function as one logical volume. This procedure assumes that none of your disk drives have been initialized and that you haven't loaded your operating system software. Before beginning this procedure, you must be booted diskless from another workstation on your network. Go to Chapter 4 for instructions on booting diskless. Return to this procedure at Step 1a or Step 1b when you have successfully booted diskless.

Perform the steps in this subsection to run **invol** to create a multidisk set. Use Step 1a if you are running **invol** from the Mnemonic Debugger (MD) (see Chapter 10).

1a. Enter the command shown in Figure 3–33 to invoke the **invol** utility from the Mnemonic Debugger (MD) environment.

Use Step 1b if you are running **invol** from a shell.

1b. Enter the command shown in Figure 3–34 to invoke the **invol** utility from an Aegis, BSD, or SysV command shell.

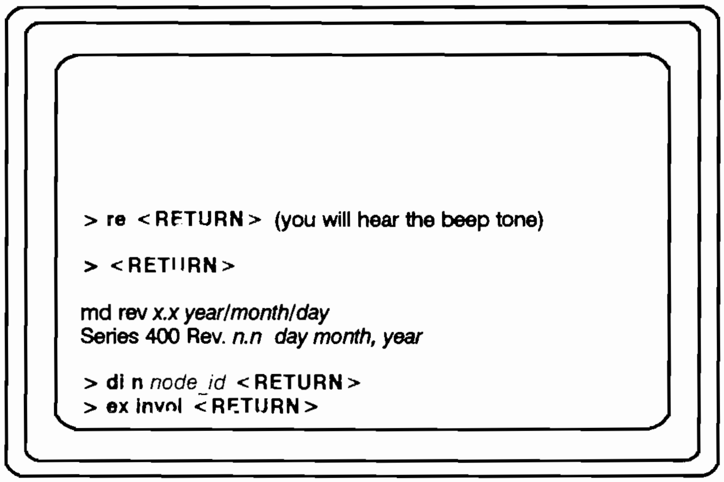


*Figure 3–33. Running **invol** from the Mnemonic Debugger*

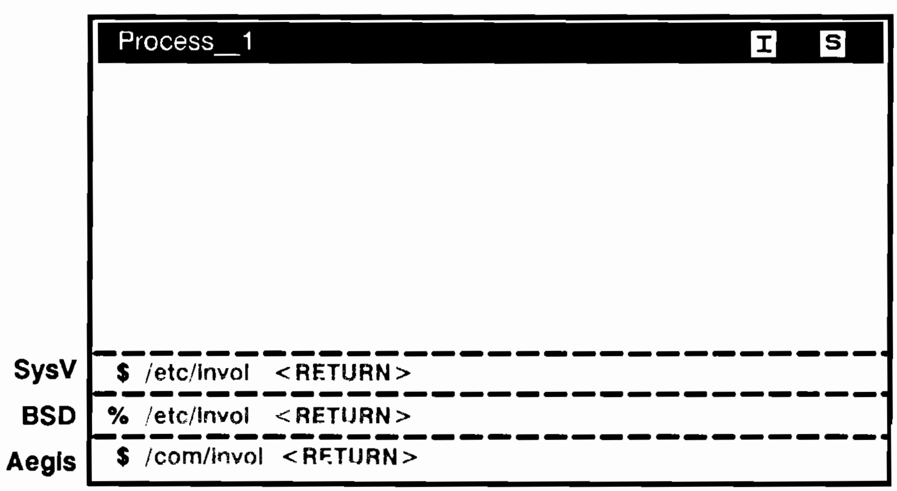


*Figure 3–34. Running **invol** from a Shell*

2. The **invol** utility returns the information shown in Figure 3–35 when run from either the MD or the shell. We will continue this example with the **invol** utility in a shell environment. If you are running in the MD environment, your responses will be the same.

If this is a new disk, use **invol** without the **–f** flag (number 7 in Figure 3–35) to initialize the physical badspot list on each drive before you go to Step 3.

If this is not a new disk drive, go to Step 3.

3. The **invol** utility queries you for the option to perform. Enter the option as shown in Figure 3–36 to create a multidisk set without re–formatting the drive.

If this is a new disk drive (never been formatted) do not use the **–f** flag as shown in Figure 3–36. Not using the **–f** flag increases initialization time, as the new disk is formatted.

```
Process_1                                                    I   S
Options are:
0 - EXIT.
1 [-fnb5uom] - initialize virgin physical volume.
2 [-fnb5u]    - add a logical volume.
3 [-fnb5] - re-initialize an existing logical volume.
     The following flags apply to options 1 thru 3, as indicated:
          f: don't re-format disk          u: don't prompt user - use defaults
          o: make sr9 format disk          n: make non-bootable volume
          b: apply bsd unix acls           5: apply sys5 unix acls
          m: build a multidisk (e.g., striped) group
4    - delete a logical volume.
5    - list logical volumes.
6 [-e]    - list badspots on disk or volume ... -e: list in decimal.
7 [-f]    - initialize physical badspot list.
8    - create or modify an os paging file.
9    - add to existing badspot list.
10   - display/change sector interleave factor.
11   - remove from existing badspot list
```

Figure 3–35. ***invol*** *Options*

```
Process_1                                                    I   S

SysV   | Option: 1 -mf <RETURN>
BSD    | Option: 1 -mf <RETURN>
Aegis  | Option: 1 -mf <RETURN>
```

Figure 3–36. Running ***invol*** *with the* **–f** *Option*

Starting Up

4. The **invol** utility prompts for the identity of the first disk in the multidisk set as shown in Figure 3–37.

   The drive that you specify (for example, **w6:0**) becomes the primary disk of the set. Specify this drive when you want to mount, dismount, **invol**, or **salvol** a multidisk set.

5. Next, **invol** prompts for the number of disks to include in the set as shown in Figure 3–38.

   Valid responses for Series 400 workstations are **2** through **7**.

NOTICE: On Series 400 workstations, the maximum size of each physical volume is 2 GB.

Process_1

Select disk: [w=Winch|s=Storage mod| f=Floppy|q=Quit] [ctrl#:] [unit#]

SysV	w6:0 <**RETURN**>
BSD	w6:0 <**RETURN**>
Aegis	w6:0 <**RETURN**>

*Figure 3–37. **invol** Prompt for Identity of First Disk in Set*

Process_1

SysV	How many disks will you be grouping together? 2 <**RETURN**>
BSD	How many disks will you be grouping together? 2 <**RETURN**>
Aegis	How many disks will you be grouping together? 2 <**RETURN**>

*Figure 3–38. **invol** Prompt for Total Disks in Set*

6. Then **invol** prompts for the algorithm to use to spread disk blocks across the multiple drives in a set as shown in Figure 3–39.

   For Series 400 workstations you have only one choice: volume striping (option 3).

   With volume striping, whole disk drives are connected together in a logical series (concatenated). Volume striping provides a larger logical volume with no change in disk performance.

7. The **invol** utility then prompts for the name of the physical volume as shown in Figure 3–40.

```
Process_1                                        I  S

   Striping options are:
   1 - NOT SUPPORTED for logically addressed disks
   2 - NOT SUPPORTED for logically addressed disks
   3 - volume striping (concatenate whole disk drives)
```

SysV	Enter striping option: 3 <RETURN>
BSD	Enter striping option: 3 <RETURN>
Aegis	Enter striping option: 3 <RETURN>

Figure 3–39. ***invol*** *Prompt for Striping Option*

```
Process_1                                        I  S
```

SysV	Physical volume name: *volume_name* <RETURN>
BSD	Physical volume name: *volume_name* <RETURN>
Aegis	Physical volume name: *volume_name* <RETURN>

Figure 3–40. ***invol*** *Prompt for Physical Volume Name*

8. Finally, **invol** prompts for the identity of additional disk drives in the set as shown in Figure 3–41.

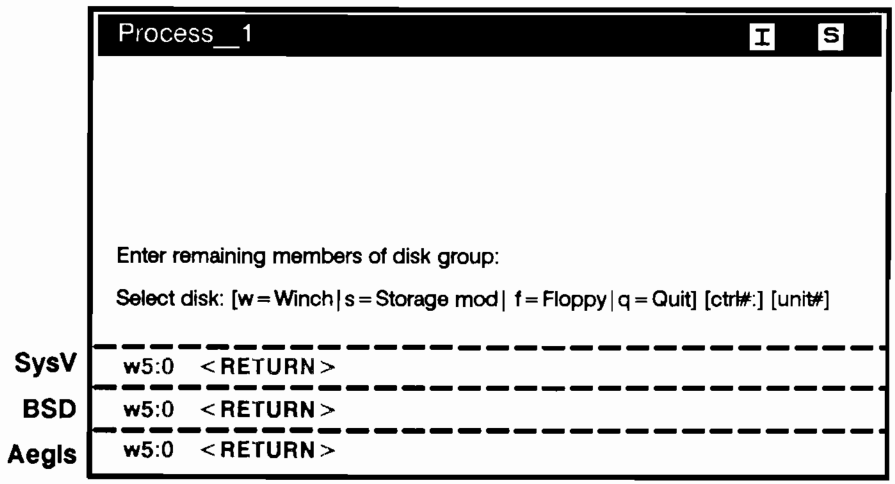


Figure 3–41. ***invol*** *Prompt for Additional Drive Identities*

9. The **invol** utility asks you to run option 2. When it asks if you have any more requests, as shown in Figure 3–42, type y to return to the **invol** main menu.

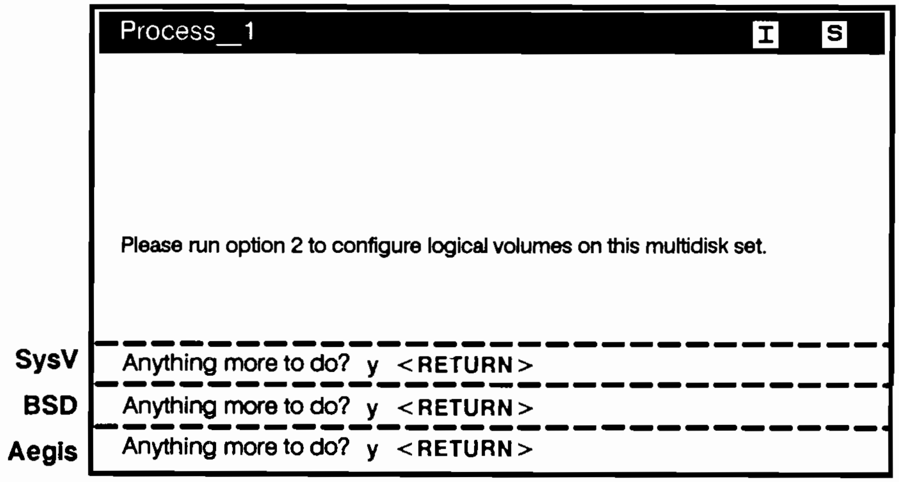


*Figure 3–42. **invol** Prompt to Return to **invol** Main Menu*

The **invol** utility returns you to its initial selection menu, as shown in Figure 3–43.

```
Process_1                                                    I   S
Options are:
0 - EXIT.
1 [-fnb5uom] - initialize virgin physical volume.
2 [-fnb5u]     - add a logical volume.
3 [-fnb5]  - re-initialize an existing logical volume.
     The following flags apply to options 1 thru 3, as indicated:
          f: don't re-format disk          u: don't prompt user - use defaults
          o: make sr9 format disk          n: make non-bootable volume
          b: apply bsd unix acls           5: apply sys5 unix acls
          m: build a multidisk (e.g., striped) group
4    - delete a logical volume.
5    - list logical volumes.
6 [-e]    - list badspots on disk or volume ... -e: list in decimal.
7 [-f]    - initialize physical badspot list.
8    - create or modify an os paging file.
9    - add to existing badspot list.
10   - display/change sector interleave factor.
11   - remove from existing badspot list
```

*Figure 3–43. **invol** Selection Menu*

10. The **invol** utility queries you for the option to perform. Enter the option as shown in Figure 3–44 to configure logical volumes on this multidisk set.

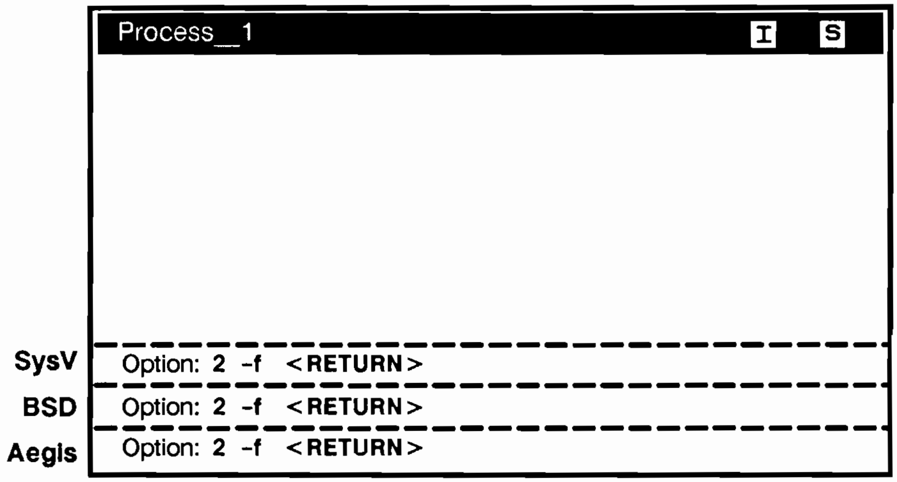


*Figure 3–44. **invol** Prompt to Configure Logical Volumes in Set*

11. The **invol** utility prompts for the identity of the first disk in the multidisk set as shown in Figure 3–45.

The drive that you specify (for example, **w6:0**) is the primary disk of the set. Specify this drive whenever you mount, dismount, **invol**, or **salvol** a multidisk set.

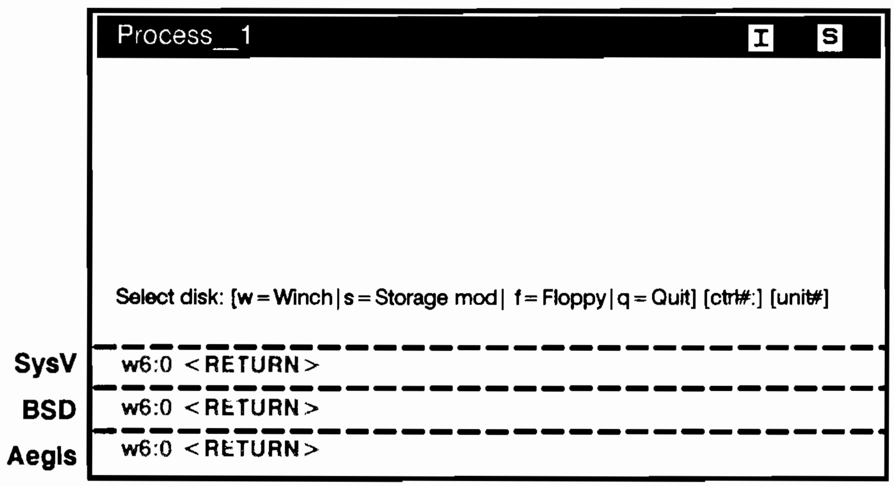


Figure 3–45. ***invol*** *Prompt for Primary Disk in Set*

12. Next, **invol** lists the physical and logical volume information and prompts you for the verification option as shown in Figure 3–46.

```
Process_1                                                    I   S
Volume built by Invol version "revision xx.x2" on "date"
Physical volume "volume_name". Member of a multiple-disk group:
    Winch      Ctrl_num = 6  Drive_num = 0
    Winch      Ctrl_num = 5  Drive_num = 0
Logical volumes:
    # size (kB)    name
    407993(d)      xxxxxx
Verification options are:
    1 - no verification
    2 - write all blocks on the volume
    3 - write and re-read all blocks on the volume
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
SysV   Enter verification option:  1  <RETURN>
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
BSD    Enter verification option:  1  <RETURN>
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
Aegis  Enter verification option:  1  <RETURN>
```


Figure 3–46. ***invol*** *Prompt to Verify Volume Information*

13. The **involvol** utility then prompts for the logical volume size as shown in Figure 3–47.

```
Process_1                                                    I  S

Expected average file size, in KB (CR for default, 5 KB):
For each logical volume to be formatted, enter the logical volume
size (in KB), followed by the name, in the form "size, name". Up to 10
volumes may be specified. Terminate input with a blank line.
Specifying a size of "all" will use all remaining blocks.
There are 407993 KB  available.
```

SysV	volume 1: **all** **<RETURN>**
BSD	volume 1: **all** **<RETURN>**
Aegis	volume 1: **all** **<RETURN>**

*Figure 3–47. **invol** Prompt for Logical Volume Size*

14. The **invol** utility then prompts to ask if you want to use the pre-recorded badspot list as shown in Figure 3–48.

Respond by typing **y** as shown in Figure 3–48. Do *not* answer **n** (no) to this prompt. If you do, **invol** will overwrite any existing badspot list.

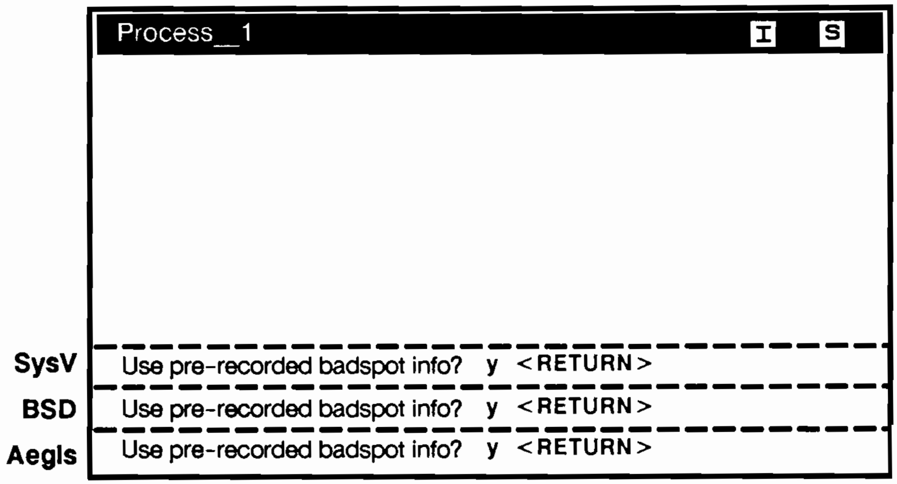


Figure 3–48. ***invol*** *Prompt to Use Pre-Recorded Badspot List*

15. The **invol** utility initializes the logical volume and then asks if you have any more requests. Type y as shown in Figure 3–49.

```
Process__1                                        I   S

Writing logical volume 1.

Initialization complete.
```

SysV	Anything more to do? y <RETURN>
BSD	Anything more to do? y <RETURN>
Aegis	Anything more to do? y <RETURN>

*Figure 3–49. **invol** Prompt for More Requests*

The **invol** utility returns to its initial selection menu, as shown in Figure 3-50.

Before you exit from the **invol** utility, you must create an OS paging file that allows this disk volume to be used as the system's boot device (as described in Step 16).

```
Process_1                                                    I   S
Options are:
0 - EXIT.
1 [-fnb5uom] - initialize virgin physical volume.
2 [-fnb5u]    - add a logical volume.
3 [-fnb5] - re-initialize an existing logical volume.
     The following flags apply to options 1 thru 3, as indicated:
          f: don't re-format disk          u: don't prompt user - use defaults
          o: make sr9 format disk          n: make non-bootable volume
          b: apply bsd unix acls           5: apply sys5 unix acls
          m: build a multidisk (e.g., striped) group
4    - delete a logical volume.
5    - list logical volumes.
6 [-e]      - list badspots on disk or volume ... -e: list in decimal.
7 [-f]      - initialize physical badspot list.
8    - create or modify an os paging file.
9    - add to existing badspot list.
10   - display/change sector interleave factor.
11   - remove from existing badspot list
```

*Figure 3–50. **invol** Selection Menu*

16. The **invol** utility queries you for the option to perform. Enter the option as shown in Figure 3-51 to create the OS paging file.

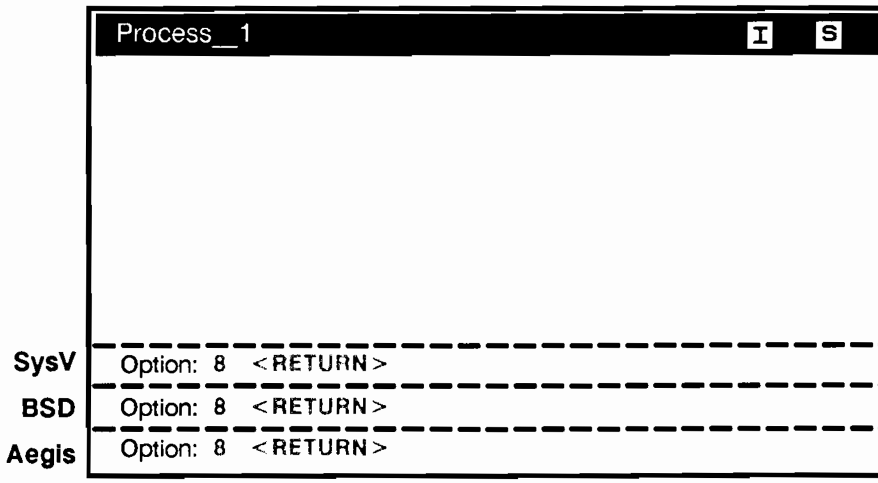


*Figure 3–51. **invol** Prompt to Create the OS Paging File*

17. The **invol** utility prompts for the identity of the first disk in the multidisk set as shown in Figure 3–52.

The drive that you specify (for example, **w6:0**) is the primary disk of the set. Specify this drive whenever you mount, dismount, **invol**, or **salvol** a multidisk set.

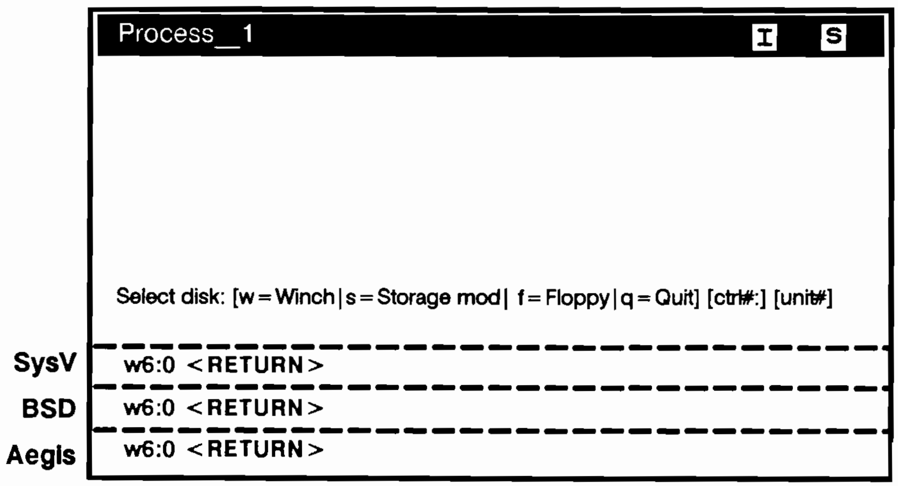


Figure 3–52. ***invol*** *Prompt to Identify Primary Disk in Set*

18. Next, **invol** lists the physical and logical volume information and prompts you for the logical volume number as shown in Figure 3–53.

```
Process_1

Volume built by Invol version "revision xx.x2" on "date"
Physical volume "volume_name". Member of a multiple-disk group:
   Winch      Ctrl_num = 6  Drive_num = 0
   Winch      Ctrl_num = 5  Drive_num = 0
Logical volumes:
   # size (KB)   name
   407993(d)     xxxxxx
```

SysV	Enter logical volume number: 1 <**RETURN**>
BSD	Enter logical volume number: 1 <**RETURN**>
Aegis	Enter logical volume number: 1 <**RETURN**>

Figure 3–53. ***invol*** *Prompt for Volume Information*

19. Next, invol prompts you to confirm the default OS paging size. Press <**RETURN**> as shown in Figure 3–54 to confirm the default size of 4000 KB.

20. The **invol** utility asks if you have any more requests as shown in Figure 3–54. Type **n** to return to the calling program (operating system or Mnemonic Debugger).

You must now load your system software using the procedures in the *Software Release Document* that you received with your system software. When you have finished the procedures in the *Software Release Document*, return to the beginning of this chapter to start up your system.

```
Process_1                                              I   S

Size in KB for the OS paging file (CR for default value = 4000)
<RETURN>
Done.

SysV    Anything more to do?  n  <RETURN>
BSD     Anything more to do?  n  <RETURN>
Aegis   Anything more to do?  n  <RETURN>
```

Figure 3–54. ***invol*** *Prompt for More Requests*

Chapter 4
Starting Up a Diskless Series 400 Workstation

This chapter describes how to start up your diskless workstation. It includes the following information:

- Preparing for start up
- Selecting the workstation's primary network
- Starting up in Normal mode
- Setting the system's calendar
- Logging in and logging out
- Shutting down

NOTICE: Chapter 3 describes how to start up a workstation that contains an internal Winchester disk drive.

Starting Up

Use the procedures in this chapter to start up and use a diskless Series 400 workstation with Domain/OS. You must have a Domain keyboard with your system in order to start up the workstation with Domain/OS.

You can start up (boot) your workstation in either Normal or Service mode. You will use Normal mode for everyday computing activities. Normal mode is the default when you power up the system.

In this chapter you will use Service mode only to select the workstation's primary network.

Chapter 10 describes starting up in Service mode to troubleshoot or reconfigure the workstation.

Preparing to Start Up

Before starting up your workstation, make sure that it has been installed according to the *HP Apollo 9000 Series 400 Workstation Installation Guide* that you received with your system.

If you're starting up a diskless workstation in Normal mode, it must be linked to a **partner** system that is equipped with a Winchester disk. Your workstation will run its operating software from the partner's disk. At power–on, your workstation automatically looks for a **network partner** system that is equipped with a Winchester disk.

Make sure the partner

- Has selected the same primary network you want to use on the diskless workstation.
- Is on the same network loop.
- Is running the **netman** program.
- Is running the minimum Software Release (SR) level. (See the *Release Document(s)* you received with your workstation for minimum SR level.)
- Contains the appropriate **/sau*nn*** subdirectory of the node entry directory.

  For Model 400dl, 400t, and 400s the partner node must contain the **/sau12** subdirectory of the node entry directory.

  For Model 425t and 433s the partner node must contain the **/sau11** subdirectory of the node entry directory.
- Has your workstation's ID (node ID) listed in its **/sys/net/diskless_list** file.

NOTICE: If your diskless workstation is not listed in the **/sys/net/diskless_list** file, edit the file and add your workstation's ID to the list.

See the *Getting Started with Domain/OS* manual if you need assistance.

Starting Up

Make sure that you have correctly set the voltage selection switch on the 16–inch monitor as shown in Figure 4–1. The correct position for the U.S. and Canada is 100 to 120 V ac (labeled 115 V on some monitors).

The 19–inch monitors and the system unit do not have voltage selection switches. The internal power supplies on these devices have voltage sensing circuitry that automatically adjusts to the correct voltage.

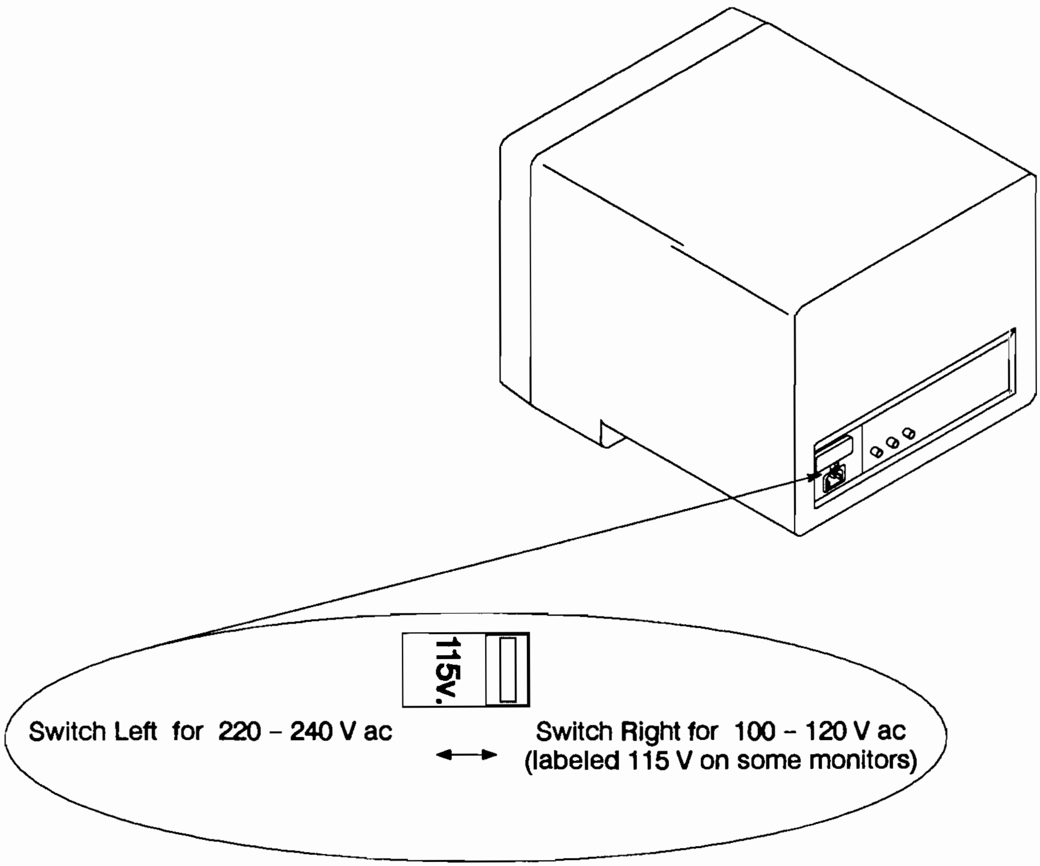


Figure 4–1. 16–Inch Monitor Voltage Selection Switch

Selecting the Primary Network in Service Mode

Follow these steps to start up your workstation in Service mode so that you can select the primary network. These steps assume that the system is powered on in Normal mode (Service LED is off).

1. Power on the monitor and the system unit.

   The workstation now runs a series of internal self tests.

2. Before the system finishes the self tests, press the Service mode switch to set the system to Service mode (the Service LED on the system's front panel lights). Then press the Reset switch as shown in Figure 4-2. Press the <RETURN> key until the screen displays the Mnemonic Debugger (MD) ">" prompt.

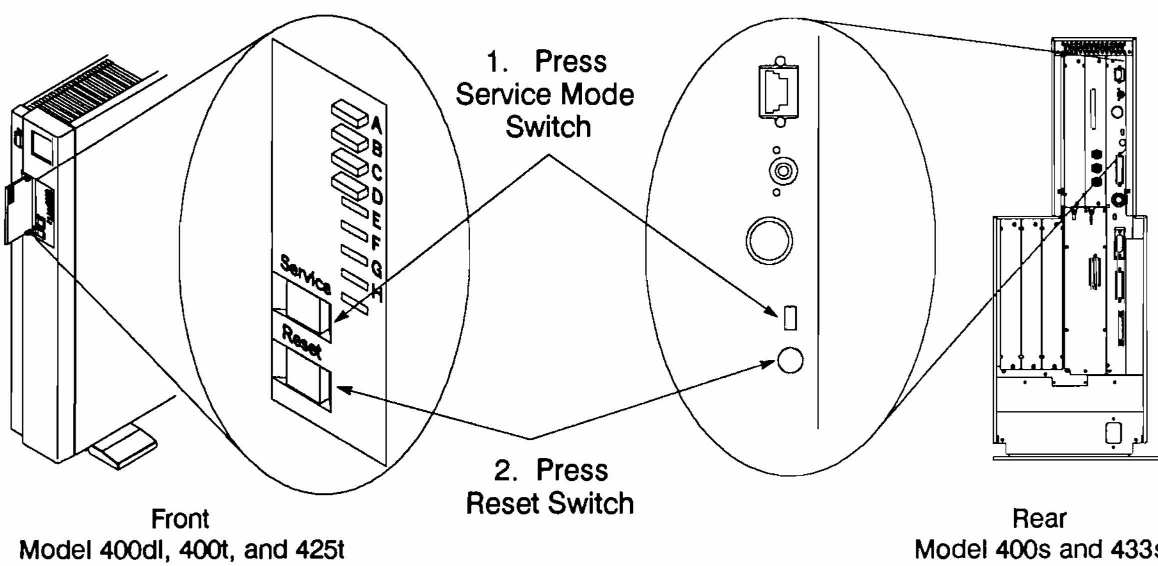


Figure 4–2. Starting a Workstation in Service Mode

The screen prompt appears as shown in Figure 4–3.

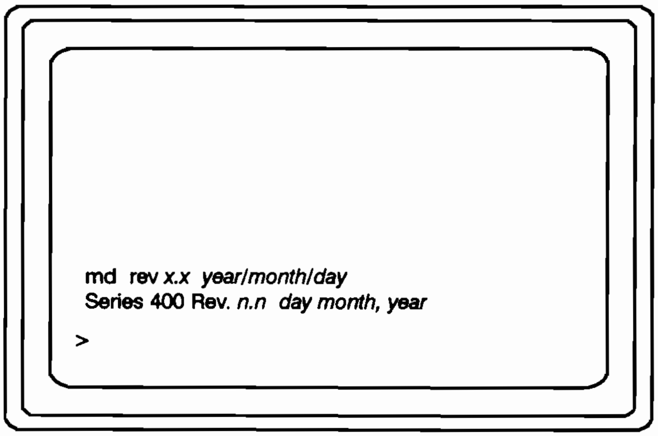


Figure 4–3. Sample Screen Prompt

3. Use the **pnet** command to select the primary network for the workstation. You have a choice of three networks: the 802.3 network, the Apollo Token Ring network, or the 802.5 network. In addition, if you have a Model 400s or 433s you may have up to two network controllers to choose from for each of the token ring networks (Apollo Token Ring and 802.5).

   Select the same primary network used by the partner node.

4. Enter the **pnet** command as shown in Figure 4–4. Substitute one of the following values for *x*:

pnet e <RETURN>	(for the 802.3 network)
pnet r <RETURN>	(for the Apollo Token Ring network)
pnet t <RETURN>	(for the 802.5 network)

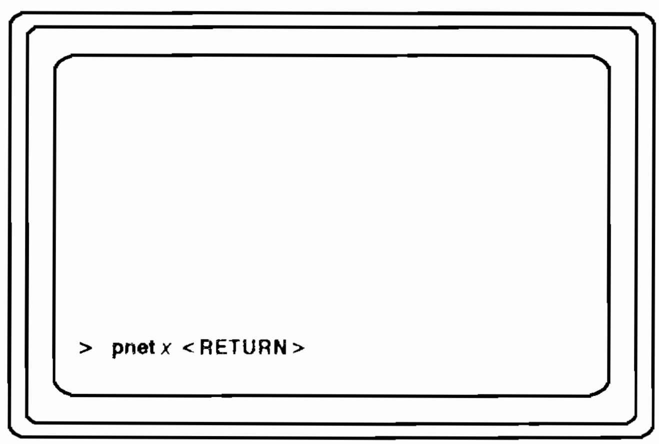


Figure 4–4. Selecting the Primary Network

5. If you are selecting either the Apollo Token Ring network or the 802.5 network and the workstation has more than one controller board for that network, then you must also indicate which is the primary network controller board when you enter the **pnet** command.

   Enter 0 or 1 for *n*, as shown in Figure 4–5. (If you do not enter 0 or 1, the default value is 0.)

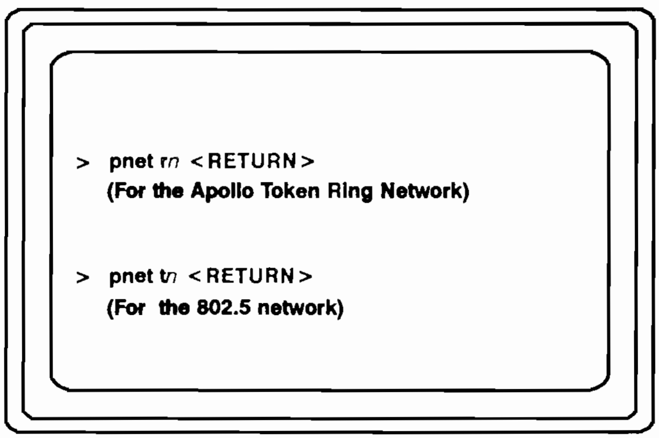


Figure 4–5. Selecting the Primary Network Controller Board

6. Use the **pnet** command to confirm the workstation's current primary network.

Figure 4–6 is an example showing the **pnet** command to confirm that the primary network was previously set to controller 1 for the Apollo Token Ring network.

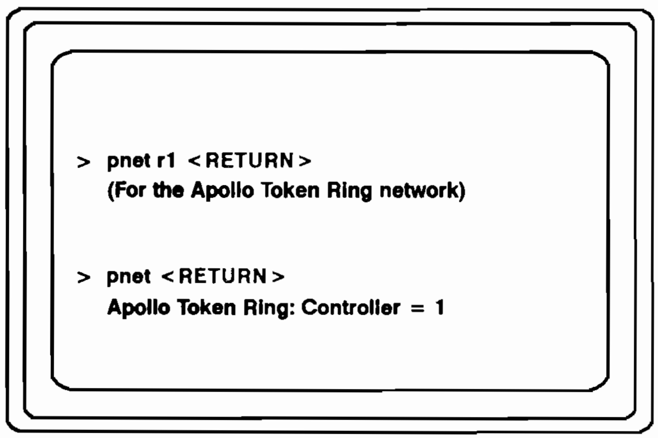


Figure 4–6. Confirming the Primary Network

Figure 4–7 shows using the **pnet** command to confirm that the primary network was previously set to the 802.3 network. Because there is never more than one 802.3 network controller board in a Series 400 workstation the default confirmation is for controller 0.

When there is only one network controller board installed for either the Apollo Token Ring network or the 802.5 network the default confirmation is for that network's controller 0.

```
> pnet e <RETURN>
  (For the 802.3 network)

> pnet <RETURN>
  Ring 802.3: Controller = 0
```

Figure 4–7. Confirming the Primary Network

7. Press the Service mode switch to set the system to Normal mode (Service LED goes off). Press the Reset switch to reboot the system.

The workstation now runs a series of internal self tests. The workstation LEDs display the number of each test as the workstation performs it, and the monitor lists the hardware the workstation finds as it is tested. These tests, stored on the CPU board and on the Winchester disk, check the functionality of each major workstation subsystem.

Starting Up in Normal Mode

1. Following the internal tests, the workstation starts up the operating system. When the operating system is loaded, you will see the "login:" prompt.

If you receive the "login:" prompt, go to Step 6.

If you receive a message concerning the workstation's calendar, go to Step 2 and run the **calendar** program.

If you receive an error message, check for possible solutions in Table 5-7.

Running the Calendar Program

2. If you receive one of the messages shown in Figure 4-8, you need to set the system's calendar. Respond to either of these screen prompts as shown in Figure 4-8.

```
More than 14 days have elapsed since the
last shutdown.

Do you want to run Domain/OS with the current
calendar? n <RETURN>

Please set the calendar using the offline calendar
program.

>
```

– or –

```
The calendar is more than a minute slow.

Do you want to run Domain/OS with the current
calendar? n <RETURN>

Please set the calendar using the offline calendar
program

>
```

*Figure 4–8. Running the **calendar** Program*

3. Use the commands shown in Figure 4–9 to start the **calendar** program.

4. Your screen now displays a series of prompts. Answer the disk type question as shown in Figure 4–10. Press <**RETURN**> after answering each question.

   If you need to run **calendar** at a later time, you can do so by shutting down the system and repeating this procedure. Follow the instructions in "Shutting Down" and "Running the Calendar Program" in this chapter.

```
> re <RETURN> (you will hear the beep tone)

<RETURN>

md rev x.x year/month/day
Series 400 Rev. n.n  day month, year

> dl n node_id <RETURN>

> ex calendar <RETURN>
```

*Figure 4–9. Starting the **calendar** Program*

```
> ex calendar <RETURN>

Calendar - Offline, revision n.n, date, time
Please select the disk [w=Winch|s=Storage mod|
f=Floppy|q=Quit] [ctrl#:] [unit#] [,lvno].
If you do not have a disk, enter none (N): n <RETURN>
                time-zone query
                calendar date/time query
                Is the above information correct?

If running online, you should now shutdown and reboot the
system to run with the new calendar setting.

Done.
>
```

Figure 4–10. Specifying the Disk Type

5. When “Done” appears on your screen, type the command shown in Figure 4–11 to start up Domain/OS software from its network partner.

   As the diskless workstation boots from its partner, you’ll see screen messages similar to those in Figure 4–12.

NOTICE: If you see the following message, ignore it:
“user_data/startup_dm.1280bw – name not found”

   When the workstation starts up successfully, LED “D” on the system unit’s front panel flashes continuously. If the software does not load, check for possible solutions in Table 5–7.

> **re** <RETURN> (you will hear the beep tone)

<RETURN>

md rev *x.x year/month/day*
Series 400 Rev. *n.n day month, year*

> **boot** <RETURN>

Figure 4–11. Loading Domain/OS

Found network device: [*Network Controller Name*]

My network ID: *xxxxxxx*

Network Partner ID: *xxxxxxx*
. . . . *xxxxx* bytes loaded
. . . . *xxxxx* bytes loaded

•

•

•

Figure 4–12. Booting from the Partner Node

6. Log in (type your username) as shown in Figure 4–13. If you don't have a username account yet, you may log in as **user**. If you log in as **user**, press **<RETURN>** at the "Password:" prompt.

When you log in as **user**, the operating system sets the working directory to the entry directory on the disked partner workstation. Ask your system administrator to assign you a personal username account. When you log in with your own log–in name, the operating system sets the working directory to your home directory.

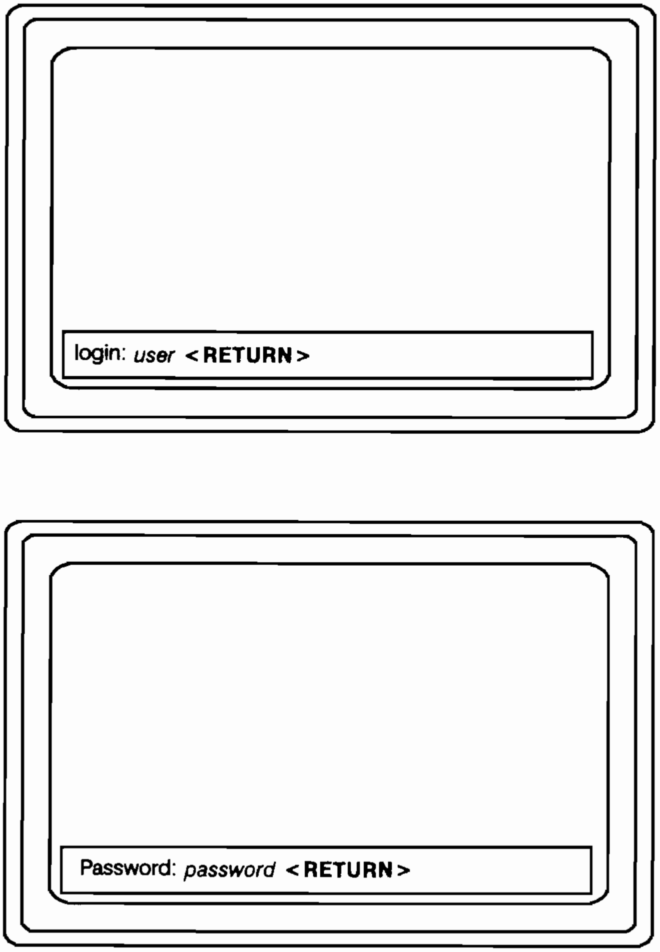
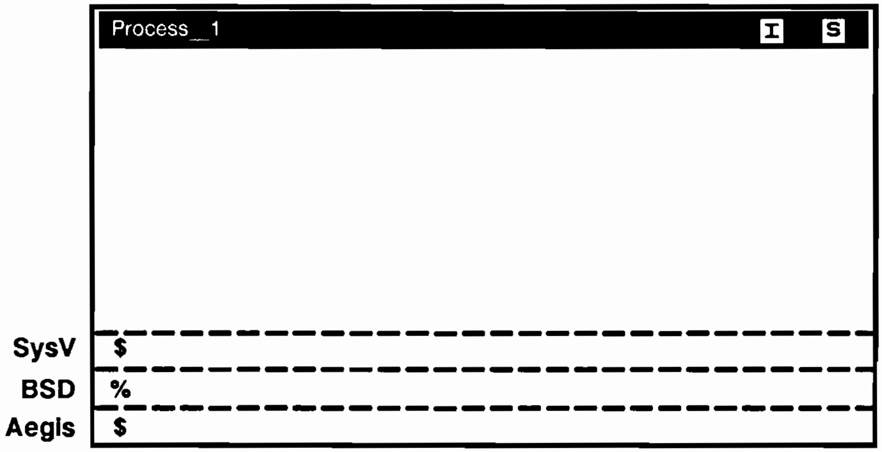


Figure 4–13. Logging In

7. Your screen will come up with a blank process window as shown in Figure 4–14.

   You may now use the workstation. See the manual entitled *Getting Started with Domain/OS* for more information.

   See the Preface of this guide for a list of related manuals and order numbers. Refer to the appropriate *Using Your Environment* manual for information about using directories and files.



NOTICE: You will see one of these prompts, depending on which shell you use.

Figure 4–14. Process Window Showing Default Shell Prompts

Logging Out

When you are done working on your system, you may want to log out. Logging out prevents anyone else from working under your username account.

To log out, press <CMD> and type **lo** as shown in Figure 4–15.

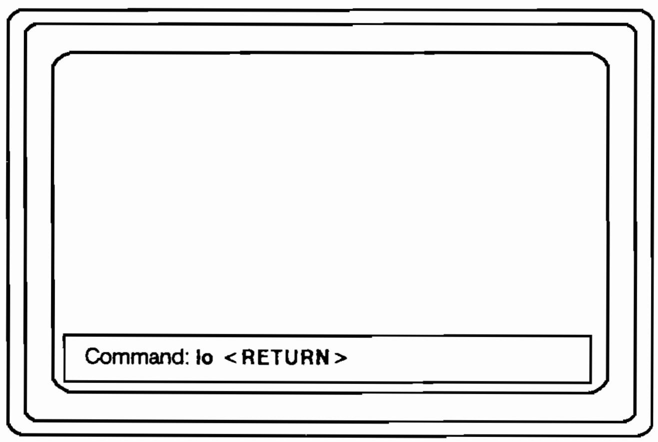


Figure 4–15. Logging Out

Shutting Down

Shutting down your workstation is nearly the reverse of the start-up procedure. You only need to shut down your workstation if you need to remove power from your system.

1. Log out of the system as shown in Figure 4-15.

2. To stop all processes, enter the **shut** command as shown in Figure 4-16.

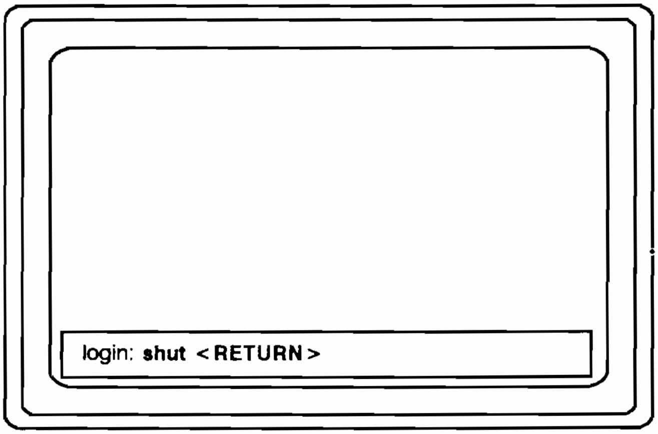


Figure 4-16. Shutting Down

Starting Up

3. When you see the message shown in Figure 4–17, shut off both the monitor and the system unit power switches.

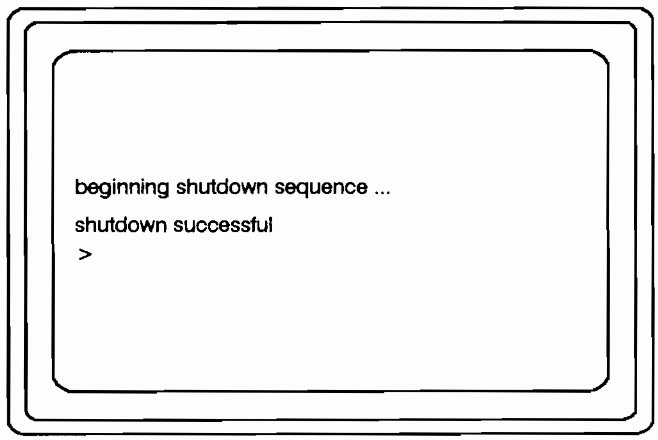


Figure 4–17. Successful Shutdown Sequence

Part 3 — Troubleshooting

Chapter 5
Troubleshooting

This chapter contains information that will help you determine what's wrong with your system when you have problems. It contains the following information:

- Problems and solutions tables
- LED error codes
- Running the SAX (System Acceptance Exerciser) tests

Calling for Service

Table 5–1 through Table 5–10 list common problems you may encounter with your system. The tables also tell you what to do to help solve the problems. If you have a problem that isn't listed here, or if your problem persists, contact your designated service representative. When calling for service, always have your system's model and serial number ready.

Table 5-1. Problems Unpacking the System

Problem	**Solution**
Pieces are missing.	Call your designated HP Apollo Sales office.
You find that the system unit is damaged.	Contact the freight carrier and insurer.
You compare the model number on the carton and the model number on the system unit and they don't match.	Call your designated HP Apollo Sales office.

Table 5-2. Problems Powering Up the System

Problem	**Solution**
The power LED doesn't light.	Make sure the ac power cables are connected securely to the system unit. Make sure the power cord is plugged into a working ac outlet. Make sure the power switch is set to the **1** (ON) position
The power lights go on, but the screen is blank or flickers.	Turn the Brightness control clockwise. If the screen is still blank, turn off the power switches. When all LEDs are off, check the video cable connections. If problems persist, call your designated service representative.

Table 5-3. Problems with the Apollo Token Ring Network

Problem	Solution
The cables in your network aren't marked IN and OUT. (This applies only to installations that use BNC network connections.)	Ask your system administrator the direction of network data flow. Mark the IN network cable. Connect the cable to the system and continue the installation.
You do not get a response when you try to access another system over the network.	Make sure that the network cable is connected to the system at one end and to the network connector at the other end. Type netsvc -a in a window to make sure that you are not disconnected from the network. Type ctnode -update to catalog the other systems on the network.
After you type **probenet**, the screen doesn't show 0 readings in the ERRS column.	Notify your system administrator or call your designated service representative.
You receive the following message after typing the **probenet** command: `***Another node <node_id> sending diagnostic packets that will confuse the results.`	Another node is also trying to run **probenet**. Make sure no other node on the network is running **probenet** before you attempt to run it.

Table 5–4. Problems with the 802.3 or 802.5 Network

Problem	**Solution**
No HP Apollo systems respond to the **lcnode** command.	Make sure that the network cable is connected to the system at one end and to the network connector at the other end. Log in at *another* workstation and type the **ctnode -update** and **lcnode** commands again. If no active HP Apollo systems respond on this attempt, you can be reasonably sure that your principal network is not functioning properly. Tell your system administrator or call your designated service representative.

Table 5–5. General System Problems

Problem	Solution
Your system does not function properly after all other troubleshooting measures have been taken.	Run the SAX tests to verify that the system's hardware is functioning properly. (See "Running SAX Diagnostics Tests" in this chapter.)

Table 5–6. Problems Starting Up the Workstation

Problem	Solution
You receive the message: `TEST FAILED`	Record the message. Press the system's Reset switch on the front of the system unit. If you still receive an error message, contact your designated service representative.

You receive the message:
 	
`My network node ID:nnnn`
`Error: Receive time-out`
	Record the message. Make sure the Service switch is set to Normal mode (Service LED is off). Press the Reset switch. Reboot the system.

You receive the message: `No boot program on this disk.`	The program that loads the Hardware Acceptance Program (HAP) software can't run. Record the message, and then press the Reset switch. If you still receive an error message, contact your designated service representative.
You receive the message: `Boot error:`	The system can't load the HAP software. Record the message, and press the Reset switch. If you still receive this message, contact your designated service representative.
You receive a random error message and the Mnemonic Debugger (MD) ">" prompt.	Type: re <RETURN> <RETURN> boot to start up the operating system.
You receive the message: `System hardware failures listed above were detected by self-test. Do you wish to continue with the boot process (y,n)`	Type y to attempt booting the system.

Table 5-7. Problems Starting Up a Diskless Workstation

Problem	Solution
The workstation loop/segment doesn't have a disked system.	If the system is connected to an Apollo Token Ring network with BNC cables, switch the loop back into the network before setting up the partner node. Recommend that the system administrator place all diskless systems in the same loop as their partners.
The partner node doesn't have the correct /**sau** directory.	Install the new software and the correct /**sau** directory on the partner node. For instructions, refer to *Installing Software with Apollo's Release and Installation Tools*; this manual ships with all standard software.

You receive the message:
 	
`My network node ID:nnnn`
`Error: Receive time-out`
	Check your system's ID and re-enter it in the partner node's diskless list.

You receive the message: `My network node ID:nnnn` but nothing happens.	Check to see if the partner node is running properly. If not, choose another partner and repeat the booting procedure. Report the faulty partner node's problem to your system administrator.
You receive the message: `Error: Transmit request failed`	This error message suggests network problems. Check with your system administrator.

Table 5–8. Problems Using the Cartridge Tape Drive

Problem	Solution
The tape drive does not respond to commands.	Re–enter the commands to make sure that you have typed them correctly. Check the SCSI cables and terminator to ensure that they are connected securely. Run the SAX tests to verify that the tape drive is functioning properly.

Table 5–9. Problems Running SAX Diagnostics Tests

Problem	Solution
You receive a message that states you don't have access rights to the **/systest** directory.	Have your system administrator append his/her log–in name and password to the **sax** command: **/systest/sax –on** *nnnnn* **–cit –login** *name_sys_admn password* <RETURN>
You receive SAX error messages.	Report the error messages to your designated service representative.

Table 5–10. Problems Configuring the Workstation in Service Mode

Problem	**Solution**
Configuration mode doesn't start.	Contact your designated service representative.
You receive the message: `Configuration EEPROM failed`	Contact your system administrator or your designated service representative to verify the workstation's System Mode and Interface Mode configurations.
You receive the message: `Too much data to save`	Contact your system administrator or your designated service representative to reconfigure the workstation with fewer interfaces.

You receive any of the following messages:
`EEPROM has bad information`
`EEPROM Load Section Missing`
`EEPROM Defaults Section Missing`
`Configure Mode Failed`
	Contact your designated service representative.

Troubleshooting

LED Error Codes

This section contains information about the error codes displayed by the LEDs on the system's front panel.

Figure 5–1 shows the location of the system unit's front panel LEDs. There are ten LEDS on the front panel. The green LED is labeled "P" and indicates that the system is powered up. When the Service LED is on, it indicates that the system is in Service mode. When the Service LED is off, the system is running in Normal mode (normal everyday operation). The amber LEDs labeled "A" through "H" indicate system status.

Table 5–11 shows the codes displayed by the LEDs during normal system operation. Note that the "Network Receive In Progress" and "Network Transmit In Progress" codes can flash so rapidly that they appear as a steady (not flashing) display.

Table 5–11. LED Codes

LED Display (A Through D Flashing)	Message
P A B C D E F G H S	
▮ ▯ ▯ ▯ ▯ ▯ ▯ ▯ ▯ ▯	Operating System Running
▮ ▯ ▯ ▯ ▯ ▯ ▯ ▯ ▯ ▯	Disk Access In Progress
▮ ▯ ▯ ▯ ▯ ▯ ▯ ▯ ▯ ▯	Network Receive In Progress
▮ ▯ ▯ ▯ ▯ ▯ ▯ ▯ ▯ ▯	Network Transmit In Progress
S = Service Mode Indicator On = Service Mode Off = Normal Mode	P = Power–On Indicator ▯ ▮ = LED On

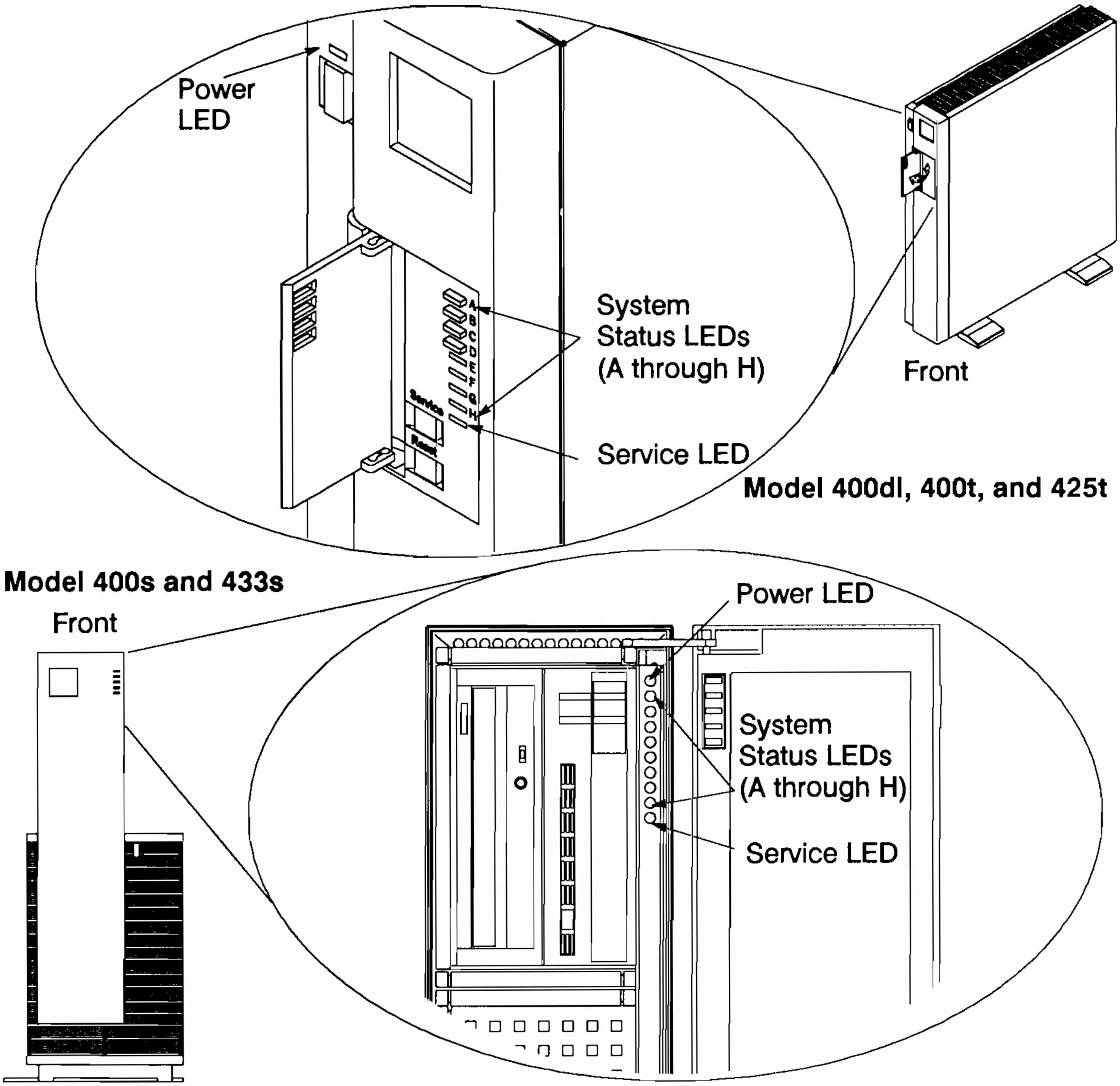


Figure 5–1. Front Panel LEDs

Boot PROM Diagnostics LED Error Codes

If an error occurs during the power-up diagnostics tests, the diagnostics use the front panel LEDs to display a code for the failing Field Replaceable Unit (FRU). Note that the Power LED is always on when the system is powered on, and that the Service mode LED is on only when the system is in Service mode.

If the system is in Normal mode and an error occurs, you receive a prompt that asks if you wish to continue the tests and try to boot the operating system; the LEDs and the display screen show the failing FRU and system status. If the system is in Service mode and an error occurs, the tests halt, with the LEDs and the display screen showing the failing FRU and system status.

Table 5–12 shows the FRU code display and hexadecimal numbers for the system as they appear on the front panel display. Use these LED codes to determine the failing FRU.

Table 5–12 illustrates the LEDs on the front panel that are used to call out the failing FRU during the CPU/Motherboard/Memory testing. Note that the Power LED is always on when the system is powered on, and that the Service mode LED is on only when the system is in Service mode.

Once the CPU/Motherboard/Memory is tested, the diagnostics use the display screen to report the test status. The screen displays any failing FRUs.

Table 5–12. LED Codes for FRUs

LED Display	Field Replaceable Unit Name	Hex Code
P A B C D E F G H S		
■ □ □ □ □ □ □ □ □ □	SCSI Device 0	30
■ □ □ □ □ □ □ □ □ □	SCSI Device 1	31
■ □ □ □ □ □ □ □ □ □	SCSI Device 2	32
■ □ □ □ □ □ □ □ □ □	SCSI Device 3	33
■ □ □ □ □ □ □ □ □ □	SCSI Device 4	34
■ □ □ □ □ □ □ □ □ □	SCSI Device 5	35
■ □ □ □ □ □ □ □ □ □	SCSI Device 6	36
■ □ □ □ □ □ □ □ □ □	SCSI Device 7	37
■ □ □ □ □ □ □ □ □ □	Network Interface Board	38
■ □ □ □ □ □ □ □ □ □	Graphics Interface Board	39
■ □ □ □ □ □ □ □ □ □	SIO	3A
■ □ □ □ □ □ □ □ □ □	Memory	3B
■ □ □ □ □ □ □ □ □ □	CPU Board	3C
■ □ □ □ □ □ □ □ □ □	System Bus	3D
■ □ □ □ □ □ □ □ □ □	Apollo Keyboard	3E
■ □ □ □ □ □ □ □ □ □	Utility Chip	3F

S = Service Mode Indicator
On = Service Mode, Not On = Normal Mode

P = Power–OK Indicator
□■ = LED On

Troubleshooting

Mnemonic Debugger Level LED Status Codes

At the Mnemonic Debugger (MD) level, while the system is in Service mode, the front panel LEDs display system status codes. Table 5-13 lists the MD status LED codes and their meanings.

Table 5-13. MD Level LED Status Codes

LED Display (E Through H Flashing)	System Status	Hex Code
P A B C D E F G H S		
■ □ □ □ □ □ □ □ □ □	Keyboard Wait Loop	08
■ □ □ □ □ □ □ □ □ □	Waiting at MD Prompt	0C
■ □ □ □ □ □ □ □ □ □	Waiting for Disk	02
■ □ □ □ □ □ □ □ □ □	Waiting for Network Transmit	03
■ □ □ □ □ □ □ □ □ □	Waiting for Volunteer Response	04
■ □ □ □ □ □ □ □ □ □	Waiting for Network Receive	05

S = Service Mode Indicator
On = Service Mode, Not On = Normal Mode

P = Power-OK Indicator
□■ = LED On

Running the SAX Diagnostics Tests

This section describes how to run the SAX diagnostics tests. Use the following procedure to run SAX:

1. If the system has a tape drive, find the cartridge tape that you received with the system.

NOTICE: Make sure the write-protect switch is pointing away from SAFE (see Figure 5-2).

If your system does not have a tape drive, go to Step 5 to run the SAX tests.

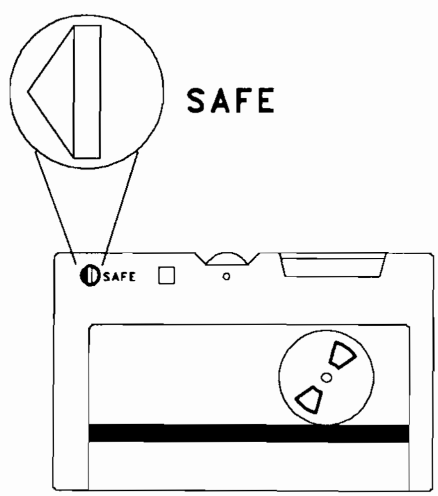


Figure 5-2. Cartridge Tape Write-Protect Switch

2. Open the tape drive (see Figure 5–3).

NOTICE: Do *not* insert a tape that contains valuable data. The SAX test will destroy data stored on the tape.

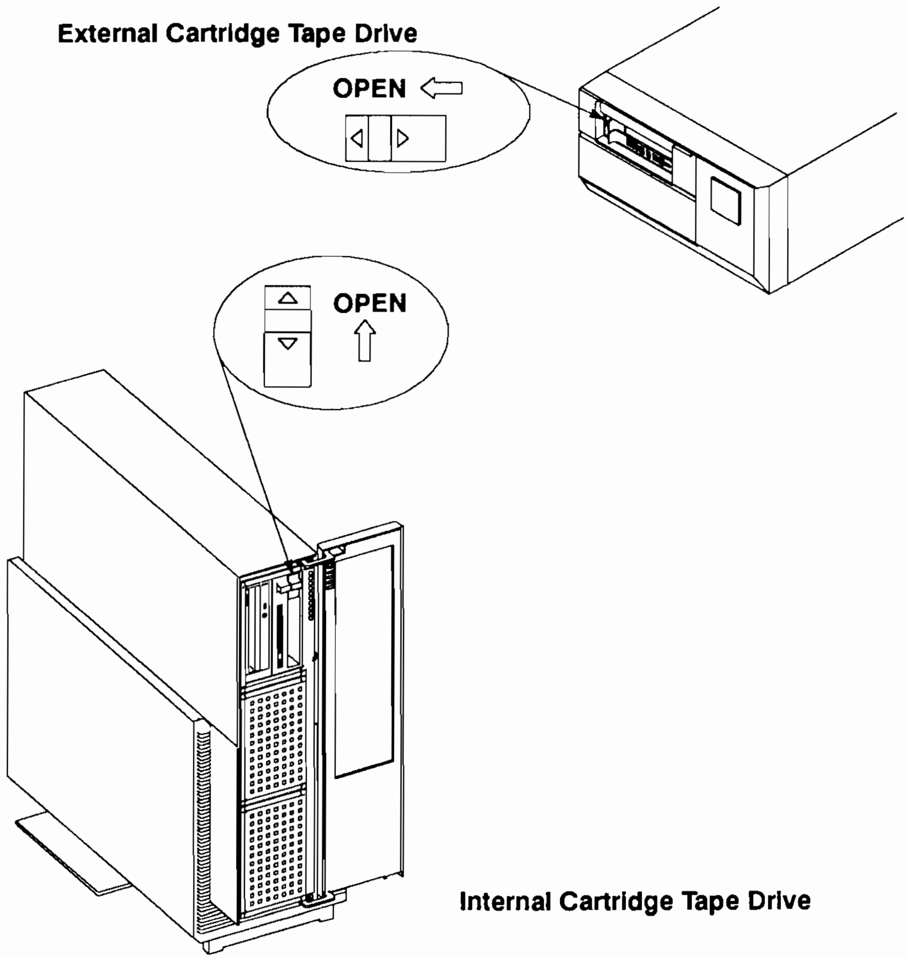


Figure 5–3. Opening the Cartridge Tape Drive

3. Insert the tape into the drive and lock the tape drive (see Figure 5–4).

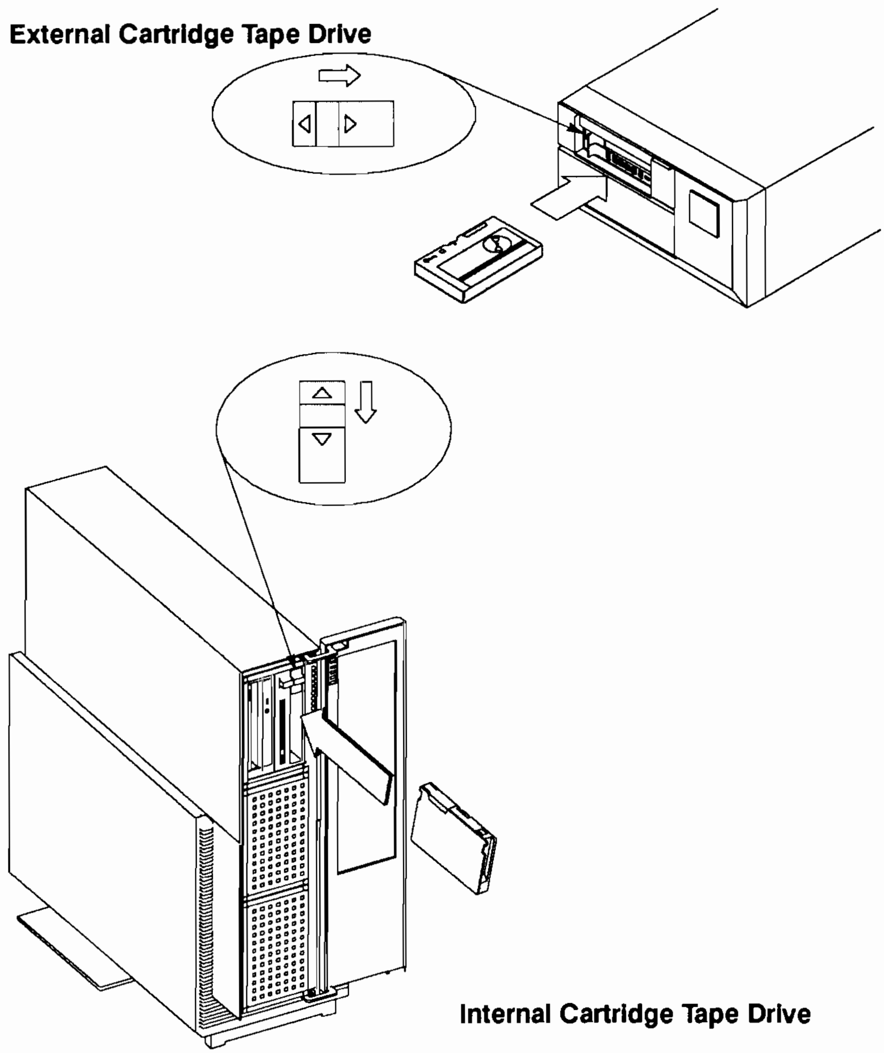


Figure 5–4. Inserting the Cartridge Tape

4. If the tape you loaded has never been used for SAX testing, initialize the tape with the command shown in Figure 5-5.

NOTICE: You must initialize the tape shipped with the system.

NOTICE: SysV is the default operating system environment for the Hardware Acceptance Program (HAP) when the system initially boots. After you complete the installation procedure, the system administrator may change the default operating system environment to any of the three operating environments: SysV, BSD, or Aegis.

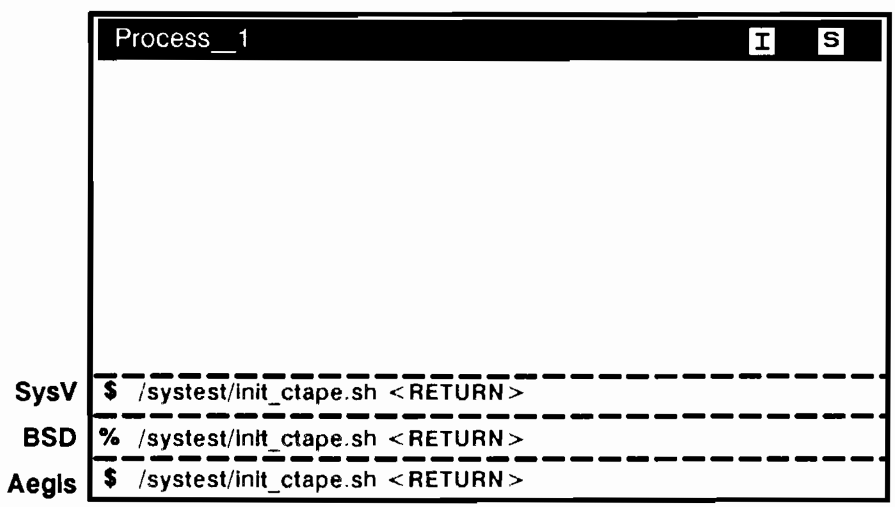


Figure 5-5. Initializing the Cartridge Tape

5. If you are testing a *disked* workstation, begin the SAX tests by typing the sax command shown in Figure 5–6.

Process_1 I S

SysV	**$ /systest/sax -cit <RETURN>**
BSD	**% /systest/sax -cit <RETURN>**
Aegis	**$ /systest/sax -cit <RETURN>**

Figure 5–6. Starting the SAX Tests

If you are testing a *diskless* workstation, you must also start the **sax** program on its partner node (see Chapter 4). Use the command shown in Figure 5–7 to start **sax** on the partner node.

If your system is *diskless*, you or your system administrator should set up a permanent partner for it. For instructions, refer to *Managing SysV System Software*, *Managing BSD System Software*, or *Managing Aegis System Software*.

Process_1

SysV	**$ /systest/sax -server <RETURN>**
BSD	**% /systest/sax -server <RETURN>**
Aegis	**$ /systest/sax -server <RETURN>**

Figure 5–7. Starting the SAX Tests on a Partner Node

6. Your screen now displays multiple windows as concurrent tests run (see Figure 5-8).

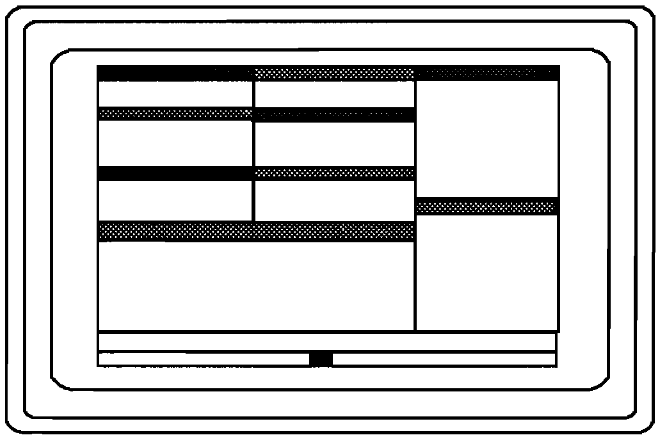


Figure 5–8. Multiple Window Display

The SAX tests take up to 20 minutes to run on a fully configured system. When the system passes the SAX test, you will receive the message:

```
End of pass 1, 0 errors
End Time: mm/dd/yyyy hh:mm:ss
Elapsed runtime: hhhh:mm:ss
```

If you receive an error message that has not been explained in the *Software Release Document(s)* you received with your system software, contact your designated service representative.

Chapter 6
Recovering from a System Crash

This chapter tells you how to recover from a system crash (failure). It describes the following:

- Handling a system hang
- Handling a system crash
- Dumping memory

Troubleshooting

Handling a System Hang

A system hang is caused by a hardware, software, or network failure. If a system hangs, it suddenly stops responding to keyboard input and the cursor stops flashing or disappears. This section describes several steps you can take to correct system hangs.

NOTICE: Use the following procedure only if your system was running the operating system when the hang occurred. If a hang occurs while you're starting up or running at the Mnemonic Debugger (MD) level, contact your designated service representative.

1. If the cursor disappears while you're executing a program, the program may have hung.

   Quit the program by typing **CTRL/c** in the SysV or BSD environments or by by typing **CTRL/q** in the Aegis environment. If your system still isn't working properly, go to Step 2.

2. If the problem continues, go to another node in your network and type the command shown in Figure 6–1.

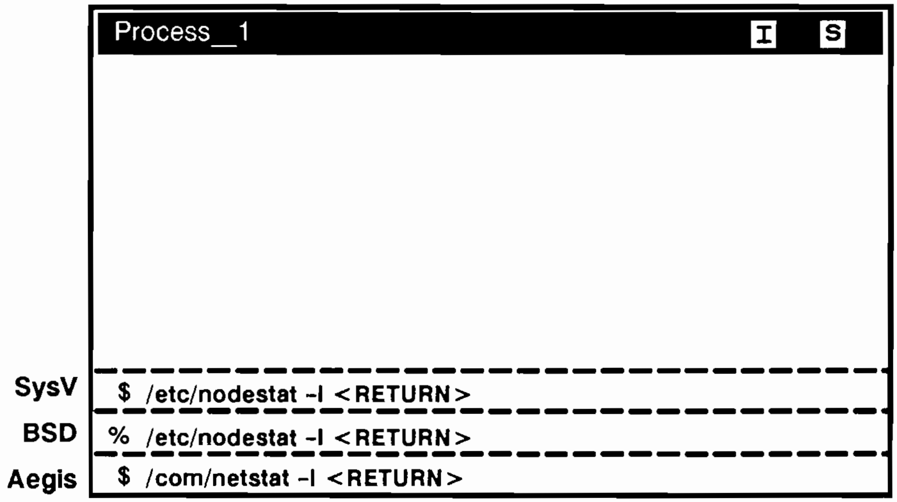


*Figure 6–1. Using the **nodestat** or **netstat** Command*

3. The screen now displays statistics about network communications. The last lines of the display contain the date and time of the last recorded network failure. Figure 6–2 shows a typical network reading regarding network failure.

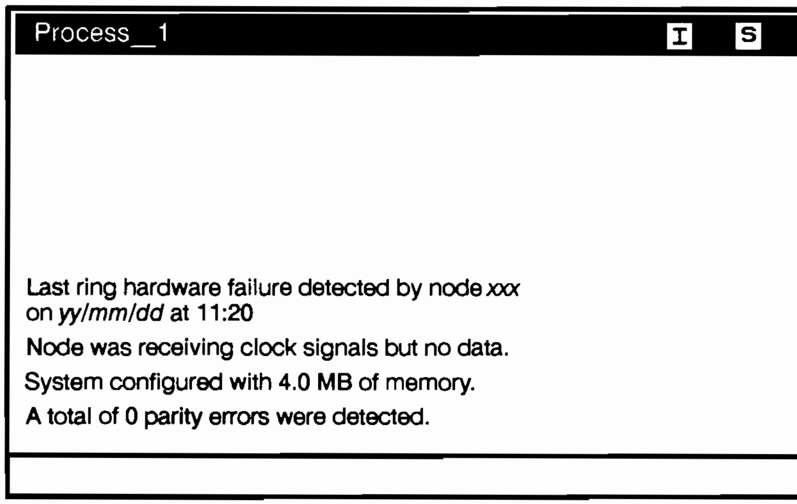


Figure 6–2. Network Communications Statistics

4. If the last network hardware failure was recent, your network may be the cause of the system hang. Report the possible network problem to your system administrator.

   If the problem isn't your network, or no network hardware problems are listed, go to Step 5.

5. Go back to your system and press the Service mode switch to set the system to Service mode. The Service LED on the system's front panel will light as shown in Figure 6–3.

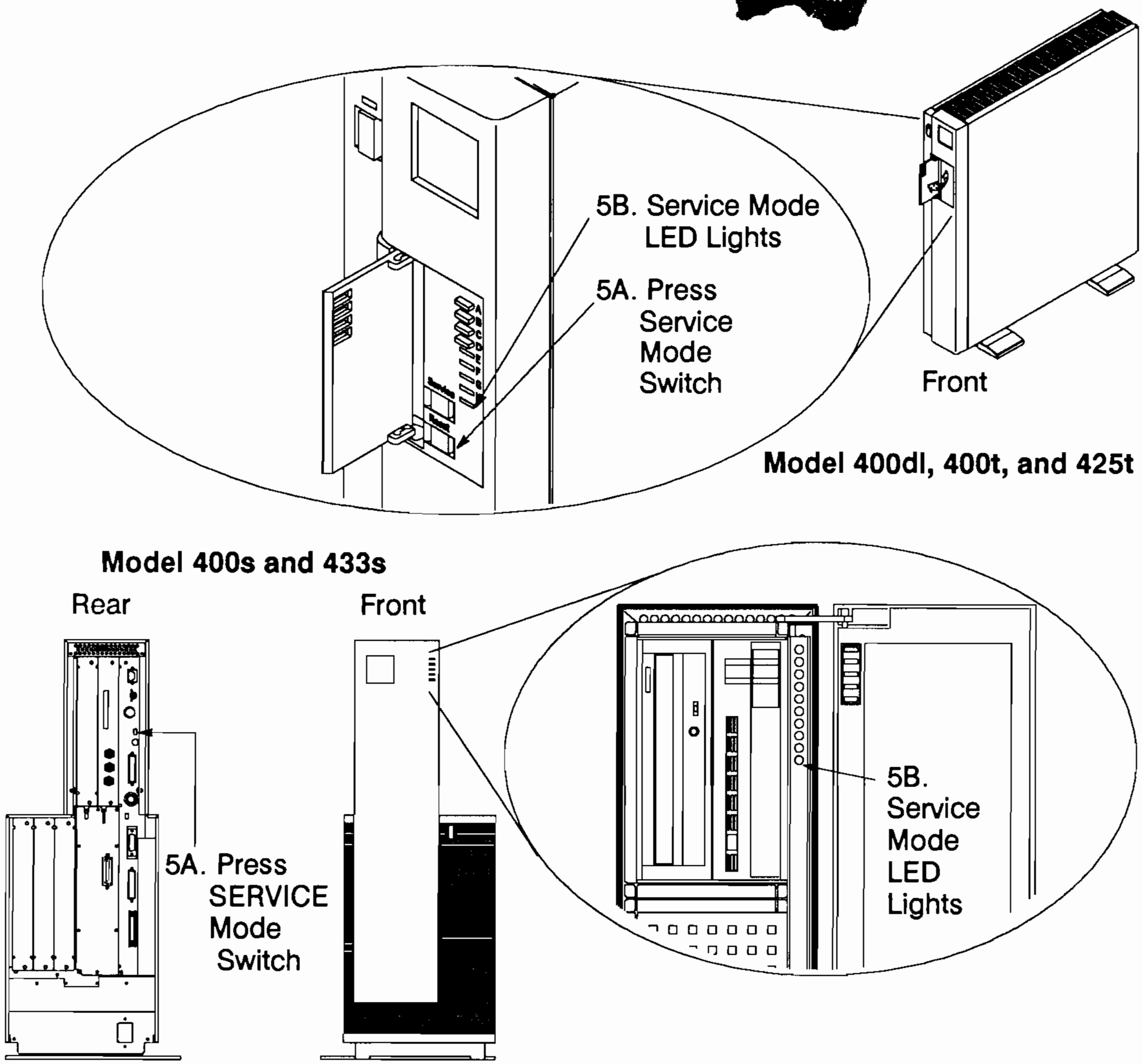


Figure 6–3. Setting the System to Service Mode

Troubleshooting

6. Now press CTRL/<RETURN>.

Check to see if your screen displays a crash status message similar to the one shown in Figure 6–4.

The crash status message shows that you've stopped the operating system and given control to the MD.

NOTICE: If the crash status message appears, go to Step 7. If it doesn't, go to Step 8.

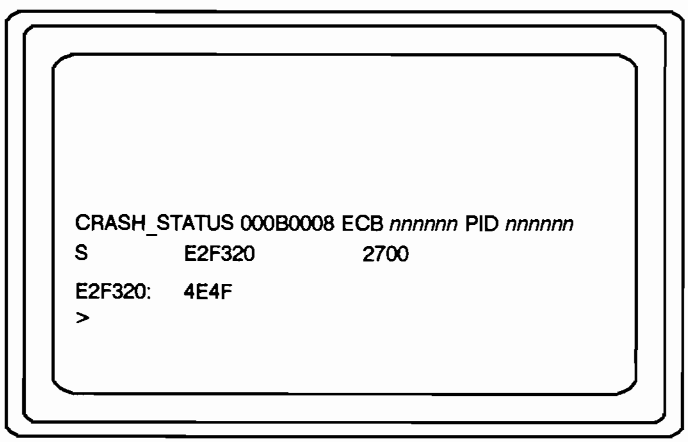


Figure 6–4. Sample Crash Status Message

7. Make a note for future reference of what program you were running when the hang occurred. Also note that you were able to give control to the MD by pressing **CTRL/<RETURN>**.

   Restart the operating system by typing the command line shown in Figure 6–5.

   Wait about 20 seconds. If your display resets and the flashing cursor appears, the node hang is fixed and you can continue normal operation. Press the Service mode switch to set the system for Normal mode (Service LED is off) and resume processing.

```
>go <RETURN>
S         E2F320          2700
E2F320:   4E4F

>go <RETURN>

CTRL/f
```

Figure 6–5. Restarting the Operating System

Follow the instructions in Steps 8 through 10 only if the crash status message shown in Step 6 *did not* appear.

8. Because the crash status message didn't appear, you should now manually reset your system. To do this, press the Reset switch on the Model 400dl, 400t, or 425t workstation's front panel or on the Model 400s or 433s workstation's rear panel as shown in Figure 6–6.

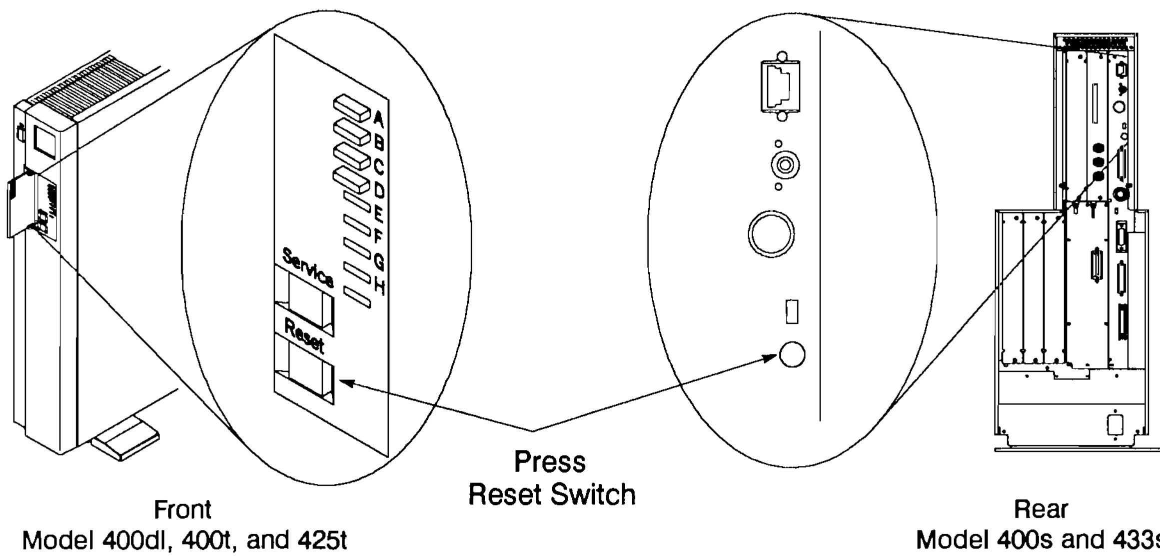


Figure 6–6. Resetting the System Manually

9. When you see the MD " >" prompt, type the lines shown in Figure 6–7.

Make a note for future reference of what program you were running when the system hang occurred. Also note that you were able to give control to the MD by pressing the Reset switch.

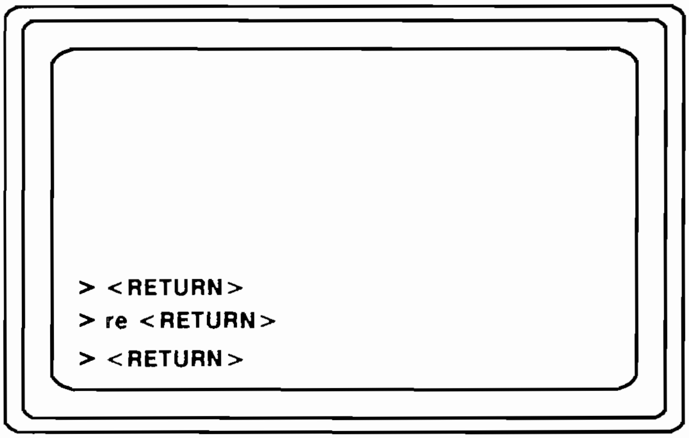


Figure 6–7. Responding to the MD Prompt

10. Report the system hang to your designated service representative. If your service representative asks you to perform a memory dump, go to the "Dumping Memory" section later in this chapter. If not, go to Step 11.

11. To restart the operating system, press the Service mode switch to set the system to Normal mode (Service LED is off). Press the Reset switch as shown in Figure 6–8.

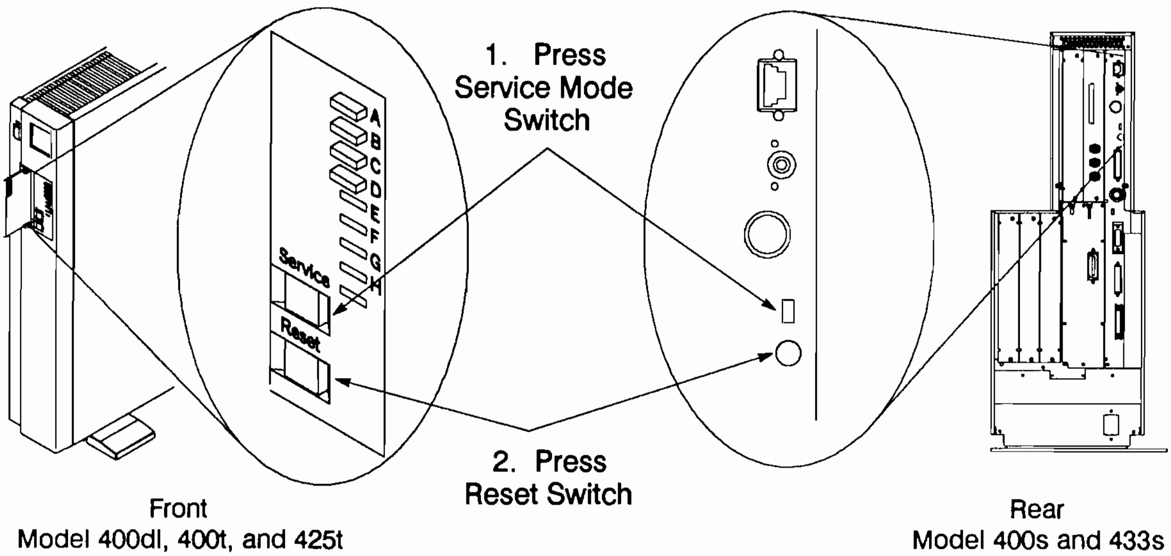


Figure 6–8. Restarting the Operating System

The system now runs the diagnostics. If the workstation boots from a storage device, and the storage device needs salvaging, the system automatically executes the **salvol** program and displays the "SALVAGING BOOT VOLUME" message. When **salvol** completes, the system loads the operating system.

12. Log in when the "login:" prompt appears. Your system has now recovered from the system hang.

Handling a System Crash

A crash is an unexpected exit from the operating system to the Mnemonic Debugger (MD) program. When a system crashes, all processes stop and a crash message appears at the bottom of your screen. The crash message is followed by the MD ">" prompt as shown in Figure 6–9.

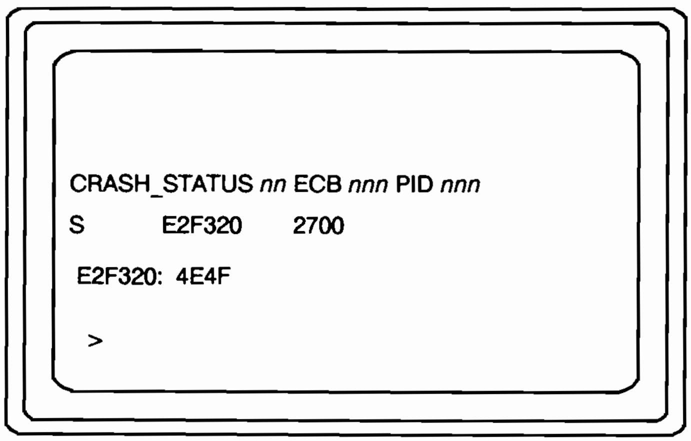


Figure 6–9. MD Prompt Following a Sample System Crash Message

After a crash, the operating system boots when certain conditions are met at the time of the crash. These conditions are as follows:

- The Service mode switch was set to Normal mode (the Service LED is off).
- System initialization is completed.
- A full disk didn't cause the crash.

When a disked system automatically reboots, your screen displays one of the messages shown in Figure 6–10.

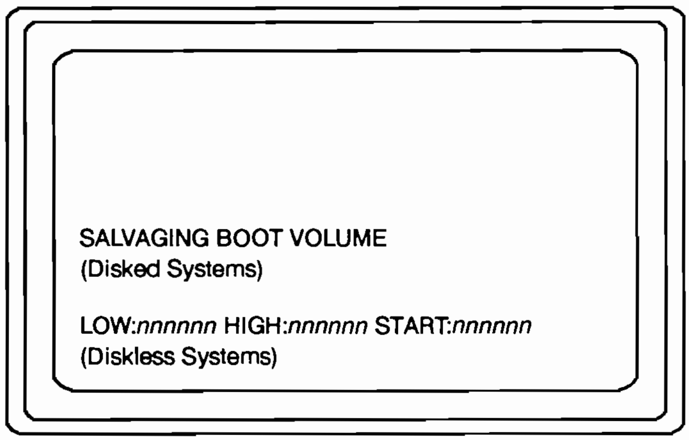


Figure 6–10. Sample Rebooting Messages

Then the system begins loading the operating system from its own disk or its partner node. When you see the "login:" prompt, log in and continue normal operations.

When the system automatically reboots, it *does not* perform a memory dump; it *does* record the error in its **sys_error_log** file.

Use the **lsyserr** utility to read the log file as shown in Figure 6–11.

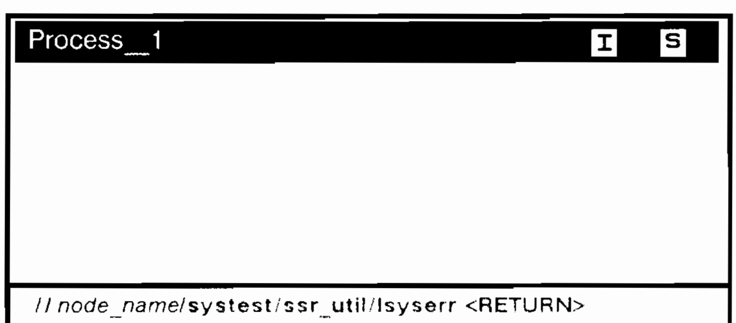


Figure 6–11. Running the ***lsyserr*** *Utility*

Because many different problems can cause crashes, we can't list all of the possibilities. However, the following three items describe common causes of crashes and tell you what to do if your system crashes and *does not* automatically reboot.

1. Record the crash message. Check to see if the system has crashed before with the same status code.

   If your system has not previously crashed with the same status code, go to Step 4.

2. If the same status code has appeared before, this may indicate a hardware problem. Report this to your designated service representative, then go to Step 6.

   If the status code has not appeared before, go to Step 4.

3. Check Table 6–1 to see if it lists your crash status code. If it does, follow the instructions in the solution column of the table.

   Record the meaning of the status code, and go to Step 6.

   If your crash status code *is not* listed in Table 6–1, go to Step 4.

Table 6–1. Common Crash Status Codes and Solutions

Status Code	Meaning	Solution
000B0008	You pressed **CTRL/<RETURN>** when your node was in Service mode or an SIO port received a 1B (hexadecimal) character.	1. Enter the following command: >go <RETURN> 2. Type CTRL/f to reset your screen. 3. Make sure the Service mode switch is set for Normal operation (Service LED is off). 4. Resume Normal operation.
0008*nnnn*	Your node may have a disk problem (*nnnn* can be any hexadecimal character).	Report the problem to your designated service representative.
0012000F	Your node may have a memory hardware problem.	Report the problem to your designated service representative.

4. Find the meaning of your crash status code by going to another node in your network that is running the operating system and type the command shown in Figure 6–12.

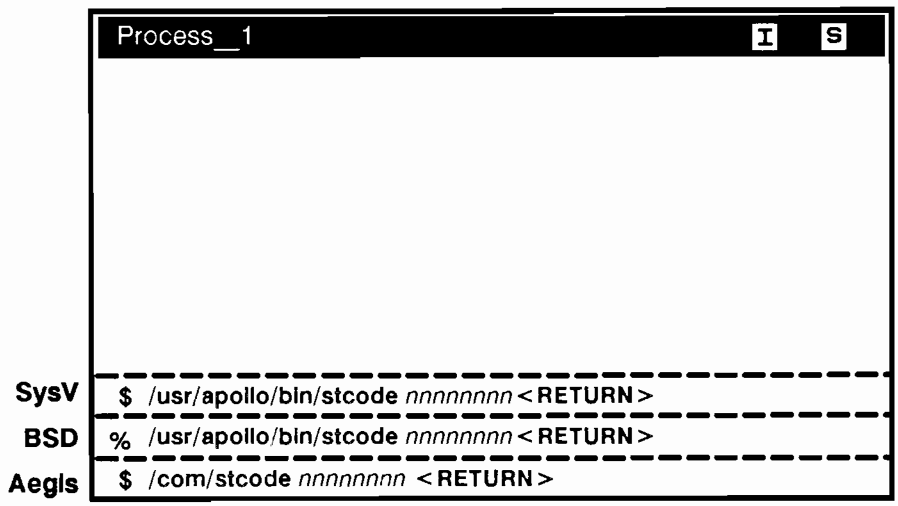


Figure 6–12. Entering the Crash Status Code

Substitute the actual crash status code you received for *nnnnnnnn*, starting with the leftmost nonzero character. For example, crash status code 0008001B would be entered as 8001B.

5. Record the meaning of the status code and report the crash to your designated service representative. If your service representative asks you to perform a memory dump, go to the “Dumping Memory” section later in this chapter. If not, go to Step 6.

6. To restart the operating system, press the Service mode switch to Normal (Service LED is off) and press the Reset switch as shown in Figure 6–13.

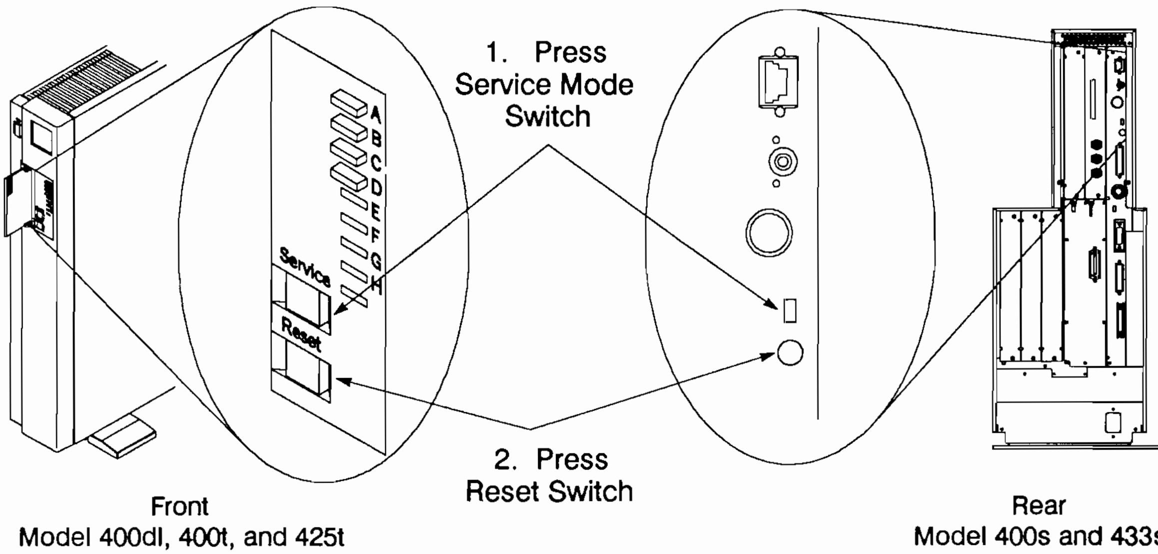


Figure 6–13. Restarting the Operating System

The system now runs the diagnostics. If the workstation boots from a storage device and the storage device needs salvaging, the system automatically executes the **salvol** program and displays the "SALVAGING BOOT VOLUME" message. When **salvol** completes, the operating system is booted.

7. Log in when the "login:" prompt appears. Your system has recovered from the crash.

Salvaging the Second Disk

In the event of a node crash, the second disk is not automatically salvaged when the first one is. Once the first disk has been salvaged by the system, you can salvage the second disk.

Press the Service mode switch to set the system to Service mode (Service LED lights). Press the Reset switch as shown in Figure 6–14.

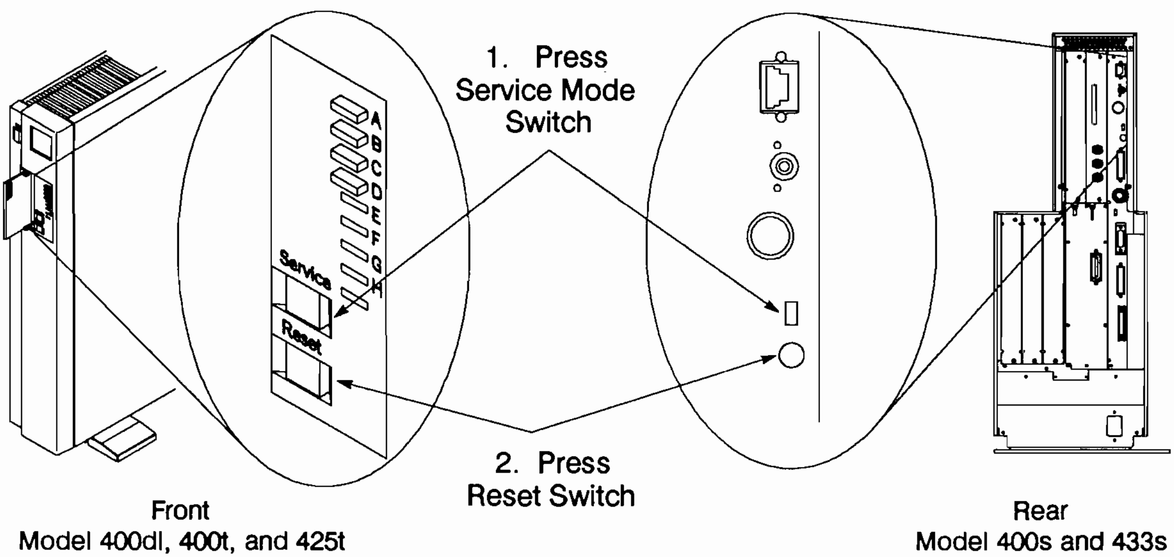


Figure 6–14. Restarting in Service Mode

Press **<RETURN>**. After a short pause, the MD (Mnemonic Debugger) prompt "**>**" appears on the screen. Type the **ex salvol** command shown in Figure 6–15 to begin salvaging the second disk.

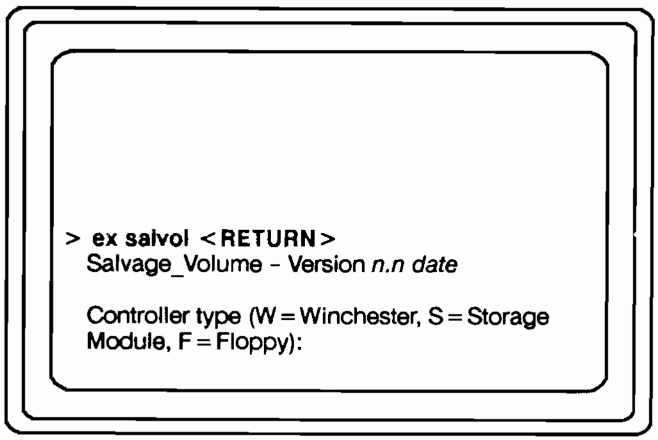


Figure 6–15. Salvaging a Second Disk from the MD

Type the command shown in Figure 6–16 to select the second disk as the target of the salvage operation, where:

> **w** specifies a Winchester disk drive
> *c* specifies the disk controller number
> *u* specifies the disk unit number

When prompted with "lv_num –option" as shown in Figure 6–16, enter the logical volume number and the desired options. For more detailed information concerning **salvol**, refer to the appropriate *Command Reference* manual. The **salvol** command runs the salvage routine, and displays disk information when finished.

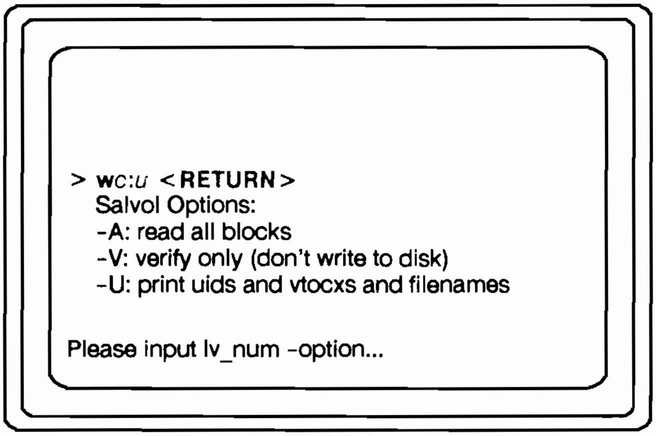


Figure 6–16. Selecting the Second Disk for Salvaging

Returning to Normal Mode

To return to Normal mode operation, press the Service mode switch to set the system to Normal mode (Service LED goes off). Press the Reset switch to reboot the system.

Dumping Memory

A memory dump makes a copy of the system memory contents at a particular time. Memory dumps are especially useful for analyzing the cause of a hang or crash. This section describes two memory dump procedures:

- Dumping Memory to a Cartridge Tape — Use this procedure if your system has a cartridge tape drive.
- Dumping Memory Across the Network — Use this procedure if you do not have a cartridge tape drive. This procedure takes slightly longer than dumping to the cartridge tape because it's a 2–step process. First, dump the system memory contents to another node in your network (the dump storage node). Then, copy the memory dump to the dump storage node's diskette or tape.

NOTICE: Do *not* perform a memory dump unless your designated service representative requests it.

Dumping Memory to a Cartridge Tape

This section describes how to dump the system memory contents to the cartridge tape drive. Before beginning this procedure, make sure

- The Service mode switch is set to Service mode (Service LED is on).
- The system is under the control of the Mnemonic Debugger (MD). Your screen should display the MD " >" prompt.
- Your system has a cartridge tape unit.

1. Reset the MD as shown in Figure 6–17. The system now displays the revision date of the CPU PROM.

2. Insert a write–enabled cartridge tape into the drive as shown in Figure 6–18.

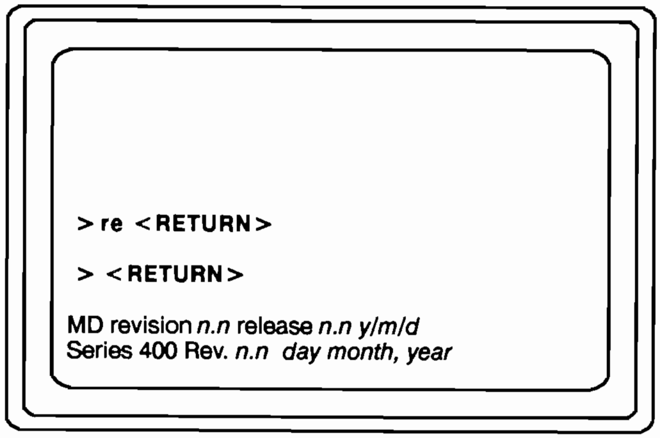


Figure 6–17. Resetting the MD

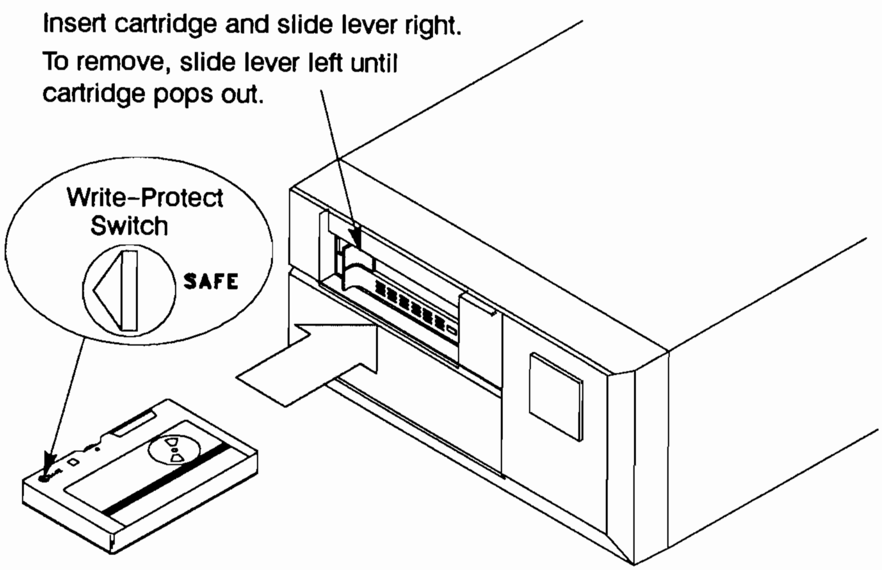


Figure 6–18. Inserting a Write-Enabled Cartridge Tape into an External Drive

3. Type the command shown in Figure 6–19 to direct the memory dump to the cartridge tape.

   Using **di c** instructs the system to look for the default (highest target ID) tape boot device. If you have more than one tape drive, you can select a specific tape drive boot device by using the following command:

   di st*n:n*

   where:

   st specifies the SCSI tape drive

   n:n specifies the drive's target *ID:unit number*

NOTICE:

The *unit number* specified in the **di** command is always 0.

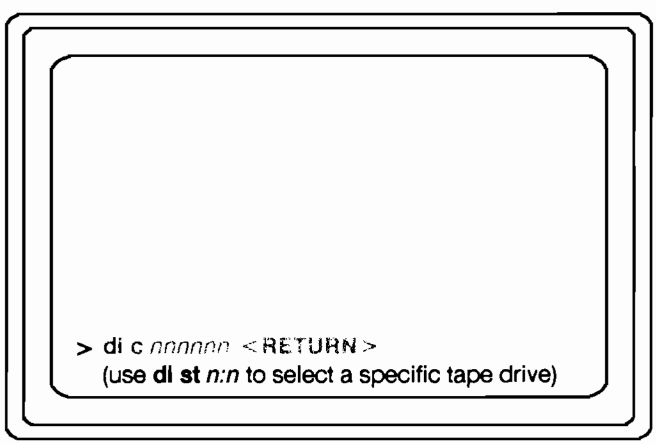


Figure 6–19. Directing a Memory Dump to a Cartridge Tape

4. Start the memory dump by typing the command shown in Figure 6–20.

Your system now displays a count of the pages dumped. Each ! represents 32 pages of memory.

NOTICE: If your system hangs during the memory dump procedure, press the Reset switch and go back to Step 1.

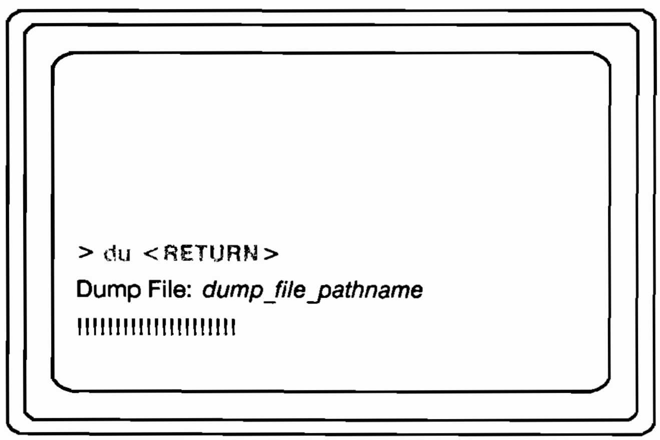


Figure 6–20. Starting the Memory Dump to a Cartridge Tape

5. When the memory dump is completed, the word "Done" appears at the bottom of your screen. Remove the cartridge tape from the drive and label it.

6. To restart the operating system, press the Service mode switch to set the Service mode switch to Normal (Service LED is off) and press the Reset switch as shown in Figure 6–21.

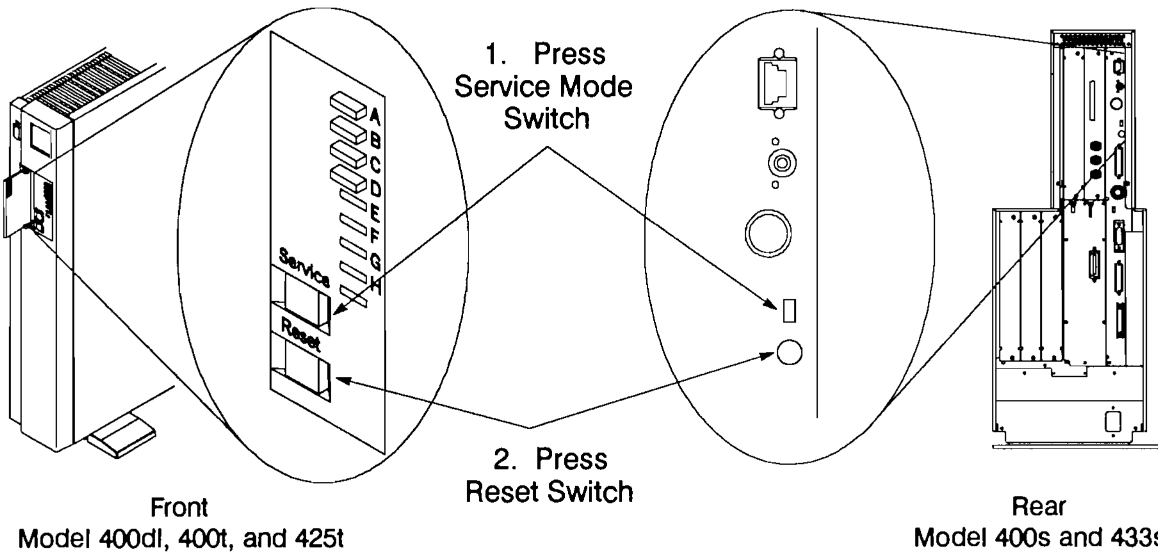


Figure 6–21. Restarting the Operating System

The system now runs the diagnostics. If the workstation boots from a storage device and it needs salvaging, the system automatically executes the **salvol** program and displays the “SALVAGING BOOT VOLUME” message. When **salvol** completes, the operating system is booted.

7. When the “login:” prompt appears, log in and set your working directory to the correct **/sau*nn*** directory for your workstation as shown in Figure 6–22.

   Use **/sau12** for Model 400dl, 400t, and 400s workstations.

   Use **/sau11** for Model 425t and 433s workstations.

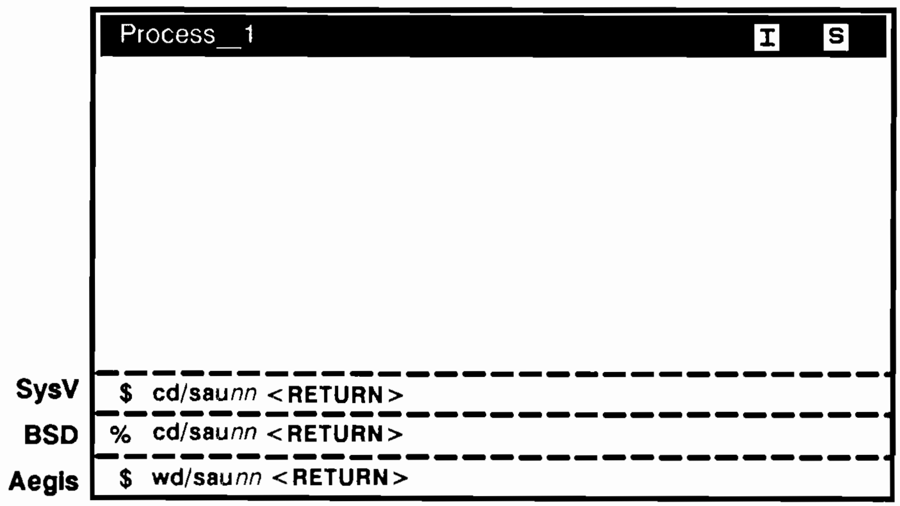


Figure 6–22. Setting the Correct Working Directory

8. Insert a blank write-enabled cartridge tape into the drive and copy the **/sau*nn*/domain_os.map** file by typing the command shown in Figure 6-23.

   Use **/sau12** for Model 400dl, 400t, and 400s workstations.

   Use **/sau11** for Model 425t and 433s workstations.

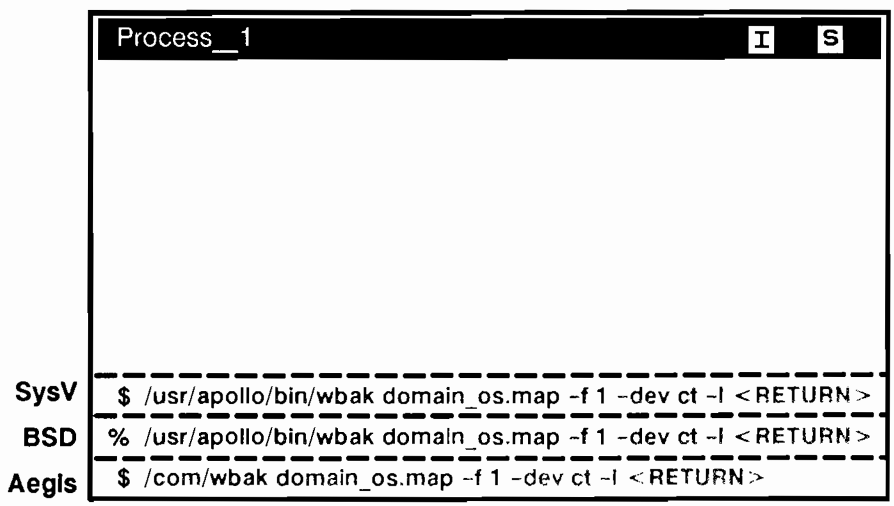


Figure 6-23. Copying the /saunn/domain_os.map File

As **wbak** proceeds, your screen displays several messages similar to those shown in Figure 6–24.

```
Process_1                                                  I   S

Label:
   Volume ID:                      (no id specified)
   Owner ID:                       (no owner specified)
   File number:                    1
   File section:                   1
   File ID:                        (no id specified)
   File written:
                                   yy/mm/dd 11:25:30 (EDT)
Starting write:

(file) /saunn/domain_os.map written

Write complete.
```

*Figure 6–24. **wbak** Messages*

9. When **wbak** completes, remove the cartridge tape from the drive and label it as follows (use **/saul2** for Model 400dl, 400t, and 400s workstations. Use **/saul1** for Model 425t and 433s workstations).

> **/sau***nn***/domain_os.map**, *system_node_id*, *date*

Your designated service representative may ask for this tape to verify the system diagnosis.

Dumping Memory Across the Network

This section describes how to send a memory dump across the network and store it on another node's Winchester disk (we call this other node the dump storage node). After storing the dump on the Winchester disk, you can then copy it to the diskette or tape drive on the dump storage node.

Before beginning this procedure, make sure that

- The Service mode switch is set to Service mode (Service LED is on).
- The system is under the control of the Mnemonic Debugger (MD). Your screen displays the MD " >" prompt.
- The dump storage node has a diskette or cartridge tape drive.
- The dump storage node is running SR9.5 or a later software release. Use the **bldt** shell command to determine the node's software release.
- The dump storage node is running the **netman** process. (Type one of the commands shown in Figure 6–25 at the dump storage node to see if **netman** is running; see your system administrator or the appropriate *Managing System Software* manual for more **netman** information.)
- You know the node ID of the dump storage node. To find it, type one of the commands shown in Figure 6–26 from the dump storage node.

Process_1 I S

SysV	**$ /bin/ps -e -n** *//dump_storage_node* <RETURN>
BSD	**% /bin/ps -ax -n** *//dump_storage_node* <RETURN>
Aegis	**$ /com/pst** *//dump_storage_node* <RETURN>

Figure 6–25. Checking for **netman** *Process on the Dump Storage Node*

Process_1 I S

SysV	**$ /etc/lcnode -me** <RETURN>
BSD	**% /etc/lcnode -me** <RETURN>
Aegis	**$ /com/lcnode -me** <RETURN>

Figure 6–26. Finding the Node ID on the Dump Storage Node

Troubleshooting

You also need to know if the dump storage node has enough free space on its Winchester disk to accept the memory dump information. To verify this, type one of the commands shown in Figure 6–27 from the dump storage node.

```
Process_1

SysV   $ /bin/df  //dump_storage_node <RETURN>
BSD    % /bin/df  //dump_storage_node <RETURN>
Aegis  $ /com/lvolfs  //dump_storage_node <RETURN>
```

Figure 6–27. Verifying Free Space on the Dump Storage Node

If your system has 8 MB of memory, the dump storage node must have about 8000 free blocks on its Winchester disk. If your system has 16 MB of memory, the dump storage node must have about 16000 free blocks, and so forth.

If the dump storage node you've chosen doesn't have enough free space, either create more free space on its disk or choose another node.

1. Go to the system from which you will dump the contents of memory. Reset the MD as shown in Figure 6–28. The system displays the revision date of the CPU PROM.

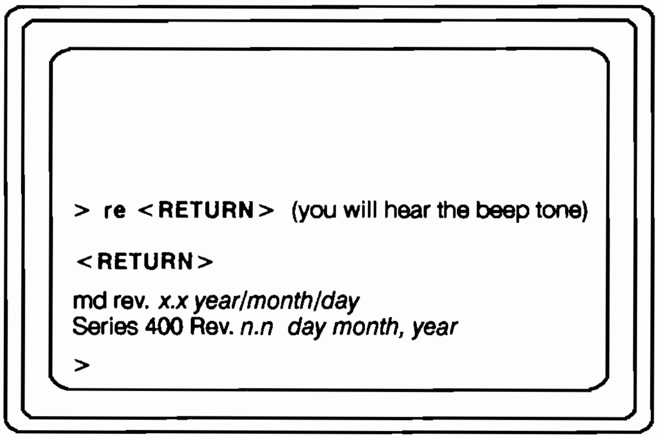


Figure 6–28. Resetting the MD on Your Workstation

2. Type the command shown in Figure 6–29 to direct the memory dump across the network.

Replace *nnnnnn* with the dump storage node ID.

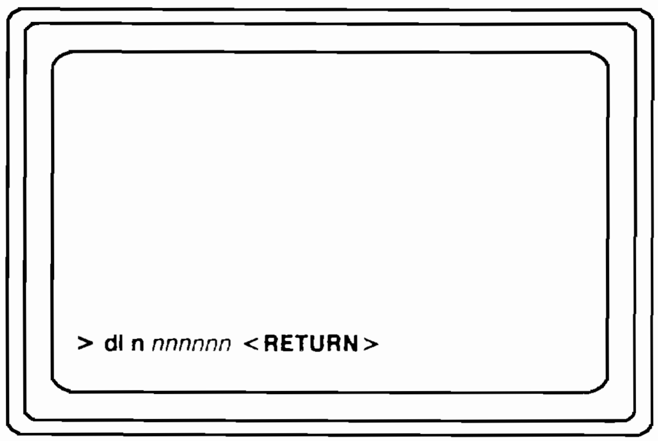


Figure 6–29. Directing the Memory Dump Across the Network

3. Start the memory dump by typing the command shown in Figure 6–30.

   Your system now displays the name of the dump file and a count of the pages dumped. Each ! represents 32 pages of memory.

   Record the *dump_file_pathname* because you'll need it in Step 4.

   The memory dump is complete when the word "Done" appears.

NOTICE: If your system hangs during the memory dump procedure, press the Reset switch and go back to Step 1.

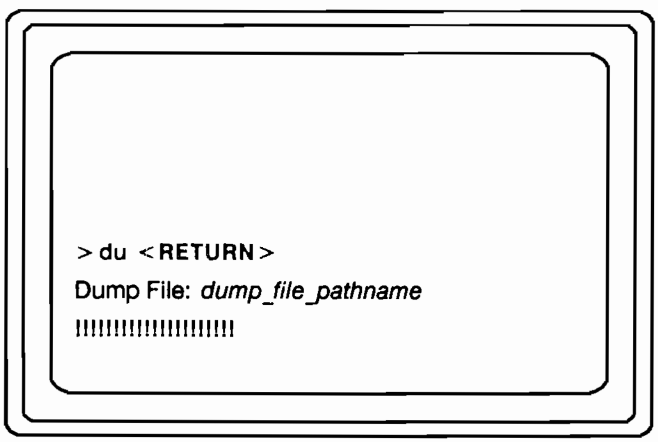


Figure 6–30. Starting the Memory Dump

4. Go to the dump storage node and copy the dump file onto a floppy diskette or cartridge tape by typing a command as follows:

   For a floppy diskette drive, type the command shown in Figure 6–31.

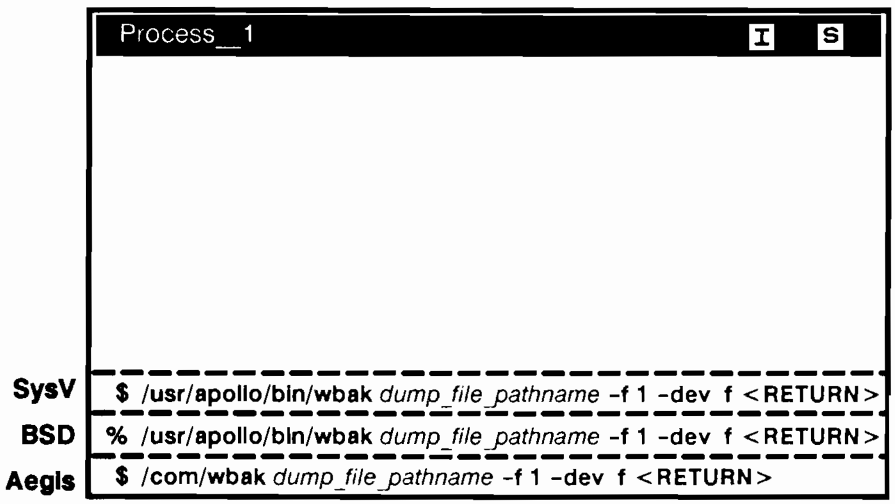


Figure 6–31. Copying the Dump File to a Floppy Diskette Drive

For a cartridge tape drive, type the command shown in Figure 6–32.

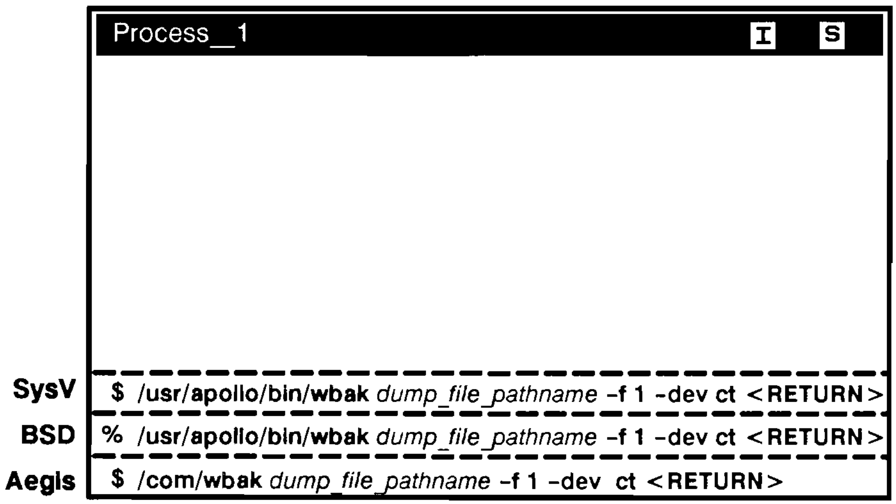


Figure 6–32. Copying the Dump File to a Cartridge Tape Drive

5. As **wbak** proceeds, your screen displays several messages similar to the ones shown in Figure 6–33.

```
Process_1                                              I   S

   Volume ID:            300_1
   Owner ID:             (no owner specified)
   File number:          1
   File section:         1
   File ID:              (no id specified)
   File written:         yy/mm/dd 11:30:30 (EDT)
Starting write:

** Floppy swap:  unit 0, volume "300_1"
   Please mount the next volume for writing.
   Press <RETURN> to continue

**  The new volume id is "300_2".
(file) "dump.27fe.01.31" written.
Write complete.

:
```

Figure 6–33. Sample ***wbak*** *Messages*

6. Copy the map associated with the dump onto a floppy diskette or cartridge tape by typing a command as follows:

- For a floppy diskette drive type the command shown in Figure 6–34.
- For a cartridge tape drive, type the command shown in Figure 6–35.

Process__1	
SysV	$ /usr/apollo/bin/wbak /sau*nn*/domain_os_map -f 2 -dev f <RETURN>
BSD	% /usr/apollo/bin/wbak /sau*nn*/domain_os_map -f 2 -dev f <RETURN>
Aegis	$ /com/wbak /sau*nn*/domain_os_map -f 2 -dev f <RETURN>

Figure 6–34. Copying the Dump Map to Floppy Diskette

Process__1	
SysV	$ /usr/apollo/bin/wbak /sau*nn*/domain_os_map -f 2 -dev ct <RETURN>
BSD	% /usr/apollo/bin/wbak /sau*nn*/domain_os_map -f 2 -dev ct <RETURN>
Aegis	$ /com/wbak /sau*nn*/domain_os_map -f 2 -dev ct <RETURN>

Figure 6–35. Copying the Dump Map to Cartridge Tape

Troubleshooting

7. When **wbak** has completed, remove the diskette or tape from the drive and label it to show the names of *both* the files you have copied to it:

   - *dump_file_pathname*

   - **/sau***nn***/domain_os_map** (Use **/sau12** for Model 400dl, 400t, and 400s workstations. Use **/sau11** for Model 425t and 433s workstations.)

8. To restart the operating system, set the Service mode switch to Normal mode (Service LED is off) and press the Reset switch as shown in Figure 6–36.

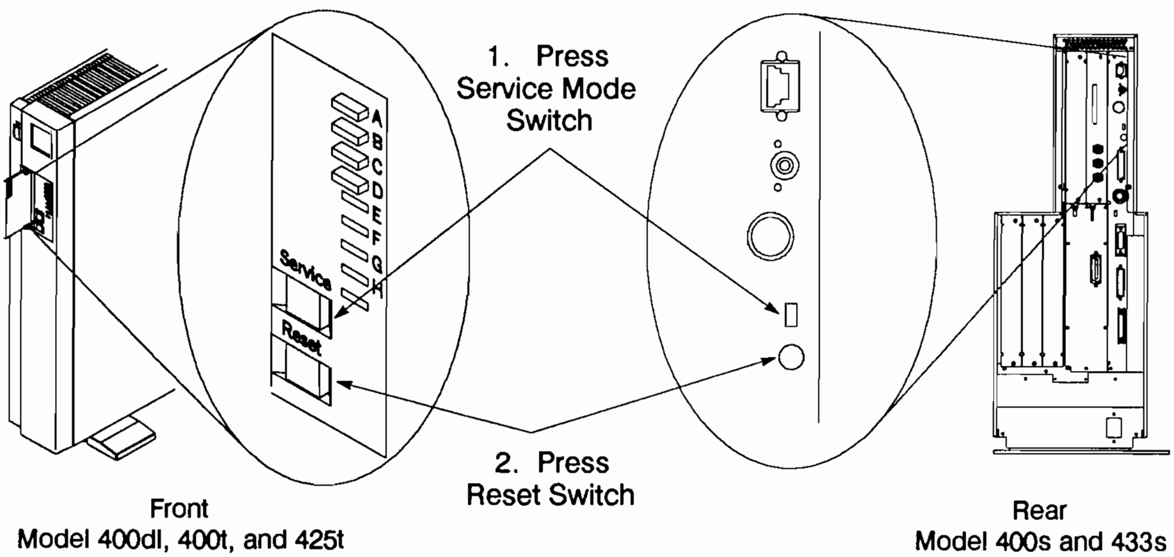


Figure 6–36. Restarting the Operating System in Normal Mode

The system now runs the diagnostics. If the workstation boots from a storage device and it needs salvaging, the system automatically executes the **salvol** program and displays the "SALVAGING BOOT VOLUME" message. When **salvol** completes, the operating system is booted.

9. When the “login:” prompt appears, go to a node in your network that contains a floppy diskette or cartridge tape drive.

10. If your system (referred to as *//problem_node*) has a Winchester disk, set your working directory as shown in Figure 6–37.

Use **/saul2** for Model 400dl, 400t, and 400s workstations.

Use **/saul1** for Model 425t and 433s workstations.

Process_1

SysV **$ cd** *//problem_node/***saunn** <**RETURN**>

BSD **% cd** *//problem_node/***saunn** <**RETURN**>

Aegis **$ wd** *//problem_node/***saunn** <**RETURN**>

Figure 6–37. Setting the Working Directory on a Node with an Internal Disk

If your system does not have a Winchester disk, set your working directory as shown in Figure 6–38 (where *//partner_node* is the name of your node's partner).

Use /**saul2** for Model 400dl, 400t, and 400s workstations.

Use /**saul1** for Model 425t and 433s workstations.

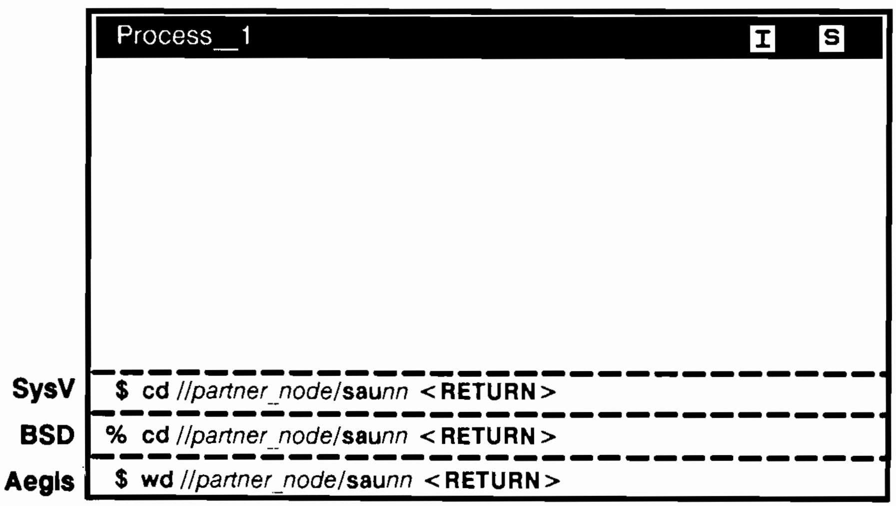


Figure 6–38. Setting the Working Directory on a Diskless Node

11. Copy the **domain_os.map** file onto the diskette or cartridge tape.

For a *diskette drive*, insert a blank, write-initialized floppy diskette into the drive and type the command shown in Figure 6–39.

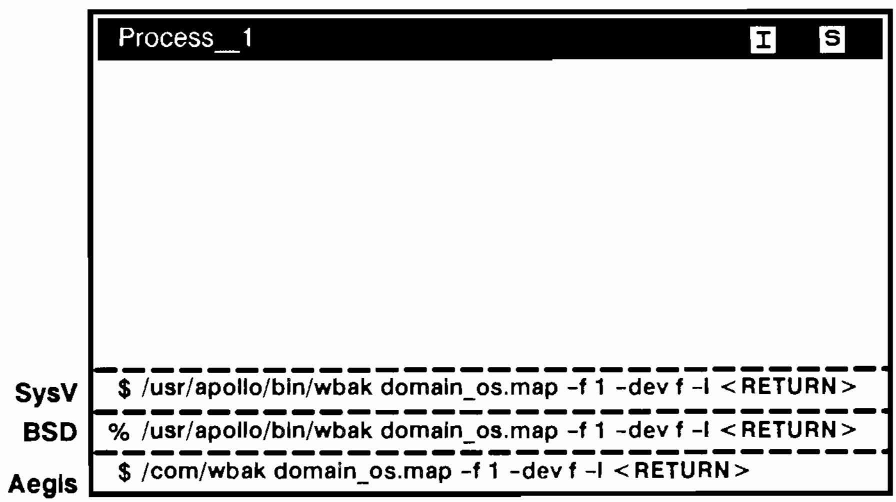


*Figure 6–39. Copying the **domain_os.map** File onto a Floppy Diskette Drive*

For a *cartridge tape drive*, insert a blank, write–enabled cartridge tape into the drive and type the command shown in Figure 6–40.

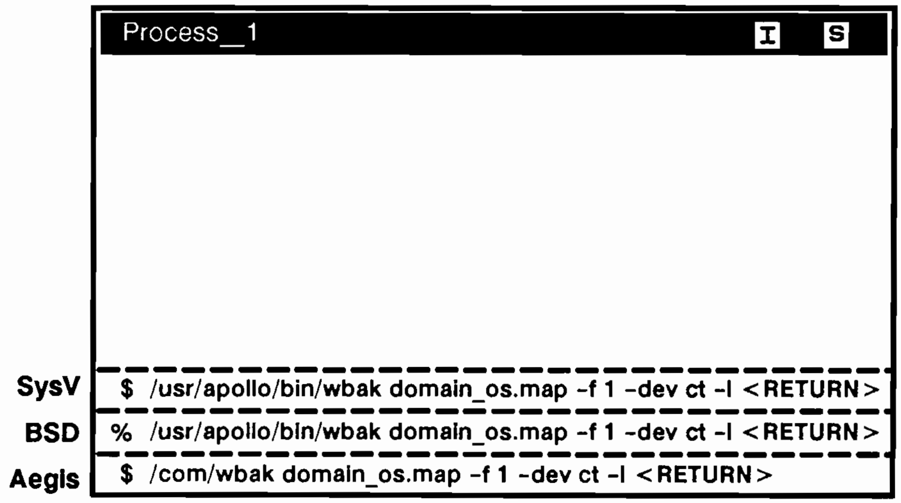


*Figure 6–40. Copying the **domain_os.map** File onto a Cartridge Tape Drive*

12. When **wbak** completes, remove the diskette or tape from the drive and label it as follows:

    /sau*nn***/domain_os.map**, *system_node_id, date*

Troubleshooting

Chapter 7
Checking the 802.3 Network

This chapter describes how to verify the operation of the 802.3 (ETHERNET) network. It includes the following information:

- Running **lcnode**
- Interpreting the **lcnode** information
- Procedures for connecting a workstation to the network

Verifying the 802.3 Network Operation

Use this section when you are installing your workstation in the 802.3 network or when you need to verify that the network is functioning properly.

NOTICE: For new installations, perform Step 1 from *another* node already installed in the *same* network as the system that you are installing.

Make sure the 802.3 network you're testing is selected as the *principal* network on the workstation that is already installed.

1. Log in at a node already installed in your network.

2. Verify the principal network of the node you chose in Step 1 by typing the **rtsvc** command shown in Figure 7–1.

3. The screen displays a listing of the networks supported on the node as shown in Figure 7–2. The principal network is the *first* network listed.

   If the 802.3 network is not the principal network on the node, select another node where the principal network is the 802.3 network, or change the principal network selection on the node (refer to Chapter 10).

Process__1

SysV	**$** /etc/rtsvc <RETURN>
BSD	**%** /etc/rtsvc <RETURN>
Aegis	**$** /com/rtsvc <RETURN>

Figure 7–1. Checking the Principal Network on Another Node

Process__1

Controller	Net ID	Services Offered
ETH802.3_AT	*nnnnnn*	Own traffic only
Ring	*nnnnnn*	Port not open

Figure 7–2. Sample Listing of Supported Networks

4. Catalog all new HP Apollo systems on the 802.3 network by typing the **ctnode** command shown in Figure 7–3.

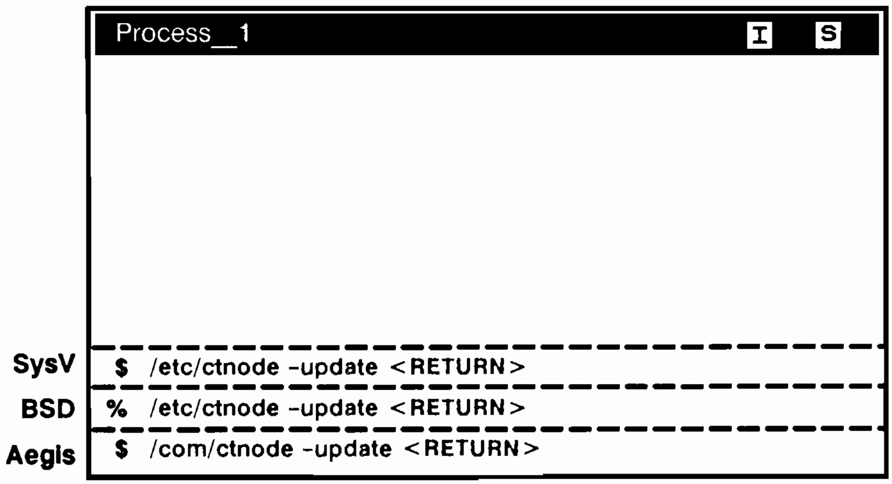


Figure 7–3. Cataloging New Systems on the 802.3 Network

5. Verify that the 802.3 network functions properly by typing the **lcnode** command shown in Figure 7–4.

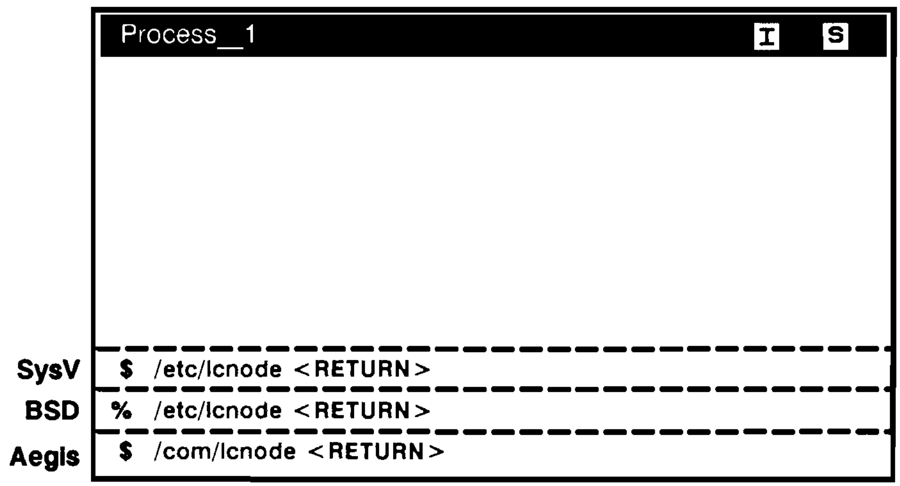


Figure 7–4. Verifying 802.3 Network Functionality

Troubleshooting

6. You will see a screen similar to the one shown in Figure 7-5.

```
Process__1                                                    I  S
$ lcnode

     The node ID of this node is nnnn.
     3 other nodes responded in random order.

Node ID       Boot time            Current Time        Entry Directory
145BF    yy/mm/dd   9:21:44   yy/mm/dd  16:06:22  //DOLLAR
1977D    yy/mm/dd  13:52:02   yy/mm/dd  16:06:13  //QUARTER
A511     yy/mm/dd  12:53:28   yy/mm/dd  16:06:07  //NICKEL
1C07     yy/mm/dd  12:03:39   yy/mm/dd  16:06:15  **DISKLESS** partner node:A511
```

Figure 7-5. Sample lcnode Response

Examine the following choices based on the response from the **lcnode** command:

- If any of the active HP Apollo systems running Domain/OS on the 802.3 network respond to the **lcnode** command, you have verified that the system can communicate over the network. This system is not the cause of network problems.

- If no active HP Apollo systems running Domain/OS on the 802.3 network respond to the **lcnode** command, log in at another workstation and enter the **ctnode** and **lcnode** commands again. If no active HP Apollo systems running Domain/OS respond on this attempt, you can be reasonably sure that the 802.3 network is not functioning properly. Tell your system administrator or contact your designated service representative.

- If any active HP Apollo systems running Domain/OS respond on the attempt from the second workstation, the system that you just installed could not accept any **lcnode** responses and may not be functioning properly. Tell your system administrator or contact your designated service representative.

- If this is the *first* workstation in your network, test the network cables to verify continuity from one end of the network to the other.

Connecting to the 802.3 Network

You can connect the system to an 802.3 network by using an *external transceiver* (thick cable) to connect to the workstation's AUI connector, or by using an *on–board (internal) transceiver* (thin cable) to connect to the workstation's LAN connector. The type of connection you use depends on the cabling used at your location.

The controller board was installed in the system unit during manufacturing, and was set for an *on–board transceiver* to use the EtherLAN LAN connector on the rear of the workstation. To connect the system to an 802.3 network by using an *on–board transceiver*, follow the directions in the "Connecting to the On–Board Transceiver" section.

However, you may have changed the setting on the controller board during your system's installation to operate the 802.3 network with the external transceiver. Follow the directions in the "Connecting to the External Transceiver" section to connect the system to an 802.3 network by using the *external transceiver* and using the EtherLAN AUI connector on the rear of the workstation.

Connecting to the External Transceiver

1. To connect the system to an 802.3 network by using the external transceiver, you'll need to install the adapter plate assembly shown in Figure 7–6. This assembly adapts the transceiver cable's D–subminiature connector to the standoffs on the system unit. Slide the threaded clips onto both ends of the adapter plate as shown in Figure 7–6.

2. Insert the screws into the clips on the adapter plate assembly as shown in Figure 7–7. Align the slots on the adapter plate with the lock posts on the network cable's connector. Slide the adapter plate onto the connector as shown in Figure 7–7.

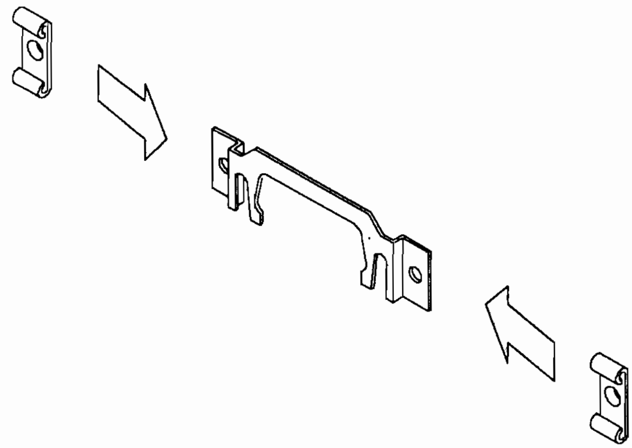


Figure 7–6. Sliding Clips onto Adapter Plate

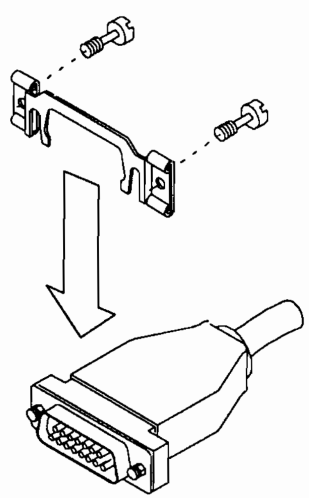


Figure 7–7. Assembling Adapter Plate to Connector

3. Connect the network cable to the system unit's AUI connector as shown in Figure 7–8. Tighten the screws with a 3-mm (1/8–inch), flat–blade screwdriver.

4. Connect the other end of the transceiver cable to the external transceiver at your site. Slide the lock closed to secure the connection.

You've now finished connecting the system to the 802.3 network by using the external transceiver.

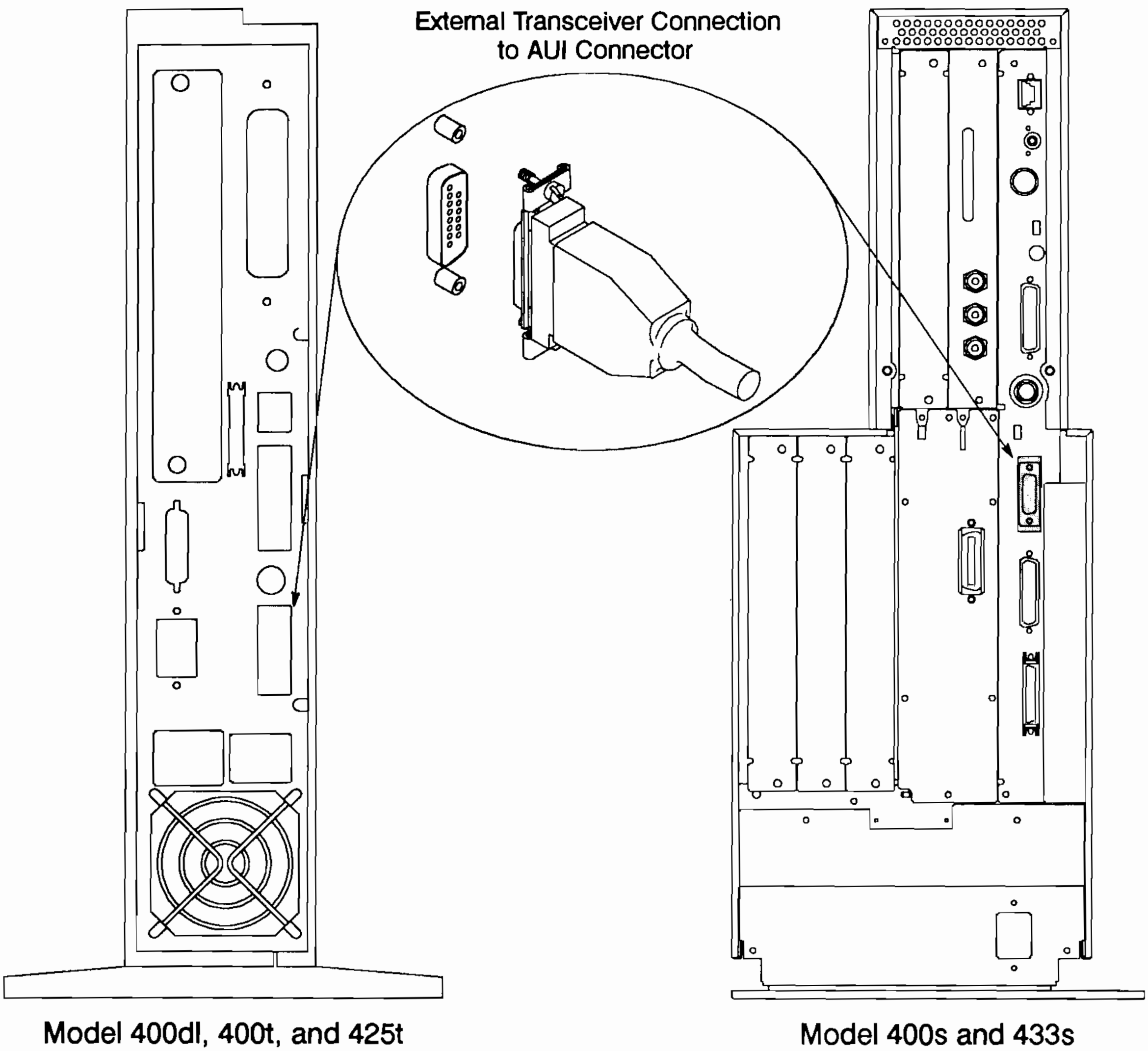


Figure 7–8. Connecting the 802.3 Cable to the AUI Connector

Connecting to the On–Board Transceiver

1. To connect the system to an 802.3 network by using an on–board transceiver, you'll need to connect the network cable to the T–connector that attaches to the system unit's EtherLAN BNC connector. Push the T–connector onto the system unit's BNC connector as shown in Figure 7–9. Turn the sleeve clockwise one quarter turn until it stops.

   If the system that you are connecting is at the end of the network cable, go to Step 3; otherwise, continue with Step 2.

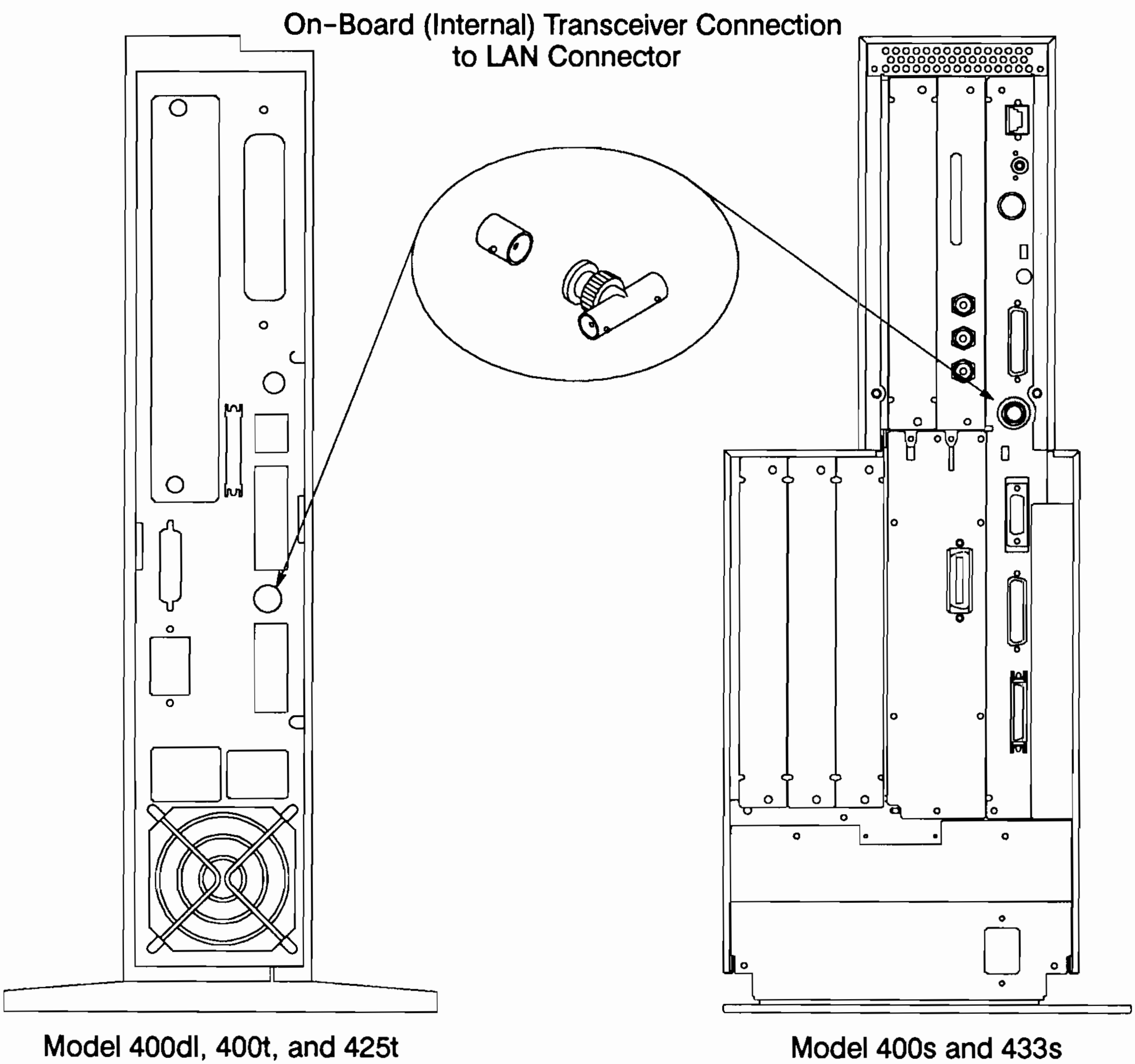


Figure 7–9. Connecting the 802.3 Cable to the LAN Connector

2. Connect the ends of the network cable onto the T–connector as shown in Figure 7–10. Turn the sleeves clockwise one quarter turn until they stop.

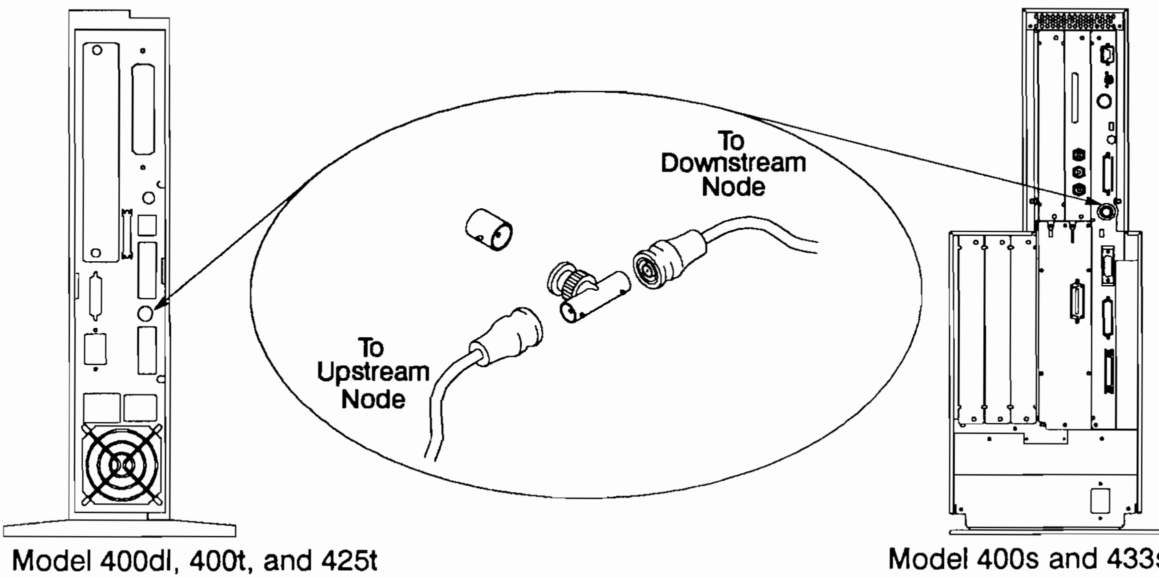


Figure 7–10. Connecting 802.3 Network Cable Ends to the T–Connector

3. Connect the network cable to the network side of the T–connector. If the system is at the end of the network segment, use a network cable terminator cap on the terminal end of the T–connector as shown in Figure 7–11.

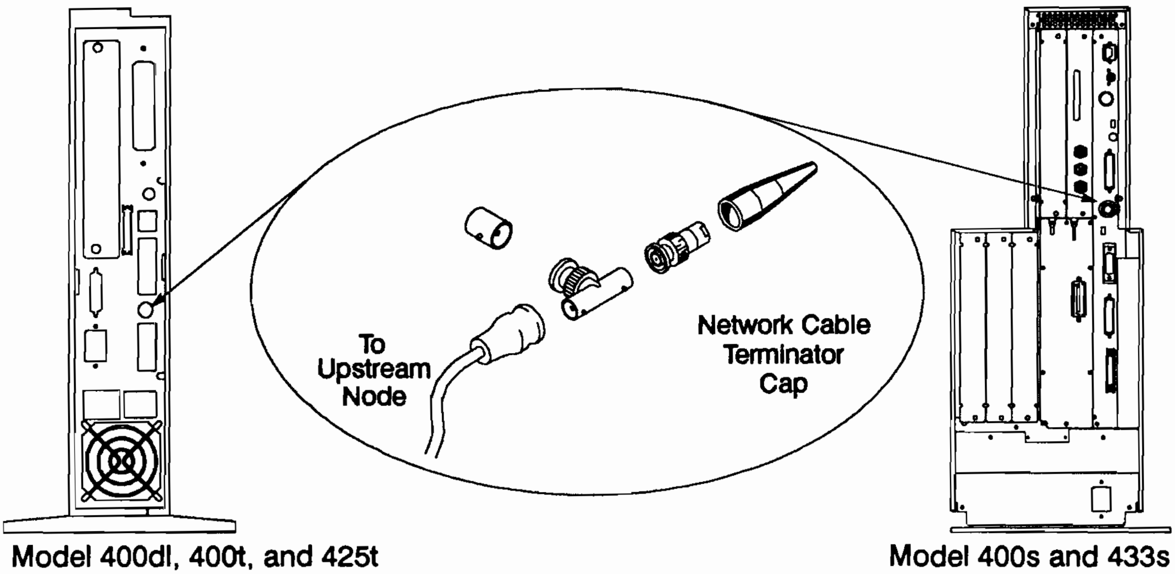


Figure 7–11. Connecting a Node at the End of an 802.3 Network Segment

You've now finished connecting the system to the 802.3 network by using the external transceiver.

Verifying the Network from the Newly Installed System

Now that you have connected your new workstation to the 802.3 network, verify that the network is functioning properly.

Use this section when you are installing your workstation in the 802.3 network or when you need to verify that the network is working properly.

1. Log in at the workstation that you have just installed in this network.

2. Catalog all new HP Apollo systems on the 802.3 network by typing the **ctnode** command shown in Figure 7–12.

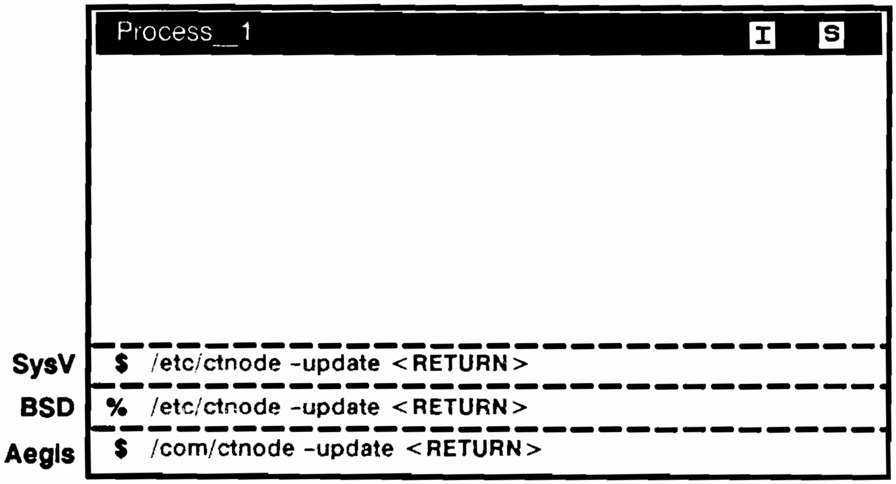


Figure 7–12. Cataloging All New Systems on the 802.3 Network

3. Verify that the 802.3 network functions properly by typing the command shown in Figure 7–13.

4. You will see a screen similar to the one shown in Figure 7–14.

Examine the following choices based on the response from the **lcnode** command:

- If any of the active HP Apollo systems running Domain/OS on the 802.3 network respond to the **lcnode** command, you have verified that the system can communicate over the network. This system is not the cause of network problems.

- If no active HP Apollo systems running Domain/OS on the 802.3 network respond to the **lcnode** command, log in at another workstation and enter the **ctnode** and **lcnode** commands again. If no active HP Apollo systems running Domain/OS respond on this attempt, you can be reasonably sure that the 802.3 network is not functioning properly. Tell your system administrator or contact your designated service representative.

- If any active HP Apollo systems running Domain/OS respond on the attempt from the second workstation, the system that you just installed could not accept any **lcnode** responses and may not be functioning properly. Tell your system administrator or contact your designated service representative.

- If this is the *first* workstation in your network, test the network cables to verify continuity from one end of the network to the other.

Process__1 I S

SysV	$ /etc/lcnode <RETURN>
BSD	% /etc/lcnode <RETURN>
Aegis	$ /com/lcnode <RETURN>

*Figure 7–13. Running **lcnode** to Verify 802.3 Network Functionality*

Process__1 I S

```
$ lcnode

    The node ID of this node is nnnn.
    3 other nodes responded in random order.

Node ID     Boot time               Current Time        Entry Directory
145BF   yy/mm/dd   9:21:44   yy/mm/dd  16:06:22  //DOLLAR
1977D   yy/mm/dd  13:52:02   yy/mm/dd  16:06:13  //QUARTER
A511    yy/mm/dd  12:53:28   yy/mm/dd  16:06:07  //NICKEL
1C07    yy/mm/dd  12:03:39   yy/mm/dd  16:06:15  **DISKLESS** partner node:A511
```

*Figure 7–14. Sample **lcnode** Response*

Chapter 8
Checking the Apollo Token Ring Network

This chapter describes how to verify the operation of the Apollo Token Ring network. It includes the following information:

- Running **probenet**
- Interpreting the **probenet** information
- Procedures for physically connecting a workstation to the network

Verifying the Apollo Token Ring Network Operation

Use this section when you are installing your workstation in the 802.3 network or when you need to verify that the network is functioning properly.

NOTICE: For new installations, perform Step 1 from *another* node already installed in the *same* network as the system that you are installing.

Make sure the Apollo Token Ring network you're testing is selected as the *principal* network on the workstation that is already installed.

1. Log in at a node already installed in your network.

2. Verify the principal network of the node you chose in Step 1 by typing the **rtsvc** command shown in Figure 8–1.

3. The screen displays a listing of the networks supported on the node as shown in Figure 8–2. The principal network is the *first* network listed.

If the Apollo Token Ring network is not the principal network on the node, select another node where the principal network is the Apollo Token Ring network, or change the principal network selection on the node (refer to Chapter 10).

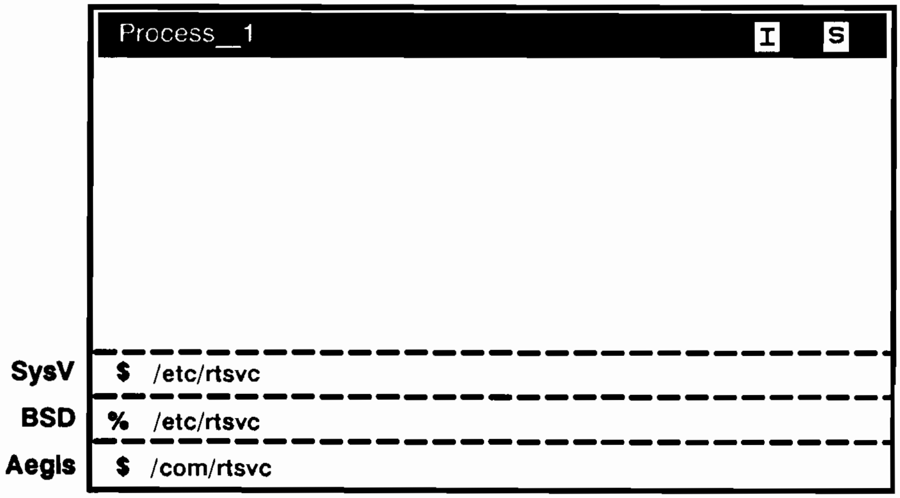


Figure 8–1. Checking the Principal Network on Another Node

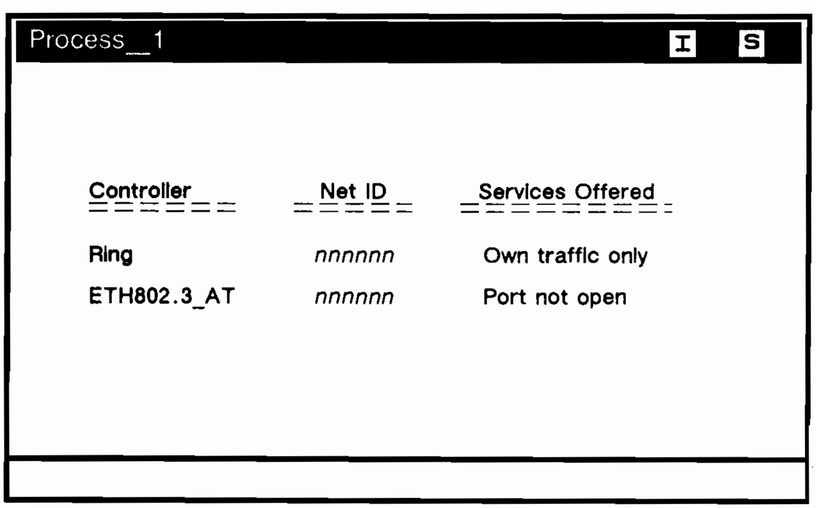


Figure 8–2. Sample Listing of Supported Networks

4. Take a base-level reading of the network. At the prompt, type the **probenet** command shown in Figure 8–3.

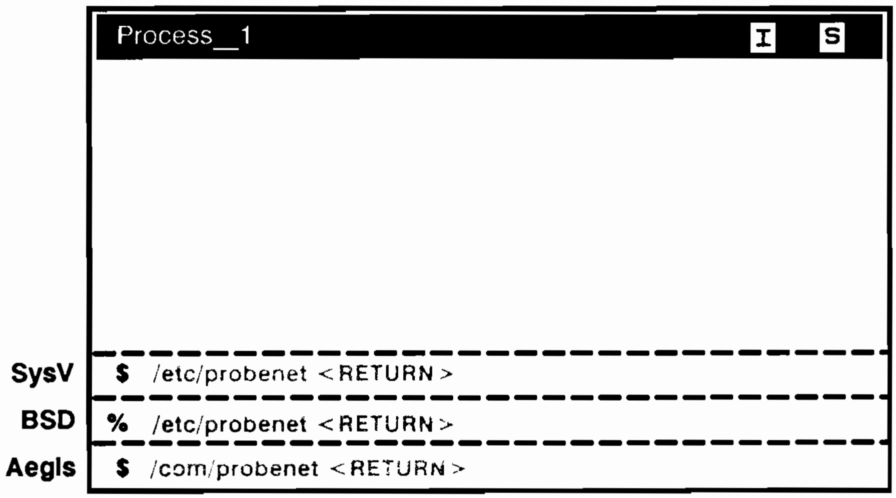


Figure 8–3. Taking a Base–Level Reading of the Network

5. You'll see a screen similar to the one shown in Figure 8–4.

   If the screen shows 0 readings in the ERRS column, the network is functioning properly.

   If the screen doesn't show 0 readings in the ERRS column, tell your system administrator or call your designated service representative.

   NOTICE: Network problems must be corrected before continuing the installation.

```
Process_1                                                    I   S

$ probenet
There are n nodes in the test.
Broadcasting 10 1024-byte packets. yy/mm/dd h:m:s # failures = n
Last ring hardware failure detected by node nnnn on yy/mm/dd at h:m

                                 MODEM
NODE  NAME    ATTEMPT   ERRS    ERRS    BIPH   ESB   TOKENS=n

nnnn  node_a  54        0       0       0      0     0   Self
nnnn  node_b  54        0       0       0      0     0
nnnn  node_c  54        0       0       0      0     0
```

Figure 8–4. Sample Network Base–Level Reading

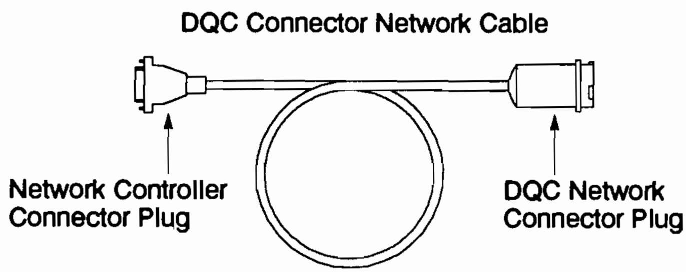
6. If the site has more than one Apollo Token Ring network, check the alternate Apollo Token Ring network by invoking the **probenet** or **lcnode** command from another node that has the alternate Apollo Token Ring network selected as its principal network.

Connecting to the Apollo Token Ring Network

This section lists the steps to connect your workstation to the Apollo Token Ring network. Follow these instructions if you are installing a new system. If you are troubleshooting a network problem with a workstation that has already been installed, follow these instructions to make sure that each step has been performed correctly.

- You can connect the workstation to the Apollo Token Ring network by using a DQC connector network cable (A1630–62024) or a BNC cable (007605). These cables are shown in Figure 8–5. Determine which type of cable you have.
- To connect the system to a DQC–100 wall receptacle, use the network connector cable (A1630–62024), and perform Steps 1 through 3.
- If you're using a BNC cable (007605) as your network connection, perform Steps 4 through 8.

1. Find the cable (A1630–62024) with the network connector plug as shown in Figure 8–5.



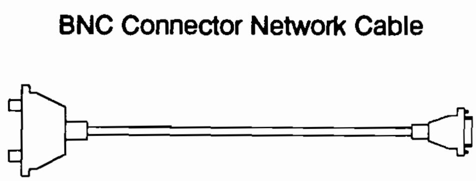


Figure 8–5. Network Cables

Troubleshooting

2. Connect the network cable to the system unit as shown in Figure 8–6. Tighten the screws with a 3-mm (1/8-inch), flat-blade screwdriver.

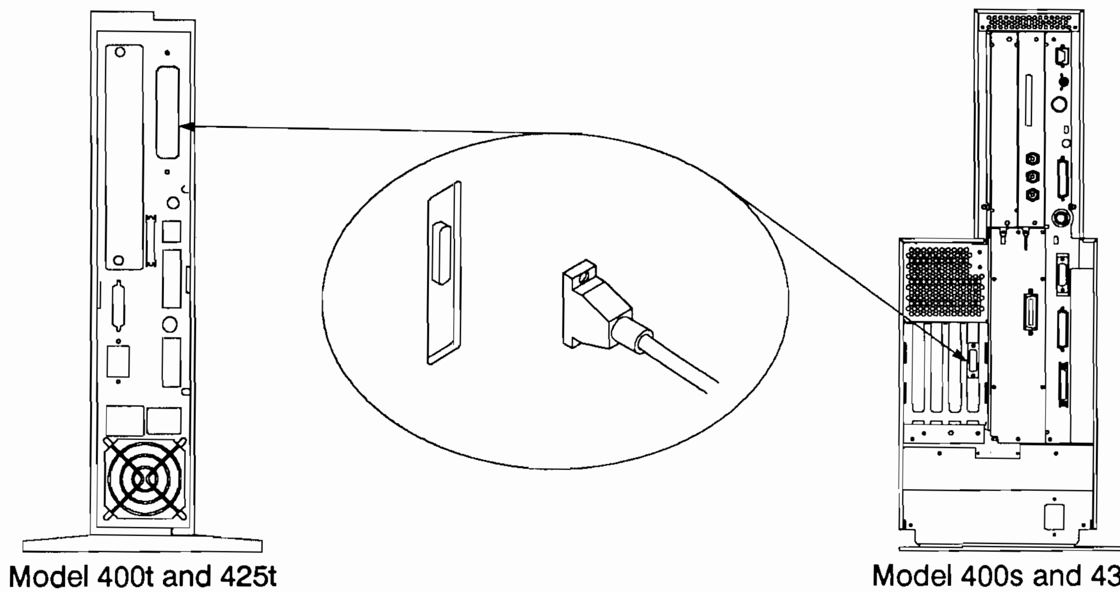


Figure 8–6. Connecting the Network Cable to the System

3. Align the cable plug notches with the connector box grooves. Turn the cable plug clockwise until it locks into place as shown in Figure 8–7.

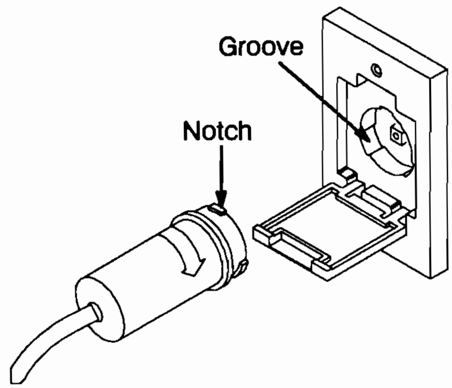


Figure 8–7. Connecting the Network Cable to the Connector Box

You've now finished connecting the system to the Apollo Token Ring network by using the network connector. If this is a new system installation, go to either Chapter 3 or 4 in this guide to start up your system.

Use Steps 4 through 8 if you are installing a workstation in the Apollo Token Ring network by using BNC connections. If you have already installed your workstation with the network connector (Steps 1 through 3), do not perform Steps 4 through 8.

If you have performed this procedure to troubleshoot a problem, go to the section entitled "Verifying the Network from the Newly Installed System" at the end of this chapter to make sure that the workstation can communicate over the network properly.

4. If you're using a cable with BNC connectors (007605), as shown in Figure 8–8, to connect the system to the network, tell the system administrator that you're about to switch the workstation loop out of the network.

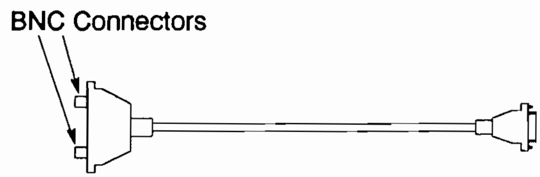


Figure 8–8. Network Cable with BNC Connectors

5. Switch the system loop out of the network as shown in Figure 8–9.

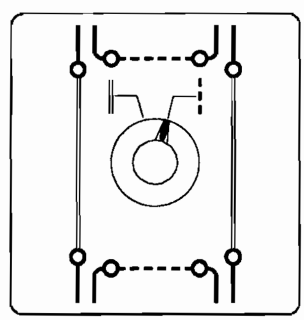


Figure 8–9. Switching the System Loop out of the Network

6. Connect the network cable to the system unit as shown in Figure 8–10. Tighten the screws with a 3-mm (1/8–inch), flat-blade screwdriver.

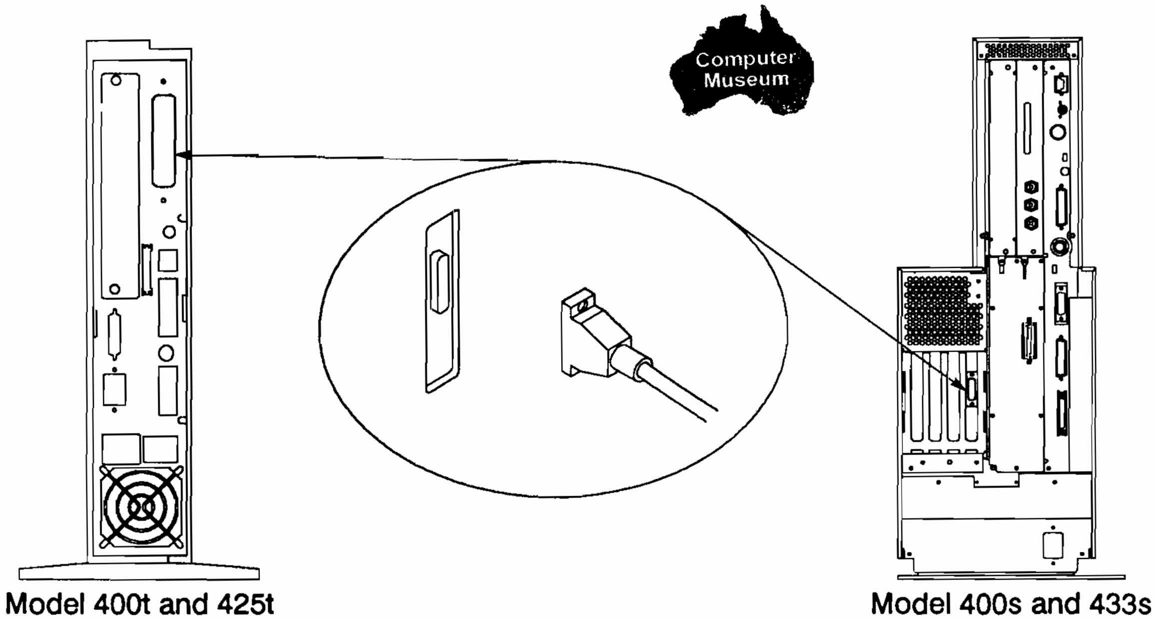


Figure 8–10. Connecting the Network Cable to the System

7. Disconnect the adapter between the cables in your network labeled IN and OUT as shown in Figure 8–11.

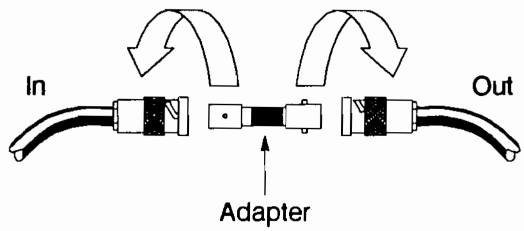


Figure 8–11. Disconnecting the Adapter Between Cables

8. Connect the IN cable to the BNC connector marked IN and connect the OUT cable to the OUT connector as shown in Figure 8–12.

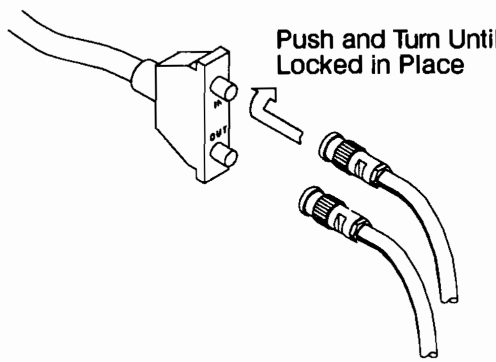


Figure 8–12. Connecting Cables to the BNC Connector

You've now finished connecting the system to the Apollo Token Ring network by using the network connector.

Switch the workstation back into the network and go to either Chapter 3 or 4 in this guide to start up your system.

If you have performed this procedure to troubleshoot a problem, go to the next section entitled "Verifying the Network from the Newly Installed System" to make sure that the workstation can communicate over the network properly.

Verifying the Network from the Newly Installed System

Now that you have connected your new workstation to the Apollo Token Ring network, verify that the network is functioning properly.

1. Log in at the workstation that you have just installed in this network.

2. Take a base-level reading of the network status to find out if your network is operating properly. Make sure that no other system is currently running **probenet**. Type the command shown in Figure 8–13.

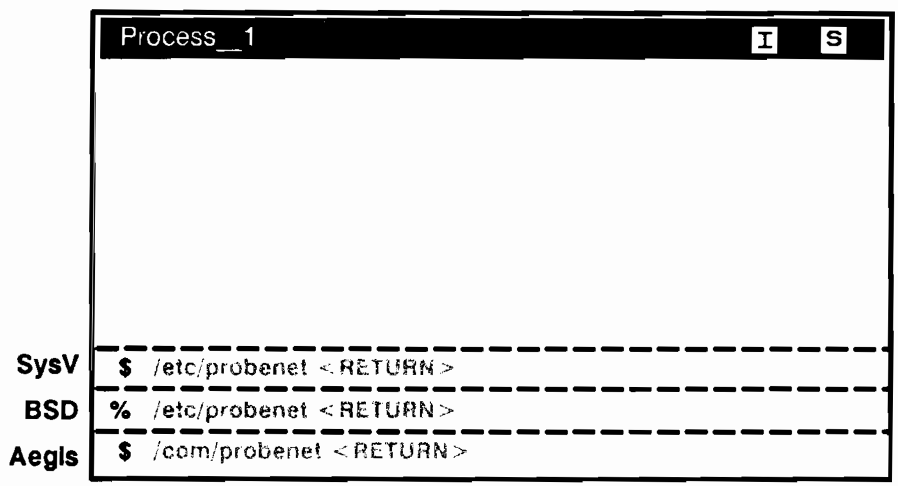


Figure 8–13. Taking a Base–Level Reading of the Network

3. You will see a screen similar to the one shown in Figure 8–14.

Examine the following choices based on the response from the **probenet** command:

- If you see a screen similar to the one shown in Figure 8–14, the system is operating properly on the network.
- If the screen doesn't show 0 readings in the ERRS column, tell your system administrator or call your designated service representative.
- If the workstation you have just installed is the *first* workstation in your network, you *must* test the network cables to verify that there is continuity from one end of the network to the other.

```
Process__1                                                   I   S

$ probenet
There are n nodes in the test.
Broadcasting 10 1024-byte packets. yy/mm/dd h:m:s # failures =  n
Last Biph hardware failure detected by node nnnn on yy/mm/dd at h:m
                                    MODEM
NODE   NAME  ATTEMPT  ERRS   ERRS   BIPH   ESB   TOKENS=n

45F2   TWE    54       0      0      0      0      0     Self
2576   DLE    54       0      0      0      0      0
190A   DEE    54       0      0      0      0      0
```

Figure 8–14. Sample ***probenet*** *Response*

Chapter 9
Checking the 802.5 Network

This chapter describes how to verify the operation of the 802.5 (IBM Token Ring) network. It includes the following information:

- Running **lcnode**
- Interpreting the **lcnode** information
- Procedures for connecting a workstation to the network

Verifying the 802.5 Network Operation

Use this section when you are installing your workstation in the 802.5 network or when you need to verify that the network is working properly.

NOTICE: For new installations, perform Step 1 from *another* node already installed in the *same* network as the system you are installing.

Make sure the 802.5 network you're testing is selected as the *principal* network on the workstation that is already installed.

1. Log in at a node already installed on your network.

2. Verify the principal network of the node you chose in Step 1. At the prompt, type the **rtsvc** command as shown in Figure 9–1.

3. The screen displays a listing of the networks supported on the node as shown in Figure 9–2. The principal network is the *first* network listed.

   If the 802.5 network is not the principal network on the node, select another node where the principal network is the 802.5 network, or change the principal network selection on the node (refer to Chapter 10).

```
Process_1
```

SysV	$ /etc/rtsvc <RETURN>
BSD	% /etc/rtsvc <RETURN>
Aegis	$ /com/rtsvc <RETURN>

Figure 9–1. Checking the Principal Network on Another Node

```
Process_1
```

Controller	Net ID	Services Offered
802.5_AT	*nnnnnn*	Own traffic only
Ring	*nnnnnn*	Port not open

Figure 9–2. Sample Listing of Supported Networks

4. Catalog all new HP Apollo systems on the 802.5 network by typing the command shown in Figure 9–3.

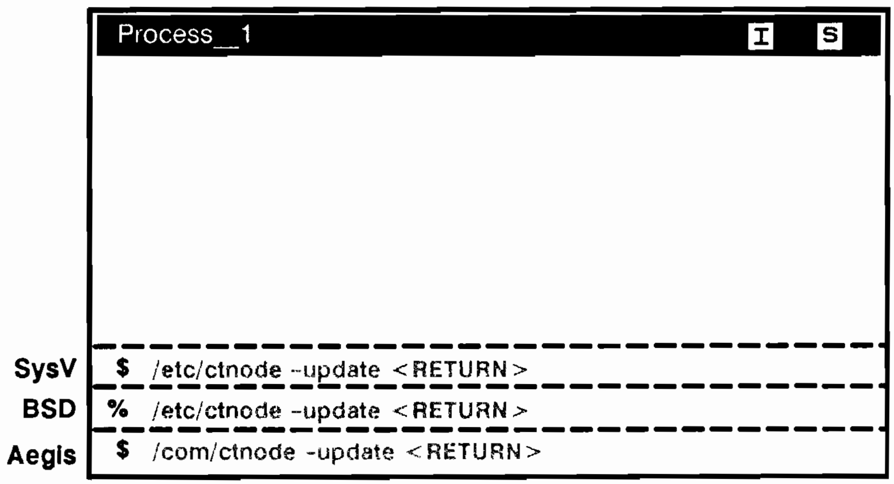


Figure 9–3. Cataloging New Systems on the 802.5 Network

5. Verify that the 802.5 network functions properly by typing the **lcnode** command shown in Figure 9–4.

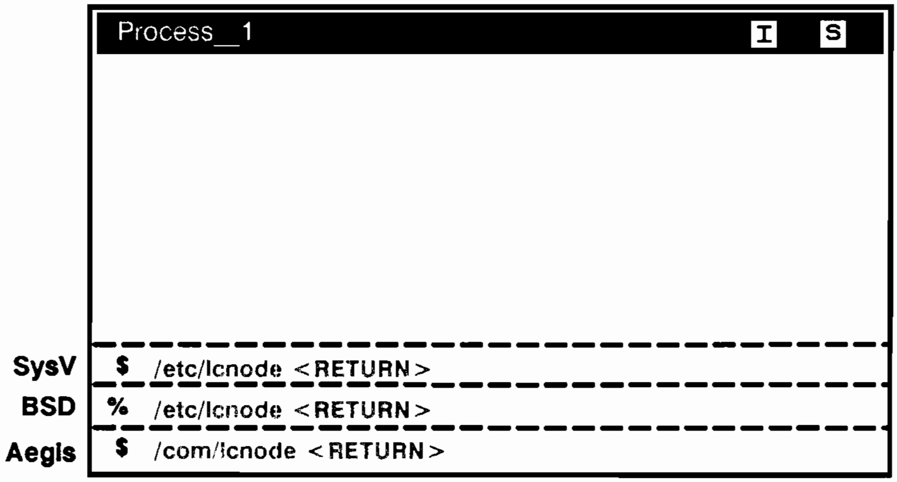


Figure 9–4. Verifying 802.5 Network Functionality

6. You will see a screen similar to the one shown in Figure 9-5.

Examine the following choices based on the response from the **lcnode** command:

- If any of the active HP Apollo systems running Domain/OS on the 802.5 network respond to the **lcnode** command, you have verified that the system can communicate over the network. This system is not the cause of network problems.
- If no active HP Apollo systems running Domain/OS on the 802.5 network respond to the **lcnode** command, log in at another workstation and enter the **ctnode** and **lcnode** commands again. If no active HP Apollo systems running Domain/OS respond on this attempt, you can be reasonably sure that the 802.5 network is not functioning properly. Tell your system administrator or contact your designated service representative.
- If any active HP Apollo systems running Domain/OS respond on the attempt from the second workstation, the system that you just installed could not accept any **lcnode** responses and may not be functioning properly. Tell your system administrator or contact your designated service representative.
- If this is the *first* workstation in your network, test the network cables to verify continuity from one end of the network to the other.

```
Process_1                                                    I  S
$ lcnode

     The node ID of this node is nnnn.
     3 other nodes responded.

Node ID       Boot time            Current Time       Entry Directory
145BF   yy/mm/dd   9:21:44   yy/mm/dd  16:06:22  //DOLLAR
1977D   yy/mm/dd  13:52:02   yy/mm/dd  16:06:13  //QUARTER
A511    yy/mm/dd  12:53:28   yy/mm/dd  16:06:07  //NICKEL
1C07    yy/mm/dd  12:03:39   yy/mm/dd  16:06:15  **DISKLESS** partner node:A511
```

*Figure 9–5. Sample **lcnode** Response*

Connecting to the 802.5 Network

You can connect to the 802.5 network by using D9 or RJ11 connections. The type of installation depends on the type of cable and the wall plate or Multistation Access Unit (MAU) connector.

Perform the steps in the "Connecting with D9 Connectors" section to connect the system to an 802.5 network by using a cable with D-subminiature and 802.5 network D9 connectors. Perform the steps in the "Connecting with RJ11 Connectors" section to connect the system to an 802.5 network by using the Type 3 cable with RJ11 connectors.

Connecting with D9 Connectors

1. To connect the system to an 802.5 network by using a cable with D-subminiature and 802.5 network D9 connectors, go to the back of the system unit and insert the D-subminiature connector into the network controller as shown in Figure 9–6. Tighten the two screws with a 3-mm (1/8-inch), flat-blade screwdriver.

2. Insert the D9 connector into the wall plate or MAU as shown in Figure 9–6.

You've now finished connecting the system to the 802.5 network.

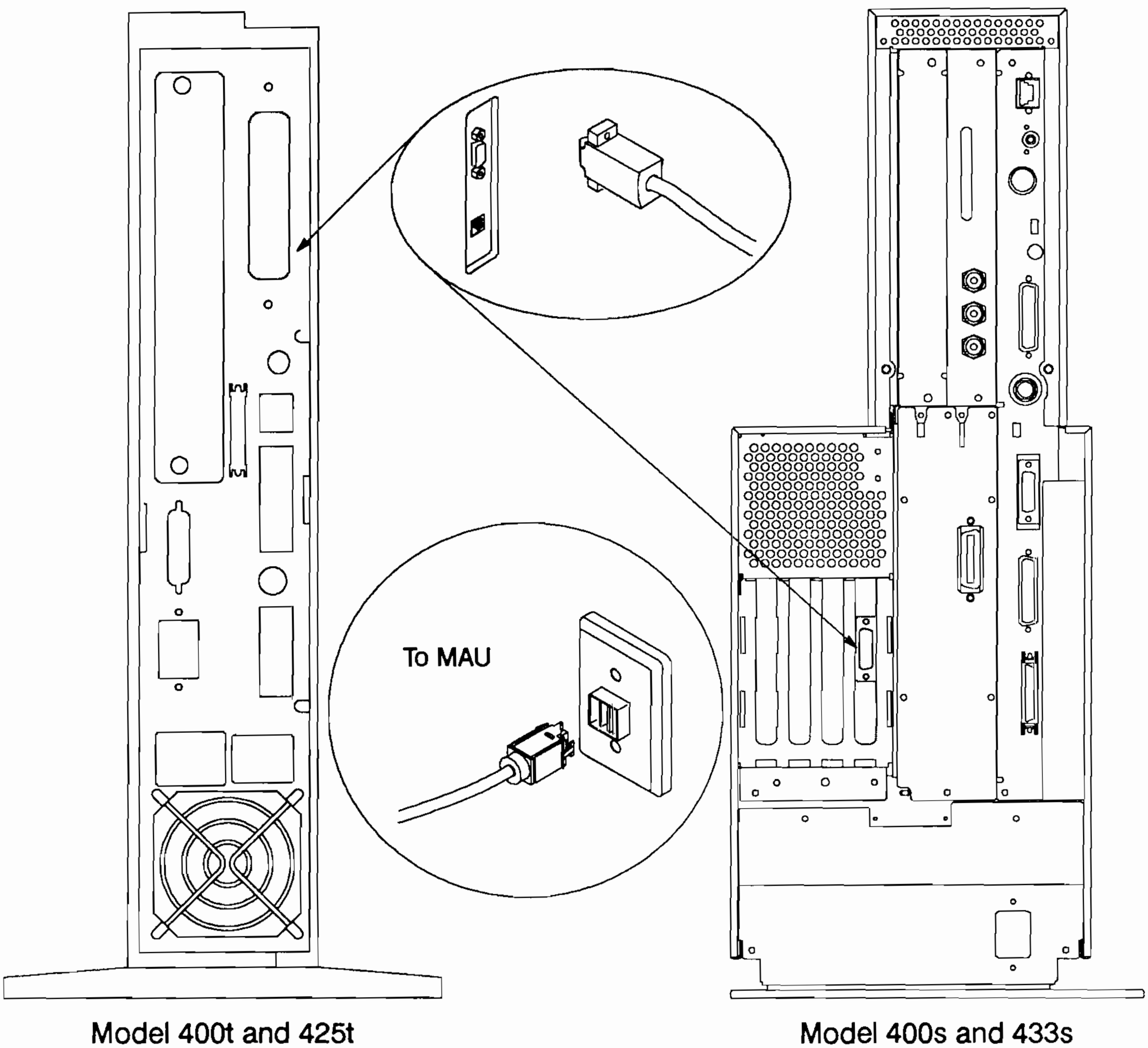


Figure 9–6. Using the D9 Connector

Connecting with RJ11 Connectors

1. To connect the system to an 802.5 network by using the Type 3 cable with RJ11 connectors, squeeze the RJ11 connector's spring clip and insert it into the face plate at the rear of the network controller as shown in Figure 9–7. Release the spring clip to complete the connection.

2. Squeeze the RJ11 connector's spring clip and insert it into the face plate on the wall plate or the MAU. Release the spring clip to complete the connection.

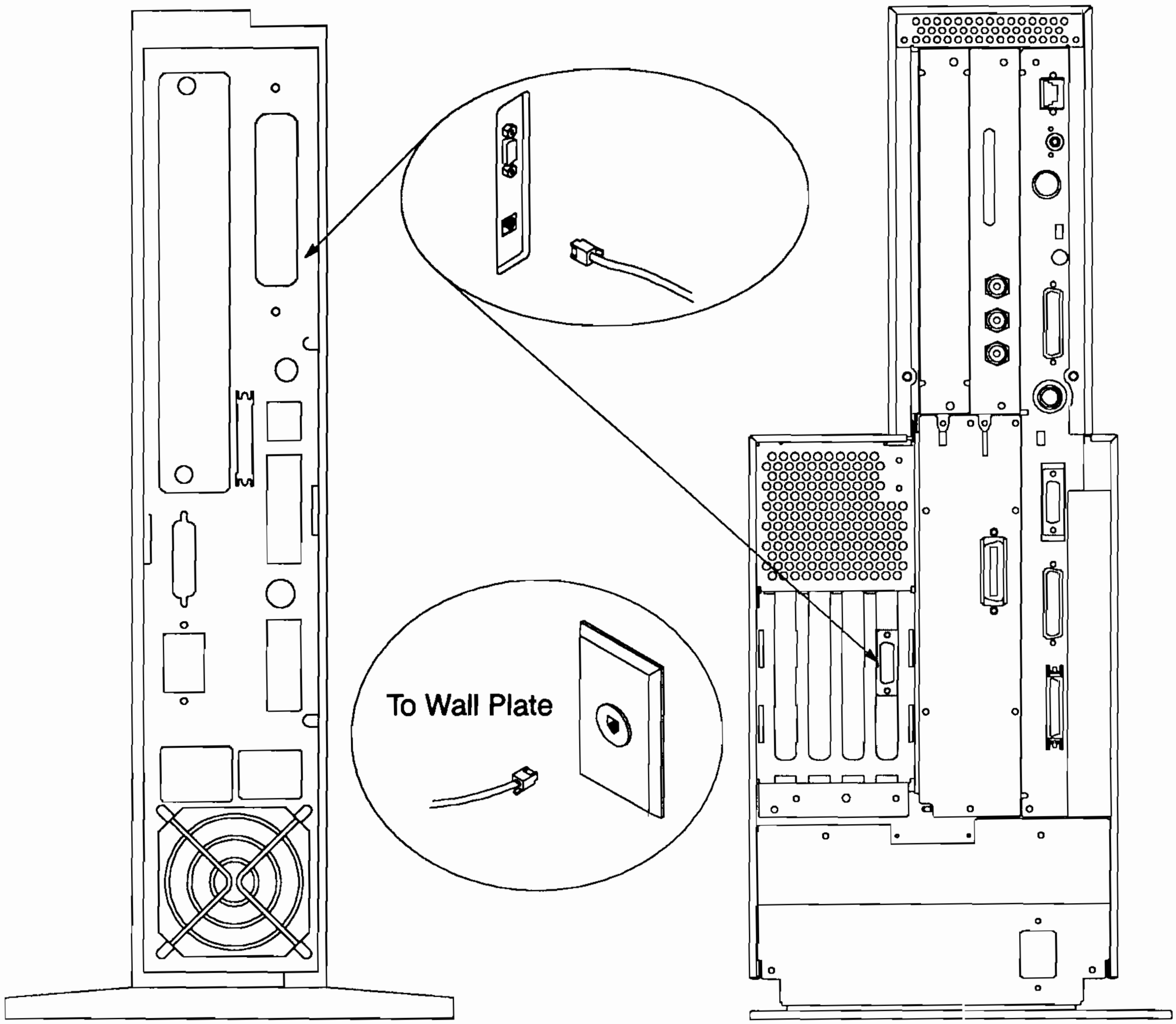


Figure 9–7. Connecting with RJ11 Connectors

Verifying the Network from the Newly Installed System

Now that you have connected your new workstation to the 802.5 network, verify that the network is functioning properly.

Use this section when you are installing your workstation in the 802.5 network or when you need to verify that the network is working properly.

1. Log in at the workstation that you have just installed in this network.

2. Catalog all new HP Apollo systems on the 802.5 network by typing the command shown in Figure 9–8.

```
Process__1                                   I  S

SysV   $ /etc/ctnode -update <RETURN>
BSD    % /etc/ctnode -update <RETURN>
Aegis  $ /com/ctnode -update <RETURN>
```

Figure 9–8. Cataloging New Systems on the 802.5 Network

3. Verify that the 802.5 network functions properly by typing the **lcnode** command shown in Figure 9–9.

4. You will see a screen similar to the one shown in Figure 9–10.

Examine the following choices based on the response from the **lcnode** command:

- If any of the active HP Apollo systems running Domain/OS on the 802.5 network respond to the **lcnode** command, you have verified that the system can communicate over the network. This system is not the cause of network problems.
- If no active HP Apollo systems running Domain/OS on the 802.5 network respond to the **lcnode** command, log in at another workstation and enter the **ctnode** and **lcnode** commands again. If no active HP Apollo systems running Domain/OS respond on this attempt, you can be reasonably sure that the 802.5 network is not functioning properly. Tell your system administrator or contact your designated service representative.
- If any active HP Apollo systems running Domain/OS respond on the attempt from the second workstation, the system that you just installed could not accept any **lcnode** responses and may not be functioning properly. Tell your system administrator or contact your designated service representative.
- If this is the *first* workstation in your network, test the network cables to verify that there is continuity from one end of the network to the other.

```
Process_1

SysV   $ /etc/lcnode <RETURN>
BSD    % /etc/lcnode <RETURN>
Aegis  $ /com/lcnode <RETURN>
```

Figure 9–9. Verifying the 802.5 Network Functionality

```
Process_1
$ lcnode

      The node ID of this node is nnnn.
      3 other nodes responded.

Node ID       Boot time          Current Time       Entry Directory
145BF   yy/mm/dd   9:21:44   yy/mm/dd  16:06:22  //DOLLAR
1977D   yy/mm/dd  13:52:02   yy/mm/dd  16:06:13  //QUARTER
A511    yy/mm/dd  12:53:28   yy/mm/dd  16:06:07  //NICKEL
1C07    yy/mm/dd  12:03:39   yy/mm/dd  16:06:15  **DISKLESS** partner node:A511
```

*Figure 9–10. Sample **lcnode** Response*

Chapter 10
Starting Up in Service Mode

This chapter describes the steps to start up your system in Service mode. You'll operate in Service mode when your service representative instructs you to run some diagnostic tests and various utility programs. When the workstation is in Service mode you do not see the normal Domain/OS system prompt. Instead, you see the Mnemonic Debugger (MD) ">" prompt.

This chapter includes the following information:

- Selecting a primary network in Service mode
- Starting up a *disked* workstation in Service mode
- Starting up a *diskless* workstation in Service mode
- Configuring your workstation in Service mode to run Domain/OS

Selecting the Primary Network in Service Mode

Follow these steps to start up your workstation in Service mode so that you can select the primary network. These steps assume that the system is powered on in Normal mode (Service LED is off).

1. Before the system finishes the self tests, press the Service mode switch to set the system to Service mode (the Service LED on the system's front panel lights). Then press the Reset switch as shown in Figure 10–1. Press the <RETURN> key until the screen displays the Mnemonic Debugger (MD) ">" prompt.

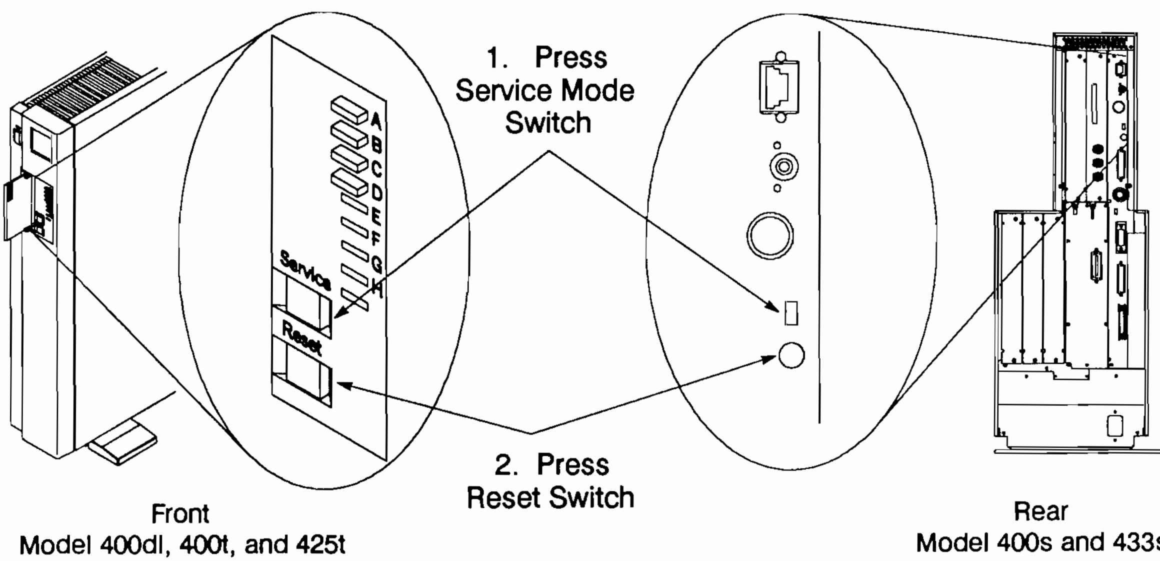


Figure 10–1. Starting a Workstation in Service Mode

The screen prompt appears as shown in Figure 10–2.

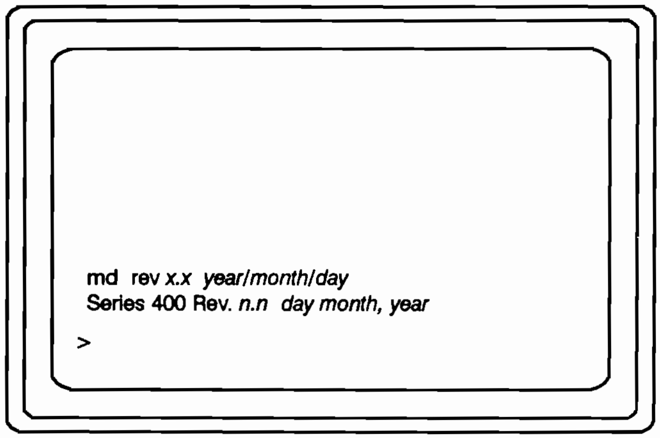


Figure 10–2. Sample Screen Prompt

2. Use the **pnet** command to select the primary network for the workstation. You have a choice of three networks: the 802.3 network, the Apollo Token Ring network, or the 802.5 network. In addition, if you have a Model 400s or 433s you may have up to two network controllers to choose from for each of the token ring networks (Apollo Token Ring and 802.5).

NOTICE: If you are selecting a primary network for a diskless workstation, select the same primary network used by the partner node.

3. Enter the **pnet** command as shown in Figure 10–3. Substitute one of the following values for *x* as follows:

pnet e <RETURN>	(for the 802.3 network)
pnet r <RETURN>	(for the Apollo Token Ring network)
pnet t <RETURN>	(for the 802.5 network)

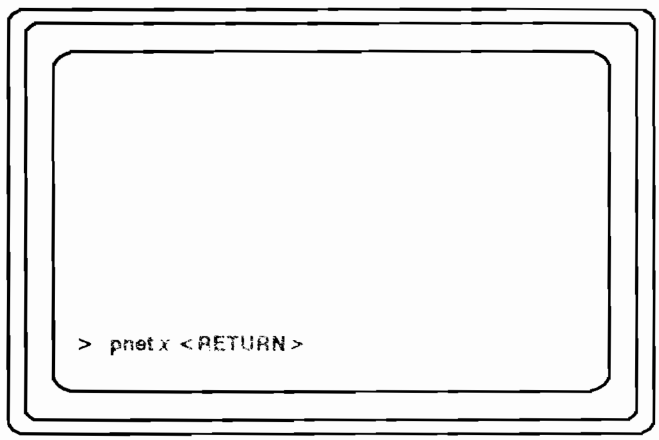


Figure 10–3. Selecting the Primary Network

4. If you are selecting either the Apollo Token Ring network or the 802.5 network and the workstation has more than one controller board for that network, then you must also indicate which is the primary network controller board when you enter the **pnet** command.

Enter 0 or 1 for *n*, as shown in Figure 10–4. (If you do not enter 0 or 1, the default value is 0.)

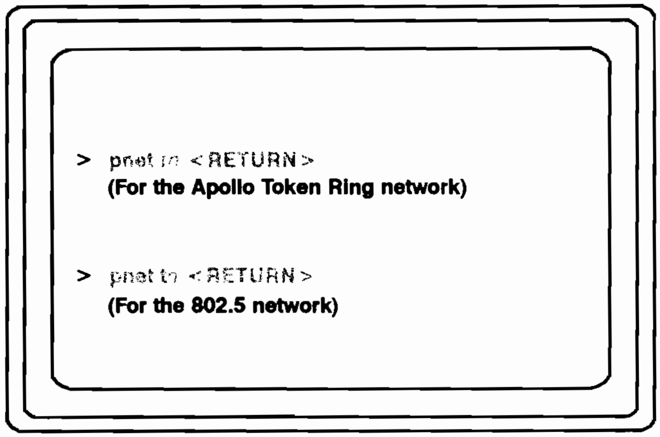


Figure 10–4. Selecting the Primary Network Controller Board

5. Use the **pnet** command to confirm the workstation's current primary network.

Figure 10–5 shows using the **pnet** command to confirm that the primary network was previously set to controller 1 for the Apollo Token Ring network.

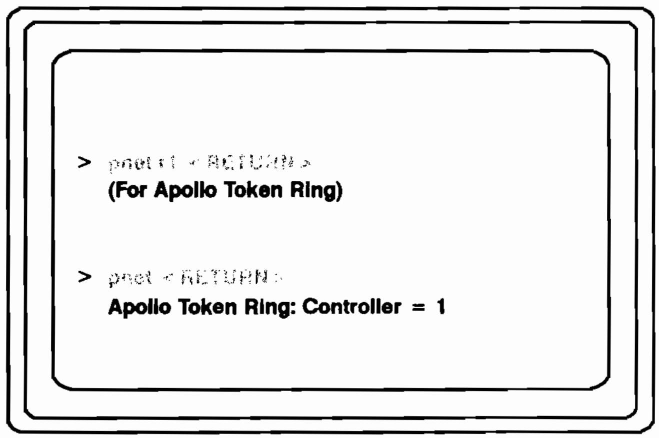


Figure 10–5. Confirming the Primary Network

Figure 10–6 shows using the **pnet** command to confirm that the primary network was previously set to the 802.3 network. Because there is never more than one 802.3 network controller board in a Series 400 workstation the default confirmation is for controller 0.

When there is only one network controller board installed for either the Apollo Token Ring network or the 802.5 network the default confirmation is for that network's controller 0.

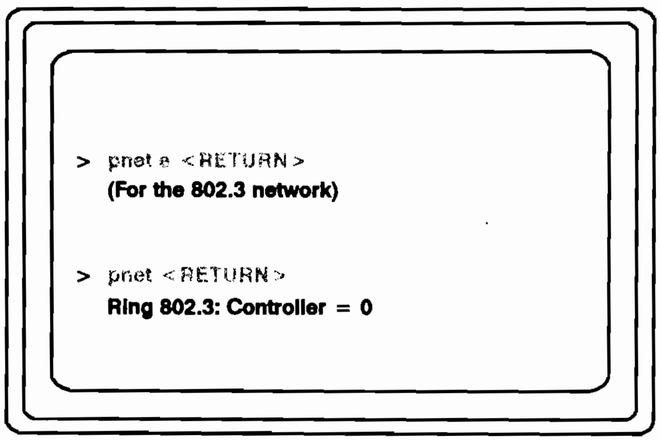


Figure 10–6. Confirming the Primary Network

6. Press the Service mode switch to set the system to Normal mode (Service LED goes off). Press the Reset switch to reboot the system.

Starting Up a Disked Workstation in Service Mode

Follow these steps to start up your disked workstation in Service mode. These steps assume that the system is powered on in Normal mode (Service LED is off).

1. Before the system finishes the self tests, press the Service mode switch to set the system to Service mode (the Service LED on the system's front panel lights). Then press the Reset switch as shown in Figure 10–7. Press the [illegible] key until the screen displays the Mnemonic Debugger (MD) ">" prompt.

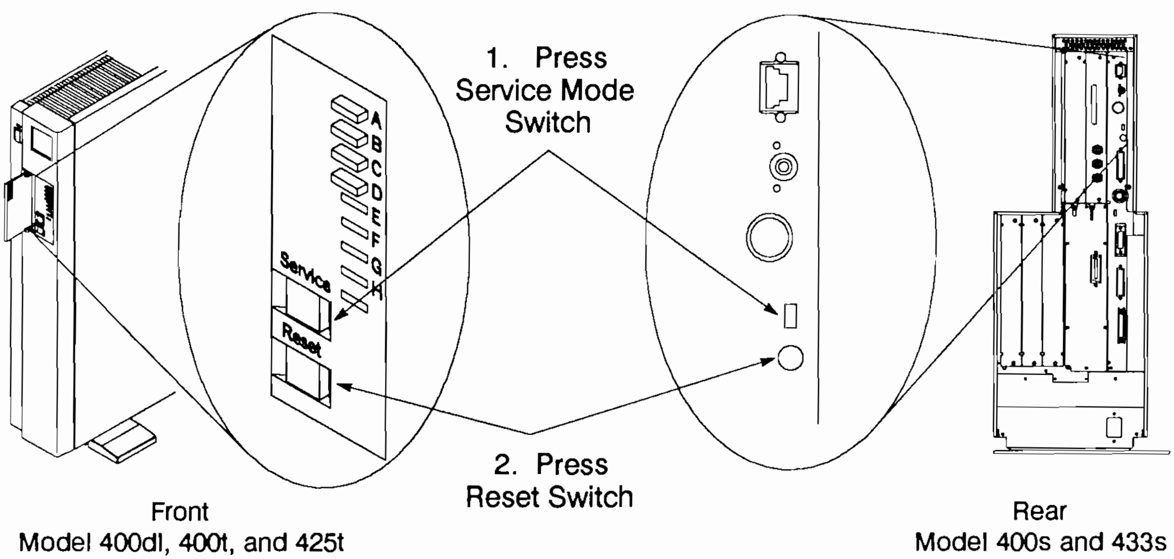


Figure 10–7. Starting a Disked Workstation in Service Mode

The screen prompt appears as shown in Figure 10–8.

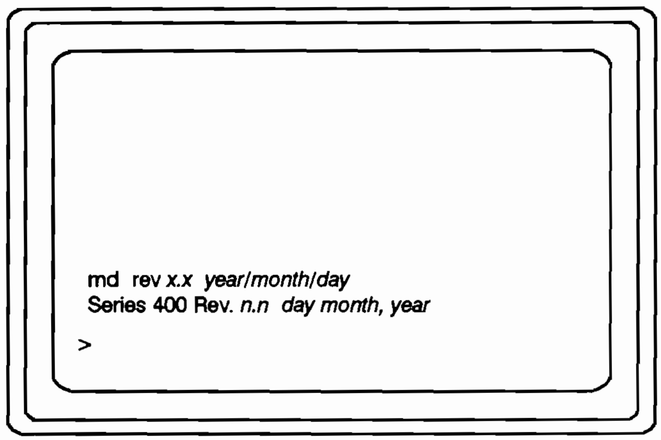


Figure 10–8. Sample Screen Prompt

2. If you have not already done so, follow the procedure in “Selecting the Primary Network in Service Mode” in this chapter to choose the 802.3 network, the Apollo Token Ring network, or the 802.5 network as the workstation’s primary network.

If you ever need to do so, use the command shown in Figure 10–9 to boot the operating system from the Winchester disk while in Service mode. This may be necessary if you are unable to boot the system in Normal mode.

```
di sdn:n
```

where:

sd specifies the SCSI disk drive

n:n specifies the drive's *target ID:unit number*

When you use the **di** command to specify another load device, you can specify any of the following valid options:

c the system's cartridge tape (defaults to the highest device ID)

d any system disk (defaults to the highest device ID)

sd*n:n*
a specific SCSI disk (when there are more than one present, specify which one to use)

st *n:n*
a specific SCSI tape device (when there are more than one present, specify which one to use)

NOTICE: The *unit number* specified in the **di** command is always 0.

For example, if you wish to boot from a Winchester disk that is configured as SCSI target ID 5, you would enter the command:

```
di sd5:0
```

If you receive an error message, refer to Table 5–6.

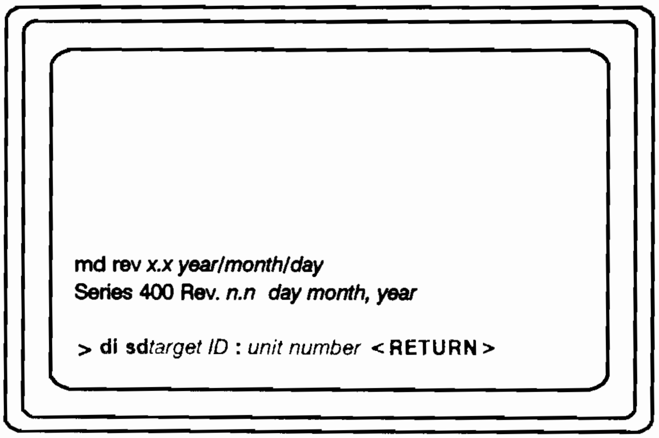


Figure 10–9. Booting from the Disk While in Service Mode

Starting Up a Diskless Workstation in Service Mode

Follow these steps to start up your diskless workstation in Service mode. These steps assume that the system is powered on in Normal mode (Service LED is off).

1. Before the system finishes the self tests, press the Service mode switch to set the system to Service mode (the Service LED on the system's front panel lights). Then press the Reset switch as shown in Figure 10–10. Press the <RETURN> key until the screen displays the Mnemonic Debugger (MD) ">" prompt.

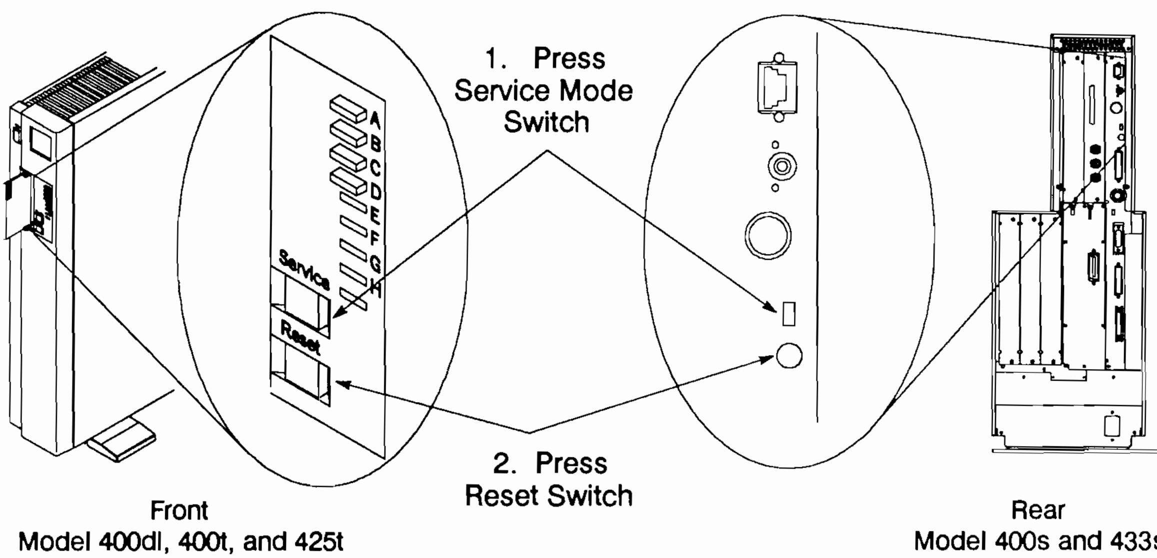


Figure 10–10. Starting Up a Diskless Workstation in Service Mode

The screen prompt appears as shown in Figure 10–11.

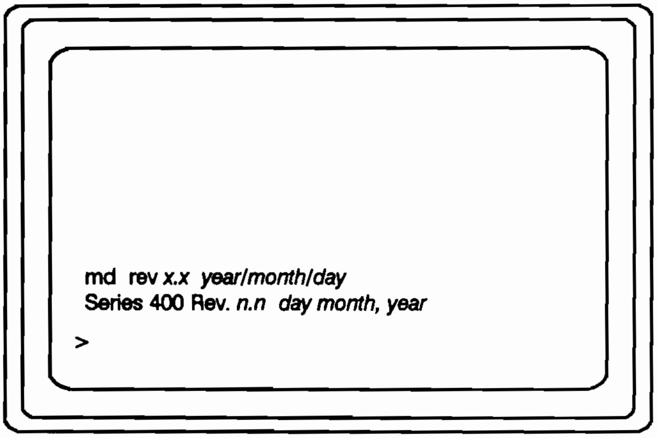


Figure 10–11. Sample Prompt

If you have not already done so, follow the procedure in "Selecting the Primary Network in Service Mode" in this chapter to choose the 802.3 network, the Apollo Token Ring network, or the 802.5 network as the workstation's primary network.

2. Enter the **di n** command to request access to the network on which the partner system resides (see Figure 10–12).

   If you just enter **di n** (and don't specify a particular network), the command default is the primary network to which you are currently connected.

   However, you can also specify a specific primary network with the **di n** command by using the following substitutions for **n**:

di r <RETURN>	(for Apollo Token Ring)
di e <RETURN>	(for 802.3)
di t <RETURN>	(for 802.5)

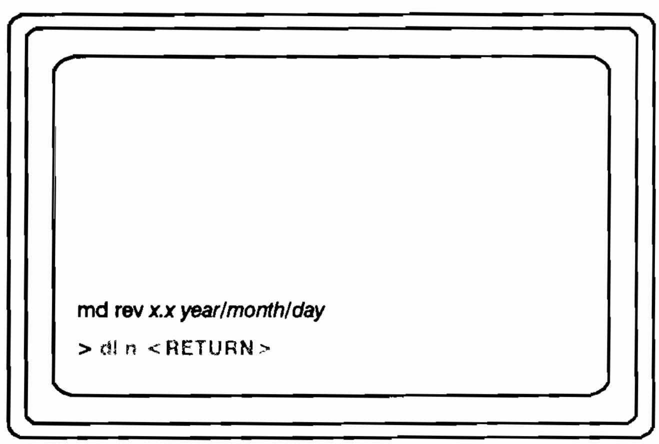


Figure 10–12. Requesting Access to the Partner System's Network

You can boot the diskless system in Service mode from another workstation's disk. Follow Steps 3 and 4 to do this.

3. To boot from a system other than the partner node, type the command shown in Figure 10–13, where *nnnnn* is the disked system's node ID. If the node ID begins with a letter (A through F), insert a 0 (zero) before the node ID.

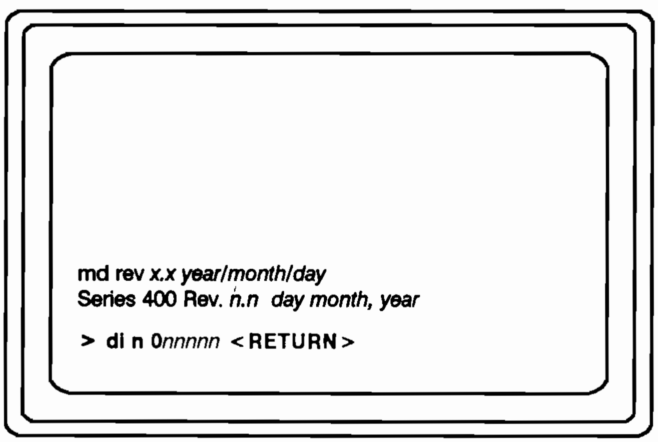


Figure 10–13. Booting from a System Other Than the Partner Node

4. Now boot the operating system by entering the commands shown in Figure 10–14.

```
> boot <RETURN>
> <RETURN>
> <RETURN>
.
.
.
(screen displays system messages)
.
.
.
> <RETURN>
> <RETURN>
) go <RETURN>
```

Figure 10–14. Booting the Operating System

You'll see several messages as the partner loads the operating system onto your workstation.

If you receive the "login:" prompt, go to Step 9.

If you receive a message concerning the system's calendar, go to Step 5.

If you receive an error message, refer to Table 5–7.

5. If you receive one of the messages shown in Figure 10–15, you need to set the system's calendar. Respond to the either of these screen prompts as shown in Figure 10–15.

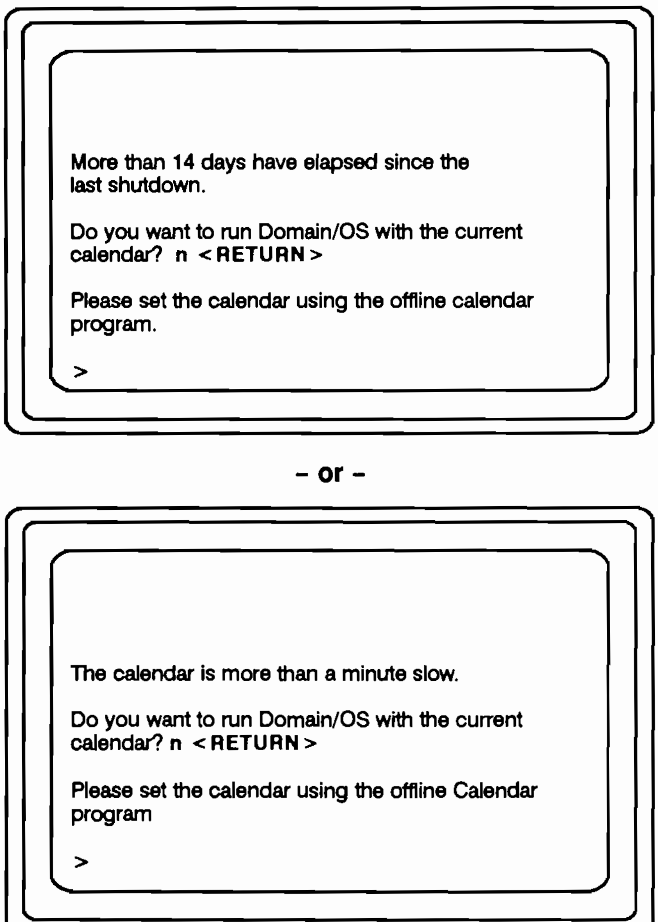


Figure 10–15. Sample ***calendar*** *Messages*

6. Use the commands shown in Figure 10–16 to start the **calendar** program.

7. Your screen now displays the SCSI disk controller and unit numbers and a series of prompts. Answer the disk type question as shown in Figure 10–17. Press <RETURN> after answering each question.

   Note that when running **calendar** and other utility programs, you are prompted for the disk type. You must enter the disk type (**w** = Winchester), controller number, and unit number. The controller and unit numbers are separated by a colon (**:**). In the Series 400 workstation, a single Winchester system disk is designated as controller number **6**, unit number **0**.

```
> re <RETURN> (you will hear the beep tone)

<RETURN>

md rev x.x year/month/day
Series 400 Rev. n.n  day month, year

> dl n 0nnnnn
> ex calendar <RETURN>
```

*Figure 10–16. Starting the **calendar** Program*

```
Found disk device: SCSI Disk ctrl 6, unit 0
low: nnnnnnnn   high: nnnnnnnn  start: nnnnnnnn

Calendar - Offline, revision n.n, date, time
Please select the disk [w=Winch|s=Storage mod|
f=Floppy|q=Quit] [ctrl#:] [unit#] [,lvno].
If you do not have a disk, enter none (N): w 6:0 <RETURN>
                  time-zone query
                  calendar date/time query
                  Is the above information correct?

If running online, you should now shutdown and reboot the
system to run with the new calendar setting.

Done.
>
```

*Figure 10–17. Sample **calendar** Responses*

8. When "Done" appears on your screen, type the command shown in Figure 10–18 to start up the Domain/OS software. At initial system startup, this command starts up the Hardware Acceptance Program (HAP) software on disked workstations.

As the diskless system boots up from its partner, you'll see screen messages similar to those in Figure 10–19.

NOTICE: If you see the following message, ignore it: "user_data/startup_dm.1280bw – name not found"

When the system starts up successfully, LED "D" on the system unit's front panel flashes continuously. If the software does not load, check Table 5–7.

When the screen displays the ")" prompt type the command shown in Figure 10–20.

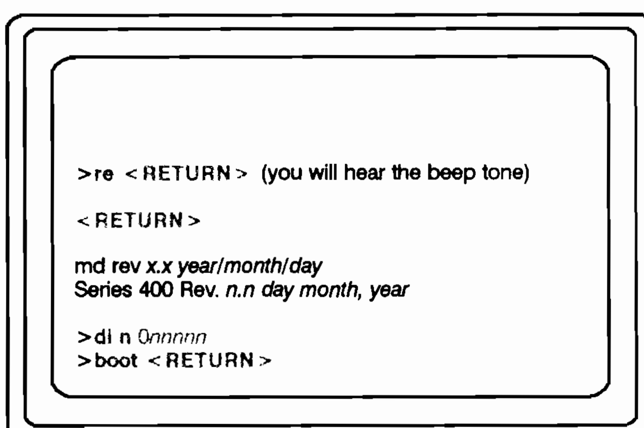


Figure 10–18. Starting Up the Domain/OS Software

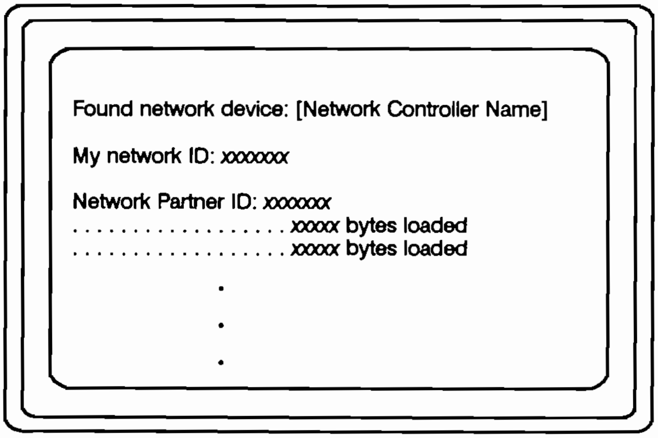


Figure 10–19. Sample Booting Messages

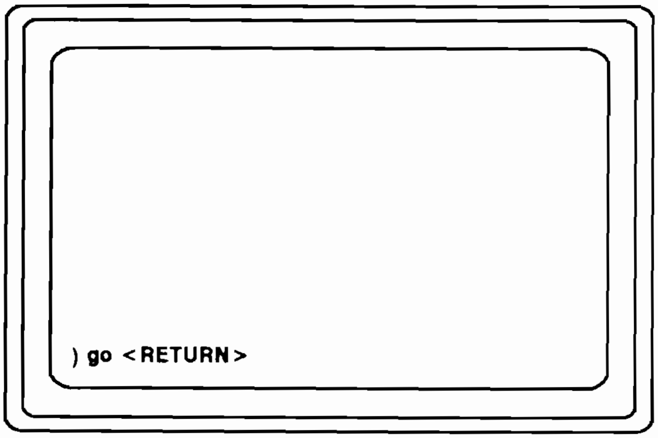


Figure 10–20. Executing the go Command

9. Log in (type your username) as shown in Figure 10–21. If you don't have a username account yet, you may log in as **user**. If you log in as **user**, press <RETURN> at the "Password:" prompt.

Contact your system administrator to get your own username account.

When you log in as **user**, the operating system sets the working directory to the entry directory on the disked partner workstation. When you log in with your own log–in name, the operating system sets the working directory to your home directory.

See *Getting Started with Domain/OS* if you need more information on using directories and files.

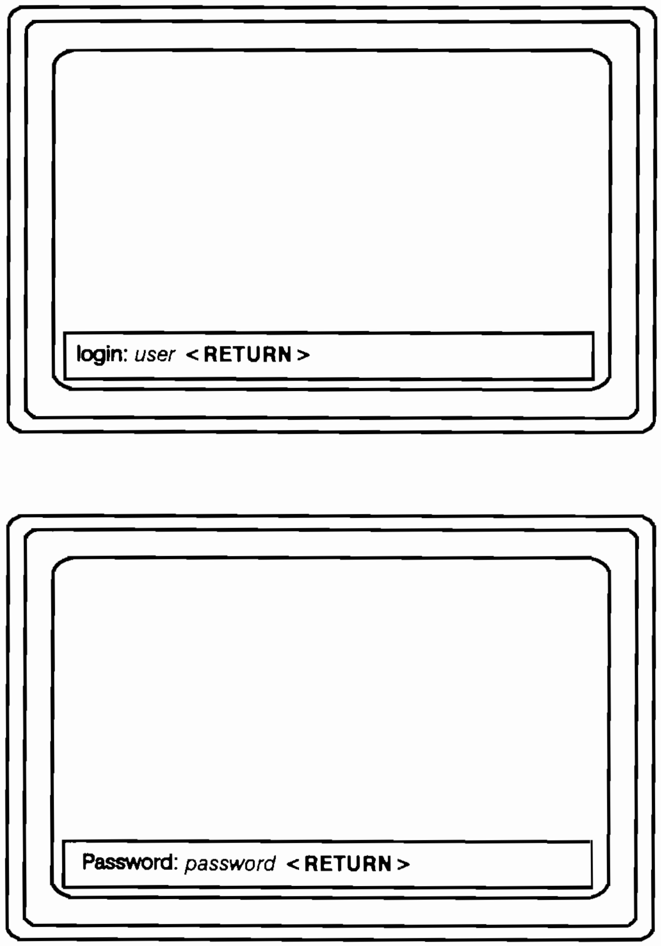


Figure 10–21. Logging In

Configuring the Workstation to Run Domain/OS

Your Series 400 workstation can run either of two operating systems: Domain/OS or HP–UX. Most systems are preconfigured to run the operating system you have chosen. If, however, your system was not preconfigured to run Domain/OS, you can reconfigure the workstation to run permanently in Domain compatibility mode. Setting your workstation permanently to Domain compatibility mode allows the system to run and operate with Domain/OS.

Follow these steps if you need to set your workstation to run in Domain compatibility mode. These steps assume that the system is powered on in Normal mode (Service LED is off).

1. Before the system finishes running self–tests, press the Service mode switch to set the system to Service mode (the Service LED on the system's front panel lights). Then press the Reset switch as shown in Figure 10–22.

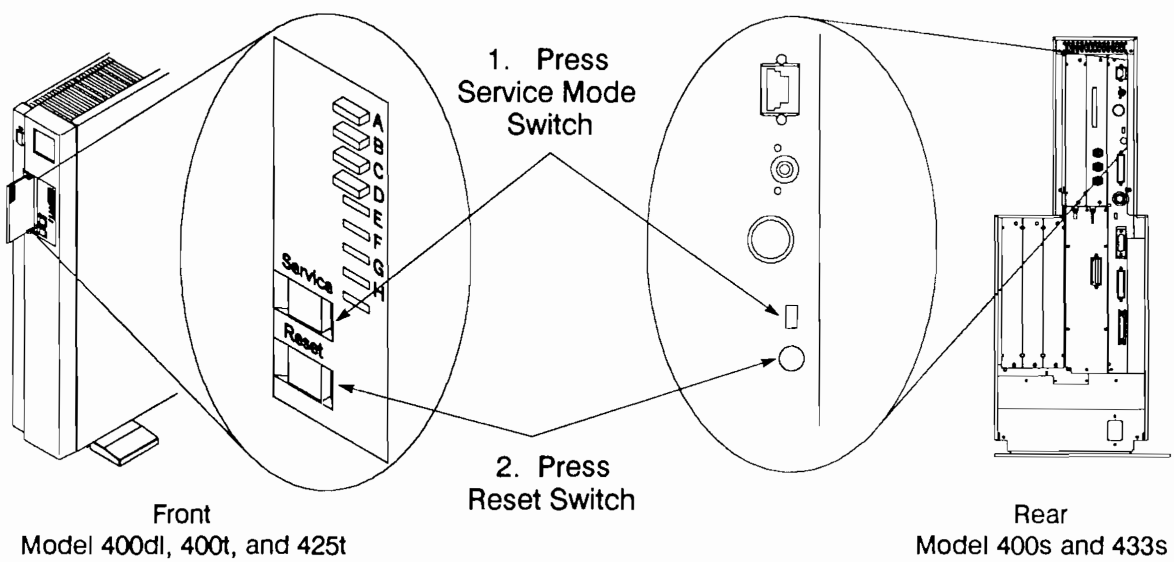


Figure 10–22. Setting the System to Service Mode

The screen displays system messages. Press the <RETURN> key until the screen displays the MD prompt as shown in Figure 10–23.

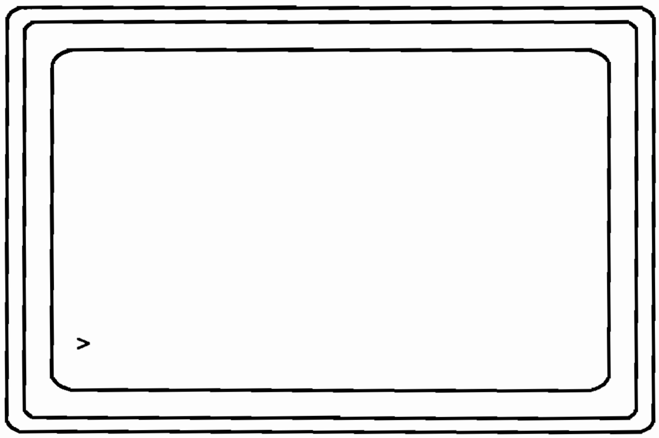


Figure 10–23. Sample Mnemonic Debugger (MD) Screen Prompt

2. Type the **cf** command as shown in Figure 10–24.

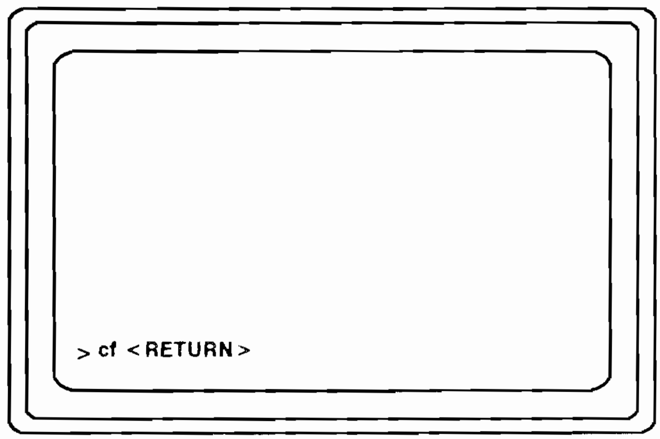


*Figure 10–24. Entering the **cf** Command*

The screen displays information about your system and the Configuration Control Menu, as shown in Figure 10–25.

If you receive an error message at item 3, refer to Table 5-10.

```
Copyright 1990,                              (1)   Configuration Control
                                                Keys Mode Name              Class
Hewlett-Packard Company,                        ----------------------------
All Rights Reserved.                              1   I/O Configuration
                                                  2   Boot Mode Selection
Series 400 Rev. n, yyyy/mm/dd.hh:mm:ss
md nn rev n.nn                                    A   Abort without changes
MC680n0 Processor                               ----------------------------
                                             (2)  Type [key] Return ?
Configuration EEPROM      (3)
xxxxxx. Keyboard
```

Legend

(1) Configuration Control Menu (see Step 3)

(2) Prompt for your menu selection (see Step 3)

(3) System EEPROM status (EEPROM error messages can appear here)

Figure 10–25. Sample Configuration Control Menu Screen Messages

Troubleshooting

3. Select the Boot Mode Selection menu by typing:

2 <RETURN>

The screen displays the Boot Mode Selection menu shown in Figure 10–26.

```
     Boot Mode Selection
Keys Mode Name          Status
-----------------------------
  1  Domain Compatible
  2  HP-UX Compatible
  3  undefined             P

  C  Clear Temp
  E  Execute
  A  Abort without Changes
-----------------------------
 Type [key] Return ?
```

Figure 10–26. Boot Mode Selection Menu

4. Select Domain Compatible mode by typing:

1 <RETURN>

The screen displays the menu shown in Figure 10–27.

```
  1  Domain Compatible
Temporary or Permanent
Type T or P Return ?
```

Figure 10–27. Selecting Domain/OS as the Permanent Operating System

5. Permanently select Domain Compatible mode in the system's EEPROM by typing:

   P <RETURN>

   Note that you must type the uppercase (capital) letter P.

6. Store your selection in the system's EEPROM by typing:

   E <RETURN>

   Note that you must type the uppercase (capital) letter E.

Troubleshooting

7. The system returns to the MD level as shown in Figure 10–28.

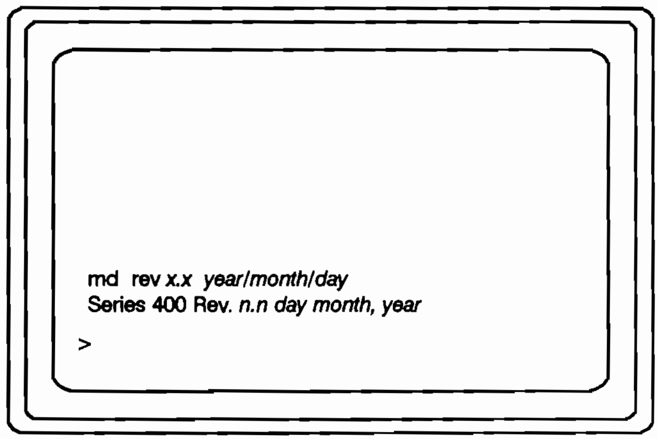


Figure 10–28. Returning to the MD Prompt

You can now continue with a normal system start up as described in Chapter 3 for a workstation with an internal disk, or as described in Chapter 4 for a diskless workstation.

Appendix A
Using the Cartridge Tape Drive

The Model 400s and 433s workstations can have an internal cartridge tape drive. This appendix tells you how to use the optional cartridge tape drive by describing the following:

- Ordering a cartridge tape
- Inserting and removing a tape
- Write–protecting a tape
- Writing and restoring directories, files, and links
- Backing up a Winchester disk
- Running Standalone Utilities (SAUs) from a cartridge tape
- Booting the operating system from a cartridge tape
- Cleaning a cartridge tape drive

For instructions on dumping memory to a tape, see Chapter 6. For information about creating and editing descriptor files for the cartridge tape drive, and using streams to perform I/O operations on the tape, refer to the appropriate *Command Reference* manual and the Domain system help files.

The tape drive holds a 1/4-inch, 45 MB (450–foot) or a 60 MB (600–foot) streaming data cartridge.

Ordering a Cartridge Tape

We recommend the following cartridge tapes for use with the Series 400 workstations (available from the HP Direct Computer Users Catalog 1-800–538–8787):

- SUP-CART-600AD (60 MB, 600 feet)
- SUP-CART-300XLD (45 MB, 450 feet)
- SUP-CART-600A (60 MB, 600 feet)
- SUP-CART-300X (45 MB, 450 feet)
- SUP-DEI-400442 (45 MB, 450 feet)
- SUP-DEI-400862 (60 MB, 600 feet)

Tape Restrictions

The cartridge tape drives in the Model 400s and 433s workstations are not compatible with HP cartridge tape drives 9144A, 9145A, and 35401A. Data on cartridge tapes from HP cartridge tape drives 9144A, 9145A or 35401A will be permanently damaged if they are used in the Model 400s or 433s cartridge tape drive.

WARNING: Do not use cartridge tapes from HP cartridge tape drives 9144A, 9145A or 35401A in the Model 400s or 433s cartridge tape drive. Data on those cartridge tapes will be permanently damaged.

Inserting and Removing a Tape

Figure A–1 shows you how to insert and remove the Model 400s and 433s tape cartridge.

NOTICE: Remove the tape cartridge from the drive when it is not in use. The cartridge may be damaged if it remains in the drive for an extended period of time.

Before using any of the commands in this appendix, insert the tape in the drive and verify that the operating system is running.

NOTICE: Never remove a tape from the drive if the LED on the front of the drive is ON, as this indicates that the tape is not positioned at the beginning. If the tape is not positioned at the beginning before you remove it from the drive, you will receive read/write errors when you insert another tape. After performing an operation, make sure that the tape rewinds (see **-rewind** later in this appendix).

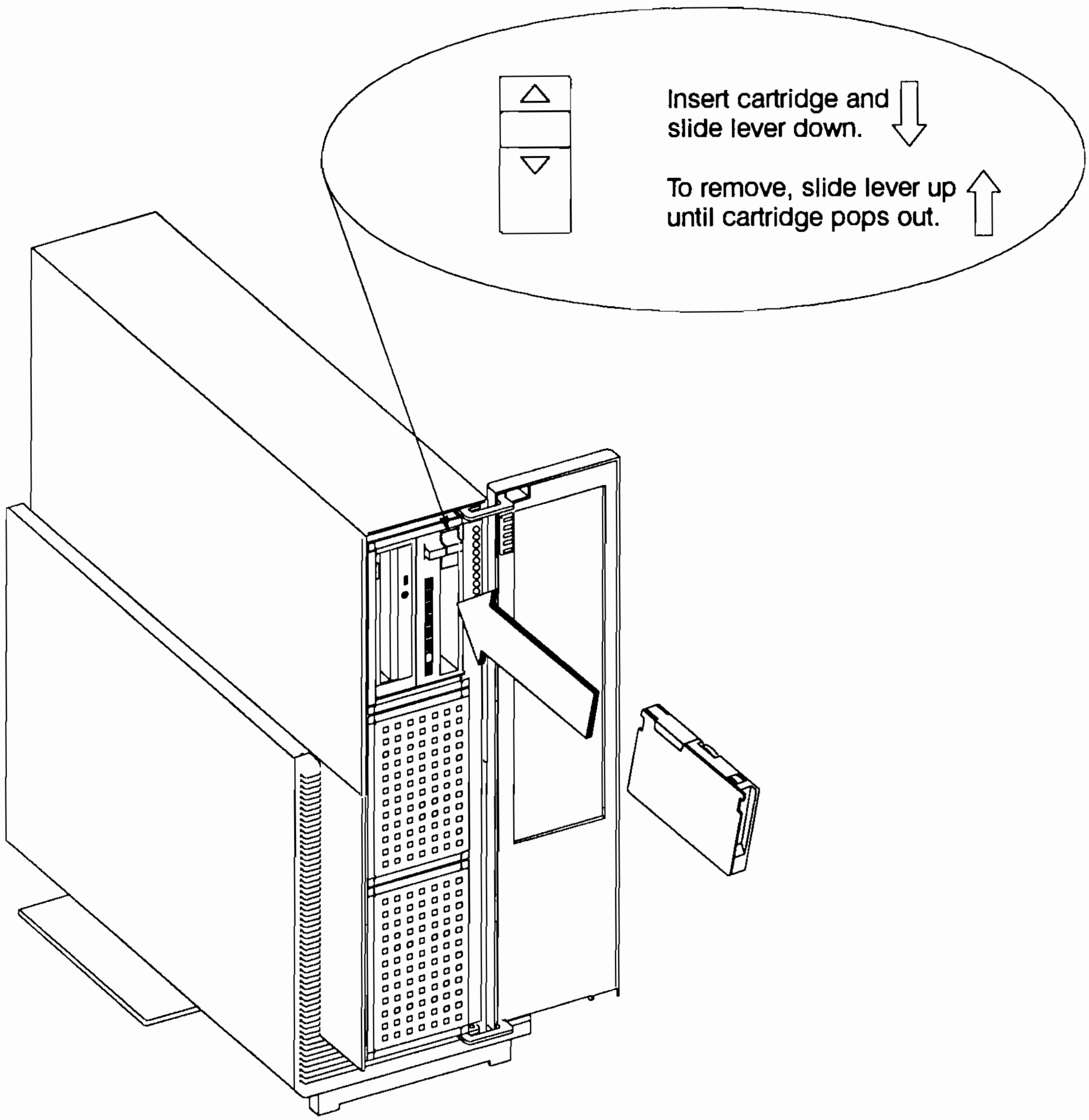


Figure A–1. Inserting and Removing a Cartridge Tape

Write–Protecting a Cartridge Tape

You can prevent accidental changes or additions to a tape by write–protecting the cartridge. Use a flat–blade screwdriver to set the write–protect switch as shown in the following illustration. If the switch points to SAFE, the tape is write–protected.

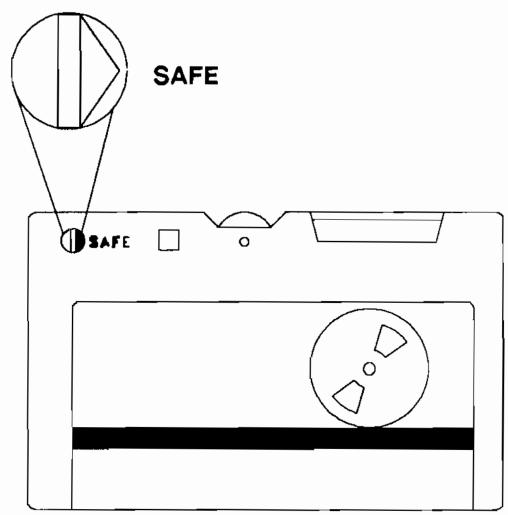


Figure A–2. Write–Protecting a Cartridge Tape

Retensioning a Cartridge Tape

To ensure accurate read/write operations, retension your tapes periodically. Retensioning restores the proper tape tension on the reel by unwinding the tape to the end and then rewinding it.

Before you use a *new* tape cartridge, retension it by using the **rbak** or **wbak** commands with the **–reten** option. Thereafter, retension the tape after every 6 hours of use, or if you receive read/write errors.

To retension a tape, type the **rbak** command as shown in Figure A–3.

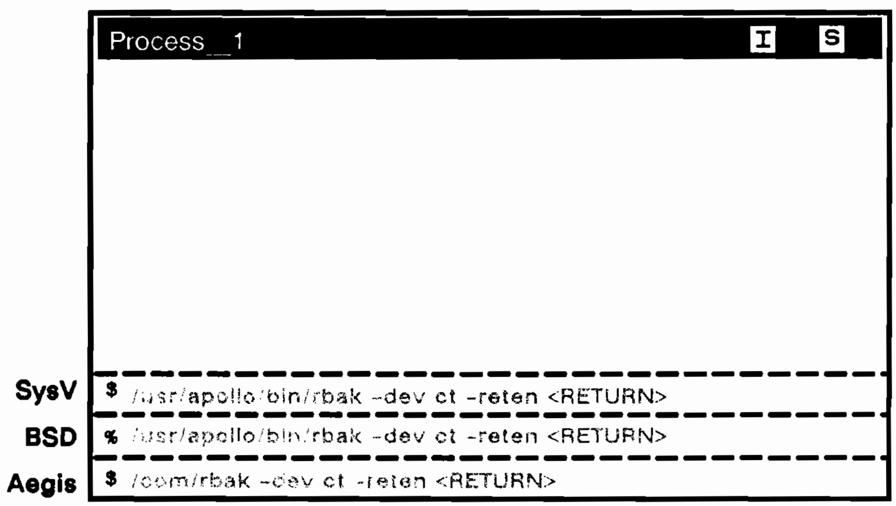


Figure A–3. Retensioning a Cartridge Tape

Retensioning can take up to three minutes. If you still receive errors, you may need to clean the tape drive. See “Cleaning a Cartridge Tape Drive” later in this appendix for cleaning recommendations.

Writing and Restoring Directories, Files, and Links

By using the tape drive you can copy objects from a Winchester disk to a tape (write to the tape) and copy objects from a tape to a Winchester disk (restore from the tape), or get an index of the tape's contents.

NOTICE: Although you cannot directly access the node's tape drive from another device as you can with a node's Winchester disk drive, you can address the tape drive by using the **spm** and **crp** commands. Refer to the appropriate *Command Reference* manual for details.

This section provides a brief summary and some examples of how to write objects to or restore objects from a tape cartridge by using the **wbak** and **rbak** commands.

To read or restore files from another system, use the **read_write_magtape** (**rwmt**) command. The **rwmt** command can read unlabeled tapes, as well as ANSI level 1 through 4 labeled tapes. The tape cartridge must, however, have the QIC–24 format. Refer to the appropriate *Command Reference* manual for further details on reading/restoring non–Domain/OS formatted files by using **rwmt**.

When performing operations using the tape drive, you commonly use the following options with the **wbak** and **rbak**, commands. The Domain help files and the appropriate *Command Reference* manual contain more detailed information about the commands and options described in the following text.

rbak and wbak Command Options

This section describes options used with the **rbak** and **wbak** commands.

–dev ct

This option specifies that the device you want to access is the cartridge tape drive. **–dev ct** is an option for **wbak** and **rbak**.

–no_eot

This option prevents the write program from placing an end–of–tape (**eot**) indication on the tape. Use **–no_eot** when you are using multiple invocations of **wbak** to copy objects sequentially onto a tape. You *must* use **–no_eot** to prevent the tape from rewinding to the beginning before searching for the next specified file position.

–reo

This option reopens the tape at the tape's current position. Use the **–reo** option with **wbak**.

–reten

This option retensions the tape by unwinding it to the end, and then rewinding. The **–reten** command is an option for **wbak** and **rbak**. If you do not specify this option, the tape does not retension.

–rewind

This option rewinds the tape to the beginning. You must use this option to rewind the tape when you perform a read with **rbak**. Otherwise, the tape remains at its current file position and the tape drive LED remains on. If you remove a tape from the drive when the LED is on, you will receive errors when you insert and try to perform operations on another tape. You can rewind a tape by specifying **–rewind** and **–dev ct** as the only options for **rbak**.

–sysboot

This option preserves or skips over the **sysboot** program when it is present on a tape. The **sysboot** program is always located at the beginning of a tape if it is present, so you need to use this option only when you are writing data in the first file position (**–f 1**) on a tape. **–sysboot** is an option of **wbak** and **rbak.**

Writing to a Cartridge Tape

To write directories, files, and links stored on the disk to a cartridge tape, use the **wbak** command. The **wbak** command writes directories, files, and links from a disk to a tape file. The tape file is ANSI standard and does not necessarily correspond to a file on a disk. A tape file holds the contents of an object or many objects as well as the attributes associated with those objects, such as the Unique ID (**uid**) number and Access Control List (**acl**).

The following examples show how to copy objects to a file on a tape by using **wbak** (the pathnames are for illustration purposes only).

NOTICE: The commands shown in the following examples must entered on one line.

The example shown in Figure A–4 writes the contents of the directory **//mars/data** to a tape file called **data_7.1.88**. The program writes the file in the first position (the first file on the tape), writes the name **data_7.1.88** as the file ID in the tape file's label, and lists the names of the subdirectories, files, and links on standard output as it copies them to the tape.

```
Process__1                                                      I   S

SysV   $ /usr/apollo/bin/wbak //mars/data -dev ct -f 1 -fid data_7.1.88 -l <RETURN>
BSD    % /usr/apollo/bin/wbak //mars/data -dev ct -f 1 -fid data_7.1.88 -l <RETURN>
Aegis  $ /com/wbak //mars/data -dev ct -f 1 -fid data_7.1.88 -l <RETURN>
```

*Figure A–4. Sample **wbak** Command Line*

The example shown in Figure A-5 writes only the files in the directory **//mars/recs** added or modified since noon on 7/1/88. The program positions the tape file at the end of the file set on the tape and writes the name **new_hires** in the tape file's label.

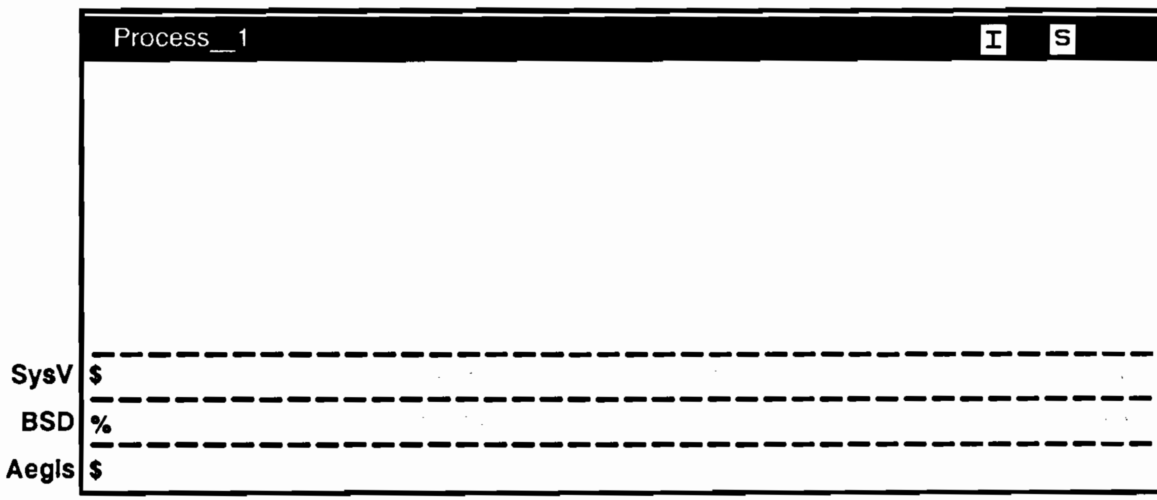


Figure A-5. Sample ***wbak*** *Command Line*

The example shown in Figure A–6 uses wildcards to match only those files in the **latest_problems** subdirectory of the current working directory whose names begin with the letters **a** through **f** and end with **bug**. The command also writes the name **latest_problems** as the file ID and the name **bob** as the owner ID in the file's label. For more information about wildcards, see the appropriate *Command Reference* manual.

```
Process_1                                                        I  S

SysV   $ /usr/apollo/bin/wbak -dev ct -f cur -own bob -fid latest_problems/[a-f]?*bug <RETURN>
BSD    % /usr/apollo/bin/wbak -dev ct -f cur -own bob -fid latest_problems/[a-f]?*bug <RETURN>
Aegis  $ /com/wbak -dev ct -f cur -own bob -fid latest_problems/[a-f]?*bug <RETURN>
```

*Figure A–6. Sample **wbak** Command Line*

The example shown in Figure A-7 adds a file to a tape that contains the **sysboot** program, but does not write over **sysboot**.

```
Process_1                                                                  I  S

SysV  $ /usr/apollo/bin/wbak //comet/new_specs -dev ct -f 1 -sysboot -fid new_specs <RETURN>
BSD   % /usr/apollo/bin/wbak //comet/new_specs -dev ct -f 1 -sysboot -fid new_specs <RETURN>
Aegis $ /com/wbak //comet/new_specs -dev ct -f 1 -sysboot -fid new_specs <RETURN>
```

*Figure A-7. Sample **wbak** Command Line*

To create multiple tape files (using successive invocations of **wbak**), use the **–no_eot** option in all the command lines except the last. In addition, use the **–f 1** option with the starting tape file position in the first command line, and **–f cur** or **–f** *n* (where n is the number of the file position) with the next tape file position in all subsequent command lines. (You can also use **–reo** to reopen the tape at the current position.)

NOTICE: You *must* use **–no_eot** to prevent the tape from rewinding to the beginning before searching for the next specified file position.

When you use the **–no_eot** option, do not use the **–f end** option. Since **–no_eot** directs **wbak** not to put a double tape mark at the end of a tape file, there are no "end" marks on the tape. If you do *not* use the **–no_eot** option, **wbak** puts a double tape mark at the end of each tape file. Then, when you copy an object to the *next* file position by using **wbak**, the tape rewinds to the beginning, searches forward to the double mark, and then continues writing. Using **–no_eot** greatly speeds up writing multiple objects to the tape.

The following example shows how successive invocations of **wbak** command lines can write several directories to multiple tape files from a Winchester disk in a SysV or BSD environment.

/usr/apollo/bin/wbak //comet/minutes -dev ct -f 1 -no_eot -fid comet_status <RETURN>

/usr/apollo/bin/wbak //comet/design_specs -dev ct -f 2 -no_eot -fid specs <RETURN>

/usr/apollo/bin/wbak //comet/schedule -dev ct -f cur -no_eot -fid schedule <RETURN>

.

.

.

/usr/apollo/bin/wbak //comet/documentation -dev ct -f cur -fid doc <RETURN>

The following example shows how successive invocations of **wbak** command lines can write several directories to multiple tape files from a Winchester disk in an Aegis environment.

```
/com/wbak //comet/minutes -dev ct -f 1 -no_eot -fid comet_status <RETURN>

/com/wbak //comet/design_specs -dev ct -f 2 -no_eot -fid specs <RETURN>

/com/wbak //comet/schedule -dev ct -f cur -no_eot -fid schedule <RETURN>

.

.

.

/com/wbak //comet/documentation -dev ct -f cur -fid doc <RETURN>
```

If the objects fill up the tape, your monitor displays the messages shown in Figure A–8.

Remove the cartridge from the drive and insert another cartridge.

To change the new cartridge tape's unit ID number, respond to the "options:" prompt by typing:

unit *n* <**RETURN**>

To change the new cartridge tape's volume ID number, respond to the "options:" prompt by typing:

volume *n* <**RETURN**>

To use the same (default) settings used by the previous (filled) cartridge tape, respond to the "options:" prompt by typing:

go <**RETURN**>

To read the help file on **wbak**, type **help wbak** next to the Aegis prompt or **man wbak** next to the BSD or SysV prompt.

```
Process _1                                                    I   S

** Tape swap: Current volume is unit 0, volume " xxxnnn "
   Please mount the next volume for writing.
   Volume swap options:
     Unit <unit#> - continue with alternate unit.
     Vid <vol_id> - continue with specified volume id.
     Go           - continue using defaults.

   Options: option <RETURN>
```

Figure A–8. Filled Tape Display

Restoring Objects to a Disk

Use the **rbak** command to restore objects written to the cartridge tape drive with **wbak**. The **rbak** command restores a tape file to a disk, retaining all the objects in the tape file, such as the Unique ID (**uid**) number and Access Control List (**acl**). A tape file is ANSI standard and does not necessarily correspond to a disk file.

You can also display the names of the tape files on your monitor without restoring any information to the disk by using the **-index** option to **rbak**.

To read the help file on **rbak**, type `help rbak` next to the Aegis prompt or `man rbak` next to the BSD or SysV prompt.

The following examples show how to restore objects on a tape file by using **rbak**.

NOTICE: The commands shown in the following examples must be entered on one line.

The example shown in Figure A-9 lists the contents of the tape file at the first position without restoring any information to the disk. (If you do not specify a file position, **rbak** prompts you to enter it.) After listing all the objects in the first position, **rbak** rewinds the tape to the beginning.

Process__1

SysV	$ /usr/apollo/bin/rbak -dev ct -f 1 -index -all -rewind <RETURN>
BSD	% /usr/apollo/bin/rbak -dev ct -f 1 -index -all -rewind <RETURN>
Aegis	$ /com/rbak -dev ct -f 1 index -all -rewind <RETURN>

*Figure A-9. Sample **rbak** Command Line*

The example shown in Figure A–10 restores the tape file **ann/bill** in position **5** to the directory **sue/joe** on node **//gold**.

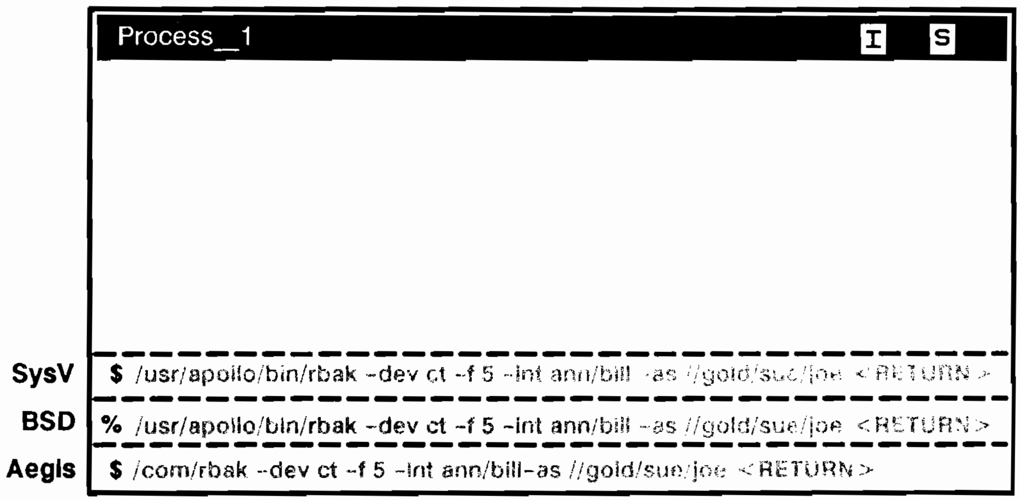


*Figure A–10. Sample **rbak** Command Line*

The example shown in Figure A–11 restores all the objects on the tape to the disk, and lists the objects on standard output as the program copies them. It then rewinds the tape to the beginning.

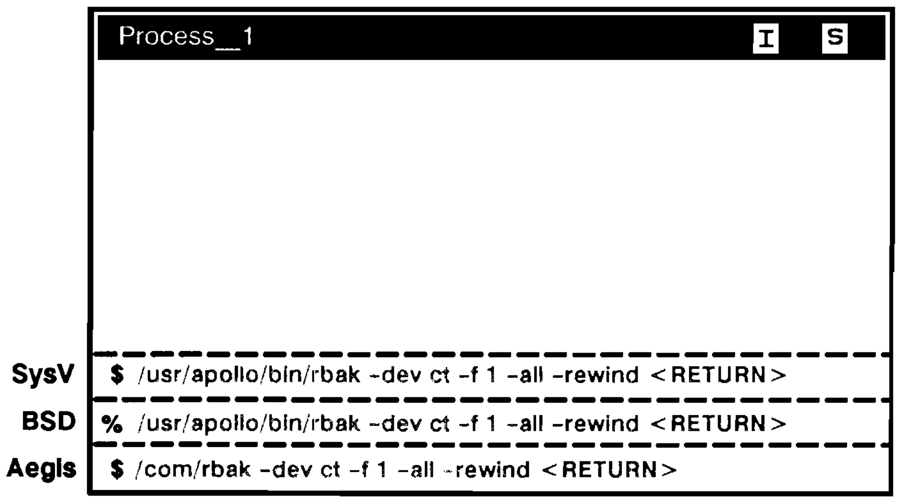


*Figure A–11. Sample **rbak** Command Line*

Backing Up a Winchester Disk

You can back up a Winchester disk on a tape cartridge by using the **wbak** command with the **-dev ct** option. Use **wbak** to do the following:

- Copy all directories, files, and links in the specified object to the tape.
- Copy only objects modified since the last backup.
- Copy all objects that were modified either before or after a specified date.

You can back up the contents of the entire Winchester disk by specifying the entry directory name as the target pathname in the command line.

You may need more than one cartridge to hold the data. If this is true, your monitor displays the messages shown in Figure A-12.

To continue copying data, remove the tape from the drive and insert another one. Make sure the new tape is *not* write-protected (see "Write-Protecting a Tape").

```
Process_1                                                  I   S

** Tape swap: Current volume is unit 0, volume " xxxnnn "
   Please mount the next volume for writing.
   Volume swap options:
     Unit <unit#> - continue with alternate unit.
     Vid <vol_id> - continue with specified volume id.
     Go           - continue using defaults.

   Options:  option <RETURN>
```

Figure A–12. Filled Tape Display

To change the new cartridge tape's unit ID number, respond to the "options:" prompt by typing:

unit *n* < RETURN >

To change the new cartridge tape's volume ID number, respond to the "options:" prompt by typing:

volume *n* < RETURN >

To use the same (default) settings used by the previous (filled) cartridge tape, respond to the "options:" prompt by typing:

go < RETURN >

The backup is complete when the monitor displays the message shown in Figure A–13 and the prompt returns.

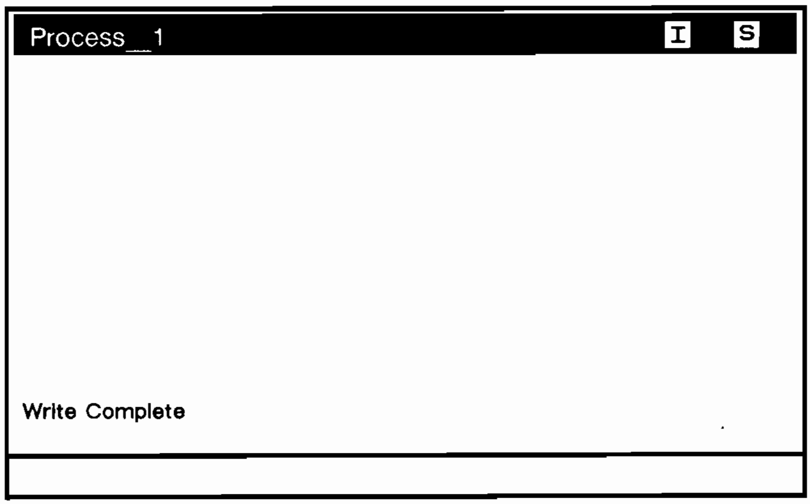


Figure A–13. Write Complete Display

The following examples show how to back up Winchester disks.

The example shown in Figure A–14 backs up the entire contents of the node whose entry directory name is **//pal**. Note that the file ID (**node_35**), owner ID (**roy**), and volume ID (**vol2**) are specified to make the tape file easy to identify when you reload it.

Process_1 I S

SysV	$ /usr/apollo/bin/wbak -dev ct -f 1 -own "roy" -vid "vol2" -fid node_35 //pal <RETURN>
BSD	% /usr/apollo/bin/wbak -dev ct -f 1 -own "roy" -vid "vol2" -fid node_35 //pal <RETURN>
Aegis	$ /com/wbak -dev ct -f 1 -own "roy" -vid "vol2" -fid node_35 //pal <RETURN>

*Figure A–14. Sample **wbak** Command Line*

The example shown in Figure A–15 copies only objects modified since the last backup (in this case, July 5, 1988). The **wbak** command stores the objects on a tape file named **pal_7.8.88**.

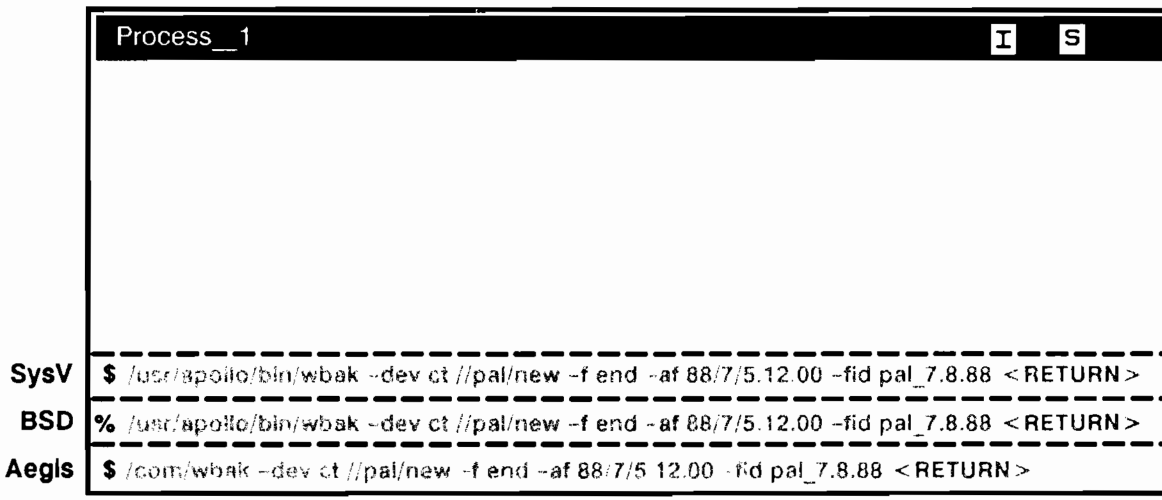


*Figure A–15. Sample **wbak** Command Line*

The example shown in Figure A–16 copies all files in the directory **//pal/office/recs** modified after July 1, 1988, to a tape file named **q3_88**.

```
Process_1

SysV   $ /usr/apollo/bin/wbak -dev ct //pal/office/recs -f end -af 88/7/1.12.00 -fid q3_88 <RETURN>
BSD    % /usr/apollo/bin/wbak -dev ct //pal/office/recs -f end -af 88/7/1.12.00 -fid q3_88 <RETURN>
Aegis  $ /com/wbak -dev ct //pal/offices/recs -f end -af 88/7/1.12.00 -fid q3_88 <RETURN>
```

*Figure A–16. Sample **wbak** Command Line*

Running Standalone Utilities from a Cartridge Tape

You can run any of the Standalone Utilities (SAUs) stored on a bootable cartridge tape by using the Mnemonic Debugger's **di** command followed by the **c** argument, and then using the **ex** command. SAU programs run from the Mnemonic Debugger (MD), the low-level program resident in the system's PROMs. Chapter 10 describes starting up the system in Service mode to access the MD. The cartridge tape used to run the SAU programs must have the sys**boot** program written to it, and the **/sau***nn* directory should be written to tape by using the **wbak** command.

For example, to run the **salvol** program on the Winchester disk from the tape, obtain a bootable cartridge tape that contains the **/sau12** directory for the Model 400dl, 400t, and 400s or the **/sau11** directory for Model 425t and 433s.

Insert the cartridge into the tape drive. Start up the system in Service mode to access the MD (See Chapter 10). Use the commands shown in Figure A–17 to load and execute the **salvol** program.

```
> <RETURN>
> re <RETURN>
> <RETURN>
> di c
> ex salvol
(when the program completes, reset the MD )
> <RETURN>
> re <RETURN>
> <RETURN>
```

Figure A–17. Executing the salvol Program

Copying the sysboot Program and sau Directory to a Cartridge Tape

If your system's bootable disk is damaged or if there is a problem with the /**sau***nn* directories on the disk, you can use the cartridge tape to perform **sau** operations (like **invol** and **salvol**) on the disk.

To do this, you need to copy the **sysboot** program and the /**sau***nn* directory to the cartridge tape.

Use the /**sau12** directory for the Model 400dl, 400t, and 400s. Use the /**sau11** directory for Model 425t and 433s.

1. Copy the **sysboot** program to a cartridge tape in a shell as shown in Figure A-18.

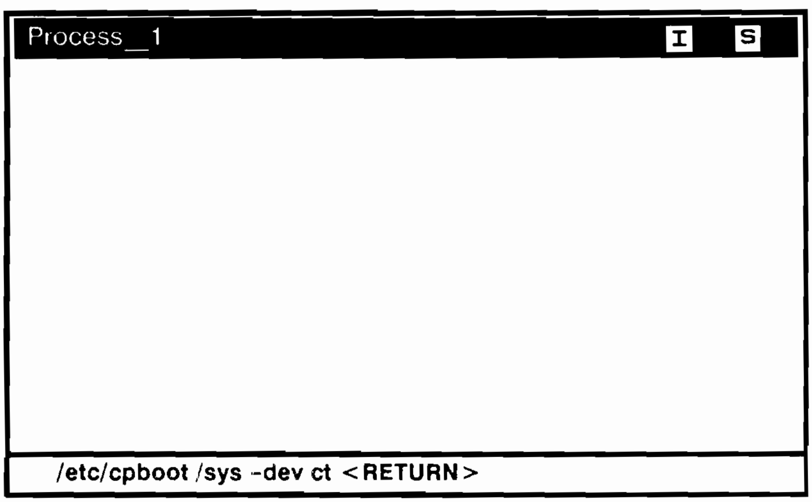


*Figure A-18. Copying the **sysboot** Program to a Cartridge Tape*

2. Copy the appropriate **/sau** directory to the cartridge tape as shown in Figure A–19. Model 400t and 400s use **/sau12**, Model 425t and 433s use **/sau11**.

```
Process_1                                            I  S

SysV   $ /usr/apollo/bin/wbak /saunn -dev ct -f 1 -sysboot <RETURN>
BSD    % /usr/apollo/bin/wbak /saunn -dev ct -f 1 -sysboot <RETURN>
Aegis  $ /com/wbak /saunn -dev ct -f 1 -sysboot <RETURN>
```

*Figure A–19. Sample **wbak** Command Line*

Booting the Operating System from a Cartridge Tape

If the Winchester disk is not functioning properly or its data is damaged, you can load and begin executing (boot) the operating system by using a cartridge tape. To use the tape drive as a boot device, obtain a cartridge that contains the boot software for your system.

The following procedure describes how to boot the operating system from a cartridge tape.

1. Insert the cartridge into the tape drive.

2. Set the node for Service mode and shut down the operating system (see Chapter 10).

3. Enter the commands shown in Figure A–20 to display the MD banner.

```
> <RETURN>
> re <RETURN>
> <RETURN>
(The screen displays the MD banner. )
md revision n.n release n.n y/m/d
(If the MD banner does not appear, press
<RETURN> several times to force the banner
to appear. )
> <RETURN>
> <RETURN>
```

Figure A–20. Displaying the MD Banner

4. Enter the commands shown in Figure A–21 to boot the system from the cartridge tape.

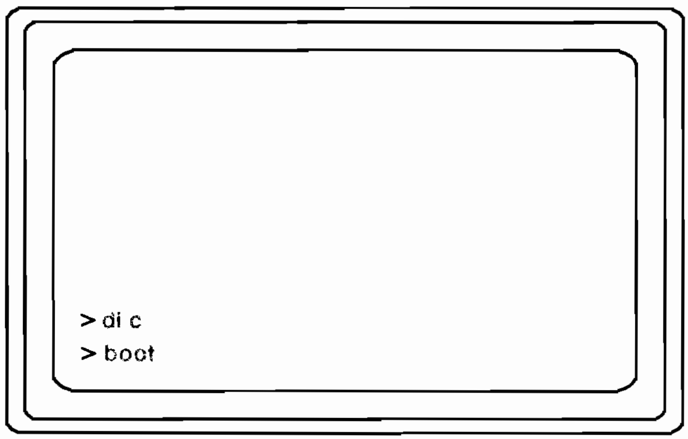


Figure A–21. Booting the System from a Cartridge Tape

5. If the **node_data/boot_shell** program on the disk is intact, the booting program transfers control to the disk. Then, you can proceed as in a normal operating system boot. See Chapter 3 for instructions on how to boot a disked workstation. See Chapter 4 for instructions on how to boot a diskless workstation.

6. Next, the program looks for the necessary software on the cartridge tape. Before the booting program begins to copy the operating system onto the disk, the screen displays the prompt shown in Figure A–22.

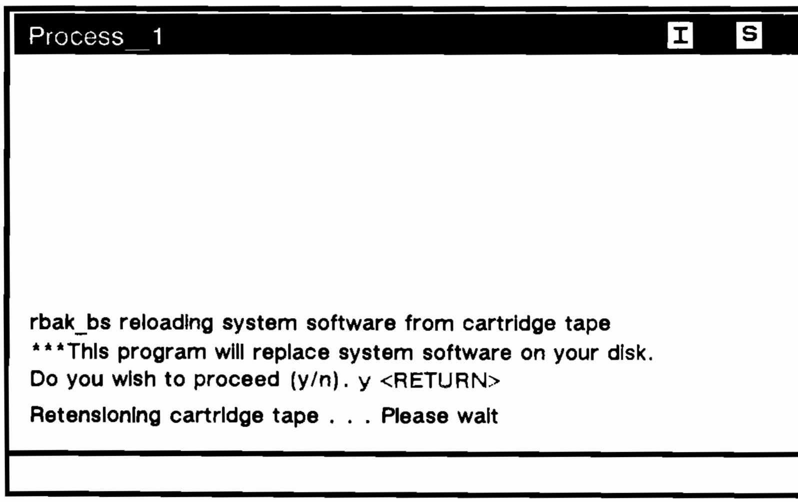


Figure A–22. Reloading System Software from a Cartridge Tape

If you respond by typing **y** **<RETURN>** (as shown in Figure A–22) the booting program on the tape now loads new software onto the Winchester disk, replacing the existing software on the disk. If you respond by typing **n** **<RETURN>**, the new software is not loaded onto the disk.

7. When you see the) prompt, type the command shown in Figure A–23 to load the Display Manager software.

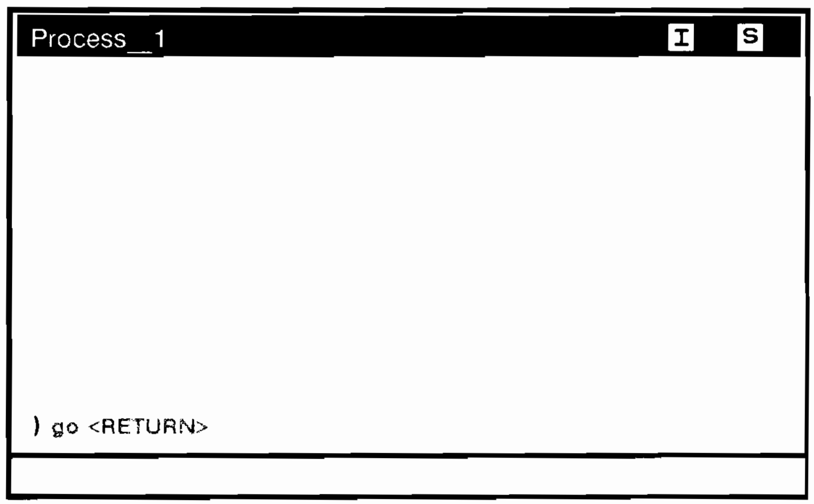


Figure A–23. Loading the Display Manager

After a few seconds, the monitor displays the boot logo, and then the log-in prompt. The system has now loaded the operating system from the tape to the disk.

Cleaning a Cartridge Tape Drive

Clean the cartridge tape drive after every 8 hours of use, or if you receive read/write errors. We recommend using the PerfectData QIC Drive Cleaning Kit, available through the Instant Apollo Catalog or most computer supply stores. Follow the instructions that come with the kit to prevent cartridge head damage.

Glossary

Access rights

These rights list the people who can use each object in the network, and specify how each person can use the object (e.g., permission to read, write, and execute the object). The phrase is used in connection with the Aegis environment; UNIX users refer to permissions, which are comparable (but not equivalent).

Active node

A node that is electrically and logically connected to the network. Nodes are connected to the network through a set of relays. Nodes are considered active when these relays are connected to the network and the node is receiving, reclocking, and transmitting data. Typically, these relays are connected when a node is running the operating system; however, the relays are also connected while the node is executing certain diagnostics from the Mnemonic Debugger (MD) program.

Aegis

The environment developed at Apollo Computer. Also refers to the shell program used to interact with the Aegis environment in the Domain/OS operating system.

ANSI

The American National Standards Institute, a non–profit organization, made up of various expert committees, that publishes standards for use by national industries. ANSI has adopted the IEEE standards for local area networks.

Apollo Token Ring Network

A 12-megabit-per-second LAN, which uses a token to control access to the network by resident nodes.

Attachment Unit Interface (AUI)

A transceiver cable that conforms to IEEE 802.3 specifications.

Boot

Short for bootstrap service. *(See* Bootstrap service*)*

Bootstrap service

A service provided by a short program, stored in the workstation's read-only memory, that loads the operating system (or any complex program) into a workstation's main memory. Partner workstations provide bootstrap service to diskless workstations.

BSD

The environment based on 4.3 BSD UNIX from the University of California at Berkeley.

Command

An instruction that you give to run a program.

Command argument

Information you provide on a command line to describe the object (usually a file or directory) to be operated on by the command.

Command option

Information you provide on a command line to indicate any special action you want the command to take. (*See also* Default.)

Configuration

The arrangement of a computer system or network as defined by the nature, number, and the chief characteristics of its functional units. More specifically, the term configuration may refer to a hardware configuration or a software configuration.

Control key sequence

A keystroke combination used as a shorthand way of specifying commands. To enter a control key sequence, hold down <CTRL> while pressing another key.

Cursor

The small blinking box initially displayed in the screen's lower left corner. The cursor marks your current typing position on the screen and indicates which program (shell or DM) receives your commands.

Default

Most programs give you a choice of one or more options. If you don't specify an option, the program automatically assigns one. This automatic option is called the default. (*See also* Command option.)

Directory

A special type of object that contains information about the objects beneath it in the naming tree. Basically, it is a file that stores names and links to files. (*See also* File.)

Disk

A thin, record–shaped plate that stores data on its magnetic surfaces. The system uses heads (similar to heads in tape recorders) to read and write data on concentric disk tracks.

Diskless booting

Loading the operating system into local memory from another workstation's disk.

Diskless workstation

A workstation that has no disk. A diskless workstation may use the disk of the partner node or other nodes, and (if needed) use the computational services of the partner node or other nodes. A diskless workstation boots from a partner node. (*See also* Node and Disk.)

Disked workstation

A workstation that has its own disk.

Display Manager (DM)

The program that executes commands that start and stop processes, and commands that open, close, move, or modify windows and pads.

DM input window

The window where you type DM commands (contains the “Command:” prompt).

DM output window

The window that displays output messages from DM commands.

Domain/OS

The operating system developed by HP’s Apollo Systems Division. Domain/OS supports a high-speed communications network connecting two or more nodes and providing Domain services on that network. Each node can use the data, programs, and devices of other network nodes. Each node contains main memory, and may have its own disk, or share one with another node. Domain/OS provides three interfaces or operating environments:
Aegis, BSD (UNIX Berkeley), and SysV (UNIX System V). The Domain services distributed file system underlies each operating environment. Domain/OS supports UNIX directory structures and such protocols as TCP/IP ftp (file transfer protocol), while also providing Domain services.

Downstream node

The node in an Apollo Token Ring network that is next in line to receive the token. See Upstream Node for contrast.

ETHERNET

A 10 Mbps LAN, developed by Digital Equipment Corporation, Intel, and Xerox Corporation, upon which the IEEE 802.3 network is based.

File

The basic named unit of data stored on disk. (*See also* Directory.)

Home directory (~)

A shorthand way of referring to a frequently used directory, almost always the log-in directory. This is a UNIX term; in Aegis, one refers to the naming directory.

Input window

The window that displays a program's prompt and any commands typed but not yet executed.

LAN

See Local Area Network.

Local Area Network (LAN)

A data communications system that allows a number of independent devices to communicate with each other.

Logging in

Initially signing on to the system so that you may begin to use it. This creates your first user process.

Log-in directory

The directory in which you are placed when you log in.

MAU

See Multistation Access Unit.

Mnemonic Debugger (MD)

A low-level debugging facility that provides a set of commands and utility programs.

Multistation Access Unit (MAU)

In an IEEE 802.5 (IBM Token Ring) network, a MAU is a wiring concentrator used to attach user devices to an IEEE 802.5 network.

Name

A character string associated with a file, directory, or link. A name can include various alphanumeric characters, but never a slash (/) or null character.

Naming directory (~)

The Aegis shell allows you to refer to a frequently used directory with the tilde (~) symbol. Aegis uses your log-in directory as the initial naming directory. UNIX users generally call this the home directory.

Network

Two or more nodes sharing information.

Network controller

A printed circuit board that passes bit streams between the network and the node's main memory. Coupled with the network transceiver, the controller also handles signal processing, encoding, and network media access.

Network root directory (//)

The top directory in the network. Each node has a copy of the network root directory.

Node

A network computer. Each node in the network can use the data, programs, and devices of other network nodes. Each node contains main memory, and has its own disk, or shares one with another node. (*See also* Diskless workstation.)

Object

Any file, directory, or link in the network.

Operating system

The program that supervises the execution of other programs on your node.

Option

See Command option.

Output window

The window that displays a process response to your command.

Pad

A temporary, unnamed file that holds the information displayed in a window. A window can display an entire pad or only part of the pad. (*See also* Window.)

Partner node

A node that shares its disk with a diskless node. (*See also* Diskless node.)

Password

The word you enter next to the "Password:" prompt at log-in time. As you type your password, the system displays periods (.) instead of the letters in your password. You should keep your password secret and change it occasionally in order to protect your account from unauthorized use. (*See also* User account.)

Pathname

A series of names separated by slashes that describe the path of the operating system from some starting point in the network to a destination object. Pathnames begin with the starting point's name, and include every directory name between the starting point and the destination object. A pathname ends with the destination object's name.

Permissions

A set of rights (read, write, execute) associated with an object in the file system. Determines who may use the object. (*See also* Access rights.)

Principal network

The network on which a node boots.

Process

A computing environment in which you may execute programs.

Prompt

A message or symbol displayed by the system to let you know that it is ready for your input.

Root directory

See Network root directory.

Shell

A command-line interpreter program used to invoke utility programs.

Shell command

An instruction you give the system to execute a utility program.

Software

Programs, such as the shells and the DM, that allow you to perform various tasks.

System administrator

The person responsible for system and network maintenance and security at your site.

SysV

The Domain/OS environment derived from UNIX System V, Release 3, from AT&T Bell Laboratories.

Token

A small bit pattern that circulates around a network. Ownership of the token enables a node to transmit over the network medium.

Transceiver

A device that transmits and receives signals.

Upstream node

The node in an Apollo Token Ring network that has most recently received the token and/or transmitted a data packet. (*See* Downstream node for contrast.)

User account

The system administrator defines a user account for every person authorized to use the system. Each user account contains the name the computer uses to identify the person (user ID), and the person's password. User accounts also contain project and organization names, helping the system determine who can use the system, and what resources they can use. (*See also* User ID and Password.)

User ID

The name the computer uses to identify you. Your system administrator assigns you your user ID. Enter your user ID during the log–in procedure when the system displays the log–in prompt. (*See also* User account.)

Utilities

Programs provided with the operating system to perform frequently required tasks, such as printing a file or displaying the contents of a directory. (*See also* Command.)

Wildcards

Special characters that you may use to represent one or more pathnames or other strings of characters.

Window

An opening on the screen for viewing information. Display management software lets you create several windows on the screen. Each window is a separate computing environment in which you may execute programs, edit text, or read text.

Workstation

Usually includes a keyboard, a monitor, and a system unit.

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