
DECpc 433T

DECpc 433T
Service Guide

Order Number ER-PCT1A-SV-001

digital equipment corporation
maynard, massachusetts

May 1991

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FRU Replacement

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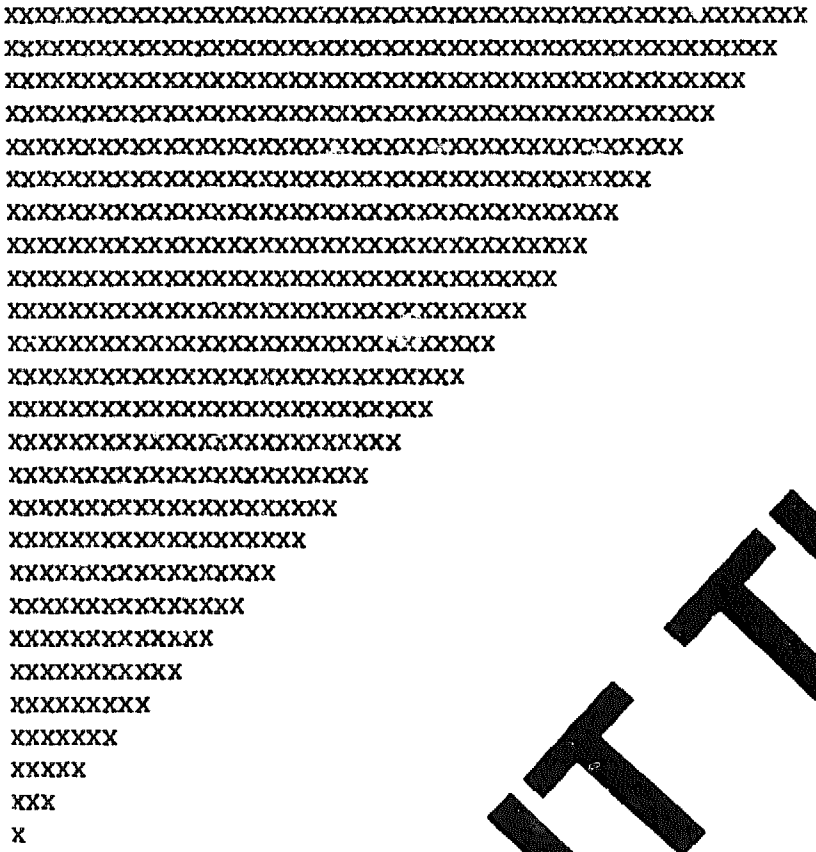
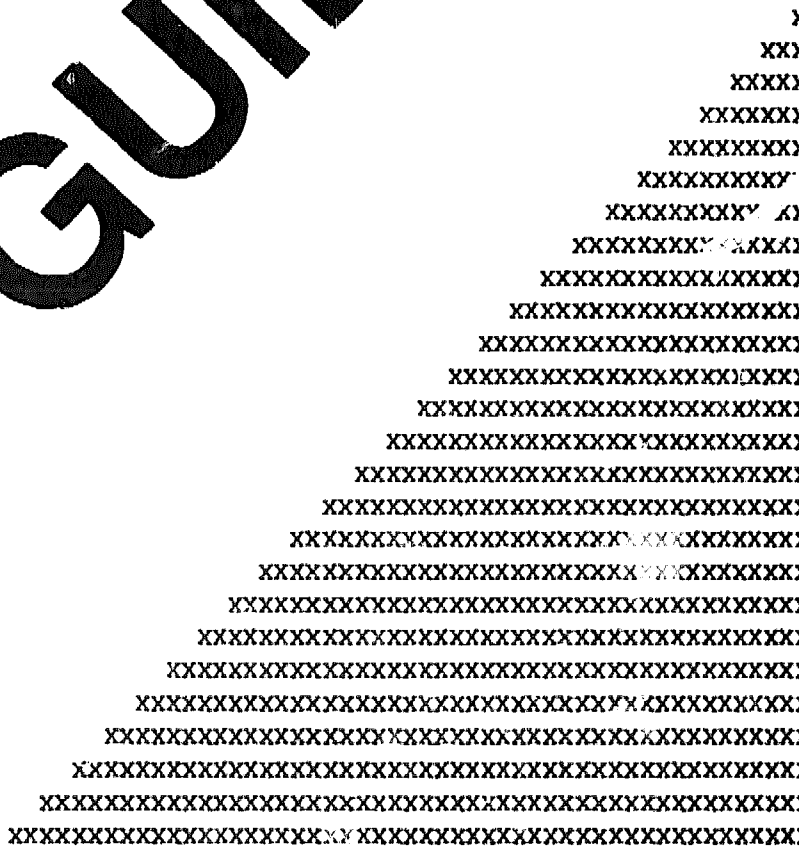


ABOUT THIS GUIDE



About This Guide

This Service guide is designed to help you diagnose and repair the DECpc 433T computer. This guide contains information on servicing the base system only. Specific information on installing, replacing, and configuring options is covered in the individual option installation guides supplied with those products, and is available to Customer Service personnel in a kit.

Organization

This guide is organized as follows:

- Chapter 1 provides an overview of the DECpc system.
- Chapter 2 details troubleshooting instructions.
- Chapter 3 contains procedures for removing and replacing field replaceable units.

For information about network troubleshooting, refer to the *PCSA Network Troubleshooting Guide*. For additional information about PC architecture and the Digital EtherWORKS option board, refer to the *DEC EtherWORKS Service Guide*.

Intended Audience

The procedures in this guide are only for service technicians trained by Digital Equipment Corporation.

Conventions

This document uses the following conventions:

Convention	Meaning
WARNING	Provides information to prevent personal injury
CAUTION	Provides information to prevent damage to equipment
NOTE	Provides general information you should be aware of
CTRL+ALT+DEL	Key sequences. Press and hold the indicated keys in the order shown. In this example, press and hold CTRL while you press both ALT and DEL. Key sequences have special functions.
`Strike the F1 key`	What the screen displays as a prompt or an instruction is shown in monospaced type.

Throughout this guide, *DECpc* refers to the DECpc 433T.

The DECpc 433T complies with the EISA specification. Support for EISA requires a defined set of ROM-BIOS (read-only memory, basic I/O system) services, which the DECpc offers.

Ordering Parts

Customers who maintain their own equipment can order spare parts by either phone or mail, or through any Digital sales office.

To order parts by phone, call 1-800-DIGITAL from 8:30 am to 8:00 pm (Eastern Standard Time).

To order parts by mail, send a purchase order to:

Digital Equipment Corporation
P. O. Box CS2008
Nashua, NH 03061

Related Documentation

The following related documents are available as supplements to the information provided in this guide.

Document Title	Part Number
DECpc 433T Installation Guide	ER-PCT10-IG
DECpc 433T User's Guide	ER-PCT10-UG
DECpc 433T Application Bulletin	ER-PCT10-AB
DECpc 433T Technical Reference	ER-PCT10-TR
DECstation Option Installation Guides Service Kit	ER-4XOPS-SV
PCSA Network Troubleshooting Guide	AA-JU54A-TH
DEC EtherWORKS Service Guide	EK-DE21A-SV
DECconnect System Stand-alone ThinWire Networks Planning and Installation Guide	EK-DECSY-TG
DECconnect System Planning and Configuration Guide	EK-DECSY-CG
DECconnect System Installation Verification Guide	EK-DECSY-VG

Digital personnel may order documents with part numbers beginning with either ER or EK from:

Digital Equipment Corporation
444 Whitney Street
Northboro, MA 01532

Attn: Publishing and Circulation Services (NR03/W3)
Order Processing Section

Digital personnel may order documents with part numbers beginning with AA from:

Digital Equipment Corporation
Digital Drive
Westminster, MA 01473-0471

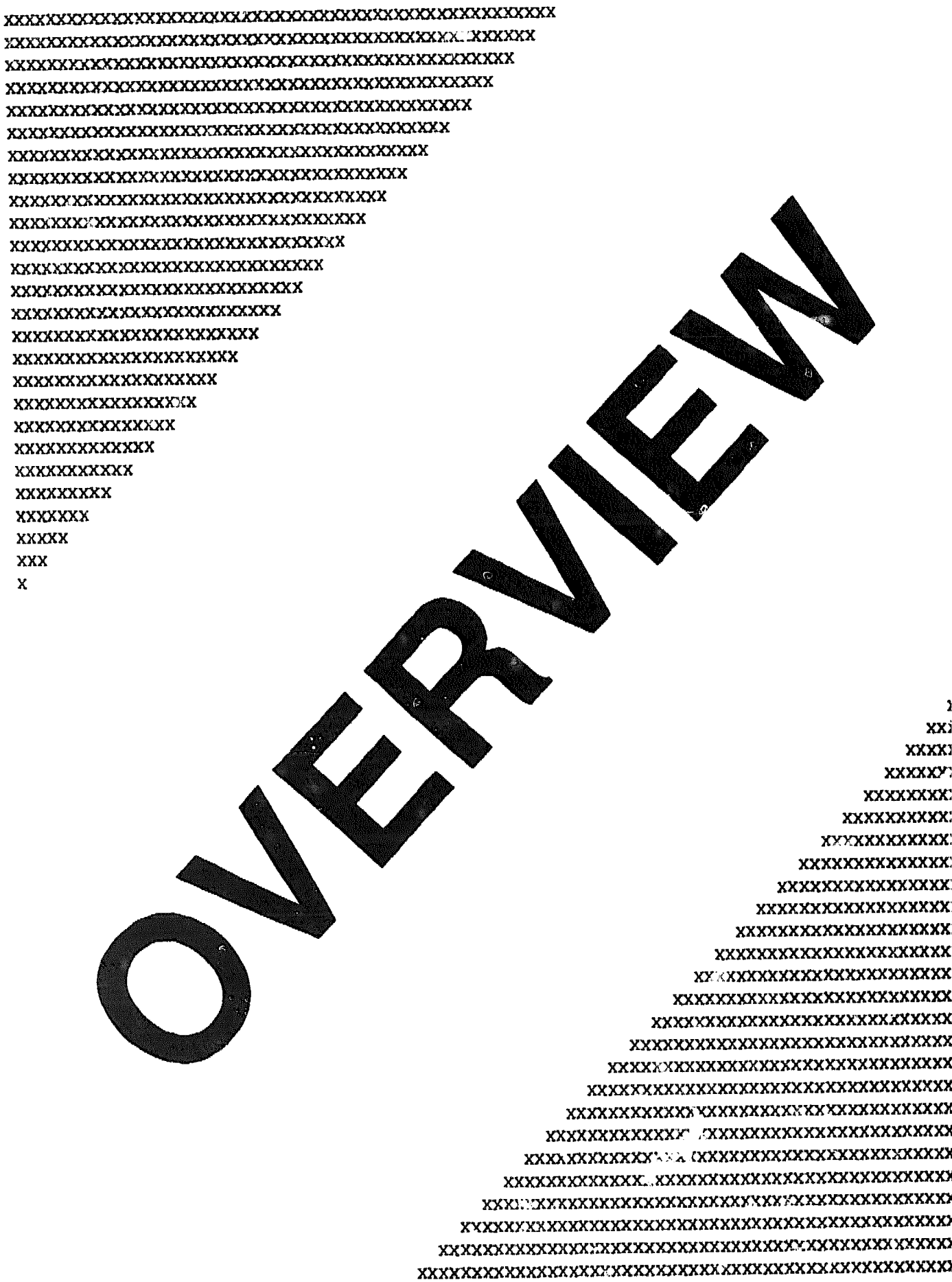
Attn: Order Administration

Digital self-maintenance customers may order documents with part numbers beginning with EK, ER, or AA by mail or by phone:

To order documents by phone, call 1-800-DIGITAL between 8:30 am and 8:00 pm Eastern Standard Time.

To order documents by mail, write to:

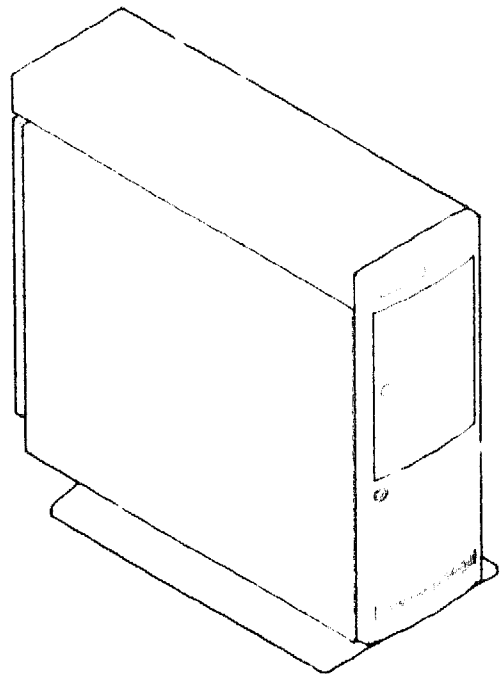
Digital Equipment Corporation
Peripherals and Supplies Group
P. O. Box CS2008
Nashua, NH 03061


OVERVIEW

Overview

Introduction

The DECpc (shown below) is a high-performance EISA computer. It can be used as a stand-alone computer or as a client or server in a network environment. The DECpc runs Digital and other industry-standard applications.



The DECpc 433T

As a node on a Personal Computing System Architecture (PCSA) network, the DECpc is the user's interface with the applications and services that the PCSA family of products provides. As part of a network, the DECpc communicates with other computers on the network and shares the various resources and services offered by Digital computers and servers.

DECpc Base System

The DECpc base system unit consists of the following:

- All-steel modular case with pedestal and LCD front panel
- i486 EISA main logic board containing:
  - 33 MHz i486 processor with built-in 8KB data cache and floating point unit
  - 4MB RAM, expandable to 64MB
  - 128KB cache memory, expandable to 256KB
  - sixteen 32-bit SIMM (RAM memory) sockets
  - eight high-speed, 32-bit EISA expansion slots (six bus master slots) compatible with ISA 16/8-bit adapters
  - PS/2-style AT-compatible keyboard interface
  - socket for optional Weitek 4167-33 coprocessor
- 383-watt power supply (automatically senses 115V, 60 Hz or 230V, 50 Hz AC input) with an auxiliary unswitched IEC-320 outlet
- 3½-inch, 1.44MB diskette drive
- System Configuration Diskette (5 language-specific diskettes), EISA SCSI Host Adapter Drivers Diskette (English-only), and an ISA Option Configuration Diskette (English-only)
- Security lock
- Support for up to 10 half-height drives
- ISA multi-function adapter that provides:
  - dual serial ports
  - one parallel printer port
  - a diskette drive controller that supports two diskette drives
  - an LCD interface
- EISA SCSI host adapter providing support for up to seven SCSI devices.
- Serial mouse

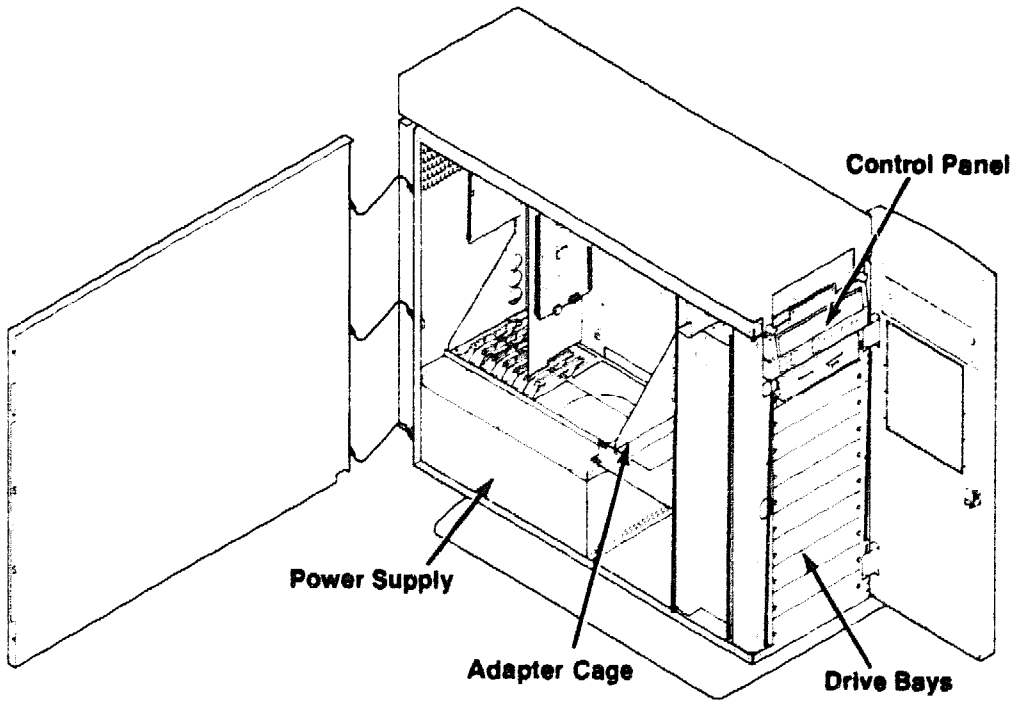
DECpc Options

The options available for the DECpc include the following:

- Color or monochrome VGA analog monitor
- Keyboard (country-specific)
- VGA 1024 graphics adapter
- 8514/A-compatible VGA adapter (Slot 2 only)
- Serial/Parallel Port adapter
- Dual Port Serial adapter
- 40MB, 80MB, 105MB, 170MB, and 320MB SCSI hard disk drives
- CD-ROM drive
- 33 MHz Weitek 4167 math coprocessor
- DEC EtherWORKS LC network interface board
- DEC EtherWORKS Turbo network interface board
- DEC EtherWORKS bus adapter

System Unit Layout

The figure below shows the location of both standard and optional equipment within the system unit. Standard, base system equipment is represented by solid lines. Optional equipment is represented by dotted lines.



System Unit Layout

DECpc System Configurations

Customers can order one of several packaged systems that offer optional system memory configurations, mass storage devices, and video adapters installed at the factory. Alternately, customers can purchase the DECpc base system and DEC-supported options separately, and configure their own systems. All DECpc systems accept either 115 VAC or 230 VAC input; the power supply automatically senses the input voltage used and operates accordingly.

The base system configurations and packaged systems are listed in the following tables.

Base System Configuration

Model Number	Part Number	Description
PCT10-A2	30-35677-01	DECpc 433T, i486-33 EISA tower, 128KB secondary cache (expandable to 256KB), 4MB memory (expandable to 64MB), 3½-in. 1.44MB diskette drive, 8 EISA expansion slots, 10 half-height storage bays, EISA SCSI Host Adapter, Dual serial, parallel, and keyboard ports, Built-in 2-line LCD display, Serial mouse, Multilingual user documentation set (Installation Guide, User's Guide), no keyboard, no power cord
PCT10-AA		PCT10-A2, plus 101-key industry standard keyboard and 15A, 115V power cord (17-00083-39)

Packaged Systems		
Model Number	**Part Number**	**Description**
DJ-PCTS1-AA		Packaged Server based on the DECpc 433T (PCT10-AA). Includes: 12MB system memory, 2 x 320MB SCSI hard drives for a total of 640MB storage, monochrome monitor, Digital ethernet controller, OS/2 ver 1.21, Pathworks for OS/2 media, documentation and server license.

DECpc Main Logic Board

The DECpc main logic board contains 8 EISA expansion slots, 16 SIMM sockets, the cache memory sockets, and the math coprocessor socket. The real-time clock and EISA configuration RAM are also on the main logic board. The clock maintains the system time and date; the RAM maintains configuration settings.

DECpc Multi-Function I/O Board

The multi-function board contains a dual diskette drive controller, 2 serial ports, 1 parallel port and the LCD interface.

EISA SCSI Host Adapter

The DECpc includes an EISA bus to SCSI host bus adapter. This adapter provides the interface for SCSI devices and the EISA bus. The EISA SCSI Host adapter can support up to seven SCSI devices.

Power Supply

The DECpc contains a 383-watt power supply that includes an auxiliary unswitched AC power (IEC) connector. The power supply is compatible with 115 VAC (60 Hz) or 230 VAC (50/60 Hz) input.

Serial Mouse

The DECpc is packaged with a two-button serial mouse. The mouse interfaces to the computer through one of the serial ports on the multi-function adapter.

Keyboards

Several keyboards are available as options on the DECpc. Keyboards used with the DECpc must be equipped with a 6-pin miniature DIN (PS/2-style) connector.

Industry Standard PS/2-style 101-key Keyboard

The 101-key enhanced keyboard provides the industry-standard PS/2-style key arrangement with American English keys.

International 102-key Industry Standard Keyboards

The international keyboards provide a standard 102-key arrangement in language-specific variations. Country-specific keyboards are available for Belgium, Denmark, Finland, France, Germany, Israel, Italy, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom.

VGA 1024 Graphics Adapter

The optional VGA 1024 graphics adapter supports Hercules Mono, CGA, EGA, VGA and Super VGA modes including 132-column text, 800 x 600 graphics, and 1024 x 768 graphics. The text mode and color or monochrome mapping are set by application software or by using the VGA.EXE utility supplied with the adapter. The VGA 1024 adapter can run software written for any of the listed video standards on any supported monitor.

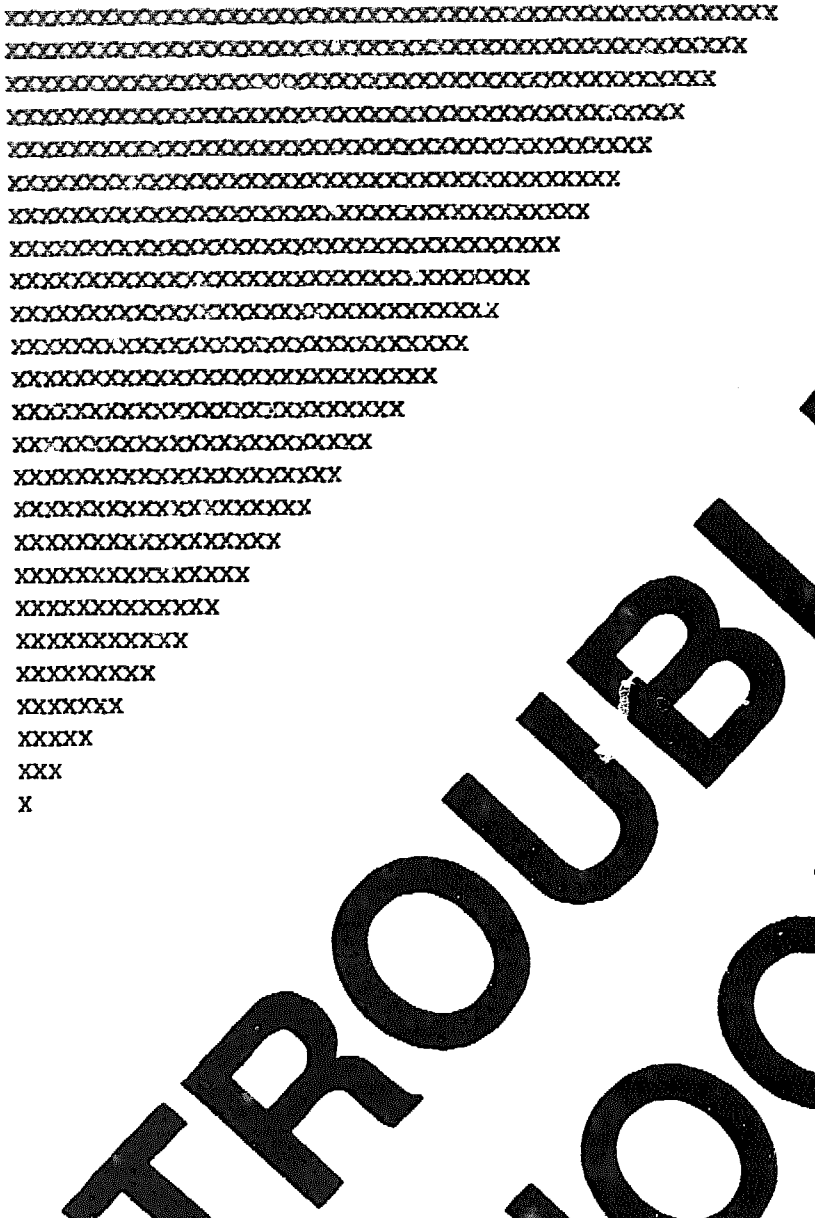
Monitors

The VGA 1024 graphics adapter supports both color and monochrome VGA analog monitors. Monitors with different input voltage and alignment specifications are available to meet international requirements.

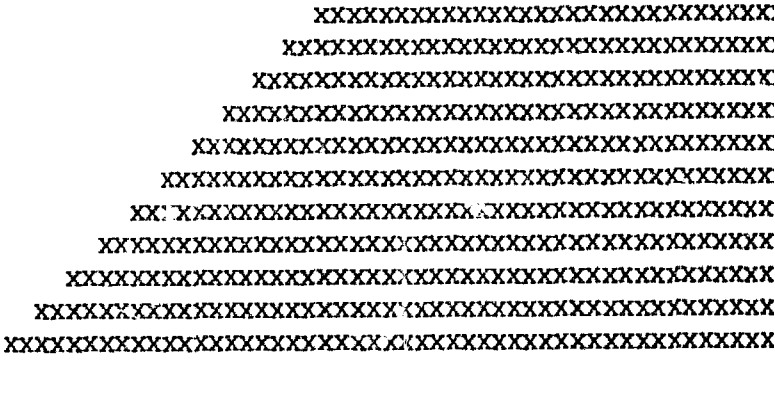
Weitek 4167 Math Coprocessor

The i486 processor in the DECpc features a floating point unit that enhances the numeric processing power of the DECpc. If additional numeric processing is required, the Weitek 4167 Abacus Math Coprocessor can be added to the DECpc. The Weitek 4167 supplements the floating point math performance for "Weitek-aware" applications. This chip independently executes mathematical calculations, allowing the i486 to perform other tasks.

NOTE: The math coprocessor speed must match the CPU speed (33 MHz).



TROUBLE-SHOOTING



Troubleshooting

This chapter provides the following information:

- diagnostic and special tools for the DECpc
- definition of the normal power-up routine
- system and component troubleshooting procedures
- error codes and messages
- how to use the System Configuration Diskette

For information about jumper settings, troubleshooting, and servicing of the DEC EtherWORKS option board and related network connections refer to the *DEC EtherWORKS Service Guide*.

Diagnostics

The DECpc has internal ROM-based diagnostics to aid in troubleshooting. These diagnostics run when the system is turned on and verify the operation of the machine. Error messages are given in two formats: beep codes and error messages on the screen or LCD panel. These error messages are explained in "*Error Codes and Messages*."

Special Tools

The following table lists the special tools needed to troubleshoot the DECpc system.

Troubleshooting Tools

Tool	Part Number	Description
DiagSoft QAPlus/fe Diagnostics Software		Stand-alone diagnostics, available separately. For information on how to use these diagnostics, refer to the *QAPlus/fe User's Guide*.
Tri-wrap Loopback Connector	FD-10164-00	Triple connector, consists of three loopback connectors (male 25-pin parallel, female 25-pin serial, and female 9-pin serial) bundled together and housed in a convenient package.
DECpc System Configuration Diskette (available in English, French, German, Spanish, and Italian)	AK-PCT10-AA Diskette 1 of 3	Use to reconfigure the system when options are installed.
EISA SCSI Host Adapter SCO UNIX System V/386 3.2 v2.0 Drivers Diskette	AK-PCT10-AA Diskette 2 of 3	SCSI DACB mode support (refer to *DECpc 433T Application Bulletin* for more information)
ISA Option Configuration Diskette	AK-PCT10-AA Diskette 3 of 3	ISA Configuration (.CFG) files to be used with Computer Configuration Utility

Normal Power-Up

A normal system power-up routine includes the following sequence of events:

1. Power to the monitor (if one is attached to the system) and system unit is turned on. Both power indicators are illuminated.
2. The system executes power-up tests and displays the BIOS ROM version, copyright information, and the memory size. Depending on the option(s) installed in the system, additional information might also be displayed.

   If an error occurs during any power-up test, the system generates a beep error code or displays an error message.
3. The system generates a single beep, displays information about the operating system, and gives the date prompt. Note that the actual information given at this time depends on the system software.

Troubleshooting Procedures

This section describes three troubleshooting procedures that can be used depending on the state of the system. Each procedure will get the system to a state where it can run the QAPlus/fe diagnostic package. Perform the steps in "*Getting Started*," and then proceed to the recommended procedure.

CAUTION: If the DECpc is connected to a network, disconnect it from the network before troubleshooting.

Getting Started

The following steps prepare you for troubleshooting a DECpc:

1. Ask the customer to describe the problem. Find out:
   - when the problem started
   - whether any new hardware options were added to the system around the time the problem started and whether the options are Digital-certified or third-party
   - whether any new software was added to the system
2. Have the customer provide a ***copy*** of the operating system diskette(s) that came with the system.
3. Have the customer provide you with the following system configuration information:
   - type and amount of memory
   - type of video graphics adapter
   - type and number of disk drives
   - type of disk adapter
   - type of monitor
   - type of keyboard
   - type of network adapter
   - type of mouse
   - any other options installed in the system
4. Observe the problem, and then refer to one of the following procedures:
   - If the system does not power up, see "*No Power.*"
   - If the system powers up but does not boot, see "*System Does Not Boot.*"
   - If the system powers up and boots, see "*System Boots.*"

No Power

This procedure is to help determine the cause of the problem when the DECpc does not power up. Before starting this procedure be sure you have completed the steps in "*Getting Started.*"

1. Check the system for loose cables and connections.
2. Plug the system unit and monitor power cord into a working AC outlet.
3. Turn on the monitor and system unit. Check for system power. The following are indications that power to the system and monitor is on:
   - power indicator lights on the main logic board, control panel, and monitor are on
   - you can hear the fan running
   - you can hear the hard disk spinning
4. If the system does not power up:
   a. Turn off the system unit and monitor.
   b. Unplug the system and monitor from the AC outlet.
   c. Disconnect the power cables from all hard drives and remove all options except the VGA adapter, if installed.
   d. Plug the monitor and system into a working AC outlet.
   e. Turn on the monitor and the system power. If the system powers up now, it indicates that the problem was a faulty device, too many options installed, or another power-related problem.
   f. Try booting the system from the operating system start-up diskette.
   g. Replace the Digital certified options one at a time. Verify that the system powers up correctly each time an option is replaced or a disk drive is reconnected.
5. If the system powers up and does not boot, refer to "*System Does Not Boot.*"
6. If the system powers up and boots, refer to "*System Boots.*"

System Does Not Boot

This procedure is to help determine why the DECpc does not boot. Before starting this procedure, be sure you have completed the steps in "*Getting Started.*"

1. Remove any third party options, and try to reboot the system. If the system generates any beep codes refer to "*Power-Up Beep Codes.*"
2. Try booting from the operating system start-up diskette.
   a. If the system does not boot, verify that all jumpers are set correctly on the system board and on the multi-function adapter. Then, reboot the system.
   b. Verify that the start-up diskette is valid. If another system is available, try booting the other system from the start-up diskette you want to verify.
   c. Verify that all cables are correctly connected and installed.
   d. Lack of video possibly indicates a faulty graphics adapter, if installed.
   e. If the system still does not boot, remove all options except the graphics adapter and try to boot the system.
   f. Replace the Digital-certified options one at a time and see whether the system powers up and boots each time an option is replaced or a disk drive is reconnected.
   g. Run "Configure computer" and "Setup computer" on the System Configuration Diskette to verify that no hardware conflicts exist.
3. When the system boots correctly, refer to "*System Boots.*"

System Boots

This procedure is to help determine the cause of a problem that arises after the DECpc powers up and boots normally. Before starting this procedure, be sure you have completed all steps in "*Getting Started.*"

CAUTION: If the DECpc is connected to a network, disconnect it from the network before beginning to troubleshoot.

1. Determine what the failure is. Refer to "*Error Codes and Messages*" for a list of possible error messages. If there are no error messages refer to

"*Troubleshooting by Symptom*" for a list of symptoms and possible causes.

2. Run the QAPlus/fe diagnostics.
3. Replace the faulty FRU.

Error Codes and Messages

During the power-up sequence, the DECpc executes built-in diagnostic routines. Initially, the system generates beep codes on the speaker if the test program detects a fatal error. After screen initialization and screen retrace verification are complete, non-fatal error messages are sent to video memory and the system displays the messages on the monitor (if available) or on the LCD panel.

CAUTION: Do not connect or disconnect the video cable from the monitor or system when the monitor and/or system is on. This can cause damage to the system. Always turn the monitor and system off, then wait 20 seconds and disconnect the power cord before you remove the system unit cover. Observe antistatic precautions.

Primary Beep Codes

The system generates two levels of beep codes. The primary level consists of a combination of long and short beeps that indicate possible system malfunction conditions. The secondary level uses bursts of beeps to indicate specific malfunction locations on the main logic board.

The following table lists the primary beep codes. The primary beep codes indicate a main logic board failure, memory failure, memory configuration error, or video error. If a memory failure is indicated, check and re-seat the single-in-line memory modules (SIMMs) in the system. If you suspect a bad SIMM, replace one SIMM at a time and test for recurrence of the error after installing each SIMM.

Primary Beep Codes

Beep Pattern	Possible Problem	Corrective Action
Short-short	Keyboard failure	Be sure the keyboard cable is firmly connected.
	Hard disk failure	Be sure the drive cables are firmly connected and all drive and adapter jumpers are set correctly.
	Diskette drive failure	Be sure the drive cables are firmly connected and the drive switch/jumper is set correctly.
	Tape drive failure	Be sure the drive cables are firmly connected and all drive and host adapter jumpers are set correctly.
	Invalid configuration	Verify the information in Setup computer and Configure computer.
	Configuration record bad	Check the information entered with the Setup utility. See the hard disk installation guide for configuration information.
	Clock chip lost power	Turn the computer off, wait 20 seconds, and then turn it on again.

Primary Beep Codes (continued)

Beep Pattern	Possible Problem	Corrective Action
Short-short (continued)	Network controller configuration error	Reset the system. Check all IRQ, memory, and I/O address jumper settings. Refer to the DEC EtherWORKS Owner's Manual for more information.
Long-short-long-short	Video failure	Be sure the VGA adapter is firmly connected to the main logic board.
Several bursts of beeps[1]	BIOS ROM, CMOS, DMA, RAM, interrupt, or read/write errors	Check cable connections and jumper and switch settings. If the problem persists, there might be a problem on the main logic board.
[1] If the system generates bursts of beeps, refer to "*Secondary Beep Codes*" for a list of specific failure locations corresponding to the particular numeric beep code pattern.		

Secondary Beep Codes

The table on the following page lists the secondary beep codes and the test in progress or test failure that corresponds to each numeric beep code pattern. Secondary beep codes are a series of beeps. When several bursts of beeps are generated, listen carefully and record the numeric beep code pattern. For example, "2-1-4" (a burst of two beeps, a single beep, and a burst of four beeps) indicates a failure of bit 3 in the first 64KB of RAM.

Secondary Beep Codes

Beep Code	Description of Test or Failure
1-1-3	CMOS write/read test in progress or failure
1-1-4	BIOS ROM checksum test in progress or failure
1-2-1	Programmable Interval Timer test in progress or failure
1-2-2	DMA initialization test in progress or failure
1-2-3	DMA page register write/read test failure
1-3-1	RAM refresh verification test in progress or failure
1-3-3	1st 64KB of RAM or data line failure – multi-bit[1]
1-3-4	1st 64KB RAM odd/even logic failure
1-4-1	1st 64KB RAM address line failure
1-4-2	1st 64KB RAM parity test in progress or failure
2-1-1	1st 64KB of RAM or data line failure – bit 0
2-1-2	1st 64KB of RAM or data line failure – bit 1
2-1-3	1st 64KB of RAM or data line failure – bit 2
2-1-4	1st 64KB of RAM or data line failure – bit 3
2-2-1	1st 64KB of RAM or data line failure – bit 4
2-2-2	1st 64KB of RAM or data line failure – bit 5
2-2-3	1st 64KB of RAM or data line failure – bit 6
2-2-4	1st 64KB of RAM or data line failure – bit 7
2-3-1	1st 64KB of RAM or data line failure – bit 8
2-3-2	1st 64KB of RAM or data line failure – bit 9
2-3-3	1st 64KB of RAM or data line failure – bit A
2-3-4	1st 64KB of RAM or data line failure – bit B
2-4-1	1st 64KB of RAM or data line failure – bit C
2-4-2	1st 64KB of RAM or data line failure – bit D
2-4-3	1st 64KB of RAM or data line failure – bit E
2-4-4	1st 64KB of RAM or data line failure – bit F
3-1-1	Slave DMA register test in progress or failure
3-1-2	Master DMA register test in progress or failure
3-1-3	Master interrupt mask register test in progress or failure
3-1-4	Slave interrupt mask register test in progress or failure
3-2-4	Keyboard controller test in progress or failure
3-3-4	Screen memory test in progress or failure[2]
3-4-1	Screen initialization test in progress or failure
3-4-2	Screen retraces tests in progress or failure

[1] Any of the RAM failures can be caused by a SIMM not being properly seated in its socket.

[2] Test failures from this point on can usually be attributed to the VGA adapter or the slot connector. Try moving the adapter to a different slot.

Test Messages

After screen initialization and verification, the system displays non-fatal error messages on the screen or LCD panel. The following table lists these messages and the corresponding BIOS error numbers.

BIOS Error Messages

Error Number	Error Message
01	Gate A20 failure
02	Unexpected interrupt in protected mode
03	Unexpected SW interrupt at xxxx:xxxx (R)eboot, other to continue
04	Memory tests terminated by keystroke
05	Memory write/read failure at xxxx - read zzzz expecting yyyy
06	Video adapter failed; using alternate
07	No timer tick interrupt
08	Shutdown failure
09	Timer chip counter 2 failed
10	Keyboard xxxxxx failure
11	Diskette subsystem reset failed
12	Diskette drive 0 seek failure
13	Diskette drive 1 seek failure
14	Hard disk configuration error
15	Hard disk controller failure
16	Hard disk failure
17	Time-of-day clock stopped
18	Invalid configuration information
19	Time-of-day not set
20	Keyboard is locked - please unlock
21	Optional ROM bad checksum = xx
22	Strike the F1 key to continue, F2 for setup
23	Diskette read failure -
24	Not a boot diskette -
25	No boot device available -
26	Hard disk read failure -
27	No boot sector on hard disk -',0
28	Insert system diskette and Strike the F1 key to retry boot
29*	I/O card parity interrupt at xxxx:xxxx (S)top NMI, (R)eboot, other to continue
30*	Memory parity interrupt at xxxx:xxxx (S)top NMI, (R)eboot, other to continue
31*	Unexpected type 02 interrupt at xxxx (S)top NMI, (R)eboot, other to continue

* not used

BIOS Error Messages (continued)

Error Number	Error Message
32	Strike F1 to retry boot, F2 for setup
33	Invalid EISA configuration storage
34	Configuration error for slot x
35	ID information mismatch for slot x
36	No fail safe timer NMI (S)top NMI, (R)eboot, other to continue
37	No Software Port NMI (S)top NMI, (R)eboot, other to continue
38	Unresolved memory parity error (S)top NMI, (R)eboot, other to continue
39	Memory Parity error at xxxx:xxxx (S)top NMI, (R)eboot, other to continue
40	I/O Expansion board NMI, Slot x
41	I/O Expansion board NMI (S)top NMI, (R)eboot, other to continue
42	Expansion Board was disabled (S)top NMI, (R)eboot, other to continue
43	Fail Safe Timer NMI (S)top NMI, (R)eboot, other to continue
44	Unresolved Bus Timeout NMI (S)top NMI, (R)eboot, other to continue
45	Bus Timeout NMI, Slot x (S)top NMI, (R)eboot, other to continue
46	Software NMI (S)top NMI, (R)eboot, other to continue
48	Enter password:
49	Password is incorrect
50	Password OK
51	Password has been removed
52	New password has been installed
53	System halted! Must power down.

Troubleshooting by Symptom

This section describes causes and corrective actions for minor problems involving the system unit, hard disk drives, diskette drives, monitor, and pointing device.

System Unit Problems

The following table lists some common problems with the system unit, possible causes, and suggested corrective actions. If the corrective action does not work and it is possible to run the QAPlus/fe diagnostics, use them to isolate the problem and then replace the failing FRU.

System Unit Troubleshooting Procedures

Problem	Possible Cause	Corrective Action
No response when the system is turned on.	System is not plugged in.	Turn the system off. Plug in the system, then turn the system on again.
	No power at wall outlet.	Use a working AC wall outlet.
Power is on, but there is no screen display.	Brightness and contrast controls are not set properly.	Adjust brightness and contrast controls.
	Power to the monitor is off.	Turn on the monitor.
	Monitor cable incorrectly installed.	Make sure the monitor cable is installed properly.
	VGA board failure.	Make sure the VGA board is firmly seated in the option slot and the jumpers are set correctly.
A DEC EtherWORKS board is installed but the node does not boot when you try to reboot after using the system configuration diskette.	Using a diskette-generated reset is not compatible with the DEC EtherWORKS board.	Press CTRL+ALT+DEL (a soft reset) to properly reset the hardware. Turn the system off and then on.

System Unit Troubleshooting Procedures (cont'd)

Problem	Possible Cause	Corrective Action
System does not boot from the hard disk.	There is no software on the partition.	Install software on the partition.
	System software is not on the disk.	Load the system software onto the hard disk.
	Requested partition does not exist or is not formatted.	Check the partitions. Format the partition; repartition if necessary.
	Drives are configured incorrectly.	Make sure the drives are correctly configured.
	Hard disk is not installed properly.	Check the hard disk installation.
Tape does not work in the tape drive.	Tape is not fully inserted into the tape drive.	Make sure the tape is fully inserted and the cartridge release handle is locked down.
	Tape is worn or damaged.	Try another tape.
System does not boot from the diskette drive.	Diskette is not in the diskette drive.	Insert a diskette containing bootable system software.
	Drive switch is set incorrectly.	Make sure the drive switch is set correctly.
	Diskette is not bootable.	Use a diskette that contains bootable system software.
	Diskette is worn or damaged.	Try another diskette.
	Hardware conflict (remote boot).	Make sure the system is not set for remote boot.
System does not reboot when power is turned off and on.	Power was not off long enough.	Turn the power off for at least 20 seconds before rebooting.

Disk-Related Problems

The following table lists some common disk-related problems, possible causes, and suggested corrective actions. If the corrective action does not work, run the QAPlus/fe diagnostics to isolate the problem and then replace the failing FRU.

If a disk-related problem occurs, verify the information recorded in the Setup computer and Configure Computer utilities. Incorrect identification in either utility can lead to unexpected responses from the drive.

Disk-Related Troubleshooting Procedures

Problem	Possible Cause	Corrective Action
Hard Disk cannot read or write information.	Problem exists with the drive or drive adapter.	Make sure all jumpers are set correctly.
Intermittent hard disk read/write problems.	Possible corrupted files.	Reformat and repartition disk; restore disk contents from backup files.
Hard disk works but files contain extra characters or garbled text.	Hard disk is affected by static electricity.	Move system away from any motors, magnetic devices, or photocopiers.
		Increase the humidity in the room and use antistatic mats around the system.
System won't start from the diskette drive or displays the message "Abort, Retry, Fail"	The diskette has been demagnetized.	Make sure the diskette drive cable is correctly installed. Replace the diskette.
	Improperly formatted diskette.	Reformat the diskette.

Disk-Related Troubleshooting Procedures (cont'd)

Problem	Possible Cause	Corrective Action
Diskette drive cannot read or write information.	The diskette drive is empty.	Insert a diskette into the diskette drive.
	Diskette is not formatted.	Use a formatted diskette.
	Cable not connected properly.	Verify correct cable connection.
	Diskette is worn or damaged.	Try another diskette.

Monitor Problems

NOTE: Not all DECpc systems include a monitor. Use this section only if your system has a monitor.

The following table lists some common monitor problems, possible causes, and suggested corrective actions. If the corrective action does not work and it is possible to run the QAPlus/fe diagnostics, use them to isolate the problem and then replace the failing FRU.

Monitor Troubleshooting Procedures

Problem	Possible Cause	Corrective Action
Green LED on monitor is not lit.	Power to the monitor is off.	Turn on monitor, then turn on the system.
	Power cord is not connected.	Make sure the power cord is connected to an AC wall outlet.
	No power at wall outlet.	Use another outlet.
Screen is blank and monitor LED is on.	Contrast and brightness controls set to minimum.	Adjust the contrast and brightness controls.
	VGA board failed.	Replace the VGA board and then the monitor.
Screen goes blank after successful power-up; monitor LED is off.	Power or monitor failure.	Turn the monitor and system off. Disconnect the monitor from the wall and then from the system. Plug the monitor into an active AC wall outlet. If the monitor LED does not turn on, there is a problem with the monitor or monitor LED.

Monitor Troubleshooting Procedures (cont'd)

Problem	Possible Cause	Corrective Action
Monitor LED is off, but display is OK.	Faulty LED.	Replace the monitor.
Monitor is on, but no cursor or text is displayed.	Power to the system is off.	Turn on the system.
	Contrast control is set to minimum.	Turn up the contrast control.
	VGA board failure	Replace the VGA board and the monitor.
Screen display is distorted, rolling, flickering, or wrong or uneven color.	Monitor cable connector pins bent or broken.	Straighten pins or replace monitor.
	Electromagnetic interference exists.	Move electro-mechanical devices away from the monitor, or move the monitor.
	Faulty video board.	Replace the video board.
Screen displays distorted images or goes blank when you run the software.	Software is not configured for, or is not compatible with, the current settings of the VGA board.	Reconfigure the software for VGA or set the VGA board to a standard supported by the software. Refer to software and VGA manuals.
Screen displays partially highlighted characters.	VGA board jumpers are incorrectly set.	Make sure the switch settings on the VGA board are correct.
You have a color monitor and the display is monochrome.	The system was turned on *before* the monitor was turned on.	Turn the monitor and system off. Wait at least 20 seconds. Turn on the monitor, *then* turn on the system.
	Main logic board DIP switch is incorrectly set.	Verify the main logic board DIP switch settings.

Troubleshooting Problems Occurring During System Operation

Use the following list to help isolate a problem to a specific subsystem. See also "*Troubleshooting by Symptom.*"

If the problem occurs during diskette drive access:

- Check drive select jumper setting on the diskette drive.
- Look for slightly loose cables.
- Check the multi-function adapter jumper settings.
- If possible, run the diagnostics. The problem may be with the main logic board, multi-function I/O board, or faulty loading on the data bus.

If the problem occurs during hard disk drive access:

- Check the hard disk drive, including jumper and switch settings.
- Check for loose drive cables.
- Make sure the SCSI board is seated properly and configured correctly.

If the problem seems to be video related:

- Check the main logic board color/mono video switch setting.
- Check the graphics adapter configuration settings.

If the problem seems to be keyboard related:

- Keyboard lock switch may be partially engaged.
- Check the keyboard connection.
- Run the QAPlus/fe diagnostics. The problem might be the keyboard interface on the main logic board.

If the problem is not reproducible or is intermittent:

Expansion options might be competing for interrupt request lines (IRQs), I/O, or memory addresses.

If the problem seems to be heat related:

Make sure there is sufficient air flow around the system and that the system is clean.

Using the System Configuration Diskette

The menu-driven System Configuration diskette (shipped with the system and required as a Customer Service tool) must be used when options are added to the system. Use the System Configuration Diskette that supports the language you choose.

When the System Configuration Diskette is used as a boot disk, an option menu displays. From this menu, select the desired utility:

```
Learn about configuring your computer
Copy Diskette
Setup Computer
Configure Computer
Set power-on password
Set front panel message.
```

Configuration Basics

The first option on the utilities menu, Learning About Configuring the Computer, displays general information about when to use each utility on the diskette. Read this information if you are not certain of the purpose of a utility.

Running the Setup Program

The Setup Computer utility must be run when any of the following occurs:

- the amount of memory in the system is changed
- diskette drives are added or removed
- a new or different video adapter is installed
- the real-time clock is disconnected or replaced
- non-SCSI hard drives are added or removed
- a SCSI Host Adapter is added or removed

You need the following information when you run the Setup Computer utility:

- the type of diskette drives and hard drives in the system
- system base memory size and extended memory size (displayed on the screen at power-up)

- Primary video adapter type

To run the Setup Computer utility:

1. Turn on the monitor.
2. Insert the System Configuration diskette in the drive and turn on the system.
3. The power-up tests run, then the monitor displays the Digital logo, then a welcome message, and then the main menu. Select SETUP COMPUTER, and then press ENTER.

   NOTE: If the hard disk is not formatted, a hard disk failure message might be displayed during the power-up tests.

4. The monitor displays the Setup utility menu. Follow the instructions on the bottom of the screen and select the correct system configuration, then press F2 to save and restart the system.

   NOTE: Use the key**board** arrow keys, not the key**pad** arrow keys, to select a configuration in the Setup utility.

Refer to the User's Guide provided with the system for more information about the Setup utility.

Running the Computer Configuration Utility

The Configure Computer option on the Configuration Diskette main menu runs the Computer Configuration Utility.

NOTE: Make a copy of the System Configuration Diskette before running the Configure Computer option.

Use the Configure Computer option when you add an EISA-compatible or an ISA-compatible option to the system. The EISA specification requires that each option in the system have a unique identification number. The system uses this number to recognize the device and allocate system resources required by the device.

To run the Computer Configuration Utility:

1. Turn on the monitor.
2. Insert a copy of the System Configuration Diskette into the drive and turn on the system. Be sure you do not use the master copy of the System Configuration Diskette.

3. The power-up tests run, and then the monitor displays the Digital logo, then a welcome message, and then the main menu. Select the CONFIGURE COMPUTER option, and then press ENTER. The Configure Computer sub-menu will be displayed on the monitor.

4. Select COPY CONFIGURATION (CFG) FILES. Insert a diskette with the appropriate CFG files, and select the options that are installed in the computer. These configuration files are copied onto the System Configuration diskette.

   NOTE: EISA configuration (CFG) files are furnished with all EISA adapter boards. If an ISA adapter did not include a CFG file on diskette, check the ISA Option Configuration diskette. The ISA Option Configuration diskette has CFG files for many common ISA adapters.

5. After the CFG files are copied to the System Configuration Diskette, the Configure Computer sub-menu is displayed again. Select CONFIGURE COMPUTER - ADVANCED METHOD.

6. To add an option, use the Edit Add command. Follow the prompts on the screen to select the option to be installed and to identify the slot in which it will be installed.

7. To move or remove an option, position the cursor on the slot where the option is currently installed. Use either the Edit Move or the Edit Remove command to appropriately revise the system configuration.

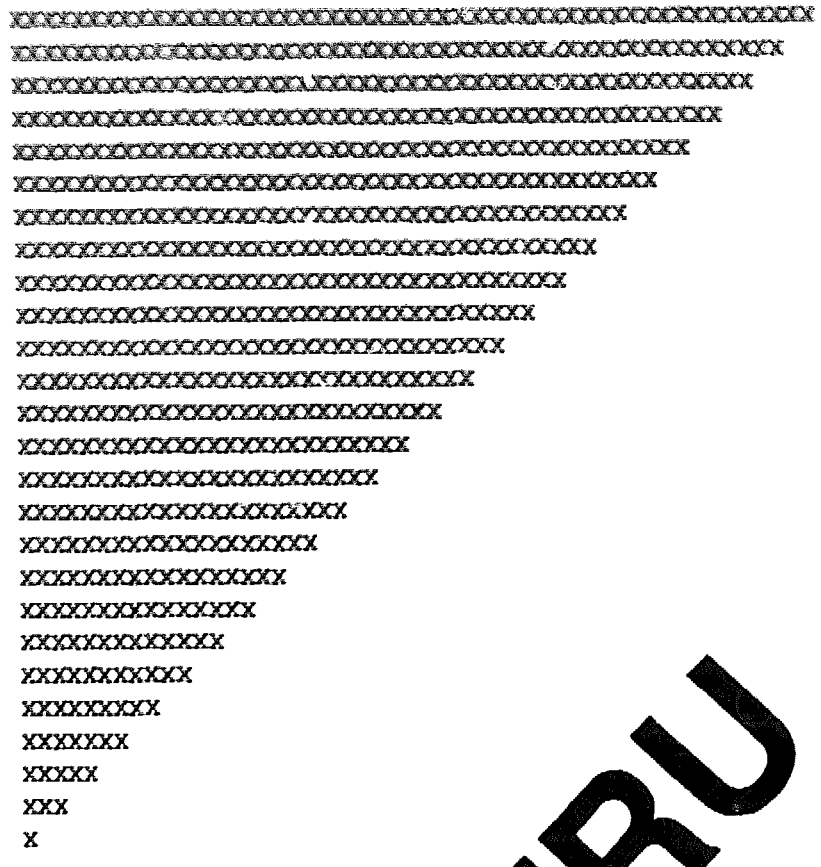
8. After making all required changes, save the configuration to the System Configuration Diskette. To do this, select the System Save As command. When prompted, enter a file name and description for the current configuration. The default filename is SYSTEM.SCI.

9. Save the configuration in non-volatile memory. Use the System Exit option to do this.

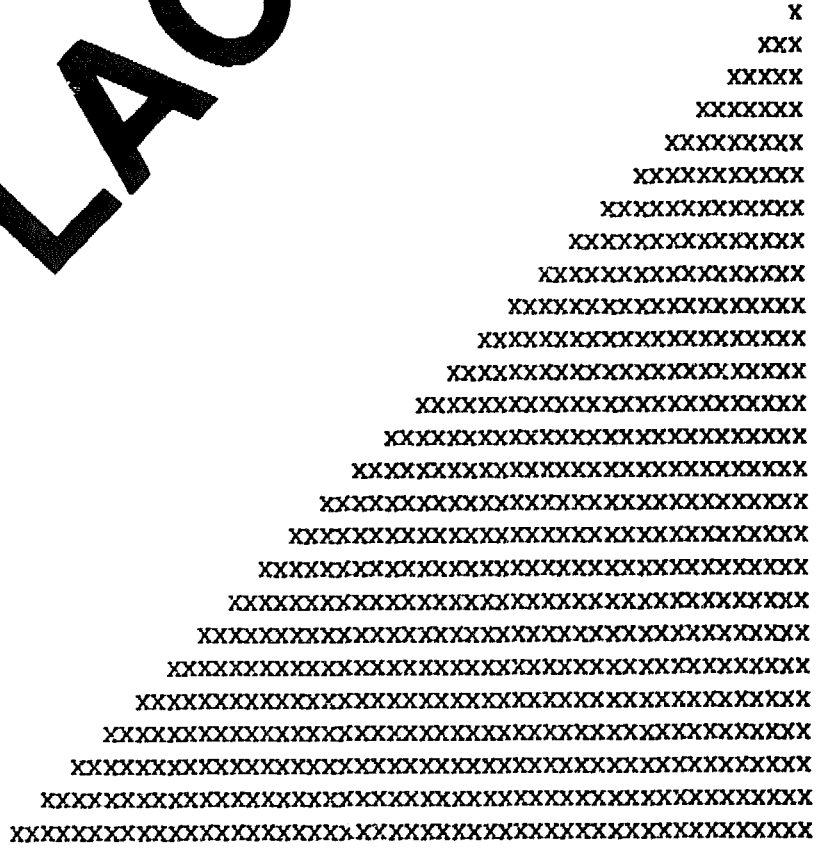
   The system will display a menu that enables you to view jumper, switch and software settings. Set the jumpers and switches on the option boards as instructed.

10. Select Save Configuration and Exit. Turn off the computer and insert the new option(s) in the appropriate slot(s). When you restart the computer, the configuration will be confirmed.

Refer to the User's Guide provided with the system for more information about the Computer Configuration Utility.



FRU REPLACEMENT



FRU Replacement

Introduction

This chapter contains procedures for removing and replacing DECpc field replaceable units (FRUs). When the installation procedure for a field replaceable unit is the reverse of the removal process, it is so noted. Only qualified service technicians should remove and replace FRUs. Use only Digital-supplied spares.

The following tables list standard and optional DECpc FRUs and their part numbers.

DECpc 433T Standard Field Replaceable Units

Standard FRU Name	Part Number
Main Logic Board, 0KB RAM	29-29155-01
383W Power Supply	29-29157-01
Multi-Function I/O Adapter	29-29156-01
LCD Control Panel Assembly	29-29160-01
VGA 1024 Graphics Adapter Kit	20-34334-01
Speaker with cable & gasket kit	29-29161-01
1.44 MB 3½-in. Diskette Drive Assembly without rails	30-30943-01
EISA SCSI Host Adapter	29-29158-01
Mouse	29-29166-01
Multi-Function Serial Cable Assembly	29-29164-01
Multi-Function Diskette Drive Cable Assembly	29-29165-01
SCSI Cable Assembly	29-29218-01
14-pin LCD Ribbon Cable	29-29219-01
Keylock Assembly	29-29159-01
Clock/Battery Chip	29-28242-01
Drive Rail (1)	29-29220-01
Keyboard Disable Switch	29-29217-01
System Diskette Set	AK-PCT10-AA

DECpc 433T Optional Field Replaceable Units

Optional FRU	Part Number
VGA 1024 Graphics Adapter Kit	20-34334-01
8514/A-compatible graphics adapter (Slot 2 only)	20-34173-01
8514/A-compatible graphics adapter utilities diskette	29-28680-01
8514/A-compatible VGS ribbon cable	29-28680-01
14-in. color monitor, 120V, North Hemisphere	30-32313-01
14-in. color monitor, 120V, South Hemisphere	30-32314-01
14-in. color monitor, 240V, North Hemisphere	30-32315-01
14-in. color monitor, 240V, South Hemisphere	30-32316-01
14-in. monochrome monitor, 120V, North Hemisphere	30-32317-01
14-in. monochrome monitor, 120V, South Hemisphere	30-32318-01
14-in. monochrome monitor, 240V, North Hemisphere	30-32319-01
14-in. monochrome monitor, 240V, South Hemisphere	30-32320-01
1.2 MByte 5¼-inch diskette drive	30-31071-01
360 KByte 5¼-inch diskette drive	30-33156-01
Mini-tape cartridge, ¼-inch (QIC-40)	30-34769-01
40MB SCSI hard disk drive	30-30903-01
80MB SCSI hard disk drive	30-30904-01
105MB SCSI hard disk drive	TBD
170MB SCSI hard disk drive	30-30905-01
320MB SCSI hard disk drive	30-33157-01
Serial/Parallel port adapter	20-30946-01
Dual Port Serial adapter	20-33970-01
2400 BPS internal modem	30-31072-01
1200/300 BPS internal modem	30-31073-01
33 MHz Weitek 4167 math coprocessor	19-34341-02
115 VAC 15-amp power cord for system unit	17-00083-39
DEC EtherWORKS Products	
LC Network interface board (Thinwire)	70-26601-01
Turbo Network interface board (Thinwire)	70-22837-01
LC/TP Network interface board (Twisted-pair)	54-19559-01
Turbo/TP Network interface board (Twisted-pair)	54-20426-01
70ns 2MB SIMM Kit	22-00913-01
70ns 8 MB SIMM Kit	22-00914-01
128KB Cache Memory Kit	22-00915-01
101/102-key keyboard (PS/2-style)	
US keycaps (101-key)	PCXAL-AA
Belgian keycaps (102-key)	PCXAL-AB
Danish keycaps (102-key)	PCXAL-AD
UK keycaps (102-key)	PCXAL-AE
German keycaps (102-key)	PCXAL-AG
Italian keycaps (102-key)	PCXAL-AI
Norwegian keycaps (102-key)	PCXAL-AN
French keycaps (102-key)	PCXAL-AP
Spanish 2 keycaps (102-key)	PCXAL-AR
Spanish keycaps (102-key)	PCXAL-AS
Hebrew keycaps (102-key)	PCXAL-AT
Portugese keycaps (102-key)	PCXAL-AV
Swedish/Finnish keycaps (102-key)	PCXAL-CA
Swiss keycaps (102-key)	PCXAL-CH

Before Replacing FRUs

The following criteria apply when removing or installing DECpc FRUs.

CAUTION: After you turn off the system, do not disconnect the power cord from the system unit or wall outlet for at least 20 seconds.

- Always turn off the system and monitor and disconnect all external cables before removing any FRU.

  NOTE: Before disconnecting the DECpc from a network, inform the system administrator that you are going to disconnect the ThinWire T-connector from the computer. Do not disconnect any cable or terminator from the T-connector. Doing so disrupts network operation.

- Always use a grounded wrist strap and grounded work surfaces when opening the system unit or handling any external component and its replacement. Static electricity can damage printed circuit boards and mass storage devices.
- After replacing a FRU, verify that it and the system operate properly.

Cable Maintenance

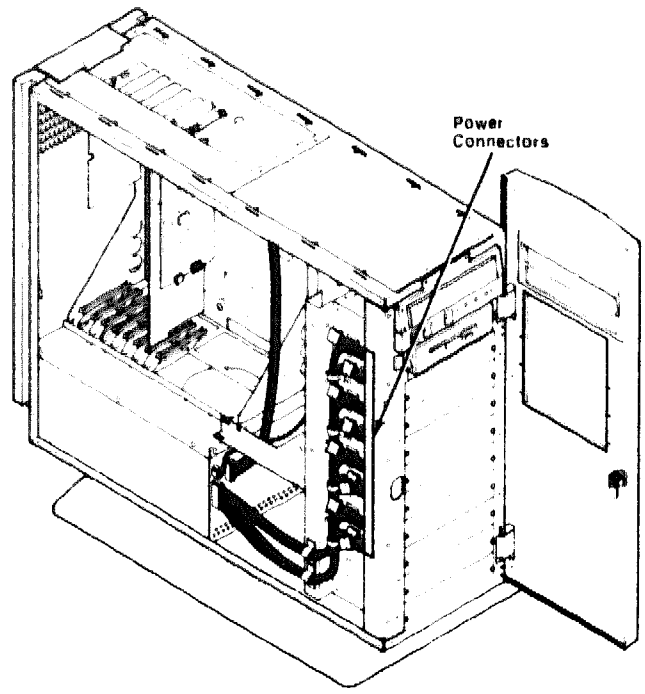
When replacing FRUs in the DECpc, follow the cable routing guidelines in this section.

Internal Cable Routing

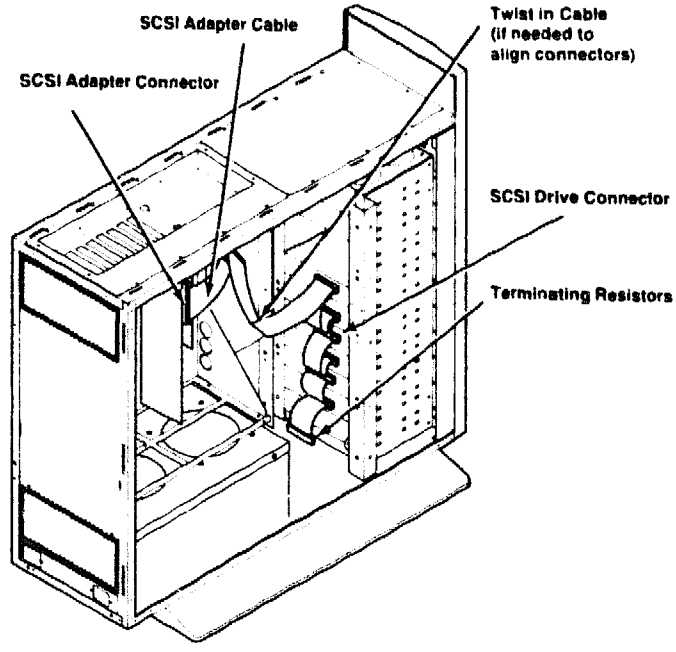
The diskette drive and SCSI cables in the DECpc are secured near the drive bays for easy access. The cables have been fixed by clips to eliminate interference with option installation.

The power connectors on the panel near the front of the system unit must be routed to devices installed in the drive bays. The ten plugs are conveniently secured near the drive bays.

Follow the routing suggestions in the following illustrations to maintain efficient cable routing to the installed options.



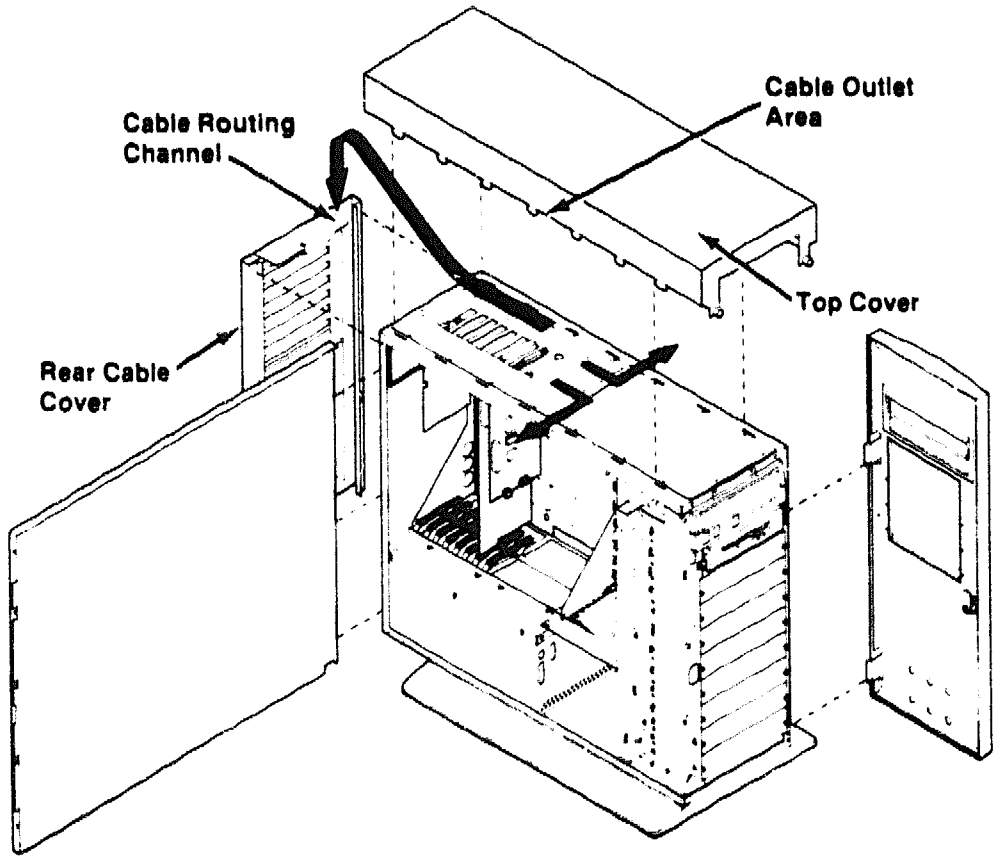
Drive Bay Power Connectors



Drive Cable Routing

External Cable Routing

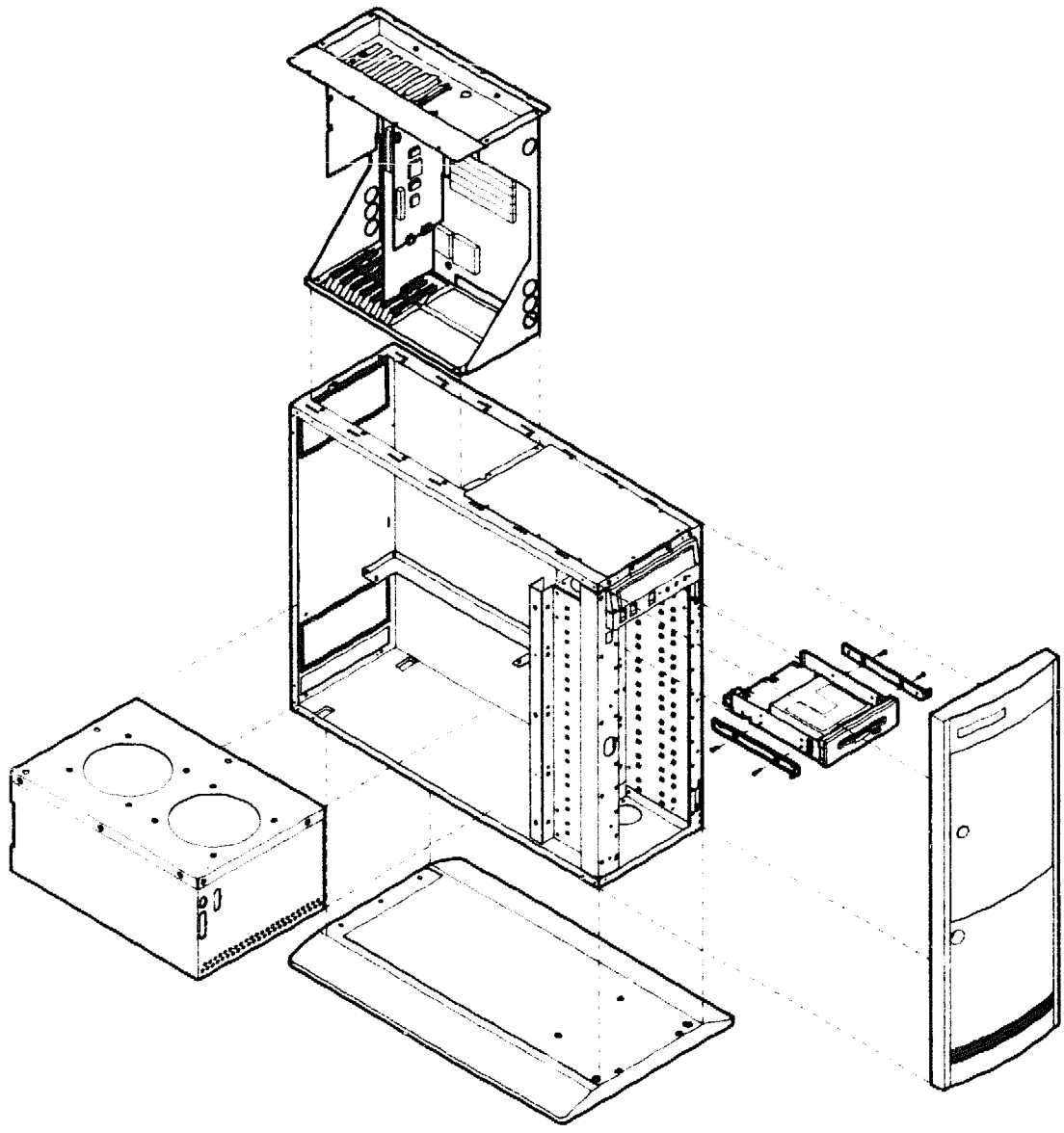
Cables for external devices such as a keyboard, monitor, mouse, and printer should be routed either through the routing channel on the rear cable cover or through the openings at the sides of the top cover as illustrated.



External Cable Routing

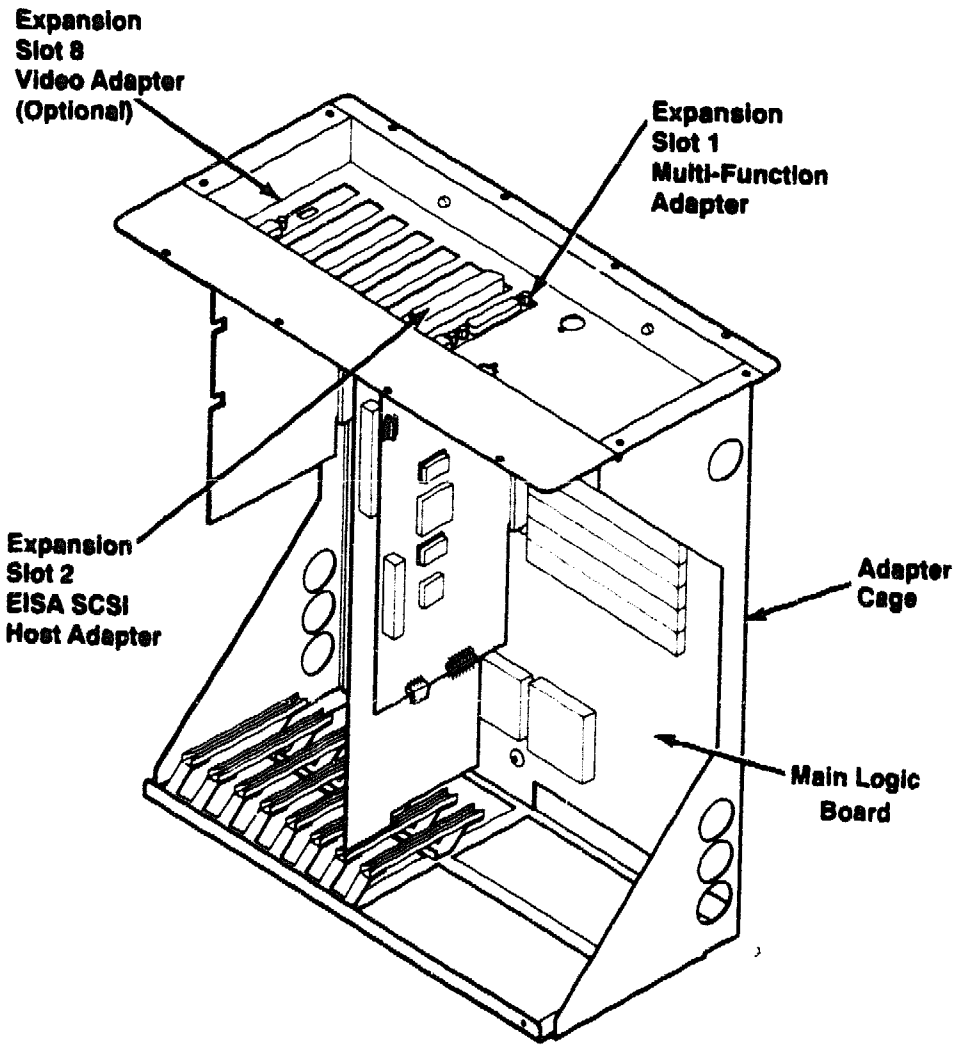
Replacing FRUs

This section describes how to replace the various FRUs in the DECpc. The following figure shows an exploded view of the DECpc chassis.



DECpc chassis, exploded view

The following figure shows a close-up view of the adapter cage.



DECpc adapter cage

Keyboard Replacement

To replace the keyboard:

1. Turn off the computer and the monitor.
2. Remove the top cover from the system unit. This permits access to the keyboard connector.
3. Disconnect the keyboard cable from the system unit.
4. Connect the cable from the new keyboard to the system unit. Route the keyboard cable through the appropriate cable guides.
5. Replace the top cover. The keyboard cable should extend from beneath the cover on the side closest to the user's work area.
6. Turn on the computer and the monitor again.

Monitor Replacement

To replace the monitor:

1. Turn off the computer and the monitor.
2. Unplug the monitor power cord from the AC outlet.
3. Remove the top cover from the system unit.
4. Disconnect the monitor cable from the system unit.
5. Connect the cable from the new monitor to the system unit. Route the monitor cable through the appropriate cable guides.
6. Replace the top cover.
7. Plug the new monitor's power cord into the auxiliary IEC outlet.
8. Turn on the computer and the monitor again.

Mouse Replacement

To replace the mouse:

1. Turn off the computer and the monitor.

   CAUTION: All power must be off when connecting or disconnecting the mouse, or damage to the mouse and/or the main logic board will result.

2. Remove the top cover from the system unit.
3. Disconnect the mouse cable from the system unit.
4. Connect the cable from the new mouse to the system unit. Route the mouse cable through the appropriate cable guides.
5. Replace the top cover. The mouse cable should extend from beneath the cover on the side closest to the user's work area.
6. Turn on the computer and the monitor again.

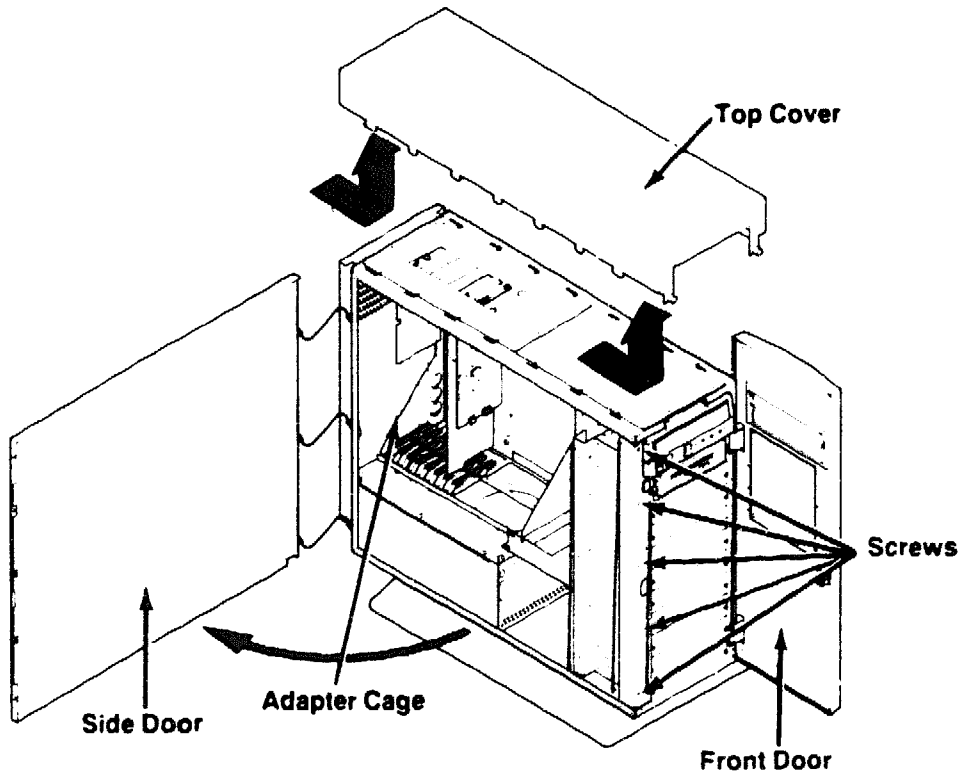
Front Door, Top Cover, and Side Door Removal

To remove the system doors:

1. Turn off the computer and the monitor.
2. Unlock the front door and rotate it to its open position. Remove the screw attaching the door-retaining cable to the chassis. Remove the door by lifting it out of the slots in the front of the chassis.

   NOTE: When you reinstall the front door, remember to reattach the door-retaining cable to the chassis.

3. To remove the top cover from the system unit, loosen the two screws above the control panel, and then pull the top cover forward and up.
4. Disconnect all cables from the top of the system unit.
5. Loosen the five screws that secure the side panel to the chassis. Rotate the panel to its open position and then lift it out of the slots at the rear of the system unit.



Removing the side door and top cover

Power Supply Removal

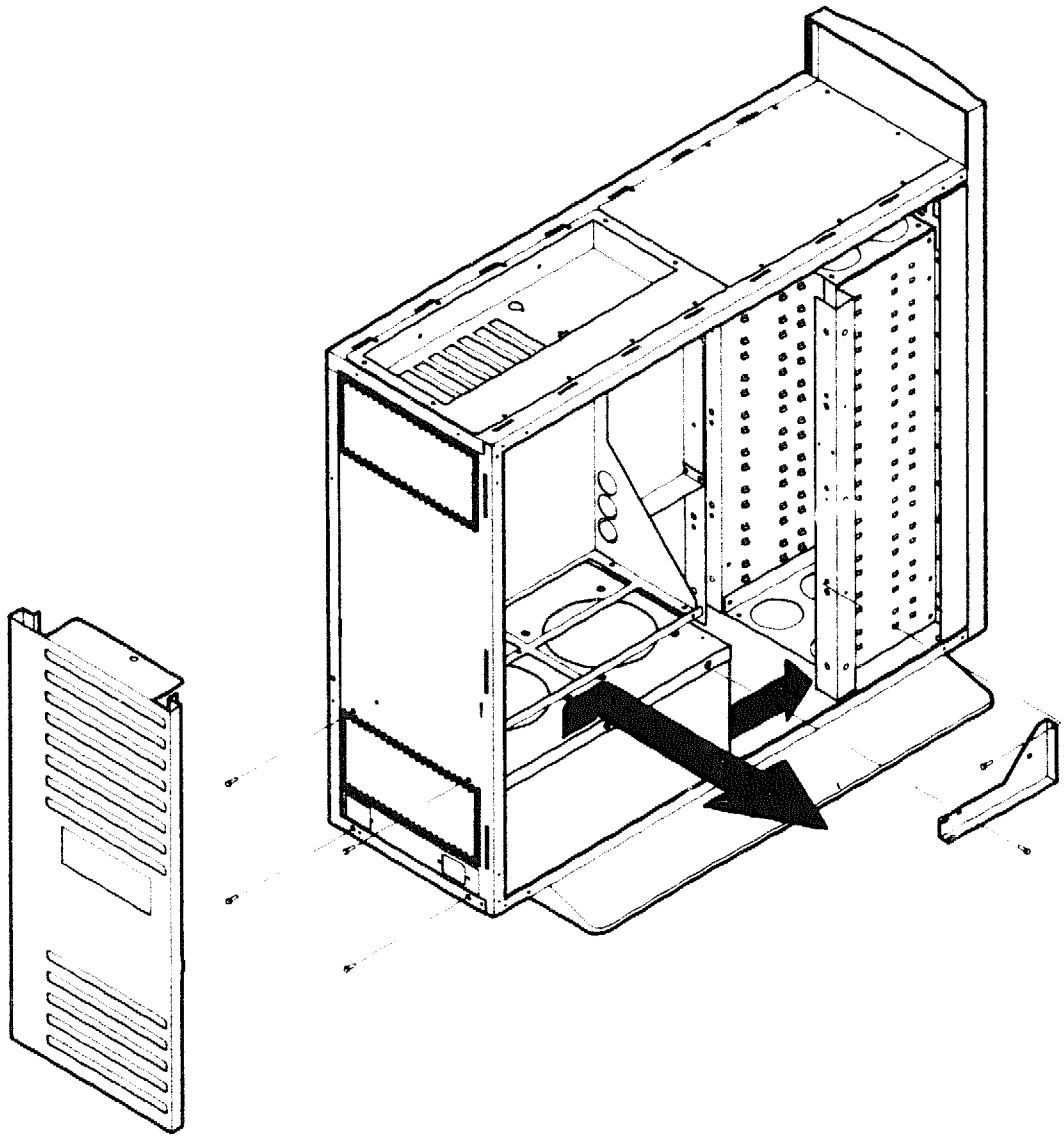
Remove the DECpc power supply as follows:

CAUTION: After you turn off the system, do not disconnect the power cord from the system unit or AC outlet for at least 20 seconds.

Refer to the following figure to locate parts referenced in these instructions.

1. Remove the top cover and side door.
2. Remove the cable guard from the rear of the system unit.
3. Remove the small bracket between the base of the card cage and the back of the drive cage.
4. Disconnect the three cables from the front of the power supply.
5. Remove the four screws on the back of the system unit that secure the power supply inside the chassis.
6. Push the power supply toward the front of the computer so it will clear the rear edge of the chassis. Lift the power supply enclosure slightly so it will clear the lower edge of the chassis. Tilt the inside edge of the enclosure slightly so it will lift out easily.
7. Lift the power supply and enclosure out of the chassis.

To install the new power supply unit, reverse these steps.

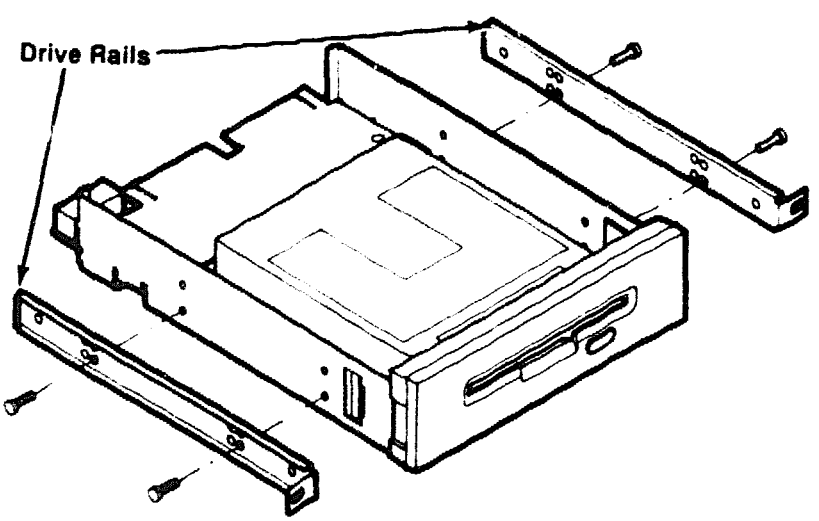


Power Supply Removal

Diskette Drive Replacement

To replace the diskette drive:

1. Open the front door and side door.
2. Remove the ribbon cable and the power cable from the back of the drive.
3. Remove the two screws that secure the selected drive in the drive rack.
4. Slide the drive and attached drive rails out of the drive rack.
5. Set the switch(es) on the replacement drive to match the switch(es) on the removed drive.
6. Remove the drive rails from the old drive, and attach them to the new drive.
7. Slide the new drive into the drive rack.
8. Tighten the two screws that secure the drive assembly in the drive rack.
9. Reconnect the ribbon cable and the power cable to the back of the drive.
10. Verify the operation of the replaced drive.
11. Close the side panel and the front door.



Optional Drive Replacement

To remove or replace an optional diskette drive, hard disk drive, or tape drive, refer to the *DECpc 433T Installation Guide*.

> **CAUTION:** In systems with multiple SCSI drives, the power supply can be overloaded if all the drives demand peak starting current from the power supply at the same time. Refer to the drive installation guide for information about the MOTOR START option of each SCSI drive in the system. Configure the drives so that all but the first drive start only after the SCSI START UNIT command is received across the SCSI bus.
>
> **NOTE:** The SCSI cable provided with the 433T has a SCSI resistor block installed at the end. Check that terminating resistors are not installed on any of the other internal SCSI devices in the system.

Option Board Replacement

The procedure for replacing an option board in the DECpc is similar for the different options in the system.

1. Remove the top cover and the side panel.
2. Note the position of any cables connected to the option board and disconnect them.
3. Remove the mounting screw that secures the option board to the card cage.
4. Remove the board by pulling it straight out of the expansion slot connector.
5. Configure the jumpers and switches on the new board to match those on the old board.
6. Install the new board in the slot from which the old board was removed. Make sure the board is firmly seated in the connector(s) on the main logic board. If the board is an EISA option, be very sure the board is correctly seated in the expansion slot. If the board is not correctly seated, it will not function correctly.
7. Secure the board to the chassis with the mounting screw.
8. Reconnect any cables you removed.
9. Reinstall the side panel and the top cover.

Control Panel Replacement

Replace the control panel as follows:

1. Open the front door and side door.
2. Disconnect all cables connected to the back of the control panel and note their location and routing. It is **not** necessary to remove the speaker.
3. Remove the two screws above the control panel.
4. Rotate the panel forward slightly, and then pull it up and out of the slots.

To install the new control panel, reverse these steps.

Speaker Replacement

Remove the speaker as follows:

1. Open the front door and side door.
2. The speaker is located behind the LCD panel. The speaker is secured to the system unit by an adhesive gasket.

   NOTE: You might need to disconnect the cables connected to the back of the control panel. If you disconnect any cables, note their location and routing
3. Disconnect the speaker cable from the main logic board and carefully pry the speaker from the front wall of the system unit.
4. Remove any remaining gasket material from the front wall of the sytem unit.

To replace the speaker:

1. Apply the adhesive gasket to the front of the new speaker.
2. Press the front of the speaker to the front wall of the system unit. Keep pressure on the speaker for approximately one minute to assure proper adhesion.
3. Connect the speaker cable to the main logic board. Reconnect any cables that you disconnected from the back of the control panel.
4. Close the side door and the front door.

Main Logic Board Replacement

Replace the main logic board as follows:

1. Open the front door. Remove the top cover and the side door.
2. Remove all option boards from the card cage.
3. Disconnect all cables connected to the main logic board and note their location and routing.
4. Remove the screws that secure the main logic board to the back wall of the system unit.
6. Remove the main logic board by lifting it out through the card cage.
7. Remove any optional components (SIMMs, external cache memory, or math coprocessor), if present, from the old main logic board. Reinstall the optional components on the new main logic board. Refer to the *Main Logic Board Diagram* for the locations of these parts.

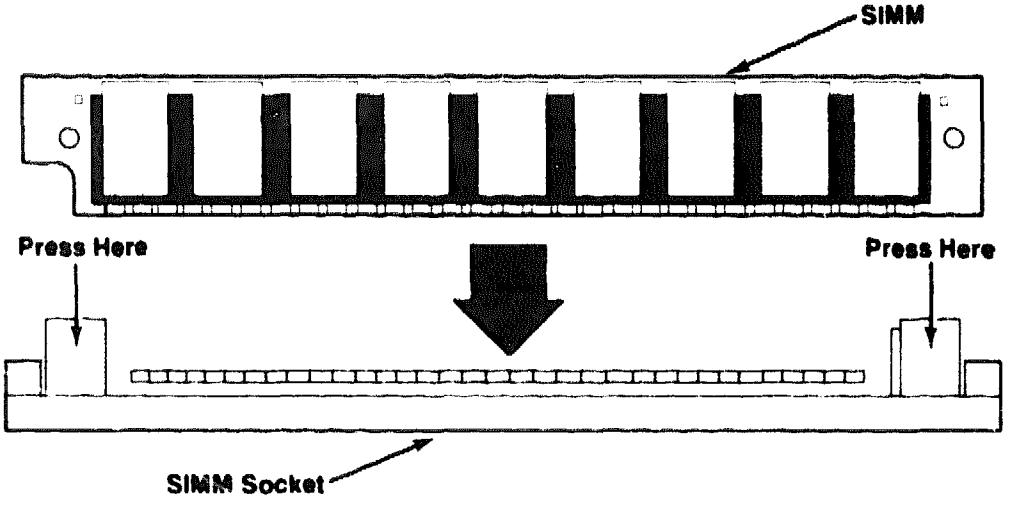
To install the new main logic board, reverse these steps.

Single-In-Line Memory Module Replacement

Replace Single-In-Line Memory Modules (SIMMs) as follows:

1. Open the front door and side door.
2. Locate the SIMM sockets on the main logic board. Refer to the *Main Logic Board Diagram*.
3. To remove a SIMM, carefully press a pointed object between the bottom of the SIMM and the retaining latch on one side of the socket to loosen the SIMM. Then pull that side of the SIMM from the socket. Repeat the procedure for the remaining side of the SIMM.
4. To install a new SIMM, grasp the SIMM at both ends and insert it into the socket. Make sure the SIMM is fully seated in the connector by pressing backward and down on the SIMM to lock it in place.

   NOTE: The number of chips on the SIMM may vary based on the vendor.



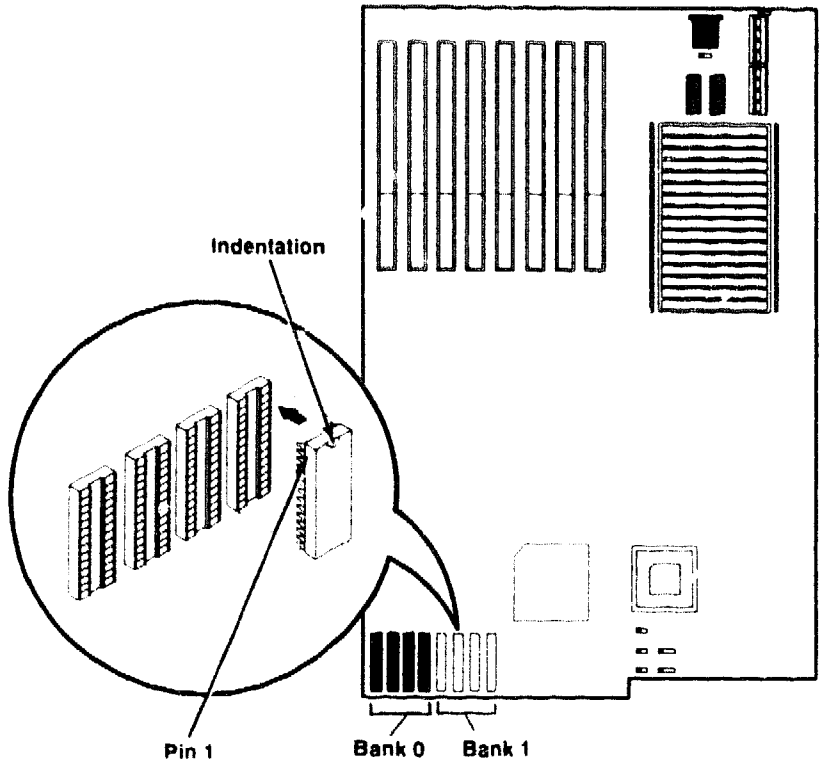
SIMM Removal and Replacement

External Cache Memory Replacement

NOTE: Replace ***all*** 4 chips in a bank with chips from the same kit.

Replace External Cache Memory as follows:

1. Open the front door and side door.
2. Locate the four cache memory sockets on the main logic board. Refer to the *Main Logic Board Diagram*.
3. Remove any option boards that might interfere with replacement of the cache chips. Remove the top cover, if necessary.
4. Remove the four cache chips from the sockets.
5. Align Pin 1 on a new cache chip with Pin Socket 1 on the socket. (See the following illustration.)
6. Carefully press the chip into the socket. Be sure that the pins of the chip do not bend.
7. Repeat Steps 4 and 5 for the remaining three new cache chips.
8. Reinstall any option boards that were removed. Reinstall the top cover.
9. Close the side panel and the front door.



Real-Time Clock Replacement

Replace the Dallas Semiconductor 1287 Real-Time Clock as follows:

1. Open the front door and side door.
2. Locate the Real-Time Clock on the main logic board. Refer to the *Main Logic Board Diagram*.
3. Carefully note the orientation of the Real-Time Clock in the socket. Remove the old Real-Time Clock from the socket.
4. Install the new Real-Time Clock in the socket, making certain that the new chip is oriented the same as the old chip.

EISA Configuration RAM Replacement

Replace the EISA Configuration RAM (Dallas Semiconductor 1225 Non-volatile SRAM) as follows:

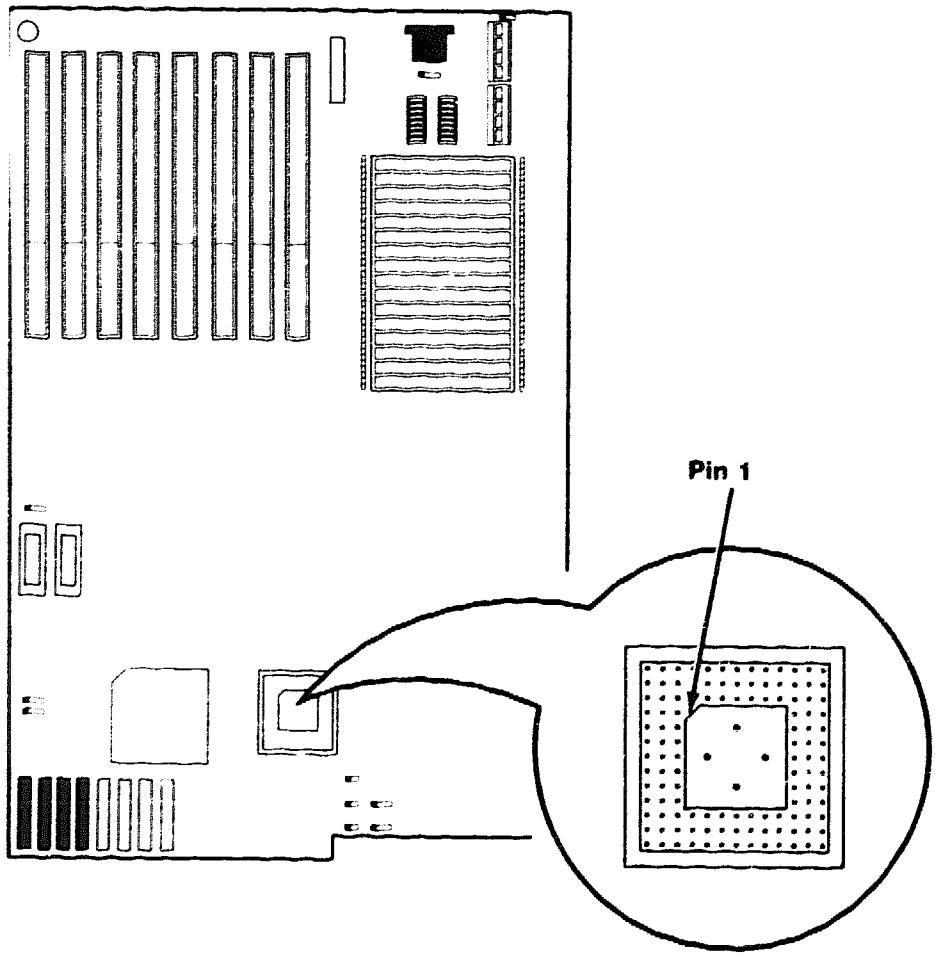
1. Open the front door and side door.
2. Locate the EISA Configuration RAM socket on the main logic board. Refer to the *Main Logic Board Diagram*.
3. Carefully note the orientation of the EISA Configuration RAM in the socket. Remove the old EISA Configuration RAM from the socket.
4. Install the new EISA Configuration RAM in the socket, making certain that the new chip is oriented the same as the old chip.

Optional Weitek 4167 Math Coprocessor Replacement

To replace an optional Weitek math coprocessor:

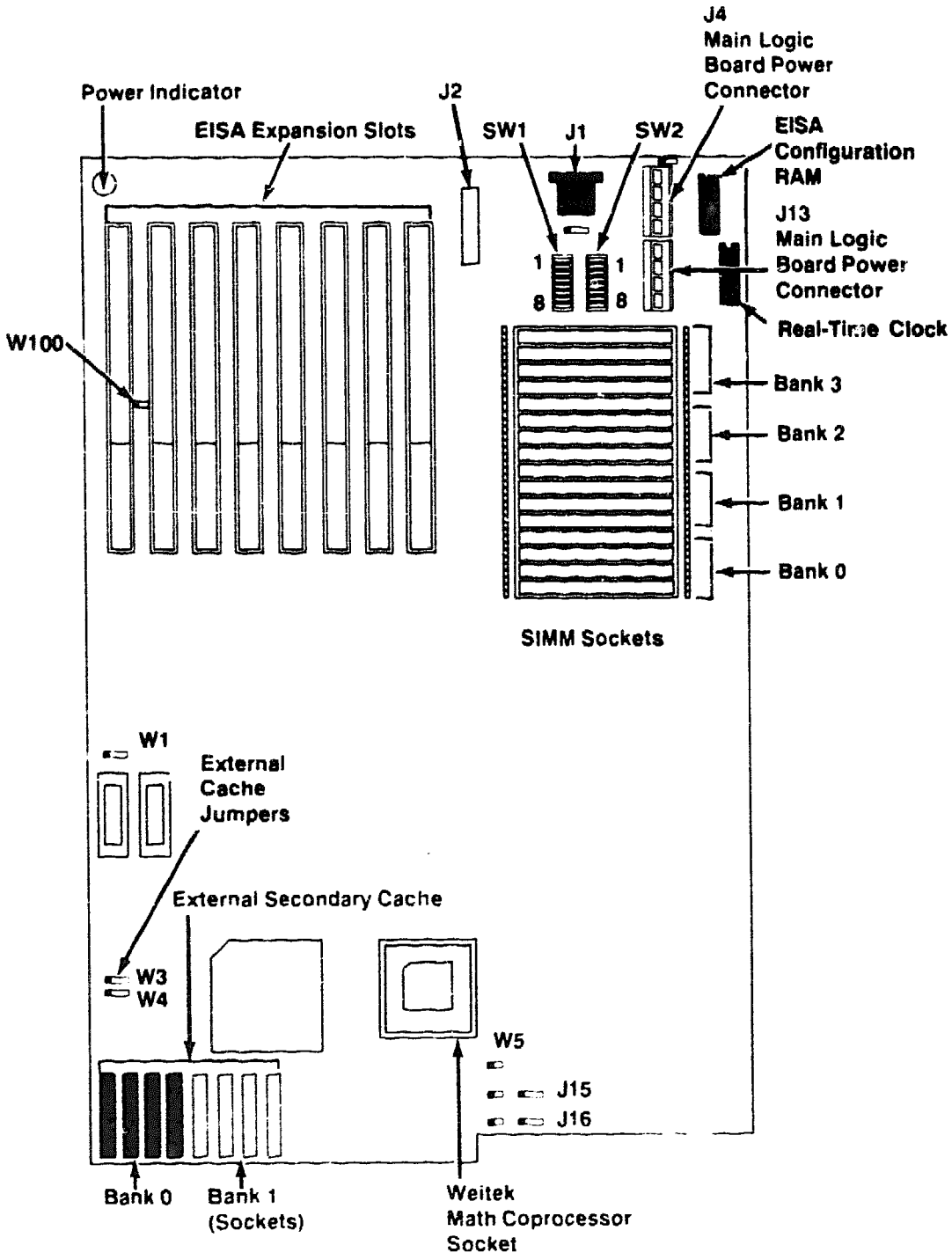
1. Open the front door and side door. Remove the top cover.
2. Locate the coprocessor socket on the main logic board.
3. Remove the EISA SCSI Host Adapter and any other option boards that might interfere with replacement of the math coprocessor.

4. Carefully note the orientation of the coprocessor in the socket. Remove the old coprocessor from the socket.
5. Install the new coprocessor in the socket, making certain that the new chip is oriented the same as the old chip. See the following illustration.
6. Replace the EISA SCSI Host Adapter and any other option boards that were removed.
7. Reinstall the top cover. Close the side panel and the front door.



Replacing the optional
Weitek 4167 Math Coprocessor

Main Logic Board Diagram



Main Logic Board Jumpers

Jumper	Description	Setting
W3	64KB or 128KB external cache 256KB external cache	1-2* 2-3
W4	64KB external cache 128KB or 256KB external cache	1-2 2-3*
W100	Slot 8 EISA Slot 8 ISA	1-2* 2-3
* Indicates factory default setting.		

Main Logic Board Switch Settings

DIP Switch 1 (SW1)		
Switch	**Description**	**Setting**
1	Reserved for factory use	ON*
2	Disable on-board BIOS Enable on-board BIOS	ON OFF*
3	128KB or 256KB external cache 64KB external cache	ON* OFF
4	25MHz system 33MHz system	ON OFF*
5	Reserved	OFF*
6	Reserved	OFF*
7	CGA/EGA/VGA Monochrome	ON* OFF
8	128KB external cache 64KB or 256KB external cache	ON* OFF
* Indicates factory default setting.		

Main Logic Board Switch Settings (continued)

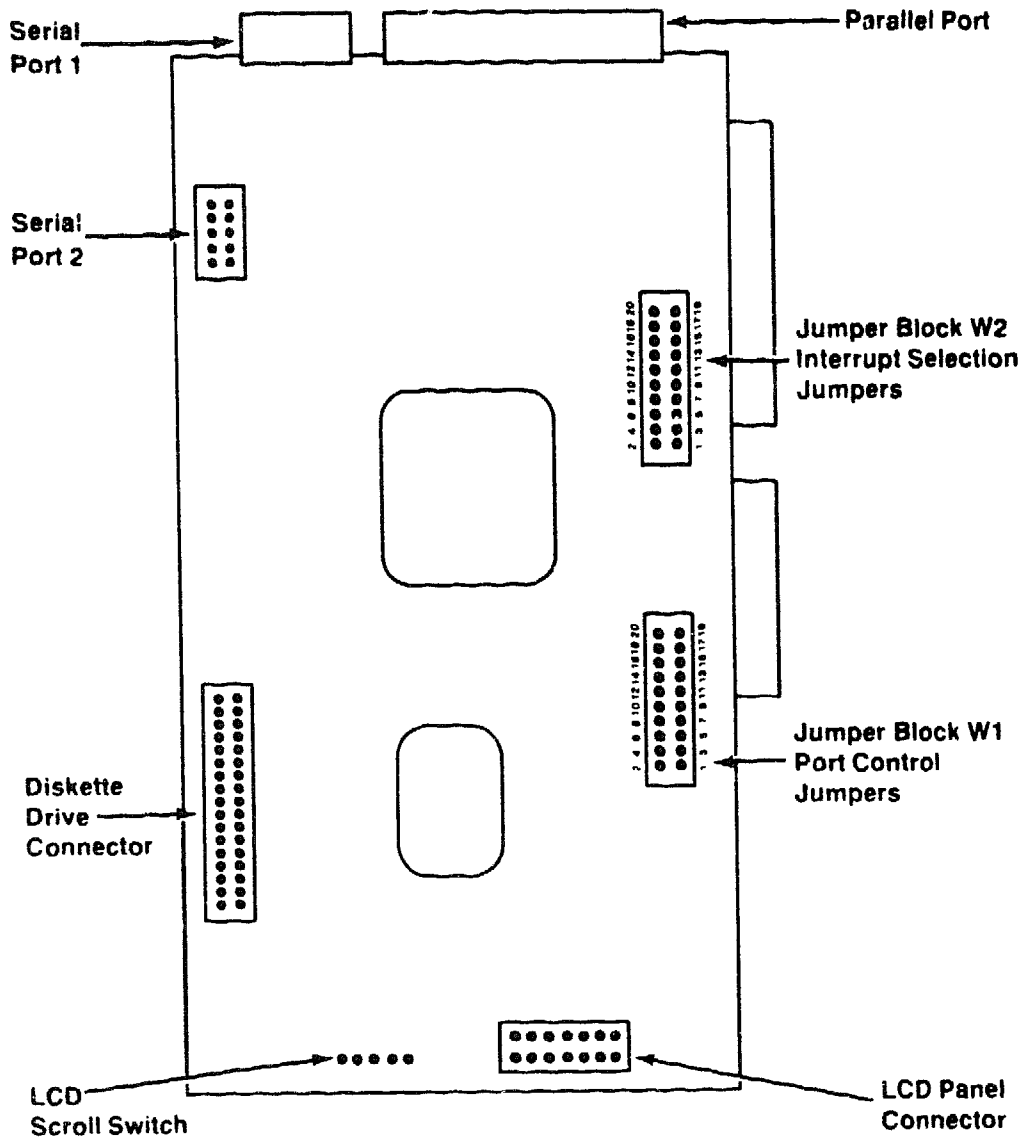
DIP Switch 2 (SW2)		
Switch	**Description**	**Setting**
1	Memory configuration settings (see note below)	ON*
2	Memory configuration settings	ON*
3	Memory configuration settings	ON*
4	Memory configuration settings	ON*
5	Memory configuration settings	ON*
6	Video BIOS non-cacheable Video BIOS cacheable	ON OFF*
7	13MB–15MB cacheable 13MB–15MB non-cacheable	ON* OFF
8	Reserved	OFF*
* Indicates factory default setting.		
Note: Switches 1-5 are set according to the memory configuration. (4MB is default.) Refer to the following chart for the memory configuration switch settings.		

Memory Configuration Settings (SW2 switches 1-5)

	SIMM Size								
Total (MB)	Bank 0	1	2	3	Switch 1	2	3	4	5
4*	1MB	–	–	–	ON*	ON*	ON*	ON*	ON*
8	1MB	1MB	–	–	OFF	ON	ON	ON	ON
12	1MB	1MB	1MB	–	ON	OFF	ON	ON	ON
16	1MB	1MB	1MB	1MB	OFF	OFF	ON	ON	OFF
16	4MB	–	–	–	ON	ON	OFF	ON	OFF
20	1MB	4MB	–	–	ON	ON	OFF	OFF	OFF
24	1MB	1MB	4MB	–	ON	OFF	ON	OFF	OFF
28	1MB	1MB	1MB	4MB	OFF	ON	ON	OFF	OFF
32	4MB	4MB	–	–	OFF	ON	OFF	ON	OFF
36	1MB	4MB	4MB	–	ON	OFF	OFF	OFF	OFF
40	1MB	1MB	4MB	4MB	OFF	OFF	ON	OFF	OFF
48	4MB	4MB	4MB	–	ON	OFF	OFF	ON	OFF
52	1MB	4MB	4MB	4MB	OFF	OFF	OFF	OFF	OFF
64	4MB	4MB	4MB	4MB	OFF	OFF	OFF	ON	OFF

* Indicates factory default setting.

Multi-Function I/O Adapter Diagram



Multi-Function I/O Adapter Jumper Settings

Port Control Jumper Block (W1)		
Function	**Pins**	**Setting**
Reserved for factory use	1,2	Not Installed*
Diskette Controller	3-4	Installed*
Disable Serial Port 2	5,6 7,8	Not Installed Not Installed
Enable Serial Port 2 as COM4	5,6 7-8	Not Installed Installed
Enable Serial Port 2 as COM3	5-6 7,8	Installed Not Installed
Enable Serial Port 2 as COM2	5-6 7-8	Installed* Installed*
Disable Serial Port 1	9,10 11,12	Not Installed Not Installed
Enable Serial Port 1 as COM3	9,10 11-12	Not Installed Installed
Enable Serial Port 1 as COM2	9-10 11,12	Installed Not Installed
Enable Serial Port 1 as COM1	9-10 11-12	Installed* Installed*
* Indicates factory default setting.		

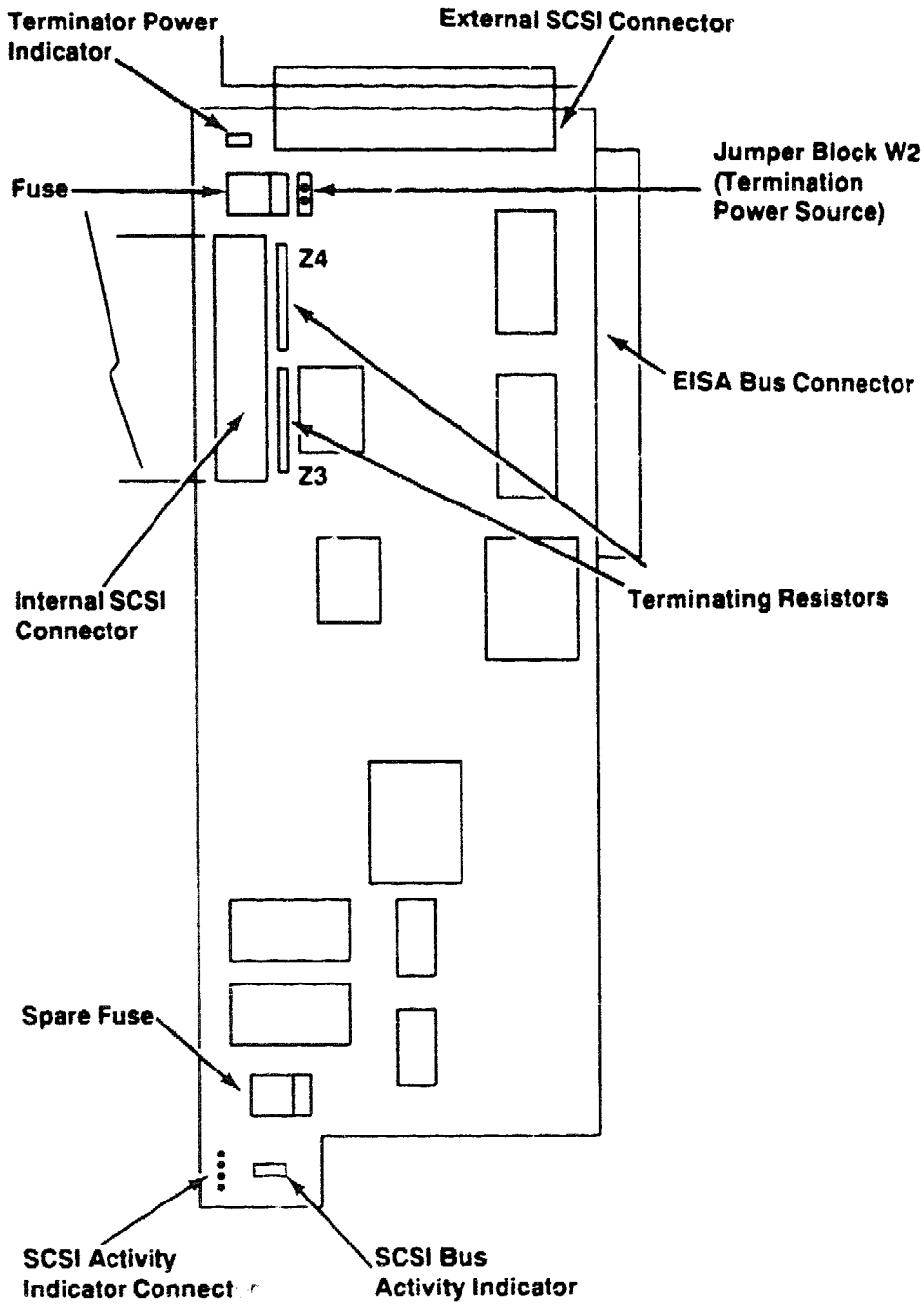
Multi-Function I/O Adapter Jumper Settings (continued)

Port Control Jumper Block (W1)		
Function	**Pins**	**Setting**
Disable Parallel Port	13,14 15,16	Not Installed Not Installed
Enable Parallel Port as LPT3	13,14 15-16	Not Installed Installed
Enable Parallel Port as LPT2	13-14 15,16	Installed Not Installed
Enable Parallel Port as LPT1	13-14 15-16	Installed* Installed*
Reserved for factory use	17,18 19,20	Not Installed Not Installed
Enable Bidirectional Parallel Port	17,18 19-20	Not Installed* Installed*
Enable Parallel Port as Output Only	17-18 19,20	Installed Not Installed
Reserved for factory use	17-18 19-20	Installed Installed
* Indicates factory default setting.		

Multi-Function I/O Adapter Jumper Settings (continued)

Interrupt Selection Jumper Block (W2)			
Port	**Interrupt**	**Pins**	**Setting**
Serial Port 1	IRQ3 IRQ4 IRQ10 IRQ11	1-2 3-4 5-6 7-8	Installed Installed* Installed Installed
Serial Port 2	IRQ3 IRQ4 IRQ10 IRQ11	9-10 11-12 13-14 15-16	Installed* Installed Installed Installed
Parallel Port	IRQ5 IRQ7	17-18 19-20	Installed Installed*
* Indicates factory default setting.			

EISA SCSI Host Adapter Diagram



EISA SCSI Host Adapter Jumper (W2)

Jumper	Description	Setting
W2	SCSI bus termination power is provided by adapter	Installed*
	SCSI bus termination power is provided by SCSI device	Not Installed
* Indicates factory default setting.		

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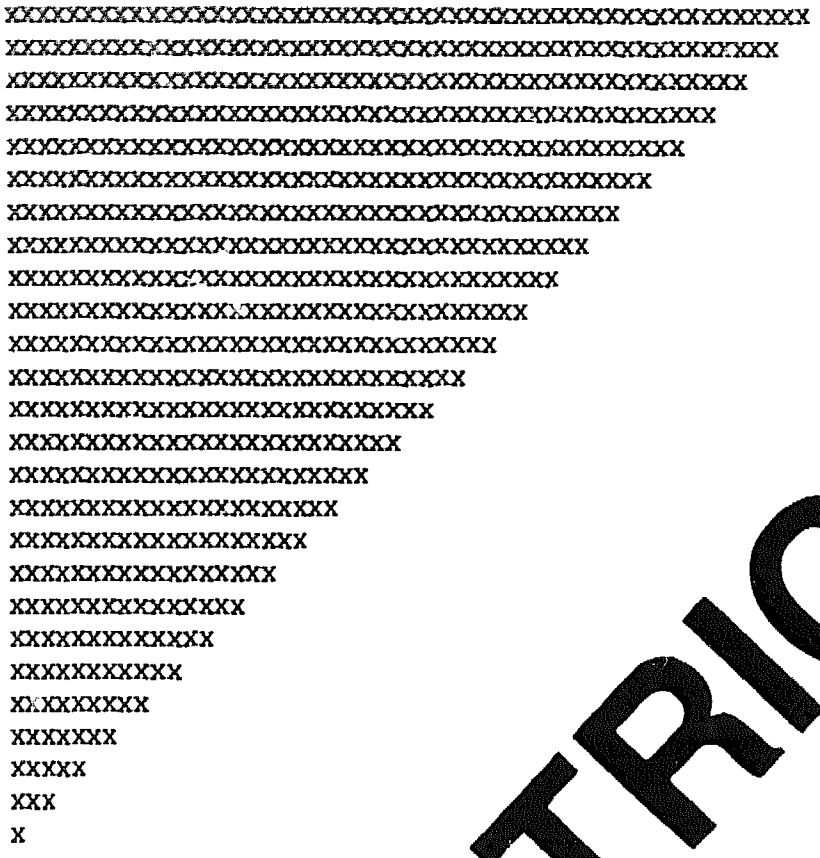
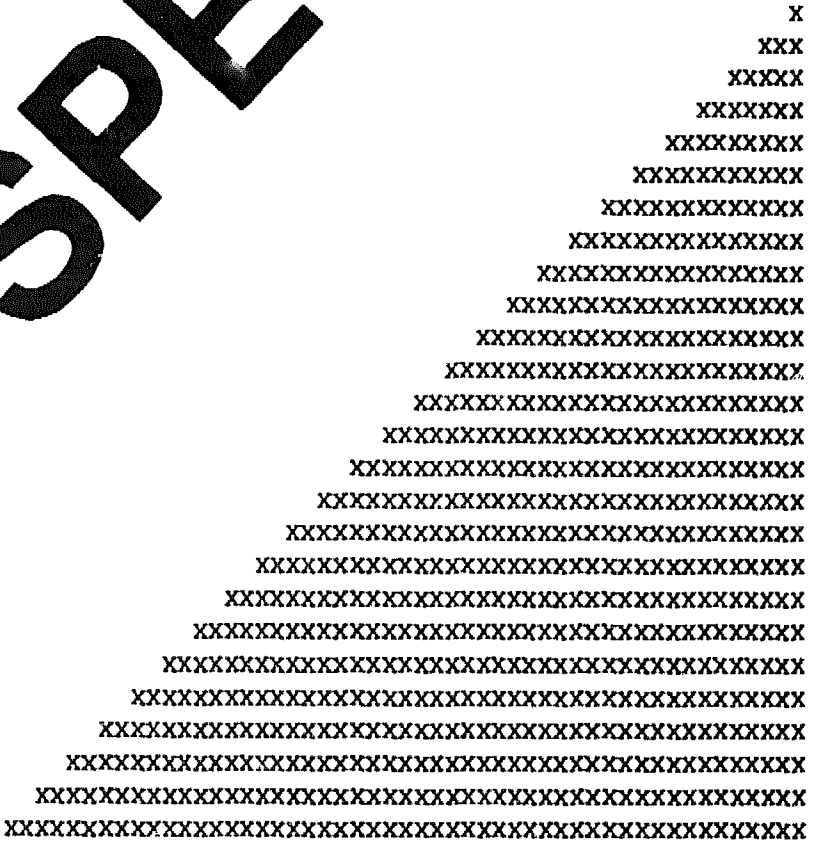


ELECTRICAL SPECS



Appendix A

Electrical Specifications

The following table lists the electrical specifications for the DECpc 433T base system:

Input Voltage (nominal)	115VAC	230VAC
Input Frequency (nominal)	60 Hz	50/60 Hz
Peak Input Current (steady state)	11A	6A
Input Low Voltage Threshold	90VAC	198VAC
Power consumption (typical)	547 W	547 W
DC output power available (max.)	383 W	383 W
* AC receptacle Output Current (nominal)	2A	1A
* IEC 320		

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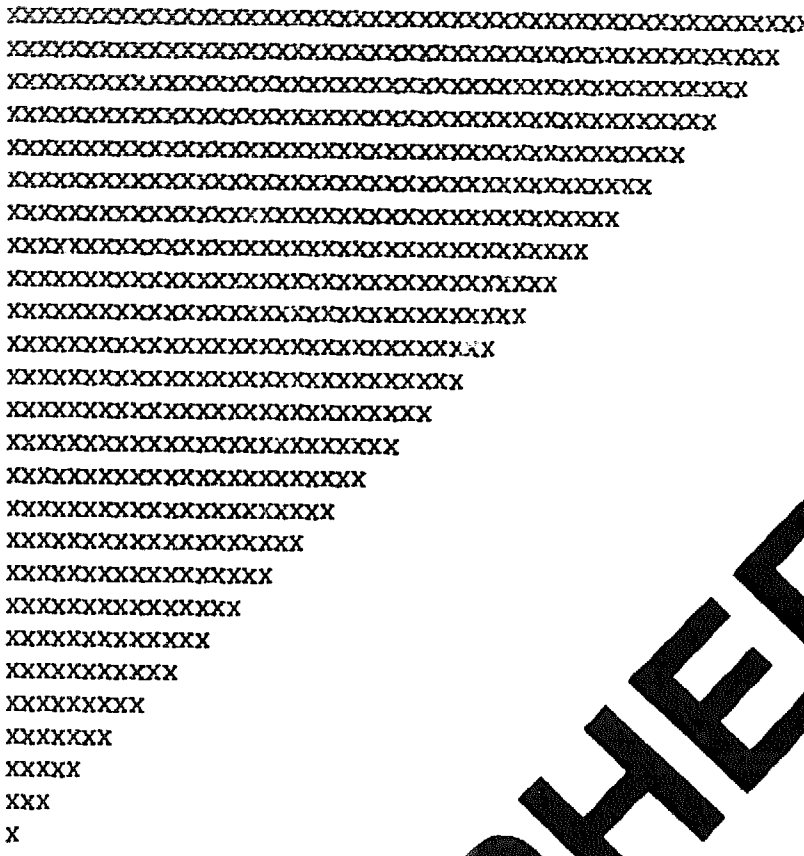
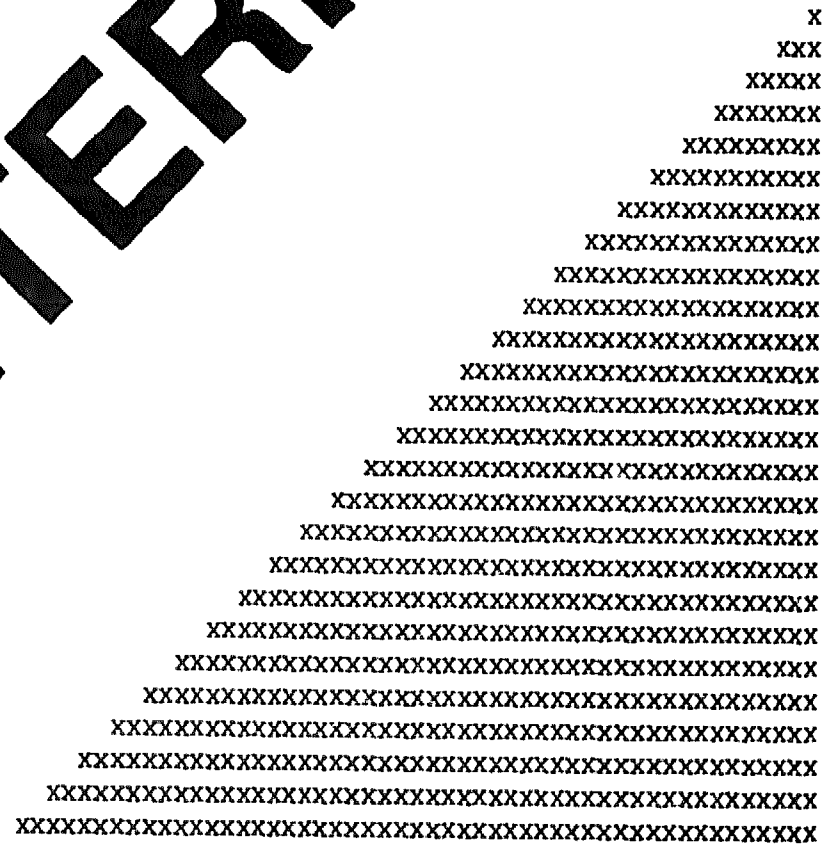


PERIPHERAL INTERFACE



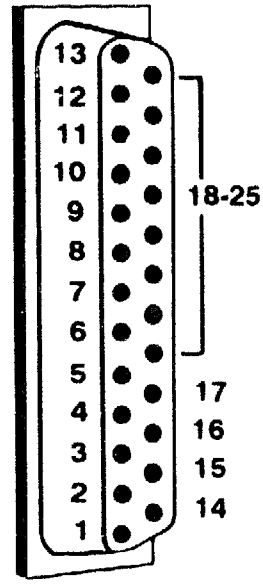
Appendix B - Peripheral Interface

The following tables and diagrams describe the pin assignments and function of the external interface connectors on the DECpc 433T system.

Parallel Port connector

The following are signal definitions for the 25-pin parallel port connector.

Pin	Signal	Function
1	STROBE–	Strobe
2	PRTDAT0	Data bit 0
3	PRTDAT1	Data bit 1
4	PRTDAT2	Data bit 2
5	PRTDAT3	Data bit 3
6	PRTDAT4	Data bit 4
7	PRTDAT5	Data bit 5
8	PRTDAT6	Data bit 6
9	PRTDAT7	Data bit 7
10	PRTACK–	Acknowledge
11	PRTBSY	Busy
12	PRTPE	Paper End
13	PRTSEL–	Select
14	PRTAF–	Auto Feed
15	PRTFLT–	Fault
16	PRTINIT	Initialize
17	PRTSEL–	Select Input
18	GND	Ground
19	GND	Ground
20	GND	Ground
21	GND	Ground
22	GND	Ground
23	GND	Ground
24	GND	Ground
25	GND	Ground

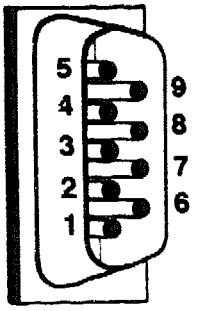


Parallel port pin assignments

RS-232 Serial Port connectors

The following are signal definitions for the 9-pin serial port connectors. (The serial mouse connects to one of the serial ports.)

Pin	Signal	Function
1	DCD	Data carrier detect
2	RXD	Receive data
3	TXD	Transmit data
4	DTR	Data terminal ready
5	GND	Signal Ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	RI	Ring indicator

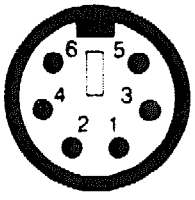


Serial port pin assignments

Keyboard connector

The keyboard uses a standard 6-pin miniature DIN connector. The pin assignments are listed in the following table.

Pin	Signal Name
1	Data
2	N/C
3	GND
4	+5Vdc
5	Clock
6	N/C



Keyboard connector pin assignments

Power Supply Connectors

The following two tables list the pin assignments for the connectors from the power supply to the main logic board board and to the disk (and/or diskette) drives.

System board power connectors

J4	
Pin	**Value**
1	Power Good
2	+5Vdc
3	+12Vdc
4	−12Vdc
5	GND
6	GND

J13	
Pin	**Value**
1	GND
2	GND
3	−5Vdc
4	+5Vdc
5	+5Vdc
6	+5Vdc

Disk drive power connector

Pin	Value
1	+12Vdc
2	GND
3	GND
4	+5Vdc