DECpc 320sxLP/325sxLP User's Guide

Order Number EK-DECSX-UG-003

June 1992
Digital Equipment Corporation
Maynard, Massachusetts

A

FCC ID A09-PC731

NOTE This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

Any changes or modifications made to this equipment may void the user's authority to operate this equipment.

this equipment generates, uses, and can rediate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning The equipment off and on, the user is encouraged to try to correct The interference by one or more of the following measures:

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Additional information on the need to interconnect the device with shielded (data) cables or the need for special devices, such as ferrite beads on cables, is required if such means of interference suppression was used in the qualification test for the device.

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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。

MA 0347 90 CPG DG

Warning:

Shielded cables must be used with this equipment. If you add or replace any cables, the new cables must have shielding capabilities equal to or higher than those provided by the dealer. Modifying or tampering with internal components can cause a malfunction and might invalidate the warranty and void your FCC authorization to operate this equipment.

B

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ABOUT THIS MANUAL

This is a User's Guide describes your DECpc 320sxLP/325sxLP computer and explains how to install it and begin using it. Separate chapters in the manual cover the following topics

Introduction Chapter 2	Describes the computer and lists all of its standard and optional features
Getting Started Chapter 3	Explains how the basic system is connected and how to start using it. You will also find it helpful to have on hand the maker's guides for your monitor and the software programs that you'll be using
BIOS Setup Chapter 4	Explains the step-by-step configuration of the battery-backed CMOS RAM, enabling the computer to correctly identify all devices and components of your DECpc and thus allow trouble-free operation
Utilities and Drivers Chapter 5	Explains the use of the utility programs contained in the Utilities Diskettes
Installing Optional Chapter 6	Describes the installation of several hardware optional items of hardware equipment that can be added to enhance the operation and your system
Troubleshooting Chapter 7	Lists some common problems and suggests possible solutions.
Specifications Chapter 8	Lists specifications for the system unit, operating environment, peripheral interfaces, and diskette drive
System Worksheet Chapter 9	Provides spaces for you to record your total amount of memory and other system configuration information

1.1 Conventions

Throughout this manual, the following conventions are used to d
ate various types of text

Words that are printed in small bold capita
letters are keys on your keyboard. For exar

Enter .

Groups of keys are printed like this: **Ctrl**

+ **Del** . This is an instruction to press an

the specified keys down (**Ctrl** , **Alt** , and
in the example) in the order shown so that
up holding them all down at the same time.

Information that you should type or that i
on the screen is printed as in the followi
example:

Type 3 at the SELECT THE ACTION DESIRED pr

Information that is especially helpful or important is presented a
caution, or a warning

NOTE: Provides supplementary information of general inter

CAUTION
**Provides information dedicated to avoiding the loss or corr
data, and/or damage to hardware or equipment.**

WARNING
Provides information crucial to preventing personal injury

1.2 Abbreviations

The following abbreviations are used in this manual:

Kb = kilobit
KB = kilobyte
Mb = megabit
MB = megabyte
Hz = Hertz
MHz = megahertz
ms = millisecond
ns = nanosecond
SIMM = single in-line memory module

2

INTRODUCTION

The DECpc 320sxLP/325sxLP is a high performance, high speed, low profile personal computer, fully compatible with the IBM PC/XT/AT It boasts a 20 MHz Intel or 25 MHz AMD 80386sx microprocessor, enabling you to run virtually all the popular software packages with plenty of room for adding a host of industry-standard expansion options Since your new DECpc supports MS-DOS, OS/2, and Digital's increasingly popular PATHWORKS software, it can get the job done as a standalone PC or a network client Thus, with DECpc, you can take advantage of thousands of productivity-boosting applications, plus a wide range of valuable network resources

The main features and options available for your DECpc 320sxLP/325sxLP are

2.1 Standard Features

20MHz Intel 80386sx microprocessor
25MHz AMD 80386sx microprocessor

The powerful 80386sx microprocessor features full 32-bit internal architecture and very high performance using a 16-bit data bus

Four disk drives bays

Enables you to add a variety of 5 25 inch and 3 5 inch data storage devices The different types of drive available are listed under "Options" 2 2

High-capacity (1.44MB), 3.5-inch diskette drive

Enables you to read and write both standard-density diskettes (720KB) and high-density (1 44MB) 3 5-inch diskettes This drive is installed in one of the two drive bays, accessible from the front of the computer

Built-in diskette drive controller	Supports diskette drive without adding a card
Built-in 16-bit Integrated Drive Electronics (IDE)	Permits you to add IDE hard drives to your system without using a 16-bit expansion slot
Three 16-bit standard expansion slots (full sized)	Allows you to install up to three adapter boards (16-bit adapters and/or most 8-bit adapters)
Built-in 16-bit Video Graphics Array (VGA) controller	Gives a high-resolution monitor display of up to 1024x768 resolution in 16 colors. Also supports 132-column text modes and can emulate the MCGA, EGA, CGA, MDA, and Hercules standards. Requires a VGA analog monitor (color or monochrome)
At least 2MB of high-speed, page-mode on board memory extendable to 32MB maximum	Enables you to use CAD/CAM, database, desktop publishing, and other sophisticated application programs that require massive of "on-board" memory
Built-in serial, parallel, keyboard and mouse ports	Provides support for peripheral equipment and leave 16-bit expansion slots open for other uses. Your computer includes a PS/2-style keyboard and mouse port, two serial ports, and a parallel port
115-watt power supply	Supports a fully configured system
Auto Voltage Select (AVS)	Automatically switches voltage between 115V and 230V
Auxiliary AC output connector	Provides non-switched power to a monitor or peripheral device
Chassis lock	Secures the computer cover to the chassis

2.2 Options

Additional storage devices	Provides a variety of data storage options. You can add 5.25-inch and 3.5-inch storage devices, including — High-capacity or standard-capacity diskette drives — IDE or SCSI fixed disk drives — SCSI fixed disk drives with an optional controller
80387sx math coprocessor	Improves the numeric processing capability of the CPU.
Modem	Transmits and receives data through an ordinary telephone line.
Keyboard	Provides easy typing with a standard 101-key layout. Most keys feature autorepeat capability to reduce the number of multiple key strokes. Your computer supports a variety of keyboard configurations. For more information see "The Keyboard" in the "Getting Started" chapter.
EtherWORKS Adapter	Connects your system to a Digital DECnet PATHWORKS network environment.

3

GETTING STARTED

Unpack your computer carefully and verify that you have received the following system components

- **Computer**
- **Utilities Diskette**
- **Country-specific power cord**
- **Keys for chassis lock**
- **Screws for mounting optional disk drives**
- **Keyboard**
- **Mouse**
- **Optional color or monochrome VGA analog monitor**

If any of the system components is damaged or missing, contact your local Digital Customer Services

If you have ordered options with your system, follow the manufacturer's installation instructions

3.1 Site Considerations

Select a clean, dust-free installation site that meets the temperature and humidity requirements listed in Chapter 8, "Specifications"

3.2 Power Cord Requirements

For 115V AC line input, use a UL-listed cord set with at least 18 A wire, type SVT or SJT three-conductor cord, not more than 15 fee equipped with a parallel blade plug and ground attachment, and 10A, 250V service

For 230V AC line input (inside the U.S.), use a UL-listed cord set least 18 AWG wire, type SVT or SJT three-conductor cord, not m 15 feet long, equipped with a tandem blade plug and ground att and rated for 10A, 250V service

For 230V AC line input (in countries outside the U S), use a cor at least 18 AWG wire, a plug with a ground attachment rated for 250V service, and marked HAR The cord set should have the ap safety approvals for the country in which the equipment is install

CAUTION

The socket-outlet shall be installed near the equipment and s easily accessible.

3.3 Hardware Installation

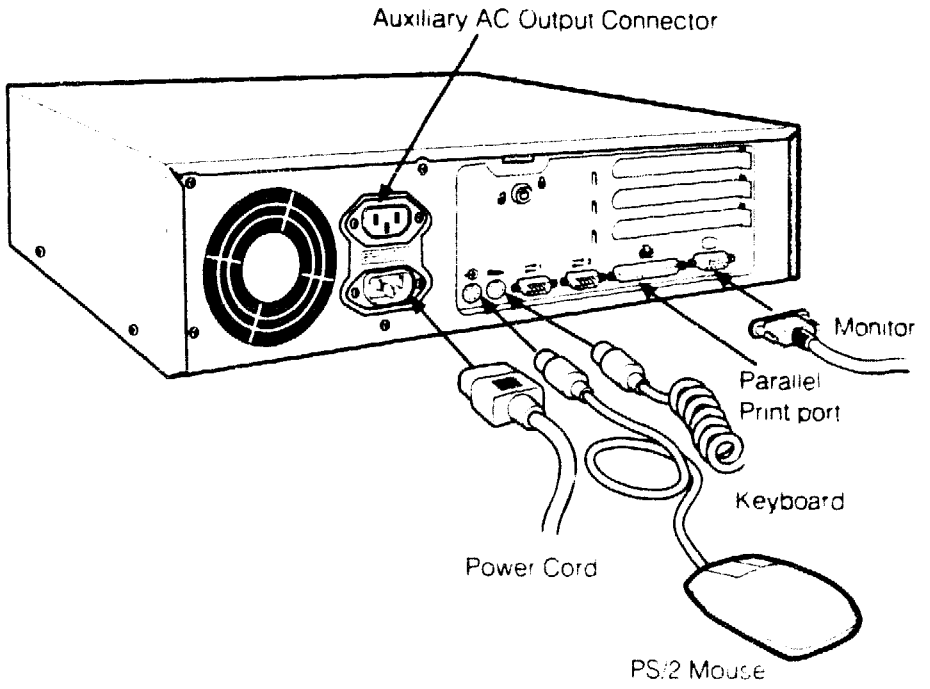
1 Place the equipment on a firm surface in a safe working envir

2 Lock the top cover in place to prevent unauthorized opening system housing

3 In accordance with Figure 3-1

- Connect the monitor video cable to the system unit
- Connect the keyboard cable to the system unit
- Connect the mouse cable to the system unit

4 Plug the monitor power cord into the monitor



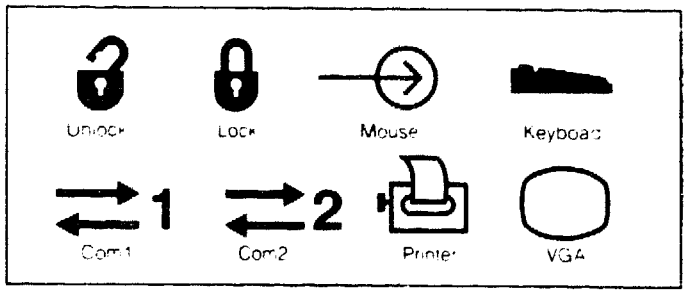


Figure 3.1: The Rear Of The Computer

5 Plug the system power cord into the system unit

6. Set the system unit power ON/OFF button to the off, or out, position (flush with system unit panel).

7. Plug the monitor and system power cords into a grounded AC outlet. Do not use an outlet that powers heavy machinery, copiers, office machines, or similar high-current devices. If an extension cord is required, use a grounded, multi-outlet strip.

8. Press the power switches on both the system unit and monitor. Your computer is now ready to use. Refer to paragraph 3.6 to learn how to perform Basic Operations.

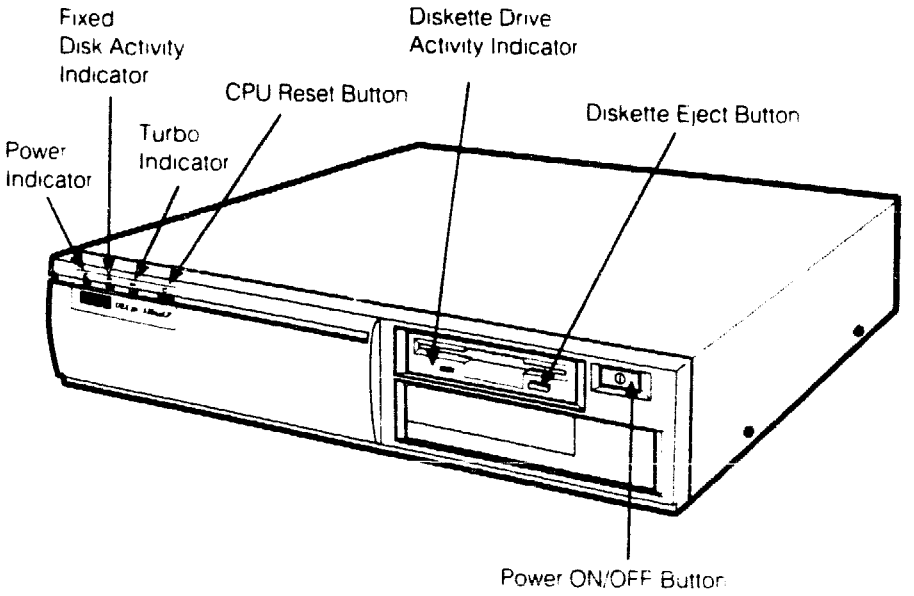
CAUTION
Never stand the system unit on its side.

3.4 Front Panel Controls and Indicators

The controls and indicators on the front panel of the system unit include a power indicator, a fixed disk activity indicator, a TURBO indicator, a CPU reset button, a diskette drive activity indicator, a diskette eject button, and a power ON/OFF button. (see Figure 3.2.)

Power Indicator
Always lights while power is applied to the system. Never move the unit when this light is on.

Fixed Disk Activity Indicator
Lights each time the fixed disk is accessed, and stays lit for reading or writing. Some commands or executions may take an exceptionally long time to accomplish (for example, recalculating a large spreadsheet). As long as this indicator flashes, it is a signal that the computer is operating normally and that the delay is due to the complexity of the task being performed.



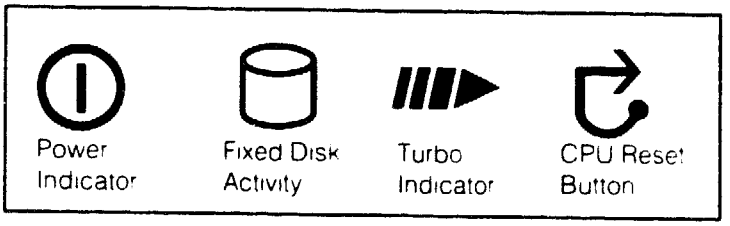


Figure 3.2: The Front Panel Of The Computer

TURBO Indicator
The system CPU runs at two speeds. You can change the CPU
any time by pressing a three-key combination:

Ctrl Alt + = Turbo mode

Ctrl Alt - = Normal mode

This indicator will be lit whenever the computer is running at the
clock speed, or turbo mode. When not lit, your PC is running at
clock speed, or normal mode.

CPU Reset Button
Permits you to restart the computer without turning the power o
back on again.

Diskette Drive Activity Indicator
Turns on whenever the diskette drive is reading from or writing
diskette, never remove a diskette when this light is on.

Diskette Eject Button
Ejects the 3.5-inch diskette from the disk drive.

Power ON/OFF Button
Depressing the push-button located on the right side of the fro
power on your computer. Whenever the button is seated inside
panel of the computer, the power is turned on. Make sure that
(that is, the button is level with the front panel) before moving t
ter or removing the cover.

3.5 The Keyboard

The 101-key enhanced keyboard has a curved profile for easy

NOTE: Keyboard should not be hot plugged.

Keyboard Layout
See Appendix A

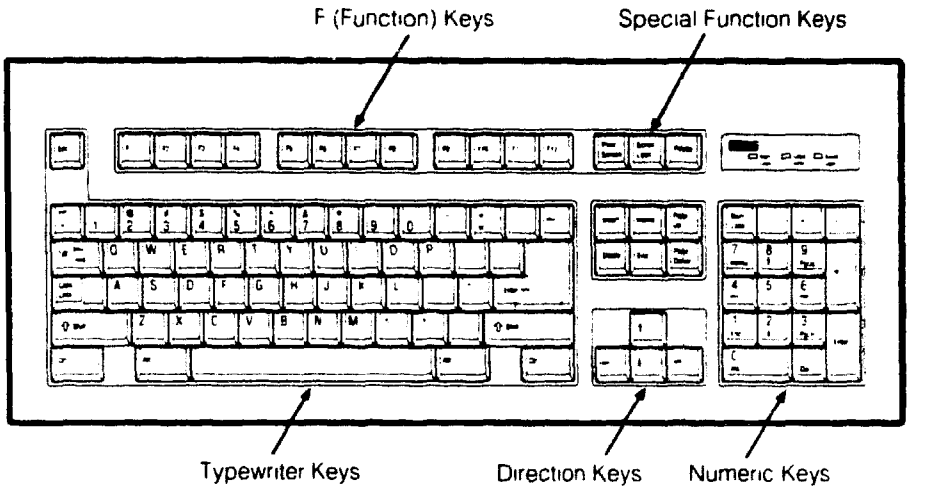


Figure 3.3: The Keyboard

F (Function) Keys
Key functions are determined by the software you are running These keys perform different functions under different programs

Special Function Keys
Perform the general functions shown on the keys (i.e SCROLL LOCK, PRINT SCREEN, etc.) Specific functions may vary slightly in some software programs

Typewriter Keys
Feature auto-repeat capability; when you hold down a typewriter key, the keystroke repeats automatically until you release the key

Direction Keys
Control the movement of the cursor (highlight) on the screen.

Numeric Keys
Enable you to type numbers in two ways You can hold down SHIFT and press a number, or you can press NUM LOCK and then type numbers without pressing the SHIFT key

3.6 Basic Operations

This section tells you how to perform some basic tasks, including

- Turn the computer on and off
- Use the diskette drive
- Reset the computer

3.6.1 Power-On/Power-Off

Refer to Figure 3-2. Make sure that the power on/off button is in t position. First plug the power cord into the power receptacle at t the system unit, then into the wall outlet.

Turn the computer on by depressing the power on/off button.

The computer automatically runs series of test. After all the tests been performed, the message below appears.

Screen example

```
Copyright 1992, Oak Technology VGA BIOS 067B/C V1.04D
Video Memory  512 KB

Phoenix BIOS (TM) A386 Version 1.01
Copyright (c) 1985-1992 Phoenix Technologies Ltd.
All Rights Reserved

DECpc 320sxLP Version 1.10
Copyright (c) 1992 Digital Equipment Corporation
All Rights Reserved


640K Base Memory, 01024K Extended
```

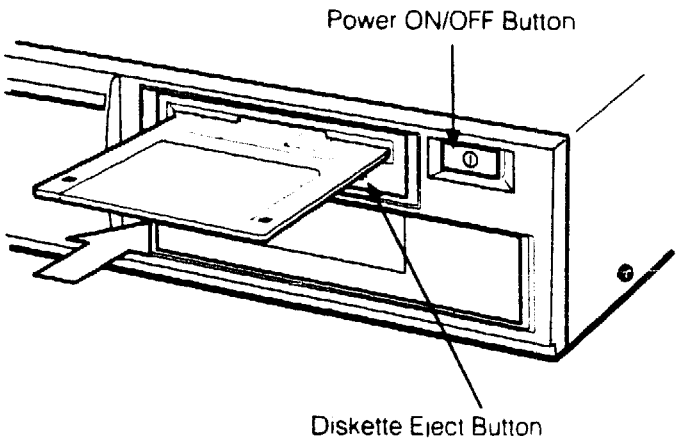


Figure 3.4: Diskette Insertion

3.6.2 Diskette Insertion

To insert a diskette, gently slide it (label side up and metal plate first) into the drive until the diskette locks into place.

To remove a diskette, press the diskette eject button. Be careful not to accidentally press the power ON/OFF button. The diskette will come part-way out of the drive and can be withdrawn gently by hand.

Caution

A drive activity light comes on when the computer is accessing the drive. Removing a diskette from a diskette drive while the activity light is on can destroy the data on the diskette and may damage the drive mechanism.

3.6.3 Diskette Types

The type of diskette you use in a diskette drive depends on the drive size (3.5-inch or 5.25-inch) and type (high-capacity or standard).

The DECpc 320sxLP/325sxLP has a 3.5-inch, high-density (1.44MB) drive.

Table 3.1: Diskette Types

Drive Capacity	Diskette Density	Read/Write
High-Capacity (1.44MB 3.5-inch or 1.2MB 5.25-inch)	High-Density Standard-Density	yes/yes yes/yes*
Standard-Capacity (720KB 3.5-inch or 360KB 5.25-inch)	High-Density Standard-Density	no/no yes/yes

*** To format a standard-density diskette in a high-capacity drive, you must include certain parameters in your operating system formatting command. See your operating system documentation for details. The capacity of a standard-density diskette will not change when it is formatted in a high-capacity drive.**

NOTE: A standard-capacity disk drive might not be able to read a standard-capacity diskette that was written or formatted in a high-density drive.

3.6.4 Resetting the Computer

Press Ctrl + Alt + Del if you need to reset your computer

If this key sequence fails, press the RESET button on the front of the computer.

If the RESET button fails to reset your computer, turn off the computer, wait at least 5 seconds, and then turn it back on.

4

SETUP

The Setup Utility allows you to easily configure your system to make your computer work more efficiently. Using the Setup Utility, you can enter configuration information for

- **Time and Date**
- **Diskette and fixed disk characteristics**
- **System memory organization information**
- **Video display data**
- **Keyboard**
- **Initial CPU speed setting data**
- **Rom base setup enable or disable**
- **Power On password**
- **NumLock on or off at boot**
- **Shadow RAM data**
- **640K - 1M Relocation**
- **Enable EMS and memory size**
- **Bus clock**

4.1 Starting SETUP

There are two ways to invoke SETUP utilities, either by using se
diskette or by pressing the three-key combination **Ctrl** + **Al**
at the time the ROM based setup is enabled. Use the up and d
keys to highlight any field you want to modify. With the exceptio
Time and Date fields, all values are default setting of the config

4.2 Setting the Time and Date

Screen example

Phoenix SETUP Utility (Version 1.00) 03
(c) Phoenix Technologies Ltd. 1985, 1992 All Rights Reserved

Pa

** Standard System Parameters **

System Time	09 43 01	ROM Base Setup	Enab
System Date	Jan 01, 1992	Power On Password	N/A
		Numlock on at boot	YES
Diskette A	3.5", 1.44MB		
Diskette B	Not Installed	Cyl Hd Pre Lz Sec	
Hard disk 1	Type 30	751 8 0 751 17	
Hard disk 2	Not Installed		
Base Memory	640 KB		
Extended Memory	1024 KB		
Video Card	VGA/EGA		
Keyboard	Installed		
CPU Speed	Fast		

ESC	F2		+/-	PgUp/
Menu	Sys Info	Field	Value	Page

4.2.1 Setting the Time

SETUP begins by highlighting the hour field of the Time line. Th
advances the hour setting, the "-" key moves the setting backw

down arrow key saves the hour setting and highlights the minute field. The minute and second field are set and saved in the same manner as the hour field. The down arrow key advances to the Date line.

4.2.2 Setting the Date

The +/- key selects the correct month, date and year. The time and date will be maintained and updated by the Real Time Clock in the system, even when the system is off.

4.3 Diskette and Hard Disk Characteristics

Screen example

Phoenix SETUP Utility (Version 1.00) 03
(c) Phoenix Technologies Ltd. 1985, 1992 All Rights Reserved

Page 1 of 2

** Standard System Parameters **

System Time	09:43:01	ROM Base Setup	Enable				
System Date	Jan 01, 1992	Power On Password	N/A				
		Numlock on at boot	YES				
Diskette A	3.5", 1.44MB						
Diskette B	Not Installed	Cyl	Hd	Pre	Lz	Sec	Size
Hard disk 1	Type 30	751	8	0	751	17	49
Hard disk 2	Not Installed						
Base Memory	640 KB						
Extended Memory	1024 KB						
Video Card	VGA/EGA						
Keyboard	Installed						
CPU Speed	Fast						

ESC	F2		+/-	PgUp/PgDn
Menu	Sys Info	Field	Value	Page

4.3.1 Configuring Diskettes

Up to five diskette drive type options may appear.

- 5.25 inch, 1.2MB
- 5.25 inch, 360KB
- 3.5 inch, 1.44MB
- 3.5 inch, 720KB
- Not Installed

"+" and "-" keys scroll through the available selections.

4.3.2 Configuring Hard Disks

Screen example

Phoenix SETUP Utility (Version 1.00) 03
(c) Phoenix Technologies Ltd. 1985, 1992 All Rights Reserved

Page 1 of 2

** Standard System Parameters **

System Time	09 43 01	ROM Base Setup	Enable					
System Date	Jan 01, 1992	Power On Password	N/A					
		Numlock on at boot	YES					
Diskette A	3.5", 1.44MB							
Diskette B	Not Installed	Cyl	Hd	Pre	Lz	Sec	Size	
Hard disk 1	Type 30	751	8	0	751	17	49	
Hard disk 2	Not Installed							
Base Memory	640 KB							
Extended Memory	1024 KB							
Video Card	VGA/EGA							
Keyboard	Installed							
CPU Speed	Fast							

ESC	F2		+/-	PgUp/PgDn
Menu	Sys Info	Field	Value	Page

Configuring Disks

If...	Then...
the correct hard disk type is shown on the screen	press the down arrow to move to the next line.
the hard disk drive type is not shown on the SETUP screen	you can use the "+" and "-" keys to go through the hard disk types one at a time.
none of the drive types on the Setup screen match the hard disk drive specifications	make sure the proper drive specifications are used and enter configuration information in hard drive type 48 through the SETUP menu screen.

4.3.3 No Information on SETUP Screen

If the hard disk information is not on the setup screen, the following specifications are needed in order to configure it:

- number of cylinders,
- number of heads,
- write precompensation,
- landing zone, and
- number of sectors.

4.3.4 Where To Find Drive Specifications

A partial list of potential sources for drive specifications includes:

- the information printed on the disk drive label
- the documentation provided with the drive

If no information is available, call Digital customer service.

4.3.5 Troubleshooting Hard Disk Drive Selection

The tables below will keep you configures the system's hard disk
Although the diversity of drives and controllers makes it impossib
predict what will happen in every case, the following conditions g
hold true when configuring the system drives.

Specification	If the hard disk drive's specification is greater than the one on the SETUP screen	If the hard disk specification is than the one or SETUP screen
Head	System will not operate	System will not o
Sector	System will not operate	System will not o
Cylinder	Hard disk error results when accessing cylinders other than last cylinder on drive	Some loss of sto capacity but sys should operate
Landing Zone	Hard disk error results when parking the heads	May lose data if chine is moved head is parked
Megabytes	No effect on operation	No effect on op

Specification	If the value = -1 and does not match table	If the value = 0 and does not match table	If the value is > 0 and does not mach table
Write pre-compensation	System should work in all cases but read/write operations may be slowed somewhat	Intermittent data errors may occur	Data errors may occur, depending on the specific controller and how much the number differs

* The write precompensation operation compresses data so that it will fit in the smaller sectors on the inner cylinders of the disk. When configured to -1, the disk controller compresses the writes for all sectors. A zero configuration means that no write precompensation takes place. A value approximately half of the total number of cylinders per disk side indicates the cylinder where write precompensation begins.

4.3.6 Configuring Drive 2

Drive 2 is configured using the same process as drive 1. If the system does not have another hard drive. Enter drive 2 as Not Installed.

4.4 Configuring Memory

Screen example

```
Phoenix SETUP Utility (Version 1.00) 03
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                                                        Page 1 of 2
                    ** Standard System Parameters **

System Time         09:43:01        ROM Base Setup      Enable
System Date         Jan 01, 1992    Power On Password   N/A
                                    Numlock on at boot  YES

Diskette A          3.5", 1.44MB
Diskette B          Not Installed   Cyl  Hd  Pre  Lz   Sec  Size
Hard disk 1         Type 30         751  8   0    751  17   49
Hard disk 2         Not Installed
Base Memory         640 KB
Extended Memory     1024 KB
Video Card          VGA/EGA
Keyboard            Installed
CPU Speed           Fast

ESC Menu    F2 Sys Info    Field    +/- Value    PgUp/PgDn Page
```

4.4.1 Configuring Base Memory

The correct value for Base Memory is usually displayed on the SETUP screen. To change this value, use the numeric keys on the keyboard to type in the correct amount of RAM installed on the system board.

4.4.2 Configuring Extended Memory

Enter the amount of extended memory on the Extended Memory line. In most systems, RAM Modules can be added at any time. After adding more RAM Modules, run SETUP again.

4.5 Configuring Display

Screen example

```
Phoenix SETUP Utility (Version 1.00) 03
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                                                        Page 1 of 2
                    ** Standard System Parameters **

System Time         09:43:01        ROM Base Setup:     Enable
System Date         Jan 01, 1992    Power On Password:  N/A
                                    Numlock on at boot: YES
Diskette A          3.5", 1.44MB
Diskette B          Not Installed   Cyl  Hd  Pre  Lz   Sec  Size
Hard disk 1         Type 30         751  8   0    751  17   49
Hard disk 2         Not Installed
Base Memory         640 KB
Extended Memory     1024 KB
Video Card          VGA/EGA
Keyboard            Installed
CPU Speed           Fast

ESC     F2                  +/-     PgUp/PgDn
Menu    Sys Info    Field   Value   Page
```

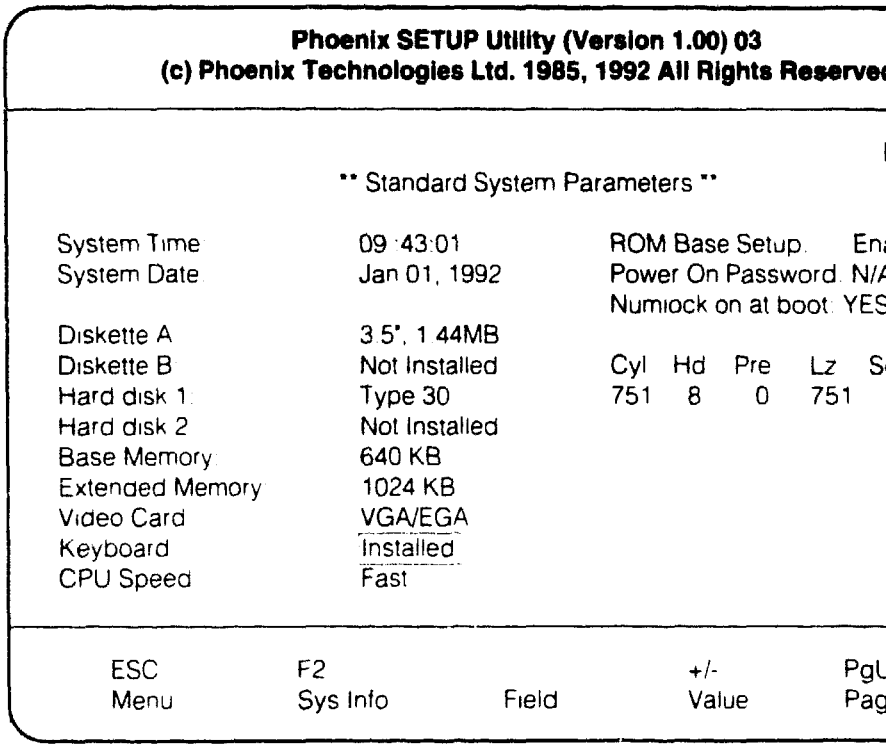
4.5.1 Display Settings

In most cases the correct video display value appears on this line. You may scroll through the settings with the "+" and "-" keys. The settings are:

- MONO (Monochrome Display Adapter)
- EGA/VGA (EGA or VGA color or monochrome display adapter)
- CGA40 (40-column CGA display adapter)
- CGA80 (80-column CGA display adapter)
- Not Installed

4.6 Configuring the Keyboard

Screen example



Only two settings are available for the Keyboard line:

- Installed
- Not Installed

The Not Installed option configures a system without a keybo keyboard is connected, but Not Installed is selected, the key operate.

4.7 Setting CPU Speed

Screen example

```
Phoenix SETUP Utility (Version 1.00) 03
(c) Phoenix Technologies Ltd. 1985, 1992 All Rights Reserved

                                                        Page 1 of 2
                    ** Standard System Parameters **

System Time         09:43:01        ROM Base Setup      Enable
System Date         Jan 01, 1992    Power On Password   N/A
                                    Numlock on at boot  YES

Diskette A          3.5", 1.44MB
Diskette B          Not Installed   Cyl  Hd  Pre   Lz  Sec  Size
Hard disk 1         Type 30         751   8    0   751   17   49
Hard disk 2         Not Installed
Base Memory         640 KB
Extended Memory     1024 KB
Video Card          VGA/EGA
Keyboard            Installed
CPU Speed           Fast

ESC Menu    F2 Sys Info    Field    +/- Value    PgUp/PgDn Page
```

The system CPU runs at two speeds: older software that runs under a copy protection scheme may require a slower speed for proper operation. To change the default setup speed, scroll through the setting by using "+" and "-" keys. The setting are:

- Fast
- Slow

4.8 ROM Base Setup

The ROM based SETUP can be enabled or disabled. Moving cu
ROM Base Setup field, press "+" or "-" to change setting. A warn
message will be displayed when the cursor is moved to this field

Screen example

Phoenix SETUP Utility (Version 1.00) 03
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Pag

** Standard System Parameters **

System Time	09 :43:01	ROM Base Setup:	Enable
System Date	Jan 01, 1992	Power On Password:	N/A
		Numlock on at boot:	YES
Diskette A	3 5", 1 44MB		
Diskette B	Not Installed	Cyl Hd Pre Lz Sec	
Ha			
Ha			
Ba			
Ex			
Vi			
Ke			
CPU Speed	Fast		

Warning! This field allows one to disable running this setup utility from ROM BIOS. then it will only allow to re-enter from disk based setup utility. Make sure this system is bootable and the setup utility is available before selecting "Disable".

ESC	F2		+/-	PgUp/P
Menu	Sys Info	Field	Value	Page

When the ROM based SETUP was disabled, the SETUP utility ca
invoked by three-key combination Ctrl + Alt + S , or by
SETUP.COM in DECpc 320sxLP/325sxLP SYSTEM UTILITIES flo
diskette must be used to invoke the SETUP utility.

4.9 Power On Password

Screen example

```
Phoenix SETUP Utility (Version 1.00) 03
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                                                        Page 1 of 2
                    ** Standard System Parameters **

System Time          09:43:01          ROM Base Setup:    Enable
System Date          Jan 01, 1992      Power On Password: N/A
                                       Numlock on at boot: YES
Diskette A           3.5", 1.44MB
Diskette B           Not Installed     Cyl  Hd  Pre  Lz  Sec  Size
Hard disk 1          Type 30           751   8    0  751   17   49
Hard disk 2          Not Installed
Base Memory          640 KB
Extended Memory      1024 KB
Video Card           VGA/EGA
Keyboard             Installed
CPU Speed            Fast

ESC Menu   F2 Sys Info   Field   +/- Value   PgUp/PgDn Page
```

The Setup Utility allow you to set your own Power On Password by changing the value of Power On Password field. To setup or change password of Power On Password field, follow the steps below:

4.9.1 Setup the Power On Password

If there is no existing security password, N/A will be displayed in the Power On Password field. For setting up a security password, go to the Power On Password field and follow the steps that shown on the screen.

> Warning! Changes to this field will alter your Post Security Code. Press ENTER to Continue or any other key to exit without changes.

> You may now enter the new password directly if you would like to set it.

Re-enter your password for verification.
If the re-enter password is correct the following message will be displayed:

New password is now installed.
Press any key to continue.

or message

Verification of your NEW password was incorrect!
The original password remains unchanged
Press any key to continue

will be displayed

4.9.2 Change the Power On Password

If a power on password has already existed, "Enabled" will be displayed in the Power On Password field. Go to the field and follow the steps shown.

Enter the current Security Password for entry to this field

If the current Security Password is entered correctly, the following message will be displayed.

Verification of the old password was correct
you may now enter the new password
or type '/' to remove password security

If a new password is entered, the following message will be displayed.

Re-enter your password for verification.

If the re-enter password is correct, the following message will be displayed:

New password is now installed
Press any key to continue

or message

Verification of your NEW password was incorrect! The original password remains unchanged. Press any key to continue.

Pressing '/' disables Power On Password.

NOTE: Password should be noted in a secure file or system that can't be booted because of entering incorrect password. If you forget the password, you can disable Power On Password by discharging CMOS (See Table 6.1). Once CMOS is discharged, you have to enter configuration information by using the Setup Utility.

4.10 Numlock On/Off Setting

Screen example

```
                 Phoenix SETUP Utility (Version 1.00) 03
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                                                          Page 1 of 2
                      ** Standard System Parameters **

System Time         09 43 01           ROM Base Setup     Enable
System Date         Jan 01, 1992       Power On Password  N/A
                                       Numlock on at boot YES
Diskette A          3.5", 1.44MB
Diskette B          Not Installed      Cyl  Hd  Pre  Lz   Sec  Size
Hard disk 1         Type 30            751  8   0    751  17   49
Hard disk 2         Not Installed
Base Memory         640 KB
Extended Memory     1024 KB
Video Card          VGA/EGA
Keyboard            Installed
CPU Speed           Fast

   ESC        F2                          +/-        PgUp/PgDn
   Menu       Sys Info      Field         Value      Page
```

Setting the default on/off of Numlock. Use the "+" and "-" key to select.

4.11 Shadowing BIOS

Screen example

Phoenix SETUP Utility (Version 1.00) 03
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Page 2 of 2

** Chip Set Feature Control **

Shadow BIOS ROM	Enabled	640K - 1M Relocation	Disabled
Shadow 16K at C0000h	Enabled		
Shadow 16K at C4000h	Enabled		
Shadow 16K at C8000h	Disabled	Enable EMS	Disabled
Shadow 16K at CC000h	Disabled	EMS Memory Size	512KB + RSVD
Shadow 16K at D0000h	Disabled	Bus Clock	10MHz
Shadow 16K at D4000h	Disabled		
Shadow 16K at D8000h	Disabled		
Shadow 16K at DC000h	Disabled		
Shadow 16K at E0000h	Disabled		
Shadow 16K at E4000h	Disabled		
Shadow 16K at E8000h	Disabled		
Shadow 16K at EC000h	Disabled		

ESC	F2		+/-	PgUp/PgDn
Menu	Sys Info	Field	Value	Page

The Shadow RAM features make it possible for the BIOS to copy video and BIOS ROM-based system software into RAM. This procedure is called shadowing. The BIOS transfers the contents of 64K BIOS ROM, 32K Video ROM (at locations C0000h and C4000h) in blocks of 16K, and up to 160K of additional ROM (also in blocks of 16K) into RAM and maps addressing schemes so that the remapped code is accessed via faster RAM.

This feature selects whether the BIOS ROM or video ROM is copied into Shadow RAM. Select Enable to shadow ROM or Disable to turn shadowing off. When enabled, this option disables the 640-1M Relocation feature

4.12 640K - 1M Relocation

Screen example

Phoenix SETUP Utility (Version 1.00) 03

Page 2 of 2

** Chip Set Feature Control **

Shadow BIOS ROM	Enabled	640K - 1M Relocation	Disabled
Shadow 16K at C0000h	Enabled		
Shadow 16K at C4000h	Enabled		
Shadow 16K at C8000h	Disabled	Enable EMS	Disabled
Shadow 16K at CC000h	Disabled	EMS Memory Size	512KB + RSVD
Shadow 16K at D0000h	Disabled	Bus Clock	10MHz
Shadow 16K at D4000h	Disabled		
Shadow 16K at D8000h	Disabled		
Shadow 16K at DC000h	Disabled		
Shadow 16K at E0000h	Disabled		
Shadow 16K at E4000h	Disabled		
Shadow 16K at E8000h	Disabled		
Shadow 16K at EC000h	Disabled		

ESC	F2		+/-	PgUp/PgDn
Menu	Sys Info	Field	Value	Page

Enabling this feature relocates the physical memory at A000h FFFFh to the top of the memory installed. This relocation feature is supported only with 2MB memory configuration to remap the 384K of memory between 640-1024K as Extended Memory. Use the "+" and "-" keys to toggle this feature

4.13 Enable EMS and Memory Size

Enabling or disabling the Expanded Memory Specification (EMS
allows you to enable/disable EMS memory and select EMS mem

4.13.1 Enable EMS

Screen example

Phoenix SETUP Utility (Version 1.00) 03
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** Chip Set Feature Control **

Shadow BIOS ROM	Enabled	640K - 1M Relocation	Disabl
Shadow 16K at C0000h	Enabled		
Shadow 16K at C4000h	Enabled		
Shadow 16K at C8000h	Disabled	Enable EMS	Disabled
Shadow 16K at CC000h	Disabled	EMS Memory Size	512KB +
Shadow 16K at D0000h	Disabled	Bus Clock	10MHz
Shadow 16K at D4000h	Disabled		
Shadow 16K at D8000h	Disabled		
Shadow 16K at DC000h	Disabled		
Shadow 16K at E0000h	Disabled		
Shadow 16K at E4000h	Disabled		
Shadow 16K at E8000h	Disabled		
Shadow 16K at EC000h	Disabled		

ESC	F2		+/-	PgU
Menu	Sys Info	Field	Value	Pag

Use the keys "+" and "-" to enable or disable the EMS feature

The EMS feature can't work if the following command line is not
the file config.sys (see Chapter 5.2):

device = TOPCAT.EMS

4.13.2 Memory Size

Screen example

```
Phoenix SETUP Utility (Version 1.00) 03
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                                                        Page 2 of 2
                    ** Chip Set Feature Control **

Shadow BIOS ROM          Enabled     640K - 1M Relocation  Disabled
Shadow 16K at C0000h     Enabled
Shadow 16K at C4000h     Enabled
Shadow 16K at C8000h     Disabled    Enable EMS            Disabled
Shadow 16K at CC000h     Disabled    EMS Memory Size       512KB + RSVD
Shadow 16K at D0000h     Disabled    Bus Clock             10MHz
Shadow 16K at D4000h     Disabled
Shadow 16K at D8000h     Disabled
Shadow 16K at DC000h     Disabled
Shadow 16K at E0000h     Disabled
Shadow 16K at E4000h     Disabled
Shadow 16K at E8000h     Disabled
Shadow 16K at EC000h     Disabled

ESC Menu   F2 Sys Info   Field   +/- Value   PgUp/PgDn Page
```

To make the memory function more efficiently, the memory size below is reserved to work as expanded memory even when EMS is disabled.

Memory Size (RSVD)	When...
0KB	The total memory is equal to 2MB and 640-1M Relocation is enabled
288KB	Both BIOS and Video ROM are shadowed
320KB	Only BIOS ROM is shadowed
352KB	Only Video ROM is shadowed
384KB	Neither BIOS nor Video ROM is shadowed

The total memory of system is equal to:

(Base Memory + Shadow RAM + RSVD) + Extended Memory + Expanded Memory

Example 1: When on board memory is 8MB and Expanded Memory is set to 4MB, the Extended Memory should be 3MB.

Example 2: When on board memory is 20MB and Expanded Memory is set to 12MB, the Extended Memory should be 7MB.

For on board memory more than 16MB, the EMS feature should be enabled, otherwise the memory over 16MB will be meaningless.

You can select the EMS Memory Size by using the keys "+" and "-".

4.14 Bus Clock

Screen example

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** Chip Set Feature Control **

Shadow BIOS ROM	Enabled	640K - 1M Relocation	Disabled
Shadow 16K at C0000h	Enabled		
Shadow 16K at C4000h	Enabled		
Shadow 16K at C8000h	Disabled	Enable EMS	Disabled
Shadow 16K at CC000h	Disabled	EMS Memory Size	512KB + RSVD
Shadow 16K at D0000h	Disabled	Bus Clock	10MHz
Shadow 16K at D4000h	Disabled		
Shadow 16K at D8000h	Disabled		
Shadow 16K at DC000h	Disabled		
Shadow 16K at E0000h	Disabled		
Shadow 16K at E4000h	Disabled		
Shadow 16K at E8000h	Disabled		
Shadow 16K at EC000h	Disabled		

ESC	F2		+/-	PgUp/PgDn
Menu	Sys Info	Field	Value	Page

Bus clock is generated by division of TCLK2 or BUSOSC. Available options are:

- 6 67MHz
- 8MHz
- 10MHz

5

UTILITIES AND DRIVERS

This chapter provides instructions for loading and executing VGA, EMS and Keyboard Password drivers and utilities

Utilities and Drivers Diskettes include

- Two VGA Graphics Utilities diskettes
- One EMS driver and Keyboard Password utility diskette

This chapter describes

- VGA Utilities and Drivers
- EMS Driver
- Keyboard Password Utility

5.1 VGA Utilities and Drivers

This section describes

- Supported Screen Formats
- Monitor and Modes Table
- VGA Mode Utility
- High Resolution Drivers

5.1.1 Supported Screen Formats

Table 5.1 Standard VGA Modes Supported

MODE (hex)	Type	COLx ROW	Colors	Pages	Map Addr (hex)	CharCell
00	Text	40 x 25	16	8	B800	8 x 8
01	Text	40 x 25	16	8	B800	8 x 8
02	Text	80 x 25	16	8	B800	8 x 8
03	Text	80 x 25	16	8	B800	8 x 8
00*	Text	40 x 25	16	8	B800	8 x 14
01*	Text	40 x 25	16	8	B800	8 x 14
02*	Text	80 x 25	16	8	B800	8 x 14
03*	Text	80 x 25	16	8	B800	8 x 14
00+	Text	40 x 25	16	8	B800	9 x 16
01+	Text	40 x 25	16	8	B800	9 x 16
02+	Text	80 x 25	16	8	B800	9 x 16
03+	Text	80 x 25	16	8	B800	9 x 16
07	Text	80 x 25	2	8	B000	9 x 14
07+	Text	80 x 25	2	8	B000	9 x 16
04	Graphics	320 x 200	4	1	B800	8 x 8
05	Graphics	320 x 200	4	1	B800	8 x 8
06	Graphics	640 x 200	2	1	B800	8 x 8
0D	Graphics	320 x 200	16	8	A000	8 x 8
0E	Graphics	640 x 200	16	4	A000	8 x 8
0F	Graphics	640 x 350	2	2	A000	8 x 14
10	Graphics	640 x 350	16	2	A000	8 x 14
11	Graphics	640 x 480	2	1	A000	8 x 16
12	Graphics	640 x 480	16	1	A000	8 x 16
13	Graphics	320 x 200	256	1	A000	8 x 8

Remarks:

1. **Modes marked with * or + are Expanded Character Cell versions of the original modes.**

2. **Mode 3+ (color) or 7+ (monochrome) is the default mode at power up.**

Table 5.2 Extended VGA Modes Supported

MODE (hex)	Type	COLx ROW	Colors	Pages	Map Addr (hex)	CharCell
4E	Text	80 x 60	16	2	B800	8 x 8
4F	Text	132 x 60	16	2	B800	8 x 8
50	Text	132 x 25	16	4	B800	8 x 14
51	Text	132 x 43	16	2	B800	8 x 8
52	Graphics	800 x 600	16	1	A000	8 x 16
53	Graphics	640 x 480	256	1	A000	8 x 16
54	Graphics	800 x 600	256	1	A000	8 x 16
55	Graphics	1024 x 768	4	1	A000	8 x 16
56	Graphics	1024 x 768	16	1	A000	8 x 16
57	PORTRAIT	768 x 1024	4	1	A000	8 x 16

5.1.2 Monitor and Modes Table

Table 5.3 Monitor and Modes

Supported Modes (in hex)	Analog Monitors	
	Multi-Frequency	Fixed-Frequency
00,*,+	Y	Y
01,*,+	Y	Y
02,*,+	Y	Y
03,*,+	Y	Y
4	Y	Y
5	Y	Y
6	Y	Y
07,+	Y	Y
D	Y	Y
E	Y	Y
F	Y	Y
10	Y	Y
11	Y	Y
12	Y	Y
13	Y	Y
4F	Y	
50	Y	
51	Y	
52	Y	
53	Y	
54	Y	
55	Y	
56	Y	
57		PORTRAIT

Remarks:

1. **Modes 00,*,+ through 13 are standard modes; modes 4F through 57 are Extended High Resolution modes provided by the VGA board.**

2. **Only modes 55, 56, and 57 can be set for either interlaced or non-interlaced.**

5.1.3 VGA Mode Utility

Although most recent software can run in the default VGA configuration, some older software programs were written specifically for non-EGA or non-VGA video hardware. To run these older programs, it is necessary to configure the on-board video controller to behave as required by the software.

This configuration is accomplished through a process called backward compatibility. Backward compatibility is provided by a combination of hardware and firmware emulation. To perform this emulation, a utility program called VGAMODE.EXE is provided on the accompanying floppy disks. VGAMODE.EXE can be extracted by using the utility INSTALL.EXE which is included in the diskette. The file must be decompressed before following the installation instruction.
To run INSTALL.EXE type:

INSTALL **Enter**

Then follow the install program instructions to extract the VGAMODE.EXE and copy it into the designated sub-directory. All previous video standards (MDA, CGA, and EGA modes) are emulated. Use VGAMODE when running applications software that requires a specific mode other than the one to which the VGA has been configured.

To activate/deactivate the emulation modes, place the floppy in drive A and enter VGAMODE **Enter**. If entered at the DOS prompt without any parameters, a menu will be displayed that allows the selection of the emulation modes as well as the display modes. A message at the bottom of the screen explains the action of the item at the current cursor position.

VGAMODE can also be executed from the DOS prompt with parameters to automatically enter an emulation mode. To select an emulation, enter VGAMODE followed by a 'C', 'M', 'E', or 'V'; **Enter** to switch to CGA, MGA, EGA, and back to VGA, respectively.

VGAMODE C (switches to CGA emulation mode)

VGAMODE M (switches to MGA emulation mode)

VGAMODE E (switches to EGA emulation mode)

VGAMODE V (returns to normal VGA mode)

To select a display mode, append the mode number in hex after VGAMODE. Refer to Table 5.1 & 5.2 for a listing of all of the supported modes.

VGAMODE 3 (select mode 3 - 80 x 25 color text mode)

VGAMODE 51 (select mode 51 - 132 x 43 color text mode)

VGAMODE 13 (select mode 13 - 320 x 200, 256 colors graphics mode)

A LOCK/UNLOCK feature allows locking and unlocking of the emulation mode. Locking an emulation mode will cause the on-board VGA controller to remain in the chosen mode even after a warm reboot (the simultaneous pressing of the Control, Alt and Delete keys). LOCK/UNLOCK will be erased by power shutdown. This feature is ideal for the running of self-bootable game programs.

Remarks:

I. **VGAMODE is not a memory resident program. Since the emulation firmware is embedded within the VGA BIOS no system RAM memory is used.**

5.1.4 High Resolution Drivers

Drivers allow you to take advantage of extended graphics modes. All of the driver files except Gem and Ventura have been compressed and can be extracted by using the utility INSTALL.EXE, which is included in the diskette. The driver files must be decompressed before following the installation instructions.
To run INSTALL.EXE type:

INSTALL **Enter**

Then follow the install program instructions to extract the driver files and copy them into the designated sub-directory.

Listed below are the applications programs for which high resolution drivers are provided. The latest list of application program drivers can be found in the file README.DOC, which is included on the driver diskettes. README.DOC also lists the driver files for each application program.

- AutoCAD Version 2.62
- AutoCAD Rel 9/10/11, AutoShade 1.1 & 2.0, AutoSketch 3.0
- Framework II and III
- Gem/3 Version 3.1
- Lotus 1-2-3 Version 2.0x, Release 2.2, and Release 3
- OrCAD 4.0
- P-CAD 4.5
- Presentation Manager Version 1.1
- RIXAI
- Ventura Publisher Version 1.1 & 2.0
- VersaCAD 6.0 & VersaCAD/386 6.0
- VESA

- Windows 286/386 Versions 2.11, and 3.0
- WordPerfect Versions 5.0 and 5.1
- 132-column Text Mode Applications

For more information about drivers for each application prograr
refer to Appendix D.

5.2 EMS DRIVER

The EMS Memory Manager for hardware EMS conforms to version 4.00 of the Expanded Memory Specification (EMS). Version 4.00 of the Lotus/ Intel/Microsoft specification is upward compatible with version 3.20 and will run programs written for that version of the memory manager.

This driver takes advantage of the hardware EMS registers available on the chip set. The chip set has numerous EMS features that this driver can control, move, enable or disable. A brief list follows.

- Both a standard and alternate EMS mapping register set with a combined total of 72 EMS 16K byte "Windows" to EMS memory.
- Each register set has 16K byte EMS "Window" granularity. In other words, each of the 4 Windows comprising the EMS "Page Frame" is 16K bytes in size.
- Each register set has Backfill capability for Operating Systems capable of using 256K-640K as EMS Backfill.
- Each register set has 12 EMS page registers available from C000H-EFFFH, and 24 Backfill registers for an individual total of 36 registers.

Hardware EMS provides superior performance to a software only EMS driver sometimes called an EMS emulator ("LIMulator"). Hardware EMS page mapping is orders of magnitude greater than software EMS. Also, Hardware EMS does not suffer from the problems of EMS emulators; for example, there are no aliasing affects with a hardware EMS.

The memory manager should be installed in the CONFIG.SYS file at the first driver. This allows other device drivers, such as the RAMDISK, to make use of the memory manager's services. After being loaded, the memory manager will determine the amount of expanded memory in the system and perform any required initialization. The syntax for installation of the memory manager is shown below. The items included in the brackets ([]) are called "Command Line Options" ; they allow the memory manager to be tailored to specific system configurations.

In general the command line will appear as below.

```
device = TOPCAT.EMS [Contexts=nnn [Exclude=xxxx-xxxx] [Frame=xxxx]
         [Handles=nnn] [Include=xxxx-xxxx] [Nobackfill]
         [Cachepresent] [Noflush] [Usealternate] [Fulldisplay]
         [Test] [Showoptions] [Zero]
```

An abbreviated command line may also be used as shown below.

```
device = TOPCAT.EMS [C=nnn] [X=xxxx-xxxx] [S=xxxx] [H=nnn]
         [I=xxxx-xxxx]
         [NB] [CP] [NF] [UA] [F] [T] [SO] [Z]
```

For detailed descriptions of the command line options and memory manager error messages, please refer to Appendix B

5.3 Keyboard Password Utility

The Keyboard Password Utility on the provided diskette allows you to set a password control for the computer keyboard, thus making it impossible for non-authorized users to access the computer.

To install the Keyboard Password utility, insert the utility diskette in drive A: and copy the file KP.EXE to the sub-directory required.

The Keyboard Password Utility will automatically extract the password in CMOS RAM if the POWER ON PASSWORD feature of the BIOS setup is enabled (see chapter 4.8). Thus, you can key-in KP to lock the keyboard. Entering your password again will restore keyboard function.

If the BIOS POWER ON PASSWORD is disabled, the message below will be displayed when you key in the command KP first time.

C> Enter the keyboard password. [Esc] to quit

Type in your password, of up to eight characters, and press <Enter>. The message on the screen will change to

C> Is this correct? (Y/N/ESC)

Pressing [Y] [Enter] will lock the keyboard.

The system will yield no response until the correct password is entered again, thus unauthorized users cannot reset your password when you leave your computer unattended

6

INSTALLING OPTIONAL HARDWARE

This Chapter explains, step-by-step, how to install a math coprocessor, a new CMOS RAM battery, expansion adapters, memory expansion, and disk/diskette drives

When installing optional hardware yourself, you are advised to read this chapter and carefully follow the instructions along with any additional instructions in the manufacturers' hardware manuals The section dealing with the "Motherboard Layout" will help you to identify sockets, slots, switches, and jumpers and their position on the board

After installing the option you may need to invoke the Phoenix Setup utility again to update your system configuration

6.1 Installation Overview

When installing optional hardware, be sure to

- Unlock the chassis lock
- Remove the top cover
- Install your optional hardware
- Invoke the BIOS Setup utility to complete the installation of drives or memory
- Replace the top cover

6.2 Removing the Top Cover

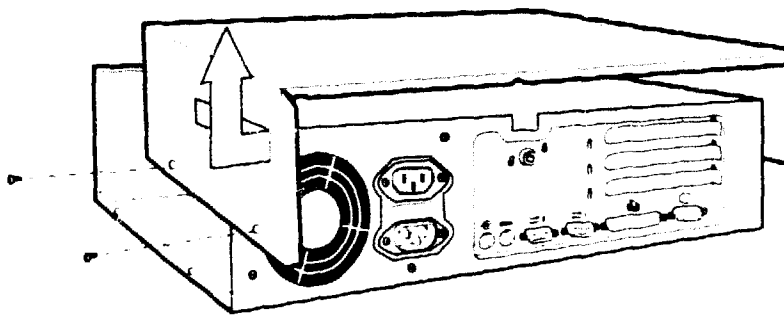


Figure 6.1: Top Cover Removal

WARNING

Before removing the cover, ensure that the computer is in working area with the power turned off and all power cord cables disconnected.

The cover is held in place by a chassis lock and by four retaini The chassis lock is located above the interface port area at the chassis. two retaining screws are located at the base of each s cover. To remove the cover, refer to Figure 6-1 and follow the s below:

1 Unlock the cover by way of the chassis lock.

2 Remove the four retaining screws, two on each side. Keep th in a safe place for re-attachment of the cover.

3 Gently slide the cover towards the rear of the computer until the base.

4 Hold each side of cover and carefully pull outwards until it is chassis.

5 Continue sliding the cover backwards to completely uncover chassis.

6.3 Replacing the Top Cover

After all installations and upgrades have been completed, the cover must be replaced.

1 Align the cover with the rear of the computer.

2 Holding the cover at the base of each side, gently pull outwards and slide the cover forwards towards the front of the computer. Ensure that the cover does not touch any of the internal components of the computer.

3 Once the cover has snapped into place, replace and tighten the four retaining screws.

CAUTION

Replacing the cover should be a smooth and easy operation. If any resistance is encountered when sliding the cover forward, DO NOT force it. Remove the cover, check the alignment with the chassis, and start again.

4 Re-lock the cover by way of the chassis lock.

5 Re-connect all power cords and peripheral cables.

6.4 Motherboard Layout

The diagrams below show the locations of the major jumpers, switches and components on the motherboard of your computer.

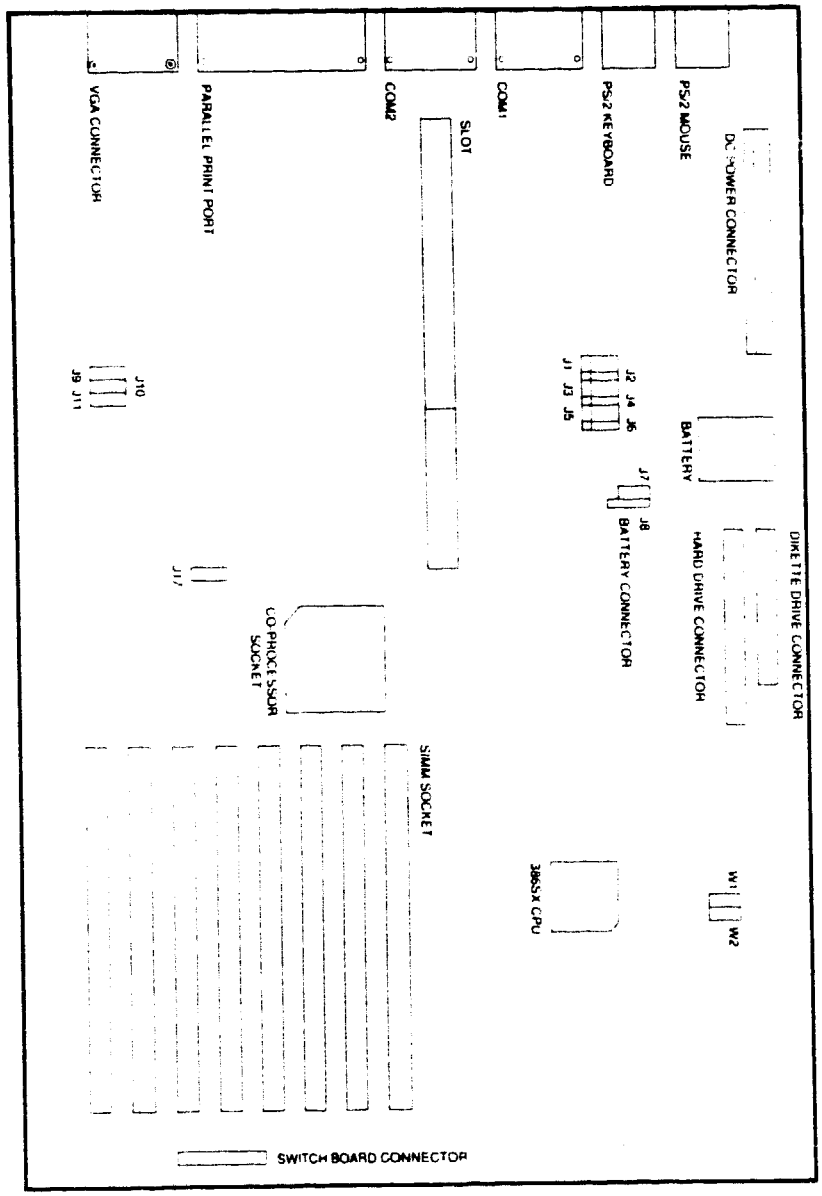


Figure 6.2: Motherboard Layout

6.4.1 Configuration Settings

The factory settings detailed in the "Configuration Settings" chart are default settings for optimum performance, and should be sufficient for the majority of users. However, if you elect to install new hardware options into your computer, some jumper settings may have to be changed

A "jumper" is a clip-type component with metal contacts. The clip is placed over two adjacent pins to connect or bypass a circuit, and is often referred to as "closed" or "open". Jumpers are installed, removed or parked (see Figure 6.3). A parked jumper is the same as no jumper connection

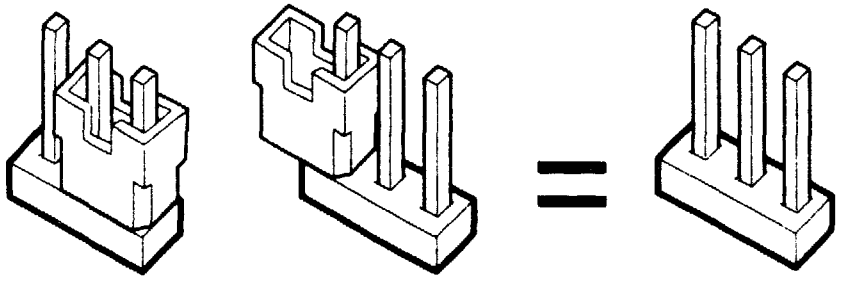


Figure 6.3: Jumper Insertion

The following table lists possible jumper settings for your computer.

Table 6.1: Configuration Setting

Feature	Description	Jumper Setting
J1 COM2 address selection	Disable 238H 2F8H (default)	2 & 3 short, 5 & 6 short 2 & 3 short, 4 & 5 short 1 & 2 short, 4 & 5 short
J2 On board FDC	Enable (default) Disable	1 & 2 short 2 & 3 short
J3 COM1 address selection	Disable 338H 3F8H (default)	2 & 3 short, 5 & 6 short 2 & 3 short, 4 & 5 short 1 & 2 short, 4 & 5 short
J4 On board IDE	Enable (default) Disable	1 & 2 short 2 & 3 short
J5 LPT1 address selection	Disable 378H 3BCH 278H (default)	2 & 3 short, 5 & 6 short 1 & 2 short, 5 & 6 short 2 & 3 short, 4 & 5 short 1 & 2 short, 4 & 5 short
J6 Display adapter Setting	VGA/EGA/MONO (default) CGA	1 & 2 short 2 & 3 short
J7 CMOS discharge	Normal (default) CMOS Discharge	1 & 2 short 2 & 3 short
J9 Monitor type	Color (default) Mono	1 & 2 short 2 & 3 short
J10 Interlaced Non-interlaced	Non-interlaced Interlaced (default)	1 & 2 short 2 & 3 short
J11 On board VGA	Enable (default) Disable	1 & 2 short 2 & 3 short
J17 387sx coprocessor clock mode select	Sync (default) Asyn	1 & 2 short 2 & 3 short
W1 Manufacturing Setting # 1	Co-processor Ready Selection	Reserved
W2 Manufacturing Setting # 2	Pipeline/Non-pipeline	Reserved

6.4.2 Installing a Math Coprocessor

The CPU inside your DECpc 320sxLP/325sxLP computer should give enough power for most applications. Certain mathematically intensive applications such as CAD, large databases or spreadsheets, or complex graphics, would benefit from the installation of a math coprocessor, a dedicated number crunching chip that greatly speeds up calculations The motherboard of your computer comes with a socket for a math coprocessor, the location of which is shown in Figure 6.2

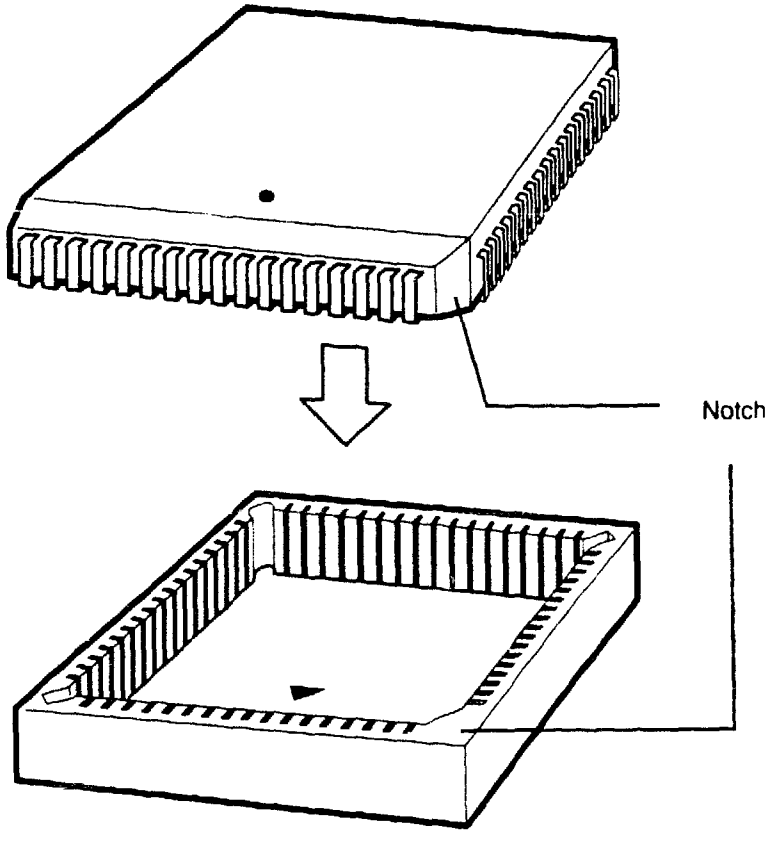


Figure 6.4: Coprocessor Insertion

1 With the help of the motherboard diagram in Figure 6.2, locate the coprocessor socket on your motherboard.

2 To aid in correct installation, both the coprocessor chip and coprocessor socket feature a notch on one end. Ensure that the notches on chip and socket are perfectly aligned.

3 Align the pins on the chip with the holes in the socket. The pins must be straight; if bent or otherwise damaged the chip will not operate

4 Press the chip into the socket carefully but firmly. If everything is aligned, the chip should seat quite easily. If you encounter even the slightest resistance, DO NOT force the chip; re-check all alignments and try again

CAUTION

- **The motherboard and/or coprocessor can be damaged if a math coprocessor is installed incorrectly. A Digital Customer Service technician can install the chip for you if you do not wish to do it yourself. If, however, you wish to perform the installation yourself, please take the time to carefully study the following instructions.**

- **Sensitive electronic components like math coprocessors can be irreparably damaged by static electricity. Before handling any electronic component, touch a grounded metal object to discharge all the static electricity your body will have naturally accumulated.**

6.4.3 SIMM Installation and Removal

The motherboard of your DECpc 320sxLP/325sxLP computer comes with SIMM sockets, allowing you to increase the amount of on-board memory To allow for the slim design of the computer, SIMM sockets are at 45°, thus the SIMM modules will overlap. Because of this, you must install the bottom-most SIMM first, then install additional modules in consecutive sockets. Each SIMM installed should overlap the preceding module

To install a SIMM:

1. Firmly insert the module into the socket. Make sure that the SIMM is seated evenly, in an upright position, with the component side to the front.

2. Press the top edge downwards until the retaining latches click into place.

To remove a SIMM:

1. Gently force the retaining latch outwards and carefully but firmly begin restoring the module to an upright position.

2 The module should come free of the retaining latches before it is completely vertical. Once free, continue pushing upwards until the module is in an upright position.

3. Vertically remove the module from the socket.

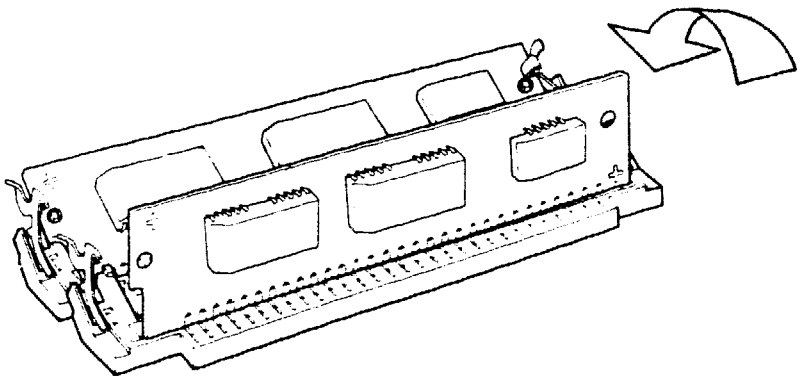


Figure 6.5: SIMM Insertion

CAUTION

System will not work normally if SIMM modules are not fit in the SIMM sockets firmly.

Add memory according to the configurations listed in the following tables.

Table 6.2: Memory Configurations

16-Bit DRAM Banks				Page/Interleave		Total
Bank0	**Bank1**	**Bank2**	**Bank3**	**BANK A**	**BANK B**	**memory**
1MB X 2				Page		2.0MB
1MB X 2	1MB X 2			2/P		4.0MB
1MB X 2	1MB X 2	1MB X 2		2/P	Page	6.0MB
1MB X 2	1MB X 2	1MB X 2	1MB X 2	4/P	4/P	8.0MB
1MB X 2	1MB X 2	4MB X 2		2/P	Page	12.0MB
1MB X 2	1MB X 2	4MB X 2	4MB X 2	2/P	2/P	20.0MB
1MB X 2	4MB X 2			Page		10.0MB
4MB X 2				Page		8.0MB
4MB X 2	4MB X 2			2/P		16.0MB
4MB X 2	4MB X 2	1MB X 2		2/P	Page	18.0MB
4MB X 2	4MB X 2	4MB X 2		2/P	Page	24.0MB
4MB X 2	4MB X 2	4MB X 2	4MB X 2	4/P	4/P	32.0MB

Remarks

1. **Bank A consists of Bank 0 and Bank 1; Bank B consists of Bank 2 and Bank3.**
2. **Any configuration more than 16MB are only supported under DOS EMS environment.**

Table 6.3: Memory Upgrade Path

Upgrade Path	Total Memory	Bank 0	Bank 1	Bank 2	Bank 3
1	2MB	1MB * 2	0	0	0
	4MB	1MB * 2	1MB * 2	0	0
	6MB	1MB * 2	1MB * 2	1MB * 2	0
	8MB	1MB * 2	1MB * 2	1MB * 2	1MB * 2
2	2MB	1MB * 2	0	0	0
	4MB	1MB * 2	1MB * 2	0	0
	12MB	1MB * 2	1MB * 2	4MB * 2	0
	20MB	1MB * 2	1MB * 2	4MB * 2	4MB * 2
3	2MB	1MB * 2	0	0	0
	10MB	1MB * 2	4MB * 2	0	0
4	8MB	4MB * 2	0	0	0
	16MB	4MB * 2	4MB * 2	0	0
	18MB	4MB * 2	4MB * 2	1MB * 2	0
5	8MB	4MB * 2	0	0	0
	16MB	4MB * 2	4MB * 2	0	0
	24MB	4MB * 2	4MB * 2	4MB * 2	0
	32MB	4MB * 2	4MB * 2	4MB * 2	4MB * 2

6.4.4 Installing an Adapter Card

Expansion adapter cards can be placed in any of the free expansion slots in your computer. The slim design of your PC means that cards are installed horizontally into a bus expansion unit connected to the motherboard.

Expansion adapter cards are installed as described below.

1. Select the appropriate expansion slot you wish to use, take out the screw from the expansion slot cover at the rear of the computer, and put the screw in a safe place for later on.

2 Remove the cover enclosing the expansion slot

3. Having made sure that the rear of the adapter card (that is, the end with the metal bracket) is facing the rear of the computer, carefully align the adapter with the expansion slot. For a full length adapter card, also ensure that it is aligned with the correct card guide on the opposite side of the computer. (see Figure 6.6)

4. Firmly press the adapter card into the expansion slot. Ensure that the card is fully and evenly seated across the entire length of the slot.

5. Ensure that the bottom of the metal bracket on the card is held in place by the hook on the computer chassis.

6 When the card is correctly in place, secure it with the screw taken from the slot cover.

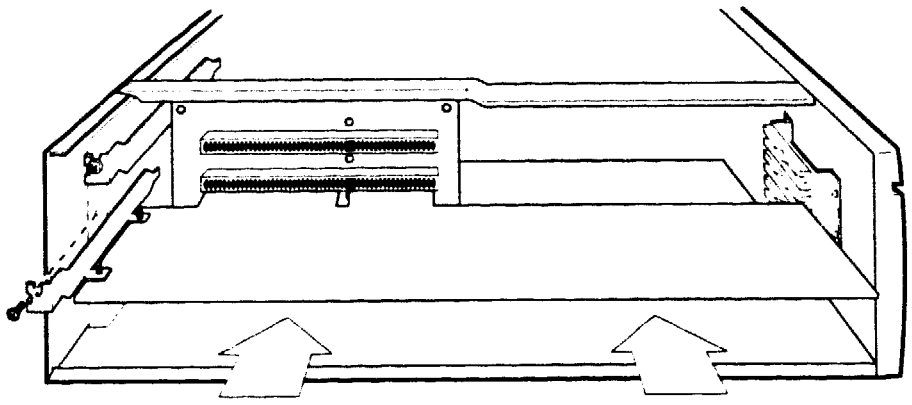


Figure 6.6: Adapter Card Installation

6.4.5 Replacing the Battery

Your computer contains a battery-backed memory chip, known as CMOS RAM, which stores information about the configuration of your system, the time, and the date.

In normal operation, the battery of the CMOS RAM should last for at least three years. Eventually, however, the battery will die and need to be replaced. The system BIOS will prompt you when this happens. Upon powering up the computer, the BIOS will display the following message on the screen.

```
Clock chip lost power
```

The battery can either be replaced by yourself or, if you prefer, by a Digital Customer Service technician.

WARNING

Fire, explosion or severe burns could result from mishandling of the battery. The battery should never be recharged, disassembled, or heated above 60°C. In no circumstances expose the contents of the battery to water or solder directly on to the battery surface.

To replace the battery, follow the steps outlined below.

1. Refer to Figure 6.2 to locate the battery and the relevant connector.

2. The battery unit itself is held on the motherboard by a strip of Velcro. Carefully remove the battery, then disconnect the connector cable from the computer motherboard.

3. Take the new battery, and gently but firmly attach it to the Velcro strip. Connect the connector cable to the motherboard, as shown in the Figure 6.7. Ensure the wires are not crossed.

4. When the battery dies, all data in CMOS RAM will be lost. Thus, configuration data must be re-entered after installing a new battery. Restart your computer, enter the CMOS Setup menu, and enter system information into CMOS RAM.

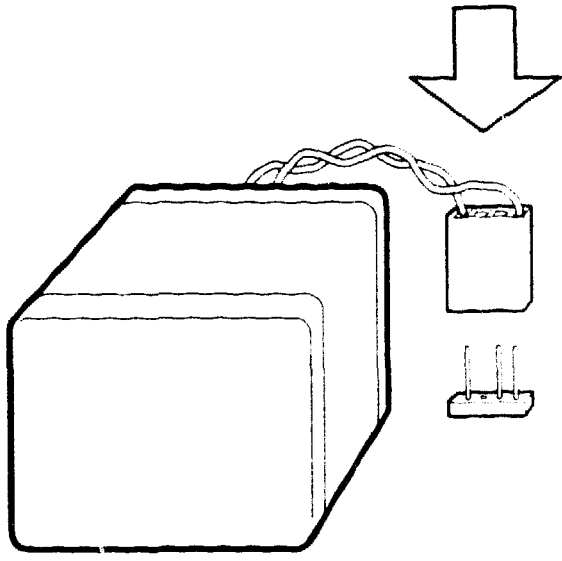


Figure 6.7: Battery Insertion

6.5 Installing Extra Disk Drives

Your DECpc 320sxLP/325sxLP computer supports up to fou
One 3 5" FDD is already installed in your DECpc When you
increase the storage capacity of the computer, you can insta
disk drives The drives can be either 3 5" or 5 25" in size, and
the following types

- High- or standard-capacity diskette drives
- IDE fixed disks drives
- SCSI fixed disks drives with an optional controller

As a general rule, 3.5" fixed disks drives are installed on the drive platform while a 5.25" diskette drive tends to be placed in the drive tower. By using the 3.5" adapter brackets, however, you can also install 3.5" diskette units in the drive tower.

For specific instructions regarding drive installation, please refer to the appropriate documentation that accompanies your drive.

For fixed disks owners:

- Record all information about your fixed disks' capacity, cylinders, heads, sectors, write precompensation, and landing zone on the system worksheet found in the section 9 of this manual. This information can be found either on the disk itself or in the documentation accompanying the drive, and is used in Phoenix Setup utility to ensure the computer correctly identifies your drive.

- After installing your drive, and before formatting it, ensure the computer is in the same position it will be during everyday operation (be it flat or on it's side).

- Increasingly, IDE and SCSI type drives come from the manufacturer preformatted. Please check with your fixed disks installation guide to determine whether or not your drive is preformatted, and for instructions of how to load the operating system on to the disk.

6.5.1 Installing a 5.25" Diskette Drive

NOTE: For details on how to configure your drive, please refer to your drive installation guide.

1. The diskette cover of your computer is a plastic panel that closes the drive tower when a unit is not installed. The cover is a dual-purpose 3.5" and 5.25" model.

2. To remove the plastic panel, put your finger through the hole on the side of the drive tower and push toward the cover. Once released push the cover outwards. (See Figure 6.8, 6.9)

3. A 3.5" mounting adapter is found above the drive tower. Keep the bracket in place, it will be needed if you wish to install a 3.5" diskette drive.

4 Keeping the drive unit flat, slowly slide it into the drive tower until the holes on the drive and the drive tower are aligned. Once in position secure the drive with the screws provided. (See Figure 6-10)

5 Referring to your drive installation guide, connect the appropriate cables to your drive and the computer motherboard

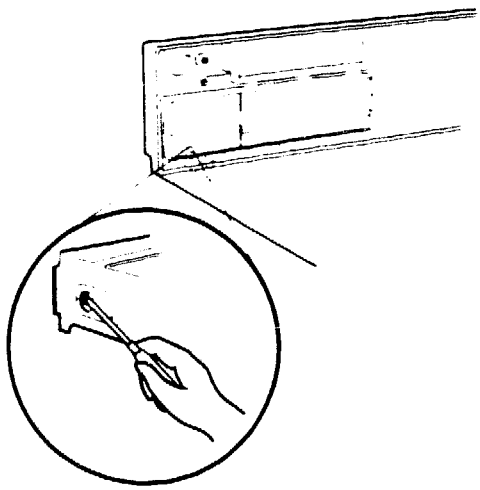


Figure 6.8: Plastic Panel Removal 1

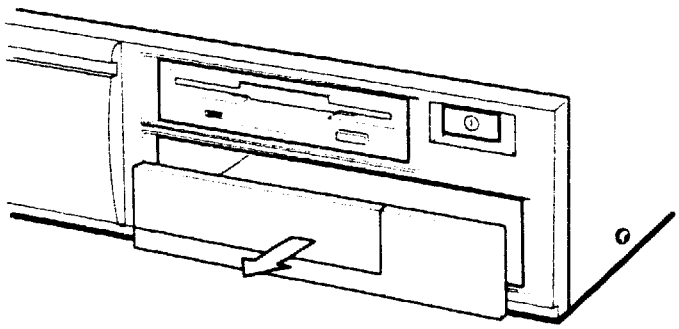


Figure 6.9: Plastic Panel Removal 2

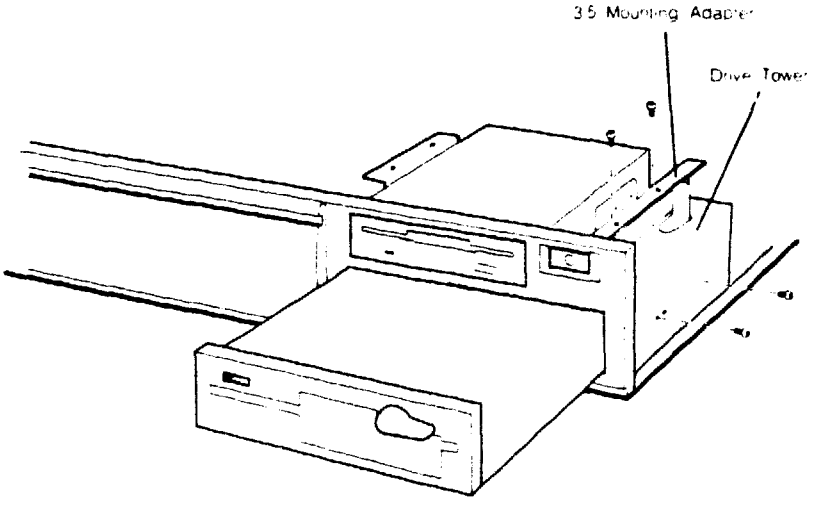


Figure 6.10: 5.25" Diskette Drive Installation

6.5.2 Installing a Second 3.5" Diskette Drive

A second 3.5" diskette drive can be installed in the drive tower by using the 3.5" mounting adapter provided.

1. Remove the entire diskette drive cover by putting a handtool such as a screw driver through the hole in side of the drive tower and pushing the cover outwards. (See Figure 6.8, 6.9)

2. Remove the 3.5" mounting adapter from above the drive tower and using the two screws (screw no. M3X6L), mount it to the side of the drive (see Figure 6.11). Secure the adapter by screwing it to the underside of the diskette drive.

3. Push the drive into the drive tower until the holes on the top of the 3.5" mounting adapter are aligned underneath corresponding holes on the drive tower. Secure the unit in place with the screws provided.

4. Detach the 3.5" segment from the plastic cover removed in Step 1. Then, having replaced the computer case, replace the rest of the cover to close the front panel of the computer. (See Figure 6.12)

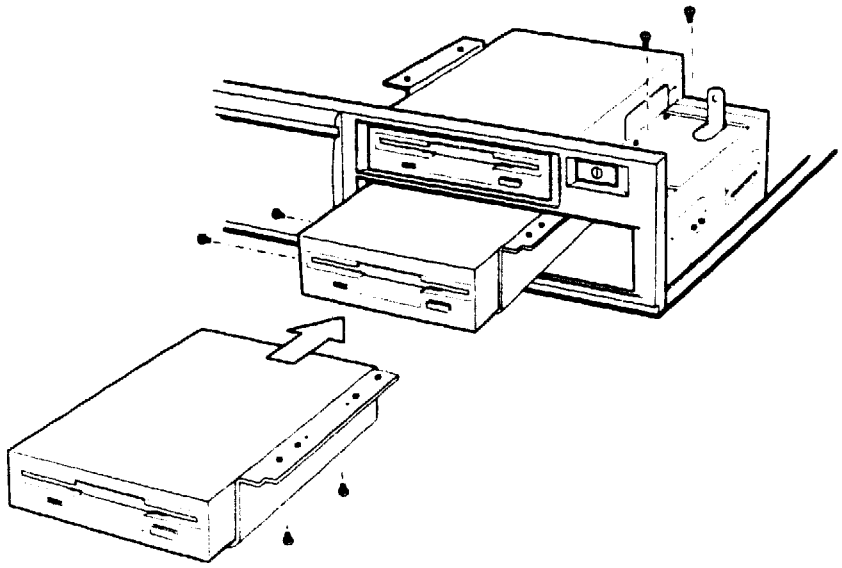


Figure 6.11: 3.5" Diskette Drive Installation

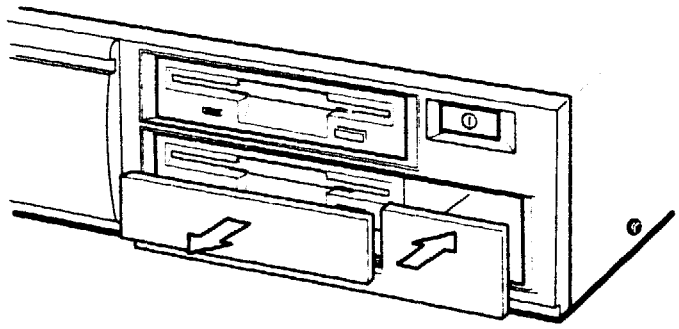


Figure 6.12: Plastic Panel Replacement

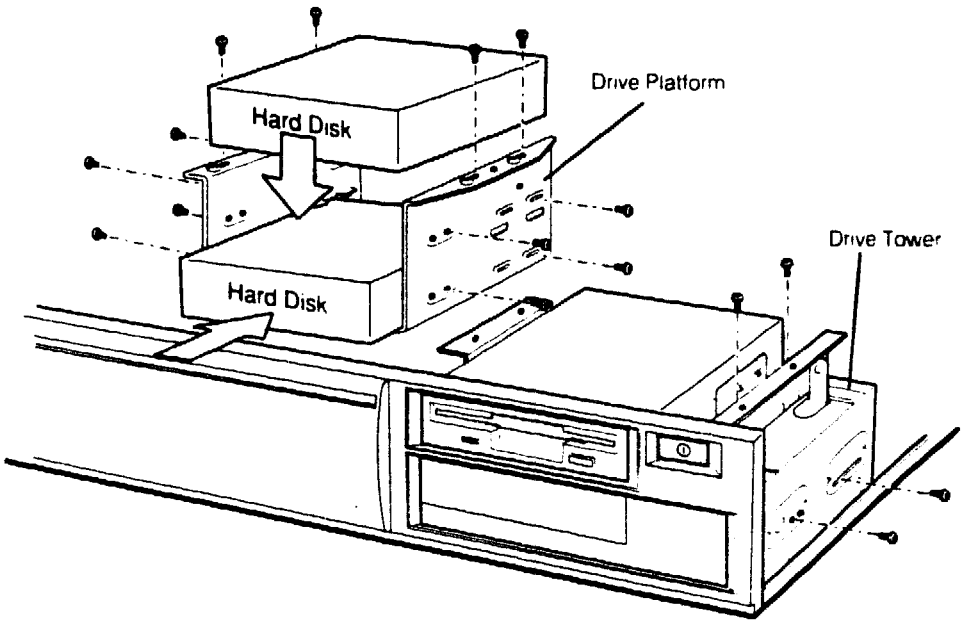


Figure 6.13: Hard Drive Installation

6.5.3 Installing a 3.5" Fixed Disks

Up to two 3 5" fixed disks can be installed in the drive platform.

1. Check with your drive installation guide on how to configure the drive unit.

2. If it is not already free, detach the drive platform and remove it from the computer chassis.

3. After selecting the appropriate mounting holes on the drive platform, use the screws provided to mount the drive(s).

4. With the drive(s) already in place, mount the drive platform into the computer, and connect the appropriate cables.

7

TROUBLESHOOTING

Depending on the type of warranty you have, if your DECpc 320sxLP/325sxLP fails, you might need to return some or all of the computer to Digital for service. Before deciding to do this, you may take some actions to identify and rectify simple problems on your own. This and the manufacturers' manuals for any optional equipment ,will help you in this identification and rectification process.

7.1 Troubleshooting Sequence

When you meet unidentified problems with your DECpc 320sxLP/325sxLP, follow the general procedure below.

1. Try performing a simple reset.
   Press **Ctrl** + **Alt** + **Del**. If that fails, press the **Reset** button. If the problem still exists, turn off the system, wait 5 seconds, and then turn on the system again.

2. Check for loose cables and connections.

3. Check the system and monitor indicator lights.

4. Observe any power-up test messages on the monitor. Refer to "Power-On Test Messages", and take the appropriate steps to correct the problem. Then, reset the computer to run the power- up test again.

5. Try to locate and rectify specific system faults following the procedures described in this manual.

6. Seek assistance.
   If you are connected to a network, call the system administrator. If you are not connected to a network, call Digital Customer Service. If you need to return the failing unit, pack it in the original container, and return it to Digital for service.

If you are a self-maintenance customer, call Digital Customer Service for assistance and recommendations.

For your convenience, you can place orders by phone, by mail, or in person at any Digital sales office.

Call 1-800-DIGITAL between 8:30 a.m. and 8:00 p.m. Eastern time.

Or write to
Digital Equipment Corporation P.O. Box CS2008 Nashua, NH03061

7.2 Power-On Test Messages

During the power-on sequence, the DECpc 320sxLP/325sxLP executes built-in diagnostic tests. If there is a problem, the system sounds two or more "beeps" and displays a message on the monitor. The following chart lists the messages and possible corrective actions.

CAUTION

Do not connect or disconnect the video cable from the monitor or system when the monitor and/or system is on.

Always turn off the monitor and the system and disconnect the power before removing the computer cover.

Avoid touching any chips on the system boards; natural body acid from your fingers could damage them.

Table 7.1: Setup Error Messages

Message	Meaning	Required Action
Clock chip lost power (hit any key to continue)	The clock chip is not working.	Replace battery. Invoke Setup Utility, check all configuration settings.
CMOS checksum invalid (hit any key to continue)	Configuration error	Invoke Setup Utility, check all configuration settings
Incorrect configuration data in CMOS (hit any key to continue)	Configuration data entered in Setup Utility is not the same as the actual system components.	Invoke Setup Utility. Verify all settings are correct. If error persists, calll Digital Customer Services
Memory size in CMOS invalid (hit any key tol continue)	Wrong base memory set error in base memory field	Invoke Setup Utility, correct error in base memory field
Disk C failed initialization (hit any key to continue)	Incorrect fixed disk type	Invoke Setup Utility, correct the disk setting
Time or date in CMOS is invalid (hit any key to continue	The system clock time/ date is not the same as that entered in the Setup Utility	Invoke Setup Utility correct the date or time field

7.3 System Unit Troubleshooting

Table 7.2: System Unit Troubleshooting

Problem	Possible Cause	Action
No response when the system is turned on	System power is not plugged in	Turn off the system, plug it in, and turn it on again
Power is on, but there is no monitor display	Brightness and contrast controls are not set	Adjust the brightness and contrast controls
	Monitor is off	Turn on the monitor
	Monitor cable is installed incorrectly	Be sure the monitor cable is installed properly
Power is on, but the system is hung or a RAM error message is displayed (EtherWORKS Adapter is installed)	Optional adapters are set to the same memory address space	Set one of the adapters to another address
System does not start up from the hard disk	Operating system software is not on the disk	Install the operating system on the hard disk
	Requested partition doesn't exist or is not formatted	Check the hard disk partitions. Format the partition, repartition the drive if necessary
	There is no software on the requested partition	Install software on the partition
	Primary and secondary drives are set incorrectly	Be sure the drive jumpers and terminators are set correctly

Table 7.2(Cont.): System Unit Troubleshooting

Problem	Possible Cause	Action
System does not start up from the diskette drive	Drive switch is set incorrectly	Be sure the drive switch is set correctly
	Diskette does not contain operating system startup files	Insert a diskette that contains the operating system
	Diskette drive is empty	Insert a diskette that contains the operating system
	Diskette is worn or damaged	Try another diskette
System does not restart when the computer is turned off and then on again	Computer was not turned off long enough	Turn off the computer for at least 5 seconds before restarting. If you system has an EtherWORKS adapter, see your system administrator
No response to keyboard commands	Keyboard is password protected	Enter the keyboard password
	Keyboard is not connected	Connect the keyboard
	Keyboard is connected to mouse port	Connect the keyboard to the keyboard port
On a network, the system does not restart after you use the Utility Diskette	Disk-generated reset is incompatible with the EtherWORKS adapter	Press **Ctrl** + **Alt** + **Del** to reset

7.4 Drive Troubleshooting

Table 7.3: Drive Troubleshooting

Problem	Possible Cause	Action
Hard disk cannot read or write information	Problem exists with the drive or motherboard	Be sure all jum cables are inst correctly
Diskette drive cannot read/write information	Diskette drive is empty	Insert a diskett the drive
	Diskette is not formatted	Format the disk or use a disket is already form
	Diskette is worn or damaged	Try another dis

7.5 Monitor Troubleshooting

Table 7.4: Monitor Troubleshooting

Problem	Possible Cause	Action
Monitor power indicator light is not on	Monitor is not turned on.	Turn on the monitor and then the system
	Power cord is not connected	Connect the power cord to the wall outlet
	No power at wall outlet	Use another outlet
	Power indicator may be defective	Call Digital Customer Service
No Display	Monitor cable not plug-cable	Connect the Monitor
	Brightness and/or contrast controls on monitor not turned up high enough	Adjust the brightness and contrast controls

Table 7.4(Cont.): Monitor Troubleshooting

Problem	Possible Cause	Action
Distorted, rolling, or flickering screen display, or the wrong or an uneven color	Interference from other electromechanical device(s)	Increase the distance between device and monitor.
	Monitor cable connector is not seated properly	Straighten any bent pins on the monitor connector. Be sure the connector is completely seated
	Monitor is not adjusted properly	Refer to the monitor manual for screen adjustment instructions
	Software is not configured for the current VGA controller settings or is incompatible with them	Reconfigure your software for VGA, or set the VGA controller to a standard supported by your software.
Color monitor displaying monochrome	System was turned on before the monitor was turned on	Turn monitor and system off. Wait at least 5 seconds. Turn on the monitor and then the system unit.

7.6 Error Codes and Messages

All 80386 ROM BIOS error messages are listed in Appendix C.

8

SPECIFICATIONS

8.1 System Unit

Processor

Intel 80386sx, 20 MHz
AMD 80386sx, 25 MHz

Bus Clock

6 67MHz/8MHz/10MHz

Dimensions

Depth 396mm (15 55")
Width 410mm (16 14")
Height 90mm (3 54")

Weight

Approx 12kg (26 4lbs) total
(system unit, keyboard, power cord, manual, and packing material)

Approx 7 75kg (17 08lbs) system unit only
(one 1 44MB, 3 5-inch diskette drive)

Power Requirements

110 to 120 VAC, 60 Hz or
220 to 240 VAC, 50/60 Hz

Power Supply

115W maximum

Environment Air Temperature

Operating	10°C to 35°C
Storage	-40°C to 60°C

Humidity

Operating	20% to 80% (non-condensing)
Storage	10% to 90% (non-condensing)

8.2 Peripheral Interfaces

8.2.1 RS-232C Serial Port

Pin Assignments:

1 - Carrier Detect
2 - Receive Data
3 - Transmit Data
4 - Data Terminal Ready
5 - Signal Ground
6 - Data Set Ready
7 - Request To Send
8 - Clear To Send
9 - Ring Indicator

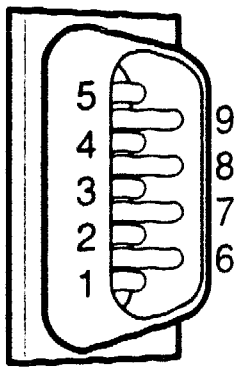


Figure 8.1

8.2.2 Parallel I/O Printer Port

Pin Assignments:

1 - Strobe
2 - Data Bit 0
3 - Data Bit 1
4 - Data Bit 2
5 - Data Bit 3
6 - Data Bit 4
7 - Data Bit 5
8 - Data Bit 6
9 - Data Bit 7
10 - ACKNOWLEDGE
11 - BUSY
12 - PAPER END
13 - SELECT
14 - AUTO FEED
15 - ERROR
16 - INITIALIZE
17 - SELECT IN
18-25 - Ground

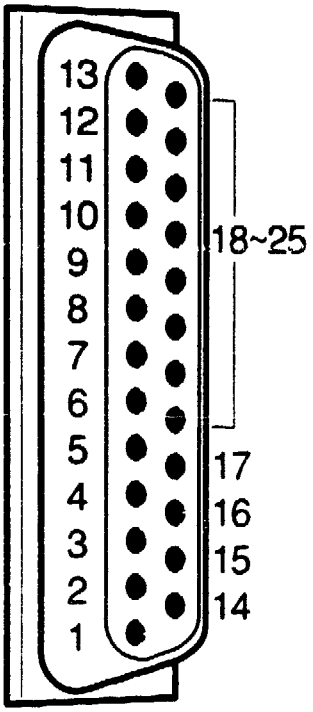


Figure 8.2

8.2.3 Keyboard and Mouse Connectors

Pin Assignments:

1 - Data
2 - Reserved
3 - Ground
4 - +5Vdc
5 - Clock
6 - Reserved

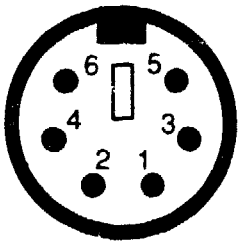
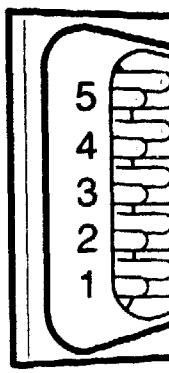


Figure 8.3

8.2.4 Video Port

Pin Assignments:

1 - Red Video
2 - Green Video
3 - Blue Video
4 - Monitor ID Bit 2 (not used)
5 - Ground
6 - Red Return (ground)
7 - Green Return (ground)
8 - Blue Return (ground)
9 - Key (no pin)
10 - Sync Return (ground)
11 - Monitor ID Bit 0 (not used)
12 - Monitor ID Bit 1 (not used)
13 - Horizontal Sync
14 - Vertical Sync
15 - Not used



Figure

8.2.5 1.44MB Diskette Drive

Unformatted Capacity

2.0MB

Formatted Capacity

1.44MB

Number of Tracks

80 per side

Number of Heads

2

Average Access Time

95 ms

Track-to-Track Access Time

3 ms

Motor Starting Time

500 ms (700 ms max.)

Rotation Speed

300 rpm

Media

3.5" high-density or standard-density

NOTE: The 1.44MB diskette drive can read, write, and format standard (720KB) diskettes as well as high-density (1.44MB) diskettes. This formatting requires a different set of command parameters. See your operating system documentation.

8.2.6 1.2MB Diskette Drive

Unformatted Capacity

1.6MB

Formatted Capacity

1.2MB

Number of Tracks

160 per side

Average Access Time

94 ms

Track-to-Track Access Time

3 ms

Motor Starting Time

400 ms (500 ms max.)

Rotation Speed

300 rpm

Media

5.25" high-density or standard-density

**NOTE: The 1.2MB diskette drive can read, write, and form
(360KB) diskettes as well as high-density (1.2MB)
This formatting requires a different set of comman
eters. See your operating system documentation.**

8.2.7 Fixed Disk Drive

1. 52AT (Type 30 in Setup Utility)

Logical Cylinders

751

Logical Heads

8

Logical Sectors/Track

17

Total Number Logical Sectors

102,136

2. 105AT (Type 31 in Setup Utility)

Logical Cylinders

755

Logical Heads

16

Logical Sectors/Track

17

Total Number Logical Sectors

205,360

9

SYSTEM WORKSHEET

Use this system worksheet to record and update information about your system configuration before invoking Setup. Update this list every time you add memory, hard drives or diskette drives to your system.

Computer

Serial Number _____

Hardware Configuration Model _____

System

Memory _____

Co-processor _____

Video Display

Type _____

Model No _____

Serial No _____

Diskette Drive 1

Size _____

Capacity _____

Model No _____

Serial No _____

Diskette Drive 2

Size _____

Capacity _____

Model No. _____

Serial No. _____

Hard Disk Drive 1

Type (SCSI/IDE) _____

Type No. _____

Capacity _____

Model No. _____

Serial No _____

Heads _____ Cylinders _____

Defective Tracks _____

Hard Disk Drive 2

Type (SCSI/IDE) _____

Type No. _____

Capacity _____

Model No. _____

Serial No. _____

Heads _____ Cylinders _____

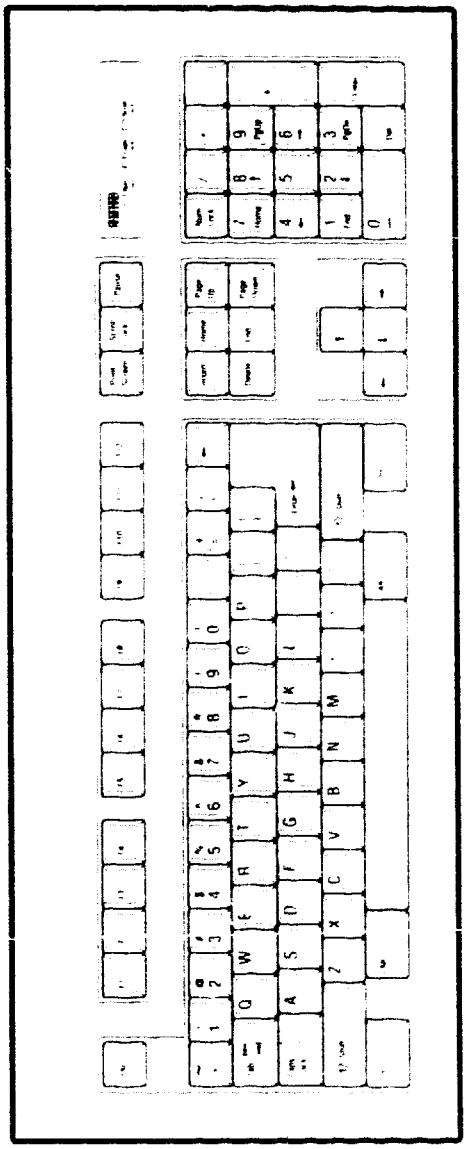
Defective Tracks _____

EtherWORKS Adapter

Ethernet Address _____

APPENDIX A

KEYBOARD LAYOUT



APPENDIX B

DETAILED DESCRIPTIONS OF TOPCAT.EMS

B.1 Detailed Descriptions of the Command Line Options

The numeric parameters for the memory manager should be specified in decimal except where specifically noted otherwise. Memory sizes should be specified in kilobytes (1024 bytes) without the K on the end of the number. 32,767 bytes would be specified as 32

All of the parameters noted above are optional. Default values for each will be selected if the parameter is not specified. A description of each of the memory manager parameters appears below

Contexts = nn (C=nn) specifies the number of contexts for windows 0-3, which can be saved by processes using EMS memory. The maximum number of contexts is 255. The minimum number is 3. The default number of contexts is equal to the number of handles which are allocated

Exclude = xxxx-xxxx (X= xxxx-xxxx) specifies a rang addresses which should not be used as EMS Page Frame "Windows" The Page Frame will, in general, range from segment C000h-EFFFh. By default, the memory manager will automatically exclude areas known to use ROMs or video RAM. This parameter allows you to exclude a range of addresses that might be included by the automatic selection process of the memory manager. The address range selected should be hexadecimal segment addresses. You may specify multiple exclude ranges as necessary, and these may overlap

NOTE: Since the memory manager will make use of RAM in the A000h-FFFFh (640K-1MB) segments that are not identifiable as Shadowed, users of Network cards that operate in this range must activate the Exclude option to ensure that all data go to the network card and not to EMS RAM.

Frame = xxxx (S=xxxx) specifies the starting address for the standard 64K EMS window frame. In general the Window frame is located in the C000h-EFFFh segment range. By default, the start for the EMS window frame is selected automatically by the memory manager software. This parameter allows you to choose the address explicitly. The number specified should be a hexadecimal segment address on a 16k boundary where no ROM, shadowed ROM, or off-board RAM (in an ISA slot) resides.
For systems with Monochrome Display adapters the default Page Frame starts at segment C000h.
For systems with EGA, VGA or similar display adapters, the default Page Frame starts at C800h.

Handles = nnnn (H=nnn) specifies the number of handles that will be available for programs that use EMS memory. The minimum number of handles that can be allocated is 3. The default number of handles is 255, which is also the maximum.

Include = xxxx-xxxx (L=xxxx-xxxx) specifies a range of addresses which should always be used as EMS Page Frame "Windows". By default, the memory manager will automatically exclude areas known to contain ROMs or video RAM. This parameter allows you to include a range of addresses that might be excluded by the automatic selection process of the memory manager. The address range selected should be hexadecimal segment addresses. You may specify as many include ranges as necessary, and these may overlap.

Nobackfill (NB) disables the backfill memory feature. Backfill is an EMS feature provided by the chip set to allow operating system software to use some of the more advanced features of LIM EMS 4.0. Essentially, the memory from 4000h-9FFFh (256K-640K Bytes) becomes part of the EMS memory. Normally, this memory is used as conventional memory. The EMS driver will enable the backfill functions by default. The Nobackfill Command Line Option overrides and prevents remapping this conventional memory as EMS memory

NOTE: Some network cards make use of the memory segment ranges 8800h-9FFFh (512K-640K) or 9000h-9FFFh (576K-640K) to address their cards in the slot bus. Therefore, these cards will require the Nobackfill Command line options.

Usealternate (UA) enables the use of the Alternate Register Set. The chip set provides both Standard and Alternate Register Sets. The memory manager will default to using only the Standard Register Set Use the Usealternate Command Line Option to instruct the memory manager to include the Alternate Register Set. Most systems will activate the UA Command Line Option

Fulldisplay (F) specifies that the memory manager display additional information (Verbose messages) about the EMS configuration after its sign-on. The default is not to display additional information (Terse messages)

Test (T) and Zero (Z) are interrelated. In general, you would use one or the other of the Command Line Options, but not both at the same time.

Test (T) specifies that memory should always be tested on both a Cold boot and Soft boot. Without the "T" Command option, the memory is tested only on a Cold boot. The default is to test EMS memory only on cold boot. This default testing condition reduces the time to boot on the system.

Zero (Z) specifies that memory should never be tested on either a Cold boot or Soft boot power-up. The use of the "Z" Command Line Option will cause memory to always be zeroed and never tested. Thus, the "Z" option will decrease the time the system takes to Cold boot, but at the expense of testing the EMS memory.

The defaults are not to use either the Test or Zero options, therefore memory is tested on a cold start and zeroed on a warm reboot.

Showoptions (SO) specifies that the memory manager show its Command Line Options after its sign-on. The default is NOT to show options.

B.2 Abbreviations of the Command Line Options for TOPCAT.EMS

Complete Option Name	Abbreviated Option Name
Contexts= nnn	C=nnn
Exclude=xxxx-xxxx	X=xxxx-xxxx
Frame=xxxx	S=xxxx (S stands for Start)
Handles=nnn	H=nnn
Include=xxxx-xxxx	I=xxxx-xxxx
Nobackfill	NB
Usealternate	UA
Fulldisplay	F
Test	T
Showoptions	SO
Zero	Z

B.2.1 Examples

Below are examples of command lines to place in the CONFIG.SYS file

A) `device = TOPCAT.EMS`

This command line installs the driver with the default values for all the command Options. In summary the defaults are as below:

Contexts	= 255
Exclude	= 0 -> include all available RAM not used by shadowing the ROMs, or as specified by BIOS set up.
Frame	= C000h -> Monochrome Monitor Place start of 64K byte page frame at segment C000h of memory. = C800h -> EGA or VGA Monitor Place start of 64K byte page frame at segment C800h of memory.
Handles	= 255
Include	= <All available RAM> -> Depending on the type of video display, either C000h-EFFFh or C800h-EFFFh.
Nobackfill	=> <off> -> The EMS backfill functions are enabled.
Usealternate	=> <off> -> The EMS driver won't make use of the EMS hardware Alternate Register Set
Fulldisplay	=> <off> -> When the EMS driver is installed, only the Sign-on message will appear and no additional information.
Test	=> <off> -> memory is tested only on cold boot
Zero	=> <off> -> Memory is zeros only on soft boot
Showoptions	=> <off> -> Do not display the Command Line Options during installation

```
B) device = TOPCAT.EMS Zero
```

The memory manager will install quickly because the memory won't be tested, just Zeroed out, on a cold or soft boot. All other options are at their defaults as above.

```
C) device = TOPCAT.EMS UA Exclude=C000-CFFFF
```

The memory manager will use the Alternate Register Set and also not include the memory in the segment range C000h-CFFFh (768K-832K Bytes) for EMS Page Frame windows
All other options are at their defaults as above

```
D) device = TOPCAT.EMS T H=100 F SC
```

The memory manager will be very cautious and Test the EMS memory on both Cold and Soft boots. It will also indicate to the user the Full verbose information and repeat the commands entered on the command line. Finally, the number of allowable Handles is reduced from 255 to 100. As a consequence, the number of Contexts will follow the number of Handles during installation. Very few users will need to alter either the Handles or Contexts from their default values
All other options are at their defaults as above.

B.3 Memory Manager Error Messages

The error messages that may be displayed by the memory manager are described below.

Invalid parameter specified	One of the parameters specified on the command line in your CONFIG.SYS file is invalid.
Expected equal after parameter	One of the parameters on the command line expected an equal (=) sign after the parameter, but none was found
Invalid number specified	A number was expected, but a non-number or a number containing invalid characters was found

Context depth must be between 1 and 32	An invalid number of contexts was specified. The number specified cannot be zero and must not be greater than 32. See CONTEXT parameter above.
Invalid page frame address specified	The page frame address specified is not available for banking. The memory manager requires a 64k area above A000 which is free of expansion ROM and RAM. See START parameter above.
Number of handles must at least 3	The number of handles specified is below three. The number of handles specified must be between 3 and 255 to be valid. See HANDLES parameter above
Number of handles cannot exceed 255	The number of handles specified is above 255. The number of handles specified must be between 3 and 255 to be valid. See HANDLES parameter above
Number of contexts must be at least 3	The number of contexts specified is below three. The number of contexts specified must be between 3 and 255 to be valid. See CONTEXTS parameter above.
Number of contexts cannot exceed 255	The number of contexts specified isabove 255. The number of contexts specified must be between 3 and 255 to be valid See CONTEXTS parameter above.
Invalid exclusion specified	An exclusion parameter was specified incorrectly. See EXCLUDE parameter above.
No expanded memory available	No expanded memory is available for use
Invalid inclusion specified	An inclusion parameter was specified incorrectly. See INCLUDE parameter above

RAM parity error detected	A parity error was detected during the expanded memory tests.
RAM data error detected	A data error was detected during the expanded memory tests.
RAM address error detected	An address error was detected during the expanded memory tests.
No 64k page frame available	The memory manager was unable to find a 64k window for the page frame. For the memory manager to operate, a 64k window free of expansion ROM or RAM must exist above A000.
Internal error in hardware interface	A general hardware error was detected.

The error codes described below are in the second group and are specific to the memory manager.

Invalid hardware for memory manager	The memory manager was run on a system that did not contain the chip set
EMS not supported in this memory configuration	The memory manager has detected a memory configuration that was set up by the system BIOS which does not support EMS memory.

APPENDIX C

ROM BIOS ERROR MESSAGES

The tables on the following pages list all error messages that may appear on-screen during

- POST (Power On Self Test) and Boot Messages (that occur when the system is power on)
- Run-Time Messages (that may be shown after the system has been booted)
- Extended Features Messages (that occur when Extended Features are operating)
- Beep Codes that indicate errors when the screen is not connected or functioning

The fault that caused the message, and suggested solutions are listed alongside each entry

C.1 POST and Boot Messages

C.1.1 Error Messages

Within POST, the two kinds of messages are

Error messages notify "fatal" errors covering failures in hardware, software, or firmware that will halt the system

Informational messages notify "non-fatal" errors, and require no urgent action

Table C.1: Error Messages

Message	Possible Cause	Solution
Diskette configuration error	The specified configuration is not supported	Change the configuration
Diskette drive 1 seek failure	The B drive has either failed or is missing	Check the B drive
Diskette drive 0 seek failure	The A drive has either failed or is missing	Check the A drive
Diskette drive reset failed	The diskette adapter has failed	Check the diskette adapter
Diskette read failure-strike F1 to retry boot	The diskette is either not formatted or defective	Replace the diskette with a bootable diskette and retry
Display adapter failed using alternate	• The color/monochrome switch is set wrong • The primary video adapter failed	• Change the switch to the correct setting • Check the primary video adapter
Errors found disk X Failed Initialization	POST reports fixed disk configuration information is incorrect	Rerun SETUP and enter correct fixed disk information
Errors found incorrect configuration information memory size miscompare	POST reports the size of base or expansion memory does not agree with configuration information	Rerun SETUP and enter correct memory size
Gate A20 failure	Protected mode cannot	Check the system be enabled board

Table C.1(Cont.): Error Messages

Message	Possible Cause	Solution
Fixed disk configuration error.	The specified configuration is not supported.	Correct the fixed disk configuration.
Fixed disk controller failure.	The on board controller has failed.	Replace the controller.
Fixed disk failure.	Bad disk.	Retry boot. If problem persists, replace the fixed disk.
Fixed disk read failure strike F1 to retry boot.	The fixed disk is defective.	Retry boot. If problem persists, replace the fixed disk.
FDD controller failure.	Disk and diskette controller for diskette drive A.	Replace the controller.
FDD controller is not installed.	Can not find diskette controller for diskette drive A.	Either install or replace the controller.
FDD B is not installed.	Can not find diskette controller for diskette drive B.	Either install or replace the controller.
Invalid configuration information - please run SETUP program.	* Memory size is incorrect * Display adapter is configured incorrectly * Wrong number of diskette drives	Run the SETUP utility.

Table C.1(Cont.): Error Messages

Message	Possible Cause	Solution
Keyboard clock line failure	Either the keyboard or the keyboard cable connection is defective	Make sure the ke cable and keybo connected prope
Keyboard controller failure	The keyboard controller firmware has failed	Check the keybo controller
Keyboard stuck key failure	A key(s) is jammed	Try pressing the again
Memory address line failure at hex-value, read hex-value, expecting hex-value	Circuitry associated with the memory chips has failed	Try turning the p off, then back on If the problem pe sists, contact qu fied service pers
Memory data line failure at hex-value, read hex-value, expecting hex-value	One of the memory chips or associated circuitry has failed	Try turning the p off, then back on If the problem pe sists, contact qu fied service pers
Memory high address line failure at hex-value, read hex-value, expecting hex-value	Circuitry associated with the memory chips has failed	Try turning the p off, then back on If the problem pe sists, contact qu fied service pers
Memory double word logic failure at hex-value, read hex-value, expecting-value	Memory chip circuitry failed	Try turning the p off, then back on If the problem p sists, contact qu fied service pers

Table C.1(Cont.): Error Messages

Message	Possible Cause	Solution
Memory odd/even logic failure at hex-value, read hex-failure, expecting hex-failure	Circuitry associated with the memory chips has failed	Try turning the power off, then back on again If the problem persists, contact qualified service personnel
Memory parity failure at hex-value, read hex-value, expecting hex-value	One of the parity memory chips has failed	Try turning the power off, then back on again If the problem persists, contact qualified service personnel
Memory write/read failure at hex-value, read hex-value, expecting hex-value	One of the memory chips has failed	Try turning the power off, then back on again If the problem persists, contact qualified service personnel
No boot device available-strike F1 to retry boot	Either diskette drive A:, the fixed disk, or the diskette itself is defective	Retry boot If problem persists, replace the diskette or the fixed disk
No boot sector in fixed disk-strike F1 to retry boot	The C: drive is not formatted or is not bootable	Format the C: drive, make it bootable
Not a boot diskette strike F1 to retry boot	The diskette in drive A: is not formatted as a bootable diskette	Replace the diskette with a bootable diskette and retry boot
No timer tick interrupt	The timer chip has failed	Try turning the power off, then back on again If the problem persists, contact qualified service personnel

Table C.1(Cont.): Error Messages

Message	Possible Cause	Solution
Hex-value optional ROM bad checksum =hexvalue	The peripheral card contains a defective ROM.	Replace the pe card
Shutdown failure	The keyboard controller or its associated logic has failed.	Check the key controller.
Time-of-day clock stopped	The CMOS time-of-day clock chip has failed.	Run SETUP.
Time-of-day not set - Please run SETUP program	Clock not set	Run SETUP.
Timer chip counter 2 failed	Chip failed	Try turning the off, then back If the problem sists, contact fied service pe
Timer or interrupt controller bad.	Either the timer chip or the interrup' con-troller is defective.	Check the tim on the mother
Unexpected interrupt in protected mode.	The nonmaskable inter-rupt (NMI) port can't be disabled.	Check the tim or interrupt co on the mother

C.1.2 Information Messages

Table C.2:Information Messages

Message	Meaning
nnnk Base Memory	The amount of base memory that tested successfully
nnnk Expanded Memory	The amount of expanded memory that tested successfully
nnnk Extended Memory	The amount of extended memory that tested successfully
nnnk Extra Memory	The amount of extra memory that tested successfully
nnnk Standard memory	The amount of standard memory that tested successfully
Decreasing available memory	Immediately follows any memory error message, and informs the user that the memory chips are failing
Memory tests terminated by keystroke	Indicates that the user has pressed the Spacebar while the memory tests were running Stops the memory tests
Strike the F1 key to continue	Indicates that an error was found during POST Pressing the F1 key allows the system to attempt to boot
Base Memory size = 640K	Used in reporting base memory for Extended Features
Extended Memory size=nnnnnK	Used in reporting extended memory size for Extended Features

C.2 Run Time Messages

Run-time messages are displayed if an error occurs after the bo
procedure is complete.

Table C.3:Run Time Messages

Message	Possible Cause	Solution
I/O card parity interrupt at address Type (S)hut off NMI. (R)eboot, other keys to continue	The peripheral card has failed	Type (S)hut off Note: Only temp allows the user continue, repla peripheral card
Memory parity interrupt at address Type (S)hut off NMI. (R)eboot. other keys to continue	A memory chip(s) has failed	Type (S)hut off Note:Only temp allows the user continue; repla memory chip(s
Unexpected HW interrupt at address Type (R)eboot other key to continue	Any hardware-related problem Note: Not displayed if the extended interrupt handler is not enabled	Check the hard
Unexpected SW interrupt at address Type (R)eboot. other key to continue	There is an error(s) in the software program. Note: Not displayed if the extended interrupt handler is not enabled.	Try turning the off and then on If problem pers check the prog
Unexpected type 02 interrupt at address Type (S)hut off NMI. (R)ebooot other keys to continue	There is an error(s) in the software program. Note: Not displayed if the extended interrupt handler is not enabled.	Try turning the off and then on If problem pers check the prog

C.3 Extended Features Run-time Messages

The following messages may be generated if another program conflicts with Extended Features.

NOTE: F1 will always abort the conflicting program if any of the following messages are encountered. The Print Screen function will still operate if these messages are generated.

Table C.4: Extended Features Run-time Messages

Message	Possible Cause	Solution
Protected operation attempted with Extended Features enabled F1 to abort program F2 to reboot F3 to disable Extended Features and reboot	Another program entered the protected mode of the Intel 80386 or 80386sx microprocessor while Extended Features were active	Press F1, F2, or F3
Halt at xxxx xxxx F2 to reboot F3 to disable Extended Features and reboot	A halt was executed with interrupts disabled	Press F2 or F3
Protection violation at xxxx xxxx F2 to reboot F3 to disable Extended Features and reboot	An exception 0Dh occurs because of a segment limit or access rights byte violation	Press F2 or F3
Exception xx at xxxx xxxx F2 to reboot F3 to disable Extended Features and reboot	The kernel cannot service an exception	Press F2 or F3

C.3.1 Informational and Initialization Messages

Table C.5:Informational and Initialization Messages

Message	Meaning
Changes will take effect when machine reboots	Extended Features configuration has been completed and will take effect the next time the system is booted
Creating configuration files	Information only. No action required
Configuration files not found-files will be created in C \XFEATS F1 to create files F10 to exit	No Extended Feature configuration files were found in ROM - they will be created on the C. drive
Unable to write feature configuration file F1 to continue configuration	Check for fixed disk problems If none, the feature configuration files cannot be written to the C drive Create a directory C \XFEATS
Feature configuration files written	Information only No action required
The file C \CONFIG SYS must contain the lines DEVICE = \XFEATS\ feature EF for each Feature	Edit the CONFIG SYS file to contain the appropriate feature files

Table C.5 (Cont.):Informational and Initialization Messages

Message	Meaning
F2 to edit C:\CONFIG.SYS auto-matically and continue F1 to continue without editing F10 to exit	Press F2 to let ROM BIOS edit CONFIG.SYS automatically
Enable Extended Features (Y/N)?	Yes enables any Extended Features that are configured No disables all features the next time the system is booted
Extended Features version 1.0	Information only No action required
Insufficient extended memory for Extended Features	This system does not have enough extended memory. A minimum of 100K of extended memory is required for Extended Features
Strike F1 key to reboot	Fatal error detected by the Extended Features kernel in the program that is currently executing
Exception at xxxxxx	Fatal error detected by the Extended Features kernel in the program that is currently executing
Protection violation at xxxxxxx	Fatal error detected by the extended kernel in the program that is currently executing
Halt	Fatal error detected by the Extended Features kernel in the program that is currently executing

C.4 Beep Codes

POST errors cannot be reported on the screen if an error occurs before the screen is initialized. In such a situation, Beep Codes identify a POST error that occurs when the screen is not available.

Example

A 2-1-4 beep code (a burst of 2 beeps, a single beep, and a burst of 4 beeps) indicates a failure of bit 3 in the first 64K of RAM.

Using Beep Codes

The table in the following pages shows the errors for which beep codes and screen messages are used.

System Board Failure		Off board Failure
Fatal	Non-fatal	
Beep and halt	Screen message and prompt to 'Press F1 to continue'	Screen message and Prompt to 'Press F1 to continue'

C.4.1 List of Beep Codes

The Beep Codes for fatal and non-fatal system board errors are listed separately on the following pages.

NOTE: No beep code is sounded if a test is aborted while in progress. The contents of port 80h can be read to identify the area of failure.

Table C.6: Beep Code List

Beep Code	Contents Port 80h	Description
none	01h	CPU register test in progress
1-1-3	02h	CMOS write/read failure
1-1-4	03h	ROM BIOS checksum failure
1-2-1	04h	Programmable interval timer failure
1-2-2	05h	DMA initialization failure
1-2-3	06h	DMA page register writer/read failure
1-3-1	08h	RAM refresh verification failure
none	09h	First 64K RAM test in progress
1-3-3	0Ah	First 64K RAM chip or data line failure, multi-bit
1-3-4	0Bh	First 64K RAM odd/even logic
1-4-1	0Ch	Address line failure first 64K RAM
1-4-2	0Dh	Parity failure first 64K RAM

Table C.6 (Cont.):Beep Code List

Beep Code	Contents Port 80h	Description
2-1-1	10h	Bit 0 first 64K RAM failure
2-1-2	11h	Bit 1 first 64K RAM failure
2-1-3	12h	Bit 2 first 64K RAM failure
2-1-4	13h	Bit 3 first 64K RAM failure
2-2-1	14h	Bit 4 first 64K RAM failure
2-2-2	15h	Bit 5 first 64K RAM failure
2-2-3	16h	Bit 6 first 64K RAM failure
2-2-4	17h	Bit 7 first 64K RAM failure
2-3-1	18h	Bit 8 first 64K RAM failure
2-3-2	19h	Bit 9 first 64K RAM failure
2-3-3	1Ah	Bit 10 first 64K RAM failure
2-3-4	1Bh	Bit 11 first 64K RAM failure
2-4-1	1Ch	Bit 12 first 64K RAM failure
2-4-2	1Dh	Bit 13 first 64K RAM failure
2-4-3	1Eh	Bit 14 first 64K RAM failure
2-4-4	1Fh	Bit 15 first 64K RAM failure

Table C.6 (Cont.):Beep Code List

Beep Code	Contents Port 80h	Description
3-1-1	20h	Slave DMA register failure
3-1-2	21h	Master DMA register failure
3-1-3	22h	Master interrupt mask register failure
3-1-4	23h	Slave interrupt mask register failure
none	25h	Interrupt vector loading in progress
3-2-4	27h	Keyboard controller test failure
none	28h	CMOS power failure and checksum calculation in progress
none	29h	CMOS configuration validation in progress
3-3-4	2Bh	Screen initialization failure
3-4-1	2Ch	Screen retrace test failure
none	2Dh	Screen for video ROM in progress
none	2Eh	Screen running with video ROM
none	30h	Screen operable
none	30h	Screen running with video ROM
none	31h	Monochrome monitor operable
none	32h	Color monitor (40 column) operable

Table C.6 (Cont.): Beep Code List

Beep Code	Contents Port 80h	Description
none	33h	Color monitor (80 column) operable
4-2-1	34h	Timer tick interrupt test in progress or failure
4-2-2	35h	Shutdown test in progress or failure
4-2-3	36h	Gate A20 failure
4-2-4	37h	Unexpected interrupt in protected mode
4-3-1	38h	RAM test in progress or address failure > FFFFh
4-3-3	3Ah	Interval timer channel 2 test or failure
4-3-4	3Bh	Time-of-Day clock test or failure
4-4-1	3Ch	Serial port test or failure
4-4-2	3Dh	Parallel port test or failure
4-4-3	3Eh	Math coprocessor test or failure
low-1-1-2-*	41h	System board select failure
low-1-1-3-*	42h	Extended CMOS RAM failure

* "Low" means a lower-pitched beep precedes the three bursts

APPENDIX D

HIGH RESOLUTION DRIVERS FOR ON-BOARD VGA CONTROLLER

D.1 AutoCAD Version 2.62

The extended high resolution drivers for the on-board VGA controller support AutoCAD Version 2.0x. Before you start running AutoCAD you must load DSVGA.EXE into your computer memory. This procedure must be done every time the computer is turned on, or when you do a warm boot. If you are a frequent user of AutoCAD, you may want to add the driver name directly to your AUTOEXEC.BAT file.

The procedure to bring up the 800 x 600 resolution driver is as follows:

1. Install AutoCAD by following the instructions provided in the AutoCAD documentation.

2. Use the INSTALL program to copy the AutoCAD driver into your AutoCAD directory.

3. Type DSVGA.EXE at the DOS prompt to load it into memory.

4. Bring up AutoCAD by typing in:

   ACAD **Enter**

   When you see the main menu on the screen:

   ```
   ==> Select (5) Configure AutoCAD
   ```

   The screen will now show your current configuration. If your current video display is ADI display then you are set up to run AutoCAD with high resolution drivers. Skip the rest of the steps and proceed with AutoCAD. If your current video display is not ADI display, then press **Enter** to continue.

5 Now you will see the configuration menu displayed as shown

```
==> Select (3) Configure video display
```

After you select (3), it shows your currently selected video d again and asks you:

```
Do you want to select a different one?
```

Answer Yes to this question.

6 The screen then shows available video displays. For your ne tion:

```
==> Select (1) ADI display Version 2.(
```

7 After this you may have to answer several questions about y desired configuration.

8 Once these questions are answered, the display returns to t figuration menu. Select (0) to exit to the main menu.

9 Then answer Yes to the question, "Keep configuration chan

10 Finally, go back to the main menu. You are now ready do yo AutoCAD work with 800 x 600 resolution.

D.2 AutoCAD Release 9/10/11, AutoShade 1.1 & 2 and AutoSketch 3.0

This extended high resolution driver supports AutoCAD (Releas AutoSketch 3.0, and AutoShade 1.1 & 2.0. The files used to co on-board VGA controller follow:

SVADI.COM	Super VGA ADI real mode driver
SVADI.CFG	Driver's configuration data
SVCONFIG.EXE	Configuration utility for SVADI.CO

SVADI is a Super VGA ADI 4.1 display driver for AutoCAD, Aut AutoSketch, and RenderMan. SVADI allows you to change the configure screen text, colors, and dual screen mode.

Your DECpc is pre-loaded with 512KB of video memory, thus can support all of the following resolutions.

640	x	480	in 16 colors
640	x	480	in 256 colors
800	x	600	in 16 colors
800	x	600	in 256 colors
1024	x	768	in 4 colors
1024	x	768	in 16 colors
768	x	1024	in 4 colors

D.2.1 Loading and Unloading the Real Mode Driver

After configuring with SVCONFIG and setting up your AutoDesk product, you must load the real mode driver. The real mode driver, SVADI.COM is a DOS TSR program. It must be loaded into memory after you boot up and before you go into an Autodesk product. To load it, change directory to SVADI and type

```
SVADI Enter
```

It can be unloaded with the command

```
SVADI -U Enter
```

D.2.2 Configuration with SVCONFIG

1. First install your Autodesk product by following the instructions provided in the Autodesk documentation.

2. Use the INSTALL program to copy the AutoCAD drivers into the subdirectory `SVADI`.

3. SVCONFIG.EXE is the program that lets you change the various configuration values of SVADI.CFG. To invoke this configuration utilit, type

```
SVCONFIG Enter
```

4. When the main menu appears

```
==> Select Resolution/Mode of Graphics Screen
```

The menu that appears has screen resolution and colors desired for both AutoCAD and AutoShade. Configure SVADI.COM for the screen resolution and colors desired. Press **Enter** to pull-up the menu of resolution or color selections.

5. Press **Esc** four times to save the configuration to SVADI.COM and to exit to the operating system.

6. Then follow the configuration instructions for AutoCAD, AutoShade, or AutoSketch.

D.2.3 Using with AutoCAD

To configure AutoCAD:

1. Bring up AutoCAD by typing

```
ACAD Enter
```

When you see the main menu on the screen:

```
==> Select (5) Configure AutoCAD
```

It will show your current configuration on the screen. If your current video display is ADI display then you are set up to run AutoCAD with high resolution drivers. Skip the rest of the steps and proceed with AutoCAD. If your current video display is not ADI display, then press **Enter** to continue.

2. Now you will see the configuration menu displayed.

```
==> Select (3) Configure video display
```

After you select (3), your current video display appears again. Do you want to select a different one? Answer Yes to this question.

3. The screen shows Available video displays:

```
==> Select (1) ADI 4.0 or ADI 4.1
```

   You should select 4.1 when possible.

4. You will be asked for an interrupt vector. The value you give here must match the one you set during SVADI configuration. The default interrupt vector of 7A is recommended.

5. After this you may have to answer several questions about your desired configuration. These are standard settings that apply to all AutoCAD display drivers, not just to the ADI. Once these questions are answered, the display returns to the configuration menu. Select (0) to exit to the main menu.

6. Answer Yes to the question, "Keep configuration changes?"

7. Finally, go back to the main menu. You are now ready to do your normal work with one of the extended high resolution displays

D.2.4 Using with AutoShade/Renderman

To configure AutoShade:

1. AutoShade must be configured for ADI. To enter AutoShade's configuration menus type:

```
SHADE -r [Enter]
```

2. When Display Device requested:

```
==> Select "Autodesk Device Interface Display
           Driver"
```

   You will be asked for an interrupt vector. The value you enter here must match that you set when configuring SVADI. The default interrupt vector 7A is recommended.

3 When Rendering Display Device is requested

```
==> Select "Autodesk Device Interface rendering
            driver"
```

You must pick the same ADI driver for both Display Device and Rendering Display Device. You will be asked for an interrupt vector. The value you enter here must match the value you set when configuring SVADI. The default interrupt vector 7A is recommended.

4. Answer Yes to the questions "Do the devices share a single screen?" and "Is a redraw required on flipscreen?"

NOTE: Failure to answer "Yes" to the above questions will result in a failure of the driver to initialize. Consequently, AutoShade will not start up.

After the last configuration menu, you should be launched into AutoShade.

D.2.5 Using with AutoSketch

To configure AutoSketch:

1. AutoSketch must be configured for ADI. To enter AutoSketch's configuration menus type:

```
SKETCH -r Enter
```

2. When you get to the menu "Configure Display Device":

```
==> select "Autodesk Device Interface Display"
```

You will be asked for an interrupt number. The value you give here must match the one you set during SVADI configuration. The default interrupt vector 7A is recommended.

D.3 Framework II and Framework III

Several drivers are included to allow Framework II and III to make use of the on-board VGA controller's enhanced extended resolution. Tables D-1 and D-2 show the supported 132 column text and graphic modes:

Table D.1: Framework II Drivers

Driver	Desktop Format	Zoom F9 Format
FW20.SC	132 x 60 text	800 x 600 graphics
FW21.SC	132 x 60 text	800 x 600 graphics
FW22.SC	132 x 25 text	640 x 480 graphics
FW23.SC	132 x 25 text	800 x 600 graphics
FW24.SC	132 x 43 text	640 x 480 graphics
FW25.SC	132 x 43 text	800 x 600 graphics

Table D.2: Framework III Drivers

Driver	Desktop Format	Zoom F9 Format
FW30.SC	132 x 60 text	640 x 480 graphics
FW31.SC	132 x 60 text	800 x 600 graphics
FW32.SC	132 x 25 text	640 x 480 graphics
FW33.SC	132 x 25 text	800 x 600 graphics
FW34.SC	132 x 43 text	640 x 480 graphics
FW35.SC	132 x 43 text	800 x 600 graphics

Since the installation procedures for Framework Ii and III are nearly identical, so all references to Framework II/III refer to either program. If this is your first time installing a program, you can follow the instructions in the Framework II/III Getting Started Manual and select one of the standard IBM EGA, VGA and PS/2 display drivers. Make sure your Framework II/III is functioning properly before proceeding with the installation of any of these drivers.

1. Use the INSTALL program to copy the Framework drivers to your Framework sub-directory.

2. Run the SETUP program on the Framework II/III SETUP disk or from your Framework II/III sub-directory on your hard disk. Type:

```
SETUP [Enter]        for Framework II
SETUPFW [Enter]      for Framework III
```

3 At the Welcome to Framework II (or III) Setup Program menu:

```
==> Select option (2): All other uses of the setup
                       program
```

4. Tell the Setup Program the location of the FWSETUP file that stores the current configuration. If you are using a floppy system, insert your SYSTEM DISK 2 into drive B: and press 1. If you are using a hard disk system, select option 2, since FWSETUP should be in the current directory.

5 At the Main Menu:

```
==> Select (2) "Configuration Hardware" for
               Framework II
           (1) "Configuration Hardware" for
               Framework III.
```

6. Now, you are in the Change Configuration menu:

```
==> Select (1) "Primary hardware"
==> Select (1) "Screen driver"
```

7. Selecting screen driver by file name.

Framework II

```
==> Select (7) I want to enter my own driver's
               file name.
```

Make sure you enter the entire file name including the proper extension.

Framework III

```
==> Select (1) "The screen driver I need
                is not listed here".
==> Select (2) "I want to enter my own
                driver's file name".
```

8. Type M to return to the main menu.

9. At the main menu:

```
==> Select (7) Save all new settings.
```

10. You will then be prompted for a driver file name. Specify the directory and path that contains the Framework driver files.

11. The Setup program will save the current configuration to the FWSETUP configuration file:

```
==> Select (1) for a floppy disk system or
           (2) for a hard disk system
```

Then press any key.

12. You have now installed the new high resolution Framework driver.

D.4 GEM/3 Version 3.1

The following drivers are supported for GEM/3.

800 x 600	with 16 colors
768 x 1024	with 4 colors
1024 x 768	with 4 colors
1024 x 768	with 16 colors

1. Make a copy of the original GEM System Master and Screen Disk #2 It is important to keep the original and use these copied diskettes for installation, since the installation will modify the (copied) disks.

2. Insert the DRIVER DISK with the GEM drivers into drive A: and run the following GEM install batch file.

```
GEM3.BAT [Enter]
```

3. Follow the instructions displayed on the screen until finished and then exit.

4. Insert the System Master (not the original one) into drive A: and type in.

```
A:\>GEMSETUP [Enter]
```

5. Respond to these items on the Setup program menu:

```
==> Select Install new configuration [Enter]
    Select the hard disk drive according to
    your configuration.

==> Select one of the above resolutions.
    Select the mouse you installed.
```

6. If you have a printer installed, select Continue; otherwise select Save and exit from GEM setup.

7. Follow the remaining instructions to finish the GEM setup.

D.5 LOTUS 1-2-3, Version 2.0x, Release 2.2, and Release 3

D.5.1 LOTUS 1-2-3 Version 2.0x

The drivers support both 132-column text modes and high resolution graphics modes for Lotus 1-2-3.

132	x	25	Text resolution
132	x	43	Text resolution
640	x	480	16 colors
800	x	600	16 colors

To install the new driver for Lotus 1-2-3, step through the following procedures.

1. Use the INSTALL program to copy the Lotus drivers to your Lotus sub-directory.

2. Run Lotus and

```
==> Select "Install"
```

3 Follow the instructions on the screen to the Main Menu.

```
==> Select "Advanced Options"
==> Select "Add New Drivers to Library"
```

Follow the directions to add drivers.

4 Upon completion, you will return to the Advanced Options Menu.

```
==> Select "Modify Current Driver Set"
==> Select "Text Display"
```

All available drivers are listed, including:

```
a. Oak VGA Super Text (132 x 25)
b. Oak VGA Super Text (132 x 43)
==> Select the driver you want
==> Select "Graphics Display"
```

All the available drivers are listed including:

```
a. Oak VGA Graphics Driver (640 x 480)
b. Oak VGA Graphics Driver (800 x 600)
==> Select the driver you want
==> Select "Return to Menu"
```

5. The display now returns to the Advanced Options Menu.

```
==> Select "Save Changes"
```

Follow the instructions to name the new driver set or, if you wish, leave it with the default name.

6 After changes have been saved, follow the instructions to exit the INSTALL program. Now Lotus 1-2-3 can be started in the mode you selected.

D.5.2 LOTUS 1-2-3 Release 2.2

The extended high resolution drivers support Lotus 1-2-3 Release 2.2 in the following resolutions.

132	x	25	Text resolution
132	x	43	Text resolution
132	x	60	Text resolution
800	x	600	16 colors
1024	x	768	4 colors
1024	x	768	16 colors
768	x	1024	4 colors

To install the driver:

1 Use the INSTALL program to copy the Lotus drivers to your Lotus sub-directory

2 Run Lotus and

```
==> Select "Install"
==> Select "Advanced Options"
==> Select "Add New Drivers to Library"
```

Follow the directions to add the new drivers.

3. Upon completion, you will return to the Advanced Options menu

```
==> Select "Modify Current Driver Set"
==> Select "Text Display"
==> Select one of the following text modes:

VGA Super Text (132 x 25)
VGA Super Text (132 x 43)
VGA Super Text (132 x 60)

==> Select "Graphic Display"
==> Select one of the following graphic
    resolutions:
```

```
VGA Graphic Driver   16 color (1024 x 768)
VGA Graphic Driver   16 color (800 x 600)
VGA Graphic Driver   4 color (1024 x 768)
VGA Graphic Driver   4 color (768 x 1024)

==> Select "Return to Menu"
```

4. Follow the instructions to name the new driver set or, if you wish, leave it the same as the default name.

5. After changes have been saved, follow the instructions to exit the INSTALL program.

D.5.3 LOTUS 1-2-3 Release 3

The extended high resolution drivers support Lotus 1-2-3 Release 3 in the following resolutions:

800 x 600	16 colors
100 x 31	Text resolution
100 x 43	Text resolution
100 x 75	Text resolution
1024 x 768	4 colors
128 x 40	Text resolution
128 x 54	Text resolution
128 x 96	Text resolution
1024 x 768	16 colors
128 x 40	Text resolution
128 x 54	Text resolution
128 x 96	Text resolution
768 x 1024	4 colors
96 x 27	Text resolution
96 x 53	Text resolution
96 x 73	Text resolution

To install the driver.

1. Use the INSTALL program to copy the Lotus drivers to your Lotus sub-directory.

2. Run Lotus and

```
==> Select "Install"
==> Select "Change Selected Equipment"
==> Select "Modify Current DCF"
==> Select "Change Selected Display"
==> Select one of the following screen display
    cards:
```

Super VGA 800 16 colors
Super VGA 1024 16 colors
Super VGA 1024 Monochrome
Super VGA Portrait Monochrome

3. If you selected "Super VGA 800 16 colors"

```
==> Select a VGA800 screen display mode:

100 x 31  color
100 x 43  color
100 x 75  color
```

If you selected "Super VGA 1024 16 colors"

```
==> Select a VGA116 screen display mode:

128 x 40  color
128 x 54  color
128 x 96  color
```

If you selected "Super VGA 1024 Monochrome"

```
==> Select a VGA104 screen display mode:

128 x 40  color
128 x 54  color
128 x 96  color
```

If you selected "Super VGA Portrait Monochrome":

```
==> Select a VGA768 screen display mode:

96 x 27  color
96 x 53  color
96 x 73  color
```

4. After selecting the display:

```
==> Select "Return to Menu"
==> Select "Save Changes"
```

5. Follow the instructions to name the new driver set or, if you wish, leave it the same as the default name.

6. After changes have been saved, follow the instructions to exit the INSTALL program.

D.6 OrCAD 4.0

The extended high resolution drivers support OrCAD in 1024 x 768 16 colors. To install the OrCAD drivers

1. Install OrCAD selecting VGA as the display adapter

2. Use the INSTALL program to copy the OrCAD drivers to your OrCAD sub-directory, C:\ORCADESP\DRV.

3. Start OrCAD and

```
==> Select "Design Management Tools"
==> Select "Configure ESP"
```

4. The "Driver Options" defines the driver prefix and display driver the design environment uses. In the Configure Display Driver box type

```
OAK1K.DRV

==> Select "OK" to save changes and return to the
    environment screen.
```

When your restart OrCAD, the new resolution will be displayed

D.7 P-CAD 4.5

The extended high resolution drivers support P-CAD 4.5 in 800x600 16 colors. To install the P-CAD driver.

1. Install P-CAD selecting "IBM VGA" as the display adapter.
2. Use the INSTALL program to copy the P-CAD drivers to your P-CAD sub-directory.
3. Use a text editor to modify the P-CAD configuration file, PCADDRV.SYS. Replace the display driver DIBMVGA.DRV with VGA800.DRV

D.8 Presentation Manager Version 1.1

The extended high resolution drivers support Presentation Manager in the following resolutions

800 x 600	16 colors
1024 x 768	16 colors

To install the drivers

1. Using an ASCII text editor such as Edlin, add this statement to your config.sys file:

   ```
   IOPL = MONITOR
   ```

2. Use the INSTALL program to copy the Presentation Manager drivers into your

   ```
   \OS2\DLL sub-directory.
   ```

3. Go to the \OS2\DLL sub-directory. Locate the file Display.DLL and rename it

   ```
   OLDDISP.DLL:

   RENAME DISPLAY.DLL OLD_DISP.DLL
   ```

4. While in the \OS2\DLL directory, rename one of the following Presentation Manager drivers to DISPLAY.DLL:

```
067_800.DLL   800x600     16 colors
067PM1K.DLL   1024x768    16 colors
```

5. For example, to view Presentation Manager in 800 x 600 mode, rename 067_800.DLL to DISPLAY.DLL

```
COPY 067_800.DLL DISPLAY.DLL
```

   Reboot the system. From now on, Presentation Manager will come up in 800 x 600 mode. To change it back to the original resolution, rename the OLD_DISP.DLL to DISPLAY.DLL.

D.9 RIXAI Version 1.1

RIXAI is an 8514/A interface emulator driver, therefore any application program that writes directly to the 8514 registers (such as Microsoft Windows) will not work with this emulator. The RIXAI driver is intended for software applications that support the 8514/A drivers and are written to the HDI Load software of the 8514/A.

The RIXAI emulator was designed for software compatibility in accordance with the IBM Technical Reference Manual for Display Adapters. Consequently, all non-Windows application software tested in the 8514/A mode is completely functional with RIXAI. RIXAI was developed by RIX Softworks, Inc., 18552 Macarthur Blvd., No 200, Irvine, CA 92715. If you have any questions or problems, contact RIX Softworks directly at (714) 476-8266.

The files contained in the RIXAI directory include a 16 color (RIXAI4.EXE) and 256 color (RIXAI8.EXE) version of the RIXAI emulator. As with the standard 8514/A, the display modes supported are 1024 x 768 (16 colors) and 640 x 480 (256 colors).

Procedures for RIXAI:

1. Create a directory, RIXAI, on your hard disk which will contain the emulator files. Remember to set the DOS path to include this directory

2. Insert the DRIVER DISK with the RIXAI directory and files in drive A. Copy the files from the DRIVER DISK directory RIXAI into the RIXAI directory you have created. (Some application programs such as AutoCAD may require that you copy the emulator files directly into its AutoCAD directory). To verify that the RIXAI files copied are valid and complete, type: CHKRIXAI

3. To install the RIXAI emulator, type:

   `RIXAIx` **Enter**

   where x is either 4 for 16 colors or 8 for 256 colors, depending on which display mode you wish to emulate. To remove RIXAI from system memory type `RIXAIx/U.`

4. Reconfigure your applications software to operate with its 8514/A driver.

Demo program

A demo program, AITEST.EXE, is included in the DRIVER DISK with the RIXAI directory. To run the demo program type RIXAIx, where x is either 4 for 16 colors or 8 for 256 colors, depending on which display mode you wish to emulate. Then type AITEST and hit **Enter** to display the next screen.

D.10 Ventura Publisher

The following display resolutions are supported for Xerox Ventura Publisher Version 2.0:

800	x	600	with 16 colors
768	x	1024	with 4 colors
1024	x	768	with 4 colors
1024	x	768	with 16 colors

D.10.1 Ventura Installation

If you have not installed Ventura on your system, then follow Step 1 through 2. If you have already installed Ventura, please skip to Step 3 for driver installation.

1. Insert the Ventura Application Disk (disk #1) into drive A: and run VPPREP

   ```
   A:\> VPPREP [Enter]
   ```

2. Follow the instructions to continue the installation until you see this question in the selection menu: "Which graphics card and display do you have?"

   ```
   ==> Select any one of them.
   ```

   The driver you select here will be replaced by a new driver later on.

3. Continue the installation until it is finished then exit and go to Step 5.

D.10.2 Driver Installation

4. Insert DRIVER DISK into drive A: run the Ventura driver installation batch file:

   ```
   A:\> VP20 [Enter]
   ```

5. Continue the installation procedure until you see: Which graphics card and display do you have?

   ```
   ==> Select one of the following

   a. VGA 1024 x 768, 16-color Display
   b. VGA 1024 x 768, 4-color Display
   c. VGA 800 x 600, 16-color Display
   d. VGA 768 x 1024, 4-color Display
   ```

   Type the letter of the desired display resolution.

6. Continue the installations procedure until finished.

D.11 VersaCAD 6.0 & VersaCAD/386 6.0

The extended high resolution drivers support VersaCAD 6.0, VersaC 386 6.0, and previous versions of VersaCAD. The 512KB of video m on the motherboard of your DECpc means that the on-board VGA c ler can run VersaCAD at the following resolutions:-

640	x	480	16 colors
640	x	480	256 colors
800	x	600	16 colors
800	x	600	256 colors
1024	x	768	4 colors
1024	x	768	16 colors
768	x	1024	4 colors

All drivers work in single or dual screen mode if a secondary mono- chrome monitor is present. Dual screen mode places the menus an coordinate information on the monochrome monitor. The drivers ha ability to change the Text, Cursor, Grid, and Border color while setti the display driver in ENVIRO.

D.11.1 VersaCAD 6.0

To install the VersaCAD 6.0 driver with the driver in driver A: and VersaCAD installed on drive C:.

1. Use the INSTALL program to copy the VersaCAD 6.0 drivers to VersaCAD sub-directory.

2. Change directory to your VersaCAD sub-directory and copy the VCAD1.BAT to the root directory as VCAD60.BAT:

```
COPY VCAD1.BAT C:\VCAD60.BAT
```

3. Run VersaCAD's ENVIRO to set up display. Once in ENVIRO, t the [S] key will go to the display set up screen. Pressing [O] move to the displays that begin with the letter "O". Pressing [S] or [Backspace] will move through the entries available. The N field will display the resolution and number of colors.

D.11.2 VersaCAD/386 6.0

To install the VersaCAD/386 6.0 driver with the driver in drive A: and VersaCAD install on drive C:.

1. Use the INSTALL program to copy the VersaCAD 6.0 drivers to your VersaCAD sub-directory.

2. Change directory to your VersaCAD sub-directory and copy the file VCAD3.BAT to the root directory as VCAD386.BAT:

```
COPY VCAD3.BAT C:\VCAD386.BAT
```

3. Run VersaCAD's ENVIRO to set up the display. Once in ENVIRO, typing the **S** key will go to the display set up screen.

   Pressing **O** will move to the displays that begin with the letter "O".

   Pressing **Space** or **Backspace** will move through the entries available. The NOTES field will display the resolution and number of colors.

D.12 VESA TSR

67VESA.COM is a Terminate Stay Resident(TSR) program that allows you to run an application program that has a Video Electronics Standards Association(VESA) driver in an extended VGA mode. 67VESA.COM support the following modes:

80	x	60	Text
132	x	25	Text
132	x	43	Text
132	x	60	Text
800	x	600	Graphics

To use 67VESA.COM

1. Use the INSTALL program to copy the VESA TSR to sub-directory, C:\VESA.

2. Change directory to C:\VESA then run 67VESA. COM.

   CD\VESA
   67VESA

3. Run your application program with the VESA driver. 6
   stays resident in memory until you reboot your system

D.13 Microsoft Windows 2.1x and 3.0/3.1

D.13.1 Windows 2.1x and Windows/386 Version 2.

In addition to the drivers provided by Microsoft, your on-
controller comes with drivers that take advantage of the
resolutions for Windows. Make sure you have the driver
Windows installation diskettes ready, then follow the inst
below.

1. Insert the Windov/s SETUP diskette in drive A. Run th
   by typing:

   A:\> SETUP **Enter**

2. Run the Setup program according to the instructions
   and in the Microsoft Windows documentation.

3. When the Setup program displays the list of options t
   installed, select VGA **Enter**

4. When Setup asks for the type of display adapter, use
   to move the highlighted bar to select:

   Other (requires disk provided by a hardware manufa

5. Insert the appropriate Display Driver diskette in drive

   Enter

6. You should see: "Here are the display drivers on your disk."

```
==> Select one of the following available drivers:

OAK TECHNOLOGY VGA 1024x768 16 Colors Display
OAK TECHNOLOGH VGA 800x600 16 Colors Display
OAK TECHNOLOGY VGA 1024x768 4 Colors Display
```

7. Continue with the SETUP program answering the other configuration questions until finished. The driver installation procedure is now complete.

D.13.2 Windows 3.0/3.1

To install the Windows 3.0/3.1 driver:

1. Install Windows 3.0/3.1, selecting the default display option (VGA)

2. Use the INSTALL program to copy the Windows 3.0/3.1 drivers to your WIN-DOWS\SYSTEM sub-directory.

3. You can now change the resolution within Windows 3.0/3.1 or with the Windows SETUP.EXE program.

4. To change the resolution within Windows 3.0/3.1, run "Windows Setup"

```
===>Select "Options"
===>Select "Change System Settings"
===>Select one of the following resolutions for
    your display.

OAK VGA  800 x  600  16 colors
OAK VGA 1024 x  768  16 colors
OAK VGA  640 x  480 256 colors
OAK VGA  800 x  600 256 colors
OAK VGA 1024 x  768   4 colors
OAK VGA  768 x 1024   4 colors (only in 3.0
                                version)

===>Select "Restart Windows" to change to the
    selected resolution.
```

5. Press ENTER twice to select the new resolution and accept the configuration.

6. Your Windows 3.0/3.1 driver is now installed.

D.14 WordPerfect 5.0 and 5.1

The on-board VGA controller supports an 800 x 600 resolution driver for WordPerfect 5.0 and both 800 x 600 and 1024 x 768 resolutions for WordPerfect 5.1. To install a new driver for WordPerfect, use this procedure:

1. Use the INSTALL program to copy the WordPerfect drivers to your WordPerfect sub-directory.

2. Run the WordPerfect program, then press SHIFT-F1 to get into the Setup menu.

3. Once in the Setup menu, choose Option 3 for Version 5.0 or Option for Version 5.1.

4. You should now be in the Display menu. Choose Option 5 for Version 5.0 or Option 2 for Version 5.1. Choose Option 3 for Version 5.1 to select the text mode of your choice.

5. You should now be in the Setup Graphics Screen Type menu. Choose the appropriate resolution desired.

6. Exit from the menus; installation is complete.

To run any of the older WordPerfect versions such as Version 4.2, follow these instructions:

1. Use the setup option of WordPerfect to set the new display dimensions.

2. Create a batch file WPVGA.BAT to do the following:

```
VGAMODE 4F (or 50 or 51)
WP
VGAMODE 3 (to return to normal text mode, 80 x 25)
```

D.15 132-Column Text Mode Applications

Following is a general set of guidelines for installing these special text mode drivers. Instructions are given on how to set up 132-column display drivers for two WordStar application programs to run in 132-column text mode.

1. Backup the application before installation.

2. Run the application's installation program and set the display dimensions to 132 columns; save the changes.

3. For convenience, create a batch file to switch the video mode to 132-column text mode and then run the application.

The VGA supports 132 x 25, 132 x 43, and 132 x 60 text modes; their corresponding mode numbers are (in hex) 50, 51, and 4F. A utility program called VGAMODE.EXE can be used to switch to those modes. For example:

```
VGAMODE 50 (will switch to 132 x 25 mode)
VGAMODE 51 (will switch to 132 x 43 mode)
VGAMODE 4F (will switch to 132 x 60 mode)
VGAMODE  3 (will switch to 80 x 25 mode)
```

WordStar Professional Release 4

1. Copy WS.EXE to WS132.EXE

2. Run WSCHANGE using WS132.EXE and save to WS132.EXE.

3. Create a batch file, for example, WSVGA.BAT, to do the following.

```
VGAMODE 51
WS132
VGAMODE 3
```

When all these steps are performed, type WSVGA to start WordStar 4 in 132-column mode.

WordStar Version 3.30

To modify WordStar Version 3.3x to operate in 132-column mode, a utility called PATCHWS.EXE is provided. The original installation program WINSTALL.COM can't set screen dimensions.

1. Copy WS.COM to WS132.COM.
2. Run PATCHWS.EXE on WS132.COM.
3. Create a batch file similar to WSVGA.BAT above.

APPENDIX E

SELECTION OF PC7XR-CA/DA IDE DRIVE'S OPERATION MODE

The configuration of a hard disk drive depends on the host system in which it is to be installed. The configuration of three jumpers controls the drive's mode of operation. Definitions of three jumpers are described as following:

1. Drive Select (DS) Jumper

   You can daisy-chain two drives on the AT-bus interface. When daisy-chaining two drives, use their Drive Select (DS) jumpers to configure one drive as the Master and the other as the Slave.

   To configure a drive as the Master (Drive 0), install a jumper at the DS pins. Quantum ships *ProDrive* 52AT and 105AT hard disk drives from the factory with the DS jumper installed-that is, configured as Drive 0.

   To configure a drives as the Slave (Drive 1), remove the DS jumper.

   Note: The order in which drives are connected in a daisy chain has no significance.

2. Slave Present (SP) Jumper

   In combination with the current DS jumper setting, the Slave Present (SP) jumper implements one of two possible configurations.

   - When the drive is configured as a Master - that is, with the DS jumper installed — the SP jumper indicates to the drive that s Slave drive is present. The SP jumper should be installed on the Master drive only if the Slave drive does *not* use the Drive Active/Slave Present (DASP-) signal to indicate its presence.

- When the drive is configured as a slave - that is, without the DS jumper installed — the SP jumper enables the self-seek test. When power is applied to the drive with the self-seek test enabled, the drive executes seeks in a *butterfly* pattern.

During the self-seek test, the LED remains on while the test proceeds without error. if the test encounters a seek error, the test terminates and the LED flashes continuousely until the SP jumper is removed.

3. Drives Mode (DM) Jumper

When the Drive Mode (DM) jumper is installed, the drives is in the Prov-Drive 40/80AT compatible mode and can be communicate with a ProDrive 40/80AT hard disk drive. In this mode, the drive does *not* use the PDIAG-signal to control Master/Slave communications. The configuration of the DS and SP jumpers determines whether the drive is the Master or Slave.

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