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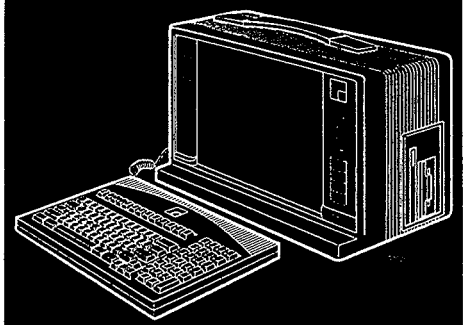
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USER'S MANUAL



P A C™

Portable Add-in Computer

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Corporate Headquarters

Dolch Computer Systems, Inc.
3178 Laurelview Court
Fremont, CA 94538
USA

U.K. Operation

Dolch Computer Systems UK (Ltd)
14 Cochran Close, Crownhill
Milton Keynes, MK8 OAJ
United Kingdom

German Operation

Dolch Computer Systems GmbH
Haidgraben 1C
D-85521 Ottobrunn
Germany

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Manual Part Number:

85-1002-0050 Rev C

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FCC Warning

This equipment is FCC approved. This means that this equipment will have been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. This equipment generates, uses and can radiate harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does not cause harmful interference to radio or television, 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.

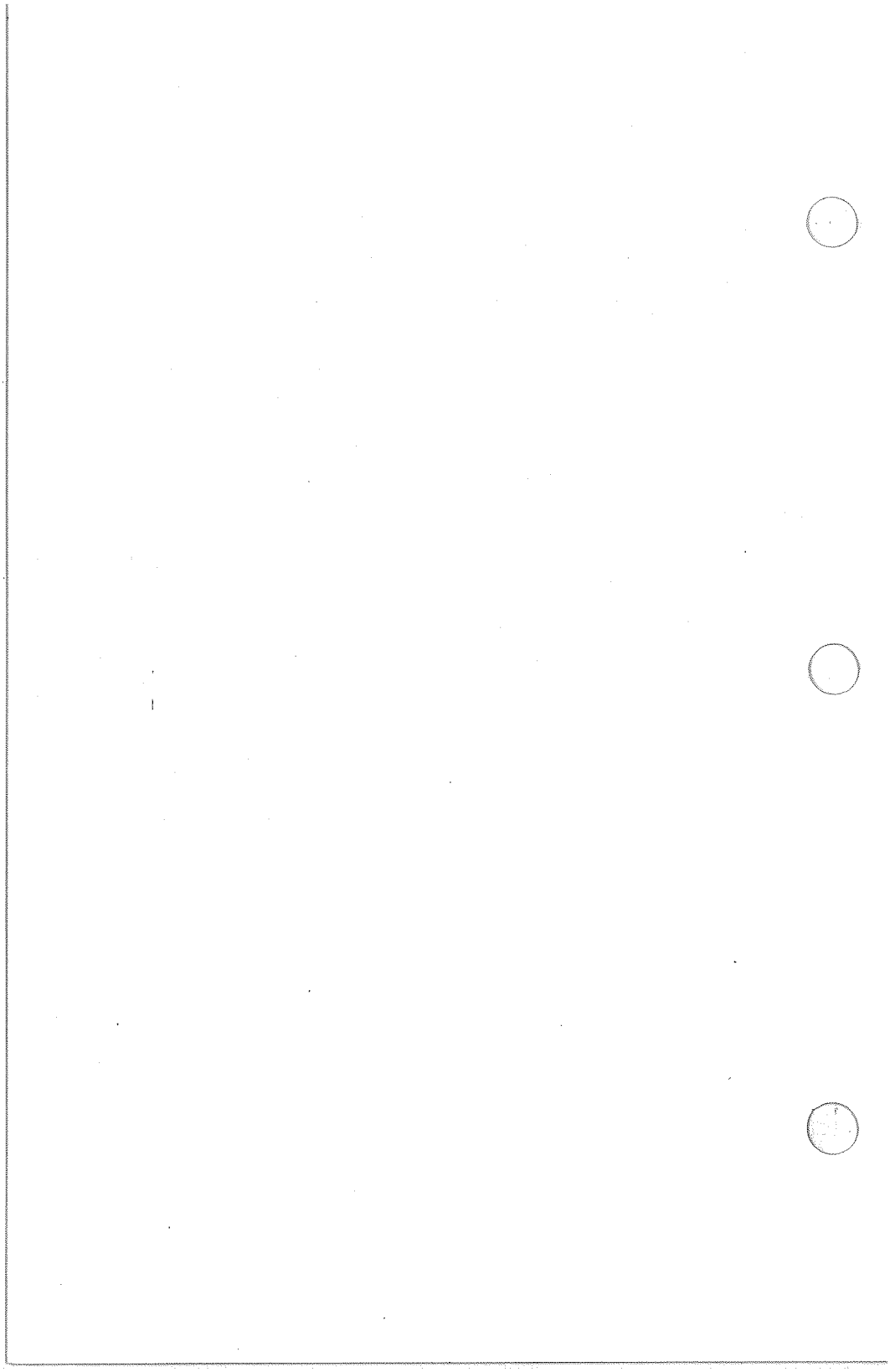
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a different circuit from which the receiver is connected into.
- Consult the dealer or an experienced radio/TV technician for help.

Caution

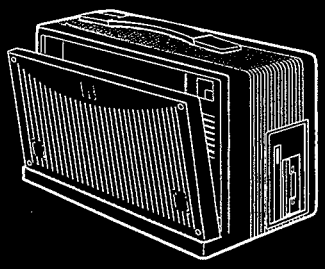
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

To meet FCC requirements, shielded cables are required to connect the device to another Class A certified device.

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1

GETTING STARTED

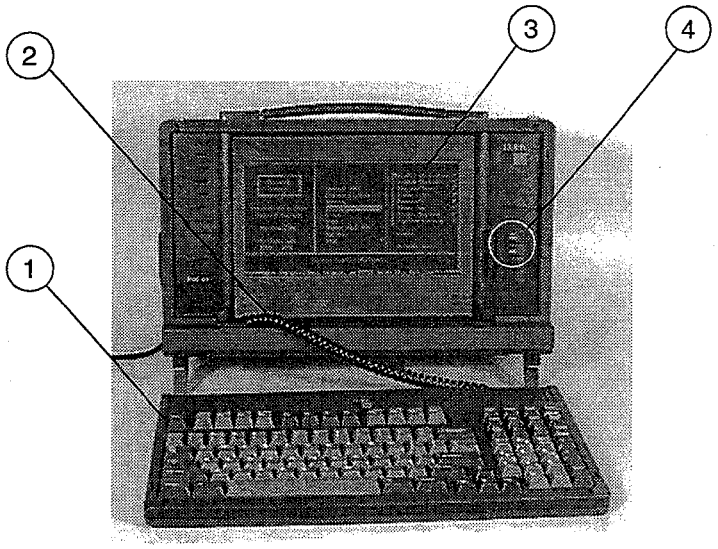
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GETTING STARTED

Component Identification

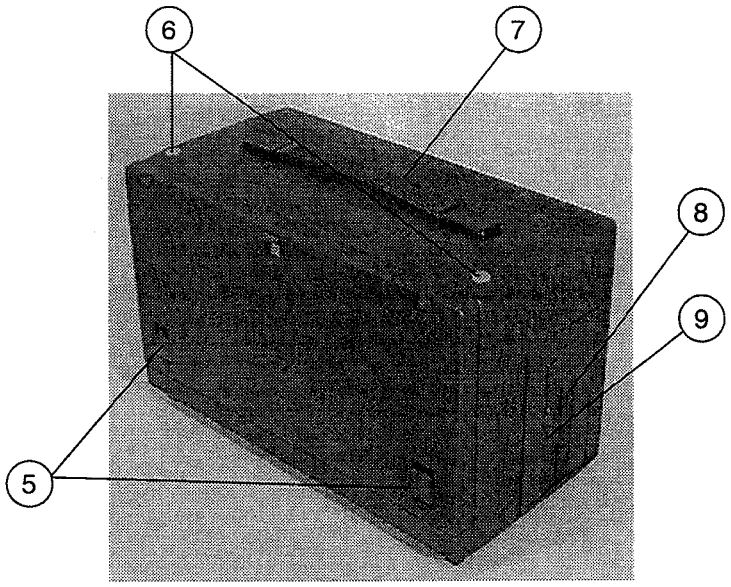
The PAC (Portable Add-In Computer) is designed for mobile applications that requires massive expansion capability for add-in boards and drives. It is a versatile, rugged, portable computer that can be used in the harshest conditions. In addition, the PAC offers an infinite number of configurations, depending on the user's needs. This section will give you an overview of the components and features designed into the PAC. A brief description will accompany each callout to help you get started and become familiar with your PAC.



1. Keyboard
2. Keyboard Cable
3. Flat-Panel Display
4. LED Status Indicators

Figure 1.1 Features of the PAC

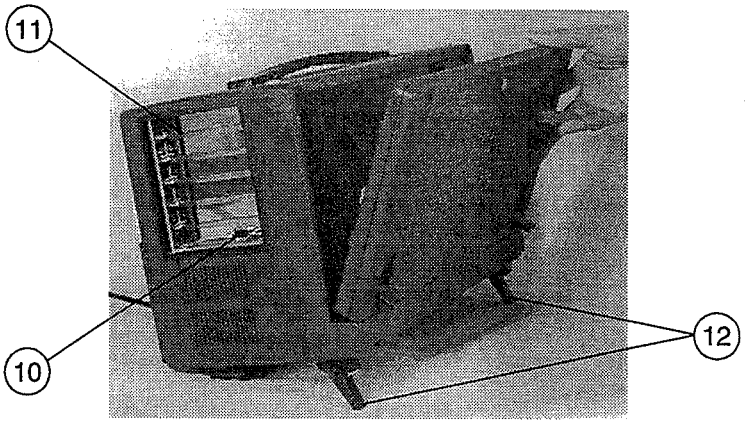
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5. Keyboard Adjustment Feet
6. Keyboard Release Buttons
7. Carrying Handle
8. Floppy Disk Drive
9. CD-ROM Drive

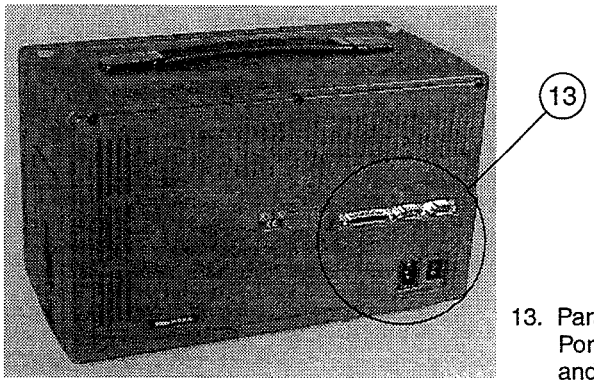
Figure 1.2 Features of the PAC

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10. External Monitor Receptacle
11. Expansion Slot Opening
12. System Adjustment Feet

Figure 1.3 Features of the PAC



13. Parallel Port, Serial Ports, Power Plug and Power Switch

Figure 1.4 Rear Panel Connections

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Features of the PAC

1. **Keyboard** - The portable keyboard can be attached to the front of the PAC for easy storage and transportation.
2. **Keyboard Cable** - This cable connects the detachable keyboard into the cable jack in the front, lower left-hand corner of the PAC.
3. **Flat-Panel Display** - The PAC is available with either a 10.4" screen or a 12.1" screen.
4. **LED Status Indicators** - These LED's illuminate for an indication of power usage and when the system is accessing the HDD.
5. **Keyboard Adjustment Feet** - These feet enable you to adjust the height and angle of the keyboard.
6. **Keyboard Release Buttons** - These buttons, when pushed down simultaneously, will release the attached keyboard from the front of the system unit.
7. **Carrying Handle** - For easier transportation and handling of your PAC.
8. **Floppy Disk Drive** - The opening slot for the floppy disk drive.
9. **CD-ROM Drive** - The PAC can be equipped with an optional CD-ROM.
10. **External Monitor Connector** - This is a 15-pin, high density, Sub-D VGA connector for plugging in a CRT external monitor.
11. **Expansion Slot Opening** - This opening accesses the add-in card brackets and the external monitor connector.
12. **System Adjustment Feet** - These feet adjust the viewing angle of the PAC.
13. **Rear Panel Connections** - This back panel contains the Parallel Port, two Serial Ports, the Power Cord receptacle and the "Off/On" switch. (See Figure 1.5 for a more detailed view of the area).

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Removing the Keyboard

When transporting or not in use, the PAC closes up neatly with the keyboard attached to the front of the unit. Not only is the screen protected, but the keyboard remains with the main unit. It can be easily released from the main unit when ready for use.

NOTE: The system power switch should be in the "Off" position.

1. Place the PAC on a flat, sturdy surface with the carrying handle facing up and the Dolch logo facing you.
2. Located on the top of the PAC are two green buttons. Press both buttons down simultaneously. This will release the keyboard from the front of the PAC.
3. Slightly lift up on the keyboard to remove it from the unit. Place the keyboard in front of the system.
4. You can flip out the legs on the bottom of the keyboard, if you wish, to angle it.

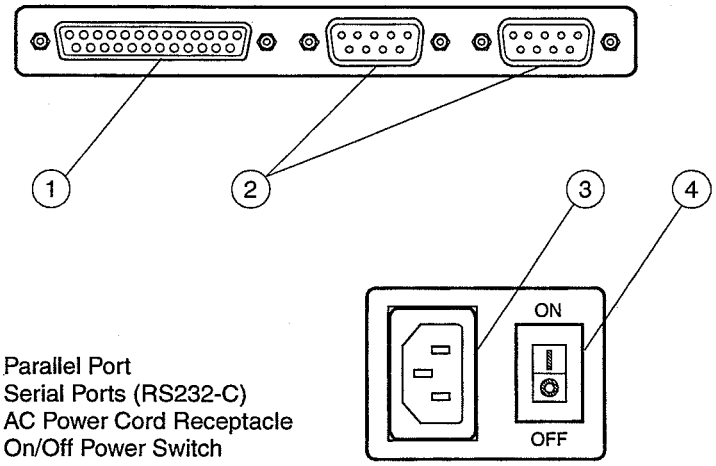
NOTE: The PAC is shipped with the keyboard already connected, however, the cable can be disconnected and reconnected if needed. The cable jack is located in the front, on the left hand side of the bottom tray.

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Connections

The PAC includes one external monitor receptacle, two RS232 serial ports and one bi-directional parallel port for connecting peripheral devices, such as a printer or a mouse, to your system.

Most of the connection receptacles are located on the back of the PAC, with one exception, the external monitor receptacle. It is located on the left side of the PAC where the expansion slot opening is for the add-in cards. The following figure shows the placements of the parallel port, two serial ports, and the AC power cord receptacle. The Off/On switch is also located on the back of the PAC.



1. Parallel Port
2. Serial Ports (RS232-C)
3. AC Power Cord Receptacle
4. On/Off Power Switch

Figure 1.5 Back Panel Connection Receptacles

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Plugging in the PAC

Before you plug in the power cord or any other equipment for the PAC, take an inventory of each device and make sure you have all the appropriate cables you need. If any cables are missing contact Dolch technical support immediately.

1. Locate the power switch on the PAC or on any other peripheral device you may be using. Make sure all the power switches are in the "Off" position.
2. Insert the female, 3-pin connector on the power cord into the power cord receptacle located on the rear of the PAC.
3. Plug the other end of the power cord into a grounded power source or power strip.

CAUTION: To avoid electrical shock, insert the female end of the power cord into the PAC first, before plugging the power cord into a power outlet.

Connecting an External Mouse

There are a two serial ports on the PAC in which to connect an external mouse or other pointing device. The serial ports are located on the back of the PAC and are both 9-pin, RS232-C connectors.

NOTE: There are special adapters available for connecting a PS/2 mouse to RS232-C serial ports. Contact your local computer dealer for more information.

The following procedure is only general in nature. Refer to the documentation supplied with your mouse or pointing device for specific installation instructions.

1. Insert the 9-pin connector, on the mouse cable, into one of the serial ports.
2. Using a phillips-head screwdriver, secure the connection by tightening down the screws.

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Connecting an External Monitor

The PAC includes a fully VGA compatible video controller card for driving the flat-panel display. This video controller card includes a 15-pin, high density, sub-D VGA connector for connecting an external monitor. It is accessible at the bottom of the expansion slot door located on the left side of the PAC. It is not necessary to connect an external monitor to the PAC, but by using an external monitor you can achieve higher resolutions than on the internal flat-panel display.

NOTE: The following procedure is only general in nature. Refer to the documentation supplied with your monitor for specific installation instructions.

1. Make sure the power is turned "Off" on the PAC. Connect the appropriate end of the monitor cable to the monitor.
2. Attach the other end of the monitor cable into the 15-pin external monitor receptacle. The receptacle is located at the bottom of the expansion slot opening, on the left hand side of the PAC. (See Figure 1.3 for the exact position of the external monitor receptacle.)
3. Insert the female end of the monitor power cord into the proper receptacle on the monitor. Plug the other end into a grounded outlet or power strip.

The Parallel Port

The PAC includes a 25-pin parallel port for connecting a printer or another parallel peripheral device. The parallel port is located on the back of the PAC, next to the serial ports. Parallel ports send multiple data and control bits simultaneously over multiple transmission lines. (See Figures 1.4. and 1.5)

NOTE: Before using the parallel port, refer to the documentation provided by the manufacturer of your peripheral device for information on installation.

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The Serial Ports

The PAC includes two 9-pin, RS232-C serial ports for connecting printers, a mouse, or other peripheral devices. The serial ports are located on the back of the PAC, next to the parallel port. Serial ports send data and control bits sequentially over a single transmission line. (See Figures 1.4 and 1.5 for the location of the serial ports.)

Turning On the Power

The power switch on the PAC is located on the back panel, next to the AC power receptacle. The PAC requires an AC power source for operation.

1. Turn the power "On" by pushing in the upper part of the switch. To turn the power "Off, push the lower part of the switch in.

2. After turning the PAC on, make sure the brightness level is high enough to see the display.

Once you have turned the system on, it will begin a Power On Self Test (POST). If you want to review your hardware configuration while the system is running the POST, press the <F2> key to enter the BIOS utility. For more information on the BIOS utility, refer to Chapter 3.

Bypassing the Memory Test

When your PAC is started up, the Basic Input/Output System (BIOS) performs the Power On Self Test (POST) to run a check on things such as the hard drive, the floppy drive, and the system's memory. If you have a lot of memory installed in your system, this can be a slow process. To bypass the memory test, press the <Del> key when the following message is displayed:

```
Hit <Del> to Bypass Memory Test
```


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Adjusting the Display Viewing Angle

You can adjust the display angle of the PAC for your viewing comfort. All PAC systems have tilt adjustment feet on the bottom of the main unit. Flipping these feet out on the bottom of the unit will angle the display.

How to Use the CD-ROM

The following section explains the main features on the CD-ROM drive, how to load and remove a CD-ROM disk and troubleshooting the CD-ROM drive.

The CD-ROM drive has the following features:

- **Eject Button** - The rectangular shaped button is used to eject the CD-ROM disk from the CD-ROM drive.
- **Status LED** - The Status LED is amber in color and illuminates to notify you that the power is on and that the system is busy accessing the CD-ROM disk.
- **Manual Eject Hole** - Is a tiny emergency hole that is used during a mechanical or power failure to eject the CD-ROM, by hand, out of th CD-ROM drive.

Loading and Removing a CD-ROM Disk

Use the following procedure to load and remove a CD-ROM disk from the CD-ROM drive.

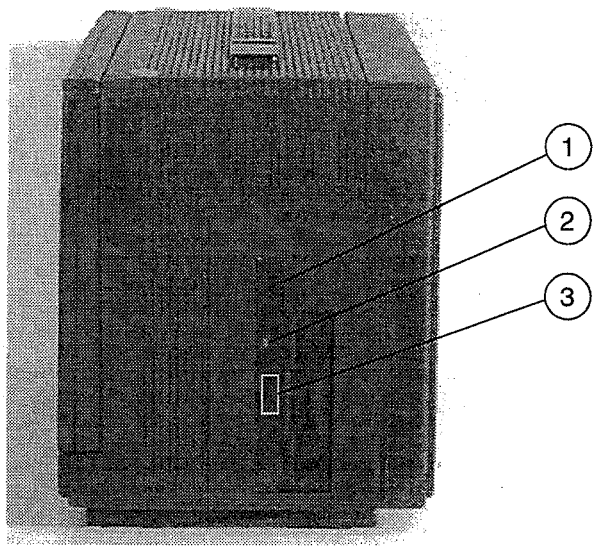
WARNING: Use care when handling a CD-ROM disk as you can easily scratch the surface and destroy the data. Hold the disk around the edge or by the center hub.

1. Push the eject button located on the CD-ROM drive and the loading tray will eject out from the PAC. (See Figure 1.6)
2. Insert the disk into the drive until the center hub fits securely in place on the spindle. (See Figure 1.7)

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3. Push the loading tray back into place on the PAC.
4. To remove the CD-ROM disk, push the "Eject" button to eject the loading tray back out of the PAC.
5. Carefully remove the disk from the drive and push the loading tray back into the PAC. Place the disk back into it's protective case for storage.

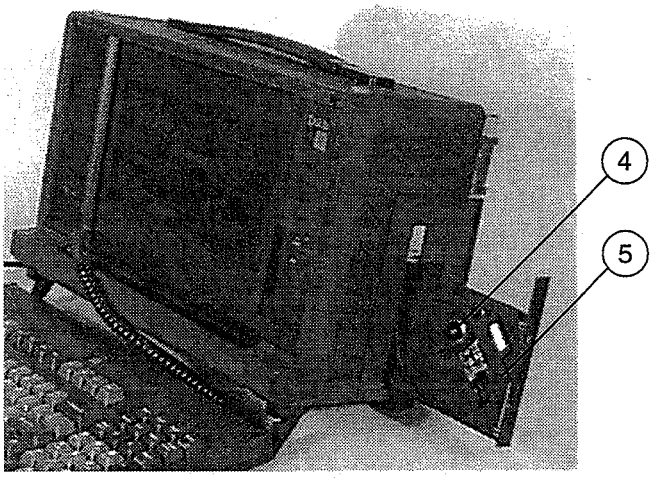
NOTE: Never force a CD-ROM disk into or out of the loading tray.



1. CD-ROM Drive
2. Status LED
3. Eject Button

Figure 1.6 Location of the CD-ROM

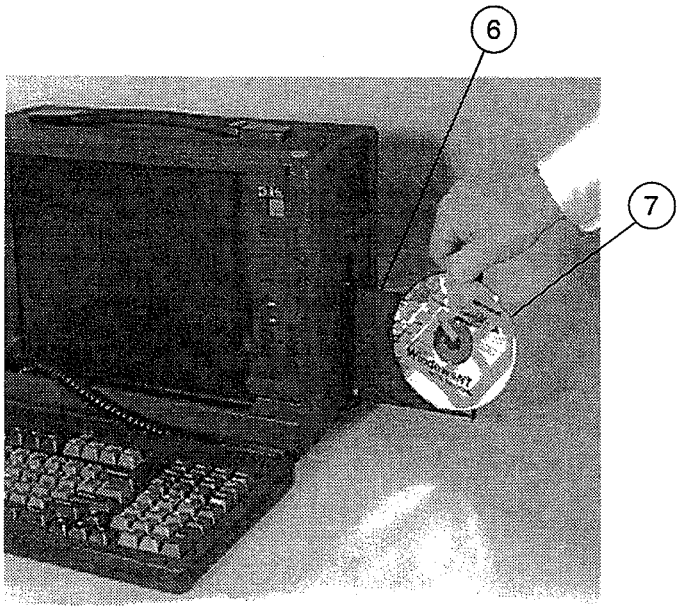
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4. Center Hub
5. Loading Tray

Figure 1.7 CD-ROM Loading Tray

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6. Loading Tray
7. CD-ROM Disk

Figure 1.8 Loading a CD-ROM Disk

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The Status LED

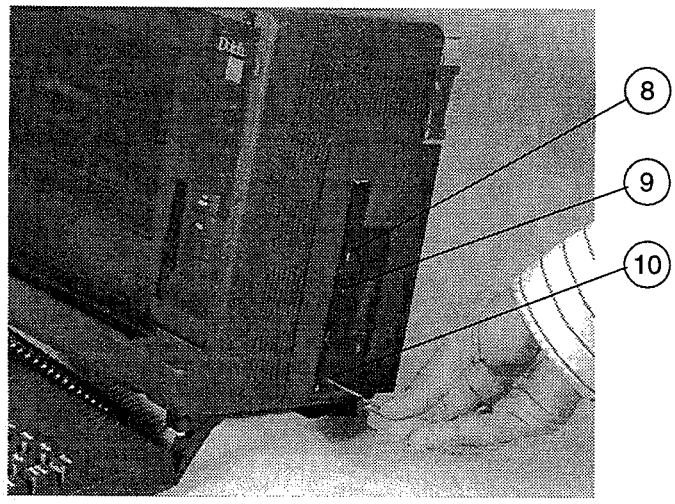
The LED indicator lights up continuously during the seek cycle and during the transfer of read data to the host. It flashes at an interval of 1.6 seconds while the audio is being used. The LED also flashes, at an interval of 0.8 seconds, while the CD-ROM is completing the following tasks:

1. From POR, (Power On Reset) to the end of TOC read
2. From tray loading to the end of TOC read
3. From POR until the end of detecting the disk, (no disk present)
4. From tray loading until the end of detecting the disk, (no disk present)
5. If a disk error occurs, flashing continues until the disk is ejected. If there is a hardware problem, flashing continues until the power is switched off.

Manual Eject of the CD-ROM Disk

The PAC must be powered on for normal CD-ROM disk insertion and removal. If you need to eject a disk during a power failure, or some other type of mechanical failure, it can be done manually by hand. First, disconnect the power. Then, carefully push a straightened paper clip or similar thin, pointed tool into the emergency "Manual Eject Hole" located at the bottom of the CD-ROM drive. (See Figure 1.9) The disk will then eject out.

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9. Status LED
10. Eject Button
11. Manual Eject Hole

Figure 1.9 Manual Ejection of a CD-ROM Disk

CD-ROM Software Drivers

In order for the CD-ROM drive to work properly in MS-DOS® or in the MS-Windows™ environments, you need to load the software drivers that are provided with your CD-ROM. For detailed installation instructions, refer to the README.TXT file located on the driver diskette, (P/N 85-1001-0237), that is included with your CD-ROM drive.

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CD-ROM Drive Software Problems and Solutions

For answers to some of the most common and general problems that might occur while using your CD-ROM, refer to the following troubleshooting list. This section provides some general procedures and troubleshooting solutions that may help you correct some of the problems that may arise.

Problem:	Solution:
If the system hangs without displaying anything when the device driver is loaded during "Boot-up".	There is a possibility that the TEAC device driver is conflicting with other device drivers. Check the position of the device driver statement.
The message "Device Driver Not Installed" is displayed during the loading of the device driver.	Verify that there is no conflict with the IDE controller address (primary, secondary, tertiary, etc.) and/or it's interrupt.
The CD-ROM drive is not recognized by the system when MSCDEX.EXE (or CORELCDX.COM) is loaded.	Drive names specified in the CONFIG.SYS and AUTOEXEC.BAT files may not match. Verify that each statement contains "/D:TEAC-CDI".
The system displays the message, "CDR101: Not Ready" when the CD-ROM is accessed.	Make sure that a disk is inserted probably in the drive and is not inserted up-side down.
The system displays the message, "CDR103: CD-ROM Not High Sierra or ISO 9660 Format" when the CD-ROM is accessed.	This message will be displayed when a non-standard CD is accessed. Example: Placing an Audio CD (redbook) and accessing it without going into CD PLAYER.
Do I need to change the BIOS CMOS Setup for use with the IDE CD-ROM?	No, the CD-ROM is not supported by the system BIOS.

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The CD-PLAYER for Windows will not work.	To operate the CD-PLAYER for Windows, (MCI) "CD Audio" has to be installed in the drivers in the control panel. Refer to the Windows manual to install the (MCI) "CD Audio".
The system does not recognize the CD-ROM drive with the error message "Not enough drive letters".	* There may be no more drive letters available. Please add or edit the "LASTDRIVE" statement in your AUTOEXEC.BAT file so that the last drive equals one more than your current last drive.

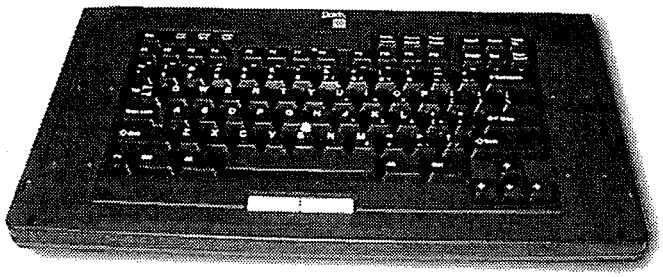
* Refer to the following example for the solution and the list of current and new "Drive Letters".

Current Drive Letter	New Drive Letter
A:FDD	A:FDD
B:FDD	B:FDD
C:HDD	C:HDD
D:HDD	D:HDD
"LASTDRIVE=E"	E:CD-ROM ->
The system displays the message, "XMS Memory Not Installed", when CORELCDX.COM is loaded.	Refer to the Corel CDX's document file (CORELCDX.TXT).

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Keyboards

The DataMaster™ Compact is the standard keyboard which is included with the PAC. It's an 85-key unit with an integral eraser pointing device. It has full-size keypads and notebook travel keys. Two other styles of keyboards are also available with the PAC. The optional DataMaster with 101 (U.S.) and 102 (International) keys and the new EnviroMaster™. The EnviroMaster is waterproof/dustproof, has 114 keys and comes with a built-in, integral HulaPoint™ pointing device.

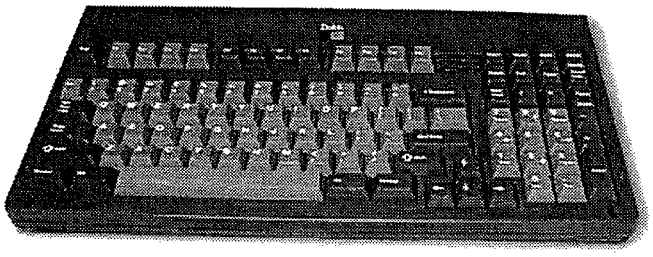


DataMaster™ Compact

- 85 Keys (U.S. & International)
- Notebook Travel Keys
- Integral Eraser Pointing Device
- Full-Size Keycaps
- Standard on PAC

Figure 1.10 DataMaster Compact Keyboard (Standard)

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DataMaster™

- 101 Keys (U.S.)
- 102 Keys (International)
- Full Travel Keys
- No Pointing Device
- No Specific Environmental Protection
- Optional on PAC

Figure 1.11 DataMaster Keyboard (Optional)

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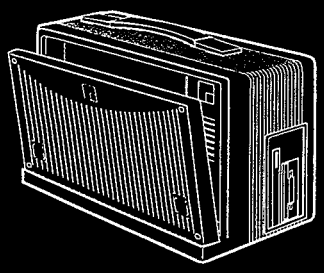


EnviroMaster™

- 114 Keys
- 2mm Travel
- Integral HulaPoint™ Pointing Device
- Dustproof/Waterproof
- IP66/NEMA 4
- Optional on PAC

Figure 1.12 EnviroMaster Keyboard (Optional)

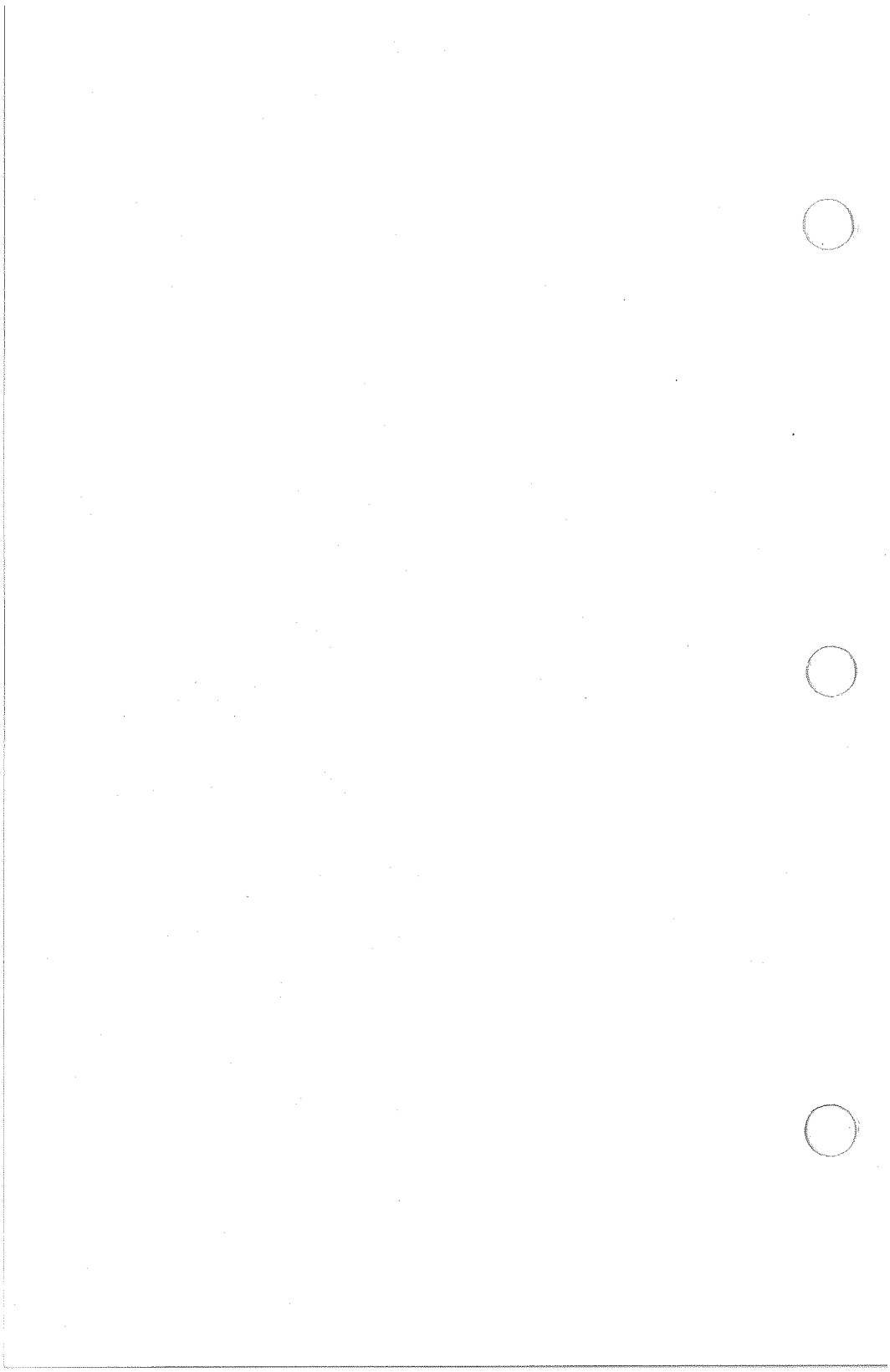
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2

SYSTEM DESCRIPTION

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SYSTEM DESCRIPTION

The PAC is a high-performance, Pentium® Processor powered system with ISA add-in buses. It is highly flexible in CPU frequency, and main memory type and size. See the following list of the main features on the Hunter Industrial system board:

- **Main Processor** - Intel P54C Pentium™ Processor operating at 75, 90, 100, 120, 133, 150, 166 and 200 MHz

- **Supported Bus Clocks** - 50, 60 and 66MHz

- **Memory** - 32 or 36-bit JEDEC standard EDO SIMMs
  - 70 ns minimum access speed
  - 1 to 128MB memory capacity

- **High Speed DRAM Cache** - 256K of write-back direct-mapped asynchronous cache

- **ROM BIOS** - AMI© WinBIOS™ BIOS with optional FLASH ROM for easy field upgrades

- **On Board I/O** - The Hunter Industrial system board includes:
  - Up to 4 enhanced IDE drives: Two PCI IDE controllers
  - Two floppies up to 1.44MB
  - Two high speed RS-232 serial ports 16-byte FIFO (16550)
  - One Centronics™ compatible bi-directional parallel port EPP/ECP mode compatible
  - PS/2 mouse port

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Hardware Description

This section briefly describes each of the major features of the PAC's Hunter Industrial system board. Refer to Figure 2.1 for the layout of the system board and the locations of it's key components.

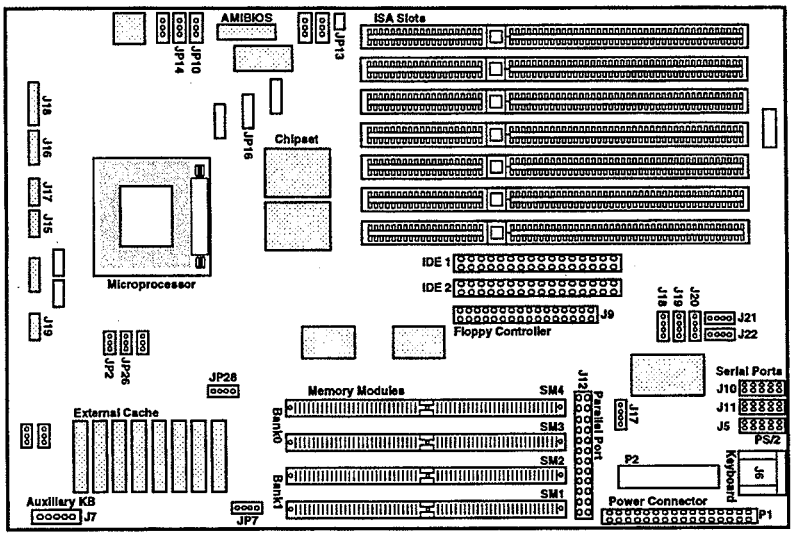


Figure 2.1 Layout of the Hunter Industrial System Board

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Jumpers

The Hunter Industrial system board is equipped with a large number of peripherals and has the ability to run at a variety of speeds. Because of this, there is a large number of configuration jumpers on the system board. This section will discuss most of the jumper settings and list their pinouts. Some of the charts contained in this section have highlighted gray areas. These gray areas are the default settings.

Standard I/O Enable (JP17)

The Hunter Industrial standard I/O consists of two serial ports, a parallel port and the floppy disk controller. JP17 is used to enable or disable these ports.

I/O	Enable	Disable
JP17	1-2	2-3

Mouse IRQ Enable (JP10)

The PS/2 type mouse port on the system board uses IRQ12 as it's interrupt request line. To enable the interrupt (default), leave the jumper on pins 2-3. To disable the interrupt and *subsequently the mouse controller*, move the jumper to pins 1-2.

IRQ12	Disable	Enable
JP10	1-2	2-3

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CMOS Reset (JP9)

This option is provided as a convenience for those who need to reset the CMOS registers. It should always be set to "Normal" for standard operation. If the CMOS needs to be reset, turn *"Off"* the system, move the jumper on JP9 to pins 2-3. Then turn the system back *"On."* Now, move the jumper back to pins 1-2 and reset the system board.

RTC	Normal	Reset
JP9	1-2	2-3

I/O Port IRQ Selection (JP18, JP19, JP20)

Both the parallel port and the serial ports must have their own IRQ's. Normally these settings can be left in their default settings and only when conflicts arise should these be changed. JP20 is used to select the parallel port's IRQ. JP19 is used to select the first serial port's IRQ and JP18 is used to select the second serial port's IRQ. Use the table below to select the IRQ's for these options.

Port	Jumper	1-2	2-3	Open
Parallel Port	JP20	IRQ7	IRQ5	Disable
Serial Port #1	JP19	IRQ4	IRQ5	Disable
Serial Port #2	JP18	IRQ3	IRQ9	Disable

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Clock Speed Selection (JP2, JP7, JP26)

JP2, JP7 and JP26 allows you to choose the appropriate CPU speed. Use the next three tables to help you with your selections.

Clock Frequency	JP7
50MHz	1-2
60MHz	3-4
66MHz	5-6

Clock Speed Selection

50MHz	60MHz	66MHz	JP2	JP26	Multiplier
75	90	100	1-2	1-2	1.5x
100	120	133	2-3	1-2	2.0x
150	180	200	1-2	2-3	3.0x
N/A	150	166	2-3	2-3	2.5x

DMA Configuration for EPP Parallel Port

Port	Jumper	1-2	3-4	5-6	7-8
EPP DMA	JP21	Disabled	DMA3	DMA5	DMA6
	JP22	Disabled	DMA3	DMA5	DMA6

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Display Selection (JP14)

Select the type of display setting through JP14. Jump pins 1-2 for a color display or jump pins 2-3 for a monochrome display.

Display	Mono	Color
JP14	1-2	2-3

Cache Size

Jumper, JP28, allows you to select the cache size desired.

Cache Size	256K	512K
JP28	1-2	2-3

IDE Drives Selection

The Hunter Industrial system board supports up to 4 drives:

- 2 IDE drives on the primary PCI IDE controller
- 2 IDE drives on the secondary PCI IDE controller

The IDE interfaces can be configured in the BIOs.

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Memory Configuration

The Hunter Industrial system board uses standard or EDO 70ns access speed or faster SIMM's. It is very important that you use high quality SIMM's. Undesirable operation of the system may result if poor quality SIMM's are used.

The Hunter Industrial system board uses standard 32 or 36-bit SIMM's. They are slightly larger than other 9-bit SIMMs that are commonly used on other system boards. They are configured into four, 8-bit (or 1 byte) sections. So a total of 32-bits (no parity) or 36-bit (with parity) are stored. This is often confusing because these SIMM's are commonly referred to as 256K by 32 or 36 or 1MB by 32 or 36. To determine the actual capacity of the SIMM, simply multiply the 256K, 512K or 1MB by 4. Thus, the actual SIMM's capacity is 1MB, 2MB and 4MB respectively.

Memory Modules

The Hunter Industrial system board has 4 memory module sockets. The order in which they should be populated is from the inside of the board, outward. Note that each socket is labeled SM1, SM2, SM3 and SM4.

When inserting the memory modules, note the notch on the edge of each module. This notch is designed to permit insertion in only one direction. This notch must be pointed towards the keyboard connector.

Start with the innermost socket (SM1). Gently place the module into the desired socket at a 30° to 45° angle. Then gently rotate or rock the module into an upright position. *Never force a memory module into it's socket.* If the module is hard to get in the socket, double check the notch and try gently rocking it into place. When the module has been properly installed, the metal latches on either side of the memory module will "click" into place. Repeat the last steps until all the memory modules have been installed. No jumpers are involved in DRAM configuration.

NOTE: At least two memory modules must be installed at a time.

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Power Control Cables

There is no formal convention for color coding the wires on the power supplies except for the ground wires which are black. When connecting the power supply cables to the system board, be sure the two black ground wires from each cable (P8 and P9) are aligned together side-by-side. Use the following table to determine the proper cable locations.

Cable	Color	Description
P8	Orange	Power
	Red	+5V
	Yellow	+12V
	Blue	-12V
	Black	Ground
	Black	Ground
P9	Black	Ground
	Black	Ground
	White	-5V
	Red	+5V
	Red	+5V
	Red	+5V

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Connectors

Connector	Description
J5	PS/2 Mouse
J6	Keyboard
J7	Auxiliary Keyboard
J9	Floppy
J10	Serial 2
J11	Serial 1
J12	Parallel Port
J15	Reset
J16	Speaker
J17	IDE LED
J18	Power LED/ Keyboard Lock
J19	CPU Fan
P1	AT Power
P2	Optional 3.3V Power
IDE1	PCI IDE
IDE2	PCI IDE

Speaker (J16)

Pin	Description
1	Speaker
2	Key
3	Ground
4	V_{CC}

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IDE LED (J17)

Pin	Description
1	Positive
2	Signal

Power LED/Keyboard Lock (J18)

Pin	Description
1	LED
2	Key
3	Ground
4	V_{CC}

CPU Fan (J19)

Pin	Description
1	Ground
2	+12V
3	Ground

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I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. There is a total of 1K port address space available. The following table lists the I/O port address used on the system board:

ADDRESS	DEVICE DESCRIPTION
000 - 01F	DMA Controller #1
020 - 03F	Interrupt Controller #1
040 - 05F	Timer
070 - 07F	Real Time Clock, NMI
080 - 09F	DMA Page Registers
0A0 - 0BF	Interrupt Controller #2
0C0 - 0DF	DMA Controller #2
0F8 - 0FF	Math Coprocessor
0F1 - 1FF	Hard Disk Controller
200 - 207	Game I/O
278 - 27F	Prototype Card
2F8 - 2FF	Serial Port #2 (COM2:)
300 - 31F	Parallel Printer Port
380 - 38F	SDLC Bi-Synchronous 2
3B0 - 3AF	Bi-Synchronous 1
3B0 - 3BF	Monochrome Display/Printer
3C0 - 3CF	(Reserved)
3D0 - 3DF	Color Graphics Display Adapter
3F0 - 3F7	Floppy Disk
3F8 - 3FF	Serial Port #1 (COM1:)

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DMA Interrupts

The Direct Memory Channel (DMA) is a channel used for transferring data from the host main memory to and from peripherals without direct involvement of the CPU resources.

Channel	Name	Function
NMI	NMI	Parity
0	IRQ0	System Timer Output 0
1	KYBIRQ	Keyboard Output Buffer Full
2	IRQ2	CNTRL2 Interrupt (IRQ8 - IRQ15)
3	IRQ3	Serial Port 2 (COM2:)
4	IRQ4	Serial Port 1 (COM1:)
5	IRQ5	Parallel Port 2
6	IRQ6	Floppy Disk Controller
7	IRQ7	Parallel Port 1
8	RTCIRQ8	Real Time Clock
9	IRQ9	Available
10	IRQ10	Available
11	IRQ11	Available
12	IRQ12	PS/2 Mouse
13	IRQ13	Math Co-Processor
14	IRQ14	Primary IDE
15	IRQ15	Secondary IDE

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Serial Ports (J10 and J11)

The serial port is a two channel port, one channel used for "In" transmissions and the other channel is used for "Out" transmissions. These connectors provide an AT-compatible serial port interface. These serial ports are high speed, 16550 compatible UARTS.

Pin	Description
1	-DCD
2	-DSR
3	RXD
4	-RTS
5	TXD
6	-CTS
7	-DTR
8	-RI
9	GND
10	No Connection

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Floppy Disk Drive Connector (J9)

Pin	Description
2	RMP/LC
4	No Connection
6	IDO
8	-INDEX
10	-MTRO
12	-DRV1
14	-DRV0
16	-MTR1
18	DIR
20	-STEP
22	-WDATA
24	-WGATE
26	-TRK0
28	-WPRT
29	ID0
30	-RDATA
32	HDSEL
33	ID1
34	DSKCHG
*	GND

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Parallel DB25 Connector

Pin	Description
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	ACK1
11	BUSY
12	PAPER EMPTY
13	SLCT
14	AUTOFEED
15	ERROR
16	INIT
17	SLCT IN
18 - 25	GROUND

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Parallel Port Connector (J17)

The parallel port is an 8-bit port usually used for connecting a printer.

Pin	Description
1	-STROBE
2	AUTOFEED
3	+DATA BIT 0
4	ERROR
5	+DATA BIT 1
6	INIT
7	+DATA BIT 2
8	SLCT IN
9	+DATA BIT 3
10	GND
11	+DATA BIT 4
12	GND
13	+DATA BIT 5

Pin	Description
14	GND
15	+DATA BIT 6
16	GND
17	+DATA BIT 7
18	GND
19	ACK
20	GND
21	BUSY
22	GND
23	PAPER EMPTY
24	GND
25	SLCT
26	N/C

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IDE Connector

Pin	Description
1	-RST
2	GND
3	D7
4	D8
5	D6
6	D9
7	D5
8	D10
9	D4
10	D11
11	D3
12	D12
13	D2
14	D13
15	D1
16	D14
17	D0
18	D15
19	GND
20	N/C

Pin	Description
21	N/C
22	GND
23	IOW
24	GND
25	IOR
26	GND
27	N/C
28	BALE
29	N/C
30	GND
31	IRQ14
32	IO16
33	SAI
34	N/C
35	SA0
36	SA2
37	CS0
38	CS1
39	HDIND
40	N/C

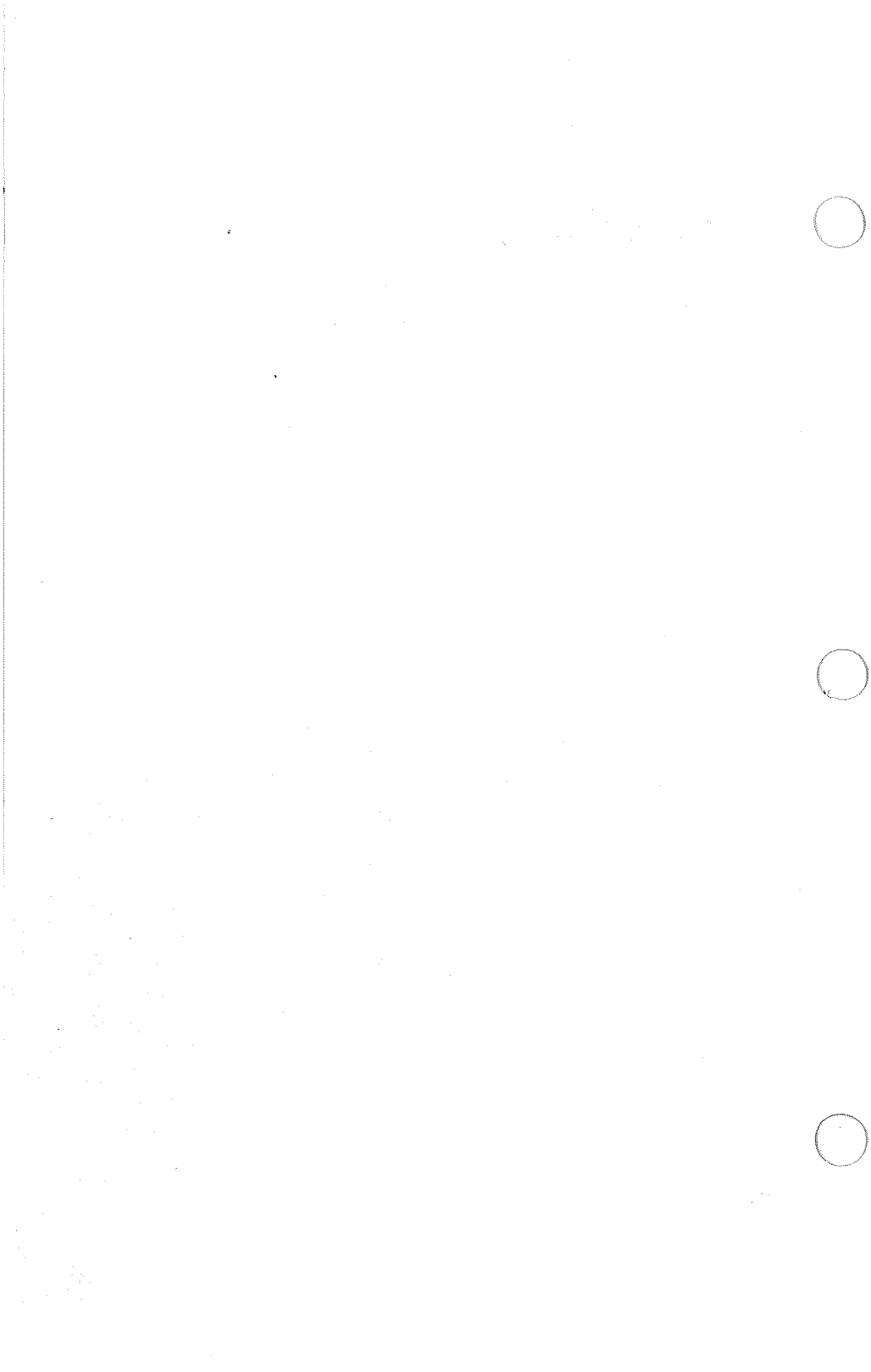
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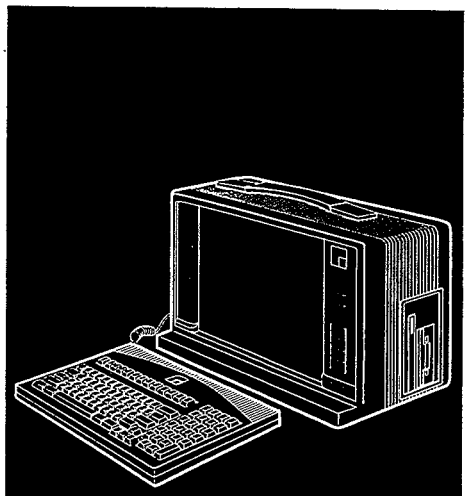
SYSTEM DESCRIPTION

* Insert Chapter 2, System Description, in this section. Between the tabbed inserts 2 and 3. Discard this page.

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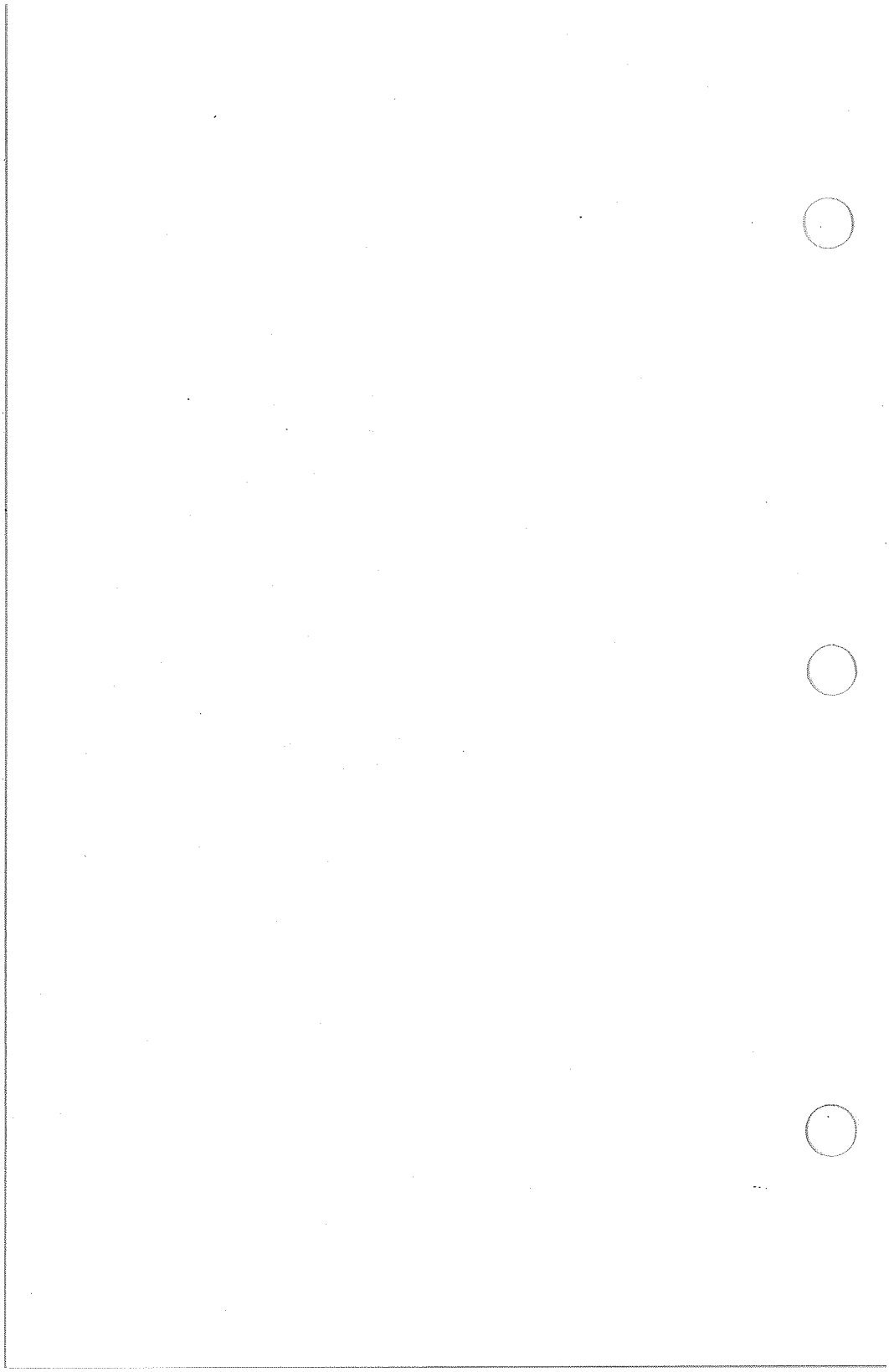
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3

CONFIGURATION

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CONFIGURATION

This chapter describes the different settings available in the system BIOS. Each Setup screen is described and the options contained in each setup screen are listed with a short explanation. The Hunter Industrial system board comes with a new feature called WINBIOS.

WINBIOS Setup

In ISA and EISA computers, the system parameters (such as the amount of memory, type of disk drives, video displays, and many other elements) are stored in CMOS RAM. Unlike the DRAM (Dynamic Random Access Memory) which is used for standard system memory, CMOS RAM requires very little power. When the computer is turned off, a back-up battery provides power to CMOS RAM, which retains the system parameters. Every time the computer is powered on, the computer is configured with the values stored in CMOS RAM by the system BIOS, which gains control when the computer is turned on.

The system parameters are configured by a system BIOS Setup Utility program. The BIOS Setup Utilities have always been character-based, requiring keyboard input, and have had user interfaces that were not very intuitive.

The Hunter Industrial system board features AMIBIOS with it's new type of system BIOS Setup utility. WINBIOS Setup has a graphical user interface that the end user can access using a mouse. The WINBIOS Setup code is so compact that it can reside on the same ROM as the system BIOS. The system configuration parameters are set by the WINBIOS Setup. Since WINBIOS Setup resides in the ROM BIOS, it is available each time the computer is turned on.

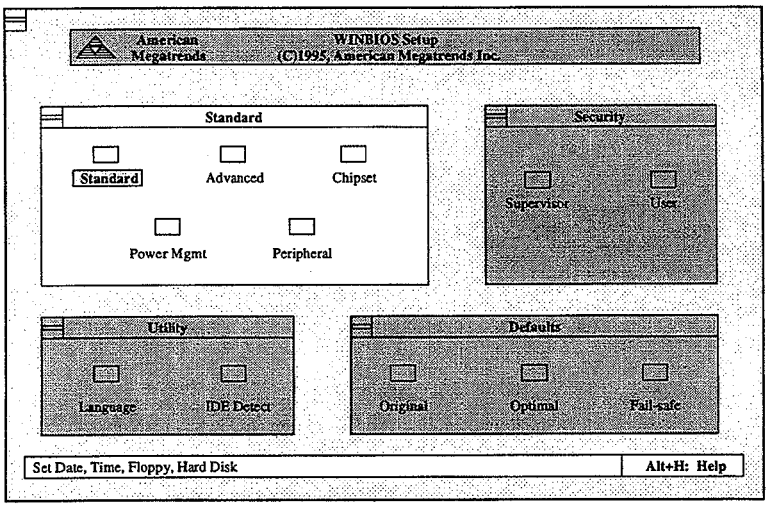
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Starting WINBIOS Setup

Power on the system and as POST executes, the screen will display:

Hit <Del> if you want to run Setup

Press <Del> to enter the WINBIOS Setup.



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Running the Setup

Point and Click Interface

The Setup uses the familiar point and click navigation technique. You can point with your mouse anywhere on the screen, click the left mouse button and the Setup control is transferred to the new location. The previous window is closed. All parameters that have been changed will automatically be saved, pending the selection on the exit screen.

WINBIOS has a built-in mouse driver and can be accessed by either a serial mouse or a PS/2 style mouse. WINBIOS Setup supports Microsoft compatible serial mice and all PS/2-type mice.

Using a Mouse with Setup

The WINBIOS Setup can be accessed via a keyboard, mouse or pen. The mouse click functions are:

- Single click to change or select both global and current fields
- Double-click to perform an operation in the selected field

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Using the Keyboard with WINBIOS Setup

WINBIOS has a built-in keyboard driver that uses simple keystroke combinations.

Keystroke	Function
<Tab>	Move to the next window or field.
→, ←, ↑, ↓	Move to the next field to the right, left, above, or below.
<Enter>	Select in the current field.
+	Increases a value.
-	Decreases a value.
<Esc>	Close the current operation and return to the previous level.
<PgUp>	Returns to the previous page.
<PgDn>	Advances to the next page.
<Home>	Returns to the beginning of the text.
<End>	Advances to the end of the text.
<Alt> <H>	Access a "Help" window
<Alt> <Spacebar>	Exit WINBIOS Setup.
Alphabetic Keys	A to Z are used in the Virtual Keyboard, and are not case-sensitive.
Numeric Keys	0 to 9 are used in the Virtual Keyboard and Numeric Keypad.

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WINBIOS Setup Menu

The Setup program is used to configure the computer's BIOS (Basic Input/ Output System). The computer's BIOS is responsible for configuring the system board and providing hardware information to the operating system. In order for the computer to work properly, run the Setup program after you first install the system board and whenever you make any hardware changes to the system.

The WINBIOS Setup main menu is organized into four sections. Each of these sections corresponds to the setup windows found in the main menu. Each window contains several icons. Clicking on each icon activates a specific AMIBIOS function. The WINBIOS Setup main windows and their related functions are described in the following table.

Window	Function
Setup	This section has five icons that permit you to set the system configurations: Standard Setup, Advanced Setup, Chipset Setup, Power Management Setup and Peripheral Setup.
Utilities Setup	This section has two icons that perform the system functions.
Security Setup	This section has three icons that control the WINBIOS Security features.
Default Setup	This setup has three icons that allows you to select a group of settings for all WINBIOS setup options.

NOTE: WINBIOS Setup can have up to six separate screens. Different types of system configuration parameters are set on each screen.

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The Standard Setup

The "Standard Setup" options are displayed by choosing the Standard icon from the WINBIOS Setup menu. All the options are listed and described in this section.

Date and Time

Select the "Date" and "Time" options to change the date and time. The current values for each category are displayed. Enter the new values through the displayed window.

Floppy Drive A: and B:

Select the floppy type option from the menu by using the up and down arrow keys.

Options
360KB, 5.25 inch
1.2MB, 5.25 inch
720KB, 3.5 inch
1.44MB, 3.5 inch
2.88MB, 3.5 inch

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Primary and Secondary Master/Slave

Select one of these options to configure the hard disk drive parameters. If you select "Auto" from the drive parameters screen, AMIBIOS will automatically configure the drive for you. The other options are Type, LBA/Large Mode, Block Mode, 32-bit Mode and PIO Mode. All the options relate to IDE drives except *"Type"*.

Configuring a MFM Drive

If configuring an old MFM hard disk drive, you must know the drive parameters (number of heads, number of cylinders, number of sectors, the starting precompensation cylinder and the drive capacity). Select the "Type" option and then choose the appropriate hard disk drive type (1-46). If the drive parameters of your MFM drive do not match any drive type listed, select *"User"* from the "Type" option and enter the drive parameters on the displayed screen.

User Defined Drive

If you are configuring a SCSI drive or a MFM, RLL ARLL or ESDI drive with parameters that don't match drive types 1-46, select "User" from the "Type" option. Then enter the drive parameters, one by one, on the displayed screen.

Parameters	Description
Cyl:	Number of cylinders
Hd:	Number of heads
WP:	Starting write precompensation cylinder
Sec:	Number of sectors
Size:	Drive capacity

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Configuring IDE Drives

If the hard disk drive to be configured is an IDE drive, select the appropriate option (Primary Master, Primary Slave, Secondary Master or the Secondary Slave). Choose the "IDE Detect" option so the drive parameters will be automatically selected.

AMIBIOS will automatically detect the IDE drive parameters (including ATAPI CD-ROM drives) and will display them. Click on the "OK" button to accept these parameters. The drive parameters can be set by hand if you are absolutely certain that you know the correct settings.

Option	Setting
LBA/Large Mode	Choose "On" to enable support for the IDE drives with capacities greater than 528MB.
Block Mode	Choose "On" to support the IDE drives that use the Block Mode.
32-Bit Mode	Choose "On" to support the IDE drives that permit 32-bit accesses.
PIO Mode	PIO programming also works with ATAPI CD-ROM drives. Choose "Auto" for AMIBIOS to automatically find the PIO mode that the IDE drive being configured uses. If you choose 0-5, you must be certain to you are selecting the right PIO mode supported by the IDE drive being configured.

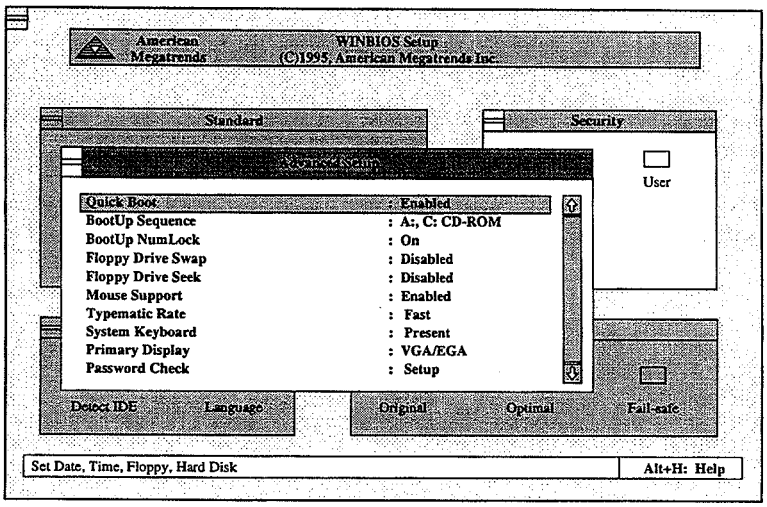
Configuring a CD-ROM

Select the appropriate drive option (Primary Master, Primary Slave, Secondary Master and Secondary Slave). Choose the "Type" option and select CD-ROM. You can boot the computer from a CD-ROM drive. If you select "Auto" AMIBIOS will automatically set the correct drive parameters.

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Advanced Setup

The "Advanced Setup" options are displayed by choosing the Advanced icon from the WINBIOS Setup main menu. The "Advanced Setup" options are described in this section along with the system defaults for each option.



Quick Boot

Set this option to "Enabled" to instruct AMIBIOS to boot quickly when the computer is powered on. This option replaces the old "Above 1MB Memory" option which used to be in the Advanced Setup category. The settings are enabled or disabled. The default is set at *Enabled*.

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BootUp Sequence

This option sets the sequence of drives the AMIBIOS attempts to boot from after the POST completes (either floppy drive A:, hard disk C:, or CD-ROM). The default is set at *A:, C:, CD-ROM.*

C, A	System will first search for the hard disk drive, then the floppy disk drive.
A, C	System will first search for the floppy disk drive, then the hard disk drive.
CD-ROM, C, A	System will first search for the CD-ROM drive, then the hard disk drive and the floppy disk drive last.
C, CD-ROM, A	System will first search for the hard disk drive, then the CD-ROM drive, and the floppy disk drive last.

BootUp NumLock

Set this option to "Off" to turn off the NumLock key when the system is powered on so you can use the arrow keys on both the numeric keypad and the keyboard. The settings are on and off. The default is set to *On.*

Floppy Drive Swap

Set this option to "Enabled" to permit drives A: and B: to be swapped. The settings are enabled or disabled. The default is set at *Disabled.*

Floppy Drive Seek

When this option is set to "Enabled," AMIBIOS performs a Seek command on floppy drive A: before booting the system. The settings are enabled and disabled. The default is set at *Disabled.*

Mouse Support

This option will enable AMIBIOS support for a PS/2-type mouse. The settings are enabled or disabled. The default is set at *Enabled.*

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Typematic Rate

This option sets the rate at which the characters on the screen repeat when a key is pressed and held down. The settings are fast or slow. The default is set at *Fast.*

System Keyboard

This option specifies if a keyboard is attached to the computer. The settings are absent and present. The default is set to *Present.*

Primary Display

This option configures the type of monitor attached to the computer. The settings are mono, CGA40, CGA80, VGA/EGA or absent. The default is set to *VGA/EGA.*

Password Check

This option enables password checking every time the system boots or when you run the WINBIOS Setup. If "Always" is selected, a user password prompt appears every time the computer is turned on. If the "Setup" option is selected, the password prompt appears only when WINBIOS is executed. The default is set to *Setup.*

OS/2 Compatible Mode

Set this option to "Enabled" if you are running an OS/2 operating system and are using more than 64MB of system memory on the system board. The settings are enabled and disabled. The default is set at *Disabled.*

Wait For <F1> If Error

AMIBIOS POST error messages are followed by: "Press <F1> to continue."

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Press <F1> to Continue

If this option is set to enabled, AMIBIOS waits for the user to press <F1> before continuing with the boot process. If this option is set to disabled, AMIBIOS does not wait for you to press <F1> after the error message. The settings are enabled and disabled. The default is set at *Enabled.*

Hit <Del> Message Display

To keep this message "Hit <Del> if you want to run Setup" from appearing every time you boot up your system, set this option to disabled. The default is set at *Enabled.*

Internal Cache

This option specifies the cache algorithm used for the L1 internal cache memory. The settings are disabled, write back or write thru. The default is set at *Write Back.*

External Cache

This option specifies the cache algorithm used for the L2 secondary (external) cache memory. The settings are disabled, write back or write thru. The default is set at *Write Back.*

System BIOS Cacheable

When this option is set to "Enabled," the contents of the F0000h system memory segment can be read from or written to L2 secondary cache memory. The contents of the F0000h memory segment are always copied from the BIOS ROM to the system RAM for faster execution. The settings are enabled and disabled. The default is set at *Enabled.*

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Shadow C000 - D800,16K

These options control the location of the contents of the 16KB of ROM beginning at the specified memory location. If no adapter ROM is using the named ROM area, this area is made available to the local bus. The settings are enabled, disabled or cached. The default settings are listed in the table below.

In the AMIBIOS for the Intel Triton chipset, the E000h page is used as ROM during POST, but shadowing is disabled and the ROM CS# signal is disabled to make the E000h page available on the local bus.

C000, 16K Shadow	Cached
C400, 16K Shadow	Cached
C800, 16K Shadow	Disabled
CC00, 16K Shadow	Disabled
D000, 16K Shadow	Disabled
D400, 16K Shadow	Disabled
D800, 16K Shadow	Disabled
DC00, 16K Shadow	Disabled

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Chipset Setup

To gain access to the system memory resources you must use the "Chipset Setup" menu. The chipset manages bus speeds, DRAM (Dynamic Random Access Memory) and external cache.

Memory Hole

Use this option to specify an area in memory that cannot be addressed on the ISA bus. The settings are disabled, 15MB - 16MB, or 512K - 640K. The default is set at *Disabled.*

DRAM Speed (ns)

This option specifies the RAS access time (in nanoseconds) of the SIMMs installed in the system board as system memory. The settings are 60 ns or 70 ns. The default is set at *70 ns.*

IRQ12/M Mouse Function

Set this option to "Enabled" to specify that IRQ12 will be used for the mouse. The settings are enabled and disabled. The default is set at *Enabled.*

8-Bit I/O Recovery Time (SYSCLK)

This option specifies the length of the delay (in SYSCLKs) that is inserted between consecutive 8-bit I/O operations. The settings are 1 - 8. The default is set at *1.*

ISA 16-Bit I/O Recovery

This option specifies the length of the delay (in SYSCLKs) that is inserted between consecutive 8-bit I/O operations. The settings are 1 - 8. The default is set at *2.*

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Power Management Setup

The Power Management Setup allows you to configure your system to save energy effectively while operating in a manner consistent with your own style of computer use.

Power Management/APM

To enable the power management and the APM (Advanced Power Management) features, set this option to "Enabled." AMIBIOS uses the RTC alarm function to wake the computer at a pre-specified time. The settings are enabled and disabled. The default is set at *Disabled.*

Instant-On Time-Out (Minute)

This option sets the standby feature. Standby is the length of system inactivity while the computer is in a full power state. When this length of time expires, the computer enters a low power consumption state, but the computer can return to full power instantly when any other system activity occurs. The time can be set from disabled up to 15 minutes. The default is set at *Disabled.*

Green PC Monitor Power State

This option specifies the power state that the green PC-compliant video monitor enters after the specified period of display inactivity has expired. The settings are off, stand-by and suspend. The default is set at *Standby.*

Video Power Down Mode

This option specifies the power management state that the video subsystem enters after the specified period of display inactivity has expired. The settings are standby, suspend or disabled. The default is set at *Disabled.*

Hard Disk Power Down Mode

This option specifies the power conserving state that the hard disk drive enters after the specified period of display inactivity has expired. The settings are disabled, stand-by or suspend. The default is set at *Disabled.*

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Hard Disk Time-Out (Minute)

This option specifies the period of hard disk drive inactivity. When this length of time expires, the computer enters the power-conserving mode specified in the "Hard Disk Power Down Mode" option described in the previous paragraph. The settings are disabled and 1 minute through 15 minutes, in 1 minute intervals. The default is set at *Disabled.*

Standby Time-Out (Minute)

This option specifies the length of system inactivity while the system is in a full power mode. When this length of time expires, the computer enters a standby power state (some power use is curtailed). The settings are disabled and 1 minute through 15 minutes, in 1 minute intervals. The default is set at *Disabled.*

Suspend Time-Out (Minute)

This option specifies the length of system inactivity while the computer is in a full power state. When this length of inactivity expires, the computer enters a suspend power state. The options are disabled and 1 minute through 15 minutes, in 1 minute intervals. The default is set at *Disabled.*

Slow Clock Ratio

This option specifies the speed at which the system clock runs while in the power saving mode. The settings are expressed as a ratio between the normal clock speed and the power down clock speed. The settings are 1:1, 1:2 (half as fast as normal), 1:4, 1:8, 1:16, 1:32, 1:64 or 1:128. The default setting is *1:8.*

Display Activity

This option specifies if AMIBIOS is to monitor activity on the display monitor for power conservation purposes. When this option is set to "Monitor" and there is no display activity for the length of time specified in the "Full-On to Standby Time-Out (Minute)" option, the computer enters a power saving mode. The settings are monitor and ignore. The default is set at *Ignore.*

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IRQ3 - IRQ15 Monitor

These options enable event monitoring. When the computer is in a power saving mode, activity on the named interrupt request line is monitored by AMIBIOS. When any activity occurs, the computer enters a Full-On mode. Each of these options can be set to monitor or ignore. The default settings for these options are listed in the following table.]

IRQ3	Monitor
IRQ4	Monitor
IRQ5	Ignore
IRQ7	Monitor
IRQ9	Ignore
IRQ10	Ignore
IRQ11	Ignore
IRQ12	Monitor
IRQ13	Ignore
IRQ14	Monitor
IRQ15	Monitor

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PCI/PnP Setup

This setup is used to configure the PCI bus system. The Personal Computer Interconnect (PCI) system allows I/O devices to operate at speeds almost the same as the CPU speed when the CPU is communicating with it's own special components.

Plug and Play Aware OS

Set this option to "Yes" if the operating system installed in the computer is Plug and Play aware. AMIBIOS only detects and enables PnP ISA add-in cards that are required for system boot. Windows 95 operating system detects and enables all other PnP-aware add-in cards. Windows 95 is PnP-aware. Set this option to "No" if the operating system (such as DOS, OS/2, Windows 3.x) does not use PnP. The settings are yes and no. The default is set at *No*.

NOTE: You must set this option correctly or the PnP-aware add-in cards installed in your system will not be configured properly.

PCI Burst Mode

Set this option to "Enabled" to enable the burst mode. The settings are disabled or enabled. The default is set at *Disabled.*

PCI Concurrency/Latency Timer (in PCI Clocks)

This option sets the latency of all the PCI devices on the PCI bus. The settings are in units equal to PCI Clocks. The settings are 32, 64, 96, 128, 160, 192, 224 or 248. The default is set at *64*.

PCI Streaming/VGA Palette Snoop

This option must be set to "Enabled" if any of the ISA add-in cards installed in the computer requires VGA palette snooping. The settings are enabled or disabled. The default is set at *Disabled.*

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PCI IDE Bus Master

Set this option to "Enabled" to specify that the IDE controller on the PCI local bus has bus mastering capabilities. The settings are disabled and enabled. The default is set at *Disabled.*

Off Board PCI IDE Card

This option specifies if an off board PCI IDE controller adapter card is being used in the computer. You must also specify which PCI expansion slot on the system board the controller card is installed in. When an off board PCI IDE controller is used, the on board IDE controller on the system board is automatically disabled. The settings are Erase, Auto, Slot1, Slot2, Slot3 or slot4. If "Auto" is selected, AMIBIOS automatically determines the correct setting for this option. The default is set at *Auto.*

In AMIBIOS for the Intel Triton chipset, this option forces IRQ14 and IRQ15 to a PCI slot on the PCI local bus. This is necessary to support non-compliant PCI IDE adapter cards.

Off Board PCI IDE Primary IRQ

This option specifies which PCI interrupt is used by the primary channel on the off board PCI IDE controller. The settings are disabled, INTA, INTB, INTC, INTD or hardwired. The default is set at *Disabled.*

Off Board PCI IDE Secondary IRQ

This option specifies which PCI interrupt is used by the secondary channel on the off board PCI IDE controller. The settings are disabled, INTA, INTB, INTC, INTD or hardwired. The default is set at *Disabled.*

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IRQ3, 4, 5, 7, 9, 10, 11, 12, 14, & 15

These options specify the bus that the named interrupt request lines (IRQs) are used on. These options allow you to specify which IRQ lines are to be used by legacy ISA adapter cards.

These options determine if AMIBIOS should remove an IRQ from the pool of available IRQs passed to BIOS configurable devices. The available IRQ pool is determined by reading the ESCD NVRAM (Flash BIOS ROM only). If more IRQs must be removed from the pool, the end user can use these PCI/PnP setup options to remove the IRQ by assigning the option to the ISA/EISA setting. On Board I/O is configurable by AMIBIOS. The IRQs used by on board I/O are configured as PCI/PnP. The settings are PCI/PnP or ISA/EISA. The default is set at *ISA/EISA* and IRQ14 and IRQ15 PCI/PnP.

Reserved Memory Size

This option specifies the size of the memory area reserved for legacy ISA adapter cards. The settings are disabled, 16K, 32K or 64K. The default is set at *Disabled.*

Reserved Memory Address

This option chooses the beginning address (in hex) of the reserved memory area. This specified ROM memory area is to be used by legacy ISA adapter cards. The settings are C0000, C4000, C8000, CC000, D0000, D4000, D8000 or DC000. The default is set at *C0000.*

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Peripheral Setup

This setup screen allows you to individually enable or modify the drives, I/O ports and other various settings.

On Board Floppy Drive Controller

This option enables the floppy drive controller on the system board. The settings are enabled, disabled or auto. The default is set at *Auto*.

On Board Serial Port 1

This option enables serial port 1on the system board and specifies the base I/O port address for serial port 1. The settings are auto, 3F8h 2F8, 3E8, 2E8 or disabled. The default is set at *Auto*.

On Board Serial Port 2

This option enables serial port 2 on the system board and specifies the base I/O port address for serial port 2. The settings are auto, 3F8h 2F8, 3E8, 2E8 or disabled. The default is set at *Auto*.

On Board Parallel Port

This option enables the parallel port on the system board and specifies the parallel port base I/O port address. The settings are auto, 378h, 278h, 3BC or disabled. The default is set at *Auto*.

Parallel Port Mode

This option specifies the parallel port mode. ECP and EPP are both bi-directional data transfer schemes that adhere to the IEEE P1284 specifications. The settings are normal, bi-directional, ECP or EEP. The default is set at *Normal*.

On Board PCI IDE

This option specifies the on board IDE controller channels that will be used. The settings are primary, secondary, both or disabled. The default is set at *Primary*.

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Security

AMIBIOS password support is located in this section. The screen has three selections from which to choose. The selections are Supervisor, User and Anti-Virus.

Both the "Supervisor" and the "User" icons configure the password support. If you use both of the choices, the "Supervisor" password must be set first.

The system can be configured so that all users must enter a password every time the system boots up or when the "WINBIOS Setup" is executed, using the "Supervisor" password and/or the "User" password.

Setting a Password

The "Supervisor" and "User" icons activate two different levels of password security.

WINBIOS Setup has an optional password feature. The system can be configured so that all users must enter a password every time the system boots up or when "WINBIOS Setup" is executed.

The password check option is enabled in "Advanced Setup" by selecting either "Always" or "Setup." If "Always" is selected, the password prompt appears every time the system is powered on. If "Setup" is selected, the password prompt appears only when WINBIOS is running. The password is encrypted and stored in CMOS RAM.

You will be prompted for a 1 - 6 character password. You can either type the password on the keyboard or select each letter of the password, one at a time, by using the mouse on the keyboard shown on the screen. The password you select does not appear on the screen when typed in. Make sure you write it down or pick an easy password you can always remember. If you forget your password, you must drain CMOS RAM and reconfigure the system.

Password Not Used

If you do not want to use a password just press <Enter> when the password prompt appears.

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Changing A Password

Select the "Supervisor" or "User" icon from the Security menu of the WINBIOS Setup main menu. Type in the password and press <Enter>. The screen does not display the characters you have entered. After the new password is entered, retype the new password, as prompted, and press <Enter>.

If the password confirmation is incorrect, an error message will appear. If the new password is entered without an error, press <Esc> to return to the WINBIOS main menu. The password is stored in CMOS RAM after WINBIOS completes. The next time the system boots up, a password prompt appears if the password function is enabled.

Remember the Password

Keep a record of the new password whenever you change it. If you forget the new password, you must erase the system configuration information in the CMOS memory. (Refer to JP9 on jumper settings - Chapter 2).

Deleting A Password

If you forget the passwords you set up through the WINBIOS Setup, the only way you can restart the computer is to erase the system configuration information where the passwords are stored. System configuration data is stored in the CMOS RAM, a type of memory that consumes very little power.

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Anti-Virus

When the Anti-Virus is selected from the "Security" option, AMIBIOS issues a warning when any program (or virus) issues a Disk Format command or attempts to write to the boot sector of the hard disk drive. The settings are enabled or disabled. If enabled is selected, the following message appears when a write is attempted to the boot sector.

Boot Sector Write!!!

Possible VIRUS: Continue (Y/N)?

NOTE: You may have to type "N" (for no) several times to prevent the boot sector write.

The following appears after any attempt to format any cylinder, head or sector of any hard disk drive via the BIOS INT 13 Hard Disk Drive Service.

Format!!!

Possible VIRUS: Continue (Y/N)?

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Defaults

Default Values

The icons in this window permit you to select a group of settings for all the Setup options. Not only can you use these icons to quickly set system configuration parameters, you can choose a group of settings that have a better chance of working when the system is having configuration-related problems.

Original

Choose the "Original" option to return to the system configuration values present in the "WINBIOS Setup" when you first began this WINBIOS Setup session.

Optimal

You can load the optimal default settings for the WINBIOS by selecting the "Optimal" option. The Optimal default settings are best-case values that should optimize system performance. If the CMOS RAM is corrupted, the Optimal settings are loaded automatically.

Fail-Safe

You can load the "Fail-Safe" WINBIOS Setup option settings by selecting the Fail-Save option from the "Default" section for the WINBOIS Setup main menu.

The Fail-Safe settings provide far from optimal system performance, but are the most stable settings. Use this option as a diagnostic aid if the system is behaving erratically.

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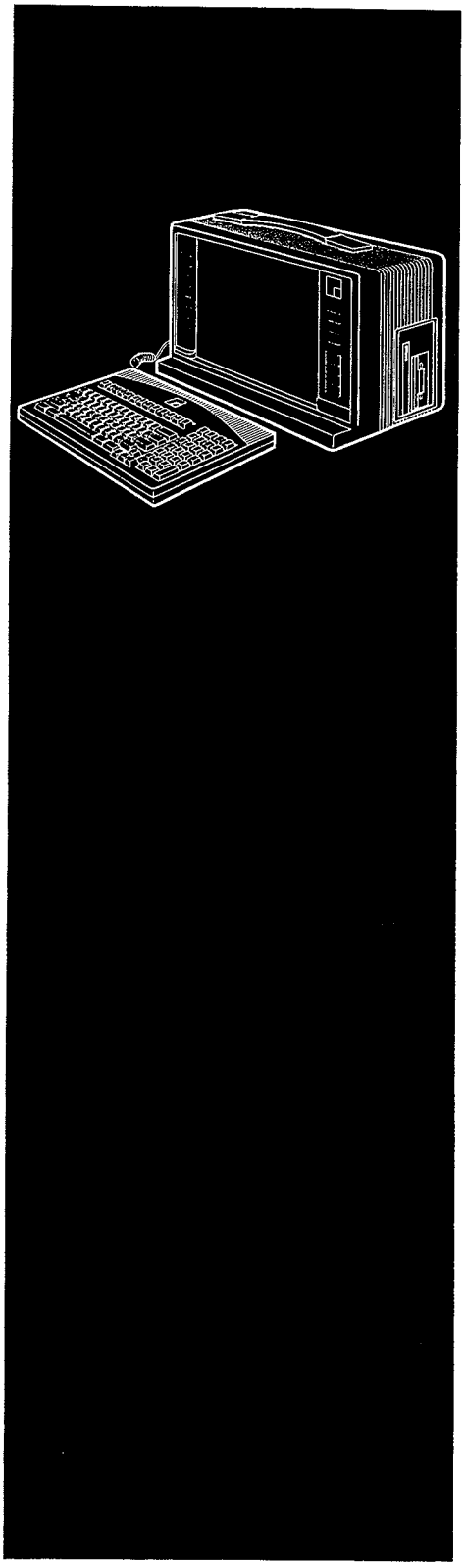
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CONFIGURATION

* Insert Chapter 3, Configuration, in this section. Between the tabbed inserts 3 and 4. Discard this page.

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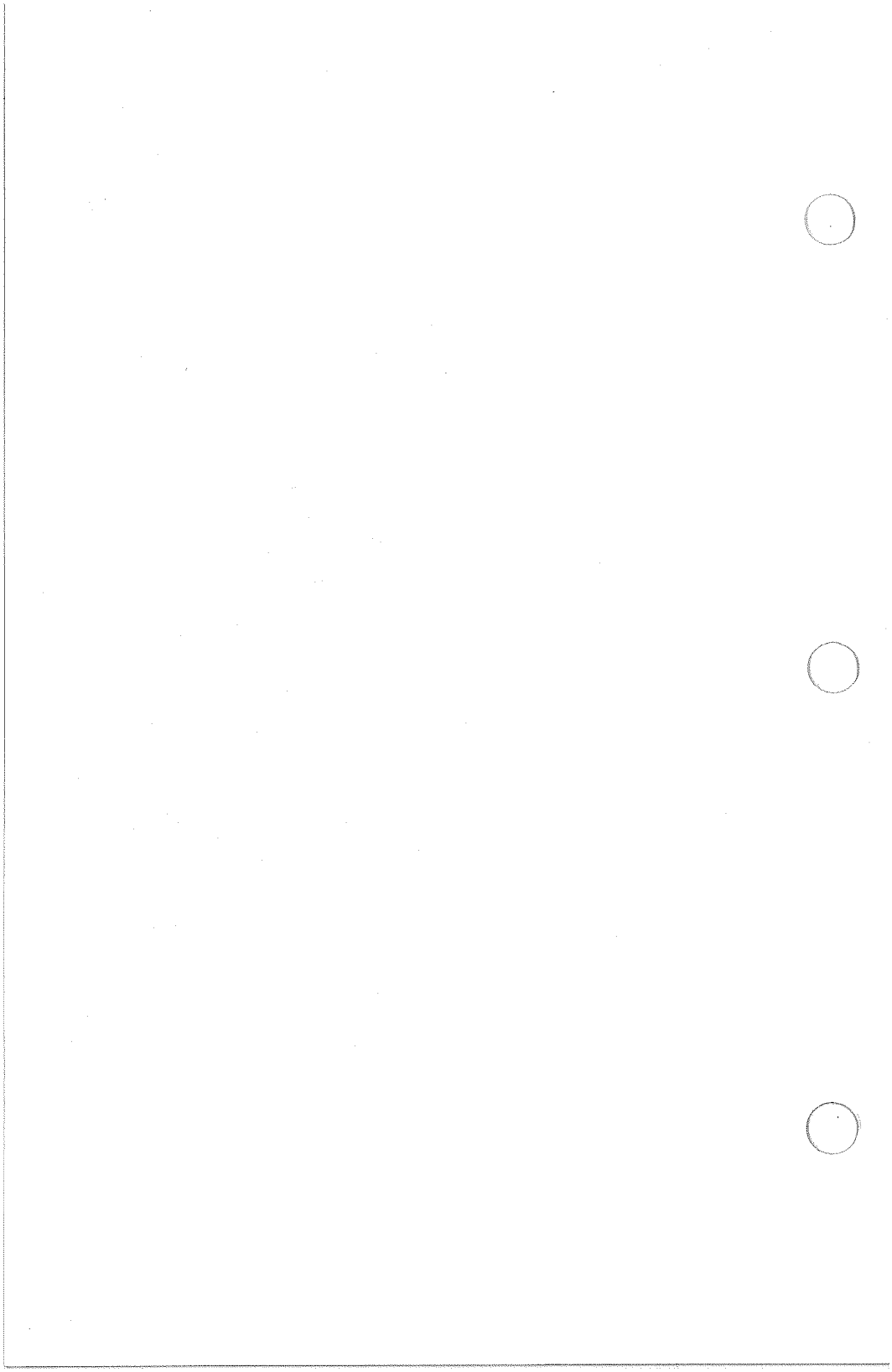
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4

DISPLAY & VIDEO

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DISPLAY AND VIDEO

This chapter contains the following sections:

- Flat-Panel Displays
- VGA Controller Card
- Display Driver Package

This chapter explains about the flat-panel display installed in your system, the VGA controller cards, and the display driver package which is included with your system.

The Flat-Panel Displays

Your PAC portable computer includes a fully VGA compatible Active Matrix Liquid Crystal Display (AMLCD) with a thin film transistor (TFT). Dolch uses only high performance, Active Matrix panels for it's displays. These displays include an associated VGA Controller Card. The flat panel display is also available in XGA and SXGA resolutions.

The AMLCD display provides high visual acuity, low emissions and non-susceptibility to emissions, as well as excellent contrast over a wide range of ambient lighting. AMLCD displays use less power than the vacuum-fluorescent, cathode-ray-tube (CRT) and plasma displays. The display has a cathode fluorescent backlight, giving bright but evenly distributed lightening across the entire screen area. The wide viewing angle of Dolch's AMLCD technology allows users to still see the screen up to 45° on either side of the perpendicular.

Color TFT (Active Matrix)

The VGA controller chipset increases the colors up to 16 million by use of a proprietary color generation algorithm, and combines pulse width modulation and dithering. The VGA chipset also stretches lower resolution software, such as 400-line text or 256 color images, to completely utilize the 480 lines on the portable computers display, allowing full screen images.

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Display Specifications

Video Input:	VGA	SVGA	XGA
Screen Size:	10.4"	12.1"	12.1"
Resolution:	640x480	800x600	1024x768
Response:	30 ms	30 ms	30 ms
Contrast Ratio:	100:1	100:1	100:1
Viewing Angle:	90°	90°	90°
Video RAM:	1MB	1MB	1MB

Connecting a CRT Monitor

This connector is like any standard, 15-pin high density, Sub-D, VGA connector. Simply attach your monitor's cable to this connector. No additional cables are required. The external monitor receptacle is located in the bottom of the expansion slot opening, on the left hand side of the PAC. (See Chapter 1, Figure 1.3 for the exact location).

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The Video Controller Card

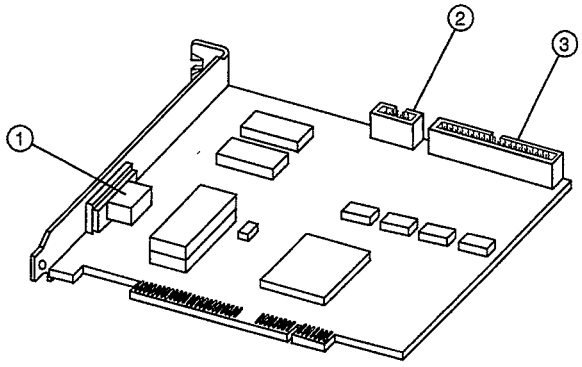
The VGA video controller card installed in the PAC is a high resolution card that provides concurrent viewing on an external monitor in MDA, CGA, EGA and VGA modes. A 15-pin analog RGB connector provides external output. These controller cards will interface with a wide variety of multi-frequency, color CRT monitors.

Features

The following are features of the VGA video controller card installed in your portable computer.

- Supports all display technologies with full text and graphics
- Supports simultaneous display on a CRT and an internal flat-panel display
- Supports up to 16 million colors using linear video drivers and 256 gray levels
- Provides advanced features, including the following:
  - Fast LCD controller
  - Programmable linear acceleration
  - Built-in VGA BIOS support
  - Vertical and horizontal compensation techniques
  - High speed bus
- Provides 1MB of DRAM (Dynamic Random Access Memory)
- Three outputs, including a 15-pin analog CRT connector
- Display Drivers extend the features of the chipset on flat-panels and external CRT monitors, including the following:
  - Resolutions up to 1024x768 in graphics mode with 256 colors
  - Resolutions up to 800x600 in graphics mode with 32K colors
  - Optimal compensation of 320x200 and 640x200 resolutions (graphics) and 40x25 (text) on 640x480 displays

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1. External VGA Connector (J5)
2. Flat-Panel Connector (JP4)
3. Panel Connector (JP3)

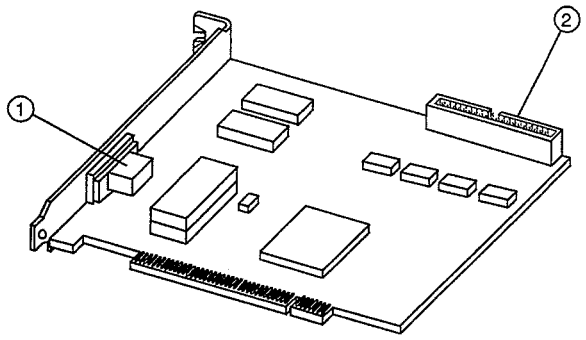
Figure 4.1 VGA Video Controller Card

The VGA video controller card supports VGA BIOS modes. It has non LVDS (low voltage differential signaling) standards.

VGA Connectors

- Panel Connector (JP3) - This 40-pin connector provides interface to the internal flat-panel display.
- Flat-Panel Connector (JP4) - This 10-pin connector also provides interface to the internal flat-panel display.
- External VGA Connector (J5) - This 15-pin connector provides interface to external CRTs.

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1. External SVGA Connector (J5)
2. Panel Connector (JP3)

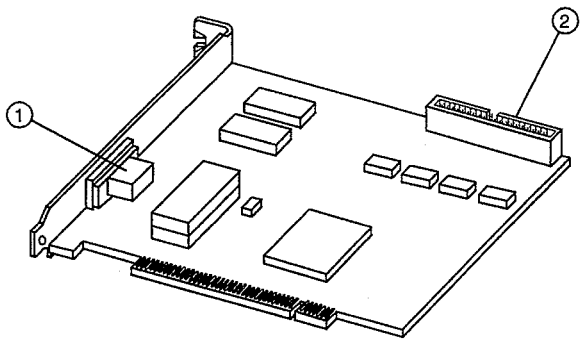
Figure 4.2 SVGA Video Controller Board

The SVGA video controller card supports only SVGA BIOS modes. It uses LVDS (low voltage differential signaling) standards.

SVGA Connectors

- Panel Connector (JP3) - This 40-pin connector provides interface to the internal flat-panel display.
- External SVGA Connector (J5) - This 15-pin connector provides interface to external CRTs.

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1. External XGA Connector (J5)
2. Panel Connector (JP3)

Figure 4.3 XGA Video Controller Board

The XGA video controller card supports only XGA BIOS modes. It uses LVDS (low voltage differential signaling) standards.

XGA Connectors

- Panel Connector (JP3) - This 40-pin connector provides interface to the internal flat-panel display.
- External XGA Connector (J5) - This 15-pin connector provides interface to external CRTs.

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Display Driver Package

The display driver package, included with the video controller card is manufactured by *Chips and Technologies*. Depending on the configuration, there should be two floppy diskettes included with your PAC. The diskettes are numbered appropriately. If these diskettes are not included in the display driver package, contact the computer dealer where you purchased the PAC, or contact the Technical Support department at Dolch Computer Systems, Inc. The toll free number is 1-800-995-7579.

The display driver package takes advantage of the extended features of the video controller chipset on the card. The extended features support the following resolutions:

- 1024 x 768 in graphics mode with 256 colors
- 800 x 600 in graphics mode with 32K colors

Software Support and Utilities

The display driver package supports many different software applications and their various versions. It also includes several utilities programs. To locate the supported applications and utilities programs, open the "Read-Me" file on the diskettes. You can inspect the file by bringing it into your word processor or editor, or by typing: "TYPE README.TXT | MORE" and pressing <Enter>.

Utilities Programs

The utilities programs listed below are provided on the diskettes in the display driver package.

- MODETEST - A diagnostic utility that sets and displays information for each video mode.
- SETVGA - Places the 655XX card in emulation mode for CGA, EGA or Hercules graphics modes.
- AUTOCOMP - Automatically adjusts resolutions of 320x200, 640x200 (graphics) and 40x25 (text) so that it is optimally displayed on a 640x480 display.
- CT, FP and SM - Settings which enables you to switch use of the display from a CRT only (CT), the flat-panel only (FP) or both (SM).

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Flat-Panel and CRT Modes

Some of the display drivers on the display driver diskettes may be used in CRT, flat-panel or simultaneous display modes. Other drivers may only be used in CRT mode because the driver resolution is too large for a flat-panel display. If a driver does not display properly on a flat-panel, switch to the CRT mode (if connected to a CRT).

The CT, FP and SM utilities are located on the display driver diskettes. Copy the files to the root directory (or subdirectory) where the other utilities are located.

- To turn "*Off*" the *flat-panel* and use an external *CRT only*, go to the directory that contains the driver utilities and type:

  "CT" and press <Enter>

- To turn "*Off*" the external *CRT* and use the *flat-panel only*, type:

  "FP" and press <Enter>

- To use the *flat-panel* and an external *CRT simultaneously*, type:

  "SM" and press <Enter>

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Installation Precautions

The following procedures explain how to install the display driver and the utilities. The procedures assume that you understand the elementary concepts of your operating system and personal computer. For novice users, learn how to:

- Copy files from a floppy diskette to a directory on the hard disk
- Format a flexible diskette
- Understand the directory structure

If you are uncertain about any of these concepts, please refer to the manual provided with your operating system for more information.

Make an extra copy of the display driver diskettes before installing the drivers. Use these for back up disks in case the original set gets lost or damaged. Store the original disks in a safe dry place.

Before getting started, verify the version of the application software for the installed drivers. Some of the application drivers are for different versions of software. The driver will not operate properly unless the correct version has been installed.

Any last minute changes to the drivers and utilities programs are documented in the "Read-Me" files in the respective directories. Check the "Read-Me" files for each of the drivers. You can inspect the file by bringing it into your word processor or editor, or by typing: "TYPE README.TXT | MORE" and pressing <Enter>.

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Installing the Application Drivers

This section provides the general installation procedures for the display driver diskettes. Refer to the documentation provided with your application program for more information.

1. The application program should already be loaded onto your system before installing the display driver diskettes. If needed, refer to the documentation manual provided with the your application program.

2. Insert *Display Driver Diskette #1* into drive A (or B). Type "A:" and press <Enter> to access the drive.

3. Type "Setup" and press <Enter>. This will run the display driver Setup program. The start up screen will appear.

4. Press any key to go to the application list.

5. Using the arrow up < ↑ > and arrow down < ↓ > keys, highlight the application to be installed and press <Enter>. A list of supported driver resolutions will be displayed.

6. Select the appropriate driver resolution for the flat-panel or CRT monitor.

NOTE: When installing the drivers for "Windows," press <Enter> to select "All Resolutions."

7. Press <Esc> or <End> to begin installing the application driver. When prompted, follow the instructions given on the screen.

8. When the installation is complete, press any key to go back to the "Application List" and continue installing the application drivers, as needed. To exit to DOS, press <Esc> and then "Y" for yes.

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Installing Drivers for SCO UNIX

For SCO ODT version 2.0 users, please ensure that the "SCO Updates and Advanced Features" is installed before proceeding. These procedures will modify your system kernel. Make certain that the System Administrator is present at all times during the installation. This procedure assumes an understanding of the UNIX operating system and it's command set. Please read all of the directions before proceeding. If the directions are not followed properly and a failure occurs or if you have any problems, contact a Technical Support representative at Dolch Computer Systems. The number is 1-800-995-7579.

System Preparation

Before you begin installing the video drivers, the system needs to be brought down to a "Single User Mode" or a "System Maintenance Mode". This can be done in a few different ways.

The first way is during the system start-up. If the system is not already turned on, do so now. As the system begins its bootstrap operation you will be given the option of giving the "root" password to enter system maintenance. Give the proper password and then move on to the next step.

An alternative method, if the system is already running, is to bring the system down to a "Single User Mode." First, save your file(s) and exit from all of your currently running programs. Next, switch to TTY1 and login as "root." Now you can safely enter "Single User Mode" by typing "init 1." (This will kill all current processes not on TTY1; any work not saved or closed will be stopped and possibly lost).

Files Extraction

Copy the files from the floppy disk to the hard disk drive by typing: "tar xvf6". This command will notify the system to copy the files located on the 3.5 inch floppy (drive A) onto the hard drive. If you are not using a 3.5 inch floppy or it is not the A drive, please refer to the SCO user's manual.

A compressed file named "chips.tar.Z" should appear on your HDD. Now, type "uncompress chips.tar.Z." Once the file has been uncompressed, you will need to create a file called "chips.tar." This has two files in it that are needed to modify your video selection; they are Xdriver.o and 655XX.XGI. To arrange the files in the proper order, type "tar -xvf chips.tar."

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Driver Installation

You are now ready to add the drivers to the kernel. To initiate a series of menus, type "mkdev graphics." From the Main menu select "UPDATE." This will automatically bring up a list of available video device drivers. Use the arrow keys to select "Chips 655x0" from the list. You will then be given a list of resolutions, using the arrow keys, select "VGA 640X480X256 LCD and CRT".

A list of monitors should appear. Select your monitor type.

If your monitor is not on the list provided, please select the option titled, "Other 14 inch." You will now be given two options on whether to use the "Default" terminals or to "Specify" a terminal. Select the "Default" option. You will be prompted to "Accept" the current configuration. If all of the choices are correct, use the arrow keys to select the "Accept" option and proceed to the next option.

You will be prompted to answer "Yes" or "No" to rebuild the kernel. Answer "Y" to this question. After the kernel rebuilds itself, you will be asked if you would like to re-link the kernel. Answer "Y" again, to re-link the kernel.

Once this is complete, you will return to the Main menu. Select "Quit" to exit the program. In order for the installation to be successfully completed, you must now restart or reboot the system.

Rebooting the System

The system can be shutdown by typing "init 0" or "shutdown -g0:0 -y." Once the system has been rebooted, you may start up normally. The SCO login should now be displayed in the 256 color mode. If there are any problems with the installation, please call the Dolch Technical Support staff.

There may be some problems with the linear video drivers if an ISA board has a system memory greater that 12MB. Some ISA system boards will not run with the linear video drivers because the linear video drivers reside at the memory location. Only system boards that can re-map the system memory address at locations 12MB to 16MB can be utilized with linear video drivers.

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Installing the Display Utilities

This section provides general installation procedures for the display driver utilities. The following sections provide specific information concerning these utilities.

1. Insert the *Display Driver Diskette #1* in drive A (or B). Type "A:" and press <Enter> to access the drive.
2. Type "Setup" and press <Enter>.
3. Press any key to go to the application list.
4. Using the arrow up key < ↑ > and the arrow down < ↓ > key, highlight the "Utility Programs" option and press <Enter>. A list of utilities will be displayed.
5. Using the arrow up key < ↑ > and the arrow down < ↓ > key, select the appropriate utility option and press <Enter>.
6. Press <End> to begin installing the utility.
7. When prompted, enter the drive and directory (e.g.: C:\BIN or C:\UTILS).
8. When the installation is complete, press any key to return to the application list and continue installing the utility drivers. When finished the utilities installation, exit to DOS, press <Esc> and then "Y" for yes.

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MODETEST Utility Program

The MODETEST utility is a diagnostic utility used to set and display information for each video mode. To use the MODETEST utility type: "MODETEST" and press <Enter>. This will cycle through each video mode and display the following information:

- Mode Number
- Resolution (in characters if text mode; in pixels if graphics mode) number of available colors
- Vertical Scanning Frequency
- Horizontal Scanning Frequency
- Dot Clock (pixel) Frequency

The MODETEST utility will also display a set of color bars and put a border of changing colors around the screen.

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SETVESA Utility Program

The SETVESA utility is used to set the page size and the number of pages for the VESA Super VGA modes. These modes can have either one or two active windows. The window size can be set to either 32KB, 64KB or 128KB. The VESA standard does not set these parameters in the BIOS extension definition. To use this utility:

1. Type "SETVESA [Page Size] [Number of Pages]" and press <Enter>.
2. Enter either 32, 64 or 128 page size.
3. Enter the number of pages [1 or 2]. If the number of pages is not entered, the system will default to 1 page. If no command line options are given, the SETVESA utility will display the current settings.
4. The following table provides valid combinations for the page size and number of pages.

Page Size	Number of Pages	
	1	2
32		✓
64	✓	✓
128	✓	

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SETVGA Utility Program

The SETVGA utility program is used to place the VGA controller card in emulation mode. The VGA controller can emulate (or imitate) the operation of other graphic controllers. The following graphics standards can be emulated.

- IBM Monochrome Adapter
- IBM Color Graphics Adapter (CGA)
- IBM Enhanced Graphics Adapter (EGA)
- Hercules Monochrome Graphics Adapter

The SETVGA utility is used to lock the VGA adapter in a specific emulation mode. Use the SETVGA utility for software specifically written for these standards and only if they cannot run in a regular VGA mode.

NOTE: Few programs require the use of SETVGA. Only use the SETVGA utility with older application programs. Before installing the SETVGA utility, determine the location of the stored program and locate the directory where the other utility programs are installed. The directory should be specified in the "*PATH=*" statement in the "*AUTOEXEC.BAT*" file.

To lock the VGA adapter in an emulation mode, indicate the emulation mode to the SETVGA program. To do this, place it after the name SETVGA on the command line by typing "SETVGA [Emulation Mode]" and press <Enter>.

The table on the following page lists the values for the Emulation Mode.

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Emulation Mode	Description
MDA	Enables and locks MDA Emulation
CGA	Enables and locks CGA Emulation
EGAC	Enables and locks EGA Color Emulation
EGAM	Enables and locks EGA Monochrome Emulation
HERC	Enables and locks Hercules Emulation
VGA	Enables and locks Hercules Emulation

AUTOCOMP Utility Program

The AUTOCOMP utility enables optimal compensation. It automatically adjusts 320x200, 640x200 (graphics) and 40x25 (text) resolutions for 640x480 displays. To use the AUTOCOMP utility, go to the utilities directory and type: "AUTOCOMP" or "AUTOCOMP ON" and press <Enter>. To turn off AUTOCOMP, type: "AUTOCOMP OFF" and press <Enter>.

NOTE: If the cursor is not at the top left of your display after turning AUTOCOMP on, you can switch to a graphical environment (such as Windows) and then exit the environment. When you go back to the DOS text mode, the cursor will be on the top left of your display.

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RGB Board

The RGB Board is a stand-alone unit which converts Red, Green and Blue analog video signals into digital signals required for driving a LCD panel. This eliminates the need for a special graphic controller with LCD interface found on certain plug-in video cards. By using the RGB option it will make the PAC display a direct replacement for an existing CRT display.

The RGB board supports various resolutions and is not restricted only to VESA timing standards. The board supports 640x480 as well as 800x600 panels. Standard VGA 15-pin connectors can be used to connect the output of the VGA card to the display.

RGB Option

This section applies only to the PAC units that come equipped with the RGB option. For proper display of your unit, adjustments must be made. The following sections will explain the adjustment of the control buttons and the options listed in the menu-driven program. Separate procedures are also listed for the text mode and the graphics mode.

Flat-Panel Display Adjustment Controls

The RGB board is equipped with four white buttons which are used to make the screen adjustments. The board is mounted inside of the PAC and to get to it, the rear cover must be removed. Once the rear cover is off, the RGB board is easy to get to. These buttons control a menu-driven program which allows you to make your adjustments by simply pressing the buttons in different sequences. Variations in the VGA output between the video card manufacturers requires that you make these adjustments accordingly. Before you proceed to adjust your display unit, read the descriptions on the following page about each option available in the menu-driven program. These options are listed in the order in which they appear when the menu-driven program is selected.

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Brightness:	This control adjusts the brightness of your screen. Adjust the brightness so the characters are easy to read and the image does not appear to be too dark or too bright, indicated by "washed out" highlights.
Contrast:	This control adjusts the contrast of your screen. The greater the contrast, the greater the difference between light and dark areas of your screen.
Horizontal Size:	This control adjusts the size of the image field on your screen in the horizontal direction. Adjust the image until there are no vertical bands of noise and the image is at its maximum size on the screen.
Horizontal Center:	This control adjusts the placement of the image field on your screen in the horizontal direction. Adjust the image so it is centered on the screen.

NOTE: Both Horizontal Center and Horizontal Size may need to be adjusted in conjunction with one another.

Vertical Center:	This control adjusts the placement of the image field on your screen in the vertical direction. Adjust the image until it is centered on the screen.
Focus:	This control adjusts the small amount of noise that may occur. Adjust this control until the noise is no longer present.
Text Focus:	This control adjusts the quality of the text on your screen. Adjust this control until all the characters are in focus and not blurry.

NOTE: Text Focus is not an option for adjustments in the graphics mode.

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How To Use the Display Adjustment Controls

Four buttons are provided on the RGB board to control the adjustments on the display. There are two RGB boards, RGB II and RGB III, used in the PAC. Each have the four buttons, but the buttons are labeled differently from one another on each board. The buttons on the RGB II board are labeled Menu, Select, Up and Down. The buttons on the RGB III board are labeled S1, S2, S3 and S4. The following instructions explain the procedure for the display adjustment controls.

NOTE: In the procedure listed below, the buttons for the RGB II board are listed first with the buttons for the RGB III board following in parenthesis.

1. Press the "Menu (S1)" button to bring up the menu overlay on the screen.
2. Press the "Up (S3)" and "Down (S4)" buttons to scroll through the menu options.
3. Press the "Select (S2)" button to choose the adjustment option you want to use. Then press the "Up (S3)" and "Down (S4)" buttons to make the adjustments.
4. Press the "Select (S2)" button, again, when you are satisfied with the adjustments you have just made. This will save the settings. To abandon the adjustments without saving them, press the "Menu (S1)" button before you press the "Select (S2)" button.

NOTE: Display adjustments must be made separately for the text and graphics modes. Follow the instructions on the next pages for complete step-by-step adjustments in the text mode and in the graphics mode.

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Text Mode (720x400, 640x400, etc.)

1. Enter a DOS program that displays a full screen in the text mode, such as DOS' EDIT.COM or HELP.COM. Entering DOS will allow you to view the whole screen before you end your display adjustments.

2. Press the "Menu (S1)" button to bring up the menu options on the screen. If the image is not centered on the screen in the horizontal direction, scroll your menu until you see "H Center" and press the "Select" button to select that option.

3. Use the "Up (S3)" and "Down (S4)" buttons to center the screen. The screen is properly centered when the extreme left edge of the image is on the far left column of the pixels. Centering can be quickly verified by moving the image left one space and then right one space to see the images begin to shift off of the active display area. Proceed to make the same adjustments for the "V Center" option.

4. If the full screen image appears to be larger or smaller than the active area of the display, then the "H Size" option needs to be selected. "H Size" is adjusted properly when the image just fills the screen in the horizontal direction and there are no vertical bands of noise. Adjust this option in conjunction with the "H Center" option.

5. If the images appear to be too dark or too bright, indicated by *"washed out"* highlights, select the "Brightness" option to correct it.

6. To control the differences between black and white on your screen select the "Contrast" option to adjust it until satisfied.

NOTE: Both brightness and contrast optimization is somewhat subjective and so they may need to be adjusted in conjunction with one another.

7. If the characters on the screen seem to be distorted, select the "Text Focus" option and adjust it until satisfied.

8. To adjust the small amount of noise that sometimes occurs, select the "Focus" option.

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When all the adjustments have been made and you are satisfied with the results, press the "Menu (S1)" button to exit the menu-driven program.

If after you exit the menu-driven program and then realize that you are not satisfied with the results of your adjustments, press the "Menu (S1)" button again to return to the menu overlay on your screen. Then follow any of the previous steps as necessary.

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Graphics Mode (640x480 only)

1. Enter MS-Windows or another graphical environment that displays a full screen in graphics mode. This will allow you to view the whole screen before you end your display adjustments.
2. Press the "Menu (S1)" button to bring up the menu options on your screen.
3. If the image is not centered on the screen in the horizontal direction, scroll your menu until you see "H Center" and press the "Select (S2)" button to select the option. Use the "Up (S3)" and "Down (S4)" buttons to center the image on the screen. The screen is properly centered when the extreme left edge of the image is on the far left column of the pixels. Centering can be quickly verified by moving the image left one space and then right one space to see the image begins to shift off of the active display area. Proceed to make the same adjustments for the "V Center" option.
4. If the full screen image appears to be larger or smaller than the active area of display, then the "H Size" is adjusted properly when the image just fills the screen in the horizontal and there are no vertical bands of noise. Adjust this option in conjunction with the "H Center" option.
5. If the images appear to be too dark or too bright, indicated by *"washed out"* highlights, select the "Brightness" option to correct it.
6. To control the differences between black and white on your screen, select the "Contrast" option and adjust it until satisfied with the result.

NOTE: Both brightness and contrast optimization is somewhat subjective and so they may need to be adjusted in conjunction with one another.

7. To adjust out the small amount of noise that sometimes occurs, select the "Focus" option.

When all the adjustments have been made and you are satisfied with the results, press the "Menu (S1)" button to exit the menu-driven program.

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Manual Reset Procedure for the Flat-Panel Display

If you plug in your PAC and the screen image is distorted or completely unrecognizable, you need to *first* check the following items:

1. Check the rear of the display to verify that the video cable is securely plugged into the Video Graphics Adapter (VGA) port, and that it is making the proper connection.

2. Confirm that the PAC is *outputting* the proper video signal.

For example: If you have a VGA flat-panel display, your PAC must *output* a VGA signal. The way to check if you have a VGA signal is to connect a CRT monitor, and to verify that the video driver is set to VGA resolution. A clear VGA image should appear on the CRT monitor screen.

NOTE: This procedure covers both the RGB II and the RGB III boards. Each board has a set of four white buttons located along the edge of the board. The buttons on the RGB II board are called out as Menu, Select, Up and Down. The buttons on the RGB III board are called out as S1, S2, S3 and S4. The rear cover must be removed to get to the boards since they are located inside the PAC.

■ If the screen image continues to be distorted and unrecognizable, then use the following procedure to reset the flat-panel display. The procedure is written using the called out buttons for the RGB II board. The buttons for the RGB III board follows in parenthesis.

CAUTION: Do not add or remove a component or its cable while the power is turned "On," you may cause damage to the unit or its components. You can also cause injury to yourself.

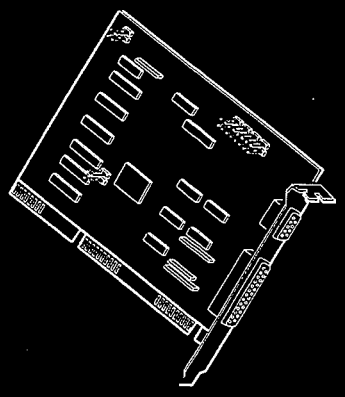
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Reset Procedure

1. Turn "Off" the power to the PAC.
2. Locate the display adjustment control buttons on the RGB II or RGB III board. Press both the "Menu (S1)" and "Select (S2)" buttons and hold them *both* down simultaneously.
3. Turn the power back "On" to the PAC while still continuously pressing down *both* the "Menu (S1)" and "Select (S2)" buttons for at least 10 seconds.
4. When you release both buttons, the monitor should now be reset. Adjustments to the monitor can now be made following the Display Adjustment procedure in this manual.

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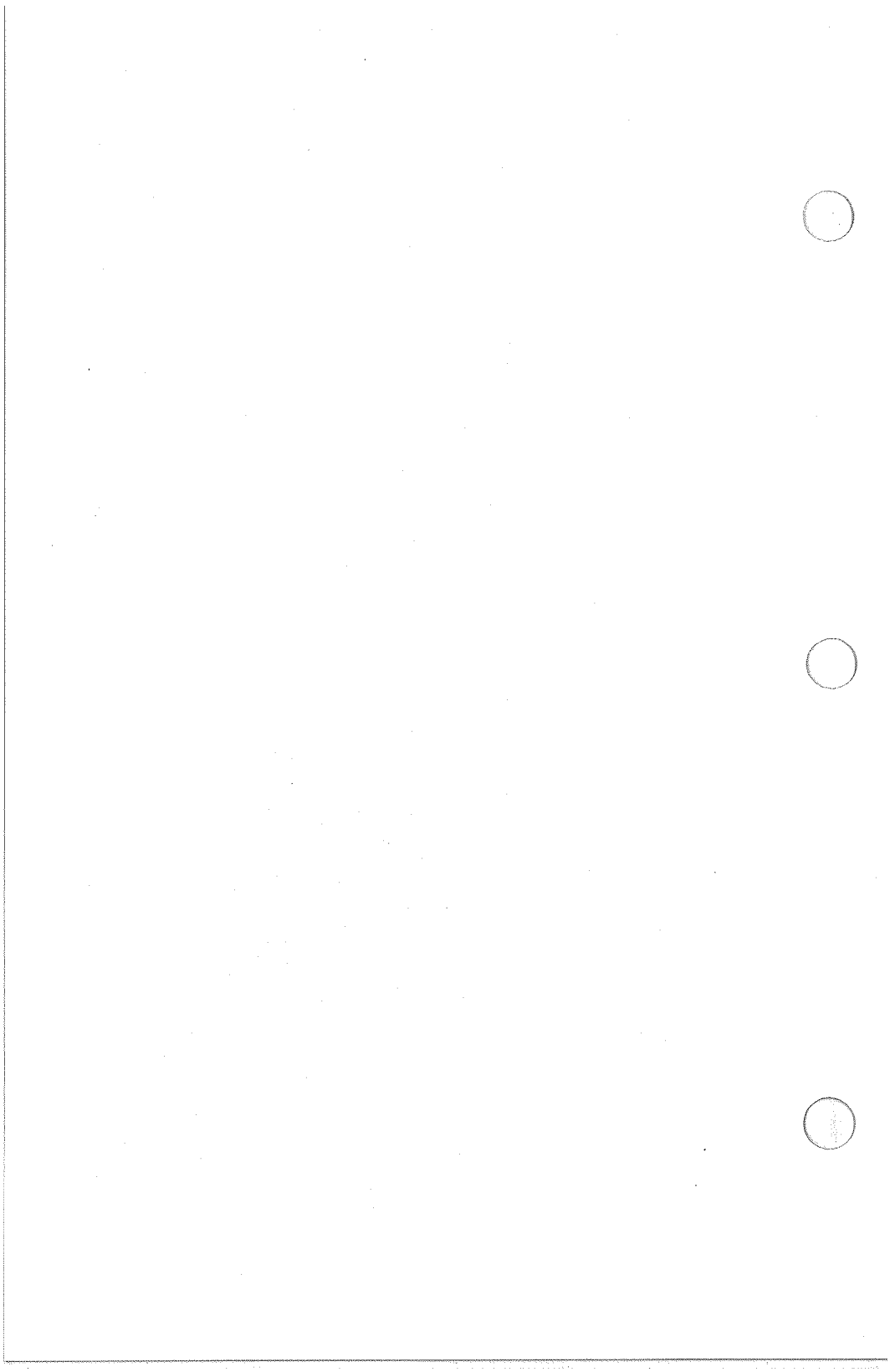
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5

EXPANDING THE PAC

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EXPANDING THE PAC

The PAC portable computer provides the expandability a desktop system in a convenient all-in-one package. The PAC has up to five open add-in slots and room for additional internal peripheral devices. The PAC can except up to 128MB of dynamic RAM memory for increased system performance.

This chapter covers the following sections:

- Opening Up the Unit
- Removal and Replacement of the Card Retention Plate
- Installation of Add-In Cards
- Installation of SIMM Modules
- Closing Up the PAC

Before You Begin

Be sure to read this section before you working and opening up the PAC. The PAC system contains components that may be damaged by electrostatic discharge. Listed below are some general precautions you should take to minimize electrostatic discharge.

- Always work in a static-free area.
- Before handling any assemblies, discharge your body by touching a grounded metal object.
- Handle all add-in cards by their edges. Do not touch the components unless absolutely necessary and avoid touching the gold edged connectors.
- Whenever possible, use electrostatic wrist straps when handling any sensitive components.

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Opening Up the Unit

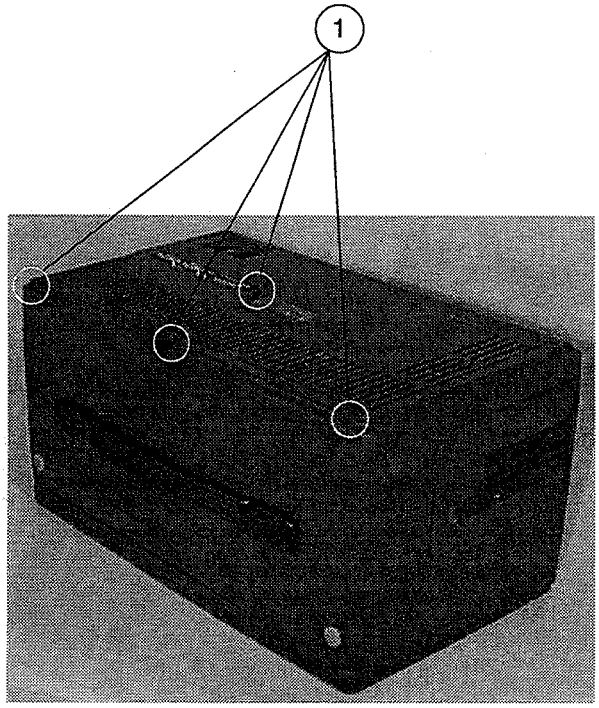
When installing components or items into the PAC, the rear cover and the card retention plate must be removed. This section provides precautions and procedures necessary for the removal and replacement of add-in cards and SIMM sockets.

WARNING: Do not attempt to disassemble the PAC unless you have technical knowledge or training in the field of electronics.

Removing the Rear Cover

1. Turn the power "Off" to the PAC. The power cord and any cables running into the PAC must be disconnected.
2. Always replace the keyboard back onto to the main unit when opening up the PAC. This will protect the keyboard and the screen from receiving any damage.
3. Place the unit face down on a flat sturdy surface. Turn the unit so the carrying handle is facing you. The rear cover will be facing up.
4. Using a phillips-head screwdriver, remove the four rear cover mounting screws on the back of the main unit. (See Figure 5.1)
5. Next, remove the two screws on the bottom of the PAC. (See Figure 5.2)
6. Gently lift the rear cover away from the main unit.

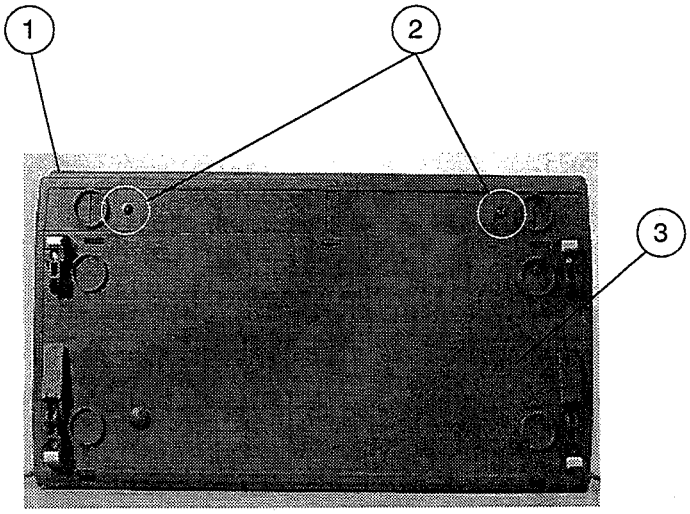
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1. Rear Cover Mounting Screws

Figure 5.1 The Four Mounting Screws on the Rear Cover

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1. Rear Cover
2. Bottom Side Mounting Screws
3. Main Unit

Figure 5.2 The Two Mounting Screws on the Bottom

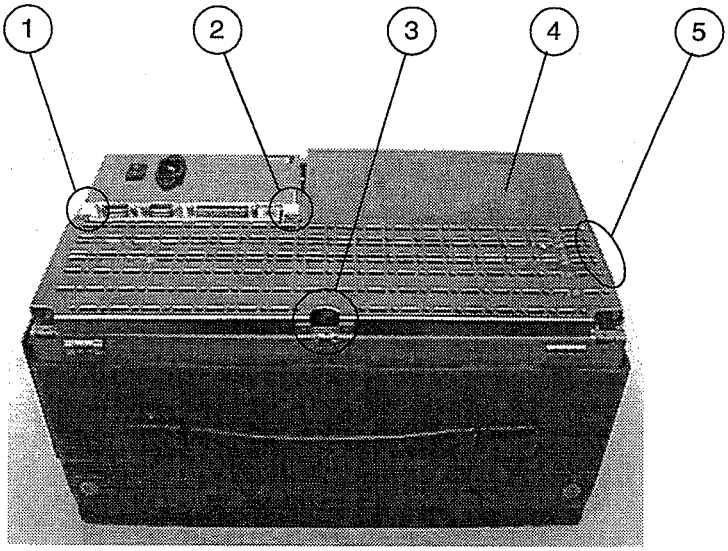
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Removing the Card Retention Plate

All PAC portables are shipped from the factory with the card retention system. This device holds each individual add-in card firmly in place. Any size card, XT or AT height and anywhere from half to full length, can be used with this system. For ease of adding or changing a card, the card retention bracket swings away with the removal of a single screw. The rear cover and the card retention plate must be removed first before the installation or removal of an add-in card. Use the following procedure to remove the card retention plate.

1. Turn the power "Off" to the PAC.
2. Remove the rear cover. (See "Removing the Rear Cover" on page 5.2)
3. Remove the end screw that secures the card retention plate to the I/O bracket. (See item 1, in Figure 5.3)
4. Remove the middle screw located on the side of the I/O bracket. (See item 2, in Figure 5.3)
5. Lift the card retention plate slightly towards the top of the PAC, (about ¼ of an inch) to disengage the side clip on the card retention plate from the PAC chassis. (See item 3, of Figure 5.3)
6. While lifting up the narrow end of the card retention plate, remove the wider end upwards and away from the hinge bracket on the PAC chassis. (See Figures 5.4 and 5.5)
7. To replace the card retention plate on the PAC chassis, push the card retention plate down towards the side of the unit where the hinge bracket is located.
8. Attach the card retention plate into the hinge bracket by guiding the two tabs of the hinge bracket through it's mating slots on the card retention plate.
9. While pushing downward on the card retention plate , position it until it engages with the side clip on side of the PAC chassis.
10. Replace both the middle screw and the end screw on the I/O bracket.
11. Replace the rear cover.

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1. End Screw
2. Middle Screw
3. Side Clip
4. Card Retention Plate
5. Hinge Bracket

Figure 5.3 The Card Retention Plate

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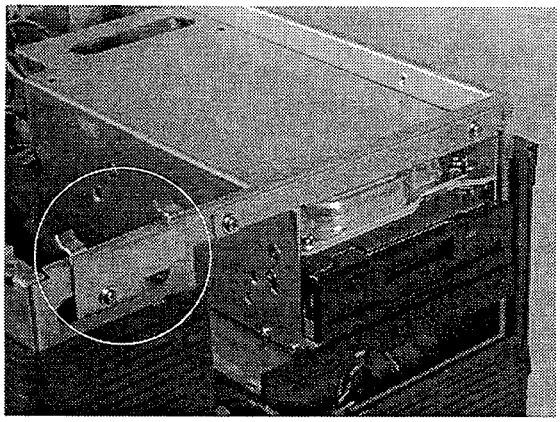


Figure 5.4 Hinge Bracket

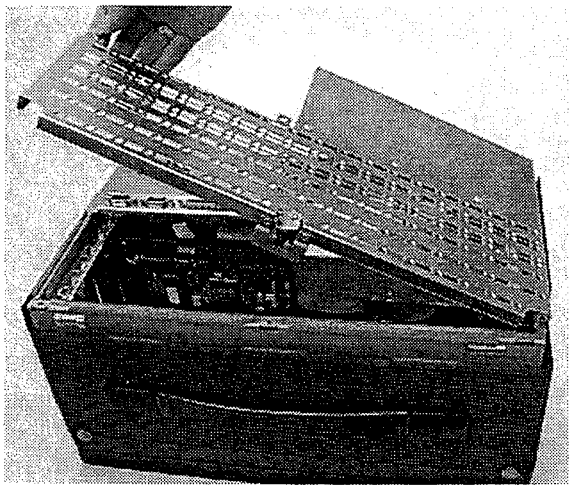


Figure 5.5 Lifting the Card Retention Plate

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Add-In Card Installation

Locate the add-in card sockets on the system board. Individual add-in cards and adapters are installed differently from the factory, depending on the system configuration. There will be a video controller card already installed. Refer to Chapter 2 for the position and location of the add-in card sockets.

NOTE: The following procedures are only general in nature. Refer to the documentation supplied with your add-in card for specific installation instructions.

1. Remove the add-in card bracket by unscrewing the M3 washer head screw with a phillips-head screwdriver. (See Figure 5.7) Put this screw in a safe place for later use.
2. Holding the add-in card at the center of the top edge, align the add-in card with the mating socket on the system board.
3. Gently push straight down, with equal pressure, at both ends of the add-in card.
4. Make sure the add-in card is fully seated in the socket.
5. Replace the M3 washer head screw into the add-in card bracket. This will secure the add-in card in place.

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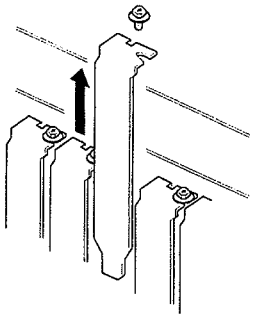


Figure 5.7 Removing an Add-In Card Bracket

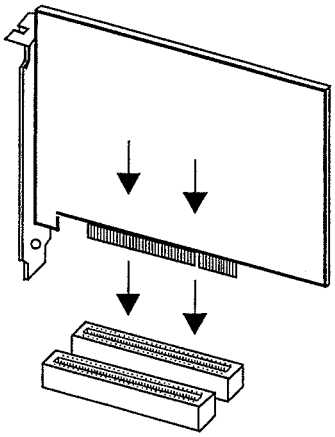


Figure 5.8 Inserting an Add-In Card

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Securing Add-In Cards

The Card Retention system is a key protection feature of the PAC. The following figure illustrates the different components of the card retention system. The card retainer assemblies can be positioned anywhere along the retention plate to assure a proper fit on the add-in cards.

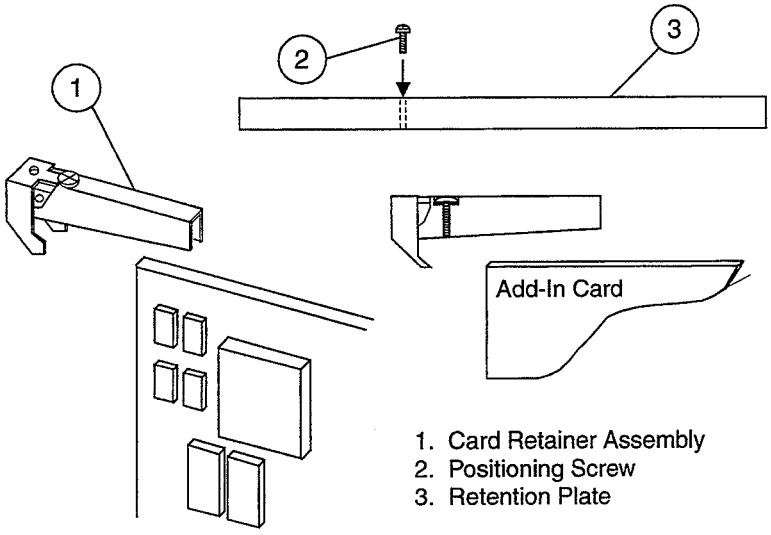


Figure 5.9 Card Retainer Components

Positioning the Card Retainers

1. Position the card retainer to line up with the corner edge of the add-in card. The edge of the card must fit properly into the plastic guide of the retainer. (See Figure 5.9)
2. Tighten down the positioning screw to secure the add-in card in place.
3. Install a card retainer to each and every add-in card being used.

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Adjusting the Card Retainers

The card retainers must be properly tightened for the add-in cards to fit securely in place. The positioning screws adjust the tightness of the fit for the add-in cards. Follow this basic procedure to obtain a proper fit.

1. Use the positioning screw on the card retainer to tighten or loosen the add-in card. You must use a phillips-head screwdriver with a shank less than .17 inches [4 mm] in diameter so that it can fit through the retaining slot on the card retention plate.
2. Turn the positioning screw counter-clockwise to tighten. The positioning screw pushes between the outside of the retention plate and against the add-in card for a secure fit. Be careful not to over-tighten the positioning screw.

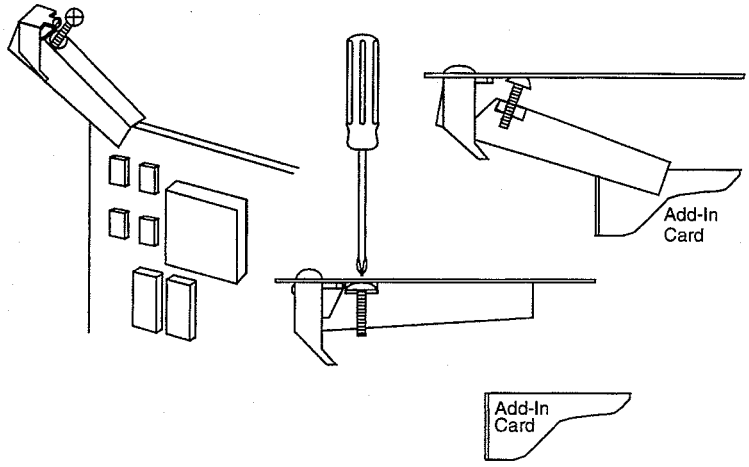


Figure 5.10 Positioning Screws and Card Retainers

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Installing SIMM Modules

To increase your memory size or RAM, extra SIMM modules can be installed. On all system boards the main memory (or RAM) is divided into several banks which are made up of memory modules or SIMMs. For more information on the system board and the SIMM socket arrangements, refer to Chapter 2.

NOTE: The following procedures are only general in nature. Refer to the documentation supplied with your SIMM modules for more specific installation instructions.

Before installing any SIMM modules, determine your memory configuration. You might have to replace some of the SIMM modules, depending on the total amount of memory you want. Locate the SIMM sockets on the system board. If necessary, remove any SIMM modules that you are going to replace.

1. Remove the modules by pulling the retaining brackets, on the socket, slightly away from the modules and then rotating the module until it is at a 90° angle. (See Figure 5.11)
2. Lift the module straight out of the socket. (See Figure 5.12)
3. Firmly push the new module into the socket at a 90° angle. Then, rotate the module at a 45° angle until the retaining brackets click into place. (See Figure 5.13)
4. Repeat steps 2 and 3 for each module you install.

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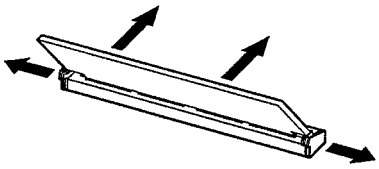


Figure 5.11 Retaining Bracket and Socket at a 90° Angle

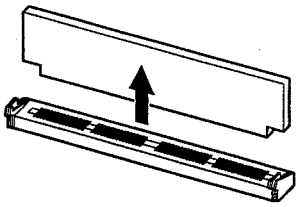


Figure 5.12 Removing a SIMM Module

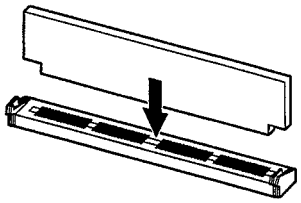
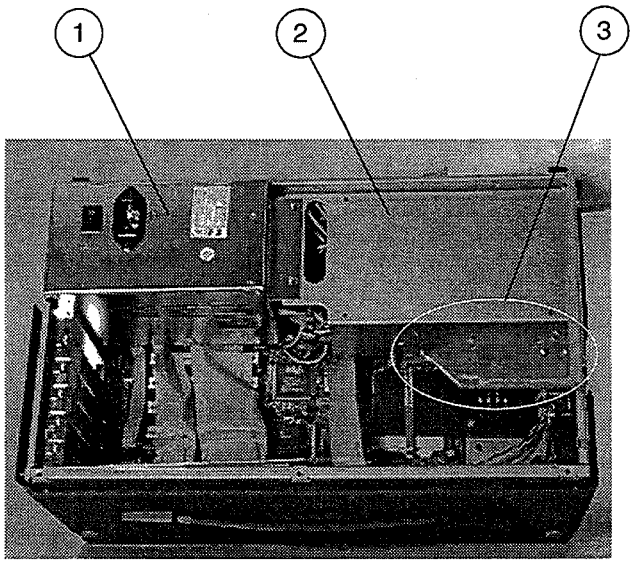


Figure 5.13 Installing a SIMM Module

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1. Power Supply Unit
2. Drive Bay
3. CD-ROM

Figure 5.14 Inside the PAC

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Closing Up the PAC

When you are ready to close up the PAC, make sure all the components or cards you might have added were correctly installed. Be careful not to pinch any wires or cables located inside of the unit when closing up the PAC, as it can cause a short and damage your unit. The following section describes how to close up the PAC.

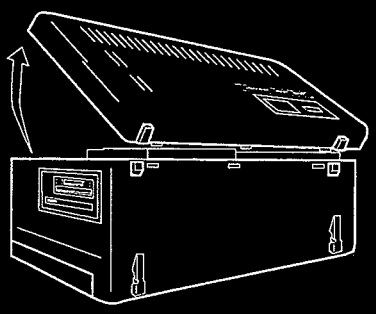
Replacing the Rear Cover

Use the following procedure to replace the rear cover:

1. Replace the rear cover on the main unit by inserting the panel hinges into the system case. Snap the rear cover shut.
2. Replace the four screws removed from the back of the unit and the two removed from the bottom of the unit. Be careful not to over-tighten the screws. (See Figures 5.1 and 5.2)
3. Replace any disconnected cables. Connect the power cord and plug into a grounded outlet or power source.
4. Turn the power "On" to the PAC and verify that there are no conflicts with any newly installed components.

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6

MAINTENANCE & TROUBLESHOOTING

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MAINTENANCE & TROUBLESHOOTING

This chapter covers some general maintenance procedures for handling and cleaning your PAC, provides basic troubleshooting for common problems and explains typical error messages reported by the BIOS. This chapter also provides procedures for clearing the CMOS data.

Handling the PAC and It's Components

The PAC portable computer is an extremely rugged system, requiring very little maintenance. But despite the ruggedness of the PAC, any piece of electrical equipment should be handled with care and used accordingly to it's specifications. Whenever working on or cleaning your PAC, make sure you place the system on a flat sturdy surface.

Connectors and Cables

- Always hold a cable by the connector when attaching it or removing it from a socket or a plug.
- Never force a connector into a socket or plug.
- Check the orientation of a connector before attaching it to the PAC.
- If the pieces do not join together easily, contact Dolch technical support.

Flat-Panel Display

- Use care when handling the flat-panel display. The flat-panel display is glass and can crack or break if the unit is dropped.
- Be careful not to scratch the display surface.
- Instead of turning off your display when not in use, try using a screen-saver program. Contact your local software dealer for information about screen saver programs.

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Power

- Turn the power "Off" to your PAC before installing or removing any parts or components.

CAUTION: If you add or remove any components or cables while the power to the PAC is "On," you may damage the system or it's components. You might also cause injury to yourself.

- Be extremely careful not to spill any liquids onto the computer, keyboard, display or any peripheral devices. If you do happen to spill liquid onto the PAC, immediately turn it "Off" and unplug it before attempting to deal with the situation.
- Always plug the power cord for the PAC into a three-pronged, grounded outlet.

WARNING: The grounding-type plug is a safety feature; do not defeat the purpose of this plug by disassembling the grounding plug. Use only a grounded outlet.

- Disconnect the power cable if it becomes frayed or damaged. Replace it with a new cable immediately.

The Keyboard

Be especially careful not to spill any liquid or food on the keyboard. If you accidentally spill liquid or food on it and it stops working, turn the power "Off" and unplug the keyboard. Let the keyboard dry for 24 hours at room temperature. If the keyboard still doesn't work, contact Dolch technical support.

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Cleaning the PAC and It's Components

Use the following procedure to clean the PAC.

CAUTION: Before cleaning the PAC make sure the power is turned "Off" and the power cord is disconnected, otherwise, you may damage the PAC or cause injury to yourself.

- Wipe dust and fingerprints off the outside casing using a cloth slightly moistened with water or a mild, ammonia-based cleaning solution.
- After cleaning the PAC, make sure the unit is completely dry before turning the system back on.

Cleaning the Flat-Panel Display

- Wipe the flat-panel display with an absorbent cotton cloth or other soft cloth. *Do Not* use any liquid cleaner on the screen.
- Use care when handling the flat-panel display. The flat-panel display is glass and can crack or break if the unit is dropped.
- Be careful not to scratch the glass on the flat-panel display. Keep all sharp objects away from the screen.

WARNING: Do not let any liquid come in contact with the TFT display, as it may cause discoloration or spots.

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Troubleshooting the PAC

In most cases, problems with personal computers are the result of improper hardware or software configurations, such as conflicting add-in cards or improper jumper settings.

When you troubleshoot your system, observe the way your equipment behaves and collect all the pertinent data on the failure (error messages, audible beeps, etc.) You then eliminate the causes of the problem, one by one.

This section focuses on some of the most common installation failures. If your system experiences a failure not described in this section, call a representative at Dolch's Technical Support department.

Typical Startup Sequence

When you turn on your system the PAC executes a predefined set of activities related to hardware initialization. This set of activities is known as a startup sequence. Your system must complete each step listed below before you can consider the system operational.

1. Your system receives power on the back of the system unit.
2. The system begins the POST test. This test verifies that the system memory, system board, video controller, floppy disk drive, hard disk drive and any other peripheral devices are all operational.
3. As the POST test executes, it displays system values (processor type and memory size) and settings on the screen. Be sure to verify that these values match your actual system configuration.

When a workstation experiences problems during startup, it either halts the sequence or generates an error message to indicate that a failure has occurred.

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Installation Problems

If your system does not power up correctly after the initial installation, the cause may be one or more of several minor problems. Problems that occur the first time you power up are usually installation errors or an incorrect CMOS hardware configuration.

If the system fails when you first start it, review the installation and configuration process and reread the applicable sections of this manual. Try to answer the following questions:

- Are all power cables connected correctly and all power switches turned on?
- Are all the interface cable connections secure and correct?
- Are the values listed in the BIOS Setup utility correct?

If the installation problem can not be solved by the previously mentioned measures try the steps below:

1. Turn "*off*" the system unit.
2. Disconnect any serial or parallel devices from the system unit.
3. Make sure the keyboard is correctly connected to the PAC.
4. Make sure the PAC is connected to a properly grounded power outlet.
5. Make sure there is no diskette in the floppy disk drive.
6. Remove any optional devices.
7. Turn "*on*" the system unit.
8. Observe the system's Startup sequence. The system should successfully complete each of the steps described in the previous section "Typical Startup Sequence." If the system does not complete each of the steps in the sequence, the component activated during that step may be faulty. Call Dolch Technical Support for help or advice if the startup sequence cannot be entirely executed.

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9. If the system issues any error messages during the startup sequence, take the appropriate corrective action described under "Error Messages" in this chapter.

10. If you isolate the problem to a specific device, refer to the user's manual which came with the device and try to fix the problem yourself.

11. If you are experiencing problems with a particular program, try re-running that program. If the problem keeps arising, see the software documentation for instructions on setting up the program parameters. You can also try running the BIOS Setup utility to disable the cache memory and BIOS shadowing. For more information on the BIOS Setup utility, see Chapter 3, Configuration, in this manual.

If your system passes all these steps and is now functioning properly, be sure to turn "Off" your system and reconnect any devices that you disconnected during your troubleshooting effort. If all these steps have been taken and the problem is still occurring, call Dolch Technical Support.

A few typical problems and their solutions are listed in the following table.

Problem	Solution
The system will not power on.	Check the power cable and make certain it is connected to an AC power source.
The system does not display the date and time correctly or at all.	Enter the BIOS Setup utility and correct the time and date settings.
A device is not recognized by the system.	Enter the BIOS Setup utility and enter the appropriate parameters for the drive.

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BIOS Beep Codes and Messages

Each time you turn on your system, the BIOS executes a Power On Self Test (POST). This series of tests verifies that the unit is able to perform basic functions related to the system board. It also does a system configuration verification where it compares the defined configuration with the actual hardware installed.

These tests make sure the system board and memory are functioning properly. If the BIOS detects any problems, they are communicated through error messages. Errors are reported in one of two ways:

- If the error occurs before the display device initializes, a series of beeps will sound. Beep codes indicate that a fatal error has occurred. A beep code is an error message consisting of speaker tones arranged in distinctive patterns.
- If the error occurs after the display device initializes, the error message is displayed as text. With some displayed error messages a prompt to press <F1> may appear.

Should your system issue any error messages or beep codes during POST testing, look up the error message(s) and beep codes listed on the next few pages to determine whether you should try to fix the problem yourself or contact Dolch Technical Support for assistance.

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Beep Codes

Errors may occur during the POST, which is performed every time the system is powered on. Fatal errors are communicated through a series of audible beeps. See the following table for the descriptions of the beep codes.

Beeps	Error Message	Description
1	Refresh Failure	The memory refresh circuity on the system board is faulty
2	Parity Error	Parity error in the first 64KB of memory
3	Base 64KB	Memory failure in the first 64KB
4	Timer Not	Memory failure in the first 64KB or Timer 1 on the system board is not functioning
5	Processor Error	The CPU on the system board has generated an error
6	8042 - Gate A20	Award BIOS cannot switch to protected mode
7	Processor Exception Interrupt Error	The CPU on the system board generated an exception interrupt
8	Display Memory Read/Write Error	The system video adapter is either missing or its memory is faulty
9	ROM Checksum Error	The ROM checksum value does not match the value encoded in Award BIOS
10	CMOS Shutdown Register Read/Write Error	The shutdown register for CMOS RAM failed

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Beep Code Solutions

Listed below are some common solutions to the system's beep code errors. If these errors should occur and the solutions still don't correct the problem, contact Dolch Technical Support.

Beep Codes	Solution
1,2, or 3 times	Reposition the memory SIMMs. If the system still beeps, replace the memory.
6 times	Reposition the keyboard controller chip. If it still beeps, replace the keyboard controller. If it still beeps, try a different keyboard, or replace the keyboard fuse, if the keyboard has one.
8 times	Memory error on the video adapter. Replace the video adapter or the RAM on the video adapter.
9 times	The BIOS ROM chip is bad. The system probably needs a new BIOS ROM chip.
11 times	Reset the cache memory on the system board. If it still beeps, replace the cache memory.
4, 5, 7, or 10 times	The system board must be replaced.

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Displayed Error Messages

If the POST initializes the system video monitor, errors will be displayed on the screen. These error messages usually allow the system to continue. Error messages are displayed as follows:

ERROR Message Line 1
ERROR Message Line 2
Press <F1> to RESUME

Each error message is accompanied by an explanation or a solution. Aside from possible conflicts within the BIOS Setup utility, some messages may be associated with configuration errors.

NOTE: For those error messages without solutions, you will need to contact Dolch Technical Support for further assistance.

- **8042 Gate-A20 Error** - This message indicates that Gate A20 on the keyboard controller (8042) is not working. Replace the 8042.
- **Address Line Short!** - This message indicates an error in the address decoding circuitry on the system board.
- **C: Drive Error** - This message indicates that there is no response from drive C. Run the Hard Disk utility. Check the "C: Hard Disk Type" option in the Main Setup menu.
- **C: Drive Failure** - This indicates that there is no response from drive C. It may be necessary to replaces the hard disk drive. Call Dolch Technical Support.
- **Cache Memory Bad, Do Not Enable Cache!** - This indicates that the cache memory on the system board is defective. Call Dolch Technical Support.
- **CH-2 Timer Error** - Most AT system boards include two timers. This message indicates that an error has occurred with timer #2.

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- **CMOS Battery State Low** - The CMOS RAM is powered by a battery. This message indicates that the battery power is low and it should be replaced.

- **CMOS Checksum Failure** - After the CMOS RAM values are saved, a checksum value is generated for error checking. This message appears if the previous value is different than the current value. Run the BIOS Setup utility.

- **CMOS System Options Not Set** - This message indicates that the values stored in the CMOS RAM are either corrupted or non-existent. Run the BIOS Setup utility.

- **CMOS Display Type Mismatch** - This message indicates that the values stored in the CMOS RAM do not match the type detected by the BIOS. Run the BIOS Setup utility and check the default value.

- **CMOS Memory Size Mismatch** - This message indicates that the amount of memory on the system board is different than the amount in the CMOS RAM. Run the BIOS Setup utility.

- **CMOS Time and Date Not Set** - Run the Main Setup menu to set the time and date.

- **D: Drive Error** - This message indicates that there is no response from drive D. Run the Hard Disk utility. Check the "D: Hard Disk Type" option in the Main Setup menu.

- **D: Drive Failure** - This message indicates that there is no response from drive D. It may be necessary to replace the hard disk drive.

- **Diskette Boot Failure** - The boot diskette in the floppy drive A: cannot be used to boot the system. Use another boot diskette and follow the instructions on the screen.

- **Display Switch Not Properly Set** - Some systems require a video switch on the system board to be set. Turn the system off, set the switch properly, then power up the system.

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- **DMA Error** - This message indicates that there is an error in the DMA (Direct Memory Access) controller on the system board.
- **DMA #1 Error** - This message indicates that there is an error in the first DMA channel on the system board.
- **DMA #2 Error** - This message indicates that there is an error in the second DMA channel on the system board.
- **FDD Controller Failure** - This message indicates that the BIOS can not communicate with the floppy disk controller. Check all appropriate connections after the system is powered down.
- **Keyboard Error** - This message indicates that there is a timing problem with the keyboard. Make sure the keyboard controller "AMI BIOS" is installed. Set the "Keyboard" option in the CMOS Setup to "Not Installed." This option will skip the keyboard POST routines.
- **KB/Interface Error** - This message indicates that there is an error in the keyboard connector on the system board.
- **HDD Controller Failure** - This message indicates that the BIOS can not communicate with the hard disk controller. If you have a SCSI disk, make sure that the IDE hard disk controller is disabled using the BIOS Setup program, and that the SCSI controller card is installed and configured properly. Then check all appropriate connections after the system is powered down.
- **INTR #1 Error** - This message indicates that interrupt channel #1 has failed POST.
- **INTR #2 Error** - This message indicates that interrupt channel #2 has failed POST.
- **Invalid Boot Diskette** - This message indicates that the BIOS can read the diskette in the floppy drive A, but it can not boot the system with it. Use another boot diskette and follow the instructions on the screen.

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- **No ROM BASIC** - This error occurs when a proper bootable sector cannot be found on either the floppy drive or the hard disk drive. The BIOS then tries to run ROM Basic. If it is not found, this error appears. If you are using your PAC for the first time, it is most likely that you need to format your hard drive.

- **Off Board Parity Error** - This message indicates that the BIOS has encountered a parity error with the off board memory installed in an I/O bus slot. The format is:

  Off Board PARITY ERROR ADDR (HEX)=(XXXX)
  "XXXX" is the hex address where the error occurred.

- **On Board Parity Error** - This message indicates that the BIOS has encountered a parity error with the on board system memory. The format is:

  On Board PARITY ERROR ADDR (HEX) = (XXXX)
  "XXXX" is the hex address where the error occurred.

- **Parity Error????** - A parity error in the system memory, at an unknown address, was encountered.

NMI Messages

Memory Parity Error at XXXXX	The memory failed. If the memory location can be determined, it is displayed as XXXXX. If not, the message is "Memory Parity Error ????"
I/O Card Parity Error at XXXXX	An adapter card failed. If the address can be determined, it is displayed as XXXXX.
DMA Bus Time-Out	A device other than the CPU has driven the bus signal for more than 7.8 seconds.

NOTE: The Award BIOS displays a screen when the POST routines are successfully completed.

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Troubleshooting Guide

If no errors are reported by the BIOS, but the system still fails to operate properly, use the following guide to troubleshoot your system. The information is provided as typical symptoms and possible solutions.

We recommend removing all of the add-in cards from your system (except the video controller card) during the initial troubleshooting procedures. You may then re-install the cards one at a time and repeat the troubleshooting procedures to isolate the problem to a particular card.

See Chapter 1 for useful information when installing and removing the add-in cards.

System Fails to Power Up

If the system fails to power up and the power LED indicator does not illuminate, check the following items:

- Is the power cord properly plugged into the power receptacle on the back of the PAC? Is the other end of the power cord plugged into a grounded power source?
- Is the PAC plugged into a switched, multiple outlet box, is the switch on the outlet box turned on?
- Is the PAC's power switch turned on?
- Is the AC outlet working? Plug a different electrical device into the outlet to make sure it's in working order.
- Are the jumpers set correctly? See Chapter 3, Configuration for the correct jumper settings.
  - CPU Jumper
  - Cache Size Jumper
  - VESA Local Bus Jumper
  - Single or Double CPU Jumper
  - CPU Supply Voltage Jumper

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System Fails to Boot From the Hard Drive

If the system fails to boot from the hard drive, check the following items.

- Has the hard drive been formatted? If the message "No ROM Basic" appears you will probably need to format your hard drive.
- Is the hard drive type number configured properly in the BIOS Setup program?
- If you have an IDE hard drive, is the IDE controller enabled through the BIOS Setup program?
- If you have a SCSI hard drive, is the IDE controller disabled through the BIOS Setup program?
- Can you boot the system from the floppy drive? Insert a bootable diskette in the floppy drive to see.
- If you booted your system from a floppy, the hard drive may have corrupted or invalid boot information.
- If the system fails to boot from the floppy drive, is the floppy drive type configured properly in the BIOS Setup program? Does the bootable diskette contain valid boot information? Try using it on another known working system.
- Is the keyboard connector firmly attached to the system?
- Is the video controller card properly installed and seated?
- Have you installed additional DRAM in the system? Is it properly installed and seated in the SIMM sockets? Does the installed memory exceed the maximum permitted access time for the microprocessor speed?

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On Board Memory is Not Accessible

If the on board memory is not accessible, check the following items.

- When you turn on the system, does the memory size displayed during the Power On Self Test (POST) equal the amount of memory installed?

NOTE: The number displayed during the POST does not include any expanded memory.

- If the amounts are equal, is the memory properly configured and are the SIMMs properly seated in the their sockets?
- Does the installed memory exceed the maximum permitted access time for the microprocessor speed?
- Is the installed memory the proper type?

Add-In Card Fails to Work Properly

If an add-in card fails to work properly after installation, check the following items:

- Is the add-in card properly installed and seated?
- Are the jumpers on the card properly configured? Refer to the manufacturer's documentation.
- Does the add-in card conflict with memory interrupts or I/O addresses of any other add-in cards?
- Most conflicts can be isolated by removing the add-in cards one at a time. Turn the power "Off" before removing the card and then turn the system back "On" to see if the problem was eliminated.

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Flat-Panel Fails to Display

If the flat-panel fails to display, check the following items.

- Is the system's power turned On?
- Is the PAC plugged into a proper power source?
- If you have a PAC with a brightness knob, is the brightness knob turned all the way down?

External CRT Monitor Fails to Display

If you have connected an external CRT monitor to the PAC and it fails to display, check the following items.

- Are the brightness and contrast controls on the monitor turned all the way down?
- Is the monitor properly connected and secured to the VGA controller card?
- Is the monitor connected to a proper power source? Is the power source working?

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Mouse Fails to Work

If you have a mouse or other pointing device connected to the PAC and it fails to work, check the following items.

- Did you install the correct mouse driver on your hard drive?
- Is the cable for the mouse securely connected?
- Is the serial port enabled?
- Is the serial port on the PAC working properly? Connect another peripheral device to the serial port to find out.
- Is the serial port jumper properly configured?

Application Program is Not Working

If the operating system works but an installed application program does not, check the following items.

- Is the processing speed compatible with your application program? Refer to the documentation supplied with your application program to determine the speed at which the computer must run.
- Is the application program installed correctly? Refer to the documentation supplied with your application program.
- Are any additional drivers required? (The proper video drivers for the specific application.)
- Are there any special memory requirements for the application program you are running?
- Are there any version requirements for your specific operating system application?

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Printer Fails to Work

If you have connected a printer to the PAC and it fails to work, check the following items.

- Is the printer plugged into a power source? Is the power source working? If the printer is plugged into a switched, multiple outlet box, is the outlet box turned on?
- Is the printer turned on? Is the printer on-line?
- Is the printer functional? Run the printer's internal self-test (if applicable). Refer to the documentation supplied with your printer.
- Are you using the proper interface cable for the printer? Does the interface cable have a secure connection? Are any of the pins on the connector bent?
- Did you select the proper parallel port setting when you configured your printer?
- If you are using a serial printer with MS-DOS, did you use the MODE command correctly?
- Is the parallel port on the PAC working properly? Connect another peripheral device to the parallel port to find out. Is the parallel port configured the same way as the printer?
- Is the printer conflicting with an add-in card or option? Remove the add-in cards one at a time to isolate any conflicts.
- Check the LPT IRQ selection, is it either IRQ5 or IRQ7?
- If an error message is displayed on the printer, refer to the documentation supplied with your printer.

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Trouble Formatting a Floppy Diskette

If you are having trouble formatting a 3.5 inch floppy diskette, check the following items.

- If you are using DOS, did you use the proper commands? See your DOS manual instructions on formatting a floppy disk.
- Is the floppy drive type properly configured?

NOTE: If you can't isolate and correct the problem, contact Dolch Technical Support.

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Clearing the CMOS Data

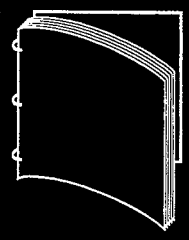
If you enabled the "Password Checking" option and then forgot your password, you will need to clear the CMOS data from the system. To clear the CMOS data you must open up the main unit and access the clear CMOS data jumper on the system board. You may also have to remove the card retainer and any add-in cards that may be blocking access to the CMOS data jumper. Refer to Chapter 3, System Description for the location of the jumper and it's settings.

WARNING: Clearing the CMOS data destroys all configuration data stored in the CMOS, such as hard disk type, date and time, etc. It is best to choose a password which is easily remembered.

1. Turn the system power "Off."
2. Remove the rear cover from the main unit.
3. Remove the card retention plate from the system. If any add-in cards are in the way, they also must be removed.
4. Locate the "Clear CMOS" switch on the system board. Refer to the system board layout to locate the position of the switch. Move the switch from the "Off" to the "On" position.
5. After a few seconds return the switch to the "Off" position.
6. Replace any add-in cards which were previously removed. Replace the card retention plate.
7. Replace the rear cover.
8. Turn the system power back "On." The CMOS data should be cleared.

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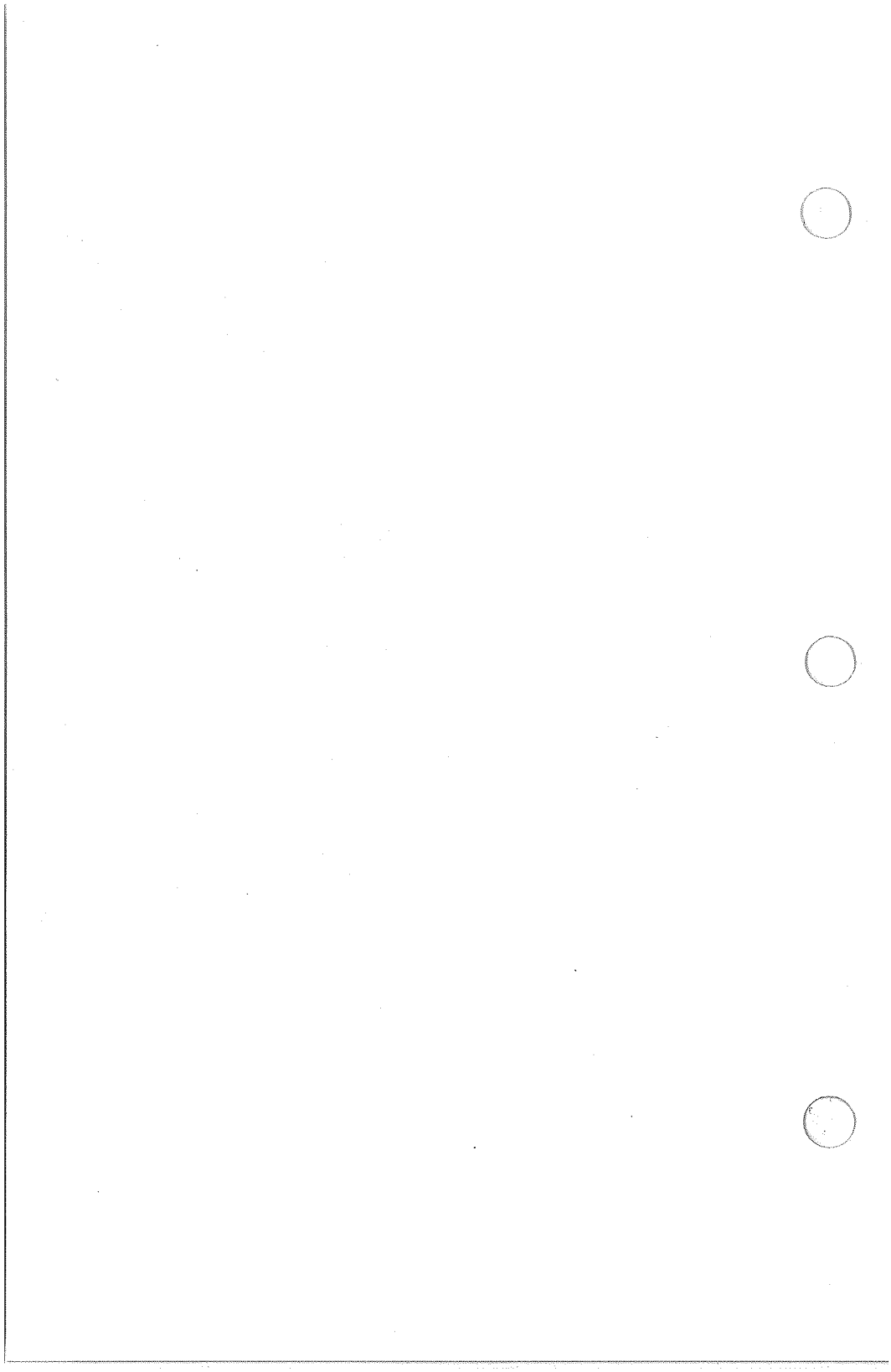
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A

APPENDIX

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APPENDIX

The Appendix provides information that is not necessary for normal operation of your system unit. The following sections are contained in this appendix:

- Connectors
- AT I/O Address Map
- System Memory Mapping
- Interrupt Assignments
- Award BIOS Hard Drive Type
- Power Supply Units
- POST Codes
- Technical Support
- Warranties

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Connectors

In this section, the descriptions for the most the common connector pin-outs are listed.

Serial Port Connectors

Pin	Description
1	Carrier Detect (RLSD)
2	Transmit Data (TXD)
3	Signal Ground
4	Request to Send (RTS)
5	Ring Indicator (RI)
6	Receives Data (RXD)
7	Data Terminal Ready (DTR)
8	Data Set Ready (DSR)
9	Clear to Send (CTS)

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Parallel Port Connectors

Pin	Description
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	-ACK
11	BUSY
12	PE
13	SLCT

Pin	Description
14	-AUTO FEED XT
15	-ERROR
16	-INIT
17	-SLCT IN
18	Ground
19	Ground
20	Ground
21	Ground
22	Ground
23	Ground
24	Ground
25	

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External RGB Monitor

Pin	Description
1	Analog R
2	Analog G
3	Analog B
4	No Connection
5	Digital Ground
6	Analog R Return
7	Analog G Return
8	Analog B Return
9	No Connection
10	Digital Ground/Shield
11	Monitor Sensor 0 (Color)
12	Monitor Sensor 1 (Mono)
13	Hsync (Digital)
14	Vsync (Digital)
15	No Connection

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AT I/O Address Map

The following table illustrates the AT I/O address map:

I/O Address (Hex)	I/O Device
000-01F	DMA Controller 1
020-03F	Interrupt Controller 1
040-05F	System Timer
060-06F	Keyboard Controller
070-07F	Real-Time Clock/CMOS and NMI
080-09F	DMA Page Register
0A0-0BF	Interrupt Controller 2
0C0-0DF	DMA Controller 2
0F0	Clear Math Coprocessor Busy Signal
0F1-1F7	IDE Interface Reset Math Coprocessor
278-27F	Serial Port 2
378-37F	Parallel Port 1
3F0-3F7	Floppy Diskette Drive Controller
3F8-3FF	Serial Port 1
B90-B93	Cluster Adapter 2
42E1	GPIB Adapter 2

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System Memory Mapping

The following table illustrates the system memory mapping:

Address (Hex)	Function
00000000-0007FFFF	512K System RAM
00080000-0009FFFF	128K System RAM
000A0000-000BFFFF	128K Video RAM
000C0000-000C7FFF	32K Video BIOS
000C8000-000CFFFF	32K I/O ROM
000D0000-000DFFFF	64K ROM
000E0000-000EFFFF	64K Extended BIOS ROM
000F0000-000FFFFF	64K On Board BIOS ROM
00100000-FFFDFFFF	System Memory
FFFE0000-FFFFFFFF	128K On Board BIOS ROM

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Interrupt Assignments

The Interrupt Assignments are as follows:

Level	Typical Interrupt Source
IRQ0	Internal Timer 1, Counter 0 Out
IRQ1	Keyboard Controller
IRQ2	Cascade Interrupts from IRQ8 to IRQ15
IRQ3	Serial Port 2
IRQ4	Serial Port 1
IRQ5	Parallel Port 2
IRQ6	Floppy Diskette Drive Controller
IRQ7	Parallel Port 1
IRQ8	Real-Time Clock
IRQ9	Software Redirected to Int 0Ah
IRQ10	Reserved
IRQ11	Reserved
IRQ12	Reserved
IRQ13	Coprocessor Error
IRQ14	Primary IDE
IRQ15	Secondary IDE

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Table 1. Award BIOS Hard Drive Type

Type	Cylinder	Heads	Write Precomp	Landing Zone	Sectors	Size
1	306	4	128	305	17	10 MB
2	615	4	300	615	17	20 MB
3	615	6	300	615	17	31 MB
4	940	8	512	940	17	62 MB
5	940	6	512	940	17	47 MB
6	615	4	65535	615	17	20 MB
7	462	8	256	511	17	31 MB
8	733	5	65535	733	17	30 MB
9	900	15	65535	901	17	112MB
10	820	3	65535	820	17	20 MB
11	855	5	65535	855	17	35 MB
12	855	7	65535	855	17	50 MB
13	306	8	128	319	17	20 MB
14	733	7	65535	733	17	43 MB
16	612	4	0	663	17	20 MB
17	977	5	300	977	17	41 MB
18	977	7	65535	977	17	57 MB
19	1024	7	512	1023	17	60 MB
20	733	5	300	732	17	30 MB
21	733	7	300	732	17	43 MB
22	733	5	300	733	17	30 MB

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Table 1. Award BIOS Hard Drive Type (Continued)

Type	Cylinder	Heads	Write Precomp	Landing Zone	Sectors	Size
23	306	4	0	336	17	10 MB
24	1024	5	0	976	17	40 MB
25	1224	9	0	1023	17	76 MB
26	1224	7	0	1223	17	71 MB
27	1224	11	0	1223	17	111 MB
28	1024	15	0	1223	17	152 MB
29	1024	8	0	1023	17	68 MB
30	1024	11	0	1023	17	93 MB
31	925	11	0	1023	17	83 MB
32	1024	9	0	926	17	69 MB
33	1024	10	0	1023	17	85 MB
34	1024	12	0	1023	17	102 MB
35	1024	9	65535	1024	17	110 MB
36	1024	14	0	1023	17	119 MB
37	1024	2	0	1023	17	17 MB
38	1024	16	0	1023	17	136 MB
39	918	15	0	1023	17	114 MB
40	820	6	0	820	17	41 MB
41	1024	5	0	1023	42	41 MB

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Table 1. Award BIOS Hard Drive Type (Continued)

Type	Cylinder	Heads	Write Precomp	Landing Zone	Sectors	Size
42	1024	5	0	1023	26	65 MB
43	809	6	0	852	17	40 MB
44	809	6	0	852	26	61 MB
45	776	8	0	775	33	100 MB
46	684	16	0	685	38	203 MB
47	User's Type					

Environmental Specifications

Stress	Operational	Non-Operational
Thermal High @ 24.0 h:	50° C [122° F]	60° C [140° F]
Thermal Low @ 24.0 h:	5° C [41° F]	0° C [32° F]
Humidity (Non-Condensing):	85%	95%
Shock 1/2 Sine @ 11 ms:	10 G	60 G
Vibration:	1.66 Gpp @ 5 - 300 Hz	2.5 Gpp @ 5 - 300 Hz
Low Altitude:	-650 ft [-200 m]	-650 ft [-200 m]
High Altitude"	15,000 ft [4.6 km]	40,000 ft [12 km]

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Power Supply Units

The Dolch PAC computers come supplied with one of four different power supply units, depending on which unit you ordered to fit your needs. The specifications for each of the four different power supply units are categorized by the wattage each one puts out.

AC 150 Watt Power Supply (EPAC only)

Specifications are typical at 25° C (unless otherwise designated)

INPUT	
Input Voltage Range:	90 to 264 VAC
Input Frequency:	47 to 440 Hz
Input Surge Current:	25A max, cold start
Efficiency:	75% typ at normal line, full power
Input Connector:	IEC-320
OUTPUT	
Output Power:	150W, 28CFM forced air 180W peak
Line Regulation:	±0.5% V_{IN} (min) to V_{IN} (max)
Load Regulation:	±0.5% (V1, 20% to 100% I_O) ±5% (V2-V4, 20% to 100% I_O)
Noise Ripple:	25mV max RMS, 50mV max P-P on ±5V with full load 0.5% max RMS, 1% max P-P, on other voltages with full load
Transient Response:	for 25% to 75% I_O change, 5% max deviation, with recovery to 1% within 500µS
Hold-up Time:	10mS, nominal input, full output power
Over-Voltage Protection:	130% V_O, all outputs
Power Foldback Point:	120% of max rated power

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ENVIRONMENTAL	
Operating Temperature Range: (Full Power)	0° C to 50° C
Operating Temperature Range: (Exceeded Range)	0° C to 70° C Derate linearly from full power at 50° C to half power at 70° C
Storage Temperature Range:	-25° C to +85° C
Relative Humidity:	5% to 95%, non-condensing
Vibration:	0.75G peak, 5Hz to 500Hz. Test three orthogonal axes at 1 octave/min, 5 min dwell at four major resonances
MTBF:	88,000 hours calculated per Mil-Std 217E, 50° C ambient

LOAD RANGE			
Voltage	**Min**	**Max**	**Peak**
+5V	3A	15A	20A
-5V	0A	1A	1A
-12V	0A	1A	1A
+12V	1A	6A	8A

NOTE: Peak Output is 30 seconds maximum.

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AC/DC 150 Watt Power Supply

INPUT	
AC Input Voltage Range:	90 to 250 VAC
DC Input Voltage Range:	10 to 30 VDC
Input Frequency:	45 to 65 Hz
Input Connector:	Hirschmann CA6 or Amphenol C16

ENVIRONMENTAL	
Operating Temperature Range:	0° C to +50° C
Storage Temperature Range:	-25° C to +65° C
Relative Humidity:	5% to 95%, non-condensing at 30° C
Operating Altitude:	15,000 ft (max)

LOAD RANGE		
Voltage	**Max**	**Amps**
+5.1V	±5%	20A
-5.0V	±5%	4A
+12.0V	±5%	0.3A
-12.0V	±5%	0.2A

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AC 250 Watt Power Supply

INPUT	
Input Voltage Range:	90 to 250 VAC
Input Frequency:	47 to 440 Hz
Input Surge Current:	60A max at 230 VAC, cold start at 25° C
Input Connector:	IEC-230
OUTPUT	
Output Power:	240 W
Line Regulation:	±1% V_{IN} (min) to V_{IN} (max)
Load Regulation:	±3% (V1, 60% I_O) ±5% (V2-V4, 60% I_O)
Noise Ripple:	Less than 1% of each output voltage at max load
Hold-up Time:	20mS, nominal input, full output power
Power Good Signal:	100ms to 500ms
Power Fail Signal:	1ms
Over Voltage Protection:	5.9V to 7V
Efficiency:	70% - 75% of max rated power

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ENVIRONMENTAL	
Operating Temperature Range:	0° C to 55° C
Storage Temperature Range:	-40° C to +75° C
Operating Altitude:	15,000 ft (max)
Operating Shock:	5 G half sine 15ms horizontal axes 10 G half sine 10ms vertical axes (upward only)
Relative Humidity:	5% to 95%, non-condensing at 55° C
Vibration:	5Hz to 19Hz, 0.02 G in 3 axes 12Hz to 500Hz, 0.35 G in 3 axes
AC Connector:	IEC-320

LOAD RANGE		
Voltage	**Min**	**Max**
+5V	4.0A	28A
-5V	1.0A	7A
-12V	0.5A	1A
+12V	0.5A	1A

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POST Codes

NOTE: ISA POST codes are output to port address 80h.

Compressed Version Only

POST (Hex)	Description
C0	1. Turn off OEM specific cache, shadow... 2. Initialize all the standard devices with default values standard devices includes: - DMA Controller (8237) - Programmable Interrupt Controller (8259) - Programmable Interval Timer (8254) - RTC Chip
C1	Auto-Detection of on board DRAM and cache
C3	1. Test system BIOS checksum 2. Test the first 256K DRAM 3. Expand the compressed codes into temporary DRAM area including the compressed system BIOS and option ROMs
C5	Copy the BIOS from ROM into E0000-FFFFF shadow RAM so that POST will go faster
01 - 02	Reserved
03	Initialize EISA registers (EISA BIOS only)
04	Reserved
05	1. Keyboard Controller Self Test 2. Enable Keyboard Interface
06	Reserved
07	Verifies CMOS's basic R/W functionality
BE	Program defaults values into chipset according to the MODBINable chipset default table

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Compressed Version Only (Continued)

POST (Hex)	Description
09	1. Program the configuration register of Cyrix CPU according to the MODBINable Cyrix Register Table 2. OEM specific cache initialization (if needed)
0A	1. Initialize the first 32 interrupt vectors with corresponding interrupt handlers - Initialize INT number from 33-120 with dummy (Suprious) - Interrupt Handler 2. Issue CPUID instruction to identify CPU type 3. Early power management initialization (OEM specific)

Boot Block POST Codes

POST (Hex)	Description
C0	1. Turn off OEM specific cache, shadow 2. Initialize all the standard devices with default values - DMA Controller (8237) - Programmable Interrupt Controller (8259) - Programmable Interval Timer (8254) - RTC Chip
C1	Auto-detection of on board DRAM and cache
C3	Checking checksum of compressed code
C5	Copy the BIOS from ROM into E0000-FFFFF shadow RAM so that POST will go faster
01	Clear base memory 0~640K
0C	Initial interrupt vector 00-1FH
0D	Initial ISA VGA
41H	Enable FDD and detect media type
FFH	Boot from FDD

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Non-Compressed Version

POST (Hex)	Description
01-02	Reserved
C0	Turn off OEM specific cache, shadow...
03	1. Initialize EISA registers (EISA BIO) only 2. Initialize all the standard devices with default values: - DMA Controller (8237) - Programmable Interrupt Controller (8259) - Programmable Interval Timer (8254) - RTC Chip
04	Reserved
05	1. Keyboard controller self-test 2. Enable keyboard interface
06	Reserved
07	Verifies CMOS's basic R/W functionality
BE	Program defaults values into chipset according to the MODBINable chipset default table
C1	Auto-detection of on board DRAM and cache
C5	Copy the BIOS from ROM into E0000-FFFFF shadow RAM so that POST will go faster
08	Test the first 256K DRAM
09	1. Program the configuration registration of Cyrix CPU according to the MODBINable Cyrix Register Table 2. OEM specific cache initialization (if needed)

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Non-Compressed Version (Continued)

POST (Hex)	Description
0A	1. Initialize the first 32 interrupt vectors with corresponding interrupt handlers Initialize INT number from 33-120 with dummy (Suprious) Interrupt Handler 2. Issue CPUID instruction to identify CPU type 3. Early Power Management Initialization (OEM specific)

Compressed and Non-Compressed Versions

POST (Hex)	Description
0B	1. Verify if the RTC time is valid or not 2. Detect bad battery 3. Read CMOS data into BIOS stack area 4. PnP initialization including (PnP BIOS only) - Assign CSN to PnP ISA card - Create resource map from ESCD 5. Assign I/O and memory for PCI devices (PCI BIOS only)
0C	Initialization of the BIOS data area (40:00 - 40:FF)
0D	1. Program some of the chipset's value according to Setup (Early Setup value program)
0E	1. Initialization the APIC (Multi-Processor BIOS only) 2. Test video RAM (if monochrome display device found) 3. Show messages including: - Award Logo, Copyright string, BIOS date code and part number - OEM specific sign on messages - Energy star logo (Green BIOS only) - CPU brand, type and speed - Test system BIOS checksum (non-compressed version only)
0F	DMA Channel 0 Test

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Compressed and Non-Compressed Versions (Continued)

POST (Hex)	Description
10	DMA Channel 1 Test
11	DMA Page Registers Test
12-13	Reserved
14	Test 8254 Timer 0 Counter 2
15	Test 8259 Interrupt mask bits for Channel 1
16	Test 8259 Interrupt mask bits for Channel 2
17	Reserved
19	Test 8259 functionality
1A - 1D	Reserved
1E	If EISA NVM checksum is good, execute EISA initialization (EISA BIOS only)
1 F - 29	Reserved
30	Detect base memory and extended memory size
31	1. Test base memory from 256K to 640K 2. Test extended memory from 1M to the top of memory
32	1. Display the Award Plug and Play BIOS extension message (PnP BIOS only) 2. Program all on board super I/O chips (if any) including COM ports, LPT ports, FDD port . . . according to Setup value
33 - 3B	Reserved
3C	Set flag to allow users to enter CMOS Setup utility
3D	1. Initialize keyboard 2. Install PS2 mouse

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Compressed and Non-Compressed Versions (Continued)

POST (Hex)	Description
3E	Try to turn on Level 2 cache **NOTE:** Some chipset may need to turn on the L2 cache in this stage. The cache is usually turned on later in POST 61h.
BF	1. Program the rest of the chipset's value according to Setup. (later setup value program) 2. If auto-configuration is enabled, program the chipset with predefined values in the MODBINable auto-table
41	Initialize floppy disk drive controller
42	Initialize hard drive controller
43	If it is a PnP BIOS, initialize serial and parallel ports
44	Reserved
45	Initialize math coprocessor
46 - 4D	Reserved
4E	If there's any errors detected (such as video, kb, etc.), show all the error messages on the screen and wait for the user to press the <F1> key
4F	1. If password is needed, ask for password 2. Clear the Energy Star Logo (Green BIOS only)
50	Write all CMOS values, currently in the BIOS stack area, back into the CMOS
51	Reserved

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Compressed and Non-Compressed Versions (Continued)

POST (Hex)	Description
52	1. Initialize all ISA ROMs 2. Later PC initialization (PCI BIOS only) - Assign IRQ to PCI devices - Initialize all PCI ROMs 3. PnP initialization (PnP BIOS only) - Assign IO, memory, IRQ and DMA to PnP ISA devices - Initialize all PnP ISA ROMs 4. Program shadows RAM according to Setup settings 5. Program parity according to Setup setting 6. Power management initialization - Enable/Disable global PM - Initialize all Pnp ISA ROMs
53	1. If it is not a PnP BIOS, initialize serial and parallel ports 2. Initialize time value in BIOS data area by translating the RTC time value into a timer tick value
60	Setup virus protection (Boot Sector Protection) functionality according to Setup setting

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Flat-Panel Display Characteristics

The display screen in your product may exhibit one or more dots that are always lit (on) or are always dark (off). This dot can look like a tiny pin hole in the screen. If your display does have a nonfunctioning dot, it is not usually noticeable when the screen is viewed from a normal distance but may appear if the dots surrounding it are of a contrasting color, for example a white dot on a field of black. This is considered a normal occurrence for Active Matrix-Liquid Crystal Display (AM-LCD) technology and does not signal impending failure of your screen.

Active Matrix Liquid Crystal Displays are highly complex electronic components that are under a constant state of improvement and refinement. The technology that allows these AM-LCDs to be manufactured is very advanced but does not, however, always produce 100% perfect displays. Unfortunately, cost-effective, visually perfect displays are virtually impossible to attain at this point in the technology timeline. Consequently, a balance has to be made between a requirement for "cost-effective, visually perfect" screens and the manufacturer's actual ability to produce a product of "near perfect" quality at a reasonable price. This has driven the AM-LCD manufacturers to write detailed specification documents defining what the difference is between a screen of acceptable quality and one of unacceptable quality. These documents contain detailed technical analyses and often are intended to help define that balance between perfection and price.

A normal AM-LCD panel may contain between 15 (for VGA) and 30 (for SXGA) non-functional dots on the screen. In VGA resolution, this is less than 0.0016% of 921,600 dots (subpixels) that make up a screen of 640 pixels horizontal x 480 pixels vertical x 3 subpixels (one subpixel each for red, green and blue). For a SXGA screen, with 30 non-functional subpixels, this would represent 0.00076% of 3,932,160 subpixels.

To minimize the possibility of *ANY* non-functional subpixels, Dolch only uses the highest quality display screens from name brand manufacturers. Working closely with these major AM-LCD manufacturers insures the highest quality AM-LCD screens possible. All display screens are tested for conformance to the specifications of their manufacturer and are certified to be within those specifications. Should you have questions pertaining to the exact display screen specifications in your product, please contact Dolch Technical Support at:

Phone:	(800) 538-7506
E-Mail:	support@dolch.com
Web Site:	http://www.dolch.com
Bulletin Board:	(510) 490-3269

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Addendum

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Corporate Headquarters

Dolch Computer Systems, Inc.
3178 Laurelview Court
Fremont, CA 94538
USA

U.K. Operation

Dolch Computer Systems UK (Ltd)
14 Cochran Close, Crownhill
Milton Keynes, MK8 OAJ
United Kingdom

German Operation

Dolch Computer Systems GmbH
Haidgraben 1C
D-85521 Ottobrunn
Germany

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If you are unable to obtain proper use of your PAC, contact Dolch Computer Systems for technical support. To ensure the most efficient technical support, be prepared to operate your PAC while discussing the problem with a technical support representative. Dolch technical support lines are available as follows:

If You Purchased Your PAC In the United States

You can contact Dolch Computer Systems, Monday through Friday, 7:30 AM to 5:00 PM, Pacific Time (excluding holidays).

- Toll Free: 1-800-538-7506
- Telephone: (510) 661-2220
- Facsimile: (510) 490-2360

You can also use the Dolch Bulletin Board:

- Telephone: (510) 490-3269
- Modem: 28800 BPS
- Settings: N 8 1 (No Parity, 8 Data Bits, 1 Stop Bit)
- Dolch Internet Address: Support@DOLCH.com

If You Purchased Your PAC Outside the United States

If you purchased your PAC outside the United States, you must contact the nearest Dolch Subsidiary concerning technical support.

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Corporate Headquarters

Dolch Computer Systems, Inc.
3178 Laurelview Court
Fremont, CA 94538
Telephone: (510) 661-2220
Facsimile: (510) 490-2360
Web Site: http://www.dolch.com

U.K. Operations

Dolch Computer Systems UK, Limited
14 Cochran Close, Crownhill
Milton Keynes, MK8 OAJ
United Kingdom
Telephone: (+44) 1908 263 622
Facsimile: (+44) 1908 163 220

German Operations

Dolch Computer Systems GmbH
Haidgraben 1C
D-85521 Ottobrunn
Germany
Telephone: (+49) 89 609 7848
Facsimile: (+49) 89 608 3856

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