Micronics C400
Pentium II
System Board Manual

MICRONICS

DIAMOND
MULTIMEDIA

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Introduction

Thank you for choosing the Micronics C400 system board. The Micronics C400 is an advanced single processor solution for high-performance desktops and workstations.

Based on the highly acclaimed Intel 440BX AGPset, Micronics C400 supports the next generation of the Pentium® II, which offers flexibility and the highest level of performance. It features support for 100MHz Front Side Bus (FSB) speeds and accepts PCI, ISA and AGP expansion cards.

Rich with features, Micronics C400 provides Ultra DMA/33 IDE hard drive protocol (up to 33MBytes/sec transfer rate), PC-100 SDRAM memory support and optional microprocessor system hardware management support.

Diamond builds all products to exacting standards, using the highest quality components available. We are proud to provide this system board and believe you will be pleased with your purchase.

Features

The Micronics C400 includes the following features:

- Single Intel Slot 1® for:
  Intel Celeron® 233-333MHz (66MHz FSB)
  Intel Pentium® II 350-450MHz (100MHz FSB)
- Intel 440BX AGPset
  Intel PIIX4e
- One AGP slot
  Four 32-bit PCI slots
  One shared PCI/ISA slot
  One 16-bit ISA slot
- Bus Speed - 66 and 100MHz
- Three 3.3V unbuffered 64/72-bit 168-pin DIMM sockets
  Maximum memory - 768MB for SDRAM (PC-100Mhz supported)
  ECC support via chipset
- Hardware Management - microprocessor system hardware monitor w/ CPU and chassis fan temperature sensors
- Ultra DMA/33 IDE support
- Mini ATX form factor

Software Compatibility

The Micronics C400 system board has been thoroughly tested for compatibility with a variety of operating systems and environments, including:

- Microsoft -
  DOS 6.2x
  Windows 95
  Windows 98
  Windows NT 3.5x
  Windows NT 4.0
- IBM -
  OS/2 Warp 4.0
- SCO -
  UNIXWare 2.1.1
  Open Server 5.04
- Novell -
  NetWare 3.12
  NetWare 4.11 (IntranetWare)

Contents Listing

The standard package should contain the following items. Check to make sure that all the items are included.

- Micronics C400 System Board
- Micronics C400 CD (includes this manual in Adobe Acrobat format)
- Two device 34-pin floppy disk drive ribbon cable
- Two device 40-pin hard disk drive ribbon cable
- Pentium II CPU retention post set

Before You Begin

This manual will familiarize you with the features, installation and use of your Micronics C400. There are several symbols and conventions used throughout this manual to help draw your attention to a feature or to focus on important information:

When you see the Magnifying Glass, it refers to something you should take a closer look at before proceeding further.

When you see the Exclamation Mark, it gives important information on avoiding damage.

Common Names

AGP	Accelerated Graphics Port
DIMM	Dual Inline Memory Module
DRAM	Dynamic Random Access Memory
ECC	Error Checking and Correction
EDO	Extended Data Out
IDE	Integrated Drive Electronics
PCI	Peripheral Component Interconnect
SDRAM	Synchronous DRAM
SPD	Serial Presence Detect
USB	Universal Serial Bus

Chapter

1

Quick Installation

We know that many experienced people prefer to read as little of the documentation as possible. If this sounds like you, here's the short form to get up and running quickly.

Installing the Micronics C400

STATIC!
Before handling the Micronics C400, be properly grounded by using a special wrist or ankle strap, or touch a safely grounded object.

1. Make backup copies of your installation and configuration diskettes.
2. Ground yourself to prevent damaging static discharge by using an anti-static wrist or ankle strap, or touch a safely grounded metal object.
3. Remove the Micronics C400 from its packaging.
4. Configure and verify the system board's jumper settings (refer to Jumper Settings in Chapter 2).
5. Install the CPU and the system memory. Be sure to attach the Retention Mechanism as described in Chapter 3.
6. Install the system board in the chassis and make all necessary case connections.
7. Install any ISA, PCI and/or AGP add-on peripherals (refer to Chapter 2 for the location of the slots).
8. Connect any optional devices.
9. Turn the computer on and press the <DEL> key when you see the screen shown in Figure 1.1.

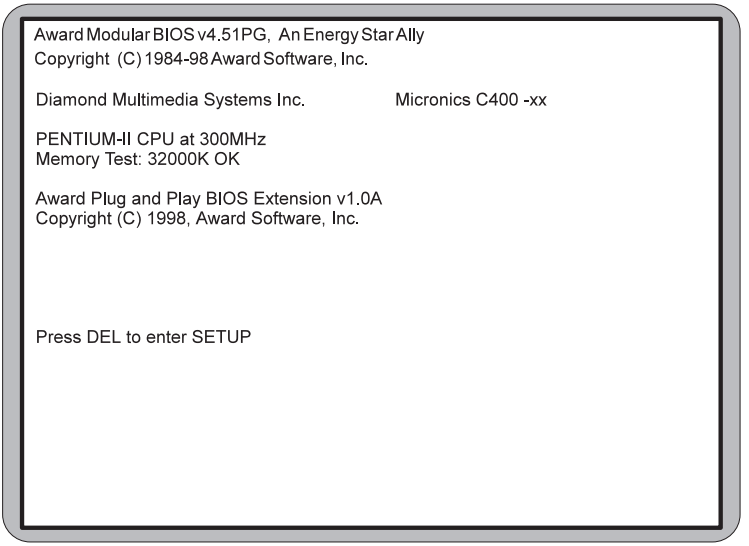


Figure 1.1: Power-Up Screen

10. The main CMOS Setup Utility screen (Figure 4-2) appears. Note that the Setup program can only be activated during the boot sequence.

11. Set the time and date. Adjust the BIOS settings to match your configuration. If installing an IDE drive, select the IDE device you wish to configure. Press ENTER with Autotype Fixed Disk selected and the BIOS will automatically configure the drive for you (refer to Chapter 4).

12. After you have configured the Standard CMOS Setup settings, make any desired setting configurations in the other available menus. When finished, go to the exit screen, select "Save and Exit Setup" and you are finished with the BIOS configuration (see Chapter 4).

Chapter

2 Configuring the Micronics C400

Although the Micronics C400 system board is packaged in materials that are designed to protect it from physical damage and static electricity, it is important to use care while unpacking the board and setting it up.

Static Electricity

The Micronics C400 is shipped from the factory in an anti-static bag. To reduce the possibility of damage from static discharge, it is important to neutralize any static charges your body may have accumulated before handling the board.

The best way to do this is to ground yourself using a special anti-static wrist or ankle strap. If you do not have an anti-static strap available, touch both of your hands to a safely grounded object, such as the power supply or chassis of a computer that is connected to the power socket. After you have grounded yourself, ground the Micronics C400 board via one of the solder pads that surround its mounting holes. When you remove the Micronics C400 from its packaging, place it on top of the anti-static bag, and carefully inspect the board for damage which might have occurred during shipment.

Environment Considerations

Make sure the finished computer system is in an area with good ventilation. The system should not be in direct sunlight, near heaters, or exposed to moisture, dust, or dirt.

Micronics C400 System Board

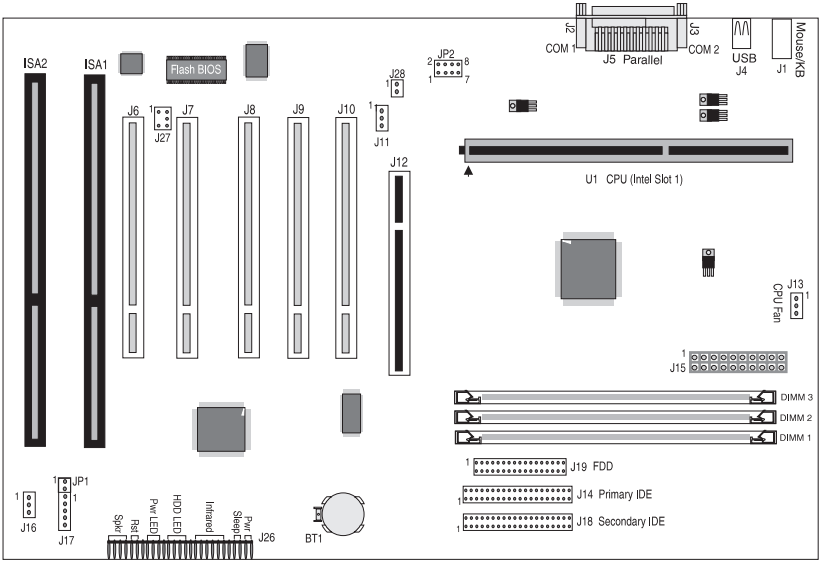


Figure 2-1: Micronics C400 System Board Diagram

Back Panel Connections

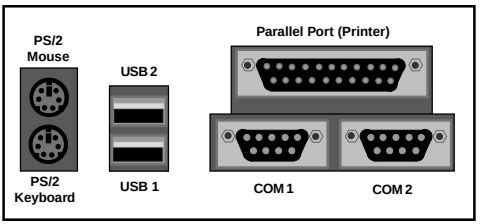


Figure 2-2: Back Panel Connections
(Intel Venus I/O Shield Compatible)

Jumper and Connector Settings

This section provides jumper and connector settings for the Micronics C400 system board that may or may not need to be changed. Other configurations can be changed through the BIOS Setup.

Table 2-1 lists the jumper settings to select the CPU bus speed frequency.

		Jumper JP2			
System Speed	**Bus Speed**	1-2	3-4	5-6	7-8
233 MHz	66MHz	Open	Close	Open	Close
266 MHz	66MHz	Close	Open	Close	Close
300 MHz	66MHz	Close	Open	Open	Close
333 MHz	66MHz	Open	Open	Close	Close
300 MHz	100MHz	Open	Close	Close	Close
350 MHz	100MHz	Open	Close	Open	Close
400 MHz	100MHz	Close	Open	Close	Close
450 MHz	100MHz	Close	Open	Open	Close

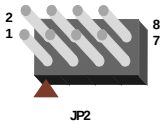


Table 2-1: CPU Speed Selection

Table 2-2 lists the settings for clearing a password, locking your case and the power LED. To clear a password set in the BIOS, place a jumper on JP1. The Power LED is the same as the Power LED in the Front Panel connectors.

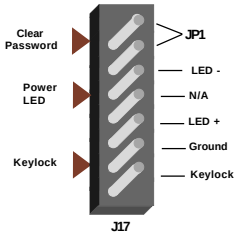


Table 2-2: Clear Password/Key Lock/Power LED Settings

Table 2-3 lists the connector settings and their functions.

Connector	Function	Notes
DIMM 1-3	DRAM (168-pin DIMM Sockets)	3.3 volt, unbuffered EDO and SDRAM DIMMs
ISA 1-2	ISA Bus Expansion Slots	
J1	PS/2 Keyboard Connector PS/2 Mouse Connector	Lower Level Upper Level
J2, J3	Serial Ports	COM 1 & COM 2
J4	USB Connector	Lower Level: USB Port 1 Upper Level: USB Port 2
J5	Parallel Port Connector	Upper Level
J6-J10	PCI Bus Expansion Slots	
J11	Wake On LAN Connector	1 - +5V Standby Power Output; 2 - Ground; 3 - LAN Wakeup Signal Input
J12	AGP Bus Expansion Slot	62 x 2-pin connector
J13	CPU (U1) Cooling Fan Connector	1 - Ground; 2 - +12V Power; 3 - Fan Speed Monitor
J14, J18	Primary and Secondary IDE Port Connectors	Both support up to two IDE devices
J15	ATX Power Connector	20-pin
J16	Chassis Cooling Fan	1 - Ground; 2 - +12V Power; 3 - Ground
J17	Keylock and Power LED	1 - Keylock; 2 - Ground; 3 - LED +; 4 - N/A; 5 - LED -
J19	Floppy Drive Connector	Supports up to two floppy drives

Table 2-3: Connector and Peripheral Connections

Connector	Function	Notes
J20-J26	Front Panel I/O Connector	
"	External PC Speaker	J20 - +5V DC (signal return); Onboard PC Speaker Signal; Logic Ground
"	System Reset Switch	J21 - Ground; Reset
"	Power-On LED	J22 - LED+; LED-
"	HDD LED	J23 - LED+; LED-; LED+
"	Infrared (IR)	J24 - IR-TX Transmit; IR Remote or Fast IR; Ground; IR-RX Receive; Vcc
"	Sleep	J25 - Ground; LID
"	System Power On/Off	J26 - Power On; Ground
J27	SB-Link Connector. Internal audio header that supports the legacy Sound Blaster compatible audio to the PCI Bus.	1 - PC/PCI DMA Grant; 2 - Ground; 3 - No Connect; 4 - PC/PCI DMA Request; 5 - Ground; 6 - PCI Serial IRQ's
J28	Modem Ring Connector	1 - Ground; 2 - Ring Indicator
U1	Pentium II CPU	Primary

Table 2-3a: Connector and Peripheral Connections

Chapter 3

Installing the Micronics C400

Introduction

This chapter explains how to install the Micronics C400 system board, memory, CPU and peripherals.

WARNING: *Before installing or removing any peripherals or components, make sure you have a clear work space and that you adhere to all anti-static precautions described in Chapter 1. Diamond recommends that only trained technicians install and configure the system board.*

Damage which occurs to the board while adding or removing peripherals or components may void the warranty. If problems arise while installing peripherals, contact the computer dealer where you purchased the peripheral or Diamond's Technical Support Department.

System Memory Support

The flexibility of the Micronics C400 is augmented by its support for EDO and SDRAM memory. The Micronics C400 supports ECC (with 72-bit DIMMs) via the chipset.

SDRAM speed and synchronous operation have enabled the breakthrough in memory-systems design needed to meet the demands of fast high-performance processors. SDRAM improves bandwidth to main memory because all address, data and control signals are synchronized with the system clock. With all operations synchronized, system wait states are reduced, thus providing increased performance over conventional DRAM.

The new PC-100 SDRAM memory has the same technology as standard SDRAM, but is faster due to its ability to support the new Intel BX chipset and system boards that support the 100MHz Front Side Bus speeds.

Installing the Micronics C400

Installation of the Micronics C400 system board depends on the type of case you use. The Micronics C400 is designed for the Mini ATX form factor and may be installed into most cases. Install the system board into the chassis using the tools and equipment required and make all necessary case connections.

NOTE: If you are unfamiliar with installing a system board, Diamond highly recommends that you read the computer user's manual or contact your dealer's technical support department.

Tools Required

Diamond recommends using the following tools to install the Micronics C400:

- ❑ Small Phillips screwdriver
- ❑ Tweezers or a pair of needle-nose pliers
- ❑ Tray (to hold loose screws)

Equipment Required

Diamond recommends using the following equipment with the Micronics C400 for a typical configuration:

- ❑ ATX chassis with standard hardware.
- ❑ A high-quality ATX power supply capable of providing continuous power within a 3 volt range. A power filter may be used with a noisy AC power source.
- ❑ PS/2 mouse and compatible keyboard.
- ❑ Eight ohm speaker.
- ❑ Standard ribbon cables for internal connections.
- ❑ Standard power cord (grounded).

System Memory

System memory is necessary to operate the Micronics C400 system board. The Micronics C400 has three 3.3V unbuffered 64/72-bit, 168-pin DIMM sockets for a maximum of 768MB of SDRAM memory. Support is provided for standard SDRAM (66MHz) and PC-100MHz SDRAM. This section list the rules for adding memory to the Micronics C400, give some examples of common memory configurations and show how to physically install the memory.

Adding Memory

For long term reliability, Diamond recommends using DIMMs with gold-plated contacts. The use of tin-plated contacts may conflict with the gold alloy on the DIMM socket.

The following is a list of rules to follow when installing DIMMs. If you follow these rules, your upgrade should be trouble-free:

- ❏ Use 8ns or faster PC-100 SDRAM DIMMs when using a 100MHz bus speed processor.
- ❏ Use 10ns or faster SDRAM DIMMs when using a 66MHz bus speed processor. NOTE: PC-100 memory is backwards compatible to run at the 66MHz bus speed.
- ❏ Use only PC-100MHz DIMM modules for the 100MHz Front Side Bus speeds (350-450). Due to the strict timing issues involved when operating at 100MHz, your system will not boot if non-compliant PC-100 DIMM modules are used.

168-Pin DIMM

Memory Configurations

DIMM memory configuration is auto-banking and therefore does not need to be installed in any particular order. The following tables list the most common memory configurations.

Memory	DIMM 1	DIMM 2	DIMM 3
8MB	1Mx64		
16MB	2Mx64		
16MB	1Mx64	1Mx64	
24MB	2Mx64	1Mx64	
24MB	1Mx64	1Mx64	1Mx64
32MB	2Mx64	2Mx64	
32MB	4Mx64		
40MB	2Mx64	2Mx64	1Mx64
40MB	4Mx64	1Mx64	
48MB	2Mx64	2Mx64	2Mx64
48MB	4Mx64	1Mx64	1Mx64
48MB	4Mx64	2Mx64	
56MB	4Mx64	2Mx64	1Mx64
64MB	4Mx64	4Mx64	
64MB	8Mx64		
80MB	8Mx64	2Mx64	
80MB	8Mx64	1Mx64	1Mx64

Table 3-1: Memory Configurations

Memory	DIMM 1	DIMM 2	DIMM 3
96MB	4Mx64	4Mx64	4Mx64
112MB	8Mx64	4Mx64	2Mx64
128MB	16Mx64		
128MB	8Mx64	4Mx64	4Mx64
128MB	8Mx64	8Mx64	
160MB	16Mx64	4Mx64	
160MB	16Mx64	2Mx64	2Mx64
192MB	8Mx64	8Mx64	8Mx64
192MB	16Mx64	4Mx64	4Mx64
192MB	16Mx64	8Mx64	
224MB	16Mx64	8Mx64	4Mx64
256MB	16Mx64	16Mx64	
256MB	16Mx64	8Mx64	8Mx64
320MB	16Mx64	16Mx64	8Mx64
384MB	16Mx64	16Mx64	16Mx64
384MB	32Mx64	16Mx64	
384MB	32Mx64	8Mx64	8Mx64

Table 3-1a: Memory Configurations

CPU Installation

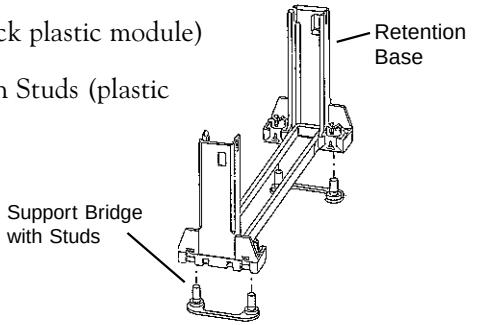
The Micronics C400 is designed to support single Pentium II processors. The Pentium II processor comes installed in a Single Edge Contact (SEC) cartridge that connects into "Slot 1" on the system board.

A Retention Mechanism is supplied to anchor the processor to the system board. Attach the Retention Mechanism before inserting the processor.

Installing the CPU Retention Mechanism

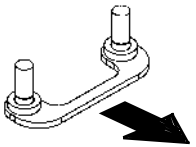
Before you begin, verify that your Retention Mechanism Kit contains the following items:

- ❑ Retention Base (black plastic module)
- ❑ Support Bridges with Studs (plastic mounts).



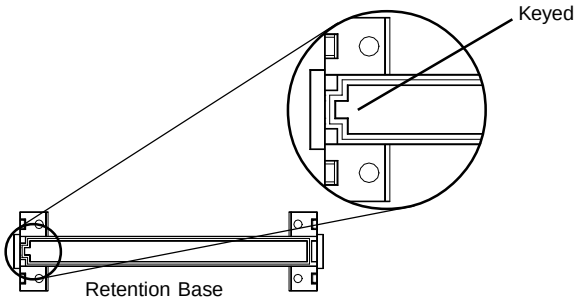
Follow the steps below to install the kit:

1. Locate the four Retention Base holes (near each end of the Slot 1 socket). Insert the two Support Bridges with studs (plastic mounts) from the bottom side of the Micronics C400 toward the component side until they snap into place.

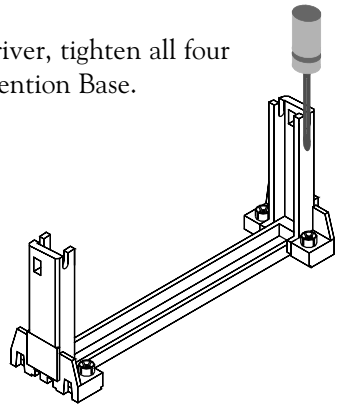


(Orient the loops toward the outer edges of the system board)

2. Place the Retention Base over the Slot 1 connector and insert it down into the Support Bridges with studs. Note the "Keyed" location of both Slot 1 and the Retention Base.



3. Using a screwdriver, tighten all four sides of the Retention Base.

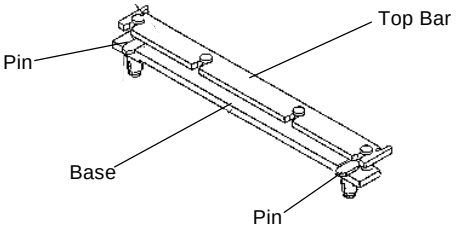


Installing a CPU

Follow the steps below to install the Pentium II processor:

1. Locate the Slot 1 connector (refer to Figure 2-1).
2. If you are installing the boxed version of the Pentium II processor, follow the instructions in the section "CPU Installation (Boxed version)."
3. If you are installing the *optional* Heat Sink Support, continue to step 4; if not, go to step 5.

4. The Heatsink components consist of a top bar, base and two pins. Gently insert the Heatsink base into the holes next to the Slot 1 socket. Push down until the base snaps into place.



5. Gently insert the processor cartridge down into the Retention Module, making sure the connector on the processor cartridge and the Slot 1 connector are aligned (refer to the keyed location on the previous page).

6. Push the processor cartridge down until it snaps into place.

7. Lock the processor cartridge into place by pushing outward on the tabs located on both sides of the processor cartridge. The processor cartridge is locked when the tabs snap into the holes on the side of the Retention Mechanism.

8. After the processor cartridge is locked into place, connect the Heatsink's top bar to the base.

9. Lock the base into place by inserting a pin down into the base on both sides.

10. Make sure the CPU speed is set correctly (refer to Chapter 2: Jumper and Connector Settings).

CPU Installation Overview

CPU Installation Overview

1. Mount the Retention Mechanism for the CPU.
2. Mount the (optional) heatsink support base onto the system board.
3. Slide the CPU into the Retention Mechanism.
4. Lock the CPU into the Retention mechanism using the tabs.
5. Slide in the Heat Sink Top Bar, then insert the pins to lock it in place.

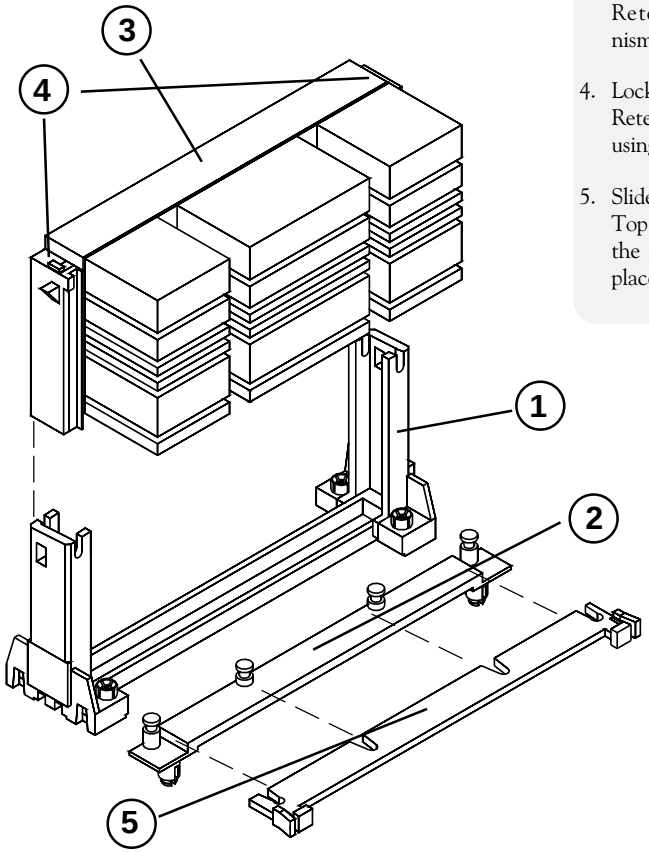


Figure 3-1: Installing a CPU

CPU Installation (Boxed version)

A boxed version of the CPU is offered through Intel. This packaging uses an active cooling fan. The mounting hardware is described below. For detailed instructions, please refer to the documentation that is supplied with your CPU.

NOTE: Make sure the CPU speed is set correctly (refer to Chapter 2: Jumper and Connector Settings).

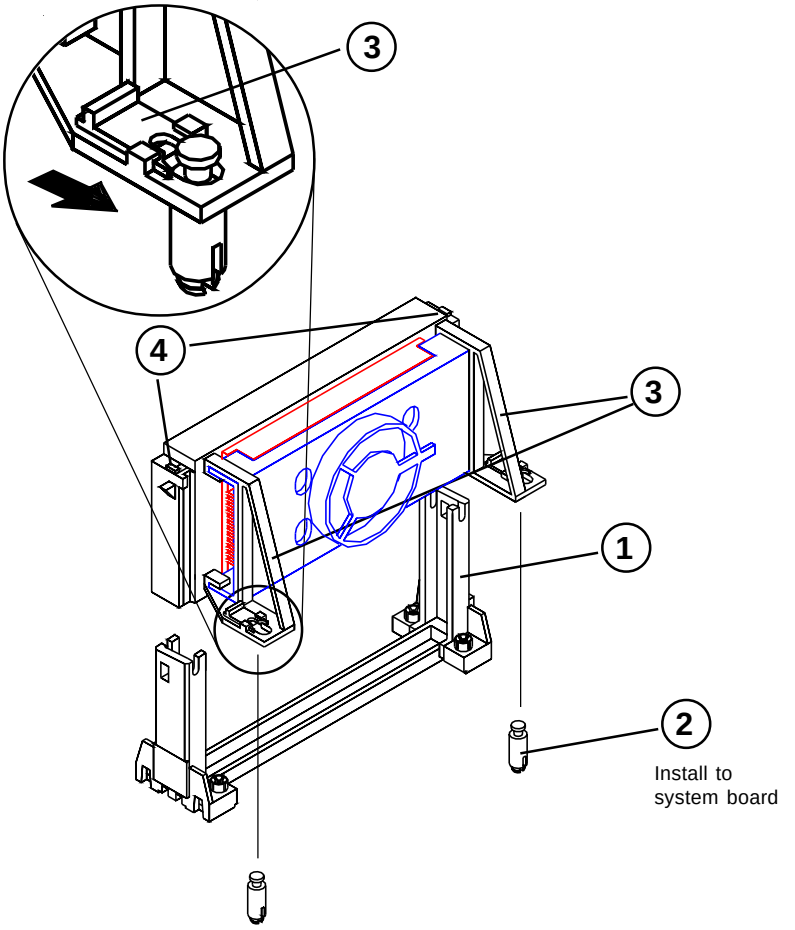


Figure 3-2: Installing a CPU (Boxed version)

Installing DIMMs

To install the DIMMs, locate the memory banks on the system board and perform the following steps:

1. Hold the DIMM so that the notched edge is aligned with the notch on the DIMM socket (Figure 3-1).
2. Insert the DIMM at a 90 degree angle.
3. Gently push the DIMM straight down until it locks into place (past the release tabs).

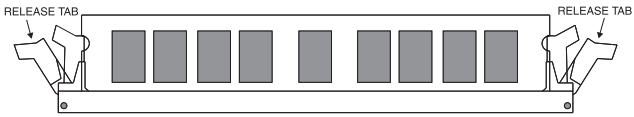


Figure 3-3: Installing a 168-Pin DIMM

Removing DIMMs

To remove DIMMs, follow the steps below:

1. With both thumbs (or fingers), press the release tabs away from the socket.
2. With the DIMM free from the release tabs, lift the module up and place in an anti-static bag or package.

Installing a PCI Peripheral Card

The Micronics C400 PCI slots accommodate all PCI peripherals that meet the PCI 2.1 specifications. Follow the steps below to install a PCI card:

1. Turn the computer system off and remove its cover.
2. Choose an unused PCI slot and remove the slot cover.
3. Insert the card with the bottom edge level to the slot. *Never insert the card at an angle.*
4. Carefully push the card straight down, making sure the card is fully inserted.
5. Replace the screw which holds the card in place.
6. Replace the computer cover.
7. Refer to the PCI card's documentation additional instructions regarding installation and software drivers.

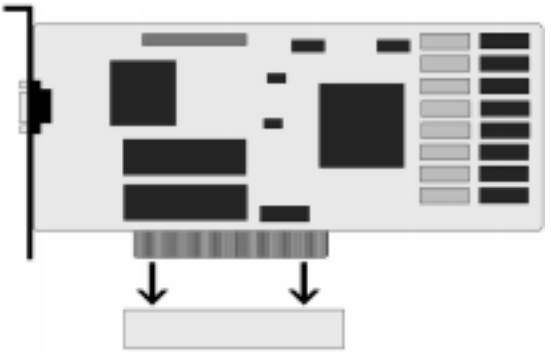


Figure 3-4: Installing a PCI Card

Installing an ISA Peripheral Card

The Micronics C400 ISA slots accommodate all standard ISA peripherals. Follow the steps below to install an ISA card:

1. Turn the computer system off and remove its cover.
2. Choose an unused ISA slot and remove the slot cover.
3. Insert the card with the bottom edge level to the slot. *Never insert the card at an angle.*
4. Carefully push the card straight down, making sure the card is fully inserted.
5. Replace the screw that holds the card in place.
6. Replace the computer cover.
7. Refer to the ISA card's documentation for additional instructions regarding installation and software drivers.

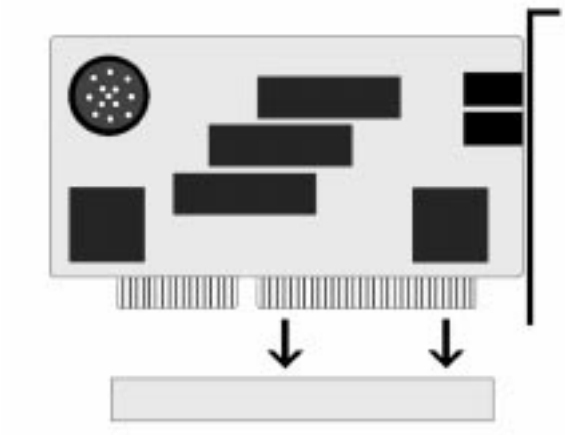


Figure 3-5: Installing an ISA Peripheral Card

Installing an AGP Peripheral Card

The Micronics C400 AGP slot can accommodate all AGP peripherals that meet the Intel AGP bus specifications. Follow the steps below to install an AGP card:

1. Turn the computer system off and remove its cover.
2. Locate the AGP slot (J12) and remove the slot cover.
3. Insert the card with the bottom edge level to the slot. *Never insert the card at an angle.*
4. Carefully push the card straight down, making sure the card is fully inserted.
5. Replace the screw which holds the card in place.
6. Replace the computer cover.
7. Refer to the AGP card's documentation for additional instructions regarding installation and software drivers.

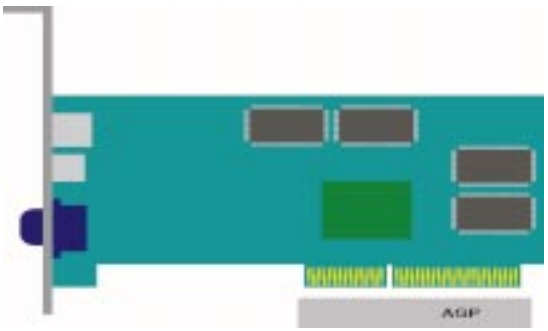


Figure 3-6: Installing an AGP Peripheral Card

Chapter 4

The BIOS Setup Utility

Configuration

After the Micronics C400 system board and all hardware is installed, the system is ready for configuration. Before turning on the computer, make sure all cables are correctly connected and all jumpers are correctly set.

We recommend that you keep the computer cover off the first time you boot the system. This makes it faster and easier to correct any difficulties that might arise.

Initial Boot Up

Power up the Micronics C400. If the system does not properly boot, check all your cables and peripherals for bad connections. You may also get POST codes or error messages. If this occurs, consult Appendix B and C for a guide to possible solutions.

After the system properly boots, it is ready to be configured. The following information explains the proper procedures for BIOS configuration.

Setup

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 run properly, run the Setup procedure after first installing the system board and whenever you make a hardware change to the system.

When the system is turned on, it performs a memory test, and a BIOS identification and system information screen is displayed on your monitor, as shown in Figure 4-1.

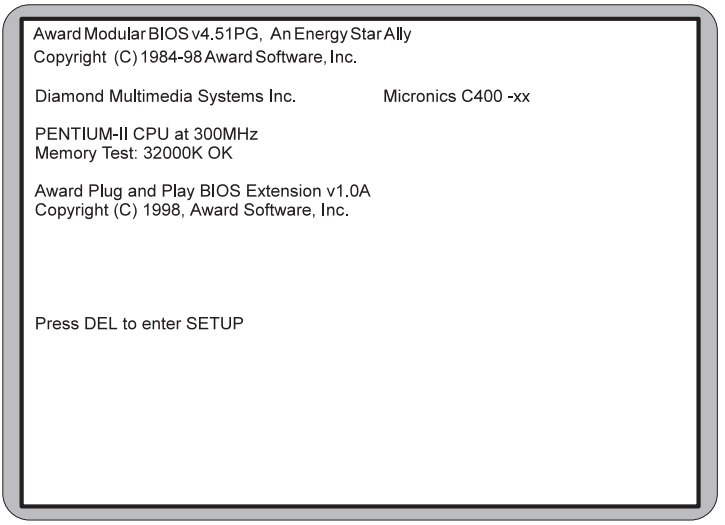


Figure 4-1: Power-Up Screen

When "Press DEL to enter Setup" appears at the bottom of the screen, press the <DEL> key to start the Setup program. The main CMOS Setup utility screen (Figure 4-2) appears. Note that the Setup program can only be activated during the boot sequence.

Running the Setup Program

The Micronics C400 system board has six primary CMOS configuration screens: main setup menu, Standard CMOS Setup, BIOS Features Setup, Chipset Features Setup, PNP/ PCI Configuration and Integrated Peripherals screen.

In addition, there are four screens containing options that do not have to be set unless you want to: the Power Management Setup screen, the Supervisor Password, the User Password and the IDE HDD Auto Detection screen. The main menu screen also contains the following options: Load BIOS Defaults, Load Setup Defaults, HDD Low Level Format, Save & Exit Setup and the Exit Without Saving.

To select any of these screens or options, use the arrow keys (<↑←↓→>) to move the highlight to the desired item and press <ENTER>. *NOTE: A brief description of each highlighted selection appears at the bottom of the screen.*

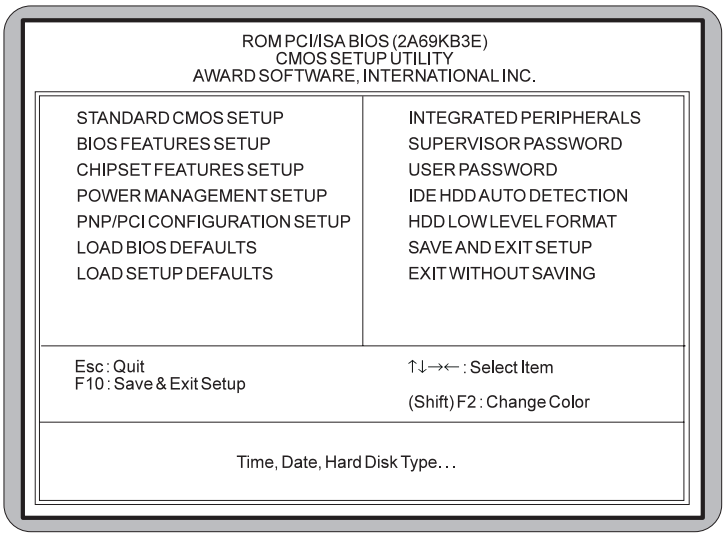


Figure 4-2: CMOS Main Screen

Standard CMOS Setup

The STANDARD CMOS SETUP allows checking or modification of general configuration information. To access the STANDARD CMOS SETUP screen, highlight this option on the main menu screen and press <ENTER>.

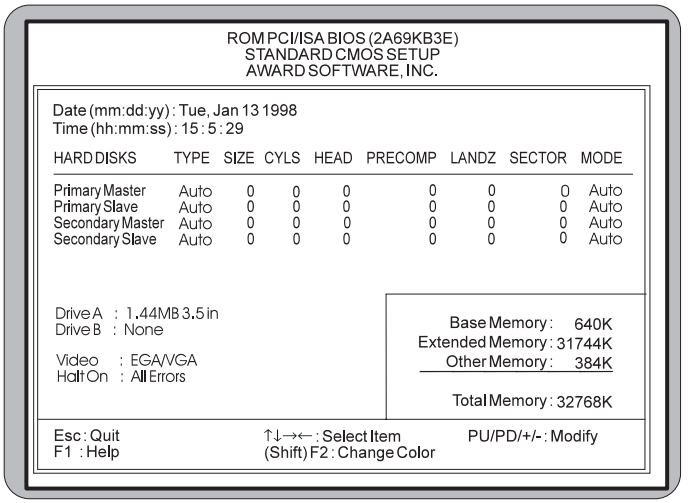


Figure 4-3. Standard CMOS Setup Screen

Date and Time

To set the date, use <→/←↑/↓> arrow keys to highlight the date and follow the same procedure to set the time.

Hard Disks Setup

The BIOS supports up to four IDE drives. You can specify the physical and electronic properties of the disk drives installed. Relevant specifications include the type, number of cylinders (CYLS), heads (HEAD), write precompensation time (PRECOMP), read/write head landing zone (LANDZ), number of sectors per track (SEC-

TOR), and HDD mode (MODE). *NOTE: We recommend that you select type Auto for all drives.*

Diskette A or B

To configure a floppy drive added to or removed from your computer, use <→/←↑/↓> arrow keys to select the desired drive. Use the <PU/PD/+/-> arrow keys to change the setting until it matches the floppy drive you installed. The BIOS supports 2.88MB, 1.44MB, 1.2MB, 720KB and 360KB floppy drives.

Video

Select the type of video card installed into your system. The default setting is EGA/VGA.

Halt On

During the Power-On Self-Test (POST), the system stops if the BIOS detects a hardware error. The default setting is All Errors.

Base/Extended/Other Memory

A small section in the lower right corner of the screen displays important information about your system that includes the base, extended and other memory sizes. They are updated automatically by the Setup program according to the status detected by the BIOS self-test.

BIOS Features Setup

This feature allows you to set the Award enhanced BIOS options of your choice. To access the BIOS FEATURES SETUP screen, highlight this option on the main menu screen and press <ENTER>.

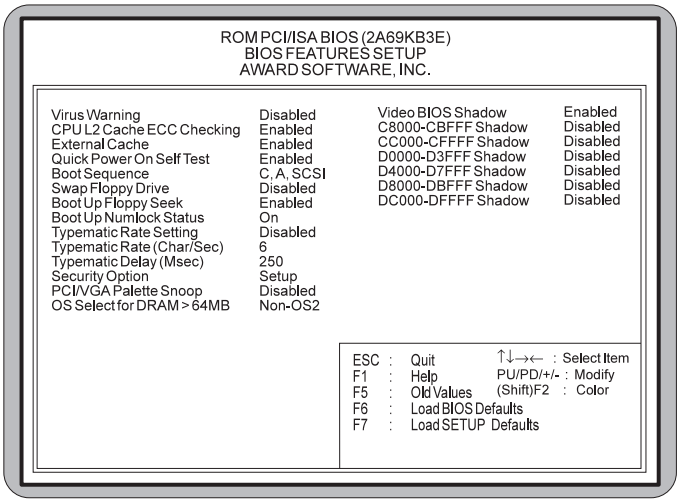


Figure 4-4: BIOS Features Setup Screen

Virus Warning

When enabled, the system BIOS will report a warning message if a program attempts to write to the boot sector or partition table of the hard disk drive.

CPU L2 Cache ECC Checking

This selection enables the internal CPU L2 Cache ECC checking function. The default setting is Enabled.

External Cache

The External Cache selection enables or disables the external (L2) cache and the onboard secondary cache. The default setting is Enabled.

Quick Power-On Self-Test

When enabled, this selection will reduce the amount of time required to run the Power-On Self-Test (POST). A quick POST skips certain steps. We recommend that you disable quick POST. The default setting is Enabled.

Boot Sequence

Boot Sequence selects the order in which the system searches for a boot disk. The default setting is C, A, SCSI.

Swap Floppy Drive

This selection can be set to remap the floppy drives. When set to Enabled, drive A: becomes drive B: and drive B: becomes drive A:.

Boot Up Floppy Seek

When set to Enabled (default), the BIOS tests (seeks) floppy drives to determine whether they have 40 or 80 tracks. Drives with 720KB, 1.2MB and 1.44MB capacity all have 80 tracks.

Boot Up Numlock Status

Toggle between On and Off to control the state of the NumLock key when the system boots. When toggled On, the numeric keypad generates numbers instead of controlling cursor operations. The default setting is On.

Boot Up System Speed

Select the system boot up speed. The default setting is High.

Gate A20 Option

Gate A20 refers to the way the system addresses memory above 1MB (extended memory). When set to Fast (default), the system chipset controls Gate A20. When set to Normal, a pin in the keyboard controller controls Gate A20. Setting Gate A20 to Fast improves system speed, particularly with OS/2 and Windows.

Typematic Rate Setting

This selection enables or disables the Type Rate and Typematic Delay options that control the speed at which a keystroke is repeated.

Typematic Rate/Typematic Delay

Typematic Rate selects the typematic rate at which characters repeat when a key is held down. The default setting is 6 (Chars/Sec). Typematic Delay controls the gap between key compression and appearance of the characters on the screen. The default setting is 250 (Msec).

Security Option

This selection determines whether the password will be asked for in every system boot or only when entering into the Setup (default) program.

PCI/VGA Palette Snoop

Alters the VGA palette setting while graphic signals pass through the feature connector of the VGA card and are processed by the MPEG card. Enable this option only if you have MPEG connections through the VGA feature connector; this means you can adjust PCI/VGA palettes. The default setting is Disabled.

OS Select for DRAM>64MB

This selection allows you to select the amount of memory installed for your operating system. The default setting is Non-OS2. Select OS2 only when running OS/2 operating systems with greater than 64MB of system memory.

Video BIOS Shadow

Enabling this selection allows you to shadow the BIOS on the video card for faster video performance. Some video cards do not support video BIOS shadowing. Disable this option if problems occur.

Chipset Features Setup

The Chipset Features Setup allows you to program the Intel 440BX AGP chipset features. To access the CHIPSET FEATURES SETUP screen, highlight this option on the main menu screen and press <ENTER>.

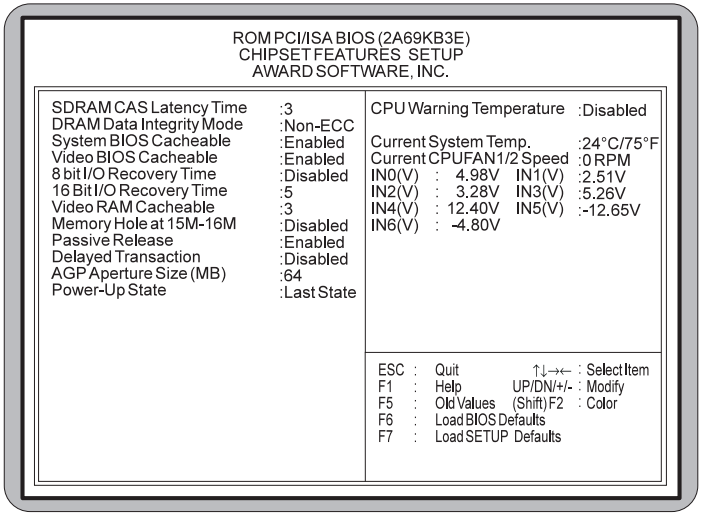


Figure 4-5: Chipset Features Setup Screen

SDRAM CAS Latency Time

When synchronous DRAM is installed, the number of clock cycles of CAS latency depends on the DRAM timing. Do not reset this field from the default value specified.

DRAM Data Integrity Mode

Select Parity or ECC (error-correcting code), according to the type of installed DRAM.

System BIOS Cacheable

Selecting Enabled allows caching of the system BIOS ROM at F0000h-FFFFFh, resulting in better system performance.

However, if any program writes to this memory area, a system error may result.

Video BIOS Cacheable

Selecting Enabled allows caching of the video BIOS ROM at C0000h to C7FFFh, resulting in better video performance. However, if any program writes to this memory area, a system error may result.

8-Bit/16-Bit I/O Recovery Time

The I/O recovery mechanism adds bus clock cycles between PCI-originated I/O cycles to the ISA bus. This delay takes place because the PCI bus is so much faster than the ISA bus. These two fields let you add recovery time (in bus clock cycles) for 16-bit and 8-bit I/O.

Video RAM Cacheable

Enable or disable the caching of the video RAM. The default settings is Disabled.

Memory Hole at 15M-16M

You can reserve this area of system memory for the ISA adapter ROM. When this area is reserved, it cannot be cached.

Passive Release

When enabled, CPU to PCI bus accesses are allowed during passive release. Otherwise, the arbiter only accepts another PCI master access to local DRAM.

Delayed Transaction

The chipset has an embedded 32-bit posted write buffer to support delay transaction cycles. Select Enabled to support compliance with PCI specification version 2.1.

AGP Aperture Size (MB)

Select the size of the Accelerated Graphics Port (AGP) aperture. The aperture is a portion of the PCI memory address range dedicated for graphics memory address space. Host cycles that hit the aperture range are forwarded to the AGP without any translation.

Power-Up State

Specifies how the computer responds following a power failure. *Stay Off* keeps power off until the power button is pressed. *Last State* restores previous power state before a power failure. *Power On* restores power without restoring previous power state.

Current System Temperature

Displays the current system temperature if your computer contains a monitoring system.

Current CPUFAN 1/2 Speed

Displays the current speed of up to three CPU fans if your computer contains a monitoring system.

Power Management Setup

The Power Management Setup option controls the power management functions of the system. To access the POWER MANAGEMENT SETUP screen, highlight this option on the main menu screen and press <ENTER>.

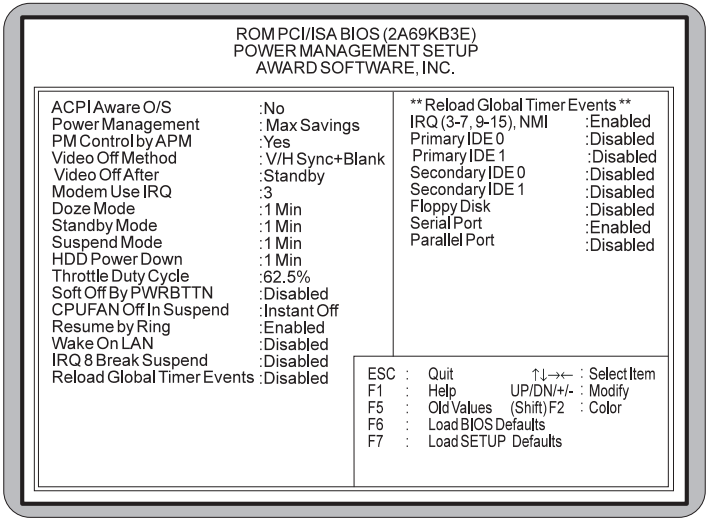


Figure 4-6: Power Management Screen

ACPI Aware O/S

Advanced Configuration and Power Interface (ACPI) enables your PC to automatically turn on and off. ACPI facilitates the transmission of commands from peripherals such as CD-ROMs, hard disk drives and modems to activate the PC when it is in a low-power sleep mode. NOTE: This selection should be set to Yes when using Windows 98.

Power Management

This selection allows you to select the type (or degree) of power saving for Sleep, Standby and Suspend modes. The options are: Maximum Power Savings, User Defined and Minimum Power Savings.

Max Saving	Maximum power savings. Inactivity period is 1 minute in each mode.
User Define	Set each mode individually. Select time-out periods in the PM Timers section.
Min Saving	Minimum power savings. Inactivity period is 1 hour in each mode (except the hard drive).

PM Control By APM

When enabled, power management is controlled by the Advanced Power Management (APM) feature, which gives better power savings. The default setting is YES.

Video OFF Method

This selection defines the video off method in standby mode. The following table describes each option:

SYNC+Blank	System turns off vertical and horizontal synchronization ports and writes blanks to the video buffer.
DPMS Support	Select this option if your monitor supports the Display Power Management Signaling (DPMS) standard of the Video Electronics Standards Association (VESA). Use the software supplied for your video subsystem to select video power management values.
Blank Screen	System only writes blanks to the video buffer.

Video OFF After

Select the mode in which you want the monitor to blank. The default setting is Standby.

Modem Use IRQ

Select an IRQ setting to be used by the modem if Resume by Ring is enabled.

Doze Mode

After the selected period of system inactivity (1 minute to 1 hour), the CPU clock runs at slower speed while all other devices still operate at full speed.

Standby Mode

After the selected period of system inactivity (1 minute to 1 hour), the fixed disk drive and the video shut off while all other devices still operate at full speed.

Suspend Mode

After the selected period of system inactivity (1 minute to 1 hour), all devices except the CPU shut off.

HDD Power Down

After the selected period of drive inactivity (1 to 15 minutes), the hard disk drive powers down while all other devices remain active.

Throttle Duty Cycle

This option allows you to select the percentage of time that the CPU clock runs when the system enters Doze Mode.

VGA Active Monitor

Select whether or not video activity restarts the global timer for Standby Mode.

Soft Off By PWR-BTTN

This selection allows you to set your system's power button to Delay 4 Sec or Instant Off. When set to Delay 4 Sec and the power button is pushed within 4 seconds, the system will go into suspend mode. When the power button is pushed over 4 seconds, the system will power off.

CPUFAN Off In Suspend

When enabled, this selection turns off the CPUFAN in Suspend mode.

Resume By Ring

When this feature is turned on, the system will wake up when an incoming call is detected on your modem. You must set up the Mode Use IRQ selection.

Wake On LAN

This selection specifies whether the computer responds to an incoming call or not. Wake On LAN requires a PCI add-in network interface card with remote wakeup capabilities and an ATX power supply that can handle the power requirement for 5V standby.

IRQ 8 Break Suspend

Sets the monitoring of IRQ8 (Real Time Clock) so that it does not awaken the system from Suspend mode.

Reload Global Timer Events

You can disable monitoring of common interrupt requests so they do not awaken the system from, or reset activity timers for Standby mode.

PnP/PCI Configuration Setup

The PnP/PCI Configuration Setup option sets the various system functions and internal addresses of PnP and PCI devices and onboard PCI IDE controller. To access the PnP/PCI CONFIGURATION SETUP screen, highlight this option on the main menu screen and press <ENTER>.

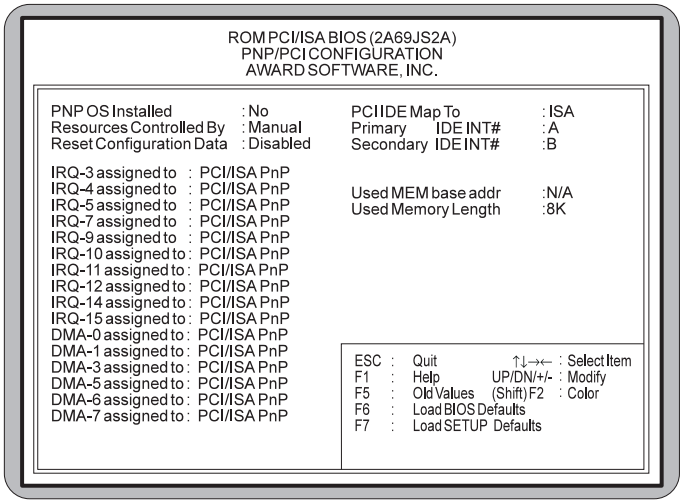


Figure 4-7: PnP/PCI Configuration Screen

PnP OS Installed

When set to Yes, this selection allows the system to work with a Plug and Play (PnP) operating system such as Windows 95. The PnP BIOS will configure only PCI and ISA Plug and Play cards needed to boot the system, and allow the operating system or device drivers to configure the remaining cards. The default setting is No.

Resources Controlled By

The Micronics C400's Plug and Play BIOS can automatically configure all the boot and Plug and Play-compatible

devices. If you select Auto all the interrupt request (IRQ) and DMA assignment fields disappear, as the BIOS automatically assigns them.

Reset Configuration Data

Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup. This selection allows the PnP BIOS to detect your PCI and ISA PnP devices and reallocate resources to them. The default setting is Disabled.

IRQ *n* Assigned To

When resources are controlled manually, assign each system interrupt as one of the following types, depending on the type of device using the interrupt:

Legacy ISA Devices compliant with the original PC AT bus specification, requiring a specific interrupt (such as IRQ4 for COM 1) or older ISA cards that use jumpers to adjust resources.

PCI/ISA PnP Devices compliant with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

DMA *n* Assigned To

When resources are controlled manually, assign each system DMA channel as one of the following types, depending on the type of device using the interrupt:

Legacy ISA Devices compliant with the original PC AT bus specification, requiring a specific DMA channel or older ISA cards that use jumpers to adjust resources.

PCI/ISA PnP Devices compliant with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

Used Memory Base Address

Select a base address for the memory area used by any peripheral that requires high memory.

Used Memory Length

Select a length of memory area specified by any peripheral that requires high memory. NOTE: This option is available only if Used Memory Base Address is not set at N/A.

Load BIOS Defaults

This selection loads the BIOS default values that would allow safe booting of the system in the event of a BIOS configuration memory loss. To select LOAD BIOS DEFAULTS, highlight this option on the main menu screen and press <ENTER>. Press <Y> or <N> when the program prompts you with the Load BIOS Defaults question.

Load Setup Defaults

This selection allows automatic configuration of all the options in the Standard CMOS Setup, BIOS Features Setup and Chipset Features Setup with the setup defaults. If problems are encountered after loading the setup defaults, reboot the system and load the BIOS defaults. To select LOAD SETUP DEFAULTS, highlight this option on the main menu screen and press <ENTER>. Press <Y> or <N> when the program prompts you with the Load Setup Defaults question.

Integrated Peripherals

This option sets the addresses of I/O subsystems that depend on the integrated peripherals controller in your system. To access the INTEGRATED PERIPHERALS screen, highlight this option on the main menu screen and press <ENTER>.

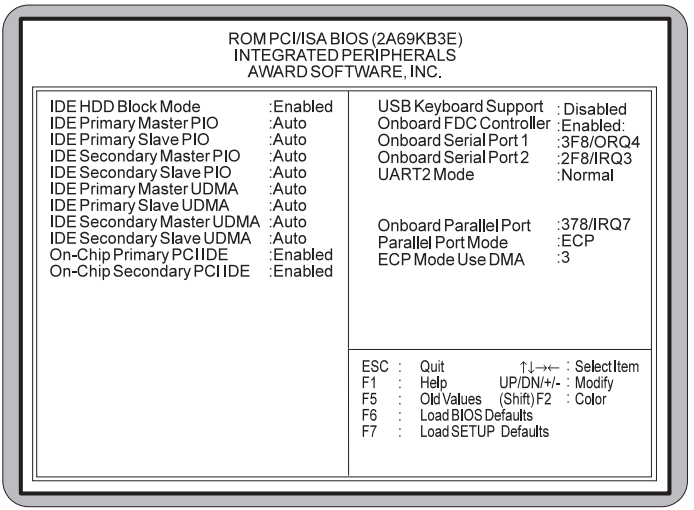


Figure 4-8: Integrated Peripherals Configuration Screen

IDE HDD Block Mode

Block mode is also called block transfer, multiple commands, or multiple sector read/write. If your IDE hard drive supports block mode (most new drives do), select Enabled (default) for automatic detection of the optimal number of block read/writes per sector the drive can support.

IDE Primary/Secondary Master/Slave PIO

The four IDE PIO (Programmed Input/Output) fields allow you to set a PIO mode (0-4) for each of the four IDE

devices that the onboard IDE interface supports. Modes 0 through 4 provide successively increased performance. In Auto (default) mode, the system automatically determines the best mode for each device.

IDE Primary/Secondary Master/Slave UDMA

Set the UDMA (Ultra DMA/33) mode for the specified onboard IDE interface. Ultra DMA/33 is a hard drive interface protocol that increases the burst data transfer rate to 33MBytes per second. NOTE: Your hard drive and operating environment must both support the UDMA mode.

On-Chip Primary/Secondary PCI IDE

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select Enabled to activate each channel separately.

USB Keyboard Support

Select Enabled if your system contains a Universal Serial Bus (USB) controller and you have USB keyboard.

Onboard FDC Controller

Select Enabled (default) to use the floppy disk controller installed on the system board. If you install an add-in controller or the system has no floppy drive, select Disabled.

Onboard Serial Port 1/2

Select a logical COM port name and matching address for the first and second serial ports.

UART2 Mode

The second serial port offers the following Infrared interface modes: Standard, HPSIR: IrDA-compliant serial infrared port, and ASK-IR: Amplitude shift keyed infrared port. Standard mode is the default.

Onboard Parallel Port

Select an address and interrupt for the physical parallel (printer) port.

Onboard Parallel Mode

Select an operating mode for the onboard parallel (printer) port. Select SPP (default) unless your hardware and software require one of the other modes offered in this field.

ECP Mode Use DMA

Select a DMA channel for the port. The default setting is channel 3.

Supervisor Password

The Supervisor Password utility allows you to setup, change or disable the password stored in the BIOS. The Supervisor Password allows access to the system Setup. To setup or change a password, highlight the SUPERVISOR PASSWORD option on the main menu screen and press <ENTER>.

The password can be no more than eight characters long. The program will prompt you to confirm the new password before exiting and enabling the utility. To disable the password, press <ENTER> when the program prompts you to enter the new password.

WARNING: If you forget the Supervisor Password, it cannot be disabled without resetting the CMOS.

User Password

The User Password utility allows you to setup, change or disable the password stored in the BIOS. Follow the same procedure used to setup the Supervisor Password. The User Password allows power-on access to the system, but will not allow you to modify the CMOS settings.

NOTE: The User Password can only be set after setting the Supervisor password.

IDE HDD Auto Detection

The IDE HDD Auto Detection option provides auto configuration of the hard drive installed in your system. To access the IDE HDD Auto Detection screen, highlight this option on the main menu screen and press <ENTER>.

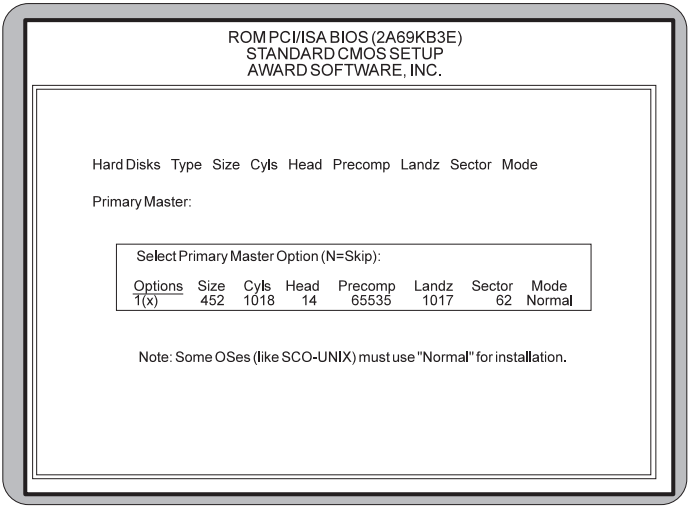


Figure 4-9: IDE HDD Auto Detection Screen

The IDE HDD Auto Detection option provides auto configuration of the hard drive installed in your system. It supports LBA, Large and Normal modes.

If your hard disk drive's capacity is under 528MB, select Normal mode. NOTE: It is recommended that you select Normal mode for your hard disk drive if you will be using UNIX. If the system's hard disk drive has a capacity of over 528MB and supports LBA functions, you may enable either the LBA mode or the Large Mode.

HDD Low Level Format

Diamond recommends that only trained technicians use this utility. This selection allows you to perform a low level format of your hard disk drive. To select the HDD LOW LEVEL FORMAT option, highlight this option on the main menu screen and press <ENTER>.

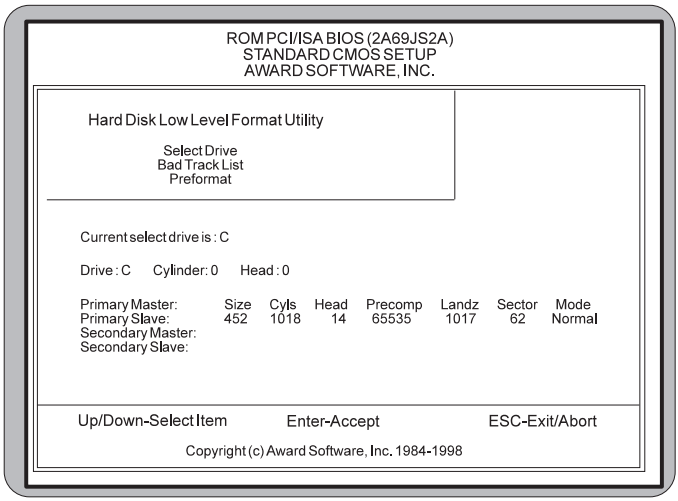


Figure 4:10: HDD Low Level Format Screen

The selections available are: Low Level Format Utility, Select Drive Bad Track List and Preformat.

WARNING: This utility should not be run on an IDE or EIDE hard drive unless the manufacturer of the hard drive instructs you to do so.

Save and Exit Setup

This selection saves the changes you have made in the setup program, then exits and reboots the system. After making all modifications in the setup program, exit to the main menu screen. Highlight the SAVE AND EXIT SETUP option and press <ENTER>. Press <Y> to confirm the changes made and <N> or <ESC> if additional modifications are needed before exiting the setup program.

Exit Without Saving

This selection abandons all previous settings, then exits and reboots the system. From the main menu screen highlight the EXIT WITHOUT SAVING option and press <ENTER>. Press <Y> and the system will exit the setup program, then reboot without saving any of the changes made.

Chapter

5 Special Features

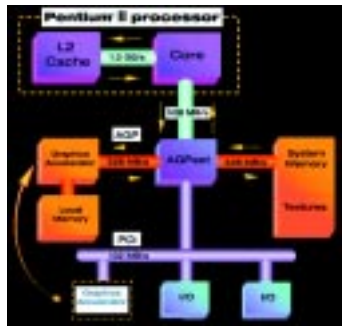
The Micronics C400 achieves high reliability, performance and scalability with numerous features.

Intel's 440BX AGPset

In the competitive world of system board chipsets, Intel's new 440BX places at the top with its support for the 100MHz Front Side Bus (FSB) technology. The 440BX is the infrastructure behind the 100MHz FSB technology. Along with PC-100 memory and Intel's new versions of the Pentium II processor family, the 440BX AGPset adds a new data highway that should post a substantial increase in bus and memory access. The flexibility of the 440BX allows for support of the first generation Pentium II processors at 66MHz FSB speeds.

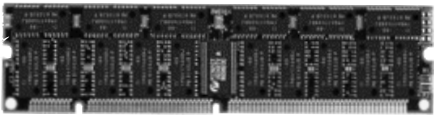
Accelerated Graphics Port (AGP)

With the introduction of the Pentium II and the 440LX AGPset, graphics took the next step onto the AGP freeway. The AGP bus is faster than the current 33MHz PCI bus. It provides a *direct* connection between the graphics subsystem and system memory. AGP, with dual 528MB/s data path, surpasses PCI's 132MB bottleneck.



SDRAM (Synchronous DRAM)

SDRAM is memory that can synchronize itself with the computer's clock. This synchronization reduces time delays and allows for fast consecutive read and write capability. SDRAM can add as much as 10% to the overall system performance.



Intel's release of the 440BX AGPset allows SDRAM to operate up to a new standard at 100MHz. At these speeds, a new standard of SDRAM or PC-100 SDRAM is required. PC-100 MHz memory is backwards compatible to run at 66MHz, however, a non PC-100 SDRAM may not be used on a 100MHz FSB system.

Wake On LAN

This feature offers you a way to access a local-area or wide-area network or modem to turn on desktop PCs remotely. The wake-up control located on the Micronics C400 system board collects input from a Wake On LAN enabled adapter and the PC's power switch. It then routes its output to the power-supply activation circuitry. You can power up your PC or multiple PCs from a remote location and manage networks more efficiently.

Wake On LAN, along with system management tools such as Intel LANDesk Client Manager, can work together to cut computing costs by allowing time-consuming PC management tasks to be done when network bandwidth is less demanding.

Ultra DMA/33 IDE

A hard drive interface protocol that increases the burst data transfer rate to 33MBytes per second. Prior to this protocol, Mode-4 protocol has been the fastest at 16.6MB per second. This new protocol is supported by Intel's 440LX and 440BX AGPsets.

Universal Serial Bus (USB)

The simple and flexible way to connect devices to your desktop or notebook PC. USB allows virtually unlimited PC expansion with no more hassles over add-in cards, dip switches, jumper cables, software drivers, IRQ settings, DMA channels and I/O addresses. With USB, you can attach and detach peripherals without opening the computer or even shutting it down.

Appendix

A Specifications

Part Number:	09-00351-xx
Processor:	Single Intel Slot 1® for Intel Celeron® 233-333MHz (66MHz FSB). Intel Pentium® II 350-450MHz (100MHz FSB).
CPU Clock Select:	Support for 66/100MHz CPU bus
Chipset:	Intel 440BX AGPset Intel PIIX4e
Form Factor:	Mini ATX footprint (7.5" x 12") 20-pin ATX power connector
Expansion:	One AGP slot Four 32-bit PCI slots One shared PCI/ISA slot One 16-bit ISA slot
BIOS:	Award BIOS on 1MB Flash APM 1.2 PCI auto configuration Auto detection of memory size Auto detection and display of EDO and SDRAM memory. Auto detection of IDE hard disk types Soft Power Down (for ATX power supply) Instant On and Quick Boot Multi-boot II DMI 2.0/SMI/ACPI

Keyboard/Mouse:	PS/2 style keyboard and mouse connector
Memory Capacity:	Three 3.3V unbuffered 64-bit DIMM sockets Maximum memory - 768MB for SDRAM (PC-100MHz SDRAM memory supported) Supports EDO and SDRAM ECC supported via chipset when using parity
Hardware Management:	Microprocessor System Hardware Monitor CPU Fan Speed Monitoring (3-pin header) Chassis Fan Speed Monitoring (3-pin header)
I/O Ports:	Two high speed serial ports (16550 compatible) One 25-pin Parallel Port (ECP and EPP) IrDA compliant IR header Two USB connectors SB-LINK header to support legacy Sound Blaster compatible PCI audio card.
Floppy Port:	Supports 360K - 2.88MB formats Auto detection of add-in floppy controllers
PCI IDE Ports:	Ultra DMA/33 IDE Two 40-pin IDE connectors (Primary and Secondary IDE). Multiple sector transfer support Auto detection of add-in IDE board Supports all ATAPI devices
Wake On LAN:	Wake On LAN ready for remote monitoring (3-pin header). *NOTE: You must use a Wake On LAN supported Ethernet adapter and an ATX power supply that can handle the power requirement for 5V standby.*

Environmental Specifications

The environment in which the Micronics C400 is located is critical. Diamond recommends the following environmental specifications:

Temperature Range

Operating: 50 to 104 degrees Fahrenheit (10 to 40 degrees Celsius).

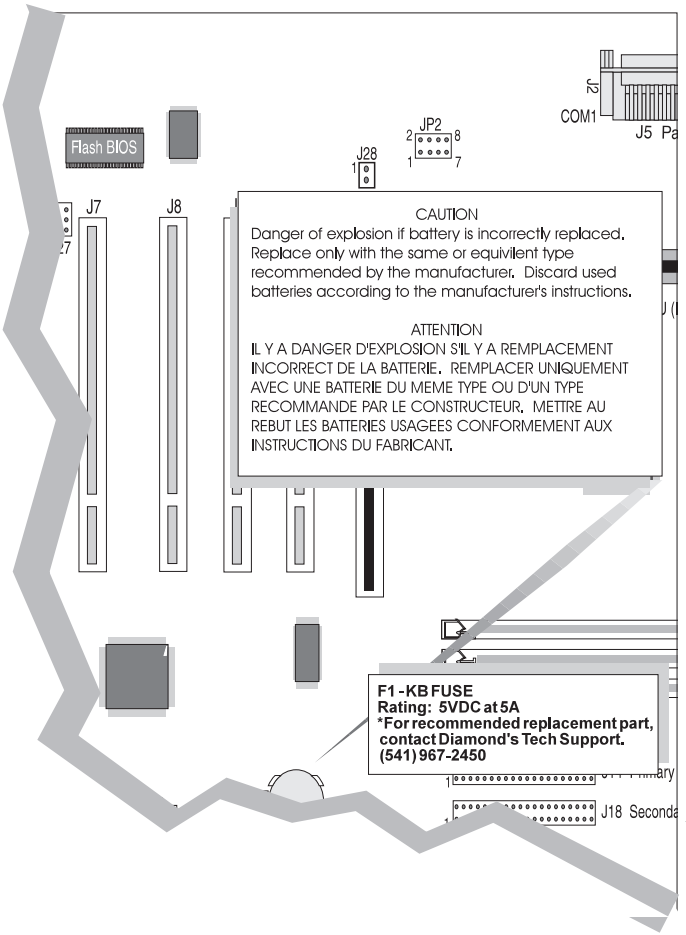
Non -Operating: 50 to 140 degrees Fahrenheit (10 to 60 degrees Celsius).

Shipping: -22 to 140 degrees Fahrenheit (-30 to 60 degrees Celsius).

Relative Humidity

Operating: 20% to 80%.
Non-Operating: 5% to 90%.

Battery Disposal



WARNING:

Please do not open battery, dispose of in fire, recharge, put in backwards or mix with used or other battery types. The battery may explode or leak and cause personal injury.

Support and Information Services

Diamond offers a variety of support and information services to help you get the most from your product. The following services are available:

- ▲ Technical Support
- ▲ Electronic Bulletin Board Service (BBS)
- ▲ Return Materials Authorization (RMA)
- ▲ Fax-On-Demand
- ▲ World Wide Web
- ▲ Customer Service

Refer to Table A-1 for details on these services.

Technical Support

If you need technical assistance, our Technical Support Engineers will be glad to help you. You can contact us via telephone, fax or BBS. Before calling Technical Support please have the following information ready:

- ❑ The model name part number and serial number of your Diamond product, which is silk screened on the back of the Micronics C400 system board.
- ❑ Your computer information such as CPU type, operating system, amount of installed memory and other peripherals installed in your computer.
- ❑ Try to call from the location of your computer.

NOTE: For Return Material Authorization purposes, please keep a copy of your product receipt.

Service	Country	Telephone Number
Technical Support - Live phone help from Technical Support Engineers	USA UK Germany France Asia-Pacific	(541) 967-2450 (541) 967-2401 (Fax) techsupt@diamondmm.com (E-mail) +44-1189-444-444 +44-1189-444-445 (Fax) +49-8151-266-330 +33 (0) 1 55 38 16 16 +65-254-3163 +65-254-3407 (Fax)
Electronic Bulletin Board Service (BBS) - Information on software upgrades, new releases and other helpful information	USA UK Germany	(541) 967-2444 +44-1189-444-415 (28.8 Kpbs) +44-1189-441-312 (56 Kbps) K56flex standard) +49-8151-266-333 (28.8 Kpbs) +49-8151-266-334 (56 Kbps) Euro ISDN) +49-8151-266-356 (56 Kbps) K56flex standard)
RMA (Return Materials Authorization) - Return products for repair	USA	(800) 468-5846 (408) 325-7408 (Fax)
Fax-On-Demand - Automated system for product literature, technical bulletins and other helpful information	USA Germany	(800) 380-0030 +49-8151-266-332
World Wide Web - Product information, technical support, press releases and other helpful information	USA UK Germany	http://wwwdiamondmm.com http://wwwdiamondmm.co.uk http://wwwdiamondmm.de
Customer Service - Order Diamond products	USA UK Germany Asia-Pacific	(800) 468-5846 (408) 325-7408 (Fax) customerservice@diamondmm.com (E-mail) +44-1189-444-444 +44-1189-444-445 (Fax) +49-8151-266-330 +65-254-3163 +65-254-3407 (Fax)

Table A-1: Support and Information Services

Appendix B

POST Codes

The following tables list the Power On Self Test (POST) codes, names and solutions. EISA POST codes are typically output to port address 300h. ISA POST codes are output to port address 80h.

Code (hex)	Name	Description
C0	Turn Off Chipset Cache	OEM Specific-Cache control
1	Processor Test 1 Verification	Processor Status (1FLAGS) Tests the following processor status flags: carry, zero, sign, overflow, The BIOS sets each flag, verifies they are set, then turns each flag off and verifies it is off.
2	Processor Test 2	Read/Write/Verify all CPU registers except SS, SP, and BP with data pattern FF and 00.
3	Initialize Chips	Disable NMI, PIE, AIE, UEI, SQWV Disable video, parity checking, DMA. Reset math coprocessor. Clear all page registers, CMOS shutdown byte. Initialize timer 0, 1, and 2, including set EISA timer to a known state. Initialize DMA controllers 0 and 1 Initialize interrupt controllers 0 and 1 Initialize EISA extended registers.
4	Test Memory Refresh Toggle	RAM must be periodically refreshed to keep the memory from decaying. This function ensures that the memory refresh function is working properly.
5	Blank video, Initialize keyboard	Keyboard controller initialization.
6	Reserved	
7	Test CMOS Interface and Battery Status	Verifies CMOS is working correctly,
BE	Chipset Default Initialization	Program chipset registers with power on BIOS defaults.
C1	Memory presence Test	OEM Specific-Test to size on-board memory
C5	Early Shadow	OEM Specific-Early Shadow enable for fast boot.
C6	Cache presence test	External cache size detection
8	Setup low memory	Early chip set initialization. Memory presence test. OEM chip set routines. Clear low 64K of memory. Test first 64K memory.
9	Early Cache Initialization	Cyrix CPU initialization Cache initialization
A	Setup Interrupt Vector Table	Initialize first 120 interrupt vectors with SPURIOUS_INT_HDLR and initialize INT 00h-1Fh according to INT_TBL
B	Test CMOS RAM Checksum	Test CMOS RAM Checksum, if bad, or insert key pressed, load defaults.
C	Initialize Keyboard	Detect type of keyboard controller (optional)x Set NUM_LOCK status.
D	Initialize Video Interface	Detect CPU clock. Read CMOS location 14h to find out type of video in use. Detect and Initialize Video Adapter.
E	Test Video Memory	Test video memory, write sign-on message to screen. Setup shadow RAM - Enable shadow according to Setup.
F	Test DMA	BIOS checksum test. Controller 0 Keyboard detect and

Code (hex)	Description	
10	Test DMA Controller 1	
11	Test DMA Page Registers	Test DMA Page Registers.
12-13	Reserved	
14	Test Timer Counter 2	Test 8254 Timer 0 Counter 2.
15	Test 8259-1 Mask Bits	Verify 8259 Channel 1 masked ts interrupts by alternately turning off and on the interrupt lines.
16	Test 8259-2 Mask Bits	Verify 8259 Channel 2 masked interrupts by alternately turning off and on the interrupt lines.
17	Test Stuck 8259's Interrupt Bits	Turn off interrupts then verify interrupt mask register is on.
18	Test 8259 Interrupt Functionality	Force an interrupt and verify the interrupt occurred.
19	Test Stuck NMI Bits (Parity/IO Check)	Verify NMI can be cleared.
1A	Display CPU clock	
1B-1E	Reserved	
1F	Set EISA Mode	If EISA non-volatile memory checksum is good, execute EISA initialization. If not, execute ISA tests an clear EISA mode flag.Test EISA Configuration Memory Integrity (checksum & communication interface).
20	Enable Slot 0	Initialize slot 0 (System Board).
21-2F	Enable Slots	Initialize slots 1 through 15.
1-15		
30	Size Base and	Size base memory from 256K to 640K Extended Memory and extended memory above 1MB.
31	Test Base and	Test base memory from 256K to 640K Extended Memory and extended memory above 1MB using various patterns. NOTE: This test is skipped in EISA mode and can be skipped with ESC key in ISA mode.x
32	Test EISA	If EISA Mode flag is set then test Extended Memory EISA memory found in slots initialization.x NOTE: This test is skipped in ISA mode and can be skipped with ESC keyin EISA mode.
33-3B	Reserved	
3C	Setup Enabled	
3D	Initialize & Install Mouse	Detect if mouse is present, initialize mouse, install interrupt vectors.
3E	Setup Cache Controller	Initialize cache controller.
3F	Reserved	
BF	Chipset Initialization	Program chipset registers with Setup values
40	Display virus protect disable or enable	

Code (hex)	Description	
41	Initialize Floppy Drive & Controller	Initialize floppy disk drive controller and any drives.
42	Initialize Hard Drive & Controller	Initialize hard drive controller and any drives.
43	Detect & Initialize Serial/Parallel Ports	Initialize any serial and parallel ports (also game port).
44	Reserved	
45	Detect & Initialize Math Coprocessor	Initialize math coprocessor.
46	Reserved	
47	Reserved	
48-4D	Reserved	
4E	Manufacturing POST Loop or Display Messages	Reboot if Manufacturing POST Loop pin is set. Otherwise display any messages (i.e., any non-fatal errors that were detected during POST) and enter Setup.
4F	Security Check	Ask password security (optional).
50	Write CMOS	Write all CMOS values back to RAM and clear screen.
51	Pre-boot Enable	Enable parity checker. Enable NMI, Enable cache before boot.
52	Initialize Option ROMs	Initialize any option ROMs present from C8000h to EFFFFh. NOTE: When FSCAN option is enabled, ROMs initialize from C8000h to F7FFFh.
53	Initialize Time Value	Initialize time value in 40h: BIOS area.
60	Setup Virus Protect	Setup virus protect according to Setup
61	Set Boot Speed	Set system speed for boot
62	Setup NumLock	Setup NumLock status according to Setup
63	Boot Attempt	Set low stack Boot via INT 19h.
B0	Spurious	If interrupt occurs in protected mode.
B1	Unclaimed NMI	If unmasked NMI occurs, display Press F1 to disable NMI, F2 reboot.
E1-EF	Setup Pages	E1- Page 1, E2 - Page 2, etc.
FF	Boot	

Appendix

C POST Messages

During the Power-On Self Test (POST), the BIOS either sounds a beep code or displays a message when it detects a correctable error. The following tables list POST messages for the ISA BIOS kernel.

Message	Solution
Beep	Currently the only beep code indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by two short beeps. Any other beeps are probably a RAM problem.
BIOS ROM checksum error - System halted	The checksum of the BIOS code in the BIOS chip is incorrect; indicating the BIOS code may have become corrupt. Contact your system dealer to replace the BIOS.
CMOS battery failed	CMOS battery is no longer functional. Contact your system dealer for a replacement battery.
CMOS checksum error - Defaults loaded	Checksum of CMOS is incorrect, so the system loads the default equipment configuration. A checksum error may indicate that CMOS has become corrupt. A weak battery may have caused this error. Check the battery and replace if necessary.
CPU at nnnn	Displays the running speed of the CPU.
Display switch is set incorrectly.	The display switch on the motherboard can be set to either monochrome or color. This message indicates the switch is set to a different setting than indicated in Setup. Determine which setting is correct, and then either turn off the system and change the jumper, or enter Setup and change the VIDEO selection.
Press ESC to skip memory test	The user may press Esc to skip the full memory test.
Floppy disk(s) fail	Cannot find or initialize the floppy drive controller or the drive. Make sure the controller is installed correctly. If no floppy drives are installed, be sure the Diskette Drive selection in Setup is set to NONE or AUTO.
HARD DISK initializing	Please wait a moment... Some hard drives require extra time to initialize.
HARD DISK INSTALL FAILURE	Cannot find or initialize the hard drive controller or the drive. Make sure the controller is installed correctly. If no hard drives are installed, be sure the Hard Drive selection in Setup is set to NONE.

Message	Solution
Hard disk(s) diagnosis fail	The system may run specific disk diagnostic routines. This message appears if one or more hard disks return an error when the diagnostics run.
Keyboard error or no keyboard present	Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are pressed during POST. To purposely configure the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. The BIOS then ignores the missing keyboard during POST.
Keyboard is locked out - Unlock the key	This message usually indicates that one or more keys have been pressed during the keyboard tests. Be sure no objects are resting on the keyboard.
Memory Test :	This message displays during a full memory test, counting down the memory areas being tested.
Memory test fail	If POST detects an error during memory testing, additional information appears giving specifics about the type and location of the memory error.
Override enabled - Defaults loaded	If the system cannot boot using the current CMOS configuration, the BIOS can override the current configuration is a set of BIOS defaults designed for the most stable, minimal-performance system operations.
Press TAB to show POST screen	System OEMs may replace the Award Software BIOS POST display with their own proprietary display. Including this message in the OEM display permits the operator to switch between the OEM display and the default POST display.
Primary master hard disk fail	POST detects an error in the primary master IDE hard drive.
Primary slave hard disk fail	POST detects an error in the secondary master IDE hard drive.
Resuming from disk, Press TAB to show POST screen	Award Software offers a save-to-disk feature for notebook computers. This message may appear when the operator re-starts the system after a save-to-disk shutdown. See the Press TAB ... message above for a description of this feature.
Secondary master hard disk fail	POST detects an error in the primary slave IDE hard drive.
Secondary slave hard disk fail	POST detects an error in the secondary slave IDE hard drive.

Appendix D

Updating the System BIOS

The Diamond system boards are designed so that the BIOS can be reprogrammed using a BIOS file. You can easily FLASH a BIOS by following the steps below:

1. After downloading the appropriate BIOS file from our BBS or Website, extract it to a bootable MS-DOS 6.X diskette.

2. Reboot your system with the MS-DOS 6.X diskette in the A: drive. To make sure a clean DOS environment is loaded, press the F5 key while "Starting MS-DOS" is displayed. After the system has rebooted, the cursor will appear at the A:> prompt.

If you encounter any problems during this process, or if you have questions about the procedure, please call Technical Support.

3. Now you can run the FLASH utility from the bootable floppy disk. Refer to the README.TXT file included with the BIOS update for detailed instructions.

4. After the update process has completed and the system reboots, verify that the new BIOS version appears on-screen. If you have problems during this process, or if you have questions about the procedure, please call Technical Support.

NOTE: If you prefer to send your system board in for the upgrade, the RMA department offers this service free of charge if your system board is under warranty.

Appendix E

Limited Warranty

Except as described below, Diamond warrants the products to be free from defects in material and workmanship in normal use for a period of one (1) year from date of purchase. Should any product fail to perform according to this warranty at any time during the warranty period, except as provided below, Diamond or its authorized service centers will, at Diamond's option, repair or replace the product at no additional charge.

The warranty does not cover loss or damage which occurs in shipment or which is due to: (1) improper installation or maintenance, misuse, neglect or any cause other than ordinary commercial application, including without limitation, accidents or acts of God; (2) adjustment, repair, or modification by other than a Diamond authorized service center; (3) improper environment, excessive or inadequate heating or air conditioning, or electrical power failures, surges or other irregularities; (4) any statement about the product other than those set forth in this warranty; or (5) nonconformity to models or samples shown to the purchaser. Any models or samples were for the sole purpose of suggesting the character of the product and are not intended to form the basis of the bargain.

A receipt or copy of the invoice with the date of purchase from a Diamond reseller is required before any warranty service can be rendered. Service can be obtained by calling Diamond for a Return Merchandise Authorization (RMA) Number.

The RMA Number should be prominently displayed on the outside of the shipping carton of the returned product. Returned product should be shipped prepaid or hand carried to Diamond. The purchaser assumes risk of loss or damage in transit, and unless otherwise agreed to in writing by Diamond, will pay inbound shipping charges.

The exclusive remedy of the purchaser under this warranty above will be repair or replace at Diamond's option, but if for

any reason that remedy should fail of its essential purpose, the exclusive remedy of the purchaser shall then be actual damages up to amounts paid for the defective product by the purchaser. This limited warranty shall be deemed to "fail of its essential purpose" if, after repeated efforts, Diamond is unable to make the product operate as warranted. Diamond's liability for damages to the purchaser for any cause whatsoever; regardless of the form of action and whether in contract or in tort, shall be limited to the purchase price in effect when the cause of action arose for the product that is the basis of the claim.

Diamond will not be liable for any lost profits or any indirect, special incidental or consequential damages in connection with the product, even if Diamond has been advised of the possibility of such damages.

Diamond makes no warranties or representations as to performance of products or as to service to distributor or to any person, except as set forth in Diamond; limited warranty accompanying delivery of product.

Diamond disclaims all other warranties whether oral, written, expressed, or implied, including without limitation, the warranties of design, merchantability, or fitness for a particular purpose, if applicable, or arising from a course of dealing, usage or trade practice.

Non-Warranty Service

After the one year warranty service is no longer in effect, repair service is still available for Diamond products. For more information, contact Diamond's RMA department at (800) 468-5846.

FCC Statement

This equipment has been tested and found to comply within the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not used in accordance with the instructions, may cause harmful interference to radio communications. Interference to radio or television reception can be determined by turning the equipment off and on. You are encouraged to try to correct the interference by one or more of the following measures:

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

To meet FCC requirements, shielded cables are required.

NOTE: Changes or modifications not expressly approved by Diamond could void your authority to operate the equipment.

Glossary

16550 UART - A high speed chip for controlling serial ports. Although unnecessary for a mouse, it is required for modems that are 14,400 baud or faster.

AGP - Accelerated Graphics Port. A faster bus than the current 33MHz PCI bus, which will connect the graphics controller to system memory through the chipset.

Asynchronous - Operations that do not require the clocks of communicating devices to be coordinated. See Synchronous.

Baby AT - A system board size measuring approximately 10.8" x 8.6".

Bidirectional Parallel Port - A type of parallel port that can send and receive information.

BIOS - An Acronym for Basic Input/Output System. Configures the system board and provides hardware information to the operating system.

Bit - A contraction of Binary digit. The smallest unit of information in a binary number system. A bit represents a choice between either zero or one.

Boot - To start up the computer and load the operating system software. See cold boot and warm boot.

Buffered DIMMs - The 168-pin buffered DIMM modules use buffer logic chips on their control lines to reduce loading on the system board. This buffering action increases the maximum number of modules on the same system board. The buffered DIMMs come with standard DRAM chips for either 5V or 3.3V operation.

Bus - A group of electronic paths used to send data between parts of the system. On a system board, the bus connects the peripheral cards with the microprocessor via the expansion slots.

Bus Mastering - The ability of a peripheral card to control the bus without requiring intervention of the CPU.

Byte - A group of adjacent bits treated as a unit. Eight bits are typically considered one byte. Also called a character.

Cache - A process where information is copied from the slower memory (DRAM) to the faster memory (SRAM). Information that is likely to be read or edited is stored in the cache providing significant performance increases.

Cache Hit - The percentage of request for data from memory that can be served from the cache.

Cache Miss - A memory access which cannot be supplied from cache.

Cold Boot - Starting the computer by turning on the power or pressing the RESET button. A cold boot makes the processor execute all of the diagnostics. See boot and warm boot.

CPU - An acronym for Central Processing Unit. A CPU performs arithmetic calculations, makes logical decisions, and directs the operation of the computer in conjunction with the operating system.

DIMM - An acronym for Dual Inline Memory Module. A small printed circuit board containing memory chips.

Disk Drive - A hardware device which provides for the storage of data on diskettes or hard metal disks that have a magnetic coating. A disk drive functions by spinning at high speed while moving a device called the read/write head across the disk's surface in order to read or write data in magnetic code.

DRAM - An acronym for Dynamic Random Access Memory. A type of memory chip that only keeps its memory if supplied with regular clock pulses and a chance to regularly refresh its data. It is slower and more cost effective than SRAM. See SRAM.

ECC - An acronym for Error Checking and Correction. ECC is logic designed to correct memory errors. The number of errors that can be corrected depends upon the algorithms used, and the number of error correction bits (non-data bits) present.

ECP - An acronym for Expanded Capabilities Port. A standard set by Hewlett Packard and Microsoft Corporation to expand the capabilities of the parallel port.

EDO Memory - An acronym for Extended Data Out. A DRAM performance feature that permits multiple bit of data in a single row to be accessed quickly.

EPP - An acronym for Enhanced Parallel Port. A standard which increases the capabilities of the parallel port.

EPROM - Acronym for Erasable Programmable Read Only Memory. A type of ROM chip that can be programmed with relatively simple tools that will retain its data until erased. It can only be erased by exposing the circuitry in the chip to ultraviolet light. See also Flash ROM.

Flash ROM - A type of ROM chip that will retain its data until erased. It can be erased or reprogrammed by supplying it with +12V of voltage. See ROM and EPROM.

Gigabyte - A disk storage capacity measurement. Approximately one thousand megabytes or 1,073,741,824 bytes.

IDE - An acronym for Integrated Device Electronics. A standard for communicating between a hard drive and a computer.

Internal Cache - Cache which is built into the CPU. See Cache.

ISA - An acronym for Industry Standard Architecture. A well-established bus standard that originated with the IBM AT. See *PCI and VESA Local Bus*.

LM78 - The LM78 is a highly integrated Data Acquisition system for hardware monitoring of servers, personal computers or virtually any microprocessor based system. In a PC, the LM78 can be used to monitor temperatures, power supply voltages and fan speeds.

NS - An acronym for Nanosecond. One billionth of a second. Measure of the access time of RAM.

Parallel - A form of data transmission in which the data is sent one byte at a time over several wires that each carry one byte. In parallel transmission, all the bytes arrive simultaneously, as opposed to serial transmission in which bits arrive one by one.

Parallel Port - A connection for a printer or similar peripheral. Generally, parallel ports are output only. See Bidirectional Parallel Port and ECP.

Parity - Logic that detects the presence of an error in memory. Generally, a single parity bit is used for each byte (8 bits) of data. The most commonly used forms of parity are even parity, odd parity and checksums.

PCI - An acronym for Peripheral Component Interconnect. A high performance 32-bit or 64-bit bus developed by Intel Corporation. PCI is designed to be independent of the hardware architecture to ensure compatibility with future computer systems. See *VESA Local Bus and ISA.*

Pentium - A high performance 64-bit CISC processor designed and manufactured by Intel Corporation.

Pipeline - In DRAMs and SRAMs, a method for increasing the performance using multistage circuitry to stack or save data while new data is being accessed.

Plug and Play - A standard developed to ensure easy installation of peripherals. Theoretically, a newly installed card will automatically configure itself and work properly without requiring jumper configuration or device drivers.

POST - An acronym for Power On Self Test. A diagnostic program that is run whenever the system is cold booted.

RAM - An acronym for Random Access Memory. A type of memory that is used as the "working memory" of a computer system. See DRAM and SRAM.

ROM - An acronym for Read Only Memory. A type of memory that retains its data without requiring power. Once written, it cannot be modified. See EPROM and Flash ROM.

Serial Port - A communications port used to connect peripherals such as modems and mice.

Serial Presence Detect - Some SDRAM modules have an onboard EEPROM which contains critical configuration information about the module. This feature, known as Serial Pres-

ence Detect (SPD), allows the platform's chipset and BIOS to quickly determine the type of memory installed in the system, resulting in optimal system performance.

Setup - A program that allows you to make changes to the system configuration.

Shadow RAM - A technique used to load a duplicate copy of BIOS from slower ROM into faster RAM. This enhances system performance because it provides higher access speed to the BIOS.

SIMM - An acronym for Standard Inline Memory Module. A small printed circuit board containing memory chips.

SDRAM - An acronym for Synchronous Dynamic Random Access Memory or Synchronous DRAM. A DRAM designed to deliver bursts of data at very high speed using automatic addressing, multiple page interleaving and a synchronous (or clocked) interface.

Synchronous Cache - A type of cache that uses a clock signal to latch the inputs and the data output. This structure spreads the cache access across two or three cycles while maintaining a

bandwidth of one access per cycle. Improves performance by 5-10%.

Unbuffered DIMMs - The unbuffered DIMM modules do not use any buffer logic chips, thus achieving faster operation due to the elimination of the propagation delay of the logic buffer. This increase in speed comes at the cost of reducing the maximum number of modules on the same system board.

USB - An acronym for Universal Serial Bus. The simple and flexible way to connect devices to your desktop or notebook PC. USB allows virtually unlimited PC expansion with no more hassles over add-in cards, dip switches, jumper cables, software drivers, IRQ settings, DMA channels and I/O addresses. With USB, you can attach and detach peripherals without opening the computer or even shutting it down.

VESA - An acronym for Video Electronics and Standards Association.

VESA Local Bus (VL-Bus) - A high performance bus designed by VESA. A 32-bit version of the ISA bus which operates at the speed of the computer's CPU. See *PCI and ISA*.

Warm Boot - Restarting the system by simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys.

Write-Back Cache - Upon a cache hit, the cache is updated and the main memory is not affected. Upon a cache miss, only the main memory is updated.

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