
Introduction



This system board is available in different configuration levels. Depending on the hardware configuration of your device, it may be that you can find several options in the system board, even though they are not described.

Notational conventions

The meanings of the symbols and fonts used in this manual are as follows:



Pay particular attention to texts marked with this symbol. Failure to observe this warning endangers your life, destroys the system, or may lead to loss of data.



This symbol is followed by supplementary information, remarks and tips.

- ▶ Texts which follow this symbol describe activities that must be performed in the order shown.
- ␣ This symbol means that you must enter a blank space at this point.
- ↵ This symbol means that you must press the Enter key.

Texts in this typeface are screen outputs.

Texts in this bold typeface are the entries you make via the keyboard.

Texts in italics indicate commands or menu items.

"Quotation marks" indicate names of chapters and terms that are being emphasized.

Important notes

Store this manual close to the device. If you pass on the device to third parties, you should also pass on this manual.



Be sure to read this page carefully and note the information before you open the device.

You cannot access the components of the system board without first opening the device. How to dismantle and reassemble the device is described in the Operating Manual accompanying the device.

Please note the information provided in the chapter "Safety" in the Operating Manual of the device.

Incorrect replacement of the lithium battery may lead to a risk of explosion. It is therefore essential to observe the instructions in the chapter "[Add-on modules](#)" - "[Replacing the lithium battery](#)".

The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer (CR2032).

Do not throw lithium batteries into the trashcan. It must be disposed of in accordance with local regulations concerning special waste.



The shipped version of this board complies with the requirements of the EEC directive 89/336/EEC "Electromagnetic compatibility".

Compliance was tested in a typical PC configuration.

When installing the board, refer to the specific installation information in the Operating Manual or Technical Manual of the receiving device.

Connecting cables for peripherals must be adequately insulated to avoid interference.



Components can become very hot during operation. Make sure you do not touch components when making extensions to the system board. There is a danger of burns!



The warranty is invalidated if the device is damaged during the installation or replacement of system expansions. Information on which system expansions you can use is available from your sales office or the customer service.

Boards with electrostatic sensitive devices (ESD) may be identified by labels.



When you handle boards fitted with ESDs, you must observe the following points under all circumstances:

- You must always discharge yourself (e.g. by touching a grounded object) before working.
- The equipment and tools you use must be free of static charges.
- Pull out the power plug before inserting or pulling out boards containing ESDs.
- Always hold boards with ESDs by their edges.
- Never touch pins or conductors on boards fitted with ESDs.

Features

Processor Information

- Two SEC slots (Slot One type).
- 66 to 100 MHz BIOS selectable bus support.
- Pentium II, P-III 233-550 MHz.

Chipset Information

- Intel 440BX AGPset.
- Intel PIIX4e controller.
- National 309 Super I/O chipset.

Main Memory

- Up to 1024 MB onboard.
- Four 168-pin DIMM sockets.
- Supports 100 MHZ SDRAM with SPD.

System Management

- National LM79 and LM75 ASICs with onboard alarm for monitoring temperature, supply voltages, and fan speed.
- Chassis intrusion detection capable.

Expansion Slots

- One 32-bit AGP slot.
- Five 32-bit PCI Bus Master slots.
- Two 16-bit ISA slots.
- One shared, seven usable slots.

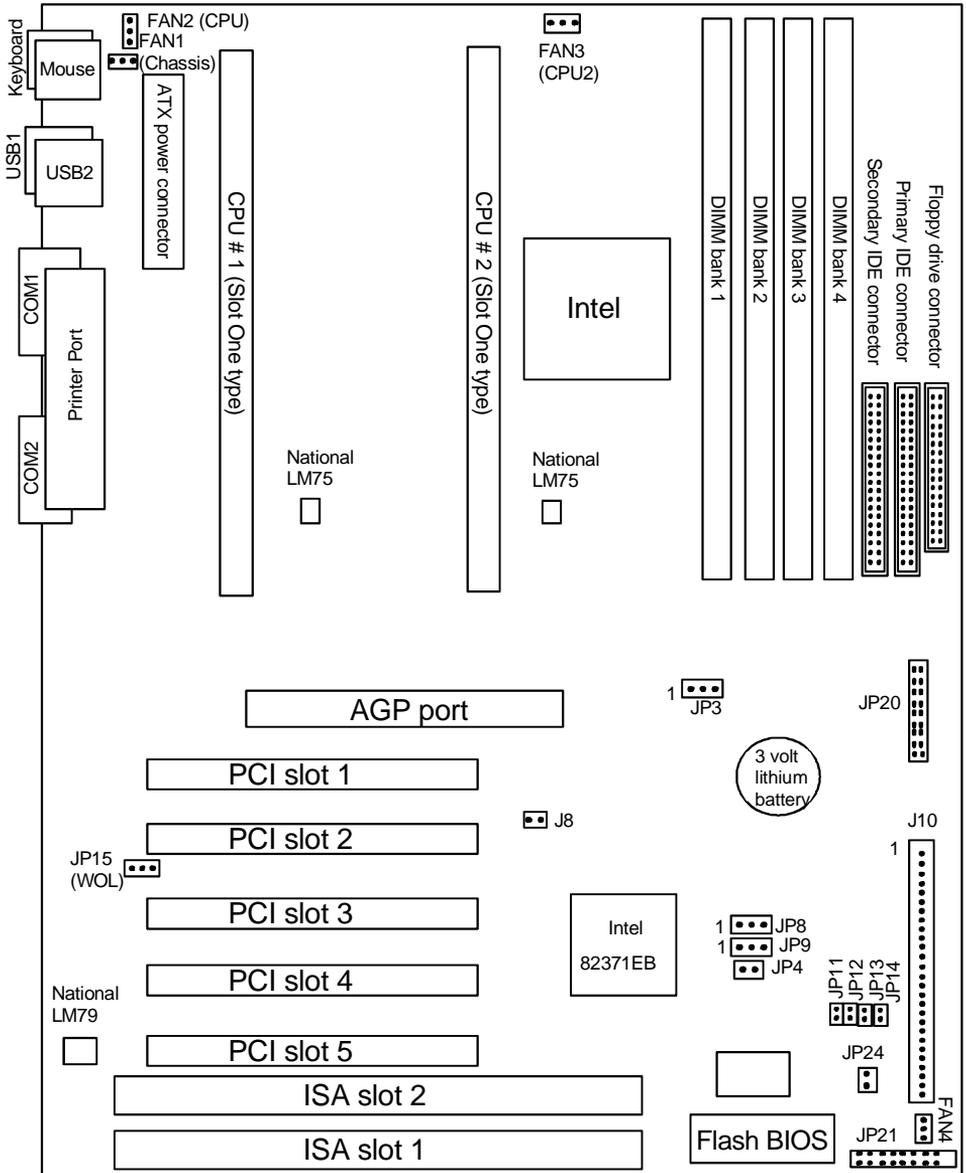
BIOS Information

- AMI Plug and Play flash BIOS.
- Deep Green, Energy Star, ACPI, Year 2000, and PC98 compliant.
- Soft power-down, multiple boot options.
- Win98/NT5 ready, DMI 2.0 compliant.
- PCI 2.1, APM 1.1 compliant.

Disk Drive & System I/O

- Two PCI bus mastering EIDE channels.
- Supports EIDE CD-ROMs.
- PIO Mode 3 & 4 (up to 17 MB/sec DTR).
- UltraDMA/33 bus mastering mode (up to 33 MB/sec DTR).
- Support for two floppy drives (up to 2.88 MB).
- Two serial ports (16550 UARTs).
- One ECP/EPP parallel port.
- One Serial IR (InfraRed) I/O interface port.
- Two USB rev 1.2 (universal serial bus) connectors.
- One PS/2 mouse connector.
- One PS/2 keyboard connector.

Interfaces, connectors and jumpers



The tiny "1" next to jumpers of 3 pins or more indicate the position of pin 1 for that jumper.

Connectors and Setting jumpers

CPU Speed Settings (Jp11, JP12, JP13, JP14)

There are two steps to set the CPU speed. First, set the **clock multiplier** with jumpers JP11-JP14 according to the specification of your CPU using the chart below. There is no need to set the bus speed. The system board auto-detects the bus speed of the CPU.

Multiplier (set jumpers onboard)	Bus Speed	CPU Speed	JP11	JP12	JP13	JP14
3.5	100	350	ON	OFF	OFF	ON
4	100	400	OFF	ON	ON	ON
4.5	66	300	OFF	ON	OFF	ON
	100	450				
5	66	333	OFF	OFF	ON	ON
	100	500				
5.5	66	366	OFF	OFF	OFF	ON
	100	550				
6	66	400	ON	ON	ON	OFF
6.5	66	433	ON	ON	OFF	OFF
7	66	466	ON	OFF	ON	OFF

FAN Connectors & Wake-On LAN (JP15)

- Fan1 connector corresponds to Rear Chassis Fan (Not used.)
- Fan2 connector corresponds to CPU 1 slot.
- Fan3 connector corresponds to CPU 2 slot.
- Fan4 connector corresponds to Front Chassis Fan (Not used).

	1	2	3
JP15 (Wake-on LAN)	Standby 5 V	GND	Wake (Power On, Active High)
FAN1-4	GND	VCC	Fan Monitor

Clear CMOS and Reset Password (Jumper JP3)

If you have been locked out of your system because you forgot your pass word or set the CMOS incorrectly, follow the instructions below.

- ▶ Power off the system
- ▶ Set jumper JP3 to pins 2 and 3.
- ▶ Wait for five seconds, then return jumper JP3 to pins 1 and 2.
- ▶ Power on the system again.

By following this procedure, you will erase your password and reset the CMOS to the BIOS defaults.

	JP3
Default	1-2
Reset CMOS	2-3

IR / Floppy

IR / FDD	JP4	JP8	JP9
2 FDD	ON	1-2	1-2
1 IR / 1 FDD (Default)	OFF	2-3	2-3

Flash EEPROM

The system board uses flash memory to store BIOS firmware. It can be easily updated if necessary using the Flash BIOS Update Disk (see chapter "[BIOS Configuration](#)"). Siemens does not recommend flashing the BIOS unnecessarily. Check the Siemens web site for the latest BIOS revision.

Add-on modules



For all steps described in this chapter pull the power plug out of the power outlet!
Even when you have run down the device, parts of the device (e. g. memory modules, AGP and PCI extension boards) are still energized.

Installing/removing the processor

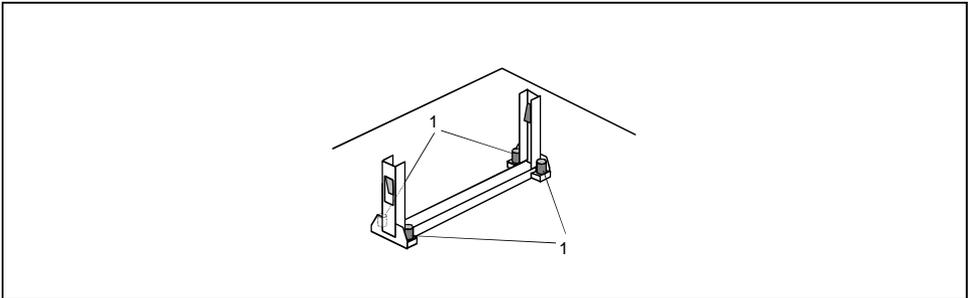
The system board can be upgraded with a second Pentium II/ III processor in the slot for the second processor. You can replace the Pentium II/ III processor in the slot of the first processor.



The second Pentium II/ III processor must have the same clock rate as the first. A suitable multiprocessor operating system must be used if dual operation is required. On the processor modules you may use only processors of the same type.

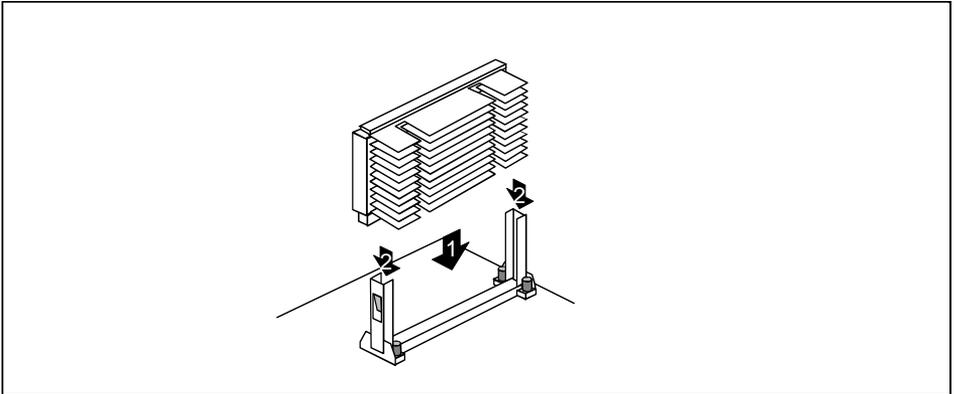
You must install the universal retention module in the slot for the second processor if you want to upgrade a second processor.

Installing the retention module



- ▶ Install the universal retention module. Secure by pressing the four body-bound rivets (1) firmly.

Installing the processor



- ▶ Slide the processor into the retention mechanism (1).
- ▶ Push the processor down in the holder and press it into the slot until the clamps (2) to the left and right snap into place.
- ▶ Set the clock frequency of the new processor using switches 5 to 8 of the switch block.
- ▶ If the processor has a fan, attach the associated cable to the fan connector (FAN) on the system board.

Removing the processor

- ▶ If the processor is equipped with a fan, then disconnect the plug-in connection of the related cable.
- ▶ Press the clamps (2) on either side of the processor slightly outwards and pull the processor up and out.

Upgrading main memory

Four locations are available on the system board for main memory. These slots are suitable for 16, 32, 64, 128 and 256 Mbyte SDRAM memory modules of the DIMM format.

Memory modules with different memory capacities can be combined.

DIMM = Dual Inline Memory Module

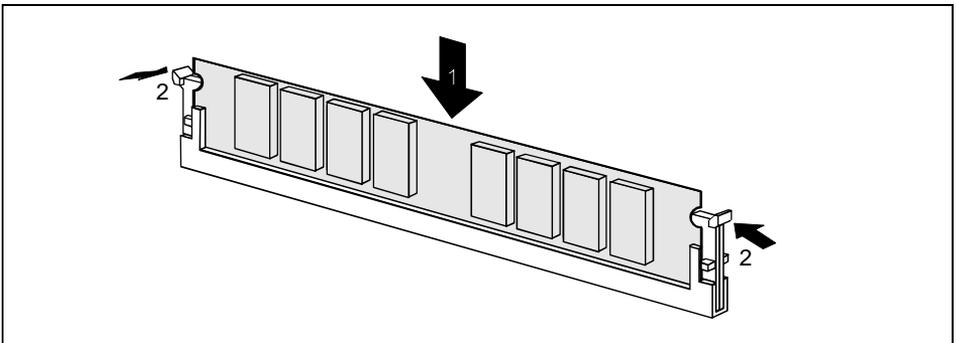
SDRAM = Synchronous Dynamic Random Access Memory



You may only use unbuffered 3.3V memory modules. Buffered memory modules are not permitted.

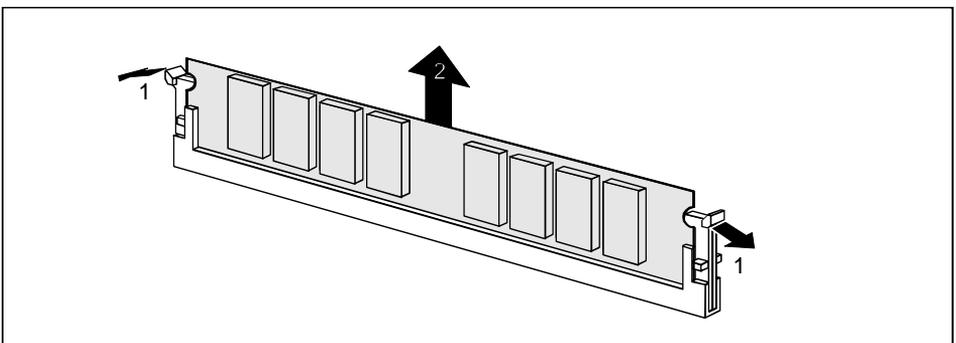
SDRAM memory modules must be designed for a clock frequency of 100 MHz or higher (meets PC100 specification).

Installing memory modules



- ▶ Flip the holders on each side of the relevant location outwards.
- ▶ Insert the memory module in the slot while folding the side holders up until the memory module engages (2).

Removing a memory module



- ▶ Flip the holders to the right and left of the location outwards (1).
- ▶ Pull the memory module out of its location (2).

Installing network board with WOL

- ▶ Install the network board as described in the operating manual for your unit.
- ▶ Push the WOL cable onto the WOL plug connector of the system board.



To use the WOL functionality of a network board the power supply must provide a 5V auxiliary voltage of at least 1 A.

You may find further information in the supplied description of the network board.

Replacing the lithium battery

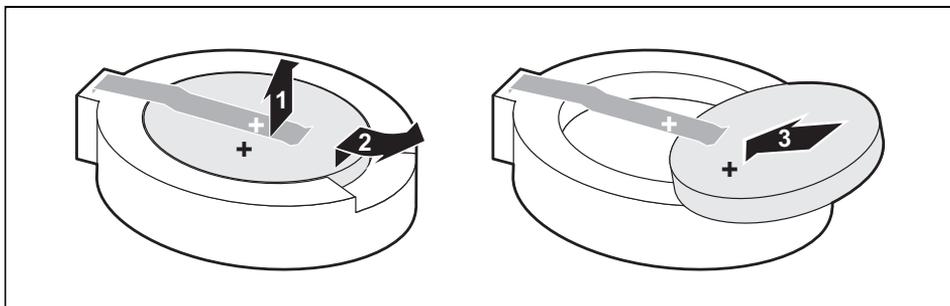


Incorrect replacement of the lithium battery may lead to a risk of explosion.

The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer (CR2032).

Do not throw lithium batteries into the trashcan. It must be disposed of in accordance with local regulations concerning special waste.

Make sure that you insert the battery the right way round. The plus pole must be on the top!



- ▶ Lift the contact (1) a few millimeters and remove the battery from its socket (2).
- ▶ Insert a new lithium battery of the same type in the socket (3).

BIOS Configuration

Calling AMIBIOS Setup

- ▶ Restart the device (switching on/off or warm boot).
- ▶ Press key **[Del]** .
- ▶ If you have assigned a setup password, you must now enter this password and confirm it.

The Main menu of AMIBIOS Setup is displayed on the screen.

The AMIBIOS Setup screen is shown below.

AMI BIOS EASY SETUP UTILITY Ver.1.16	
(c)1998 American Megatrends, Inc. All Rights Reserved	
Main	Advanced Security Exit
System Date Thu Oct 15 1998 System Time 12:55:37 Floppy Drive A 1.44 MB 3½ Floppy Drive B Not Installed Primary IDE Master Auto Primary IDE Slave Auto Secondary IDE Master Auto Secondary IDE Slave Auto Auto-Detect Hard Disks [Enter] Boot Sector Virus Protection Disabled	Setup Help Month: Jan - Dec Day: 01 - 31 Year: 1901 - 2099 - Previous Item - Next Item -@ Select Menu
ESC:Exit Enter:Select F5:Setup Defaults F6:Original Values F10:Save & Exit	

Example for *Main* menu

You can select a Setup option by using the following keyboard keys:

Key	Function
Tab	Moves from one box to the next
Arrow keys	Changes selections within a box
Enter	Opens highlighted selection

The pages which follow contain explanations of the settings for the AMIBIOS Setup menus. Drawings have been included for ease of reference. Overall, the AMIBIOS Setup program is easy to use, and fairly intuitive. Note that the graphics in the manual are simpler than those that appear on your screen.



Since the setting options and menus depend on the hardware configuration of your device, some of them may not be offered in the AMIBIOS Setup.

Main Setup

Select the AMIBIOS Setup options below by choosing Main Setup. The Standard Setup menu screen is shown below.

AMI BIOS EASY SETUP UTILITY Ver.1.16 (c)1998 American Megatrends, Inc. All Rights Reserved			
Main	Advanced	Security	Exit
	System Date Thu Oct 15 1998 System Time 12:55:37 Floppy Drive A 1.44 MB 3½ Floppy Drive B Not Installed Primary IDE Master Auto Primary IDE Slave Auto Secondary IDE Master Auto Secondary IDE Slave Auto Auto-Detect Hard Disks [Enter]		Setup Help Month: Jan - Dec Day: 01 - 31 Year: 1901 - 2099 - Previous Item - Next Item -Ⓞ Select Menu
Boot Sector Virus Protection Disabled			
ESC:Exit Enter:Select F5:Setup Defaults F6:Original Values F10:Save & Exit			

System Date/Time

You can type the date and time in directly, or select the portion of the date or time that you want to modify and adjust it using the **↑** **↓** cursor keys. The clock runs on a 24-hour cycle (i.e. 1:00 PM is 13:00).

[System Date Setting] MM/DD/YY: Jan 1 1999	[System Time Setting] Current Time 12:00:00
---	--

Floppy Drive A: and B:

Move the cursor to these fields via the arrow keys and select the floppy type. The settings are 360 KB 5¼ inch, 1.2 MB 5¼ inch, 720 KB 3½ inch, 1.44 MB 3½ inch, or 2.88 MB 3½ inch. If you are not sure what type of floppy drive you have, consult the documentation that came with your drive.

Options	
Not Installed	
360 KB	5¼
1.2 MB	5¼
720 KB	3½
1.44MB	3½
2.88MB	3½

Primary Master, Primary Slave, Secondary Master, Secondary Slave

Select these options to configure the various drives. A screen with a list of drive parameters appears.

AMI BIOS EASY SETUP UTILITY Ver.1.16	
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Main	Advanced Security Exit
PRIMARY IDE MASTER SETUP IDE Device Configuration AUTO Cylinders Heads Write Precompensation Sectors Maximum Capacity LBA Mode Block Mode Fast Programmed I/O Modes 32 Bit Transfer Mode ON	Setup Help 1-46: Predefined types USER: Set Parameters by User AUTO: Set Parameters automatically CD-ROM: Use for ATAPI CD-ROM drives OR Double click [AUTO] to set all HDD parameters automatically
ESC:Back Enter:Select --:Select Items F5:Setup Defaults F6:Original Values	

IDE Device Configuration:

To have the BIOS autodetect the IDE drive, select *Auto*. Otherwise, you may choose one of the 46 drive types offered, or enter the parameters yourself (see *Entering Drive Parameters*). Consult the table below to see how to configure various drive types yourself.

Type	How to Configure
SCSI	Select <i>Type</i> . Select <i>Not Installed</i> on the driver parameter screen. The SCSI drivers provided by the SCSI manufacturer should allow you to configure the SCSI drive.
IDE	Select <i>Type</i> . Select <i>Auto</i> to let AMIBIOS determine the parameters. Click on <i>OK</i> when AMIBIOS displays the drive parameters. Select <i>LBA Mode</i> . Select <i>On</i> if the drive has a capacity greater than 540 MB. Select <i>Block Mode</i> . Select <i>On</i> to allow block mode data transfers. Select <i>32-Bit Mode</i> . Select <i>On</i> to allow 32-bit data transfers. Select the <i>PIO Mode</i> . It is best to select <i>Auto</i> to allow AMIBIOS to determine the PIO mode. If you select a PIO mode that is not supported by the IDE drive, the drive will not work properly. If you are absolutely certain that you know the drive's PIO mode, select PIO mode 0-4, as appropriate.
CD-ROM	Select <i>Type</i> . Select <i>CDROM</i> . Click on <i>OK</i> when AMIBIOS displays the drive parameters.
Standard MFM	(MFM drives are older IDEs which use an encoding scheme that produces slower data access and less storage room.) Select <i>Type</i> . You must know the drive parameters. Select the drive type that exactly matches your drive's parameters.
Non-Standard MFM	Select <i>Type</i> . If the drive parameters do not match the drive parameters listed for the drive types 1-46, select <i>User</i> and enter the correct hard disk parameters.

LBA/Large Mode:

These modes make it possible for the BIOS to take advantage of the additional space on drives which are larger than 504 MB. This can be autodetected (when you select *Auto* for *Type*), or you can turn the modes *On* or *Off* yourself.

Block Mode:

If *On*, Block Mode automatically detects the optimal number of block read/writes per sector that the drive can support.

Fast Programmed I/O Modes:

Programmed Input/Output is a method of transmitting data between devices that uses the system's CPU as part of the data path. There are 6 modes - 5 with their own transmission speed and 1 auto mode. To use modes 3 and 4, you must be using an Enhanced IDE drive.

PIO Mode	Data Transfer Rate (MBps)
Auto	
0	3.3
1	5.2
2	8.3
3	11.1
4	16.6

32bit Transfer Mode:

If On, allows for the transmission of 32 bits in parallel (i.e. at the same time). If Off, only 16 bits will be transmitted in parallel.

Entering Drive Parameters

If you select User for the drive Type, you can enter the hard disk drive parameters yourself. The drive parameters are as follows:

Parameter	Description
Type	The number for a drive with certain identification parameters.
Cylinders (Cyl)	The number of cylinders in the disk drive.
Heads (Hd)	The number of heads.
Write Precompensation (WP)	The actual physical size of a sector gets progressively smaller as the track diameter diminishes. Yet, each sector must still hold 512 bytes. Write precompensation circuitry on the hard disk compensates for the physical difference in sector size by boosting the write current for sectors on inner tracks. This parameter is the track number on the disk surface where write precompensation begins.
Sectors (Sec)	The number of sectors per track. MFM drives have 17 sectors per track. RLL drives have 26 sectors per track. ESDI drives have 34 sectors per track. SCSI and IDE drives have even more sectors per track.
Size	The formatted capacity of the drive is the number of heads times the number of cylinders times the number of sectors per track times 512 (bytes per sector).

Auto-Detect Hard Disks

This option lets the system detect your hard disk(s) automatically for your convenience.

Boot Sector Virus Protection

The available settings for this option are Enable and Disable.

Exit Setup

Select the AMIBIOS Setup options below by choosing Exit Setup.

AMI BIOS EASY SETUP UTILITY Ver.1.16	
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Exit	
Exit Saving Changes [Enter] Exit Discarding Changes [Enter] Load Optimal Settings [Enter] Load Fail Safe Settings [Enter] Load Original Values [Enter]	Setup Help Load configuration settings giving highest performance - Previous Item - Next Item -Ⓢ Select Menu
ESC:Exit Enter:Select F5:Setup Defaults F6:Original Values F10:Save & Exit	

Exit Saving Changes

Write the current settings to CMOS and exit.

Exit Discarding Changes

Exit without saving the current settings.

Load Optimal Defaults

The Optimal default values provide optimum performance settings for all devices and system features.

Load Fail-Safe Defaults

The Fail-Safe default settings consist of the safest set of parameters. Use them if the system is behaving erratically. They should always work but do not provide optimal system performance characteristics.

Load Original Values

Load original values configuration settings.

Advanced Setup

Select the AMIBIOS Setup options below by choosing Advanced Setup.

AMI BIOS EASY SETUP UTILITY Ver.1.16	
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Main	Advanced
Security	Exit
Advanced CMOS Setup [Enter] Advanced Chipset Setup [Enter] Power Management Setup [Enter] Plug and Play Setup [Enter] Peripheral Setup [Enter] Change Language Setting English	Setup Help Load configuration settings giving highest performance - Previous Item - Next Item -@ Select Menu
ESC:Exit Enter:Select F5:Setup Defaults F6:Original Values F10:Save & Exit	

Advanced CMOS Setup

Choose Advanced CMOS Setup on the AMIBIOS Setup Advanced menu.

Advanced CMOS Setup Default Settings Chart

Setting Option	Optimal Default	Fail-Safe Default
Quick Boot	Enabled	Disabled
Primary Master ARMD Emulated as	Auto	Auto
Primary Slave ARMD Emulated as	Auto	Auto
Secondary Master ARMD Emulated as	Auto	Auto
Secondary Slave ARMD Emulated as	Auto	Auto
1st Boot Device	Floppy	Floppy
2nd Boot Device	SCSI	SCSI
3rd Boot Device	1st IDE-HDD	1st IDE-HDD
4rd Boot Device	ATAPI CDROM	ATAPI CDROM
Try Other Boot Devices	Yes	Yes
Initial Display Mode	Silent	Bios
Floppy Access Control	Read-Write	Read-Write
Hard Disk Access Control	Read-Write	Read-Write
S.M.A.R.T. for Hard Disks	Enabled	Disabled
Boot Up Num-Lock	On	On
PS/2 Mouse Support	Enabled	Enabled
Primary Display	VGA/EGA	VGA/EGA
Password Check	Setup	Setup
Boot To OS/2	No	No
Internal Cache	Write Back	Write Back
System BIOS Cacheable	Disabled	Disabled
Cache Bus ECC	Disabled	Enabled
Default Primary Video	AGP	AGP
MPS Type	Generic	Generic
MPS Revision	1.4	1.4
C000, 16K Shadow	Cached	Cached
C400, 16K Shadow	Cached	Cached
C800, 16K Shadow	Disabled	Disabled
CC00, 16K Shadow	Disabled	Disabled
D000, 16K Shadow	Disabled	Disabled
D400, 16K Shadow	Disabled	Disabled
D800, 16K Shadow	Disabled	Disabled
DC00, 16K Shadow	Disabled	Disabled

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 1 MB Memory Test Advanced Setup option. The settings are:

Setting	Description
Disabled	AMIBIOS tests all system memory. AMIBIOS waits up to 40 seconds for a READY signal from the IDE hard disk drive. AMIBIOS waits for .5 seconds after sending a RESET signal to the IDE drive to allow the IDE drive time to get ready again. AMIBIOS checks for a key press and runs AMIBIOS Setup if the key has been pressed.
Enabled	AMIBIOS does not test system memory above 1 MB. AMIBIOS does not wait up to 40 seconds for a READY signal from the IDE hard disk drive. If a READY signal is not received immediately from the IDE drive, AMIBIOS does not configure that drive. AMIBIOS does not wait for .5 seconds after sending a RESET signal to the IDE drive to allow the IDE drive time to get ready again. You cannot run AMIBIOS Setup at system boot, because there is no delay for the <i>Hit to run Setup</i> message.

Pri/Sec Master/Slave ARMD Emulated as

ATAPI Removable Media Disks (e.g. ZIP drives) are hybrid drives. They are removable, and can be used as floppy drives, but also have great capacity and so are sometimes used as hard drives. These four options ensure that, if you have an ARMD attached as a master or slave device, it can be properly detected by the system. The settings are Auto, Floppy, and Hard Disk.

1st Boot Device

This option sets the type of device for the first boot drive that the AMIBIOS attempts to boot from after AMIBIOS POST completes. The settings are Disabled, 1st IDE-HDD, 2nd IDE-HDD, 3rd IDE-HDD, 4th IDE-HDD, Floppy, ARMD-FDD, ARMD-HDD, ATAPI CDROM, SCSI, NETWORK, and I₂O.

2nd Boot Device

This option sets the type of device for the second boot drive that the AMIBIOS attempts to boot from after AMIBIOS POST completes. The settings are Disabled, 1st IDE-HDD, 2nd IDE-HDD, 3rd IDE-HDD, 4th IDE-HDD, Floppy, ARMD-FDD, ARMD-HDD, ATAPI CDROM, and SCSI.

3rd Boot Device / 4rd Boot Device

This option sets the type of device for the third boot drive that the AMIBIOS attempts to boot from after AMIBIOS POST completes. The settings are Disabled, 1st IDE-HDD, 2nd IDE-HDD, 3rd IDE-HDD, 4th IDE-HDD, Floppy, ARMD-FDD, ARMD-HDD, ATAPI CDROM.

Try Other Boot Devices

Set this option to Yes to instruct AMIBIOS to attempt to boot from any other drive in the system if it cannot find a boot drive among the drives specified in the 1st Boot Device, 2nd Boot Device, and 3rd Boot Device options. The settings are Yes or No.

Initial Display Mode

Instead of a start information a logo is displayed on the screen. Set this option to Bios the start information is displayed on the screen. Set this option to Silent the logo is displayed on the screen.

Floppy Access Control

This option specifies the read-write access that is set when booting from a floppy drive. The settings are Read-Write or Read-Only.

Hard Disk Access Control

This option specifies the read-write access that is set when booting from a hard disk drive. The settings are Read-Write or Read-Only.

S.M.A.R.T. for Hard Disks

Set this option to Enabled to permit AMIBIOS to use the SMART (System Management and Reporting Technologies) protocol for reporting server system information over a network. Enabling this feature allows you to back up your data when your hard disk is about to fail. The settings are Enabled or Disabled.

Boot Up Num-Lock

Set this option to Off to turn the Num Lock key off when the computer is booted so you can use the arrow keys on both the numeric keypad and the keyboard. The settings are On or Off.

PS/2 Mouse Support

Set this option to Enabled to enable AMIBIOS support for a PS/2-type mouse. The BIOS will allocate IRQ12 for the PS/2 mouse. The settings are Enabled or Disabled.

Primary Display

This option configures the type of monitor attached to the computer. The settings are Absent, VGA/EGA, CGA40x25, CGA80x25, or Mono.

Password Check

This option enables password checking every time the system boots or when you run AMIBIOS Setup. If Always is chosen, a user password prompt appears every time the computer is turned on. If Setup is chosen, the password prompt appears if AMIBIOS is executed.

Boot To OS/2

Set this option to Yes if you are running an OS/2 operating system and using more than 64 MB of system memory on the system board. The settings are Yes or No.

Internal Cache

This option sets the type of caching algorithm used by the L1 internal cache memory on the CPU. The settings are Disabled, WriteThru, or WriteBack.

System BIOS Cacheable

When set to Enabled, the contents of the F0000h system memory segment can be read from or written to cache memory. The contents of this memory segment are copied from the BIOS ROM to system RAM for faster execution. The settings are Enabled or Disabled. The Optimal default setting is Enabled.

Cache Bus ECC

When Enabled, this option permits ECC error checking on the L2 cache bus. This ensures that cached data is not improperly altered. The settings are Enabled or Disabled.

Default Primary Video

This option sets the primary video card as either AGP (Accelerated Graphics Port) card or a regular PCI video card. The settings are AGP or PCI.

MPS Type

This option enables the Multi-Processor Symmetry Support. The setting are Generic or ISA Type.

MPS Revision

This option sets the Multi-Processor Symmetry. Then settings are 1.1 or 1.4.

C000, 16K Shadow and C400, 16K Shadow

These options specify how the 32 KB of video ROM at C0000h is treated. The settings are:

Setting	Description
Disabled	The contents of the video ROM are not copied to RAM.
Enabled	The contents of the video ROM area from C000h-C7FFFh are copied (shadowed) from ROM to RAM for faster execution.
Cached	The contents of the video ROM area from C000h-C7FFFh are copied from ROM to RAM and can be written to or read from cache memory.

C800, 16K Shadow; CC00, 16K Shadow; D000, 16K Shadow; D400, 16K Shadow; D800, 16K Shadow; and DC00, 16K Shadow

These options enable shadowing of the contents of the ROM area named in the option. The ROM area not used by ISA adapter cards is allocated to PCI adapter cards. The settings are:

Setting	Description
Disabled	The contents of the video ROM are not copied to RAM.
Enabled	The contents of the designated ROM area are copied (shadowed) from ROM to RAM for faster execution.
Cached	The contents of the designated ROM area are copied from ROM to RAM and can be written to or read from cache memory.

Advanced Chipset Setup

Choose Advanced Chipset Setup on the AMIBIOS Setup Advanced menu. All Chipset Setup options are then displayed. AMIBIOS Setup can be customized via AMIBCP. See the AMIBIOS Utilities Guide for additional information.

AMI BIOS EASY SETUP UTILITY Ver.1.16 (c)1998 American Megatrends, Inc. All Rights Reserved	
Main Advanced Security Exit	
Advanced CMOS Setup [Enter] Advanced Chipset Setup [Enter] Power Management Setup [Enter] Plug and Play Setup [Enter] Peripheral Setup [Enter] Change Language Setting English	Setup Help Load configuration settings giving highest performance - Previous Item - Next Item -Ⓞ Select Menu
ESC:Exit Enter:Select F5:Setup Defaults F6:Original Values F10:Save & Exit	

Advanced Chipset Setup Default Settings Chart

Setting Option	Optimal Default	Fail-Safe Default
USB Function	Disabled	Disabled
*USB KB /Mouse Legacy Support	Disabled	Disabled
*Port 64/60 Emulation	Disabled	Disabled
SERR#	Disabled	Disabled
PERR#	Disabled	Disabled
WSC# Handshake	Enabled	Enabled
USWC Write Post	Enabled	Enabled
Master Latency Timer (Clks)	64	64
Multi-Trans Timer (Clks)	32	32
PCI1 to PCI0 Access	Disabled	Disabled
Method of Memory Detection	Auto & SPD	Auto & SPD
DRAM Integrity Mode	ECC Hardware	ECC Hardware
DRAM Refresh Rate	15.6 μ s	15.6 μ s
Memory Hole	Disabled	Disabled
SDRAM RAS# to CAS# Delay	Auto	3S CLKs
SDRAM RAS# Precharge	Auto	3S CLKs
Power Down SDRAM	Disabled	Disabled
ACPI Control Register	Disabled	Disabled
Gated Clock	Disabled	Disabled
Graphics Aperture Size	64 MB	64 MB
Search for MDA Resources	Yes	Yes
AGP Multi-Trans Timer (AGP Clks)	32	Disabled
AGP Low-Priority Timer (Clks)	16	Disabled
AGP SERR	Disabled	Disabled
AGP Parity Error Response	Disabled	Disabled
8 bit I/O Recovery Time	Disabled	Disabled
16 bit I/O Recovery Time	Disabled	Disabled
PIIX4 SERR	Disabled	Disabled
USB Passive Release	Disabled	Disabled
PIIX4 Passive Release	Disabled	Disabled
PIIX4 Delayed Transaction	Disabled	Disabled
Type F DMA Buffer Control1	Disabled	Disabled
Type F DMA Buffer Control2	Disabled	Disabled
DMA-0 Type	Normal ISA	Normal ISA
DMA-1 Type	Normal ISA	Normal ISA
DMA-2 Type	Normal ISA	Normal ISA
DMA-3 Type	Normal ISA	Normal ISA
DMA-4 Type	Normal ISA	Normal ISA
DMA-5 Type	Normal ISA	Normal ISA
DMA-6 Type	Normal ISA	Normal ISA
DMA-7 Type	Normal ISA	Normal ISA
CPU Bus Frequency	Auto	Auto

* Setting option not selectable

USB Function

Set this option to Enabled to enable USB (Universal Serial Bus) support. The settings are Enabled or Disabled.

USB KB/Mouse Legacy Support

Set this option to Enabled to enable support for older keyboards and mouse devices if the USB Function option is set to Enabled. The settings are Enabled or Disabled.

Port 64/60 Emulation

Setting this option to Enabled allows a USB keyboard to act like a legacy keyboard. If this option is not Enabled, USB keyboard lights will not work under Windows NT. With other operating systems, a USB keyboard will work normally with this option Disabled. The settings are Enabled or Disabled.

SERR#

Set this option to Enabled to enable the SERR# signal on the bus. The settings are Enabled or Disabled.

PERR#

Set this option to Enabled to enable the PERR# signal on the bus. The settings are Enabled or Disabled. The Optimal and Fail-safe default settings are Disabled.

WSC# Handshake

Set this option to Enabled to enable handshaking for the WSC# signal. Handshaking is a form of encryption; see the Glossary for more information. The settings are Enabled or Disabled.

USWC Write Post

This option sets the status of USWC posted writes to I/O. USWC is a type of memory that is used by VGA devices. The settings are:

Setting	Description
Disabled	USWC posted writes to I/O are enabled.
Enabled	USWC posted writes to I/O are disabled.

BX Master Latency Timer (Clks)

This option specifies the master latency timer (in PCI clocks) for devices in the computer. The settings are Disabled, 32, 64, 96, 128, 160, 192, or 224.

Multi-Trans Timer (Clks)

This option specifies the multi-trans latency timings (in PCI clocks) for devices in the computer. The settings are Disabled, 32, 64, 96, 128, 160, 192, or 224.

PCI1 to PCI0 Access

Set this option to Enabled to enable access between two different PCI buses (PCI1 and PCI0). The settings are Enabled or Disabled.

Method of Memory Detection

This option determines how your system will detect the type of system memory you have installed. Options are Auto+SPD or Auto only.

DRAM Integrity Mode

This option sets the type of system memory checking. The settings are:

Setting	Description
Non ECC	No error checking or error reporting is done.
EC	Errors are detected, but no corrections will be made-
ECC Hardware	Errors are detected, and single bit errors are corrected.

DRAM Refresh Rate

This option specifies the interval between refresh signals to DRAM system memory. The settings are 15.6 us (microseconds), 31.2 us, 62.4 us, 124.8 us, or 249.6 us.

Memory Hole

This option specifies the location of an area of memory that cannot be addressed on the ISA bus. The settings are Disabled, 512KB-640KB, or 15MB-16MB.

SDRAM RAS# to CAS# Delay

This option specifies the length of the a inserted between the RAS and CAS signals of the DRAM system memory access cycle if SDRAM is installed. The settings are Auto, 2 SCLKs or 3 SCLKs. The Optimal default setting is Auto.

SDRAM RAS# Precharge

(CHANGE) This option specifies the length of the RAS precharge part of the DRAM system memory access cycle when SDRAM system memory is installed in this computer. The settings are Auto, 2 SCLKs, or 3 SCLKs.

Power Down SDRAM

If this option is set to Enabled, the SDRAM Power Down feature is enabled. The settings are Enabled or Disabled.

ACPI Control Register

Set this option to Enabled to enable the ACPI (Advanced Configuration and Power Interface) control register. The settings are Enabled or Disabled. The Optimal and Fail-safe default settings are Enabled.

Gated Clock

Set this option to Enabled to enable the gated clock. The settings are Enabled or Disabled.

Graphics Aperture Size

This option specifies the amount of system memory that can be used by the Accelerated Graphics Port (AGP). The settings are 4 MB, 8 MB, 16 MB, 32 MB, 64 MB, 128 MB, or 256 MB.

Search for MDA Resources

Set this option to Yes to let AMIBIOS search for MDA resources. The settings are Yes or No.

AGP Multi-Trans Timer (AGP Clks)

This option sets the AGP multi-trans timer. The settings are in units of AGP Clocks. The settings are Disabled, 32, 64, 96, 128, 160, 192, or 224.

AGP Low-Priority Timer (Clks)

This option sets the AGP low priority timer. The settings are in units of AGP Clocks. The settings are Disabled, 16, 32, 48, 64, 80, 96, 112, 128, 144, 176, 192, 208, 224, or 240.

AGP SERR

Set this option to Enabled to enable the AGP SERR signal. The settings are Enabled or Disabled.

AGP Parity Error Response

Set this option to Enabled to enable AGP parity error response. The settings are Enabled or Disabled.

8 bit I/O Recovery Time

This option specifies the length of a delay inserted between consecutive 8-bit I/O operations. The settings are Disabled and from 1 to 8 Sysclk (system clocks) in increments of one.

16 bit I/O Recovery Time

This option specifies the length of a delay inserted between consecutive 16-bit I/O operations. The settings are Disabled and from 1 to 4 Sysclk (system clocks) in increments of one.

PIIX4 SERR#

Set this option to Enabled to enable the SERR# signal for the Intel PIIX4 chip. The settings are Enabled or Disabled.

USB Passive Release

Set this option to Enabled to enable passive release for USB. The settings are Enabled or Disabled.

PIIX4 Passive Release

Set this option to Enabled to enable passive release for the Intel PIIX4e chip. This option must be Enabled to provide PCI 2.1 compliance. The settings are Enabled or Disabled.

PIIX4 DELAYED TRANSACTION

Set this option to Enabled to enable delayed transactions for the Intel PIIX4 chip. This option must be Enabled to provide PCI 2.1 compliance. The settings are Enabled or Disabled.

TypeF DMA Buffer Control1 and 2

These options specify the DMA channel where TypeF buffer control is implemented. The settings are Disabled, Channel-0, Channel-1, Channel-2, Channel-3, Channel-5, Channel-6, or Channel-7.

DMA-*n* Type

These options specify the bus that the specified DMA channel can be used on. The settings are Normal ISA, PC/PCI, or Distributed.

CPU Bus Frequency

This option provides selective CPU Bus Frequency; however, it is strongly recommended that the default setting (Auto) be selected. Unpredictable situations may arise if the Intel default CPU bus speed is not used. The settings are Auto, 66.8 MHz, 68.5 MHz, 75 MHz, 83.3 MHz, 100 MHz, 103 MHz, or 112 MHz.

Power Management Setup

The AMIBIOS Setup options described in this section are selected by choosing Power Management Setup from the AMIBIOS Setup Advanced menu.

AMI BIOS EASY SETUP UTILITY Ver.1.16	
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Main	Advanced Security Exit
Advanced CMOS Setup [Enter] Advanced Chipset Setup [Enter] Power Management Setup [Enter] Plug and Play Setup [Enter] Peripheral Setup [Enter] Change Language Setting English	Setup Help Load configuration settings giving highest performance - Previous Item - Next Item -Ⓞ Select Menu
ESC:Exit Enter:Select F5:Setup Defaults F6:Original Values F10:Save & Exit	

Power Management Setup Default Settings Chart

Setting Option	Optimal Default	Fail-Safe Default
ACPI Aware O/S	No	No
Power Management / APM	Enabled	Enabled
Power Button Function	On/Off	On/Off
Green PC Monitor Power State	Suspend	Standby
Video Power Down Mode	Suspend	Disabled
Hard Disk Power Down Mode	Suspend	Disabled
Hard Disk Time Out (Minute)	Disabled	Disabled
Power Saving Type	Sleep	Sleep
Standby / Suspend Timer Unit	4 min	4 min
Standby Time Out	Disabled	Disabled
Suspend Time Out	Disabled	Disabled
Slow Clock Ratio	50 % - 62.5 %	50 % - 62.5 %
Display Activity	Ignore	Ignore

Settings Chart (continued)

Device 6 (Serial port 1)	Monitor	Monitor
Device 7 (Serial port 2)	Monitor	Monitor
Device 8 (Parallel port)	Monitor	Monitor
Device 5 (Floppy disk)	Monitor	Monitor
Device 0 (Primary master IDE)	Monitor	Monitor
Device 1 (Primary slave IDE)	Monitor	Monitor
Device 2 (Secondary master IDE)	Monitor	Monitor
Device 3 (Secondary slave IDE)	Monitor	Monitor
LAN Wake-up	Enabled	Disabled
PC 98 Power LED	Disabled	Disabled
Fan OFF at Suspend	Enabled	Enabled
RTC Wake-up	Disabled	Disabled
*Hour	N/A	N/A
*Minute	N/A	N/A

* Setting option not selectable

ACPI Aware O/S

Set this option to Yes to enable Advanced Configuration and Power Interface (ACPI) BIOS for an ACPI-aware operating system.

Power Management/APM

Set this option to Enabled to enable the chipset power management and APM (Advanced Power Management) features. The settings are Enabled or Disabled.

Power Button Function

This option specifies how the power button mounted externally on the computer chassis is used. See "Soft Power Connector" for more information. The settings are shown in the table below.

Setting	Description
On/Off	Pushing the power button turns the computer on or off.
Suspend	Pushing the power button places the computer in Suspend mode or Full On power mode.

Green PC Monitor Power State

This option specifies the power state that the green PC-compliant video monitor enters when AMIBIOS places it in a power saving state after the specified period of display inactivity has expired. The settings are Off, Stand By, or Suspend.

Video Power Down Mode

This option specifies the power state that the video subsystem enters when AMIBIOS places it in a power saving state after the specified period of display inactivity has expired. The settings are Stand By, Suspend, or Disabled.

Hard Disk Power Down Mode

This option specifies the power conserving state that the hard disk drive enters after the specified period of hard drive inactivity has expired. The settings are Disabled, Stand By, or Suspend.

Hard Disk Time Out (Minute)

This option specifies the length of a period of hard disk drive inactivity. When this length of time expires, the computer enters power-conserving state specified in the Hard Disk Power Down Mode option (see above). The settings are Disabled, and from 1 to 15 minutes, in one minute intervals.

Power Saving Type

There are several types of sleeping states within the general sleep state. This option allows you to choose how "asleep" you want your system to be. In deeper sleep modes, more energy is saved. However, upon waking up, the system must "reorient" itself, and reestablish control over the system's sleeping components. The settings are POS, Sleep, Stop Clock, and Deep Sleep. POS is the lightest sleep mode; Deep Sleep is the heaviest.

Standby/Suspend Timer Unit

This option specifies the unit of time used for the Standby and Suspend time out periods. The settings are 4 msec, 4 sec, 32 sec, or 4 min.

Standby Time Out

This option defines the length of time that the system, while in Full On state, must be inactive before it enters Standby mode. The settings are Disabled and from 4 minutes to 508 minutes, in increments of 4 minutes.

Suspend Time Out

This option defines the length of time that the system, while in Standby mode, must be inactive before it enters Suspend mode. The settings are Disabled and from 4 minutes to 508 minutes, in increments of 4 minutes.

Slow Clock Ratio

This option specifies the speed at which the system clock runs in the Standby Mode power saving state. The settings are expressed as a percentage of the normal CPU clock speed. The settings are 0-12.5%, 12.5%-25%, 25%-37.5%, 37.5%-50%, 50%-62.5%, 62.5%-75%, or 75-87.5%.

Display Activity

When set to Monitor, this option enables event monitoring on the video display. If set to Monitor and the computer is in a power saving state, display activity will cause the system to enter the Full On state. AMIBIOS reloads the Standby and Suspend time-out timers if display activity occurs. The settings are Monitor or Ignore.

Device n (Device identity)

When set to Monitor, these options enable event monitoring on the specified hardware interrupt request line. If set to Monitor and the computer is in a power saving state, any activity on the IRQ line will cause the system to enter the Full On state. AMIBIOS reloads the Standby and Suspend time-out timers if activity occurs on the specified IRQ line. The settings for each of these options are Monitor or Ignore.

LAN Wake-up

When this option is Enabled, the system will wake up when a signal is received on the Wake-on LAN header. In order for this wake up function to work, the system must have been brought up at least past the POST before it was last shut down (i.e. if you turn the system off before the POST, the registry will not be set, and the system will not be able to wake up using this function). This function requires an ATX 2.01 compliant power supply with 5V standby (STB5V) current of at least 800 mA. The settings are Enabled or Disabled.

PC98 Power LED

When this option is Enabled, your power LED will turn to yellow when your system is in Suspend mode. Note that if you do not have a two-color LED, your LED will turn off when the system is in Suspend mode if this option is set to Enabled. The settings are Enabled or Disabled.

FAN OFF at Suspend

If this option is Enabled, the CPU fan will turn off when the system is in Suspend mode. If Disabled, the CPU fan will remain on while the system is in Suspend mode. The settings are Enabled or Disabled.

RTC Wake-up

If Enabled, this option allows you to set an hour and minute for the system to wake up. The next two fields allow you to choose the wake up time. Note that the time fields will not be available if this option is set to Disabled. In order for this wake up function to work, the system must have been brought up at least past the POST before it was last shut down (i.e. if you turn the system off before the POST, the registry will not be set, and the system will not be able to wake up using this function). The settings are Enabled or Disabled.

Plug and Play Setup

Choose PCI/Plug and Play Setup from the AMIBIOS Setup Advanced menu to display the PCI and Plug and Play Setup options, described below.

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Main	Advanced Security Exit
Advanced CMOS Setup [Enter] Advanced Chipset Setup [Enter] Power Management Setup [Enter] Plug and Play Setup [Enter] Peripheral Setup [Enter] Change Language Setting English	Setup Help Load configuration settings giving highest performance - Previous Item - Next Item -@ Select Menu
ESC:Exit Enter:Select F5:Setup Defaults F6:Original Values F10:Save & Exit	

Plug and Play Setup Default Settings Chart

Setting Option	Optimal Default	Fail-Safe Default
Plug and Play Aware O/S	No	No
PCI Latency Timer (PCI Clocks)	64	64
PCI VGA Palette Snoop	Disabled	Disabled
Allocate IRQ to PCI VGA	Yes	Yes
PCI IDE Bus Master	Enabled	Disabled
Off Board PCI IDE Card	Auto	Auto
*Off Board PCI IDE Primary IRQ	Disabled	Disabled
*Off Board PCI IDE Secondary IRQ	Disabled	Disabled
PCI Slot1&5 IRQ Priority	Auto	Auto
PCI Slot2 IRQ Priority	Auto	Auto
PCI Slot3 IRQ Priority	Auto	Auto
PCI Slot4 IRQ Priority	Auto	Auto

Settings Chart (continued)

DMA Channel 0	PnP	PnP
DMA Channel 1	PnP	PnP
DMA Channel 3	PnP	PnP
DMA Channel 5	PnP	PnP
DMA Channel 6	PnP	PnP
DMA Channel 7	PnP	PnP
IRQ3	PCI/PnP	PCI/PnP
IRQ4	PCI/PnP	PCI/PnP
IRQ5	PCI/PnP	PCI/PnP
IRQ7	PCI/PnP	PCI/PnP
IRQ9	PCI/PnP	PCI/PnP
IRQ10	PCI/PnP	PCI/PnP
IRQ11	PCI/PnP	PCI/PnP
IRQ12	PCI/PnP	PCI/PnP
IRQ14	PCI/PnP	PCI/PnP
IRQ15	PCI/PnP	PCI/PnP
Reserved Memory Size	Disabled	Disabled
Reserved Memory Address	C8000	C8000
PCI Device Search Order	First-Last	First-Last
BIOS Devnode for Shadow RAM	Disabled	Disabled

* Setting option not selectable

Plug and Play Aware O/S

Set this option to Yes to inform AMIBIOS that the operating system can handle plug and Play (PnP) devices. The settings are No or Yes.

PCI Latency Timer (PCI Clocks)

This option specifies the latency timings (in PCI clocks) for PCI devices installed in the PCI expansion slots. The settings are 32, 64, 96, 128, 160, 192, 224, or 248.

PCI VGA Palette Snoop

When this option is set to Enabled, multiple VGA devices operating on different buses can handle data from the CPU on each set of palette registers on every video device. Bit 5 of the command register in the PCI device configuration space is the VGA Palette Snoop bit (0 is disabled). For example, if there are two VGA devices in the computer (one PCI and one ISA) and this field is set for:

Setting	Description
Disabled	Data read and written by the CPU is only directed to the PCI VGA device's palette register.
Enabled	Data read and written by the CPU is directed to the both the PCI VGA device's palette registers and the ISA VGA device palette registers, permitting the palette registers of both devices to be identical.

This option must be set to Enabled if any ISA adapter card installed in the system requires VGA palette snooping.

Allocate IRQ to PCI VGA

Set this option to Yes to allocate an IRQ to the VGA device on the PCI bus. The settings are Yes or No.

PCI IDE BusMaster

Set this option to Enabled to specify that the IDE controller on the PCI bus has bus mastering capability. The settings are Disabled or Enabled.

OffBoard PCI IDE Card

This option specifies whether or not an offboard PCI IDE controller adapter card is used in the computer, and where it is installed. If an offboard PCI IDE controller is used, the system board onboard IDE controller is automatically disabled. The settings are Auto and Slot1 through Slot6. If Auto is selected, AMIBIOS automatically determines the correct setting (including using the onboard controller if no offboard controller card is detected). This option forces IRQ 14 and 15 to a PCI slot on the PCI local bus. This is necessary to support non-compliant PCI IDE adapter cards.

OffBoard PCI IDE Primary IRQ

This option specifies the PCI interrupt used by the primary IDE channel on the offboard PCI IDE controller. The settings are Disabled, Hardwired, INTA, INTB, INTC, or INTD.

Offboard PCI IDE Secondary IRQ

This option specifies the PCI interrupt used by the secondary IDE channel on the offboard PCI IDE controller. The settings are Disabled, Hardwired, INTA, INTB, INTC, or INTD.

PCI Slot *n* IRQ Priority

These options specify the IRQ priority for PCI devices installed in the PCI devices installed in the PCI expansion slots. The settings are Auto, IRQ 3, 4, 5, 7, 9, 10, and 11, in priority order.

DMA Channel *n*

These options allow you to specify the bus type used by each DMA channel. The settings are PnP or ISA/EISA .

IRQ*n*

These options specify the bus that the specified IRQ line is used on. These options allow you to reserve IRQs for legacy ISA adapter cards. These options determine if AMIBIOS should remove an IRQ from the pool of available IRQs passed to devices that are configurable by the system BIOS. The available IRQ pool is determined by reading the ESCD NVRAM. If more IRQs must be removed from the pool, you can use these options to reserve the IRQ by assigning an ISA/EISA setting to it. Onboard I/O is configured by AMIBIOS. All IRQs used by onboard I/O are configured as PCI/PnP. IRQ12 only appears if the Mouse Support option in Advanced Setup is set to Disabled. IRQ14 and 15 will not be available if the onboard PCI IDE is enabled. If all IRQs are set to ISA/EISA and IRQ14 and 15 are allocated to the onboard PCI IDE, IRQ9 will still be available for PCI and PnP devices, because at least one IRQ must be available for PCI and PnP devices. The settings are ISA/EISA or 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.

Reserved Memory Address

This option specifies the beginning address (in hex) of the reserved memory area. The specified ROM memory area is reserved for use by legacy ISA adapter cards. This option does not appear if the Reserved Memory Size option is set to Disabled. The settings are C0000, C4000, C8000, CC000, D0000, D4000, D8000, or DC000.

PCI Device Search Order

This option changes the BIOS scan order of the PCI slot - from first to last or last to first. The settings are First-Last or Last-First.

BIOS Devnode for Shadow RAM

This option is used for some add-on card ROMs which do not claim the correct memory range that they occupy. The settings are Disabled or Enabled.

Peripheral Setup

Peripheral Setup options are displayed by choosing Peripheral Setup from the AMIBIOS Setup Advanced menu. All Peripheral Setup options are described here.

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Main	Advanced Security Exit
Advanced CMOS Setup [Enter] Advanced Chipset Setup [Enter] Power Management Setup [Enter] Plug and Play Setup [Enter] Peripheral Setup [Enter] Change Language Setting English	Setup Help Load configuration settings giving highest performance - Previous Item - Next Item -Ⓢ Select Menu
ESC:Exit Enter:Select F5:Setup Defaults F6:Original Values F10:Save & Exit	

Peripheral Setup Default Settings Chart

Setting Option	Optimal Default	Fail-Safe Default
Power Interruption	Disabled	Disabled
Overdock Warning Message	Enabled	Enabled
CPU Current Temperature	N/A	N/A
LM79 IN0	N/A	N/A
LM79 IN1	N/A	N/A
LM79 IN2	N/A	N/A
LM79 IN3	N/A	N/A
LM79 IN4	N/A	N/A
LM79 IN5	N/A	N/A
LM79 IN6	N/A	N/A
LM79 FAN1	N/A	N/A
LM79 FAN2	N/A	N/A
LM79 FAN3	N/A	N/A
Onboard FDC	Auto	Auto
Onboard Serial Port 1	3F8h	3F8h
Onboard Serial Port 2	2F8h	2F8h
Serial Port 2 Mode	Normal	Normal
*IR Duplex Mode	N/A	N/A

Settings Chart (continued)

*IR Recover Pin	IRRX1	IRRX1
Onboard Parallel Port	378	378
Parallel Port Mode	Normal	Normal
*EPP Version	N/A	N/A
Parallel Port IRQ	7	7
Parallel Port DMA Channel	N/A	N/A
Onboard IDE	Both	Both

* Setting option not selectable

Power Interruption

The settings are Enabled or Disabled.

Overclock Warning Message

When enabled, this option sends a warning message if the CPU is overclocked. The settings are Enabled or Disabled.

CPU Current Temperature

This option shows the current CPU temperature.

LM79 IN(X)

This option shows various CPU core voltage settings.

LM79 FAN(X)

This option shows the current fan rotation speed. FAN1 correspond to the rear fan, FAN2 correspond to CPU 1 fan, FAN3 correspond to the CPU 2 fan.

Onboard FDC

Set this option to Enabled to enable the floppy drive controller on the system board. The settings are Auto, Enabled, or Disabled.

Onboard Serial Port1

This option specifies the base I/O port address of serial port 1. The settings are Auto, Disabled, 3F8h, 2F8h, 3E8h, or 2E8h.

Onboard Serial Port2

This option specifies the base I/O port address of serial port 2. The settings are Auto, Disabled, 3F8h, 2F8h, 3E8h, or 2E8h.

Serial Port2 Mode

This option specifies the operating mode for serial port 2. This option will not appear if the Onboard Serial Port2 option is set to Disabled, or is set to Auto and your system does not have an onboard serial port 2. The settings are Normal, Sharp-IR, IrDA, and Consumer.

IR Transmission Mode

This option specifies the infrared transmission method. This option will not appear if the Serial Port2 Mode option is set to Normal. The settings are Full or Half.

Mode	Description
Full Duplex	Data is transmitted in two directions at once. Any data you send will not appear on your screen until it has been received by the other device and sent back to you. Full duplex is the faster of the two modes.
Half Duplex	Data is transmitted in only one directions at a time. Any data you send will be instantly displayed on your screen. Half duplex is easier for the devices to execute. Not all IR-capable devices can handle full duplex mode.

IR Receiver Pin

This option specifies which pin will act as the receiver for IR data transmission. This option will not appear if the Serial Port2 Mode option is set to Normal. The only setting is IRRX1.

OnBoard Parallel Port

This option specifies the base I/O port address of the parallel port on the system board. The settings are Auto, Disabled, 378, or 278.

Parallel Port Mode

This option specifies the parallel port mode. The settings are:

Setting	Description
Normal	The normal parallel port mode is used.
Bi-Dir	Use this setting to support bi-directional transfers on the parallel port.
EPP	The parallel port can be used with devices that adhere to the Enhanced Parallel Port (EPP) specifications. EPP uses the existing parallel port signals to provide asymmetric bi-directional data transfer driven by the host device.
ECP	The parallel port can be used with devices that adhere to the Extended Capabilities Port (ECP) specifications. ECP uses the DMA protocol to achieve data transfer rates of up to 2.5 Megabits per second. ECP provides symmetric bi-directional communication.

EPP Version

This option specifies the Enhanced Parallel Port specification version number that is used in the system. This option only appears if the Parallel Port Mode option is set to EPP. The settings are 1.7 or 1.9. Version 1.9 is common on newer devices; consult your device's user information for the appropriate port type. There are no default settings.

Parallel Port IRQ

This option specifies the IRQ used by the parallel port, and only appears if onboard Parallel Port is set to 278 or 378. The settings are 5 or 7.

Parallel Port DMA Channel

This option is only available if the setting for the Parallel Port Mode option is set to ECP and the onboard Parallel Port option is set to 378, 278, or 3BC. This option sets the DMA channel used by the parallel port. The settings are 0 through 7 in increments of one.

Onboard IDE

This option specifies the IDE channel used by the onboard IDE controller. The settings are Disabled, Primary, Secondary, or Both.

Language Utility

Currently, the BIOS Setup program is available only in English.

Flash Writer Utility

The AMI Flash Writer Utility is now included in the AMIBIOS, and so it is simpler to upgrade the BIOS of your system board. The system BIOS is stored on a flash EEPROM ROM chip on the system board which can be erased and reprogrammed by following the directions below.

- ▶ Insert the Flash BIOS Update Disk into the A: drive.
- ▶ Turn the power off.
- ▶ While holding the <Ctrl> and <Home> keys, turn the power on. The system will begin to read from the A: drive, and write the BIOS information contained on the floppy disk in that drive to the EEPROM ROM chip. When the BIOS has been totally reprogrammed, the system will reboot with the new BIOS in operation.
- ▶ If the system does not reboot in three minutes, power down the system wait a few seconds, and then turn the power back on again. You will be prompted to press <F1> to run Setup. You may check your settings at this time, or simply save and exit the program.



It is not possible to update the BIOS with a LS-120 120 MB UHD Floppy disk drive. To update the BIOS, you have to connect a standard 1.44 MB floppy disk drive temporary.

Beep Codes

Fatal errors, which halt the boot process, are communicated through a series of audible beeps. If AMIBIOS POST can initialize the system video display, it displays the error message. Displayed error messages, in most cases, allow the system to continue to boot.

Beeps	Error Message	Description
1	Refresh Failure	The memory refresh circuitry is faulty.
2	Parity Error	Parity error in the base memory (the first 64 KB block) of memory.
3	Base 64 KB Memory Failure	Memory failure in first 64 KB.
4	Timer Not Operational	A memory failure in the first 64 KB of memory, or Timer 1 is not functioning.
5	Processor Error	The CPU generated an error.
6	8042 - Gate A20 failure	Cannot switch to protected mode.
7	Processor exception Interrupt Error	The CPU on the CPU card generated an exception interrupt.
8	Display Memory Read/Write Error	The system video adapter is either missing or its memory is faulty. This is not a fatal error.
9	ROM Checksum Error	The ROM checksum value does not match the value encoded in AMIBIOS.
10	CMOS Shutdown Register Read/Write Error	The shutdown register for CMOS RAM has failed.
11	Cache Memory Bad - Do Not Enable Cache	The cache memory test failed. Cache memory is disabled. Do not press <Ctrl> <Alt> <Shift> <+> to enable cache memory.

Troubleshooting System Problems

If the computer beeps... then...

- | | |
|-------------------------|--|
| 1, 2, or 3 times... | reseat the memory SIMMs or DIPs. If the system still beeps, replace the memory. |
| 6 times... | reseat 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 there is one. |
| 8 times... | there is a 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... | reseat the cache memory on the system board. If it still beeps, replace the cache memory. |
| 4, 5, 7, or 10 times... | for 5 or 7 beeps, first test with a new CPU - if that does not solve the problem, then system board must be replaced. |

Displayed Error Messages

If an error occurs after the system display has been initialized, the error message will be displayed as follows:

```

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

```

and the system will halt. The system will not halt if the Wait for <F1> If Any Error option in Advanced Setup is Disabled.

```
RUN SETUP UTILITY
```

may also appear. Press <F1> to run WINBIOS Setup if this message appears.

Error Message	Explanation
8042 Gate-A20 Error	Gate A20 on the keyboard controller (8042) is not working. Replace the 8042.
Address Line Short!	Error in the address decoding circuitry.
C: Drive Error	No response from drive C:.. Run the AMIDiag Hard Disk Utility. Check the C: hard disk type in Standard Setup.
C: Drive Failure	No response from drive C:.. Replace the drive.
Cache Memory Bad, Do Not Enable Cache!	Cache memory is defective. Run AMIDiag.
CH-2 Timer Error	An AT system has two timers. There is an error in timer 2.
CMOS Battery State Low	CMOS RAM is powered by a battery. The battery power is low. Replace the battery.
CMOS Checksum Failure	CMOS RAM checksum is different than the previous value. Run WINBIOS Setup.
CMOS System Options Not Set	The values stored in CMOS RAM have been destroyed. Run WINBIOS Setup.
CMOS Display Type Mismatch	The video type in CMOS RAM does not match the type detected. Run WINBIOS Setup.
CMOS Memory Size Mismatch	The amount of memory found by AMIBIOS is different than the amount in CMOS RAM. Run WINBIOS Setup.
CMOS Time and Date Not Set	Run Standard Setup to set date and time.
D: Drive Error	No response from drive D:.. Run the AMIDiag Hard Disk Utility. Check the D: hard disk type in Standard Setup.
D: Drive Failure	No response from drive D:.. Replace the drive.
Diskette Boot Failure	The boot diskette in drive A: cannot be used to boot the system. Use another boot diskette and follow the screen instructions.
Display Switch Not Proper	Some systems require a video switch be set to either color or monochrome. Turn the system off, set the switch properly, then power on.
DMA Error	Error in the DMA controller.

Error Message	Explanation
DMA 1 Error	Error in the first DMA channel.
DMA 2 Error	Error in the second DMA channel.
FDD Controller Failure	AMIBIOS cannot communicate with the floppy disk drive controller. Check all appropriate connections after the system is powered down.
HDD Controller Failure	AMIBIOS cannot communicate with the hard disk drive controller. Check all appropriate connections after the system is powered down.
INTR1 Error	Interrupt channel 1 failed POST.
INTR2 Error	Interrupt channel 2 failed POST.
Invalid Boot Diskette	AMIBIOS can read the diskette in floppy drive A:, but it cannot boot the system with it. Use another diskette and follow the screen instructions.
Keyboard Is Locked...Unlock It	The keyboard lock on the system is engaged. The system must be unlocked to continue to boot.
Keyboard Error	The keyboard has a timing problem. Make sure a Keyboard Controller AMIBIOS is installed. Set Keyboard in Advanced Setup to Not Installed to skip the keyboard POST routines.
KB/Interface Error	There is an error in the keyboard connector.
No ROM BASIC	Cannot find a proper bootable sector on either drive A: or C:. AMIBIOS cannot find ROM Basic.
Off Board Parity Error	Parity error in memory installed on an adapter card in an expansion slot. The format is: OFF BOARD PARITY ERROR ADDR = (XXXX) XXXX is the hex address where the error occurred. Run AMIDiag to find and correct the problem.
On Board Parity Error	Parity error in system board memory. The format is: ON BOARD PARITY ERROR ADDR = (XXX) XXXX is the hex address where the error occurred. Run AMIDiag to find and correct the problem.
Parity Error ????	Parity error in system memory at an unknown address. Run AMIDiag to find and correct the problem.

Glossary

ACPI (Advanced Configuration and Power Interface) is a power management specification that allows the operating system to control the amount of power distributed to the computer's devices. Devices not in use can be turned off, reducing unnecessary power expenditure.

AGP (Accelerated Graphics Port) is a PCI-based interface which was designed specifically for demands of 3D graphics applications. The 32-bit AGP channel directly links the graphics controller to the main memory. While the channel runs at only 66 MHz, it supports data transmission during both the rising and falling ends of the clock cycle, yielding an effective speed of 133 MHz.

The **AT** was the original form factor of IBM's PC.

ATAPI (AT Attachment Packet Interface), also known as IDE or ATA, is a drive implementation that includes the disk controller on the device itself. It allows CD-ROMs and tape drives to be configured as master or slave devices, just like hard drives.

The **ATX** form factor was designed to replace the AT form factor. It improves on the AT design by rotating the board ninety degrees, so that the IDE connectors are closer to the drive bays, and the CPU is closer to the power supply and cooling fan. The keyboard, mouse, serial, USB, and parallel ports are built in.

Bandwidth refers to carrying capacity. The greater the bandwidth, the more data the bus, phone line, or other electrical path, can carry. Greater bandwidth, then, also results in greater speed.

A **BBS (Bulletin Board System)** is a computer system with a number of modems hooked up to it which acts as a center for users to post messages and access information.

The **BIOS (Basic Input/Output System)** program resides in the ROM chip, and provides the basic instructions for controlling your computer's hardware. Both the operating system and application software use BIOS routines to ensure compatibility.

A **buffer** is a portion of RAM which is used to temporarily store data, usually from an application, though it is also used when printing, and in most keyboard drivers. The CPU can manipulate data in a buffer before copying it, all at once, to a disk drive. While this improves system performance--reading to or writing from a disk drive a single time is much faster than doing so repeatedly--there is the possibility of losing your data should the system crash. Information stored in a buffer is temporarily stored, not permanently saved.

A **bus** is a data pathway. The term is used especially to refer to the connection between the processor and system memory, and between the processor and PCI or ISA local buses.

Bus mastering allows peripheral devices and IDEs to access the system memory without going through the CPU (similar to DMA channels).

A **cache** is a temporary storage area for data that will be needed often by an application. Using a cache lowers data access times, since the needed information is stored in the SRAM instead of in the slower DRAM. Note that the cache is also much smaller than your regular memory: a typical cache size is 512 KB, while you may have as much as 1 GB of regular memory.

Cache size refers to the physical size of the cache onboard. This should not be confused with the cacheable area, which is the total amount of memory which can be scanned by the system in search of data to put into the cache. A typical setup would be a cache size of 512 KB, and a cacheable area of 512 MB. In this case, up to 512 MB of the main memory onboard is capable of being cached. However, only 512 KB of this memory will be in the cache at any given moment. Any main memory above 512 MB could never be cached.

Closed and open jumpers. Jumpers and jumper pins are active when they are On or Closed, and inactive when they are Off or Open.

CMOS Complementary Metal-Oxide Semiconductors are chips that hold the basic start-up information for the BIOS.

The **COM port** is another name for the serial port, which is so-called because it transmits the eight bits of a byte of data along one wire, and receives data on another single wire (that is, the data is transmitted in serial form, one bit after another). Parallel ports transmit the bits of a byte on eight different wires at the same time (that is, in parallel form, eight bits at the same time).

DIMM Dual In-line Memory Modules are a faster and more capacious form of RAM than SIMMs, and do not need to be installed in pairs.

DIMM bank DIMM banks are sometimes called DIMM sockets, because the physical slot and the logical unit are the same. That is, one DIMM module fits into one DIMM socket, which is capable of acting as a memory bank.

DMA Direct Memory Access channels are similar to IRQs. DMA channels allow hardware devices (like sound cards or keyboards) to access the main memory without involving the CPU. This frees up CPU resources for other tasks. As with IRQs, it is vital that you do not double up devices on a single line. Plug and Play devices will take care of this for you.

In **Doze mode**, only the CPU's speed is slowed.

DRAM Dynamic RAM is a widely available, very affordable form of RAM which has the unfortunate tendency to lose data if it is not recharged regularly (every few milliseconds). This refresh requirement makes DRAM slower three to ten times slower than non-recharged RAM such as SRAM.

EDO RAM (Extended Data-Out RAM) speeds access to memory locations by assuming that memory addresses are static: the next time it looks for a bit of data, it will be at the same spot, or one nearby.

EEPROM Electrically Erasable Programmable ROM, also called Flash BIOS, is a ROM chip which can, unlike normal ROM, be updated. This allows you to keep up with changes in the BIOS programs without having to buy a new chip. SIEMENS's BIOS updates can be found at <http://www.siemens.de>

ESCD (Extended System Configuration Data) is a format for storing information about Plug and Play devices in the system BIOS. This information helps properly configure the system each time it boots.

Firmware is low level software that controls the system hardware.

Form factor is an industry term for the size, shape, power supply type, and external connector type of the PCB (personal computer board) or system board. The standard form factors are the AT and ATX, although SIEMENS also makes some Baby-AT boards.

A **Global timer** is an onboard hardware timer, such as the Real Time Clock.

Handshaking is a form of encryption. One system, typically the server, sends an encryption scheme to another agent, typically a client. Thus, the client's data is protected during transmittal to the server.

HDD stands for **Hard Disk Drive**.

H-SYNC controls the horizontal properties of the monitor.

IC (Integrated Circuit) is the formal name for the computer chip.

IDE Integrated Device (or Drive) Electronics is a simple, self-contained hard drive interface. It can handle drives up to 8.4 GB in size. Almost all IDEs sold now are in fact Enhanced IDEs (EIDEs).

IDE INT (IDE Interrupt) is a hardware interrupt signal that goes to the IDE.

I/O Input/Output is the connection between your computer and another piece of hardware (mouse, keyboard, etc.).

IRQ An Interrupt Request is an electronic request that runs from a hardware device to the CPU. The interrupt controller assigns priorities to incoming requests and delivers them to the CPU. It is important that there is only one device hooked up to each IRQ line; doubling up devices on IRQ

lines can lock up your system. Happily, Plug and Play operating systems take care of these details for you.

ISA stands for **Industry Standard Architecture**. ISA is a slower 8- or 16-bit BUS (data pathway).

Latency is the amount of time that one part of a system spends waiting for another part to catch up. This is most common when the system sends data out to a peripheral device, and is waiting for the peripheral to send some data back (peripherals tend to be slower than onboard system components).

NVRAM ROM and EEPROM are both examples of **Non-Volatile RAM**, memory that holds its data without power. DRAM, in contrast, is volatile.

OEMs (**Original Equipment Manufacturers**) like Compaq or IBM package other companies' system boards and hardware inside their case and sell them.

The **parallel port** transmits the bits of a byte on eight different wires at the same time (that is, in parallel form, eight bits at the same time).

PCI stands for **Peripheral Component Interconnect**. PCI is a 32-bit local bus (data pathway) which is faster than the ISA bus. Local buses are those which operate within a single system (as opposed to a network bus, which connects multiple systems).

The **PCI PIO** (**PCI Programmable Input/Output**) modes are the data transfer modes used by IDE drives. These modes use the CPU for data transfer (DMA channels do not). PCI refers to the type of bus used by these modes to communicate with the CPU.

PCI-to-PCI bridge allows you to connect multiple PCI devices onto one PCI slot.

Pipeline burst SRAM is a fast secondary cache. It is used as a secondary cache because SRAM is slower than SDRAM, but usually larger. Data is cached first to the faster primary cache, and then, when the primary cache is full, to the slower secondary cache.

Pipelining improves system performance by allowing the CPU to begin executing a second instruction before the first is completed. A pipeline can be likened to an assembly line, with a given part of the pipeline repeatedly executing a set part of an operation on a series of instructions.

PM timers (**Power Management timers**) are software timers that count down the number of seconds or minutes until the system times out and enters sleep, suspend, or doze mode.

PnP is an acronym for Plug and Play, a design standard that has become ascendant in the industry. Plug and Play devices require little set-up to use. Novice end users can simply plug them into a computer that is running on a Plug and Play-aware operating system (such as Windows 95), and go to work. Devices and operating systems that are not Plug and Play require you to reconfigure your system each time you add or change any part of your hardware.

The term **RAM** (**Random Access Memory**), while technically referring to a type of memory where any byte can be accessed without touching the adjacent data, is often used to refer to the system's main memory. This memory is available to any program running on the computer.

ROM (**Read-Only Memory**) is a storage chip which contains the BIOS (**Basic Input/Output System**), the basic instructions required to boot the computer and start up the operating system.

SDRAM (**Synchronous Dynamic RAM**) is so-called because it can keep two sets of memory addresses open simultaneously. By transferring data alternately from one set of addresses, and then the other, SDRAM cuts down on the delays associated with non-synchronous RAM, which must close one address bank before opening the next.

The **serial port** is so called because it transmits the eight bits of a byte of data along one wire, and receives data on another single wire (that is, the data is transmitted in serial form, one bit after another).

SIMM **Single In-line Memory Modules** are the most common form of RAM. They must be installed in pairs, and do not have the carrying capacity or the speed of DIMMs.

SIMM bank/socket SIMM sockets are the physical slots into which you stick SIMM modules. A pair of SIMM sockets form a SIMM bank, and act as a unit. If only one socket is filled, the bank will not operate.

In **Sleep/Suspend mode**, all devices except the CPU shut down.

SRAM Static RAM, unlike DRAM, does not need to be refreshed in order to prevent data loss. Thus, it is faster, and more expensive.

In **Standby mode**, the video and fixed disk drive shut down; all other devices operate normally.

UltraDMA/33 is a fast version of the old DMA channel. UltraDMA is also called UltraATA. Without UltraDMA your system cannot take advantage of the higher data transmission rates of the new UltraATA hard drives.

Universal Serial Bus or USB, is a versatile port. This one port type can function as a serial, parallel, mouse, keyboard, or joystick port. It is fast enough to support video transfer, and is capable of supporting up to 127 daisy-chained peripheral devices.

VGA (Video Graphics Array) is the PC video display standard.

V-SYNC controls the vertical properties of the monitor.

ZIF socket Zero Insertion Force sockets make it possible to insert CPUs without damaging the sensitive pins. The CPU is lightly placed in an open ZIF socket, and the metal lever pulled down. This shifts the processor over and down, guiding it into place on the board.

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System board D1161

Technical Manual

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