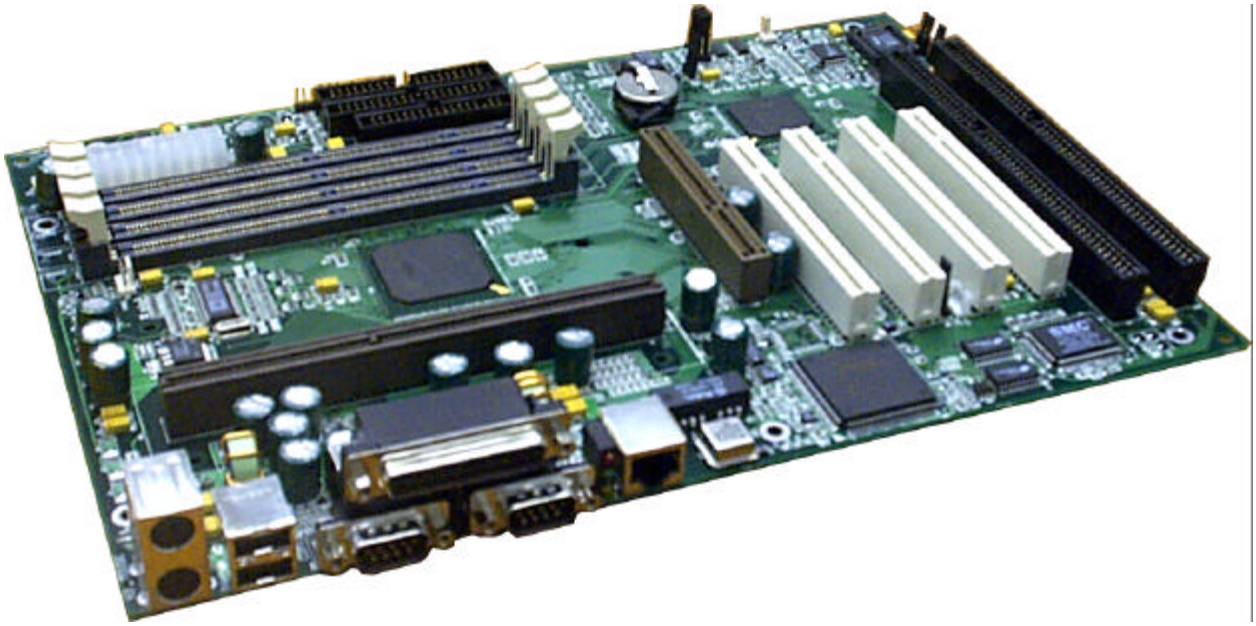
Columbia BX Motherboard



User Manual

Version 1.1

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Contents

1.Product Description

Pentium® II Processor-based ATX motherboard

The Columbia BX Motherboard is an innovative, high performance ATX platform for the Pentium® II processor - giving your customers the performance needed for today's Windows based business applications and providing performance for tomorrow's even more advanced software.

The Accelerated Graphics Port (AGP) is a new bus for the graphics controller, freeing system resources to quickly move memory-intensive graphics data in and out of system memory. This enables a new level of sophisticated lifelike 3-D graphics with higher speeds and resolutions than previously possible. Off-loading bandwidth-intensive graphics from the PCI bus also contributes to an increase in overall system performance.

Features of the Columbia BX Motherboard

- ATX form factor of 12 x 8.25 inches

Microprocessor:

- Single Pentium II processor
- 100MHz and 66MHz host bus speeds
- All current Pentium II processor speeds, voltages, and bus frequencies
- Integrated 512 KB second-level cache
- Slot 1 connector

Main memory:

- Four 168-pin DIMM sockets
- Supports up to 512 MB of synchronous DRAM (SDRAM) memory
- Error checking and correcting (ECC)
- Intel 82440BX AGPset and PCI/IDE Interface
- Intel 82440BX PCI/A.G.P. controller (PAC)
- Integrated PCI bus mastering controller
- Integrated Accelerated Graphics Port (A.G.P.) controller
- Intel 82371EB PCI ISA IDE Xcelerator (PIIX4E)
- Supports up to four IDE drives or devices
- Multifunction PCI-to-ISA bridge
- Universal Serial Bus (USB) and DMA controllers
- Two fast IDE interfaces
- Power management logic
- Real-time clock

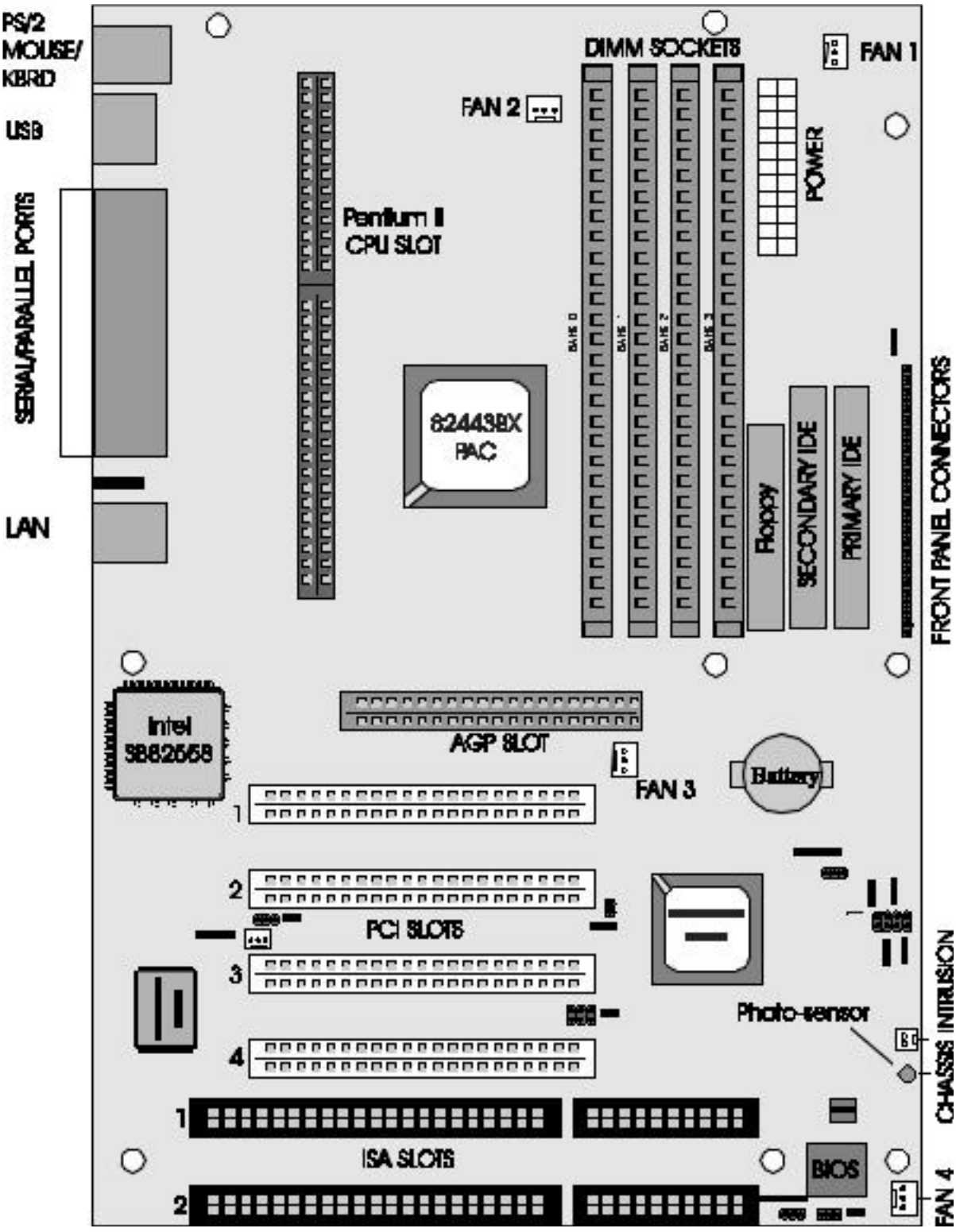
I/O features:

- SMC FDC37C672 Super I/O controller
- Integrates standard I/O functions
- Two USB ports
- Six expansion slots:
  - One AGP slot
  - One ISA slot
  - Three PCI slots
  - One shared PCI/ISA slot

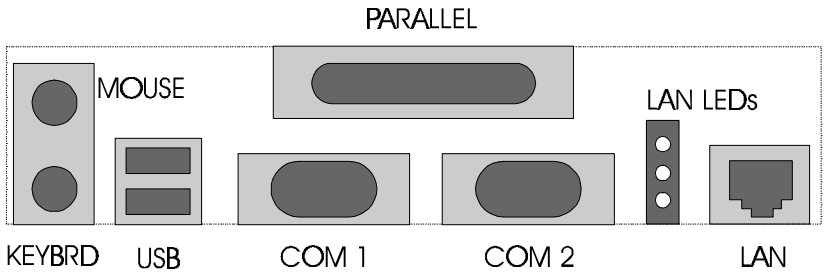
Other features:

- AMI BIOS
- Plug and Play compatible
- Advanced Power Management (APM) 1.2
- Advanced Configuration and Power Interface (ACPI) 1.0

Motherboard Layout.



Port Connectors



Central Processing Unit

This motherboard is designed to operate with a single Intel Pentium® II processor. The processor's VID pins automatically program the voltage regulator on the motherboard to the required processor voltage. In addition, the front side bus speed (100 MHz and 66 MHz) is automatically selected.

The Pentium II processor includes the following features:

- Intel's highest performance processor, combining the power of the Pentium® Pro processor with the capabilities of MMX™ technology.
- Takes advantage of the same high-performance Dual Independent Bus architecture used in the Pentium Pro processor for high bandwidth and performance.
- Single Edge Contact (S.E.C.) cartridge packaging technology delivers high performance processing and bus technology to mainstream systems. The cartridge includes the processor core, second-level cache, thermal plate, and back cover.
- Optimized for 32-bit applications running on advanced operating systems.
- Data integrity and reliability features include system bus ECC, Fault Analysis, Recovery, and Functional Redundancy Checking.

Memory

The motherboard has four dual inline memory module (DIMM) sockets. Synchronous DRAM (SDRAM) can be installed in any of the 4 sockets. EDO DIMMs are not supported. Minimum memory size is 16 MB; maximum memory size is 512 MB. Memory size can vary between sockets.

The motherboard supports the following memory features:

- 168-pin DIMMs
- 100 or 66 MHz SDRAM
- Non-ECC (64-bit) and ECC (72-bit) memory
- 3.3 V memory only
- Single- or double-sided DIMMs in the following sizes:

DIMM SIZE	NON-ECC CONFIGURATION	ECC CONFIGURATION
16 MB	2 Mbit x 64	2 Mbit x 72
32 MB	4 Mbit x 64	4 Mbit x 72
64 MB	8 Mbit x 64	8 Mbit x 72
128 MB	16 Mbit x 64	16 Mbit x 72

NOTE

Pentium II processors with 100 MHz front-side bus should be paired only with 100 MHz SDRAM.

Processors with 66 MHz front side bus can be paired with either 66 MHz or 100 MHz SDRAM.

SDRAM

Synchronous DRAM (SDRAM) improves memory performance through memory access that is synchronous with the memory clock. This simplifies the timing design and increases memory speed because all timings are dependent on the number of memory clock cycles.

NOTE

All memory components and DIMMs used with this motherboard must comply with the PC SDRAM specifications. These include the PC SDRAM Specification (memory component specific), the PC Unbuffered DIMM Specification, and the PC Serial Presence Detect Specification. You can access these documents through the Internet at http://www.intel.com/design/pcisets/memory/

ECC Memory

ECC memory detects multiple-bit errors and corrects single-bit errors. When ECC memory is installed, the BIOS supports both ECC and non-ECC mode. ECC mode is enabled in the Setup program. The BIOS automatically detects if ECC memory is installed and provides the Setup option for selecting ECC mode. If any non-ECC memory is installed, the Setup option for ECC configuration does not appear and ECC operation is not available.

The following table describes the effect of using Setup to put each memory type in each supported mode. Whenever ECC mode is selected in Setup, some performance loss occurs.

Cache Memory

The Pentium II microprocessor includes 32 KByte (16K/16K) non-blocking level one cache and up to 512 KByte unified, non-blocking level two cache on the substrate in the Single Edge Connector (S.E.C.) cartridge. The level two cache could be 0K, 128K, 256Kbytes, 512 Kbytes or 1 Mbyte.

Chipset

The Intel 440BX PCIset includes a Host-PCI bridge integrated with both an optimized DRAM controller and an Accelerated Graphics Port (A.G.P.) interface. The I/O subsystem of the 440BX is based on the PIIX4E, which is a highly integrated PCI-ISA/IDE Accelerator Bridge. This chipset consists of the Intel 82443BX PCI/A.G.P. controller (PAC) and the Intel 82371EB PCI/ISA IDE Xcelerator (PIIX4E) bridge chip.

Intel 82443BX PCI/A.G.P. controller (PAC)

The PAC provides bus-control signals, address paths, and data paths for transfers between the processor's host bus, PCI bus, Accelerated Graphics Port (A.G.P.), and main memory. The PAC comes in a 492-pin BGA package and features:

- Processor interface control
  - Support for processor host bus frequencies of 100 MHz or 66 MHz
  - 32-bit addressing
  - Desktop Optimized GTL+ compliant host bus interface
- Integrated DRAM controller, with support for:
  - +3.3 V only DIMM DRAM configurations
  - Up to four double sided DIMMs
  - Synchronous 100-MHz or 66-MHz SDRAM
  - SDRAM 64-bit data interface with ECC support
- A.G.P. interface
  - Complies with the A.G.P. specification (see Section 6.2 for specification information)
  - Support for +3.3 V PCI-66, A.G.P.-66/133 devices
  - Synchronous coupling to the host-bus frequency
- PCI bus interface
  - Complies with the PCI specification Rev 2.1, +5 V 33 MHz interface
  - Asynchronous coupling to the host-bus frequency
  - PCI parity generation support
  - Data streaming support from PCI-to-DRAM
  - Support for concurrent host, A.G.P., and PCI transactions to main memory
- Data buffering
  - DRAM write buffer with read-around-write capability
  - Dedicated host-to-DRAM, PCI0-to-DRAM, and PCI1/A.G.P.-to-DRAM read buffers
  - A.G.P. dedicated inbound/outbound FIFOs (133/66 MHz), used for temporary data storage
- Power management functions

Support for system suspend/resume (DRAM and power-on suspend)

Compliant with ACPI power management

- SMBus support for desktop management functions
- Support for system management mode (SMM)

Intel 82371EB PCI ISA IDE Xcelerator (PIIX4E)

The PIIX4 is a multifunction PCI device implementing the PCI-to-ISA bridge, PCI IDE functionality, Universal Serial Bus (USB) host/hub function, and enhanced power management. The PIIX4E comes in a 324-pin MBYTESGA package that features:

- Multifunction PCI-to-ISA bridge

  Support for the PCI bus at 33 MHz

  Complies with the PCI specification (see Section 6.2 for specification information)

  Full ISA bus support
- USB controller

  Two USB ports (see Section 6.2 for specification information)

  Support for legacy keyboard and mouse

  Support for UHCI interface (see Section 6.2 for specification information)
- Integrated dual-channel enhanced IDE interface

  Support for up to four IDE devices

  PIO Mode 4 transfers at up to 16 MB/sec

  Support for Ultra DMA/33 synchronous DMA mode transfers up to 33 MB/sec

  Bus master mode with an 8 x 32-bit buffer for bus master PCI IDE burst transfers
- Enhanced DMA controller

  Two 8237-based DMA controllers

  Support for PCI DMA with three PC/PCI channels and distributed DMA protocols
- Interrupt controller based on 82C59

  Support for 15 interrupts

  Programmable for edge/level sensitivity
- Power management logic

  Sleep/resume logic

  Support for wake-on-modem, Wake on LAN technology, and wake on PME

  Support for ACPI (see Section 6.2 for specification information)
- Real-Time Clock

  256-byte battery-backed CMOS SRAM

  Includes date alarm
- 16-bit counters/timers based on 82C54

Accelerated Graphics Port (A.G.P.)

The Accelerated Graphics Port (A.G.P.) is a high-performance interface for graphic-intensive applications, such as 3D applications. A.G.P. is independent of the PCI bus and is intended for exclusive use with graphical-display devices. A.G.P. provides these performance features:

- Pipelined-memory read and write operations that hide memory access latency.
- De-multiplexing of address and data on the bus for near 100 percent bus efficiency.
- AC timing for 133 MHz data transfer rates, allowing data throughput of 500MBYTES/sec.
- A.G.P. complies with the 66 MHz PCI specification.

Universal Serial Bus (USB)

The motherboard has two USB ports; one USB peripheral can be connected to each port. For more than two USB devices, an external hub can be connected to either port. The motherboard fully supports the universal host controller interface (UHCI) and uses UHCI-compatible software drivers. USB features include:

- Self-identifying peripherals that can be plugged in while the computer is running.
- Automatic mapping of function to driver and configuration.
- Supports isonchronous and asynchronous transfer types over the same set of wires.
- Supports up to 127 physical devices.
- Guaranteed bandwidth and low latencies appropriate for telephony, audio, and other applications.
- Error-handling and fault-recovery mechanisms built into the protocol.

IDE Support

The motherboard has two independent bus-mastering PCI IDE interfaces. These interfaces support PIO Mode 3, PIO Mode 4, ATAPI devices (e.g., CD-ROM), and Ultra DMA/33 synchronous-DMA mode transfers. The BIOS supports logical block addressing (LBA) and extended cylinder head sector (ECHS) translation modes. The BIOS automatically detects the IDE device transfer rate and translation mode.

Programmed I/O operations usually require a substantial amount of processor bandwidth. However, in multitasking operating systems, the bandwidth freed by bus mastering IDE can be devoted to other tasks while disk transfers are occurring.

The motherboard also supports laser servo (LS-120) drives. LS-120 technology allows the user to perform read/write operations to LS-120 (120 MB) and conventional 1.44 MB and 720 KB diskettes. An optical servo system is used to precisely position a dual-gap head to access the diskette’s 2,490 tracks per inch (tpi) containing up to 120 MB of data storage. A conventional diskette uses 135 tpi for 1.44 MB of data storage.

LS-120 drives are ATAPI-compatible and connect to the motherboard’s IDE interface. (LS-120 drives are also available with SCSI and parallel port interfaces.) Some versions

of Windows 95 and Windows NT operating systems recognize the LS-120 drive as a bootable device in both 120 MB and 1.44 MB mode.

Connection of an LS-120 drive and a standard 3.5-inch diskette drive is allowed. The LS-120 drive can be configured as a boot device if selected in the Setup program.

Real-Time Clock, CMOS RAM and Battery

The real-time clock is compatible with DS1287 and MC146818 components. The clock provides a time-of-day clock and a multi-century calendar with alarm features and century rollover. The real-time clock supports 256 bytes of battery-backed CMOS SRAM in two banks that are reserved for BIOS use.

The time, date, and CMOS values can be specified in the Setup program. The CMOS values can be returned to their defaults by using the Setup program.

An external coin-cell battery powers the real-time clock and CMOS content. When the computer is not plugged into a wall socket, the battery has an estimated life of three years. When the computer is plugged in, the 3.3 V standby current from the power supply extends the life of the battery.

Super I/O Controller

The motherboard uses the SMC FDC37C672 I/O controller which features:

- Single diskette drive interface
- ISA Plug-and-Play compatible register set
- Two serial ports
- FIFO support on both serial and diskette interfaces
- One parallel port with ECP and EPP support
- PS/2 † style mouse and keyboard interfaces
- Intelligent auto power management, including:

  Shadowed write-only registers for ACPI compliance

  Programmable wake-up event interface

The Setup program provides configuration options for the I/O controller.

Serial Ports

The motherboard has two 9-pin D-Sub serial port connectors located on the back panel. The NS16C550-compatible UARTs support data transfers at speeds up to 115.2Kbits/sec with BIOS support.

Parallel Ports

The connector for the multi-mode bi-directional parallel port is a 25-pin D-Sub connector located on the back panel of the motherboard. In the Setup program, there are four options for parallel port operation:

- Compatible (standard mode)
- Bi-directional
- Bi-directional Enhanced Parallel Port (EPP). A driver from the peripheral manufacturer is required for operation.
- Bi-directional high-speed Extended Capabilities Port (ECP)

Floppy disk Controller

In the Setup program, the floppy interface can be configured for the following floppy drive capacities and sizes:

- 360 KB, 5.25-inch
- 1.2 MBYTES, 5.25-inch
- 720 KB, 3.5-inch
- 1.44 MBYTES, 3.5-inch
- 2.88 MBYTES, 3.5-inch

Keyboard and Mouse Interface

PS/2 keyboard and mouse connectors are located on the back panel. The 5 V lines to these connectors are protected with a PolySwitch† circuit that, like a self-healing fuse, re-establishes the connection after an over-current condition is removed.

Power to the computer should be turned off before a keyboard or mouse is connected or disconnected.

The keyboard controller also supports the hot-key sequence <Ctrl><Alt><Del> for a software reset. This key sequence resets the computer's software by jumping to the beginning of the BIOS code and running the Power-On Self Test (POST).

Infrared Support

On the front panel I/O connector (JP2 pins 6-11), there are six pins that support Hewlett Packard HSDL-1000 compatible infrared (IR) transmitters and receivers. In the Setup program, Serial Port 2 can be directed to a connected IR device. The connection can be used to transfer files to or from portable devices like laptops, PDAs, and printers. The Infrared Data Association (IrDA) specification supports data transfers of up to 115 Kbaud at a distance of 1 meter.

BIOS System Support

BIOS, an acronym for Basic Input Output System, stands as the first link between hardware and software in coordinating the startup configuration of computers. Plug and play ready, AMIBIOS automatically configures the computer's hard drives, disk drives, processors, chipsets, memory, and boot-up of the operating system.

The system BIOS, from AMI, provides ISA PnP and PCI PnP compatibility. The BIOS is contained in a flash memory device. The BIOS provides the power-on self test (POST), the system Setup program, a PCI and IDE auto-configuration.

The system BIOS is always shadowed. Shadowing allows any BIOS routines to be executed from fast 32-bit onboard DRAM instead of from the slower 8-bit flash device.

1. Plug and Play Rev 1.0A support.
2. Boot Block Protection.
3. Auto detects Pipeline Burst SRAM and Cache size, IDE mode type and size.
4. Supports APM 1.2.
5. Supports DMI 2.0.
6. Supports USB.
7. Supports Booting from a Floppy drive, IDE device, CD-ROM, SCSI, Floptical or Network.
8. 1MBYTES/2MBYTES flash EEPROM for easy BIOS upgrade.

PCI IDE

1. "Ultra DMA/33" Synchronous DMA IDE support.
2. Meets Microsoft requirement for PC97/PC98.
3. Fully compatible with PCI spec.V2.1.
4. Supports PCI Bus Mastering.
5. Supports Mode 3 and Mode 4 for Enhanced IDE specification.
6. Supports Multi-word DMA mode 0,1,2.
7. Supports PCI burst Read/Write.
8. Supports Primary and Secondary IDE for a total of 4 drives.
9. IDE CD-ROM support.

PCI Auto-configuration

The PCI auto-configuration works in conjunction with the Setup program to support using PCI add-in boards in the system. When you turn on the system power after installing a PCI board, the BIOS automatically configures interrupts, DMA channels, I/O space, and so on. Since PCI add-in boards use the same interrupt resources as ISA add-in boards, you must specify the interrupts used by non PnP ISA boards in the Setup program. Chapter 3 tells how to use the Setup program. The PCI auto-configuration program complies with version 2.1 of the PCI BIOS specification.

IDE Auto-configuration

When an IDE drive is installed in the system, the IDE auto-configuration function automatically detects and configures the drive for operation in the system. This function eliminates the need to enter the Setup program after you install an IDE drive.

ISA Plug and Play Capability

This provides auto-configuration of Plug and Play ISA cards and resource management for legacy (non Plug and Play) ISA cards.

Universal Serial Bus (USB) Support

AMIBIOS 97 stands as the first BIOS to offer full support for the Universal Serial Bus (USB) standard. The USB technology enables users to quickly and easily attach and reconfigure a wide range of peripheral devices, from keyboards to printers to telephony devices. With comprehensive support for both USB host controllers and USB devices, AMIBIOS 97 offers the ability to fully utilize USB technology now. Support for Intel's Universal Host Controller Interface (UHCI) ensures compatibility and usability well into the future. AMI's USB-WARE serves as a total firmware system solution for anyone using a USB micro-controller.

AMIBIOS 97 offers advanced features for ease-of-use and flexibility: Full Hub Support Full Bus Enumeration Dynamic Hard Attach/Detach Legacy Keyboard and Mouse Support.

The motherboard features two USB ports as a factory installed option. The ports permit the direct connection of two USB peripherals without an external hub. If more devices are required, an external hub can be connected to either of the built-in ports This motherboard fully supports the standard Universal Host Controller Interface (UHCI) and uses standard software drivers that are UHCI compatible. Features of the USB include:

- Self-identifying, hot pluggable peripherals.
- Automatic Mapping of function to driver and configuration.
- Support for Isochronous and Asynchronous transfer types over the same set of wires.
- Support for up to 127 physical devices.
- Guaranteed bandwidth and low latencies appropriate for telephony, audio, and other applications.

Error handling and fault recovery mechanisms built into protocol.

BIOS Upgrades

Because the BIOS is stored in a flash memory device, you can easily upgrade the BIOS without having to disassemble the system. The flash upgrade process can be done by running a utility from a diskette or hard disk, or over a network.

WARNING

For information about the latest BIOS update for the Columbia, contact your service representative.

Expansion Slots

This motherboard has two 16-bit ISA slots, four PCI expansion slots and an AGP slot that supports A.G.P. boards only.

PCI Slots:

The PCI bus transfers data at 132 MBytes/second. Part of the reason for high transfer rates is the PCI bus can operate concurrently with the processor bus; it doesn't override it. The CPU can be processing data in an external cache while the PCI bus is busy transferring information between other parts of the system. Another key feature of the PCI bus is it's plug and play capabilities which eliminates the need for jumper and dip switches for configuring a PCI card.

The PCI slots on the Columbia motherboard are labeled as:

PCI 1

PCI 2

PCI 3

PCI 4

PCI 1 to PCI 4:

These are all fully functional bus-mastering slots.

PCI 1:

This slot shares the PCI Interrupt used by the integrated onboard LAN and AGP slot.

PCI 4:

This slot shares the PCI Interrupt used by the USB port.

Hardware Monitor

The optional hardware monitor subsystem provides the instrumentation capabilities. The features of the hardware monitor subsystem include:

- Support for an optional chassis intrusion sensor.
- An integrated ambient temperature sensor.
- Fan speed sensors, which monitor the fan 1, fan 2 and fan 3 connectors (see motherboard layout for the location of these connectors).
- Power supply voltage monitoring to detect levels above or below acceptable values.

When suggested ratings for temperature, fan speed, or voltage are exceeded, an interrupt is activated. The hardware monitor component connects to the SMBUS.

Onboard LAN

The optional onboard LAN for the Columbia motherboard is driven by the Intel 82558 chipset. The Intel82558 is a 10/100 MBps PCI Ethernet LAN Controller. It automatically detects between 10 Base-T or 100 Base-TX Fast Ethernet connections. This function is a manufacturing option, if it is not installed the JP5 jumper will also NOT be installed.

The LAN LEDs which are mounted next to the LAN connector indicate the following:

Red LED (Speed)	On status indicates a 100 MBps connection.
	Off status indicates a 10 MBps connection.
Green LED (ACT)	Indicates there is activity on the LAN.
Yellow LED (LNK)	Indicates if the LAN cable is connected (linked).

Remote reset capabilities are possible from a remote peer or server using the LANDesk Client Manager, Version 3.11.1 and service layers (when available)

Wake On LAN Header (WOL)

The header, JP8, is used to implement the Wake on LAN feature when the onboard LAN is not installed. Connect this header to a PCI LAN adapter that supports the Wake on LAN feature. The adapter monitors network traffic. When the adapter detects a ‘Magic Packet’, it asserts a signal through the Wake on LAN header to wake up the computer. This signal can wake up the computer only when the AC power cord is still plugged into the wall socket and the computer is turned off using the Standby Power button.

Note: WOL requires an ATX power supply that can supply 720 mA current at the 5V standby output.

Front Panel Connector

PWR ON	Pins 1 & 2, connected to Standby Power On/Off Switch via twisted pair cable.
SLEEP	Pins 3 & 4, connected to Sleep Switch via twisted pair cable (orange/white).
INFRARED	Pins 6-11, not currently used.
HD LED	Pins 15 & 16, connected to the HDD LED via twisted pair cable (red/white).
PWR LED	Pins 18 & 20, connected to the Power LED via twisted pair cable (white/green respectively).
RESET	Pins 22 & 23, connected to Reset Switch via twisted pair cable (orange/white).

SPEAKER Pins 24, & 27, connected to the case speaker via twisted pair cable (red/black).

Fan Connectors

Four fan connectors are provided, Fan 2 is recommended for the CPU heatsink fan, Fans 1,3 and 4 can be used for any other case or heatsink fans, however fan 4 does not have the fan speed monitoring capability.

The pin assignment for these connectors are as follows:

Pin 1 – Ground.

Pin 2 - +12V.

Pin 3 – Sensor

Main Power Connector

When used with an ATX-compliant power supply that supports remote power on/off, the motherboard can turn off the system power through software control.

To enable soft-off control in software, advanced power management must be enabled in the Setup program and in the operating system. When the system BIOS receives the correct APM command from the operating system, the BIOS turns off power to the computer.

With soft-off enabled, if power to the computer is interrupted by a power outage or a disconnected power cord, when power resumes, the computer returns to the power state it was in before power was interrupted (on or off).

Management Extension Hardware

The optional Management Extension component (National Semiconductor LM 78 or LM79) provides the instrumentation capabilities designed to reduce the total cost of owning a PC when used with Intel LANDesk Client Manager. Feature include:

- Integrated temperature monitoring.
- Fan speed monitoring.
- Power supply voltage monitoring to detect levels above or below acceptable values.
- Registers for storing POST hardware test results and error codes.
- Chassis Intrusion - This is carried out by the installation of a light sensitive device on the motherboard (close to the BIOS). This will detect the presence of light if the chassis cover is removed. Alternatively, a header (close to the BIOS) is installed on the motherboard for the connection of a micro switch to detect chassis intrusion.

When suggested ratings for temperature, fan speed, or voltage are exceeded, an interrupt is activated to report the status.

LS-120 Support

LS-120 MBytes Diskette technology enables users to store 120 MBytes of data on a single, 3.5 Inch removable diskette. LS-120 technology is backward (both read and write) compatible with 1.44 MBytes and 720 KB DOS-formatted diskettes and is supported by Windows 95 and Windows NT operating systems.

The Columbia motherboard allows connection of an LS-120 compatible drive and a standard 3.5-inch diskette drive. The LS-120 drive can be configured as a boot device, if selected in the BIOS setup utility.

System Security

The BIOS provides Supervisor level and User level passwords that you can enable through the Setup program.

Chassis Intrusion Detection is also available as a manufacturing option.

2.Installation and Settings

CAUTION

Electrostatic discharge (ESD) can damage components. Perform the procedures described in this chapter only at an ESD workstation. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer.

Jumper Settings

The motherboard contains configuration jumpers that make it possible to change the system configuration. Normally, the only time you will ever change a jumper is if you need to:

- Change the system operating speed.
- Clear CMOS
- Clear Password.

NOTE

A jumper is a small plastic-encased conductor that slips over jumper pins. To change a jumper setting, use a pair of fine needle-nosed pliers to remove the jumper from its current location and slide it onto the new pins to obtain the desired setting.

CAUTION

Do not squeeze the pliers or other tool you use to remove a jumper, or you might bend or break the pins.

* Default Settings

CPU Speed Setting

CPU Speed	JP7	JP6	JP5	JP4
233MHz	On	Off	Off	On
266MHz	On	On	On	Off
300MHz	On	Off	On	Off
333MHz	On	On	Off	Off
350MHz	On	Off	Off	On
400MHz	On	On	On	Off
450MHz	On	Off	On	Off
500MHz	On	On	Off	Off

Flash Device Mode Settings

Mode	JMODE1	J7
*Prog. Dev	1-2	1-2
Write Protect	2-3	2-3

JP3 - Clear Password

*Off Normal

On Clear Password

Jumper settings are silk-screened on the Motherboard

To clear the password do the following:

- Power down the system.
- Remove the system cover to access the motherboard.
- Change the setting of JP3 to On (see the motherboard layout for it's location).
- Turn on the system, wait until you see video and turn the system off again.
- Change the setting of JP3 back to Off (the default).
- Replace the system cover.

J5 – Onboard LAN power supply voltage source

1-2 Use 5V from ATX power supply

*2-3 Use standby 5V from ATX power supply

JBAT1 – Clear CMOS

*1-2 Normal

2-3 Clear CMOS

Jumper settings are silk-screened on the Motherboard

To clear the CMOS do the following:

- Power down the system.
- Remove the system cover to access the motherboard.
- Change the setting of JBAT1 to 2-3 (see the motherboard layout for it's location).
- Turn on the system, wait until you see video and turn the system off again.
- Change the setting of JBAT1 back to 1-2 (the default).
- Replace the system cover.
- Turn on the system and change the BIOS settings according to your preferences.

CPU Installation

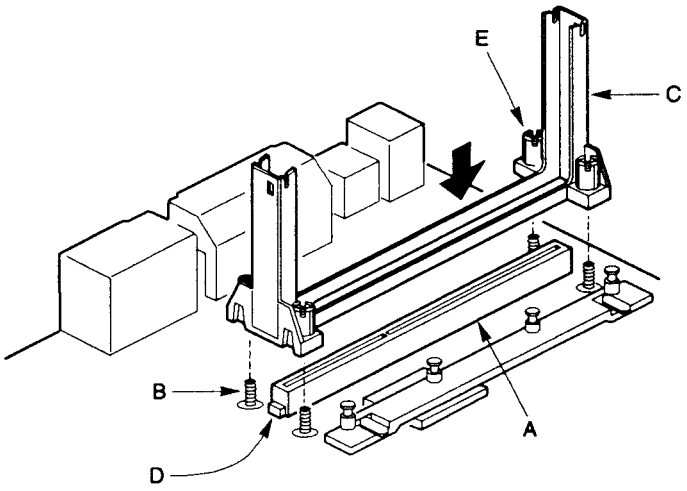
Installing the Retention Mechanism

NOTE

To install the retention mechanism, you need a Phillips (#2 bit) manual torque screwdriver capable of a 6.0 in.-lb. ± 1.0 in.-lb. (0.678 N-m ± 0.113 N-m) setting. The screwdriver also must have a shaft longer than 2 inches.

To install the retention mechanism, follow these steps:

1. Locate SIot 1 (A) and the four attachment studs (B) on the motherboard.



2. To position the mechanism (C), orient it as shown above. The tab (D) on the connector fits into a notch in the base of the mechanism. When properly seated, the base of the mechanism is flush with the motherboard.

CAUTION

Over tightening the captive nuts on the retention mechanism can damage the motherboard. Tighten the captive nuts (E) to no more than 6.0 in.-Lb. ± 1.0 in.-lb. (0.678 N-m ± 0.113 N-m).

3. Finger tighten all four captive nuts to make sure they start correctly on the threads of the attachment studs.

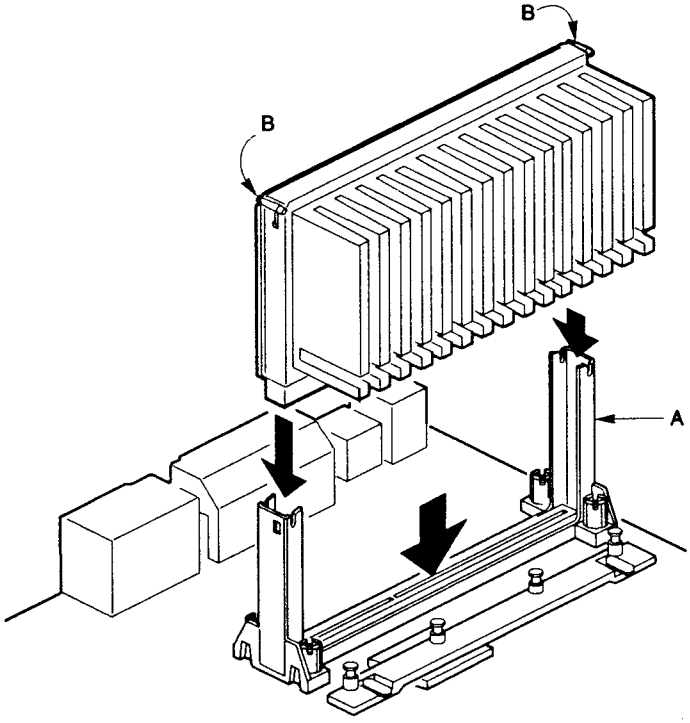
4. To secure the mechanism, tighten the captive nuts with the torque screwdriver to no more than 6.0 in.-Lb. ± 1.0 in.-lb. (0.678 N-m ± 0.113 N-m).

Installing the Processor

To install the processor, follow these steps:

1. Insert the processor in the retention mechanism (A).

2. Press down on the processor until it is firmly seated in the SIot 1 connector and the latches (B) on the processor lock into place.



The CPU Heatsink may not appear as shown in the illustrations. Your heatsink will most likely be fitted with an electric fan, connect the fan connector to the Header on the motherboard marked for this purpose.

After installing the processor, set the processor speed by using the Setup program. See Chapter 3 to set processor speed.

System Memory Installation

You can install from 16 MBytes to 512 MBytes of memory in the motherboard DIMM sockets. The board has DIMM sockets arranged as banks 0, I, 2 and 3. The motherboard supports the following memory features:

- 168-pin SDRAM DIMMs.
- 100 MHz or 66 MHz unbuffered SDRAM DIMMs.
- Non-ECC (64-bit) or ECC (72-bit) memory.
- 16 MBytes, 32 MBytes, 64 MBytes, and 128 MBytes modules.

When adding memory, follow these guidelines:

- You can install DIMMs in any of the four banks.
- You can use different size DIMMs in different banks.
- The BIOS detects the size of installed memory.
- For ECC operation to be available, all installed memory must be ECC and you must enable the ECC Configuration feature in the Setup program (see chapter 3).

The motherboard layout at the beginning of this manual shows the location of the DIMM sockets. To install DIMMs, follow these steps:

1. Turn off all peripheral devices connected to the computer. Turn off the computer.

2. Remove the computer cover and locate the DIMM sockets.

3. Holding the DIMM by the edges, remove it from its antistatic package.

4. Make sure the clips at either end of the socket are pushed away from the socket.

5. Position the DIMM above the socket. Align the two small notches in the bottom edge of the DIMM with the keys in the socket.

6. Insert the bottom edge of the DIMM into the socket.

7. When the DIMM is seated, push down on the top edge of the DIMM until the retaining clips at the ends of the socket snap into place. Make sure the clips are firmly in place.

8. Replace the computer cover.

9. If you installed a DIMM with ECC memory, start the computer and use the ECC Configuration feature in Setup to enable the use of ECC.

Removing Memory

To remove a DIMM, follow these steps:

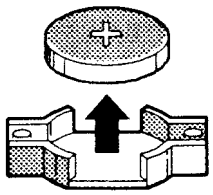
1. Gently spread the retaining clips at each end of the socket. The DIMM pops out of the socket.

2. Hold the DIMM by the edges, lift it away from the socket, and store it in an antistatic package.

3. Reinstall and reconnect any parts you removed or disconnected to reach the DIMM sockets.

Battery Replacement

When your computer is turned off, a lithium battery keeps the time-of-day clock and the values in CMOS RAM current.



The battery should last about seven years. When the battery begins to die, it loses voltage; when the voltage drops below a certain level, the Setup program settings stored in CMOS RAM (for example, the date and time) might not be accurate. Replace the battery with an equivalent one.

If your local ordinances permit, you may dispose of individual batteries as normal trash. Do not expose batteries to excessive heat or fire. Keep all batteries away from children.

CAUTION

Danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.

Expansion Card Installation

The computer system should be switched off and the power cord removed before installing any expansion cards into the system. Failure to do so may cause severe damage to both your motherboard and expansion cards.

Before installing an expansion card, read it’s documentation regarding any hardware or software settings that may be required to set up your specific card.

- Set any necessary jumpers on the expansion card.
- Remove your computer system’s cover.
- Identify the type of slot where the expansion card will be installed and isolate one of the vacant slots for your card.
- Remove the blanking bracket for that slot and retain for possible future use.
- Carefully align the cards edge connector with the motherboard slot and press down firmly to seat the card in the slot, a rocking motion usually makes this easier.
- Secure the cards’ back-plate with the screw you removed earlier.
- Replace the computer system’s cover.
- Plug in the power cord and proceed to install any drivers or software needed for that card.

3.Using the BIOS Setup Program

This chapter tells how to use the Setup program that is built into the BIOS. The Setup program makes it possible to change configuration information (such as the types of peripherals that are installed) and the boot-up sequence for the system. The Setup information is stored in CMOS random access memory (RAM) and is backed up by a battery when power is off.

If the board does not operate as described here, see Chapter 3 for problem descriptions and error messages.

Record the Setup Configuration

To make sure you have a reference to the Setup values for your system, we recommend you to write down the current settings and keep this record up-to-date.

AMI BIOS Setup Menu Overview

The AMI BIOS Setup program is easy to use and can be controlled by the keyboard. Enter the AMI BIOS Setup main menu as follows:

1. Turn on or reboot your system.
2. When the message "Hit <DEL>, if you want to run SETUP" appears, press the <DEL> key to enter the BIOS setup program. The AMI BIOS setup utility (Main Menu) screen, as illustrated on the next page, will appear.

AMIBIOS HIFLEX SETUP UTILITY – VERSION 1.20 © 1996 American Megatrends, Inc. All Rights Reserved
Standard CMOS Setup Advanced CMOS Setup Advanced Chipset Setup Power Management Setup PCI / Plug and Play Setup Peripheral Setup Hardware Monitor Setup Auto-Detect Hard Disks *Change User Password* Change Supervisor Password Auto Configuration with Optimal Settings Auto Configuration with Fail Safe Settings Save Settings and Exit Exit Without Saving
ESC: Exit ↑↓: Sel F2/F3: Colour F10: Save & Exit

Optimal Settings – These settings provide the best performance settings.

Fail-Safe Settings – These settings are more likely to configure a workable computer when something is wrong. If you cannot boot the computer successfully, select the Fail-Safe options and try to diagnose the problem after the computer boots. These settings do not provide optimal performance.

Overview of the Setup Keys

The following keys have special functions in the AMI BIOS Setup Utility.

Setup Key	Description
<Tab>	Move to the next field.
<Esc>	Closes the current operation and return to the previous level.
<Enter>	Selects the current item or option.
+	Increments a value.
-	Decrements a value.
<←> <→> <↑> <↓>	Moves to the next field to the left, right, up and down.
<PgUp> <PgDn>	Modifies the numeric value or makes changes.
<F2> <F3>	Changes screen colour.
<F10>	Saves current CMOS changes at the Main Menu level and exit.
Numeric Keys	0 to 9 are used in the Virtual Keyboard and Numeric Keyboard

The Setup program initially displays the Main menu screen. In each screen there are options for modifying the system configuration. Use the up <↑> or down <↓> arrow keys to highlight items in the BIOS setup screen. Use the <Enter> key to select an item for modification. For certain items, pressing <Enter> brings up a sub-screen. After you have selected an item, use the <+>, <->, <PgUp>, or <PgDn> keys to modify the setting. To exit, press <ESC> until the Main Menu window appears. Choose "Save Settings and Exit" to save your changes and reboot the system, or "Exit without Saving" to ignore your changes and exit the BIOS Setup program.

Standard CMOS Setup

AMIBIOS SETUP – STANDARD CMOS SETUP

Date (mm:dd:yyyy) : Tue, Oct 20, 1998 Base Memory : 640 KB

Time (hh:mm:ss) : 16 : 38 : 13 Extd Memory : 63 MB

Floppy Drive A: 1.44 MB 3½

Floppy Drive B: Not Installed

	Type	Size	Cyln	Head	WPcom	Sec	LBA Mode	Blk Mode	PIO Mode	32Bit Mode
Pri Master	:Auto									On
Pri Slave	:Auto									On
Sec Master	:Auto									On
Sec Slave	:Auto									On

Boot Sector Virus Protection Disabled

Month : Jan – Dec ESC : Exit ↑↓ : Sel

Day : 01 – 31 PgUp/PgDn : Modify

Year : 1901 – 2099 F2/F3 : Color

This section describes the Setup options found on the Standard CMOS Setup menu. It is used to set the time and date and to configure the disk drives. If you select certain options from the main screen (e.g., Primary IDE Master), the Setup program switches to a subscreen for the selected option.

Date / Time

Select the Date/Time option to change the date or time. The current date and time are displayed. Enter new values through the displayed window.

Floppy Drive A, B

Choose the Floppy Drive A or B option to specify the floppy drive type. The settings are 360 KB 5.25-inch; 1.2 MBYTES 5.25-inch; 720 KB 3.5-inch; 1.44MBYTES 3.5-inch; and 2.88 MBYTES, 3.5-inch. The default is 1.44MBYTES, 3.5-inch.

Primary IDE Master, Primary IDE Slave, Secondary IDE Master, Secondary IDE Slave

Choose these options to configure the hard disk drive shown in the field. When you select an option, the following parameters are listed: Type, LBA/Large Mode, Block Mode, 32Bit Mode, and PIO Mode. Use the cursor to highlight "Type" and then choose "Auto" or other options. If you choose "Auto", the BIOS will automatically detect the type of HDD before booting the operating system. You can press <enter> again, then the BIOS will show the complete parameters of HDD type.

AMIBlOS automatically detects the IDE drive parameters (including ATAPI CD-ROM drives) and displays them. Click on the OK button to accept these parameters Or you can set the parameters manually if you are absolutely certain that you know the correct IDE drive parameters.

Click on LBA/Large Mode and choose 'On' to enable support for IDE drives with capacities greater than 528 MBYTES.

Click on Block Mode and choose 'On' to support IDE drives that use Block Mode.

Click on 32Bit Mode and click on 'On' to support IDE drives that permit 32-bit accesses.

Click on PlO Mode to select the IDE Programmed I/O mode. PIO programming also works with ATAPI CD-ROM drives. The settings are Auto, 0, 1, 2, 3, 4, or 5. Click on 'Auto' to allow AMIBIOS to automatically find the PIO mode that the IDE drive being configured uses. If you select 0-5 you must make absolutely certain that you are selecting the PIO mode supported by the IDE drive being configured.

Configuring a CD-ROM Drive Select the appropriate drive icon (Pri Master, Pri Slave, Sec Master, or Sec Slave). Choose the Type parameter and select CDROM. You can boot the computer from a CD-ROM drive. You can also choose Auto and let AMIBIOS automatically set the correct drive parameters.

Advanced CMOS Setup

AMIBIOS SETUP – ADVANCED CMOS SETUP

Quick Boot	Enabled	Available Options :
1st Boot Device	Floppy	Disabled
2nd Boot Device	IDE-0	IDE-0
3rd Boot Device	CDROM	IDE-1
4th Boot Device	Disabled	IDE-2
Try Other Boot Devices	Yes	IDE-3
Floppy Access Control	Read-Write	FLOPPY
Hard Disk Access Control	Read-Write	FLOPTICAL
S.M.A.R.T. for Hard Disks	Enabled	CDROM
BootUp Numlock	On	SCSI
Floppy Drive Swap	Disabled	
Floppy Drive Seek	Disabled	
PS/2 Mouse Support	Enabled	
System Keyboard	Absent	
Primary Display	Absent	
Password Check	Setup	
Boot to OS/2 > 64MBYTES	No	
Cache Bus ECC	Disabled	
System BIOS Cacheable	Enabled	
C000, 16K Shadow	Cached	
C400, 16K Shadow	Cached	
C800, 16K Shadow	Disabled	
CC00, 16K Shadow	Disabled	
D000, 16K Shadow	Disabled	
D400, 16K Shadow	Disabled	ESC : Exit ↑↓ : Sel
D800, 16K Shadow	Disabled	PgUp/PgDn : Modify
DC00, 16K Shadow	Disabled	F2/F3 : Color

This section describes the Setup options available in the Advanced CMOS Setup menu which are used to configure basic system performance parameters. If you select certain options the Setup program switches to a subscreen for the selected option.

Quick Boot

Enabling this option instructs the BIOS to boot quickly when the computer is powered on. System memory above 1MBYTES is not tested, there is no 40 second wait for the HDD ready signal or the 0.5 sec wait for the reset signal to the HDD.

The Optimal and the Fail-Safe default setting is "Enabled".

Boot Sequence

(Boot Devices 1-4). Set this option to the sequence of boot drives (floppy drive A:, hard disk drive C:, CD-ROM drive, SCSI hard-drive, Floptical or Network) that the AMI BIOS attempts to boot from after AMI BIOS POST completes. The default setting is "Floppy, IDE-0 and CD-ROM".

Try Other Boot Device

Set this option to 'Yes' for the BIOS to try to boot from other devices if all selected boot devices failed to boot. The default setting is 'Yes'.

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. The Optimal and Fail-Safe default settings are Read/Write.

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. The Optimal and Fail-Safe default settings are Read/Write.

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

S.M.A.R.T. (Self-Monitoring, Analysis, and Reporting Technology), is a technology developed to manage the reliability of the hard disk by predicting some, but not all of the future device failures. This feature helps the BIOS warn the user of possible device failures. Thereby giving the user a chance to back up the device and/or replace the device before actual failure occurs. The default setting is set to Enabled.

BootUp Num-Lock

Set this option to "On" to turn the Numlock key on when the computer is booted. The settings are "On" and "Off". The default setting is "On".

Floppy Drive Swap

Set this option to “Enable” to permit drives A: and B: to be swapped. The settings are “Enabled” and “Disabled”. The default setting is “Disabled”.

Floppy Drive Seek

Set this option to Enabled to specify that floppy drive A: will perform a Seek operation at system boot. The settings are Disabled or Enabled. The Optimal and Fail-Safe default settings are Disabled.

PS/2 Mouse Support

Set this option to enable or disable the system detecting and assigning an IRQ to a PS/2 mouse. The default setting is “Enabled”.

Primary Display

This option specifies the type of display monitor and adapter in the computer. The settings are Mono, CGA40, CGA80, EGA/VGA, or Absent. The Optimal and Fail-Safe default settings are “Absent”.

Password Check

This option enables password checking every time the computer is powered on or every time WINBIOS Setup is executed. 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 WINBIOS is executed. The Optimal default setting is “Setup”.

Boot to OS/2 > 64MBYTES

When using the OS/2 operating system with 64 Mbytes or more of DRAM, set this option to “yes”. The default setting is “No”.

System BIOS Cacheable

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

The Optimal default setting is Enabled. The Fail-Safe default setting is “Enabled”.

Advanced Chipset Setup

AMIBIOS SETUP – ADVANCED CHIPSET SETUP

**********SDRAM Timing**********		Available Options :
Configure SDRAM Timing:by SPD	Disabled	Disabled
SDRAM RAS to CAS Delay	3 SCLKs	Enabled
SDRAM RAS Precharge Time	3 SCLKs	
SDRAM CAS Lattency	3 SCLKs	
SDRAM Leadoff Cmd Timing	Auto	
DRAM Integrity Mode	Non ECC	
DRAM Refresh Rate	15.6 us	
Memory Hole	Disabled	
Graphics Aperture Size	64MB	
8bit I/O Recovery Time	1 Sysclk	
16bit I/O Recovery Time	1 Sysclk	ESC : Exit ↑↓ : Sel
USB Function	Enabled	PgUp/PgDn : Modify
USB Keyboard Legacy Support	Disabled	F2/F3 : Color

This section describes the Setup options available in the Advanced Chipset Setup menu which are used to configure the features specific to the chipset used on this motherboard. If you select certain options the Setup program switches to a sub-screen for the selected option.

SDRAM Timing Latency

- RAS To CAS This option specifies the length of the delay inserted between the RAS and CAS signals of the DRAM system memory access cycle. The settings are 2 CLKs or 3 CLKs. The Optimal default setting is 3 CLKs.
- CAS Lattency.- This option sets the latency period for the CAS signal. The settings are 2 CLKs or 3 CLKs. The Optimal and Fail-Safe default settings are 3 CLKs.
- RAS Precharge Time - This option specifies the length of the RAS precharge part of the DRAM system memory access cycle when EDO DRAM system memory is installed in this computer. The settings are 3 CLKs or 2 CLKs. The Optimal default setting is 3 CLKs.

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.
ECC ONLY	Multibit errors are detected and reported as parity errors. Single-bit errors are corrected by the chipset. Corrected bits of data from memory are not written back to DRAM system memory.
ECC	Multibit errors are detected and reported as parity errors. Single-bit errors are corrected by the chipset and are written back to DRAM system memory. If a soft (correctable) memory error occurs, writing the fixed data back to DRAM system memory will resolve the problem. Most DRAM errors are soft errors. If a hard (uncorrectable) error occurs, writing the fixed data back to DRAM system memory does not solve the problem. In this case, the second time the error occurs in the same location, a Parity Error is reported, indicating an uncorrectable error. If ECC is selected, AMIBIOS automatically enables the System Management Interface (SMI). If you do not want to enable power management, set the Power Management/APM option to Disabled and set all Power Management Setup timeout options to Disabled. To enable power management, set Power Management /APM to Enabled and set the power management timeout options as desired.

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. The Optimal default setting is 64MBytes.

USB Function

This motherboard supports Universal Serial Bus devices. The default setting is set to “Enabled”.

USB Keyboard Legacy Support

This option is automatically greyed-out if the USB function is set to Disabled. When Enabling the USB Function this may be set to Enabled or Disabled. The default setting is set to Disabled.

Power Management Setup

AMIBIOS SETUP – POWER MANAGEMENT SETUP

Power Management / APM	Enabled	Available Options :
Green PC Monitor Power State	Suspend	Disabled
Video Power Down Mode	Suspend	Enabled
Hard Disk Power Down Mode	Suspend	
Hard Disk Time Out (Minute)	Disabled	
Standby Time Out (Minute)	Disabled	
Suspend Time Out (Minute)	Disabled	
Throttle Slow Clock Ratio	50 – 62.5%	
Modem Use I/O Port	N/A	
Modem Use IRQ	N/A	
Display Activity	Ignore	
Device 6 (Serial Port 1)	Monitor	
Device 7 (Serial Port 2)	Monitor	
Device 8 (Parallel Port)	Ignore	
Device 5 (Floppy Disk)	Monitor	
Device 0 (Primary master IDE)	Monitor	
Device 1 (Primary slave IDE)	Ignore	
Device 2 (Secondary master IDE)	Monitor	
Device 3 (Secondary slave IDE)	Ignore	
System Thermal	Ignore	
Thermal Slow Clock Ratio	50 – 62.5%	
CPU Critical Temperature	65°C/149°F	
Power Button Function	On/Off	
Restore on AC Power Loss	Last State	
RTC Alarm Resume From Soft Off	Disabled	
RTC Alarm Date	*15*	ESC : Exit ↑↓ : Sel
RTC Alarm Hour	*12*	PgUp/PgDn : Modify
RTC Alarm Minute	*30*	F2/F3 : Color
RTC Alarm Second	*30*	

This section describes the Setup options available in the Power Management Setup menu used to configure the power conservation features. If you select certain options the Setup program switches to a sub-screen for the selected option.

Power Management

Power Management allows the user to reduce power consumption. Set this option to “Enabled” to enable the power management and APM (Advanced Power Management) features. The default setting is “Enabled”.

Green PC Monitor Power State

This option specifies the power management state that the Green-PC compliant video monitor enters after the specified period of display inactivity has expired. The settings are “Disabled, Off, Standby or Suspend”. The default setting is “Suspend”.

Video Power Down Mode

This option specifies the power management state that the video subsystem enters after the specified period of display inactivity has expired. The settings are “Disabled”, “Standby”, and “Suspend”. The default setting is “Suspend”.

Hard Disk Power Down Mode

This option specifies the power management state that the hard disk drive enters after the specified period of inactivity has expired. The settings are “Disable”, “Standby”, and “Suspend”. The default setting is “Suspend”.

Standby Time Out

Choose the inactive time between 1 and 60 minutes before the system enters the Suspend mode. The default setting is “Disabled”.

Suspend Time Out

Choose the inactive time between 1 and 60 minutes before the system enters the Suspend mode. Default is “Disabled”.

Throttle Slow Clock Ratio

This option specifies the speed at which the system clock runs in power saving modes. The settings are expressed as a ratio between the normal clock speed and the power down clock speed. The default setting is 50 - 62.5%.

Display Activity

This option specifies if AMIBIOS is to monitor activity on the display monitor for power conservation purposes. When this options set to Monitor and there is no display activity for the length of time specified in the value in the Full-On to Standby Timeout (Min) option, the computer enters a power saving state. The settings are Monitor or Ignore. The default setting is "Ignore".

Devices 0 to 8

These options enable event monitoring. When the computer is in a power saving mode, activity on the named port is monitored by AMIBIOS. When any activity occurs, the computer enters Full On mode.

Each of these options can be set to Monitor or Ignore.

PCI / Plug and Play Setup

AMIBIOS SETUP – PCI / PLUG AND PLAY SETUP

Plug and Play Aware O/S	Yes	Available Options :
Clear NVRAM	No	No
Onboard PCI LAN Controller	Enabled	Yes
PCI Latency Timer (PCI clocks)	64	
Primary Graphics Adapter	PCI	
PCI VGA Palette Snoop	Disabled	
PCI IDE BusMaster	Disabled	
Offboard PCI IDE Card	Auto	
Offboard PCI IDE Primary IRQ	Disabled	
Offboard PCI IDE Secondary IRQ	Disabled	
PCI Slot1 IRQ Priority	Auto	
PCI Slot2 IRQ Priority	Auto	
PCI Slot3 IRQ Priority	Auto	
PCI Slot4 IRQ Priority	Auto	
DMA Channel 0	PnP	
DMA Channel 1	PnP	
DMA Channel 3	PnP	
DMA Channel 5	PnP	
DMA Channel 6	PnP	
DMA Channel 7	PnP	
IRQ 3	PCI / PnP	
IRQ 4	PCI / PnP	
IRQ 5	PCI / PnP	
IRQ 7	PCI / PnP	
IRQ 9	PCI / PnP	
IRQ 10	PCI / PnP	
IRQ 11	PCI / PnP	
IRQ 14	PCI / PnP	
IRQ 15	PCI / PnP	ESC : Exit ↑↓ : Sel
Reserved Memory size	Disabled	PgUp/PgDn : Modify
Reserved Memory Address	C8000	F2/F3 : Color

This section describes the Setup options available in the PCI/Plug and Play Setup menu to configure the PCI and Plug & Play features. If you select certain options the Setup program switches to a sub-screen for the selected option.

Plug and Play Aware OS

Set this option to "Yes" if the operating system installed in the computer is Plug and Play-aware. AMI BIOS only detects and enables PnP ISA adapter cards that are required for system boot. The Windows 95 operating system detects and enables all other PnP-aware adapter cards. Windows 95 is PnP aware. Set this option to "No" if the operating system (such as DOS, OS/2, Windows 3.x) does not use PnP. You must set this option correctly or PnP-aware adapter cards installed in your computer will not be configured properly. The default Optimal setting is "Yes".

Onboard PCI LAN Controller

This option is set to enabled when your motherboard has the manufacturing option of on board LAN installed. The default setting is set to "Enabled".

PCI Latency Timer

This option sets latency of all PCI devices on the PCI bus. The settings are in units equal to PCI clocks. The settings are 32, 64, 96, 120, 160, 192, 224, or 248. The default setting of "64 PCI Clocks" enables maximum PCI performance for this motherboard.

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:

VGA Palette Snoop Bit	Action
Disabled	Data read and written by the CPU is only directed to the PCI VGA device's palette registers.
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. The Optimal and Fail-Safe default settings are Disabled.

PCI IDE BusMaster

Set this option to Enabled to specify that the IDE controller on the PCI local bus has bus mastering capability. The settings are Disabled or Enabled. The Optimal and Fail-Safe default setting is **"**Disabled**"**.

- PCI Slot1 IRQ Priority
- PCI Slot2 IRQ Priority
- PCI Slot3 IRQ Priority
- PCI Slot4 IRQ Priority

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

DMA Channel 0 to DMA Channel 7

This option can be used to reserve a DMA channel for use by legacy ISA adapter cards. The settings are Disabled, DMA ChI, DMA Ch 3 DMA Ch 5, DMA Ch 6, or DMA Ch 7. The Optimal and Fail-Safe default settings are PnP.

IRQ3 to IRQ15

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

These options determine if AMIBlOS should remove an IRQ from the pool of available IRQs passed to BIOS configurable devices. The available IRQ pool is determined by readling the ESCD NVRAM. If more IRQs must be removed from the pool, the end user can use these PCI/PnP Setup options to remove the IRQ by assigning the option to the ISA/ElSA setting. Onboard I/O is configurable by AMIBlOS. The IRQs used by onboard I/O are configured as PCI/PnP.

The settings are PCI/PnP or ISA/EISA. The Optimal and Fail-Safe default settings are "PCI/PnP".

Peripheral Setup

AMIBIOS SETUP – PERIPHERAL SETUP © 1996 American Megatrends, Inc. All Rights Reserved		
OnBoard FDC	Auto	Available Options :
OnBoard Serial Port 1	Auto	Auto
OnBoard Serial Port 2	Auto	Disabled
Serial Port 2 Mode	Normal	Enabled
Serial Port 2 Duplex Mode	*N/A*	
Serial Port 2 Receiver Polarity	*N/A*	
Serial Port 2 Xmitter Polarity	*N/A*	
Serial Port 2 IR Interface	*N/A*	
OnBoard Parallel Port	Auto	
Parallel Port Mode	Normal	
EPP Version	*N/A*	
Parallel Port IRQ	*Auto*	
Parallel Port ECP DMA Channel	*N/A*	ESC : Exit ↑↓ : Sel
OnBoard IDE	Both	PgUp/PgDn : Modify
		F2/F3 : Color

This section describes the Setup options available in the Peripheral Setup menu to configure the I/O support. If you select certain options the Setup program switches to a subscreen for the selected option.

OnBoard FDC

This option enables the floppy drive controller on the motherboard. The settings are "Auto", "Enabled" and "Disabled". The default setting is Auto.

OnBoard Serial Port1

This option enables Serial Port 1 on the motherboard and specifies the base I/O port address for serial port 1. The settings are "3F8h", "3E8h", "2F8h", "2E8h", "Auto", and "Disabled". The Optimal and Fail-Safe default settings are both "Auto".

OnBoard Serial Port2

This option enables serial port 2 on the motherboard and specifies the base I/O port address for serial port 2. The settings are "2F8h", "2E8h", "3F8h", "3E8h", "Auto", and "Disabled". The Optimal and Fail-Safe default settings are both "Auto".

Serial Port2 Mode

This option specifies the operating mode for serial port 2.This option only appears if the Onboard Serial Port2 option is not set to Auto or Disabled. The settings are IR (infrared) or Normal. The Optimal and Fail-Safe default settings are Normal.

Serial Port2 Duplex Mode

This option specifies the type of duplexing used for infrared on serial port 2. This option only appears if the Onboard Serial Port2 option is not set to Auto or Disabled. The settings are Half or Full. There are no default settings.

OnBoard Parallel Port

This option enables the parallel port on the motherboard and specifies the parallel port base I/O port address. The settings are “378h”, “278h”, “3BCh”, “Auto”, and “Disabled”. The default setting for Optimal and Fail-Safe is “Auto”.

Parallel Port Mode

This option specifies the parallel port mode. ECP (Extended Capabilities Port) and EPP (Enhanced Parallel Port) are both bi-directional data transfer schemes that adhere to the IEEE P1284 specifications. The settings are “Normal” (SPP), “EPP”, and “ECP”. The default setting is “Normal”.

EPP – EPP uses the existing parallel port signals to provide asymmetric bi-directional data transfer driven by the host device.

ECP – ECP uses the DMA protocol to achieve transfer rates of approximately 2.5 MBytess. ECP provides symmetric bi-directional communications.

Parallel Port ECP DMA Channel

This option is only available if the setting for the Parallel Port Mode is ECP.0

OnBoard IDE

This option enables or disables the onboard IDE controller channels. Available options are “Disabled”, “Primary”, “Secondary” or “Both”. The default setting is “Both”.

Hardware Monitor Setup

AMIBIOS SETUP – HARDWARE MONITOR SETUP © 1996 American Megatrends, Inc. All Rights Reserved		
System Hardware Monitor		Available Options :
Chassis Intrusion	Enabled	
Current CPU Temperature	46°C/114°F	
Current CPU Fan Speed	6026 RPM	
Current Case Fan 1 Speed	0 RPM	
Current Case Fan 2 Speed	0 RPM	
Vcore	2.800 V	
Vtt	1.488 V	
Vio	3.328 V	
+5.000V	5.109 V	
+12.000V	12.256 V	
-12.000V	-12.238 V	
-5.000V	-5.144 V	
		ESC : Exit ↑↓ : Sel
		PgUp/PgDn : Modify
		F2/F3 : Color

H/W Monitor BIOS Support

This function is responsible for monitoring certain Voltages, Fan rates and Temperatures of components on the motherboard.

Auto-Detect Hard Disks

This "Auto-Detect Hard Disks" option detects the parameters of IDE hard disk drives, and automatically enters them into the standard CMOS setup screen.

Change User Password & Change Supervisor Password

AMI BIOS has two optional password features. "Supervisor Password" sets a password that will be used to protect the system and the setup utility; "User Password" sets a

password that will be used exclusively on the system. The system can be configured so that all users must enter a password every time the system boots or when the BIOS Setup is executed. The password is stored in CMOS RAM. When you select Supervisor or User, AMI BIOS prompts for a password. You must set the Supervisor password before you can set the User password. Enter a 1-6 character password. The password does not appear on the screen when typed. Make sure you write it down. If you forget it, you must clear the BIOS Passwords (see the section on Jumper Settings.

To enter these passwords do the following:

- Boot your system and press DEL to enter into the BIOS setup program.
- Select the “Change Supervisor Password” option and press Enter.
- You will be prompted to enter your Supervisor password two times.
- The “Change User Password” option is now enabled, select this option and press Enter.
- You will be prompted to enter your User password two times.
- Select the “Save Settings and Exit” option, press Y to save the current settings.

Auto Configuration with Optimal Settings

You can load the Optimal default settings. The Optimal default settings are best-case values that should optimize system performance. If CMOS RAM is corrupted, the Optimal settings are loaded automatically.

Auto Configuration with Fail Safe Settings

You can load the Fail-safe Setting by pressing <enter> at the Fail-safe Setting. The Fail-safe settings provide far from optimal system performance, but are the most stable settings. Use this option as a diagnostic aid if the system is behaving erratically.

Save Settings and Exit

Saves the changes to CMOS RAM and exits the Setup program. You can also press the <F10> key anywhere in the BIOS Setup program (main menu) to do this.

Exit Without Saving

Exits the Setup program without saving any changes. This means that any changes made while in the Setup program are discarded and **NOT SAVED**. Pressing the <ESC> key in BIOS Setup program (main menu) will do this.

Upgrading the BIOS

The system BIOS resides on a flash component. You can upgrade a flash BIOS through software, without taking the system apart or replacing the flash component. This appendix tells how to upgrade your system BIOS from a diskette particular for your motherboard. Your service representative can provide you with the latest BIOS upgrade for your system.

WARNING

Upgrading BIOS other than the one provided by the Motherboard manufacturer will automatically have the product warranty voided. Using the incorrect BIOS for upgrade might cause permanent unrecoverable damage to the motherboard.

Flashing the BIOS

1. Insert the BIOS diskette into your floppy drive. At A:\, type

   "Flash632 <*BIOS filename*>" and hit <enter>

2. A Flash EPROM Programming Utility screen pops up. Make sure the version of the AMIFLASH Utility is 6.32 or above. Press "Y" to continue.

WARNING

System must NOT be turned off during the Programming operation. The system will Re-Boot if Programming is successfully completed.

3. Please wait for the programming operation to complete. Once completed, take the BIOS diskette out from the floppy drive and press any key to restart the computer.
4. Once the system has re-booted, go into the CMOS Setup main. Select "Auto Configuration with Optional Settings" and then "Load high performance setting". You can change this CMOS setting at a later time if you want to customize your settings.
5. Save and exit the BIOS Setup Program.

4.Error and Information Messages

This chapter describes the following:

- Jumper block locations and functions
- Procedures to remove and install optional components
- Information about replacing the battery

Before You Begin

- Be sure to do each procedure in the correct order.
- Set up an equipment log to record the system model and serial numbers, all installed options, and other information about the system. If you need this information, it will be easier to consult the log than to open up and examine the system.
- You will need a medium flat-bladed screwdriver and a jumper removal tool, such as a pair of fine needle-nosed pliers. We recommend that you use an antistatic wrist strap and a conductive foam pad when working on the board.

WARNING

The procedures in this chapter assume familiarity with the general terminology associated with personal computers and with the safety practices and regulatory compliance required for using and modifying electronic equipment.

Disconnect the system from its power source and from any telecommunications links, networks or modems before doing any of the procedures described in this chapter. Failure to disconnect power, telecommunications links, networks or modems before you open the system or do any procedures can result in personal injury or equipment damage. Some circuitry on the system board may continue to operate even though the front panel power button is off.

CAUTION

Electrostatic discharge (ESD) can damage components. Do the procedures described in this chapter only at an ESD workstation. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis.

Add-in boards can be extremely sensitive to ESD and always require careful handling. After removing the board from its protective wrapper or from the system, place the board flat on a grounded, static-free surface, component-side up. Use a conductive foam pad if available, but not the board wrapper. Do not slide the board over any surface.

Beep Codes

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

Beeps	Error Message	Description
1	Refresh Failure	The memory refresh circuitry on the motherboard 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 the first 64 KB.
4	Timer Not Operational	A memory failure in the first 64 KB of memory, or Timer 1 on the motherboard is not functioning.
5	Processor Error	The CPU generated an error.
6	8042 - Gate A20 Failure	The BIOS 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 the BIOS.
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.

Error Messages

An error can occur after the system display has been initialized.

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 on the motherboard.
C: Drive Error	No response from drive C:. Run the AMIDiag Hard Disk Utility. Check the C: hard drive type in Standard Setup.
C: Drive Failure	No response from hard drive C:. Replace the drive.
Cache Memory Failure, 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 BIOS Setup.
CMOS System Options Not Set	The values stored in CMOS RAM have been destroyed. Run BIOS Setup.
CMOS Display Type Mismatch	The video type in CMOS RAM does not match the type detected. Run BIOS Setup.
CMOS Memory Size Mismatch	The amount of memory found by AMIBIOS is different than the amount in CMOS RAM. Run BIOS Setup.
CMOS Time and Date Not Set	Run Standard Setup to set the date and time.
D: Drive Error	No response from drive D:. Run the AMIDiag Hard Disk Utility. Check the hard disk type in Standard Setup.
D: drive failure	No response from hard disk drive D: Replace the drive.
Diskette Boot Failure	The boot disk in floppy drive A: is corrupt. It cannot be used to boot the system. Use another boot disk and follow the screen instructions.
Display Switch Not Proper	Some systems require a video switch be set to either colour 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	The BIOS can read the disk in floppy drive A:, but cannot boot the system with it. Use another boot disk 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 / 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 memory problems.
On Board Parity Error	Parity error in motherboard memory. The format is: *ON BOARD PARITY ERROR ADDR = (XXXX)* XXXX is the hex address where the error occurred. Run AMIDiag to find and correct memory problems.
Parity Error ????`	Parity error in system memory at an unknown address. Run AMIDiag to find and correct memory problems.

5.Glossary

ADDRESS:

Specific location in the memory of the computer where information about programs, data and software drivers is stored. Peripheral devices such as mouse, modems, etc. require a specific I/0 port address and interrupt in order to function properly.

BIOS:(BASIC INPUT OUTPUT SYSTEM)

That part of a ROM that is the interface between the system hardware and the operating system. The ROM BIOS is a group of low level programs responsible for interfacing the computer to peripheral devices, such as disk drives, serial and parallel ports, keyboard, and video display. Low-level BIOS routines are common to all operating systems and are generally resident in ROM. High-level BIOS routines are specific to the particular operating system in use and are therefore generally stored on disk, and loaded only when the operating system is booted.

BIT:

A binary digit that is the most reducible element of computer information. Eight bits make one byte.

BOOT or BOOTSTRAP:

A small ROM-based program which is automatically loaded when the system is first powered up (or "booted), in order to load and execute an operating system or other large program from disk. Also, the process of starting the computer, either by turning on the power, pressing the Reset switch or by pressing the CTRL + ALT + DEL keys simultaneously. The latter is known as a "warm boot"

BYTE:

Smallest unit of storage required to hold a character of information in memory or on a disk.

BUS CLOCK:

The speed at which data is transferred between the microprocessor and the I/O channel.

CMOS:

Acronym for Complementary Metal Oxide Semiconductor. CMOS integrated circuitry uses very little electrical power. Hence CMOS RAM is ideal for storing system configuration information that cannot be stored permanently in ROM.

COM PORT:

Communication port where devices such as a mouse or an external modem are attached.

CONFIG.SYS:

A file usually located in the root directory of the boot disk that contains information required to load installable device drivers and other system configuration parameters.

CONVENTIONAL MEMORY:

System main memory from 0 to 640KB. Many programs run in this area.

COPROCESSOR:

An auxiliary processor that reduces microprocessor overhead and increases system speed by executing certain math related functions. In Pentium systems the math coprocessor is built into the microprocessor.

CPU:(CENTRAL PROCESSING UNIT)

Also called the microprocessor. The "brain" of the computer, where program instructions and arithmetic operations are executed.

CPU CLOCK:

The speed at which the microprocessor executes its instructions.

DOS:(DISK OPERATING SYSTEM)

Software that controls the activities performed by the computer. DOS sets up an environment under which application software can load and function. It is an interface between the system and application software.

DRAM:(DYNAMIC RANDOM ACCESS MEMORY)

A type of RAM that requires a refresh cycle to keep information valid. Main system memory uses DRAM.

EXPANSION SLOT:

A connector on the system board into which an adapter card can be inserted.

EXTENDED MEMORY:

Memory beyond the 1 MBYTES limit that is accessed by programs such as Windows.

HERTZ:

A unit of frequency which is equivalent to one cycle per second.

INTERFACE:

The connection between the system board and a peripheral.

INTERLEAVING:

A technique for improving system performance by speeding up memory access. Successive memory locations are assigned to different memory banks. Then, when the system requires the information, it accesses both banks simultaneously rather than having to access a single bank sequentially.

INTERRUPT:

Special operation used by hardware peripheral devices to allow them to communicate with the Central Processing Unit. Each peripheral device is allocated a unique interrupt number which the CPU recognizes when talking to the device.

ISA:

Industry Standard Architecture.

JUMPER:

A patch cable, wire or other such device used to establish a circuit.

MEMORY:

RAM and ROM are devices used to hold information and programs while they are being accessed by the system.

MICROPROCESSOR:

Also known as the CPU. The "brain" of the system, which contains the circuitry used for calculation and communication with the rest of the system.

PAGE MODE:

Special function in DRAM that saves cycle time by not re-loading the “Row Address strobe bits”.

PARALLEL PORT:

Also called "printer port", or LPT 1:, the parallel port is used to attach a printer or other peripheral using a Centronics† parallel cable.

PARITY BIT:

An additional non-informational bit appended to a group of 8 bits to make the number of ones in the group of bits either even or odd. This is an elementary error correction mechanism. Example: During a subsequent read from a memory location, and using odd parity, the system will check the sum of ones. If the sum of ones is NOT still odd then the system knows that the information at that location has been corrupted.

SERIAL PORT:

Communication port used by the computer to communicate with the outside world. An IBM PC compatible normally recognizes four standard serial ports: COM1, COM2, COM3 and COM4 which are used to attach a mouse, modems, serial printers, plotters and other serial devices

SHADOW RAM:

Refers to the technique of copying BIOS routines from slower ROM chips to faster RAM, thereby increasing system performance

6. Specifications

This motherboard complies with the following specifications:

Specification	Description	Revision Level
A.G.P.	Accelerated Graphics Port Interface Specification	Revision 1.0, July, 1996, Intel Corporation. The specification is available through the Accelerated Graphics Implementers Forum at http://www.agpforum.org/.
APM	Advanced Power Management BIOS interface specification.	Revision 1.2, February, 1996. Intel Corporation, Microsoft Corporation.
ACPI	Advanced Configuration and Power Interface specification.	Revision 1.0, December 22, 1996, Intel Corporation, Microsoft Corporation, and Toshiba Corporation.
ATA-3	Information Technology –AT Attachment-3 Interface.	X3T10/2008D Revision 6 ATA Anonymous FTP site: fission.dt.wdc.com
ATAPI	ATA Packet Interface for CD-ROMs.	SFF-8020I Revision 2.5 (SFF) Fax Access: (408) 741-1600
ATX	ATX Form Factor Specification	Revision 2.01, February 1997, Intel Corporation. The specification is available at: http://www.intel.com/
DMI	Desktop Management Interface BIOS specification.	Version 2.0, October 16, 1995, American Megatrends Inc., Award Software International Inc., Dell Computer Corporation, Intel Corporation, Phoenix Technologies Ltd., SystemSoft Corporation.
El Torito	Bootable CD-ROM format specification.	Version 1.0, January 25, 1995, Phoenix Technologies Ltd., IBM Corporation. The El Torito specification is available on the Phoenix web site at http://www.ptltd.com/techs/specs.html
EPP	Enhanced Parallel Port	IEEE 1284 standard, Mode [1 or 2], v1.
IrDA	Serial Infrared Physical Layer Link specification.	Version 1.1, October 17, 1995 Infrared Data Association.
PCI	PCI Local Bus specification.	Revision 2.1, June 1, 1995, PCI Special Interest Group.
Plug and Play	Plug and Play BIOS specification.	Version 1.0a, May 5, 1994, Compaq Computer Corporation, Phoenix Technologies Ltd., Intel Corporation.
SDRAM DIMMs (64 and 72 bit)	PC SDRAM Unbuffered DIMM specification.	Revision 0.9, October 22, 1997, Intel Corporation.
USB	Universal Serial Bus specification.	Revision 1.0, January 15, 1996, Compaq Computer Corporation, Digital Equipment Corporation, IBM PC Company, Intel Corporation, Microsoft Corporation, NEC, Northern Telecom.