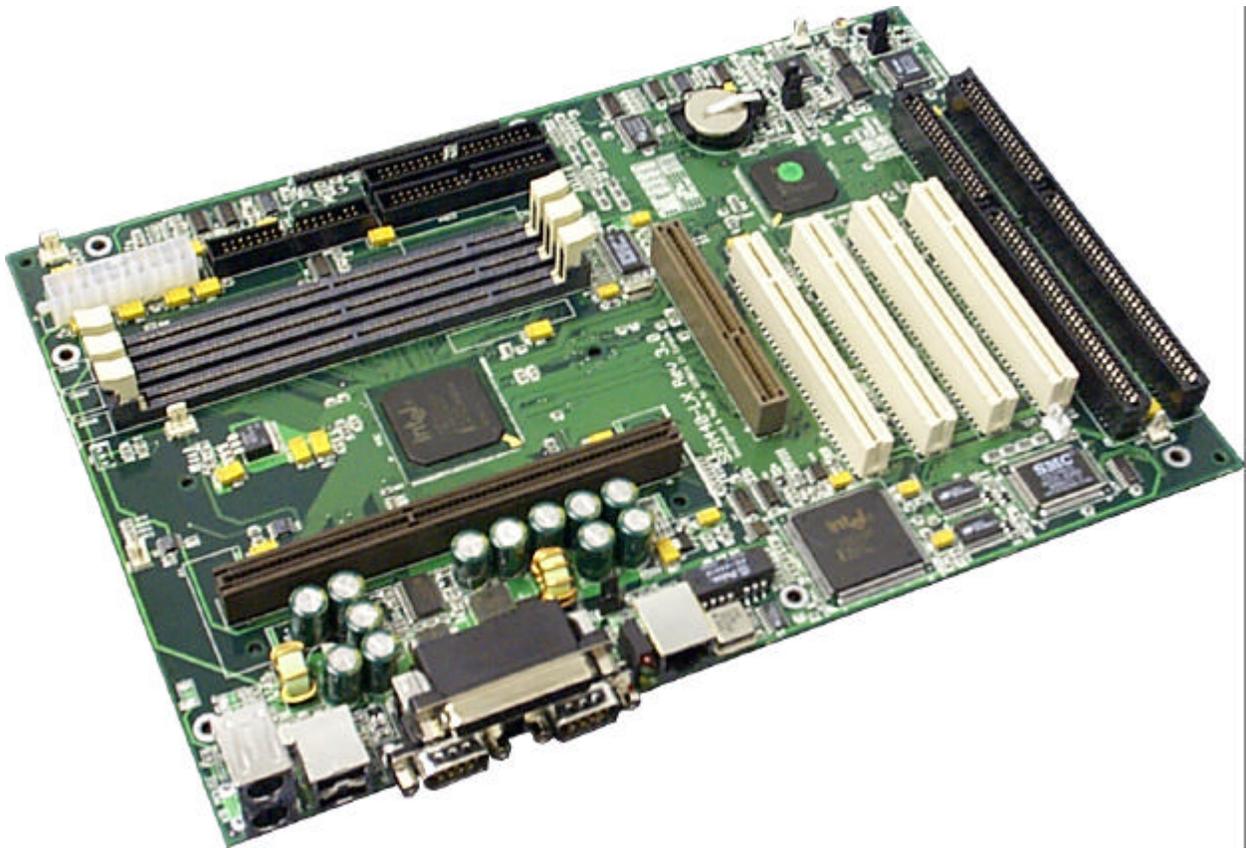


# Kootenay (SEA440LX) Motherboard



## User Manual

Version 2.0

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# TABLE OF CONTENTS

<b>1.PRODUCT DESCRIPTION.....</b>	<b>5</b>
FEATURES OF THE KOOTENAY 2.X MOTHERBOARD.....	5
MOTHERBOARD LAYOUT.....	7
PORT CONNECTORS .....	8
CENTRAL PROCESSING UNIT .....	8
MEMORY .....	8
CACHE MEMORY.....	9
INTEL 82443 PCI/A.G.P. CONTROLLER (PAC).....	9
INTEL 82371AB PCI ISA IDE XCELERATOR (PIIX4E).....	9
ACCELERATED GRAPHICS PORT (A.G.P.).....	10
UNIVERSAL SERIAL BUS (USB).....	10
IDE SUPPORT .....	10
REAL-TIME CLOCK, CMOS RAM AND BATTERY .....	10
SUPER I/O CONTROLLER.....	11
BIOS SYSTEM SUPPORT.....	12
EXPANSION SLOTS.....	15
ONBOARD LAN.....	16
WAKE ON LAN HEADER (WOL) .....	16
WAKE ON RING (WOR) .....	16
FRONT PANEL CONNECTOR.....	17
FAN CONNECTORS.....	17
MAIN POWER CONNECTOR.....	17
MANAGEMENT EXTENSION HARDWARE .....	17
LS-120 SUPPORT.....	18
SYSTEM SECURITY.....	18
<b>2.INSTALLATION AND SETTINGS.....</b>	<b>19</b>
JUMPER SETTINGS.....	19
CPU INSTALLATION .....	22
SYSTEM MEMORY INSTALLATION.....	24
BATTERY REPLACEMENT .....	25
EXPANSION CARD INSTALLATION.....	25
<b>3.USING THE BIOS SETUP PROGRAM.....</b>	<b>26</b>
STANDARD CMOS SETUP.....	29
ADVANCED CMOS SETUP.....	31
ADVANCED CHIPSET SETUP.....	34
POWER MANAGEMENT SETUP .....	37
PCI / PLUG AND PLAY SETUP .....	40
PERIPHERAL SETUP .....	43
HARDWARE MONITOR SETUP.....	45
AUTO-DETECT HARD DISKS.....	46
CHANGE USER PASSWORD & CHANGE SUPERVISOR PASSWORD .....	46

AUTO CONFIGURATION WITH OPTIMAL SETTINGS .....	46
AUTO CONFIGURATION WITH FAIL SAFE SETTINGS .....	46
SAVE SETTINGS AND EXIT .....	47
EXIT WITHOUT SAVING .....	47
UPGRADING THE BIOS .....	47
<b>4.ERROR AND INFORMATION MESSAGES .....</b>	<b>48</b>
BEEP CODES.....	49
ERROR MESSAGES .....	50
<b>5.GLOSSARY .....</b>	<b>52</b>

# 1. Product Description

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## Pentium® II Processor-based ATX board supporting the Accelerated Graphics Port

The Kootenay 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) includes a new bus and port 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 3D 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.

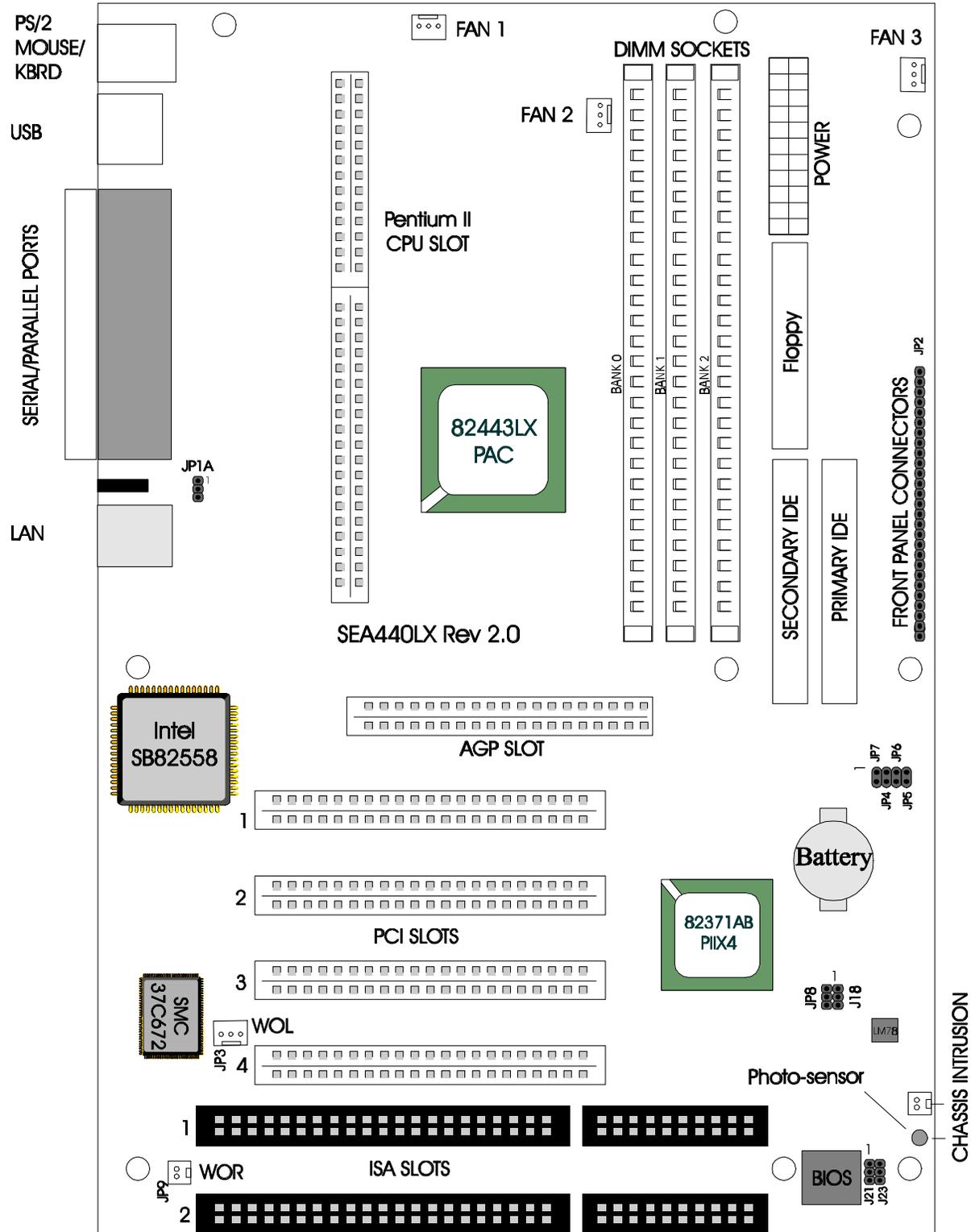
The Intel 440LX AGPset - which makes AGP support possible - also provides additional advanced capabilities including SDRAM support, Ultra DMA/33, and Dynamic Power Management Architecture. Memory support to 384 MBytes, along with enhanced manageability, and it's clear why the Kootenay motherboard is the ideal choice for Pentium® II processor-based systems.

## Features of the Kootenay 2.x Motherboard

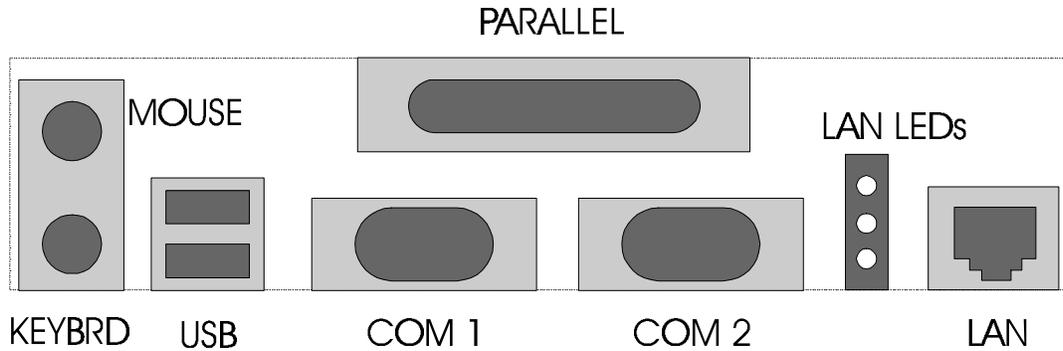
- Support for one 233, 266, 300 or 333 MHz Intel Pentium II processor in a Single Edge Contact (S.E.C.) cartridge.
- Support for up to 384 MBytes of 66 MHz synchronous DRAM (SDRAM) using three DIMM sockets with 168-pin DIMM modules and 3.3 V memory (only two DIMM sockets if your motherboard uses the EX chipset).
- Intel 440LX (or EX) AGPset that includes a high-speed processor interface controller, a DRAM controller, the Accelerated Graphics Port (A.G.P.) interface, a Universal Serial Bus (USB) controller, a fully synchronous PCI bus interface, the real-time clock, and support for power management and system management mode.
- SMC 37C672 I/O component that includes the floppy drive interface, one multi-mode parallel port, two FIFO serial ports, keyboard and mouse controller, and an IrDA compatible interface.
- AMI BIOS that supports power management, Plug and Play, advanced IDE features, DMI 2.0, APM 1.2 and password security.
- Ultra DMA/33

- The LX chipset has six expansion slots: two 16-bit ISA/AT compatible slots and four PCI compatible expansion slots. Refer to the section on 'Expansion Slots' for more details.
- The EX chipset has five expansion slots: two 16-bit ISA/AT compatible slots and three PCI compatible expansion slots. Refer to the section on 'Expansion Slots' for more details.
- Two USB connectors.
- Onboard AGP connector that supports add-in A.G.P. cards.
- Optional hardware monitor that integrates a temperature sensor, fan speed headers, power supply voltage monitor and support for chassis intrusion.
- Optional Onboard LAN using the Intel 558 chipset to provide Wake-On-LAN capability.
- Wake-on-Ring (WOR) support.
- support for Intel LANDesk Client Manager

# Motherboard Layout.



## Port Connectors



## Central Processing Unit

This motherboard is designed to operate with a single Intel Pentium® II microprocessor. The Pentium II processors include the following features:

- Intel's highest performance processor, combining the power of the Pentium® Pro processor with the capabilities of MMX™ technology.
- At 266MHz, the Pentium II processor delivers a 1.6x to over 2x performance boost compared to the 200MHz Pentium processor on industry standard processor benchmarks and over twice the performance on multimedia benchmarks.
- 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 (except in the case of the Celeron CPU's), thermal plate, and back cover.
- Optimized for 32-bit applications running on advanced operating systems.
- All versions have 32 KByte (16K/16K) non-blocking level one cache.
  - P II – 512 KByte unified, non-blocking level two cache.
  - Mendocino – 128 KByte unified, non-blocking level two cache.
  - Celeron – no level two cache.
- Enables systems which are scalable up to two processors and 64 GByte of physical memory.
- Data integrity and reliability features include system bus ECC, Fault Analysis, Recovery, and Functional Redundancy Checking.

## Memory

Support for up to 384 MBytes synchronous DRAM (SDRAM) using two or three DIMM sockets with 168-pin DIMM modules.

The motherboard supports the following memory features:

- 168-pin 3.3 V EDO DIMMs.
- 66 MHz unbuffered SDRAM.
- Non-ECC (64-bit) or ECC (72-bit) memory (EX chipsets support non-ECC memory only).
- Supports 8 MBytes, 16 MBytes, 32 MBytes, 64 MBytes, and 128 MBytes modules.

## **Cache Memory**

The Pentium II microprocessor includes 32 KByte (16K/16K) non-blocking level one cache and 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, 128 Kbyte, 256 Kbyte, 512 Kbyte or 1 MByte.

## **Intel 82443 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.
- Integrated DRAM controller.
- Integrated PCI bus mastering controller.
- Accelerated Graphics Port (A.G.P.) controller.
- Fully-synchronous PCI bus interface.
- Data Buffering.
- Support for system management mode (SMM).

## **Intel 82371AB PCI ISA IDE Xcelerator (PIIX4E)**

The PIIX4E 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 BGA package that features:

- Multifunction PCI-to-ISA bridge.
- USB controller.
- Integrated dual-channel enhanced IDE interface.
- Enhanced DMA controller.
- Interrupt controller based on 82C59.
- Power management logic.
- Real-time Clock.
- 16-bit counters/timers based on 82C54.

## **Accelerated Graphics Port (A.G.P.)**

The Accelerated Graphics Port (A.G.P.) is a high-performance interconnect 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 500 MBYTES/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 isochronous 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.

## **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 SMC 37C672 is an ISA Plug and Play compatible multifunction I/O device that provides the following features:

- Two Serial Ports with high speed 16C550 compatible enhanced UARTs.
- Multi-mode bidirectional parallel port
- Floppy disk controller.
- Keyboard and mouse controller.
- Supports an IrDA and Consumer IR-compliant infrared interface.

By default, the I/O controller interfaces are automatically configured during boot up. The I/O controller can also be manually configured in the Setup program.

### **Serial Ports**

Two 9-pin D-Sub serial port connectors are located on the back panel and are compatible with 16450 and 16550A UARTs.

### **Parallel Ports**

The connector for the multi-mode bidirectional parallel port is a 25-pin D-Sub connector located on the back panel. In the Setup program, the parallel port can be configured for the following:

- Compatible (standard mode).
- Bidirectional (PS/2 compatible).
- Extended Parallel Port (EPP).
- Enhanced 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<sup>†</sup> circuit that, like a self-healing fuse, reestablishes 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.
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 Kootenay, 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:

Using a 32 bit CPU 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 its plug and play capabilities which eliminates the need for jumper and dip switches for configuring a PCI card.

The PCI slots on the Kootenay LX 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 3:

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

PCI 4:

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

## Onboard LAN

The onboard LAN for the Kootenay 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 JP1 jumper will also NOT be installed and the Wake On LAN header WILL be installed.

The LAN LED's 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)

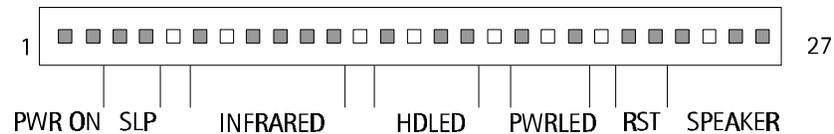
## Wake On LAN Header (WOL)

The header, JP3, 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 socket and the computer is turned off using the Standby Power button.

## Wake On Ring (WOR)

- The Wake On Ring header (JP9) is a 2-pin header that allows the computer to wake from sleep mode when a call is received on a telephony device, such as a modem that supports WOR.
- WOR also supports the on-board COM1 or COM2 ports. The first incoming call powers up the computer, a second call must be made to access the computer.

## Front Panel Connector



PWR ON	Pins 1 & 2, connected to Standby Switch via twisted pair cable.
SLP	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).
RST	Pins 22 & 23, connected to Reset Switch via twisted pair cable (orange/white).
SPEAKER	Pins 24, 26 & 27, connected to the case speaker via twisted pair cable (red/black).

## Fan Connectors

Three fan connectors are provided, Fan 1 is recommended for the CPU heatsink fan, Fans 2 & 3 can be used for any other case or heatsink fans.

The pin assignment for these connectors are as follows:

Pin 1 – Ground.

Pin 2 - +12V.

Pin 3 – Sensor

## Main Power Connector

The power supply connector is an ATX style twenty-pin male connector. The connector from the power supply can fit into the socket in only one direction.

## Management Extension Hardware

The optional Management Extension component (National Semiconductor LM 78 or LM79) provides low-cost instrumentation capabilities designed to reduce the total cost of owning a PC when used with LANDesk Client Manager. The hardware implementation is a single-chip ASIC. 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 Kootenay 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.
- Change the System mode.
- Power Supply Type.
- 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.*

Jumper settings (silk-screened on Motherboard)

### CPU Speed Setting

CPU Speed	JP4	JP5	JP6	JP7
233MHz	On	Off	Off	On
266MHz	Off	On	On	On
300MHz	Off	On	Off	On
333MHz	Off	Off	On	On

## Flash Device Mode Settings

Mode	J23	J21
*Prog. Dev	1-2	1-2
PnP	2-3	1-2
Write Protect	2-3	2-3

## J18 - Clear Password

*1-2	Normal
2-3	Clear Password

### To clear the BIOS password do the following:

- Power down the system.
- Remove the system cover to access the motherboard.
- Change the setting of J18 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 J18 back to 1-2 (the default).
- Replace the system cover.
- Turn on the system and change the BIOS settings according to your preferences.

## JP8 - Clear CMOS

*1-2	Normal
2-3	Clear CMOS

### To clear the CMOS do the following:

- Power down the system.
- Remove the system cover to access the motherboard.
- Change the setting of JP8 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 JP8 back to 1-2 (the default).
- Replace the system cover.
- Turn on the system and set the BIOS settings according to your preferences.

## **JP1 – Power Supply Selection**

- \*1-2 The 5V standby voltage can deliver the 0.75A needed for the WOL function.
- 2-3 The 5V standby voltage can deliver only 0.1A, the WOL function will not work

\* Default Settings

# CPU Installation

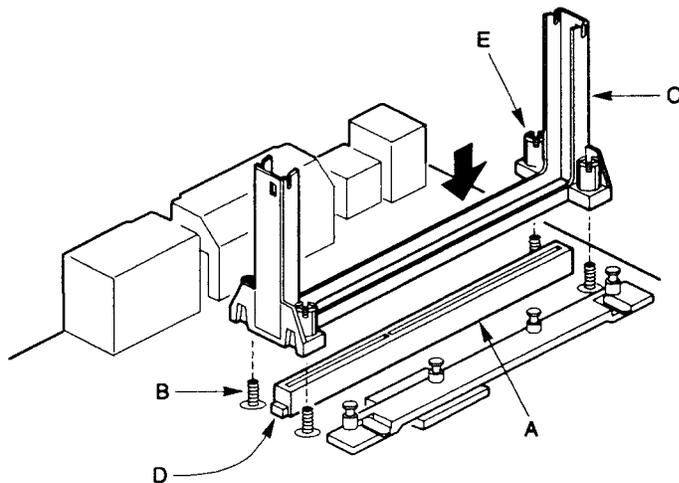
## Installing the Retention Mechanism

 **NOTE**

To install the retention mechanism, you need a Phillips (#2 bit) manual torque screwdriver capable of a 6.0 in.-lb.  $\pm$  1.0 in.-lb. (0.678 N-m  $\pm$  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 Slot 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

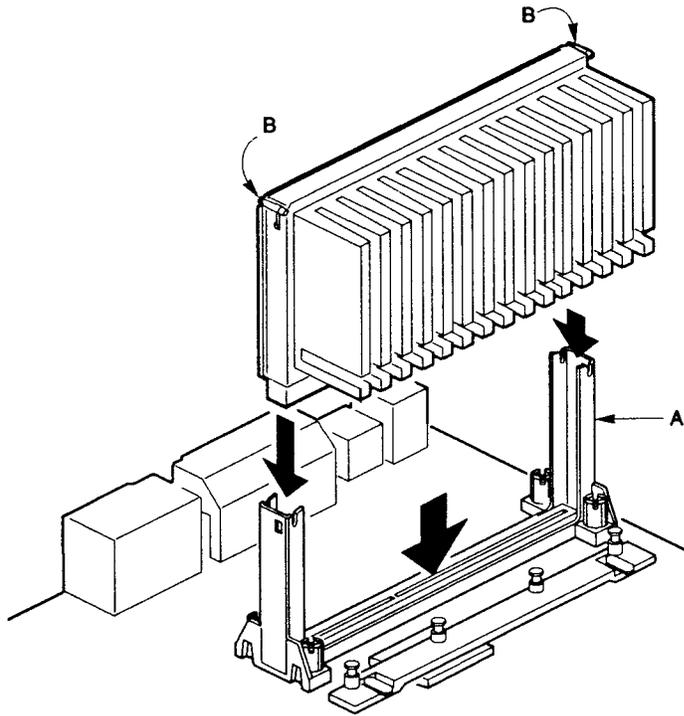
Over tightening the captive nuts on the retention mechanism can damage the motherboard. Tighten the captive nuts (E) to no more than 6.0 in.-Lb.  $\pm$  1.0 in.-lb. (0.678 N-m  $\pm$  0.113 N-m).

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.  $\pm$  1.0 in.-lb. (0.678 N-m  $\pm$  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 Slot 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 8 MBytes to 384 MBytes of memory in the motherboard DIMM sockets. The LX motherboard has DIMM sockets arranged as banks 0, 1, and 2. The motherboard supports the following memory features:

- 168-pin 3.3 V EDO DIMMs.
- 66 MHz unbuffered SDRAM DIMMs.
- Non-ECC (64-bit) or ECC (72-bit) memory (LX only).
- 8 MBytes, 16 MBytes, 32 MBytes, 64 MBytes, and 128 MBytes modules.

When adding memory, follow these guidelines:

- You can install DIMMs in any of the three banks.
- You can use different size DIMMs in different banks.
- The BIOS detects the size and type 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:

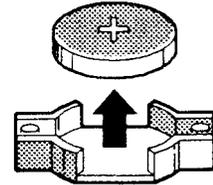
1. Gently spread the retaining clips at each end of the socket. The DIMM pops out of the socket.
2. Hold the DIMM by the edges, lift it away from the socket, and store it in an antistatic package.

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 1.19

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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							
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Date (mm:dd:yy) : Fri, Jan 21, 1998				Base Memory : 640 KB			
Time (hh:mm:ss) : 16 : 38 : 13				Extd Memory : 63 MBYTES			
Floppy Drive A: 1.44 MBYTES 3½							
Floppy Drive B: Not Installed							
				LBA	Blk	PIO	32Bit
	Type	Size	Cyln	Head	Wpcom	Sec	
	Mode				Mode	Mode	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 sub-screen 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.

AMIBIOS 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 PIO 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

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Quick Boot	Disabled	Available Options : Disabled IDE-0 IDE-1 IDE-2 IDE-3 FLOPPY FLOPTICAL CDROM SCSI  ESC : Exit ↑↓ : Sel PgUp/PgDn : Modify F2/F3 : Color
1 <sup>st</sup> Boot Device	Floppy	
2 <sup>nd</sup> Boot Device	IDE-0	
3 <sup>rd</sup> Boot Device	CDROM	
4th Boot Device	Disabled	
Try Other Boot Devices	Yes	
Initial Display Mode	BIOS	
Display Mode at Add-on ROM Init	Force BIOS	
Floppy Access Control	Read-Write	
Hard Disk Access Control	Read-Write	
S.M.A.R.T. for Hard Disks	Disabled	
BootUp Numlock	On	
Floppy Drive Swop	Disabled	
Floppy Drive Seek	Disabled	
PS/2 Mouse Support	Enabled	
Primary Display	VGA/EGA	
Password Check	Setup	
Boot to OS/2 > 64MBYTES	No	
CPU MicroCode Updation	Enabled	
External Cache	WriteBack	
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	
D800,16K Shadow	Disabled	
DC00,16K Shadow	Disabled	

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 “Disabled”.

### **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 “A, C, 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 Drives**

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 Disabled.

### **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 EGA/VGA.

## **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 Always.

## **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 Disabled.

## Advanced Chipset Setup

AMIBIOS SETUP – ADVANCED CHIPSET SETUP		
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Auto Configure EDO DRAM Timing:Enabled		Available Options :
EDO DRAM Speed (ns)	60	Disabled
<i>EDO Read Burst Timing</i>	<i>x222</i>	Enabled
<i>EDO Write Burst Timing</i>	<i>x222</i>	
<i>EDO RAS Precharge Timing</i>	<i>3 clocks</i>	
<i>EDO RAS to CAS Delay</i>	<i>3 clocks</i>	
<i>MA Wait State</i>	<i>Slow</i>	
*****SDRAM Timing*****		
SDRAM RAS to CAS Delay	2 clocks	
SDRAM CAS Lattency	3 clocks	
SDRAM RAS Precharge Time	2 clocks	
DRAM Integrity Mode	Non ECC	
A.G.P Aperture Size	64MBYTES	ESC : Exit ↑↓ : Sel
USB Passive Release	Enabled	PgUp/PgDn : Modify
PIIX4 Passive Release	Enabled	F2/F3 : Color
USB Function	Enabled	
USB Keyboard Legacy Support	Disabled	

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.

### EDO DRAM Speed

Choose DRAM timings from “70ns”, “60ns”, or “Manual”. When choosing “60ns”, the system performance will be the best if you use the 60ns DRAM. If choosing “70ns”, the system performance will not be the best, but it will be more stable. If choosing “Manual”, you can modify the options from “DRAM Refresh Rate” to “Turn-Around Insertion” and will affect the system performance and its stability. The recommendation is to change only the speed of both the “DRAM Refresh Rate” and the “ISA Clock Divisor” so that the speed is the same as the CPU Bus Clock. If the system becomes unstable, we recommend the user to choose the “70ns” option.

- EDO Read Burst Timing - This option specifies the timings for EDO DRAM system memory for Read operations in burst mode. The settings are x222 or x333. The Optimal default setting is x222.
- EDO Write Burst Timing - This option specifies the timings for EDO DRAM system memory for Write operations in burst mode. The settings are x222 or x333. The Optimal default setting is x222.
- EDO RAS Pre-charge - This option specifies the length of the RAS pre-charge part of the DRAM system memory access cycle when EDO DRAM system memory is installed in this computer. The settings are 3 CLKs or 4 CLKs. The default setting is 3 CLKs.
- EDO 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 when EDO DRAM system memory is installed in this computer. The settings are 2 CLKs or 3 CLKs. The default setting is 3 CLKs.
- MA Wait State - This option specifies the length of the delay inserted between MA signals. The settings are Slow or Fast. The Optimal and Fail-safe default settings are Slow.

#### 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 2 CLKs.
- CAS Latency.- 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 Pre-charge Time - This option specifies the length of the RAS pre-charge 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 2 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. If Level I is selected, the J25 External SMI software jumper on the Series 745 board is disabled.
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

	<p>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.</p>
--	---

**AGP 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 Disabled, until USB devices become available.

**USB Keyboard Legacy Support**

This option is automatically grayed-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

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Power Management / APM	Enabled	Available Options : Disabled Enabled
Green PC Monitor Power State	Stand By	
Video Power Down Mode	Suspend	
Hard Disk Power Down Mode	Stand By	
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	
<i>Thermal Slow Clock Ratio</i>	<i>50 – 62.5%</i>	
CPU Critical Temperature	65°C/149°F	
CPU FAN Stop in Suspend	Disabled	
Power Button Function	On/Off	
Restore on AC/Power Loss	Last State	
Ring Resume from Soft Off	Disabled	
LAN Resume from Soft Off	Disabled	ESC : Exit ↑↓ : Sel PgUp/PgDn : Modify F2/F3 : Color
RTC Alarm Resume from Soft Off	Disabled	
<i>RTC Alarm Date</i>	<i>15</i>	
<i>RTC Alarm Hour</i>	<i>12</i>	
<i>RTC Alarm Minute</i>	<i>30</i>	
<i>RTC Alarm Second</i>	<i>30</i>	

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 “Standby”.

## **Video Power Down Mode**

This option specifies the power management state that the video subsystem enters after the specified period of display inactivity has expired. The settings are “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 “Standby”.

## **Standby Time Out**

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

## **Suspend Time Out**

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

## **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 Inactivity**

This option specifies if AMIBIOS is to monitor activity on the display monitor for power conservation purposes. When this option is set to Monitor and there is no display activity for the length of time specified in the 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

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Plug and Play Aware O/S	Yes	Available Options :
Clear NVRAM on every Boot	No	
Onboard LAN Controller	Enabled	No
PCI Latency Timer (PCI clocks)	64	Yes
Primary Graphics Adapter	PCI	
PCI VGA Palette Snoop	Disabled	
Allocate IRQ to PCI VGA	Yes	
PCI IDE BusMaster	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	ESC : Exit ↑↓ : Sel
IRQ 10	PCI / PnP	PgUp/PgDn : Modify
IRQ 11	PCI / PnP	F2/F3 : Color
IRQ 14	PCI / PnP	
IRQ 15	PCI / PnP	
Reserved Memory Size	Disabled	
Reserved Memory Address	C8000	

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 setting for Optimal setting is “Yes”.

## On Board 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 “Disabled”.

## 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.

## 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. The Optimal and Fail-safe default settings are Yes.

## **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 Ch1, 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 AMIBIOS should remove an IRQ from the pool of available IRQs passed to BIOS configurable devices. The available IRQ pool is determined by reading the ESCD NVRAM. If more IRQs must be removed from the pool, the end user can use these PCI/PnP Setup options to remove the IRQ by assigning the option to the ISA/EISA setting. Onboard I/O is configurable by AMIBIOS. 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		
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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	
OnBoard Parallel Port	Auto	
Parallel Port Mode	ECP	
<i>EPP Version</i>	N/A	
<i>Parallel Port IRQ</i>	Auto	
<i>Parallel Port ECP DMA Channel</i>	N/A	
OnBoard IDE	Both	ESC : Exit ↑↓ : Sel 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 sub-screen 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.

## 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 MBytes. 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

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CPU Speed Selection	300 MHz
<<System Hardware Monitor>>	
Chassis Intrusion	Disabled
Current CPU Temperature	33°C/91°F
Current System Temperature	30°C/86°F
Current CPU Fan Speed	4166 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

Available Options :

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 in 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.***

## Re-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. System will Re-Boot if Programming is successfully complete.***

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 reboot, go into the CMOS Setup main menu (refer to Chapter 2). Select “Auto Configuration with Optional Settings” and then “Load high performance setting”. You can change your CMOS setting again.
5. Save and exit BIOS Setup Program.

## 4. Error and Information Messages

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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.

<b>Error Message</b>	<b>Explanation</b>
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: <i>OFF BOARD PARITY ERROR ADDR = (XXXX)</i> XXXX is the hex address where the error occurred. Run AMIDdiag to find and correct memory problems.
On Board Parity Error	Parity error in motherboard memory. The format is: <i>ON BOARD PARITY ERROR ADDR = (XXXX)</i> XXXX is the hex address where the error occurred. Run AMIDdiag to find and correct memory problems.
Parity Error ????	Parity error in system memory at an unknown address. Run AMIDdiag to find and correct memory problems.

# 5.Glossary

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## **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/O 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<sup>†</sup> 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