Advanced/ZP Baby-AT Board

Technical Product Summary

Version 2

July, 1995

Order Number 281786-002

Advanced/ZP Technical Product Summary

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Introduction

The Intel Advanced/ZP baseboard features the Pentium® processor in a Baby-AT form factor with integrated I/O. Advanced/ZP baseboards are focused on providing the best possible performance at the lowest possible price for mainstream desktop computers.

Advanced/ZP is a flexible baseboard which is available with the 75 MHz, 90 MHz, 100 MHz, or 120 MHz Pentium processor. The processor is complemented by a standard 256 KB asynchronous SRAM second level write-back cache and support for up to 128 MB of Fast Page or EDO DRAM. A Pentium OverDrive® socket (Socket 5) provides access to future performance enhancements.

The Advanced/ZP baseboard offers outstanding I/O capabilities starting with the full set of I/O, including a floppy drive interface, dual channel PCI local bus IDE interfaces, two serial ports with FIFOs, an EPP/ECP capable parallel port, and an infrared (IrDA) port. Two dedicated PCI local bus slots, and one shared PCI/ISA slot, provide a high bandwidth data path for functions such as graphics that have a high data throughput requirement. The integrated Bus Mastering capable PCI IDE controller provides two high performance IDE interfaces for hard drives and CD-ROMs. Bus mastering enhances the performance in multi-tasking environments such as Windows* 95. The Advanced/ZP baseboard also provides three dedicated ISA connectors and one shared PCI/ISA connector. There is one PCI full length capable slot, and three ISA full length capable slots.

In addition to superior hardware capabilities, features like Windows 95-ready Plug and Play and Advanced Power Management (APM) with application restart are provided by software available from Intel for the Advanced/ZP platform.

The Advanced/ZP baseboard provides the foundation for cost effective, high performance, highly expandable platforms which deliver the latest in CPU and I/O technology.

Although the Advanced/ZP will support CGA emulation by VGA cards, it will not support CGA cards.

ADVANCED/ZP FORM FACTOR

The Advanced/ZP baseboard is designed to fit into a standard Baby-AT form factor chassis. Figure 1 illustrates the mechanical form factor for the Advanced/ZP. The actual dimensions of the Advanced/ZP baseboard do not strictly adhere to the standard Baby-AT guidelines, and exceptions to the standard are listed in the Baseboard Design Exceptions section.

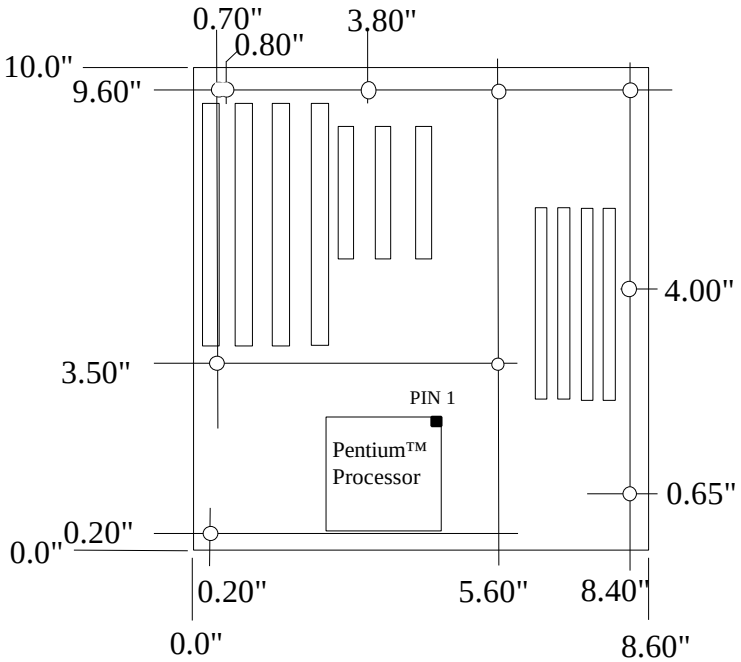

Figure 1. Advanced/ZP Baseboard dimensions.

BASEBOARD DESIGN EXCEPTIONS

BASEBOARD DIMENSIONS

The Advanced/ZP is 3.0" shorter than the Baby-AT standard. The shorter board length may require some chassis to be modified to add additional mounting holes.

MOUNTING HOLE PLACEMENT

The mounting holes located in the bottom left and right corners of Figure 1 are pseudo Baby-AT standard and are available in many, but not all, Baby-AT compatible chassis.

FRONT PANEL CONNECTORS

There is no front panel connector on the baseboard for a Turbo/Deturbo switch. The processor speed can be set either through a parameter in the CMOS Setup Utility, or from the keyboard (<CTL><ALT><+> = Turbo, <CLT><ALT><-> = Deturbo). Changing processor speed from the keyboard may be prohibited by the operating system, or when the processor is in protected mode.

Setting the processor to deturbo (or slow) only slows the processor to the approximate equivalent of a 25 MHz clock rate, not the standard 8 MHz clock rate.

JUMPERS/SWITCHES

There is no Color/Mono jumper/switch on the baseboard to specify Monochrome or Color video mode at boot, the BIOS will automatically detect the type of video card installed.

Also, there is no Flash write protect jumper/switch, the BIOS needs to be able to write to FLASH to support the Plug and Play features.

Board Level Features

A – Two PCI IDE interfaces
B – National 87306 I/O controller
C – Primary power connector
D – Four SIMM sockets (two banks)
E – 82438FX Triton Data Path (TDP)
F – Parallel port connector
G – Floppy drive connector
H – 256KB Secondary cache
I – 82437FX Triton System Controller (TSC)
J – Socket 5 Pentium processor socket
K– CPU voltage regulator
L – Front Panel I/O connectors
M – Configuration switch block
N – 82371FB PCI ISA/IDE Accelerator (PIIX)
O – Battery for the Real-time clock
P – Four ISA expansion connectors
Q – BIOS recovery boot jumper
R – Flash EEPROM for system BIOS
S – Three PCI expansion connectors
T – 3.3 volt power connector for PCI
U – Serial port connectors
V – AT Keyboard Connector

(Optional PS/2 style Keyboard and Mouse connectors may be available)

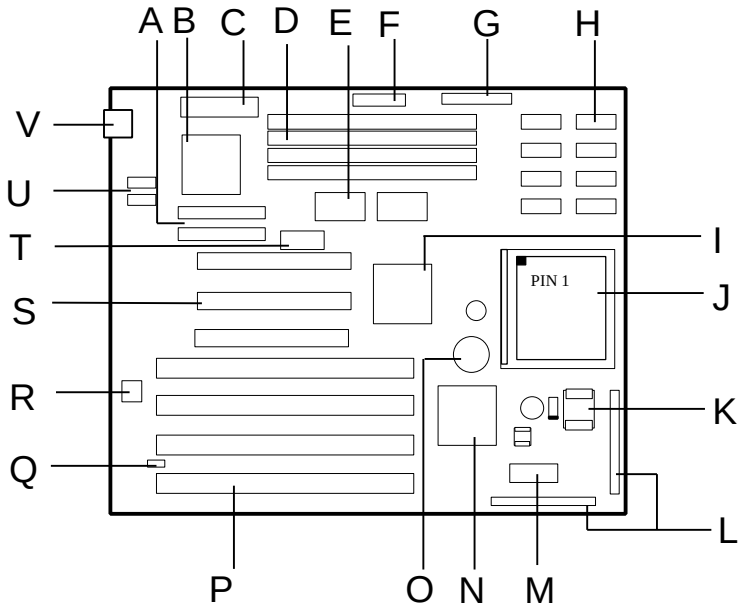

Figure 2. Advanced/ZP Board Level Features

CPU

The Advanced/ZP baseboard is designed to operate with 3.3 volt Pentium processors. A patented on-board voltage regulator circuit provides the required 3.3 volts from the 5 volt tap provided by a standard PC power supply. The baseboard supports the Pentium processors at iCOMP™ index 610 \ 75 MHz, 735 \ 90 Mhz, 815 \ 100 Mhz, and 1000 \ 120 Mhz. The Pentium processor is backward-compatible with the 8086, 80286, i386™ and i486™ CPUs. It supports both read and write burst mode bus cycles, and includes separate 8K on-chip code and data caches which employ a write-back policy. Also integrated into the Pentium processor is an advanced numeric coprocessor which significantly increases the speed of floating point operations, while maintaining backward compatibility with i486DX math coprocessor and complying to ANSI/IEEE standard 754-1985.

All Advanced/ZP baseboards support the 75 MHz and 90 MHz processors. The matrix below shows which Printed Board Assemblies (PBA number found on the baseboard) also support the 100 MHz or 120 MHz processor.

Processor Speed	*Supported by PBA Numbers:*
75 MHz	All PBAs
90 MHz	All PBAs
100 MHz	PBA 638995, PBA 641525, PBA 639379
120 MHz	Suffixes -606, -607, -806, -807, -808 and above

Table 1. Processor support

PERFORMANCE UPGRADE

A 320-pin Type 5 Zero Insertion Force socket provides users with a performance upgrade path to future, higher speed, Pentium® processors. An OverDrive processor being developed for use with this socket will provide performance beyond that delivered by the originally installed Pentium processor.

SECOND LEVEL CACHE

The Pentium processor's internal cache is complemented by 256 KB direct mapped write-back second level cache. The 256 KB cache configuration is implemented with eight 32kx8 asynchronous SRAM devices for the cache data and one 32kx8 SRAM for the cache tag. The cache size is set by three configuration jumpers located on the baseboard. This is preset by the factory to support the onboard 256 KB configuration.

SYSTEM MEMORY

The Advanced/ZP baseboard provides four 72-pin SIMM sites for memory expansion. The sockets support 1M x 32 (4 MB), 2M x 32 (8 MB), 4M x 32 (16 MB), and 8M x 32 (32 MB) single-sided or double-sided SIMM modules. Minimum memory size is 8 MB and maximum memory size, using four 8M x 32 SIMM modules, is 128 MB. For external CPU speeds of less than 60 Mhz (used with 75, 90 and 120 Mhz processors) memory timing requires 70 ns fast page devices or, for higher performance, 70 ns EDO DRAM. For external CPU speeds of 66 Mhz (used with 100 Mhz processors) you must use 60 nS EDO DRAM, but 70 nS fast page DRAM may still be used. Parity generation and checking is not supported by the chip set.

The four sockets are arranged as Bank 0 and Bank 1, with each bank consisting of two sockets and providing a 64-bit wide data path. Both SIMMs in a bank must be of the same memory size and type, however Banks 0 and 1 may have different types of memory installed. It is even possible to have 70 ns Fast Page DRAM in one bank and 60 ns EDO DRAM in the other, in which case each bank is independently optimized for maximum performance. Bank 0 only, Bank 1 only, or both banks may be populated. There are no jumper settings required for the memory size or type, which is automatically detected by the system BIOS. Tin lead SIMMs are required to be used when adding Fast Page or EDO DRAM.

EDO DRAM

Extended Data Out (or Hyper Page Mode) DRAM is designed to improve the DRAM read performance. EDO DRAM holds the memory data valid until the next CAS# falling edge, unlike standard fast page mode DRAM which tri-states the memory data when CAS# negates to precharge for the next cycle. With EDO, the CAS# precharge overlaps the data valid time, allowing CAS# to negate earlier while still satisfying the memory data valid window time.

EXPANSION SLOTS

Up to six expansion slots may be populated on the Advanced/ZP baseboard. There are four ISA bus expansion conectors and three PCI expansion connectors. One slot is shared by connectors that will accommodate either an ISA or a PCI expansion card, but not both at the same time. This accounts for the disparity between the number of slots and connectors. All three PCI expansion slots accept PCI bus mastering cards, and fully comply with the PCI 2.10 specification. Three of the ISA slots and one PCI slot can accommodate full length add-in cards. Interference with the processor heat sink and CPU voltage regulator support circuitry limits the rest of the ISA and PCI slots to being able to support only half-length add-in cards.

PCI 3.3 VOLT CAPABILITIES

To maintain strict compliance with the PCI specification, the baseboard provides a connector which can be used to route 3.3 volt power to the PCI slots. The connector may be used with a separate 3.3 volt power supply or with a custom designed voltage converter. *Note: The on-board 3.3 volt regulator provides power for the CPU, PCIset and L2 cache only, not the PCI slots.*

PERIPHERAL COMPONENT INTERCONNECT (PCI) PCISET

The Intel Triton 82430FX PCIset consists of the 82437FX Triton System Controller (TSC), two 82438FX Triton Data Path (TDP) devices, and one 82371FB PCI ISA/IDE Accelerator (PIIX) bridge chip. The Triton PCIset provides the following functions:

- CPU interface control
- Integrated L2 write-back cache controller
  - Pipelined Burst or standard SRAM
  - 256kB or 512kB Direct Mapped
  - Integrated Tag Status Bits
- Integrated DRAM controller
  - 64-bit path to Memory
  - Support for EDO and Fast Page DRAM
  - 4 MB to 128 MB main memory
- Fully synchronous PCI bus interface
  - 25/30/33 MHz
  - PCI to DRAM > 100 Mbytes/sec
  - PCI to DRAM posting of 12 Dwords
  - 5 Dword buffers for CPU-PCI write posting
  - 4 Dword buffers for PCI to Memory bus master cycles
  - Support for up to 5 PCI masters
- Interface between the PCI bus and ISA bus
- Integrated fast IDE interface
  - Support for up to 4 devices
  - PIO Mode 4 transfers up to 16MB/sec
  - Integrated 8 x 32-bit buffer for PCI IDE burst transfers
- Enhanced Fast DMA controller
- Interrupt controller and steering
- Counters/Timers
- SMI interrupt logic and timer with Fast On/Off mode

82437FX TRITON SYSTEM CONTROLLER (TSC)

The 82437FX provides all control signals necessary to drive a second level cache and the DRAM array, including multiplexed address signals. It also controls system access to memory and generates snoop controls to maintain cache coherency. The TSC comes in a 208 pin QFP package.

82438FX TRITON DATA PATH (TDP)

There are two 82438FX components which provide data bus buffering and dual port buffering to the memory array. Controlled by the 82437FX, the 82438FX devices add one load each to the PCI bus and perform all the necessary byte and word swapping required. Memory and I/O write buffers are included in these devices. The TDP devices are 100 pin QFP packages.

82371FB PCI ISA/IDE ACCELERATOR (PIIX)

The 82371FB provides the interface between the PCI and ISA buses and integrates a dual channel fast IDE interface capable of supporting up to 4 devices, seven 32-bit DMA channels, five 16-bit timer/counters, two eight-channel interrupt controllers, PCI-to-AT interrupt mapping circuitry, NMI logic, ISA refresh address generation, and PCI/ISA bus arbitration circuitry. The PIIX comes in a 208-pin QFP package.

TRITON DESIGN CONSIDERATIONS

Triton Memory Hole Limitation

Due the design of the Triton chipset, only one memory hole can be active at a time. The user can not set the Base Memory size to 512 KB and enable the ISA LFB at the same time.

Triton PCI Hold Time Requirement

The Triton chipset provides less hold time than the earlier Neptune and Mercury chipsets on the PCI address and data lines, but still is within the PCI specification. (The PCI specification calls out a 0 ns minimum hold time.) Some PCI expansion cards do not meet this requirement, and in fact require more hold time than the Triton chipset provides. Disabling PCI write bursting will sometimes enable these cards to function.

IDE SUPPORT

The Advanced/ZP baseboard provides two independent high performance bus-mastering PCI IDE interfaces capable of supporting PIO Mode 3 and Mode 4 devices for up to 16 MB/sec transfers. Support for ATAPI devices is provided in the system BIOS. The system BIOS also supports Logical Block Addressing (LBA) and ECHS on both IDE interfaces. When used in conjunction with a special driver the IDE interface operates as a PCI bus master for optimum performance in a multi-tasking environment. One such driver is provided by Intel for the Windows 95 environment.

NATIONAL SEMICONDUCTOR 87306 SUPER I/O CONTROLLER

Control for the integrated serial ports, parallel port, floppy drive, RTC and keyboard controller is incorporated into a single component, the National Semiconductor 87306. This component provides:

- Two NS16C550-compatible UARTs with send/receive 16 byte FIFO
  - Support for an IrDA compliant Infra Red interface
- Multi-mode bi-directional parallel port
  - Standard mode; IBM and Centronics compatible
  - Enhanced Parallel Port (EPP) with BIOS/Driver support
  - High Speed mode; Enhanced Capabilities Port (ECP) compatible
- Industry standard floppy controller with 16 byte data FIFO (2.88 MB floppy support)
- Integrated Real Time Clock accurate within +/- 13 minutes/yr
- Integrated 8042 compatible keyboard controller

Configuration of these interfaces is possible via the CMOS Setup program that can be invoked during boot-up. The serial ports can be enabled as COM1, COM2 or disabled. COM2 can alternately be configured as an IRDA port. The parallel port can be configured as normal, extended , or disabled. The floppy interface can be configured for 720 KB, 1.2 MB, 1.44 MB, or 2.88 MB media. Header pins located near the back of the board allow cabling to use these interfaces.

KEYBOARD INTERFACE

The AT keyboard connector is located on the back panel side of the baseboard. The 5V lines to this connector is protected with a PolySwitch* circuit which acts much like a self-healing fuse, re-establishing the connection after an over-current condition is removed. While this device eliminates the possibility of having to replace a fuse, care should be taken to turn off the system power before installing or removing a keyboard.

The integrated 8042 microcontroller contains the AMI Megakey keyboard controller code which, besides providing traditional keyboard control functions, supports Power-On/Reset (POR) password protection. The POR password can be defined by the user via the Setup program. The keyboard controller also provides for the following "hot key" sequences:

• CTRL-ALT-DEL: System software reset. This sequence performs a software reset of the system by jumping to the beginning of the BIOS code and running the POST operation.

• CTRL-ALT+ and CTRL-ALT-: Turbo mode selection. CTRL-ALT- sets the system for de-turbo mode, emulating a 25 MHz AT, and CTRL-ALT+ sets the system for turbo mode. Changing the Turbo mode may be prohibited by an operating system, or when the CPU is in Protected mode or virtual 86 mode under DOS.

• CTRL-ALT-<defined in setup>: Power down and coffee-break key sequences take advantage of the SMM features of the Pentium processor to greatly reduce the system's power consumption while maintaining the responsiveness necessary to service external interrupts.

REAL TIME CLOCK, CMOS RAM AND BATTERY

The integrated Real Time Clock, RTC, is accurate to within 13 minutes/year. The RTC can be set via the BIOS SETUP Program. CMOS memory supports the standard 128-byte battery-backed RAM, fourteen bytes for clock and control registers, and 114 bytes of general purpose non-volatile CMOS RAM. All CMOS RAM is reserved for BIOS use. The CMOS RAM can be set to specific values or cleared to the system default values using the BIOS SETUP program. Also,

the CMOS RAM values can be cleared to the system defaults by using a configuration switch on the baseboard. Appendix B lists switch and jumper configurations.

An external coin-cell style battery provides power to the RTC and CMOS memory. The battery has an estimated lifetime of seven years and is socketed for easy replacement. Refer to Appendix A for battery replacement details.

IRDA (INFRARED) SUPPORT

Serial port 2 can be configured to support an IrDA module via a 5 pin header connector. Once configured for IrDA, the user can transfer files to/from portable devices such as laptops, PDA's and printers using application software such as LapLink. The IrDA specification provides for data transfers at up to 115kbps from a distance of 1 meter.

A 5-pin header is provided to allow connection to a Hewlett Packard HSDSL-1000 compatible Infra-red transmitter/receiver.

SYSTEM BIOS

The Advanced/ZP baseboard uses an American Megatrends Incorporated (AMI) Pentium Processor ROM BIOS, which is stored in Flash EEPROM and easily upgraded using a floppy disk-based program. In addition to the AMIBIOS, the Flash EEPROM also contains the Setup utility, Power-On Self Tests (POST), update recovery code, and the PCI auto-configuration utility. This baseboard supports system BIOS shadowing, allowing the BIOS to execute from 32-bit on-board write-protected DRAM.

The BIOS displays a sign-on message during POST identifying the type of BIOS and a five-digit revision code. As an example the BIOS for the Advanced/ZE will be 1.00.02.BS0. As BIOS updates occur the revision number will increase to 1.00.03.BS0, and so on.

Information on BIOS functions can be found in the IBM PS/2 and Personal Computer BIOS Technical Reference published by IBM, and the ISA and EISA Hi-Flex AMIBIOS Technical Reference published by AMI. Both manuals are available at most technical bookstores.

FLASH IMPLEMENTATION

The Intel 28F001BXT 1 Mb FLASH component is organized as 128K x 8 (128 KB). The Flash device is divided into five areas, as described in Table 1.

System Address		*FLASH Memory Area*
F0000H	FFFFFH	64 KB Main BIOS
EE000H	EFFFFH	8 KB Boot Block (Not FLASH erasable)
ED000H	EDFFFH	4 KB Plug and Play ESCD Storage Area
EC000H	ECFFFH	4 KB OEM LOGO Area
E0000H	EBFFFH	48 KB System BIOS Reserved

Table 2. Flash Memory Organization

The FLASH device resides in system memory in two 64 KB segments starting at E0000H, and can be mapped two different ways, depending on the mode of operation. In *Normal Mode*, address line A16 is inverted, setting the E000H and F000H segments so that the BIOS is organized as shown in the system address column above. *Recovery mode* removes the inversion on address line A16, swapping the E000H and F000H segments so that the 8 KB boot block resides at FE000H where the CPU expects the bootstrap loader to exist. This mode is only necessary in the unlikely event that a BIOS upgrade procedure is interrupted, causing the BIOS area to be left in an unusable state. For information on recovering the BIOS in the event of a catastrophic failure, refer to the appendix.

BIOS UPGRADES

FLASH memory makes distributing BIOS upgrades easy. A new version of the BIOS can be installed from a diskette. BIOS upgrades will be available as downloadable files on the Intel bulletin board.

The disk-based Flash upgrade utility, FMUP.EXE, has three options for BIOS upgrades:

- The Flash BIOS can be updated from a file on a disk;
- The current BIOS code can be copied from the Flash EEPROM to a disk file as a backup in the event that an upgrade cannot be successfully completed; or
- The BIOS in the Flash device can be compared with a disk file to ensure the system has the correct BIOS version.

The upgrade utility ensures the upgrade BIOS extension matches the target system to prevent accidentally installing a BIOS for a different type of system. A recovery jumper is provided to allow recovery in the unlikely event of an unsuccessful BIOS upgrade. The jumper forces the ROM decode to access a 8 KB block of write protected recovery code in the Flash device.

SETUP UTILITY

The ROM-based Setup utility allows the configuration to be modified without opening the system for most basic changes. The Setup utility is accessible only during the Power-On Self Test, POST, by pressing the <F1> key after the POST memory test has begun and before boot begins. A prompt may be enabled that informs the user to press the <F1> key to access Setup. A switch on the baseboard can be set to prevent user access to Setup for security purposes. Setup options are detailed in the BIOS appendix.

PCI AUTO-CONFIGURATION

The PCI auto-configuration utility operates in conjunction with the system Setup utility to allow the insertion and removal of PCI cards to the system without user intervention. When the system is turned on after adding a PCI add-in card, the BIOS automatically configures interrupts, DMA channels, I/O space, and other parameters. The user does not have to configure jumpers or worry about potential resource conflicts. Because PCI cards use the same interrupt resources as ISA cards, the user must specify the interrupts used by ISA add-in cards in the Setup utility. The PCI Auto-Configuration function complies with version 2.10 of the PCI BIOS specification.

ISA PLUG & PLAY

The BIOS incorporates ISA Plug and Play capabilities conforming to version 1.0a of the Plug-n-Play specification. This will allow auto-configuration of Plug and Play ISA cards, and resource management for legacy ISA cards, when used in conjunction with the ISA Configuration Utility (ICU).

SHADOW MEMORY

Memory from C8000-DFFFF is not shadowed. This is a change from previous Intel products using AMI BIOS. This may have a slight adverse affect on the performance of some non-Plug and Play ISA cards. All or part of this area may be used as shared ISA memory if needed. Video BIOS located from C0000-C7FFF is shadowed to boost performance.

POWER MANAGEMENT

The Advanced/ZP will enable you to have an Energy Star compliant system through its Advanced Power Management resources. The Advanced/ZP BIOS supports power management via System Management Mode (SMM) interrupts to the CPU and Advanced Power Management (APM v1.1). In general, power management capabilities will allow the system to be put into a power managed Stand By state. This can be accomplished by pressing the sleep/resume button on the front of the chassis, entering an user configured hot-key sequence on the keyboard, or by the expiration of a hardware timer which detects system inactivity for a user-configurable length of time. While in the Stand By state, the Advanced/ZP baseboard reduces the system power consumption to Energy Star levels by utilizing the power saving capabilities of the Pentium® Processor, spinning down the IDE hard drive, and turning off an Energy Star rated monitor. Add-in cards supplied with APM-aware drivers can also be put into a power managed state for further energy savings. The ability to respond to external interrupts is fully maintained while in Stand By mode allowing the system to service requests such as in-coming FAX's or network messages while unattended.

FLASH LOGO AREA

Advanced/ZP supports a 4 KB programmable FLASH user area located at EC000-ECFFF. An OEM may use this area to display a custom logo. The BIOS accesses the user area at several points during the boot up sequence.

SECURITY FEATURES

ADMINISTRATIVE PASSWORD

The administrative password protects several sensitive Setup options from being viewable to a user unless the password is entered. These sensitive fields are viewable unless the administrative password is set.

BIOS PASSWORD

A BIOS password feature provides security during the boot process. A password can be entered using the Setup utility, and will be required on boot up before normal operation of the system can commence. To enable, disable, or change the password, refer to the Setup program options in the appendix.

If the password is forgotten, it can be cleared by turning off the system and setting the "password clear" jumper to the clear position.

SETUP ENABLE SWITCH

A baseboard configuration switch controls access to the BIOS Setup utility. By setting switch SW5 to the ON position, the user is prevented from accessing the Setup utility during the Power-On Self Test or at any other time. The message prompting the user to press <F1> to enter setup is also disabled

CONNECTORS

FRONT PANEL CONNECTIONS

The Advanced/ZP baseboard provides header connectors to support functions typically located on the chassis bezel:

- System Reset
- Power LED
- Keyboard Lock
- Hard Drive activity LED
- Turbo LED
- System Speaker
- Secondary CPU Fan
- Infra-Red (IrDA) port
- Sleep/Resume

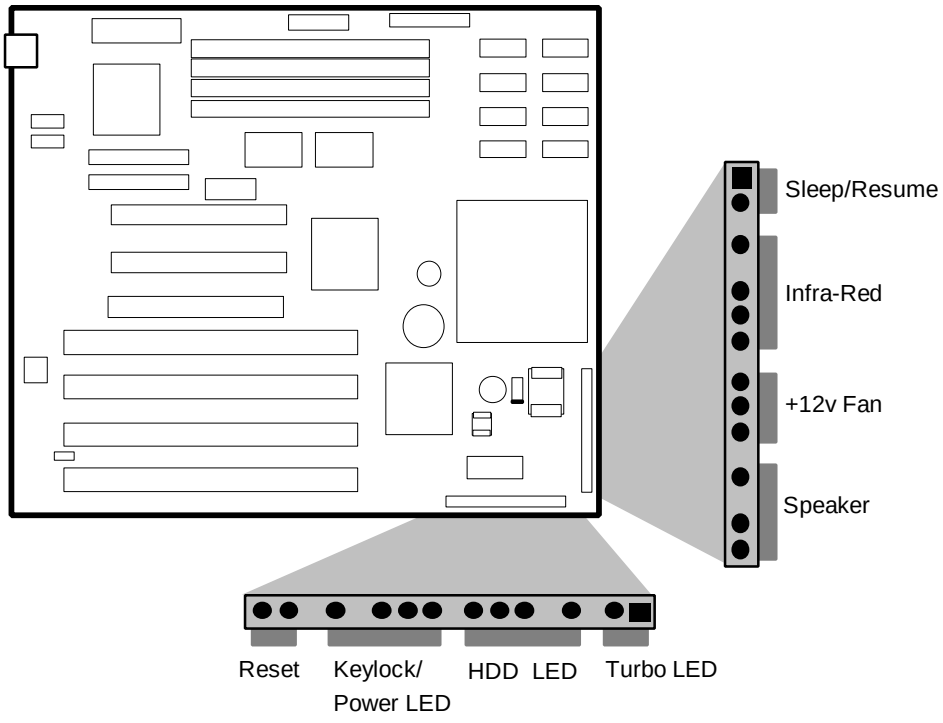

Figure 3. Front Panel Connectors

Sleep/Resume

This two pin header, when connected to a momentary switch, can be used to put the system into a power managed state (standby) that will reduce the system's power consumption. If the system is in Stand By mode and the switch is pressed, the system will instantly "wake up" or Resume full system activity. When used with a power supply with a high efficiency rating, the Advanced/ZE is easily capable of reducing the system power to below EPA Energy Star requirements. The function of the Sleep/Resume button can also be achieved via the keyboard with a hot key sequence programmable in setup.

Infra-Red (IrDA) connector

Serial port 2 can be configured to support an IrDA module via a 5 pin header connector. Once configured for IrDA, the user can transfer files to/from portable devices such as laptops, PDA's and printers using application software such as LapLink. The IrDA specification provides for data transfers at up to 115kbps from a distance of 1 meter.

Speaker

The external speaker provides error beep code information during the Power-On Self Test if the system cannot use the video interface. See the appendix for more information about error beep codes.

BACK PANEL CONNECTIONS

The back panel provides external access to an AT style keyboard connector integrated on the Advanced/ZP baseboard. Figure 4 shows the general location of the AT style keyboard connector.

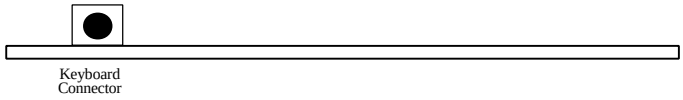

Figure 4. Advanced/ZP AT Style Back panel

I/O CONNECTIONS

The baseboard contains shroudless stake pin header connections for cabling the serial, parallel, floppy, and IDE interfaces. Figure 5 shows the locations of these connectors and the orientation of pin 1 on each.

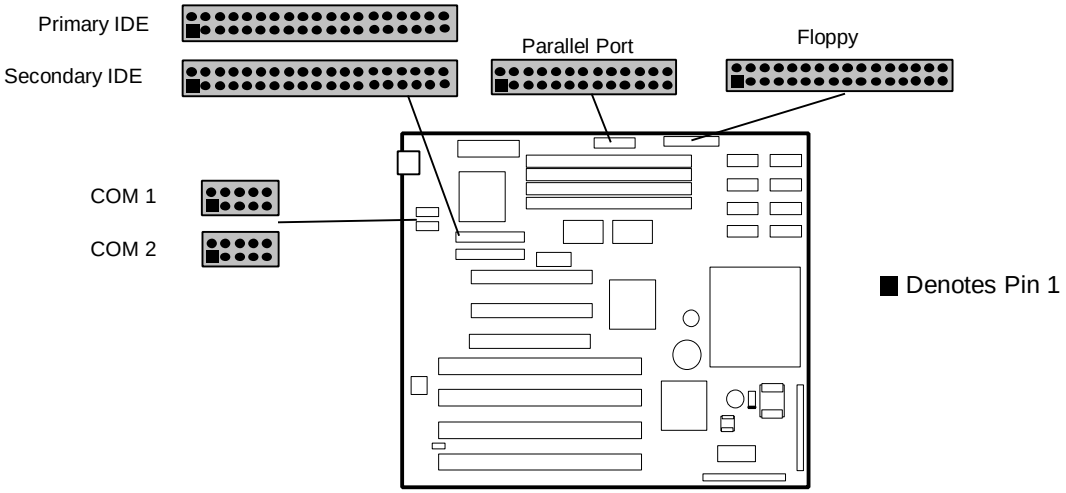

Figure 5. I/O Connections

POWER CONSUMPTION

Table 2 lists the current used by system resources in a configuration which includes 8 MB of DRAM. Table 3 lists the typical power consumed by the same configuration. Note that the 3.3 volts used to drive the CPU and core logic is derived

from an on-board voltage regulator from the +5 volt source. This information is provided only as a guide for calculating approximate total system power usage with additional resources added.

CURRENT

DC Voltage	*75 MHz Typical Current**	*90 MHz Typical Current**
+5V	3.3 amps	3.45 amps
-5V	20 milliamps	20 milliamps
+12V	75 milliamps	75 milliamps
-12V	10 milliamps	10 milliamps

Table 3. Advanced/ZP Current Requirements
*(measured with 8 MB DRAM, VGA controller and Floppy Drive while sitting at DOS prompt)

WATTS

Resource	*Typical Power**	*Standby Power**
Advanced/ZP baseboard, 8 MB, 256 KB cache, 3½" floppy drive, 540 MB hard drive	32 Watts	21 Watts

Table 4. Power used by System Resources
*(true power measured from the wall with a 65% efficient power supply)

Appendix A - User-Installable Upgrades

SYSTEM MEMORY

Table A-1 shows the possible memory combinations. The Advanced/ZP will support both Fast Page DRAM or EDO DRAM SIMMs, but they cannot be mixed within the same memory bank. If Fast Page DRAM and EDO DRAM SIMMs are installed in separate banks, each bank will be optimized for maximum performance. Parity generation and detection is NOT supported. SIMM requirements are Fast Page Mode or EDO DRAM, 60 nS or 70 nS, with tin-lead connectors.

SIMM 1,2 (Bank 0) SIMM Type (Size)	*SIMM 3,4 (Bank 1) SIMM Type (Size)*	*Total System Memory*
Empty	1M X 32 (4 MB)	8 MB
Empty	2M X 32 (8 MB)	16 MB
Empty	4M X 32 (16 MB)	32 MB
Empty	8M X 32 (32 MB)	64 MB
1M X 32 (4 MB)	Empty	8 MB
1M X 32 (4 MB)	1M X 32 (4 MB)	16 MB
1M X 32 (4 MB)	2M X 32 (8 MB)	24 MB
1M X 32 (4 MB)	4M X 32 (16 MB)	40 MB
1M X 32 (4 MB)	8M X 32 (32 MB)	72 MB
2M X 32 (8 MB)	Empty	16 MB
2M X 32 (8 MB)	1M X 32 (4 MB)	24 MB
2M X 32 (8 MB)	2M X 32 (8 MB)	32 MB
2M X 32 (8 MB)	4M X 32 (16 MB)	48 MB
2M X 32 (8 MB)	8M X 32 (32 MB)	80 MB
4M X 32 (16 MB)	Empty	32 MB
4M X 32 (16 MB)	1M X 32 (4 MB)	40 MB
4M X 32 (16 MB)	2M X 32 (8 MB)	48 MB
4M X 32 (16 MB)	4M X 32 (16 MB)	64 MB
4M X 32 (16 MB)	8M X 32 (32 MB)	96 MB
8M X 32 (32 MB)	Empty	64 MB
8M X 32 (32 MB)	1M X 32 (4 MB)	72 MB
8M X 32 (32 MB)	2M X 32 (8 MB)	80 MB
8M X 32 (32 MB)	4M X 32 (16 MB)	96 MB
8M X 32 (32 MB)	8M X 32 (32 MB)	128 MB

Table A-1. Possible SIMM Memory Combinations

RTC BATTERY

The battery can be replaced with either of the following batteries:

Sony CR2032 3V Lithium cell

Panasonic CR2032 3V Lithium cell

Appendix B - Jumpers and Switches

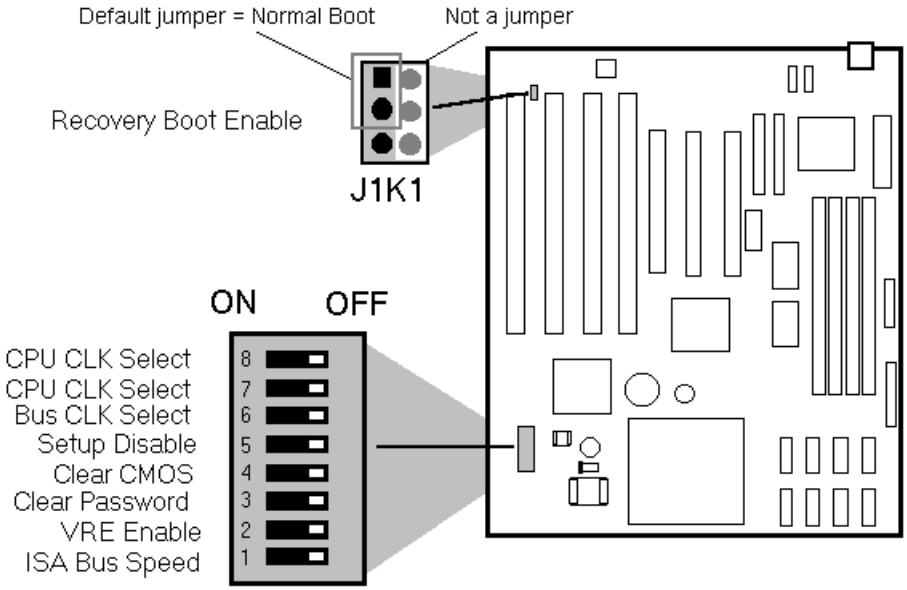

Figure B-1. Jumper locations and settings (default settings shown)

EXTERNAL CPU CLOCK SPEED (50/60/66 MHZ) - SWITCHES 7 & 8

This jumper sets the CPU's external operating frequency at 50, 60, and 66 MHz.. Default setting is 50 MHz.

Frequency	*Switch 7*	*Switch 8*
50 MHz	OFF	OFF
60 Mhz	ON	OFF
66 MHz	OFF	ON

Table B-1. External CPU Speed Switches

INTERNAL CPU BUS CLOCK SPEED - SWITCH 6

Sets the internal processor speed to either 3/2 or 2 times the external CPU clock speed. Switch 6=OFF for 3/2, Switch 6=ON for 2 times. The 3/2 setting is used for 75 MHz, 90 MHz, and 100 MHz processors. The 2 times setting is used for 120 MHz processors. The default setting is 3/2, (Switch 6 = OFF).

SETUP DISABLE - SWITCH 5

Allows access to CMOS Setup Utility to be disabled by setting switch 5 to the ON position. Default is for access to setup to be enabled (switch 5 = OFF).

CLEAR CMOS - SWITCH 4

Allows CMOS settings to be reset to default values by moving switch 4 to the ON position and turning the system on. The system should then be turned off and switch 4 should be returned to the OFF position to restore normal operation. This procedure should be done whenever the system BIOS is updated. Default setting is SW4=OFF.

PASSWORD CLEAR - SWITCH 3

Allows system password to be cleared by moving switch 3 to the ON position and turning the system on. The system should then be turned off and switch 3 should be returned to the OFF position to restore normal operation. This procedure should only be done if the user password has been forgotten. Default setting is SW3=OFF.

PROCESSOR VOLTAGE REGULATION - SWITCH 2

Sets the output of the on-board voltage regulator. The switch settings are OFF = VR, and ON = VRE. The VR voltage specification requires a voltage range of 3.3-3.465 Volts DC, while the VRE specification requires a voltage range of 3.45-3.6V. Pentium processors currently available that do not require the VRE voltage specification should use the VR setting. When upgrading your CPU be sure to consult the documentation for the processor voltage requirements before setting this switch, as an incorrect setting may damage the processor. The default position is with the switch set for VR (off).

ISA BUS SPEED - SWITCH 1

Sets the ISA bus speed to either 1/4 or 1/3 of the PCI bus speed to best maximize system performance for 75, 90, 100 or 120 MHz processor speeds. When SW1=ON the ISA bus speed will be 1/4 of the PCI bus speed and when SW1=OFF the ISA bus speed will be 1/3 the PCI bus speed. The ISA bus speed is derived from the PCI bus speed which is derived from the external processor clock frequency. The position of SW1 will set the ISA bus speed to either Compatible or Enhanced for 90 MHz, 100 MHz, and 120 MHz processors and will leave the ISA bus speed Compatible for 75 MHz processor speed. For 90 MHz, 100 MHz, and 120 MHz processor speeds, if SW1 is set to Compatible (SW1=ON), the speed will fall within the limits defined by the IBM AT Technical Reference (6-8.33 MHz). If set to Enhanced (SW1=OFF), the speed will be greater than the maximum defined by the IBM AT Technical Reference manual. SW1 can be set to either position when a 75 MHz processor speed is used for maximum ISA bus performance. Modern ISA cards can operate with the enhanced speeds, however some older cards can experience difficulties. The actual value of the Bus Clock when set to Compatible or Enhanced is dependent upon the setting of the external processor frequency. The following table describes the ISA bus speeds for the 75 MHz, 90 MHz, 100 MHz, and 120 MHz processor speeds.

Internal Processor Frequency	*PCI bus Frequency*	*SW1=OFF (1/3)*	*SW1=ON (1/4)*
75 MHz	25 MHz	8.33 MHz	8.33 MHz
90 MHz	30 MHz	10.0 MHz	7.50 MHz
100 MHz	33 MHz	11.0 MHz	8.33 MHz
120 MHz	30 MHz	10.0 MHz	7.50 MHz

Table B-2. ISA Bus Speed Switch Settings

RECOVERY BOOT ENABLE - J1K1

This switch allows the system to boot in the event the system BIOS has been corrupted by moving the jumper from the default position of 1-2 to the 2-3 position. A recovery disk must be in drive A while booting up with this jumper set to 2-3. Once the recovery is complete the jumper should be move back to pins 1-2, and the system rebooted.

Appendix C - I/O Map

Address (hex)	*Size*	*Description*
0000 - 000F	16 bytes	PIIX - DMA 1
0020 - 0021	2 bytes	PIIX - Interrupt Controller 1
0040 - 0043	4 bytes	PIIX - Timer 1
0048 - 004B	4 bytes	PIIX - Timer 2
0060	1 byte	Keyboard Controller Data Byte
0061	1 byte	PIIX - NMI, speaker control
0064	1 byte	Kbd Controller, CMD/STAT
0070, bit 7	1 bit	PIIX - Enable NMI
0070, bits 6:0	7 bits	PIIX - Real Time Clock, Address
0071	1 byte	PIIX - Real Time Clock, Data
0078	1 byte	Reserved - Brd. Config.
0079	1 byte	Reserved - Brd. Config. RD Only
0080 - 008F	16 bytes	PIIX - DMA Page Register
00A0 - 00A1	2 bytes	PIIX - Interrupt Controller 2
00C0 - 00DE	31 bytes	PIIX - DMA 2
00F0	1 byte	Reset Numeric Error
0170 - 0177	8 bytes	Secondary IDE Channel

Address (hex)	*Size*	*Description*
01F0 - 01F7	8 bytes	Primary IDE Channel
0278 - 027B	4 bytes	Parallel Port 2
02F8 - 02FF	8 bytes	On-Board Serial Port 2
0376	1 byte	Sec IDE Chan Cmd Port
0377	1 byte	Sec IDE Chan Stat Port
0378 - 037F	8 bytes	Parallel Port 1
03BC - 03BF	4 bytes	Parallel Port x
03E8 - 03EF	8 bytes	Serial Port 3
03F0 - 03F5	6 bytes	Floppy Channel 1
03F6	1 bytes	Pri IDE Channel Cmnd Port
03F7 (Write)	1 byte	Floppy Channel 1 Command
03F7, bit 7	1 bit	Floppy Disk Change Channel 1
03F7, bits 6:0	7 bits	Pri IDE Channel Status Port
03F8 - 03FF	8 bytes	On-Board Serial Port 1
LPT + 400h	8 bytes	ECP port, LPT + 400h
0CF8-0CFB*	4 bytes	PCI Config Addr Reg Enable
0CFC-0CFF*	4 bytes	PCI Config Data Reg
FF00-FF07	8 bytes	IDE Bus Master Reg.

Table C-1 and C-2. Advanced/ZP I/O Address Map
* Only accessible after PCI configuration space is enabled.

I/O Port 78 is reserved for BIOS use. I/O Port 79 is a read only port, the bit definitions are shown below.

Bit #	*Description*	*Bit = 1*	*Bit = 0*
0	Internal CPU Clock Freq. (Switch 6)	3/2x	2x
1	No Connect		
2	No Connect		
3	External CPU clock (Switch 7)		
4	External CPU clock (Switch 8)		
5	Setup Disable (Switch 5)	Enable access	Disable access
6	Clear CMOS (Switch 4)	Keep values	Clear values
7	Password Clear (Switch 3)	Keep password	Clear password

Figure C-3. I/O Port For Board Configuration

PCI CONFIGURATION SPACE MAP

The Triton chipset uses Configuration Mechanism 1 to access PCI configuration space. The PCI Configuration Address register is a 32-bit register located at CF8h, the PCI Configuration Data register is a 32-bit register located at CFCh. These registers are only accessable by full DWORD accesses. The table below lists the PCI bus and device numbers used by the baseboard.

Bus Number (hex)	*Dev Number (hex)*	*Func. Number (hex)*	*Description*
00	00	00	Intel 82437FX (TSC)
00	07	00	Intel 82371FB (PIIX) PCI/ISA bridge
00	07	01	Intel 82371FB (PIIX) IDE Bus Master
00	0F		PCI Expansion Slot 1
00	0D		PCI Expansion Slot 2
00	0E		PCI Expansion Slot 3
00	10		PCI Expansion Slot 4

Table C-4. Advanced/ZP PCI Config. Space Map

Appendix D - Memory Map

Address Range (Decimal)	*Address Range (hex)*	*Size*	*Description*
1024K-131072K	100000-8000000	127M	Extended Memory
960K-1023K	F0000-FFFFF	64K	AMI System BIOS
952K-959K	EE000-EFFFF	8K	FLASH Boot Block (Available as UMB)
948K-951K	ED000-EDFFF	4K	ESCD (Plug and 'Play configuration area)
944K-947K	EC000-ECFFF	4K	OEM LOGO (available as UMB)
896K-943K	E0000-EBFFF	48K	BIOS RESERVED (Currently available as UMB)
800K-895K	C8000-DFFFF	96K	Available HI DOS memory (open to ISA and PCI bus)
640K-799K	A0000-C7FFF	160K	Available HI DOS memory (open to ISA and PCI bus)
639K	9FC00-9FFFF	1K	Extended BIOS Data (moveable by QEMM, 386MAX)
512K-638K	80000-9FBFF	127K	Extended conventional
0K-511K	00000-7FFFF	512K	Conventional

Table D-1. Advanced/ZP Memory Map

The table above details the Advanced/ZE memory map. The ESCD area from ED000-EDFFF is not available for use as an Upper Memory Block (UMB) by memory managers. The area from E0000-EBFFF is currently not used by the BIOS and is available for use as UMB by memory managers. Parts of this area may be used by future versions of the BIOS to add increased functionality.

Appendix E - Interrupts & DMA Channels

IRQ	*System Resource*
NMI	Unused
0	Reserved, Interval Timer
1	Reserved, Keyboard buffer full
2	Reserved, Cascade interrupt from slave PIC
3	Serial Port 2
4	Serial Port 1
5	Parallel Port 2
6	Floppy
7	Parallel Port 1
8	Real Time Clock
9	User available
10	User available
11	User available
12	User available
13	Reserved, Math coprocessor
14	Primary IDE if enabled, else available to user
15	Secondary IDE if enabled, else available to user

Table E-1.Advanced/ZP Interrupts

DMA	*Data Width*	*System Resource*
0	8- or 16-bits	Open
1	8- or 16-bits	Open - Normally used for LAN
2	8- or 16-bits	Floppy
3	8- or 16-bits	Parallel Port
4		Reserved - Cascade channel
5	16-bits	Open
6	16-bits	Open
7	16-bits	ISA IDE

Table E-2. Advanced/ZP DMA Map

Appendix F - Connectors

POWER SUPPLY CONNECTORS

PRIMARY POWER (J9J1)

Pin	*Name*	*Function*
1	PWRGD	Power Good
2	+5 V	+ 5 volts Vcc
3	+12 V	+ 12 volts
4	-12 V	- 12 volts
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	-5 V	-5 volts
10	+5 V	+ 5 volts Vcc
11	+5 V	+ 5 volts Vcc
12	+5 V	+ 5 volts Vcc

AUXILIARY (3.3V) PCI POWER (J6G1)

Pin	*Name*	*Function*
1	GND	Ground
2	GND	Ground
3	GND	Ground
4	+3.3 V	+ 3.3 volts
5	+3.3V	+ 3.3 volts
6	+3.3 V	+ 3.3 volts

Tables F-1 and F-2. Power Connectors

FRONT PANEL CONNECTORS - (J2A1, J1B1)

sleep/resume

Pin	*Signal Name*
1	+5 V
2	Sleep

Table F-3. Sleep/Resume Connector

Turbo LED

Pin	*Signal Name*
1	PULL_UP_330
2	LED_TURBO-

Table F-4. Turbo LED Connector

Infra-red

Pin	*Signal Name*
1	+5 V
2	Key
3	IR_RX
4	Ground
5	IR_TX

Table F-5. IRDA Connector

Hard Drive LED (Disk)

Pin	*Signal Name*
1	PULL_UP_330
2	Key
3	HD ACTIVE
4	PULL_UP_330

Table F-6. HDD LED

Auxiliary 12V CPU Fan Power

Pin	*Signal Name*
1	Ground
2	+12 V (fused)
3	Ground

Table F-7. CPU Fan Connector

Key lock/Power LED

Pin	*Signal Name*
1	LED_PWR
2	Key
3	Ground
4	KEY LOCK
5	Ground

Table F-8. Key Lock/Power LED Connector

Speaker Connector

Pin	*Signal Name*
1	SPKR_DAT
2	Key
3	SPKR_DAT onnect
4	Ground

Table F-9. Speaker Connector

Reset Connector

Pin	*Signal Name*
1	Ground
2	RESET

Table F-10. Reset connector

I/O CONNECTORS

AT Keyboard Connector (J8k1)

Pin	*Signal Name*
1	Clock
2	Data
3	No Connect
4	Ground
5	Vcc (fused)

Table F-11. Keyboard Connector

Serial Ports (j7k1, j7k2)

Pin	*Signal Name*
1	DCD
2	DSR
3	Serial In - (SIN)
4	RTS
5	Serial Out - (SOUT)
6	CTS
7	DTR
8	RI
9	GND
10	N.C.

Figure F-9. Serial Connectorr

Parallel Port (j9e1)

Signal Name	*Pin*	*Pin*	*Signal Name*
STROBE-	1	2	AUTO FEED-
Data Bit 0	3	4	ERROR-
Data Bit 1	5	6	INIT-
Data Bit 2	7	8	SLCT IN-
Data Bit 3	9	10	Ground
Data Bit 4	11	12	Ground
Data Bit 5	13	14	Ground
Data Bit 6	15	16	Ground
Data Bit 7	17	18	Ground
ACJ-	19	20	Ground
BUSY	21	22	Ground
PE (Paper End)	23	24	Ground
SLCT		26	N.C.

Table F-11 Parallel Ports

IDE Connectors (j6h1, j6h2)

Signal Name	*Pin*	*Pin*	*Signal Name*
Reset IDE	1	2	Ground
Host Data 7	3	4	Host Data 8
Host Data 6	5	6	Host Data 9
Host Data 5	7	8	Host Data 10
Host Data 4	9	10	Host Data 11
Host Data 3	11	12	Host Data 12
Host Data 2	13	14	Host Data 13
Host Data 1	15	16	Host Data 14
Host Data 0	17	18	Host Data 15
Ground	19	20	Key
DRQ3	21	22	Ground
I/O Write-	23	24	Ground
I/O Read-	25	26	Ground
IOCHRDY	27	28	BALE
DACK3-	29	30	Ground
IRQ14	31	32	IOCS16-
Addr 1	33	34	Ground
Addr 0	35	32	Addr 2
Chip Select 0-	37	38	Chip Select 1-
Activity	39	40	Ground

Figure F-10 IDE Connectors

FLoppy Connector (j9c1)

Signal Name	*Pin*	*Pin*	*Signal Name*
Ground	1	2	FDHDIN
Ground	3	4	Reserved
Key	5	6	FDEDIN
Ground	7	8	Index-
Ground	9	10	Motor Enable A-
Ground	11	12	Drive Select B-
Ground	13	14	Drive Select A-
Ground	15	16	Motor Enable B-
Ground	17	18	DIR-
Ground	19	20	STEP-
Ground	21	22	Write Data-
Ground	23	24	Write Gate-
Ground	25	26	Track 00-
Ground	27	28	Write Protect-
Ground	29	30	Read Data-
Ground	31	32	Side 1 Select-
Ground	33	34	Diskette

Table F-12. Floppy Connector

ISA CONNECTORS (J1G1, J2G1, J2G2, J3G1)

Signal Name	*Pin*	*Pin*	*Signal Name*
GND	B1	A1	IOCHK-
RSTDRV	B2	A2	SD7
Vcc	B3	A3	SD6
IRQ9	B4	A4	SD5
-5V	B5	A5	SD4
DRQ2	B6	A6	SD3
-12V	B7	A7	SD2
0WS-	B8	A8	SD1
+12V	B9	A9	SD0
GND	B1	A1	IOCHRDY
SMEMW-	B1	A1	AEN
SMEMR-	B1	A1	SA19
IOW-	B1	A1	SA18
IOR-	B1	A1	SA17
DACK3-	B1	A1	SA16
DRQ3	B1	A1	SA15
DACK1-	B1	A1	SA14
DRQ1	B1	A1	SA13
REFRESH-	B1	A1	SA12
SYSCLK	B2	A2	SA11
IRQ7	B2	A2	SA10
IRQ6	B2	A2	SA9
IRQ5	B2	A2	SA8
IRQ4	B2	A2	SA7
IRQ3	B2	A2	SA6
DACK2-	B2	A2	SA5
TC	B2	A2	SA4
BALE	B2	A2	SA3
Vcc	B2	A2	SA2
OSC	B3	A3	SA1
GND	B3	A3	SA0
	KE	KE	
MEMCS16-	D1	C1	SBHE-
IOCS16-	D2	C2	LA23
IRQ10	D3	C3	LA22
IRQ11	D4	C4	LA21
IRQ12	D5	C5	LA20
IRQ15	D6	C6	LA19
IRQ14	D7	C7	LA18
DACK0-	D8	C8	LA17
DRQ0	D9	C9	MEMR-
DACK5-	D1	C1	MEMW-
DRQ5	D1	C1	SD8
DACK6-	D1	C1	SD9
DRQ6	D1	C1	SD10
DACK7-	D1	C1	SD11
DRQ7	D1	C1	SD12
Vcc	D1	C1	SD13
Master-	D1	C1	SD14
GND	D1	C1	SD15

Table F-13. ISA Connector

PCI CONNECTORS (J4G1, J5G1, J5G2)

Signal Name	*Pin*	*Pin*	*Signal Name*	*Signal Name*	*Pin*	*Pin*	*Signal Name*
GND	A1	B1	-12V	AD16	A32	B32	AD17
+12V	A2	B2	No Connect	3.3V	A33	B33	CBE2-
No Connect	A3	B3	GND	FRAME-	A34	B34	GND
No Connect	A4	B4	No Connect	GND	A35	B35	IRDY-
Vcc	A5	B5	Vcc	TRDY-	A32	B32	3.3V
PCIINT3-	A6	B6	Vcc	GND	A37	B37	DEVSEL-
PCIINT1-	A7	B7	PCIINT2-	STOP-	A38	B38	GND
Vcc	A8	B8	PCIINT4-	3.3V	A39	B39	PLOCK-
Reserved	A9	B9	No Connect	SDONE	A40	B40	PERR-
Vcc	A10	B10	Reserved	SBO-	A41	B41	3.3V
Reserved	A11	B11	No Connect	GND	A42	B42	SERR-
GND	A12	B12	GND	PAR	A43	B43	3.3V
GND	A13	B13	GND	AD15	A44	B44	CBE1-
Reserved	A14	B14	Reserved	3.3V	A45	B45	AD14
SPCIRST-	A15	B15	GND	AD13	A46	B46	GND
Vcc	A16	B16	PCLKE	AD11	A47	B47	AD12
AGNT-	A17	B17	GND	GND	A48	B48	AD10
GND	A18	B18	REQA-	AD9	A49	B49	GND
Reserved	A19	B19	Vcc	KEY	A50	B50	KEY
AD30	A20	B20	AD31	KEY	A51	B51	KEY
3.3V	A21	B21	AD29	CBEO-	A52	B52	AD8
AD28	A22	B22	GND	3.3V	A53	B53	AD7
AD26	A23	B23	AD27	AD6	A54	B54	3.3V
GND	A24	B24	AD25	AD4	A55	B55	AD5
AD24	A25	B25	3.3V	GND	A56	B56	AD3
AD22 (IDSEL)	A26	B26	CBE3-	AD2	A57	B57	GND
3.3V	A27	B27	AD23	AD0	A58	B58	AD1
AD22	A28	B28	GND	Vcc	A59	B59	Vcc
AD20	A29	B29	AD21	SREQ64-	A60	B60	SACK64-
GND	A30	B30	AD19	Vcc	A61	B61	Vcc
AD18	A31	B31	3.3V	Vcc	A62	B62	Vcc

Table F-14. PCI Connectors

Appendix G - BIOS Setup

OVERVIEW OF THE SETUP MENU SCREENS

The Setup program initially displays the Main menu screen. In each screen there are options for modifying the system configuration. Select a menu screen by pressing the left <←> or right <→> arrow keys. Use the up <↑> or down <↓> keys to select items in a screen. Use <Enter> to select an item for modification. For certain items, pressing <Enter> will bring up a submenu. After you have selected an item, use the arrow keys to modify the setting.

Setup Menu Screen	*Description*
Main	For setting up and modifying some of the basic options of a PC, such as time, date, diskette drives, hard drives.
Advanced	For modifying the more advanced features of a PC, such as peripheral configuration and advanced chipset configuration.
Security	For specifying passwords that can be used to limit access to the system.
Exit	For saving or discarding changes.

Setup Submenu	*Description*
Hard Disk Configuration	For configuring your hard drives.
Boot Options	For modifying options that affect the system boot up, such as the boot sequence.
Peripheral Configuration	For modifying options that affect the serial ports, the parallel port, and the disk drive interfaces.
Advanced Chipset Configuration	For modifying options that affect memory and system busses.
Power Management Configuration	For accessing and modifying Advanced Power Management (APM) options.
Plug and Play Configuration	For modifying options that affect the system's plug and play capabilities.

Table G-1. Set Up Screen For BIOS

OVERVIEW OF THE SETUP KEYS

Setup Key	*Description*
<F1>	Pressing the <F1> key brings up a help screen for the currently selected item if available.
<Esc>	Pressing the <Esc> key takes you back to the previous screen. Pressing <esc> in the Main, Advanced, Security, or Exit screen allows you to Exit Discarding Changes (see later in this chapter).
<Enter>	Pressing the <Enter> key selects the current item or option.
<↑>	Pressing the up <↑> key changes the selection to the previous item or option.
<↓>	Pressing the down <↓> key changes the selection the to the next item or option.
<←> <→>	Pressing the left <←> or right <→> keys in the Main, Advanced, Security, or Exit menu screens changes the menu selection. Pressing either key in a submenu does nothing.
<F5>	Pressing the <F5> key allows you to Load Setup Defaults (see later in this chapter).
<F6>	Pressing the <F6> key allows you to Discard Changes (see later in this chapter).
<F10>	Pressing the <F10> key allows you to Exit Saving Changes (see later in this chapter).

Table G-2. Overview of Special Purpose Keys For Setup

MAIN SCREEN

This section describes the Setup options found on the main menu screen. If you select certain options from the main screen (e.g, Hard Disk), the Setup program will switch to a submenu for the selected option. Submenus are described in the sections following the description of the main screen options.

System Date

When selected, this brings up a dialog box that allows you to specify the current date.

System Time

When selected, this brings up a dialog box that allows you to specify the current time.

Floppy Options

When selected, this brings up the Floppy Options submenu.

Hard Disk 0:, 1:, 2:, 3:

This reports if a hard disk is connected to the system. When selected, this brings up the Hard Disk Configuration submenu.

Language

When selected, this brings up a dialog box that allows you to specify the language of the text strings used in the Setup program and the BIOS. The options are any installed languages. If no additional languages have been installed, this item will not appear.

Boot Options

When selected, this brings up the Boot Options screen.

Video Mode

This reports the video mode. This is informational only, and there are no options.

Mouse

This reports if a mouse is installed or not. This is informational only, and there are no options.

Base Memory

This reports the amount of base memory. This is informational only, and there are no options.

Extended Memory

This reports the amount of extended memory. This is informational only, and there are no options.

FLOPPY OPTIONS SUBMENU

Floppy A: Type

When selected, this brings up a dialog box that allows you to specify the physical size and capacity of the diskette drive. The options are Disabled, 360 KB, 5.25-inch; 1.2 MB, 5.25-inch; 720 KB, 3.5-inch; 1.44 MB, 3.5-inch; 2.88 MB, 3.5-inch. The default is 1.44 MB, 3.5-inch.

Floppy B: Type

When selected, this brings up a dialog box that allows you to specify the physical size and capacity of the diskette drive. The options are Disabled, 360 KB, 5.25-inch; 1.2 MB, 5.25-inch; 720 KB, 3.5-inch; 1.44 MB, 3.5-inch; 2.88 MB, 3.5-inch. The default is Disabled.

HARD DISK CONFIGURATION SUBMENU

Hard Disk Type

When selected, this brings up a dialog box that allows you to manually configure your hard drive or have the system auto configure it. The options are Auto Configured and User Definable. The default is Auto Configured. If you select User Definable then the Number of Cylinders, Number of Heads, and Number of Sectors items can be modified.

Number of Cylinders

If Hard Disk Type is set to User Definable, you must type the correct number of cylinders for your hard disk. If Hard Disk Type is set to Auto Configured, this reports the number of cylinders for your hard disk and cannot be modified.

Number of Heads

If Hard Disk Type is set to User Definable, you must type the correct number of heads for your hard disk. If Hard Disk Type is set to Auto Configured, this reports the number of heads for your hard disk and cannot be modified.

Number of Sectors

If Hard Disk Type is set to User Definable, you must type the correct number of sectors for your hard disk. If Hard Disk Type is set to Auto Configured, this reports the number of sectors for your hard disk and cannot be modified.

Maximum Capacity

This reports the maximum capacity of your hard disk. It is calculated from the number of cylinders, heads, and sectors. This is informational only, and there are no options here.

Initialization Timeout

When selected, this brings up a dialog box that allows you to specify the amount of time the system allows for auto-configuring an IDE drive before reporting that a drive is not present. The options are Disabled, 5, 10, or 31 seconds. The default setting for drive C: is 5 seconds, and the default for drives D:, E:, and F: is Disabled. To decrease boot-up time, you can set the time-out specification to Disabled for any drive not in the system. Furthermore, many hard drives do not require 5 seconds for auto-configuration. You may try setting the time-out to Disabled for a hard drive in your system. When set to Disabled, the system will try to auto-configure your drive once. If you set the time-out to Disabled and the drive is not detected, reset the time-out to a higher setting.

IDE Translation Mode

When selected, this brings up a dialog box that allows you to specify the IDE translation mode. The options are Standard CHS (standard cylinder head sector — less than 1024 cylinders), Logical Block Addressing (LBA), Extended CHS (extended cylinder head sector — greater than 1024 cylinders), and Auto Detected (BIOS detects IDE drive support for LBA). The default is Auto-detected.

Do not change this from the option selected when the hard drive was formatted. Changing the option may result in corrupted data or drive not properly recognized.

Multiple Sector Setting

When selected, this brings up a dialog box that allows you to set the IDE programmed I/O cycles so that multiple sectors are transferred in a single block. This only affects drives connected to the ISA/IDE connector. The options are Disabled, 4 Sectors/Block, 8 Sectors/Block, or Auto Detected. The default is Auto Detected. Check the specifications for your hard disk drive to determine which setting will provide the optimum performance for your drive.

Fast Programmed I/O Modes

When selected, this brings up a dialog box that allows you to set how fast transfers on the PCI IDE interface occur. The options are Disabled or Auto Detected. The default is Auto Detected. If set to Disabled, transfers occur at an un-optimized speed. If set to Auto Detected, transfers occur at the drive’s maximum speed.

BOOT OPTIONS SUBMENU

Boot Sequence

When selected, this brings up a dialog box that allows you to set the order of drives the system uses to find an operating system to boot from. The following options are available:

C: First, Then A:	The system checks drive C first, followed by drive A.
A: First, Then C:	The system checks drive A first, followed by drive C.
	(The above selection allows you to boot from a diskette when necessary.)
C: Only	The system checks drive C and no other drives.
A: Only	The system checks drive A and no other drives.

The default is A: First, Then C:

System Cache

When selected, this brings up a dialog box that allows you to enable or disable both the primary and secondary cache memory. The options are Enabled or Disabled. The default is Enabled.

Boot Speed

When selected, this brings up a dialog box that allows you to set the system's boot speed. The options are Deturbo and Turbo. The default is Turbo. If Turbo is selected, boot-up occurs at full speed. If Deturbo is selected, the board operates at a slower speed (similar to a 25 MHz AT).

Num Lock

When selected, this brings up a dialog box that allows you to set the beginning state of the Num Lock feature on your keyboard. The options are On and Off. The default is Off.

Setup Prompt

When selected, this brings up a dialog box that allows you to turn on the "Press <F1> Key if you want to run Setup" prompt during the power-up sequence. The options are Enabled and Disabled. The default is Enabled.

Hard Disk Pre-Delay

When selected, this brings up a dialog box that allows you to set the hard disk drive pre-delay. The options are Disabled, 1, 2, 3, 4, 5, 6, or 7 seconds. The default is 3 seconds. When enabled, this option causes the BIOS to wait the specified time before it first accesses the hard drive. If your system contains a hard drive, and you don't see the drive type displayed during boot-up, the hard drive may need more time before it is able to communicate with the controller. Setting a pre-delay will provide additional time for the hard drive to initialize.

Typematic Rate Programming

When selected, this brings up a dialog box that allows you to set the typematic rates. The options are Default and Override. The default is Default. Choosing Override enables Typematic Rate Delay and Typematic Rate.

Typematic Rate Delay

When selected, this brings up a dialog box that allows you to set how long it takes for the key-repeat function to start when you hold down a key on the keyboard. The options are 250, 500, 750, and 1000 millisecond delays. The default is 250. If Typematic Rate Programming is set to Default, this option will not be visible.

Typematic Rate

When selected, this brings up a dialog box that allows you to set the speed at which characters repeat when you hold down a key on the keyboard. The higher the number, the faster the characters repeat. The options are 6, 8, 10, 12, 15, 20, 24, and 30 characters per second. The default is 6. If Typematic Rate Programming is set to Default, this option will not be visible.

ADVANCED SCREEN

This section describes the Setup options found on the Advanced menu screen. If you select certain options from the Advanced screen (e.g, Peripheral Configuration), the Setup program will switch to a submenu for the selected option. Submenus are described in the sections following the description of the Advanced screen options.

Processor Type

This reports the CPU type. This is informational only, and there are no options.

Processor Speed

This reports the clock speed of the CPU. This is informational only, and there are no options.

Cache Size

This reports the size of the secondary cache. This is informational only, and there are no options. If no secondary cache is installed, this field will not be displayed.

Peripheral Configuration

When selected, this brings up the Peripheral Configuration submenu.

Advanced Chipset Configuration

When selected, this brings up the Advanced Chipset Configuration submenu.

Power Management Configuration

When selected and enabled, this brings up the Advanced Power Management (APM) submenu.

Plug and Play Configuration

When selected, this brings up the Plug and Play Configuration submenu.

PERIPHERAL CONFIGURATION SUBMENU

Configuration Mode

When selected, this brings up a dialog box that allows you to set the peripheral configuration yourself, or have the system do it. The options are Auto and Manual. The default is Auto.

When Auto is selected, the system peripherals are automatically configured during power up. The options below for the PCI/IDE Interfaces, Floppy Interface, Serial Port 1 and Serial Port 2 Addresses, and the Parallel Port Address can not be modified. The settings displayed for those options reflect the current state of the hardware, and not necessarily the state after reboot.

If Manual is selected, the options for the PCI IDE Interfaces, Floppy Interface, Serial Port 1 and Serial Port 2 Addresses, and Parallel Port Address can be explicitly configured.

PCI IDE Interface

When selected, this brings up a dialog box that allows you to enable the PCI IDE hard disk interface. The options are Enabled and Disabled. The default is Enabled. (If Configuration Mode is set to Auto, this option cannot be modified.)

Floppy Interface

When selected, this brings up a dialog box that allows you to enable the diskette drive interface. The options are Enabled and Disabled. The default is Enabled. (If Configuration Mode is set to Auto, this option cannot be modified.)

Serial Port 1 Address

When selected, this brings up a dialog box that allows you to select the address of the serial port. The options are Disabled; COM1, 3F8h; COM2, 2F8h; COM3, 3E8h; and COM4, 2E8h. The default is COM1, 3F8h. If the Configuration Mode is set to Auto, the Setup program assigns the first free COM port (normally COM1, 3F8h) as the serial port 1 address, regardless of what is selected under the Serial Port 1 Address option. (If Configuration Mode is set to Auto, this option cannot be modified.)

If either serial port address is set, the address it is set to will not appear in the options of the other serial port.

Serial Port 2 Address

When selected, this brings up a dialog box that allows you to select the address of the serial port. The options are Disabled; COM1, 3F8h; COM2, 2F8h; COM3, 3E8h; and COM4, 2E8h. The default is COM2, 2F8h. If the Configuration Mode is set to Auto, the Setup program assigns the first free COM port (normally COM2, 2F8h) as the serial port 2 address, regardless of what is selected under the Serial Port 2 Address option. (If Configuration Mode is set to Auto, this option cannot be modified.)

If either serial port address is set, the address it is set to will not appear in the options of the other serial port.

Serial Port 2 IR Mode

When selected, this dedicates Serial Port 2 for infrared applications. Serial Port 2 also can be enabled with software from application programs. This option is only available when the Configuration Mode is set to Manual.

Parallel Port Address

When selected, this brings up a dialog box that allows you to select the address of the parallel port. The options are Disabled; LPT3, 3bch, IRQ7; LPT1, 378h, IRQ7; LPT1, 378h, IRQ5, and LPT2, 278h, IRQ5. The default is LPT1, 378h. If the Configuration Mode is set to Auto, the setup program assigns LPT1, 378h, IRQ7 as the parallel port address, regardless of what is selected under the Parallel Port Address option. (If Configuration Mode is set to Auto, this option cannot be modified.)

Parallel Port Mode

When selected, this brings up a dialog box that allows you to select the mode for the parallel port. The options are Compatible, Bi-directional, ECP or EPP. The default is Compatible. Compatible means the parallel port will operate in AT-compatible output mode. Bi-directional means the parallel port will operate in bi-directional PS/2-compatible mode. EPP/ECP means the parallel port will operate in either ECP or EPP compatible mode, which is the most advanced mode at which the chipset will operate.

Serial Port 1 IRQ

This reports the IRQ number for serial port 1. This is informational only, and there are no options. If the Serial Port 1 Address field is set to Disabled, this field will not be visible.

Serial Port 2 IRQ

This reports the IRQ number for serial port 2. This is informational only, and there are no options. If the Serial Port 2 Address field is set to Disabled, this field will not be visible.

Parallel Port IRQ

This reports the IRQ number for the parallel port. This is informational only, and there are no options. If the Parallel Port Address field is set to Disabled, this field will not be visible.

ADVANCED CHIPSET CONFIGURATION SUBMENU

Base Memory Size

When selected, this brings up a dialog box that allows you to set the size of the base memory. The options are 512 KB and 640 KB. The default is 640 KB.

ISA LFB Size

When selected, this brings up a dialog box that allows you to set the size of the video linear frame buffer. The options are Disabled or 1 MB. The default is Disabled. If this is not set to Disabled, then the ISA LFB Base Address field will appear.

ISA LFB Base Address

This reports the base address of the LFB. This is informational only, and there are no options. This field will not appear if the ISA LFB Size is set to Disabled.

Video Palette Snoop

When selected, this brings up a dialog box that allows you to control the ability of a PCI graphics card to "snoop" write cycles to an ISA graphics card's color pallet registers. The options are Enabled and Disabled. The default is Disabled. *Note: Some video capture or TV tuner add-in boards may require this feature to be enabled. Depending on hardware limitations, this item may not appear*.

Latency Timer (PCI Clocks)

When selected, this brings up a dialog box that allows you to control the time and agent on the PCI bus can hold the bus when another agent has requested the bus. The valid numbers are between 0 and 256. The default is 66.

PCI Burst

This enables or disables support for PCI/memory burst mode data transfers. The options are Enabled or Disabled. The default is Enabled. PCI burst mode allows higher throughput of data between the PCI bus and memory. Not all cards are capable of utilizing this enhanced data transfer mode. Some cards may act unpredictably with PCI burst mode enabled. If you are having problems with a PCI add in card, PCI Burst mode should be disabled.

SIMM Type Detection

This reports the type of DRAM installed in each of the two memory banks: Fast Page Mode, Extended Data Out Mode, or None. This is informational only, and there are no options.

POWER MANAGEMENT CONFIGURATION

Power Management Configuration enables or disables the Advanced Power Management (APM) support in your system's BIOS. Power Management will only work with APM-capable operating systems to manage power consumption in your system. If Advanced Power Management is set to Disabled, none of the fields in the Advanced Power Management submenu will be visible.

IDE Drive Power Down

When selected, this brings up a dialog box that allows you to set any IDE drives to spin down when the system goes into power managed mode. The options are Enabled and Disabled. The default is Enabled.

VESA Video Power Down

When selected, this brings up a dialog box that allows you to set the command issued to your graphics card when the system goes into power managed mode. The command options are Disabled, Standby, Suspend, and Sleep. The default is Sleep.

Inactivity Timer

This allows you to set how many minutes the system must be inactive before it enters power managed mode. The range is 0 to 255 minutes. The default is 10 minutes.

Hot Key

This allows you to enter a hot key that, when pressed while holding down the <Ctrl> and <Alt> keys, will cause the system to enter power managed mode. All alphanumeric keys, punctuation, and spaces are valid.

PLUG AND PLAY CONFIGURATION SUBMENU

Configuration Mode

When selected, this brings up a dialog box that allows you to set how the BIOS gets information about ISA cards that do not have plug and play capabilities. The options are Use Setup Utility and Use ICU (ISA Configuration Utility). The default is Use Setup Utility.

If Use ICU is selected, the BIOS will depend on run-time software to ensure that there are no conflicts between ISA boards with plug and play capabilities and those without. None of the rest of the items in this submenu will be visible.

If Use Setup Utility is selected, the BIOS will depend on the following items to avoid conflicts.

ISA Shared Memory Size

When selected, this brings up a dialog box that allows you to set the size of ISA shared memory. The options are Disabled, 16 KB, 32 KB, 48 KB, 64 KB, 80KB, and 96 KB. The default is Disabled. If this is set to Disabled, ISA Shared Memory Base Address, below, will not be visible.

ISA Shared Memory Base Address

When selected, this brings up a dialog box that allows you to set the base address for the ISA Shared Memory. The options are C8000h, CC000h, D0000h, D4000h, D8000h, and DC000h. The default is C8000h. This setting may affect the ISA Shared Memory Size item. The value entered in the ISA Shared Memory Size item cannot extend into the E0000h address. For example, if a size of 64K was selected, options D4000h, D8000h, and DC000h will not be available.

Boot With PnP OS

When Enabled is selected, the BIOS will activate only those Plug and Play add-in cards needed to boot the system, then pass control to the operating system to configure any remaining Plug and Play add-in cards. The default is Disabled, but this feature should be set to Enabled for use with Windows 95..

IRQ 3, 4, 5, 7, 9, 10, 11, 12

When selected, this brings up a dialog box that allows you to set the status of the IRQ. The options are Available and Used By ISA Card. The default is Available. The PCI auto-configuration code looks here to see if these interrupts are

available. If an interrupt is available, the PCI auto-configuration code can assign the interrupt to be used by the system. If your system contains an ISA agent that uses one of these interrupts, select Used By ISA Card for that interrupt.

Some of these interrupts may not be displayed if they already have been assigned to other peripherals, such as IRQ 3 and IRQ 4, which are normally used by the serial ports, and IRQ 7 for the parallel port, and IRQ12 for the mouse port.

Note: One IRQ is required for PCI devices. When selecting IRQs for use by ISA the BIOS will not allow you to select all IRQs as used by ISA.

Note: IRQ 14 and IRQ 15 will not show up on the list of available IRQs, even when the on board IDE controllers are disabled. If the on board IDE controllers are not used, these IRQs may be used for ISA cards, even though they do not show up on the menu. These interrupts will not be used by PCI devices other than the IDE controllers, as they must remain available for bootable devices.

SECURITY SCREEN

This section describes the two access modes that can be set using the options found on the Security screen, and then describes the Security screen options themselves.

ADMINISTRATIVE AND USER ACCESS MODES

The options on the Security screen menu make it possible to restrict access to the Setup program by allowing you to set passwords for two different access modes: Administrative mode and User mode.

In general, Administrative mode has full access to the Setup options, whereas User mode has restricted access to the options. Thus, by setting separate Administrative and User passwords, a system administrator can limit who can change critical Setup values. The actual limitations depend on whether either the Administrative or User passwords or both are set.

If you want to limit access to who can boot the system, you must set the User password. This is the password that the system will ask for before booting. If only the Administrative password is set, the system will boot up without asking for a password. If both passwords are set, you can enter either password to boot the system.

This table shows the effects of setting the Administrative and User passwords. (The table is for reference only, and is not shown on the Security screen.) In the table, the statement “Can change a limited number of options” means you can change the system date and time, the User password, and the security hot key.

Password Set	Administrative mode can:	User mode can:	Pswd Required at Boot
Neither	Change all options*	Change all options*	None
Administrative only	Change all options	Change a limited number of options	None
User only	N/A	Change all options	User
Both	Change all options	Change a limited number of options	Administrative or User

Table G-1. Password Settings

* If no password is set, any user can change all Setup options.

SECURITY SCREEN OPTIONS

User Password is

This reports if there is a User password set. This is informational only, and there are no options.

Administrative Password is

This reports if there is an Administrative password set. This is informational only, and there are no options.

Set User Password

When selected, this brings up a dialog box that allows you to set the User password.

Set Administrative Password

When selected, this brings up a dialog box that allows you to set the Administrative password.

Unattended Start

When selected, this brings up a dialog box that allows you to control when the security password is requested. The options are Enabled and Disabled. The default is Disabled. The User password must be enabled before you can enable this option. If Enabled is selected, the system will boot, but the keyboard will be locked until the User password is entered.

Security Hot Key (CTRL-ALT-)

This allows you to set a hot key that, when pressed, will lock the keyboard until the User password is entered.

EXIT SCREEN

Exit Saving Changes

When selected, this allows you to save the change to CMOS and exit the Setup program. You can also press the <F10> key anywhere in the Setup program to do this.

Exit Discarding Changes

When selected, this allows you to exit the Setup program without saving any changes. This means that any changes made while in the Setup program will be discarded and **NOT SAVED**. Pressing the <Esc> key in any of the four main screens will do this.

Load Setup Defaults

When selected, this allows you to reset all of the setup options to their defaults. You can also press the <F5> key anywhere in the Setup program to do this. This selection loads the default values from the ROM table.

Discard Changes

When selected, this allows you to discard any changes you made during the current Setup session without exiting the program. You can also press the <F6> key anywhere in the Setup program to do this. This selection loads the CMOS values that were present when the system was turned on.

Appendix H - BIOS Recovery

The Advanced/ZE incorporates the AMIBIOS in a Flash memory component. Flash BIOS allows easy upgrades without the need to replace an EPROM. The upgrade utility fits on a floppy diskette and provides the capability to save, verify, and update the system BIOS. The upgrade utility also provides the capability to install alternate languages for BIOS messages and the SETUP utility. The upgrade utility can be run from a hard drive or a network drive, but no memory managers can be installed during upgrades.

USING THE UPGRADE UTILITY

If the utility is obtained from the bulletin board, UNZIP the archive and copy the files to a bootable MS-DOS 3.3, 4.01, 5.0, or 6.x diskette. Reboot the system with the upgrade diskette in the bootable floppy drive and follow the directions in the easy to use menu-driven program.

RECOVERY MODE

In the unlikely event that a FLASH upgrade is interrupted catastrophically, it is possible the BIOS may be left in an unusable state. Recovering from this condition requires the following steps (be sure a power supply and speaker have been attached to the board, and a floppy drive is connected as drive A:):

1. Change Flash Recovery jumper to the recovery mode position.
2. Install the bootable upgrade diskette into drive A:
3. Reboot the system.
4. Because of the small amount of code available in the non-erasable boot block area, no video is available to direct the procedure. The procedure can be monitored by listening to the speaker and looking at the floppy drive LED. When the system beeps and the floppy drive LED is lit, the system is copying the recovery code into the FLASH device. As soon as the drive LED goes off, the recovery is complete.
5. Turn the system off.
6. Change the Flash Recovery jumper back to the default position.
7. Leave the upgrade floppy in drive A: and turn the system on.
8. Continue with the original upgrade.

Appendix I - Error messages and Beep Codes

Errors can occur during POST (Power On Self Test) which is performed every time the system is powered on. Fatal errors, which prevent the system to continue the boot process, are communicated through a series of audible beeps. Other errors are displayed in the following format:

ERROR *Message Line 1*

ERROR *Message Line 2*

For most displayed error messages, there is only one message. If a second message appears, it is "RUN SETUP". If this message occurs, press <F1> to run AMIBIOS Setup.

BEEP CODES

Beeps	*Error Message*	*Description*
1	Refresh Failure	The memory refresh circuitry on the baseboard is faulty.
2	Parity Error	Parity is not supported on this product, will not occur.
3	Base 64 KB Memory Failure	Memory failure in the first 64 KB.
4	Timer Not Operational	Memory failure in the first 64 KB of memory, or Timer 1 on the baseboard is not functioning.
5	Processor Error	The CPU on the baseboard generated an error.
6	8042 - Gate A20 Failure	The keyboard controller (8042) may be bad. The BIOS cannot switch to protected mode.
7	Processor Exception Interrupt Error	The CPU 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	ROM checksum value does not match the value encoded in BIOS.
10	CMOS Shutdown Register Rd/Wrt Error	The shutdown register for CMOS RAM failed.
11	Cache Error / External Cache Bad	The external cache is faulty.

Table I-1. Beep Codes

ERROR MESSAGES

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 baseboard.
Cache Memory Bad, Do Not Enable Cache!	Cache memory is defective. Replace it.
CH-2 Timer Error	Most AT systems include 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	After CMOS RAM values are saved, a checksum value is generated for error checking. The previous value is different from the current value. Run AMIBIOS Setup.
CMOS System Options Not Set	The values stored in CMOS RAM are either corrupt or nonexistent. Run Setup.
CMOS Display Type Mismatch	The video type in CMOS RAM does not match the type detected by the BIOS. Run AMIBIOS Setup.
CMOS Memory Size Mismatch	The amount of memory on the baseboard is different than the amount in CMOS RAM. Run AMIBIOS Setup.
CMOS Time and Date Not Set	Run Standard CMOS Setup to set the date and time in CMOS RAM.
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 on the baseboard be set to either color or monochrome. Turn the system off, set the switch, then power on.
DMA Error	Error in the DMA controller.
DMA #1 Error	Error in the first DMA channel.
DMA #2 Error	Error in the second DMA channel.

Table I-2. Error Messages

ERROR MESSAGES (CONT.)

FDD Controller Failure	The BIOS cannot communicate with the floppy disk drive controller. Check all appropriate connections after the system is powered down.
HDD Controller Failure	The BIOS cannot communicate with the hard disk drive controller. Check all appropriate connections after the system is powered down.
INTR #1 Error	Interrupt channel 1 failed POST.
INTR #2 Error	Interrupt channel 2 failed POST.
Invalid Boot Diskette	The BIOS can read the disk in floppy drive A:, but cannot boot the system. Use another boot disk.
Keyboard Is Locked...Unlock It	The keyboard lock on the system is engaged. The system must be unlocked to continue.
Keyboard Error	There is a timing problem with the keyboard. Set the *Keyboard* option in Standard CMOS Setup to *Not Installed* to skip the keyboard POST routines.
KB/Interface Error	There is an error in the keyboard connector.
Off Board Parity Error	Parity error in memory installed in an expansion slot. The format is: OFF BOARD PARITY ERROR ADDR (HEX) = (XXXX) *XXXX* is the hex address where the error occurred.
On Board Parity Error	Parity is not supported on this product, this error will not occur.
Parity Error ????	Parity error in system memory at an unknown address.

PLUG AND PLAY ERROR MESSAGES

Bad PNP Serial ID Checksum	The serial ID checksum of a Plug and Play card was invalid.
Floppy Disk Controller Resource Conflict	The floppy disk controller has requested a resource that is already in use.
NVRAM Checksum Error, NVRAM Cleared	The ESCD data was reinitialized because of an NVRAM checksum error. Try rerunning the ICU.
NVRAM Cleared by Jumper	The "Clear CMOS" switch has been moved to the ON position and CMOS RAM has been cleared.
NVRAM Data Invalid, NVRAM Cleared	Invalid entry in the ESCD area.
Parallel Port Resource Conflict	The parallel port has requested a resource that is already in use.
PCI Error Log is Full	This message is displayed when more than 15 PCI conflict errors are detected. No additional PCI errors can be logged.
PCI I/O Port Conflict	Two devices requested the same resource, resulting in a conflict.
PCI IRQ Conflict	Two devices requested the same resource, resulting in a conflict.
Primary Memory Conflict	Two devices requested the same resource, resulting in a conflict.
Primary Boot Device Not Found	The designated primary boot device (hard disk drive, diskette drive, etc.) could not be found.
Primary IDE Controller Resource Conflict	The primary IDE controller has requested a resource that is already in use.
Primary Input Device not Found	The designated primary input device (keyboard, mouse, or other, if input is redirected) could not be found.
Secondary IDE Controller Resource Conflict	The secondary IDE controller has requested a resource that is already in use.
Serial Port 1 Resource Conflict	Serial port 1 has requested a resource that is already in use.
Serial Port 2 Resource Conflict	Serial port 2 has requested a resource that is already in use.
Static Device Resource Conflict	A non-Plug and Play ISA card has requested a resource that is already in use.
System Board Device Resource Conflict	A non Plug and Play system resource has requested a resource that is already in use.

Table I-3. Plug and Play Error Messages

ISA NMI MESSAGES

ISA NMI Message	*Explanation*
Memory Parity Error at *xxxxx*	Memory failed. If the memory location can be determined, it is displayed as *xxxxx*. If not, the message is *Memory Parity Error ????.*
I/O Card Parity Error at *xxxxx*	An expansion card failed. If the address can be determined, it is displayed as *xxxxx*. If not, the message is *I/O Card Parity Error ????*.
DMA Bus Time-out	A device has driven the bus signal for more than 7.8 microseconds.

Table I-4. ISA NMI Messages

Appendix J - Environmental Standards

Parameter	Condition	Specification
Temperature		
	Non-Operating	-40^{O}C to +70^{O}C
	Operating	+0^{O}C to +55^{O}C
Humidity		
	Non-Operating	92% Relative Humidity max. @ 36^{O}C
	Operating	80% Relative Humidity max. @ 36°C
Shock	Non-Operating	30.0G, 11ms, 1/2 sine

Table J-1. Environmental standards

Appendix K - Reliability Data

The Mean-Time-Between-Failures (MTBF) data is calculated from predicted data @ 55°

Advanced/ZP baseboard 105053