

# Advanced/ATX Baseboards

*Technical Product Summary*

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# Advanced/ATX Technical Product Summary

## Table of Contents

<b>Introduction .....</b>	<b>4</b>
<b>ATX Form Factor .....</b>	<b>5</b>
<b>Board Level Features.....</b>	<b>6</b>
Processor	
Processor Upgrade	
Second Level Cache	
System Memory	
Expansion Slots	
Peripheral Component Interconnect (PCI) chip set	
National Semiconductor PC87306B I/O Controller	
Graphics Subsystem	
Crystal Audio Subsystem	
Baseboard BIOS	
Front Panel Connections	
Back Panel Connections	
Audio Connections	
Baseboard Connections	
Power Consumption	
<b>Appendix A - User-Installable Upgrades.....</b>	<b>18</b>
<b>Appendix B - Jumpers .....</b>	<b>19</b>
<b>Appendix C - Memory Map .....</b>	<b>21</b>
<b>Appendix D - I/O Map.....</b>	<b>21</b>
<b>Appendix E - PCI Configuration Space Map .....</b>	<b>23</b>
<b>Appendix F - Interrupts &amp; DMA Channels.....</b>	<b>24</b>
<b>Appendix G - Connectors .....</b>	<b>25</b>
<b>Appendix H - BIOS Setup .....</b>	<b>30</b>
<b>Appendix I - PCI Configuration Error Messages .....</b>	<b>41</b>
<b>Appendix J - AMIBIOS Error messages and Beep Codes .....</b>	<b>42</b>
<b>Appendix K - BIOS Updates .....</b>	<b>43</b>
<b>Appendix L - Soft-off Control .....</b>	<b>44</b>
<b>Appendix M - Environmental Standards.....</b>	<b>44</b>
<b>Appendix N - Reliability Data .....</b>	<b>44</b>

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# Introduction

The Advanced/ATX baseboard integrates the latest advances in processor, memory, and I/O technologies into a new form factor named ATX. The ATX form factor combines performance, flexibility, and ease of use into a highly integrated baseboard capable of meeting a variety of price/performance levels. The ATX baseboard is an ideal platform for the increasing requirements of today's and tomorrow's desktop applications.

The flexible ATX design will accept Pentium® processors operating at 75 MHz, 90 MHz, 100 MHz, 120 MHz, 133 MHz, and future speeds. There is a manufacturing option for having 256 KB of Pipeline Burst SRAM soldered onto the baseboard. The memory subsystem is designed to support up to 128 MB of EDO DRAM (for improved performance) or standard Fast Page DRAM in standard 72-pin SIMM sockets. A Type 7 Pentium OverDrive® socket provides upgrades to future OverDrive processors.

The Advanced/ATX baseboard utilizes Intel's 82430FX PCIset to provide increased integration and performance over other baseboard designs. The 82430FX PCIset contains an integrated PCI Bus Mastering IDE controller with two high performance IDE interfaces for up to four IDE devices (such as hard drives, CD-ROM readers, and so forth). The National PC87306B I/O controller integrates the standard PC I/O functions: floppy interface, two FIFO serial ports, one EPP/ECP capable parallel port, a Real Time Clock, keyboard controller, and support for an IrDA compatible infrared interface. To provide for the increasing number of multimedia applications, a Crystal CS4232 audio codec is integrated onto the baseboard. The CS4232 provides 16-bit stereo, Sound Blaster Pro\* compatible audio with full-duplex capabilities to meet the demands of today's and tomorrow's multimedia applications. Up to four PCI local bus slots provide a high bandwidth data path for data-movement intensive functions such as video or networking, and up to three ISA slots complete the I/O mix. A total of six expansion slots may be populated with full length add-in cards (one PCI and ISA slot share the same chassis I/O panel).

In addition to superior hardware capabilities, a full set of software drivers and utilities are available to allow advanced operating systems such as Windows\* 95 to take full advantage of the hardware capabilities. Features such as bus mastering IDE, Windows 95-ready Plug and Play, Advanced Power Management (APM) with application restart, software-controlled power supply shutdown, and glitchless bi-directional audio are all provided by software available for the Advanced/ATX.

# ATX Form Factor

The ATX form factor has been defined to address four major areas of improvement required of today's predominant form factors, Baby-AT and LPX:

- 1) Enhance PC ease-of-use
- 2) Better support for current and future I/O
- 3) Reduce total system cost
- 4) Better support for future processor technology

ATX is an evolution of the popular Baby-AT form factor. By mounting the typical Baby-AT power supply on its side, it is possible to rotate the baseboard through 90 degrees in the chassis. The processor is relocated away from the expansion slots and the longer side of the board is used to host more on-board I/O connectors. Placing more I/O down on the baseboard reduces cabling inside the box, lowering cost and improving reliability and ease-of-use. A flexible I/O panel allows ATX to support all current and future I/O requirements. The ATX power supply, rather than blowing air out of the chassis as in most Baby AT platforms, blows air into the chassis and over the processor, saving the cost of a secondary fan in the system. System cost is further reduced by the higher integration of PC components onto the baseboard itself, saving material, inventory holding and assembly costs.

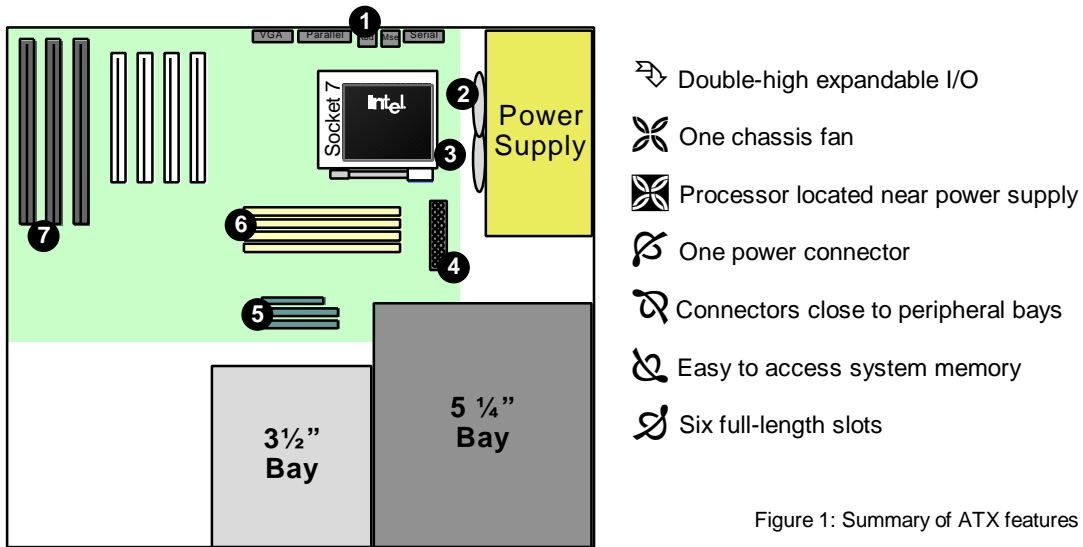
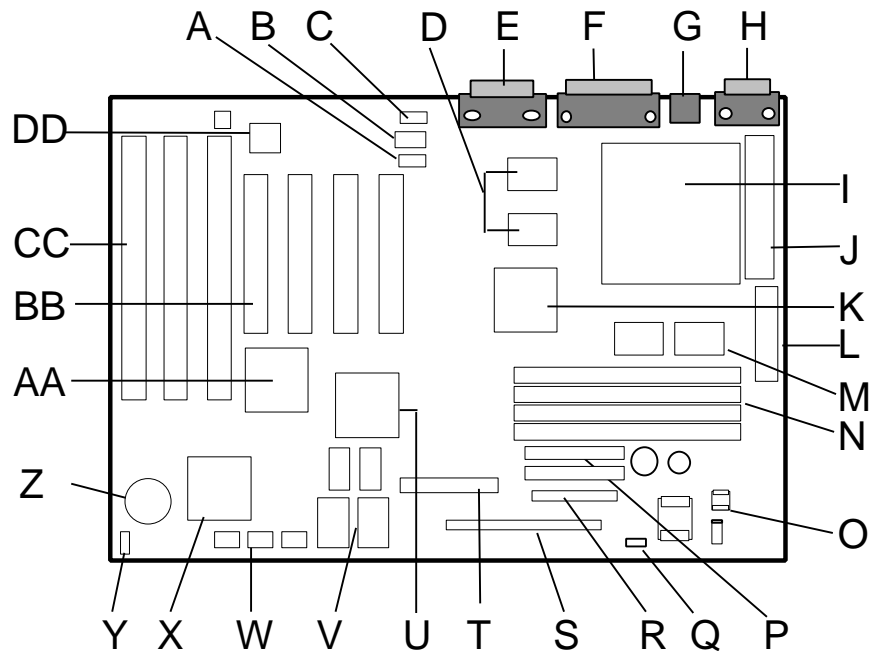


Figure 1: Summary of ATX features

The Advanced/ATX baseboard is designed to fit into an ATX form factor chassis. All board dimensions and mounting hole locations are part of the ATX Baseboard Specification, which is available from your Intel sales representative, the Intel Applications Support BBS, or via the World Wide Web at <http://www.intel.com/pc-supp/motherbd/atx.html>

## Board Level Features



- |   |  |
|---|--|
| A – Telephony input connector             | P – Two PCI IDE interfaces                   |
| B – Wave table upgrade connector          | Q – Voltage regulator jumper                 |
| C – CD-ROM audio connector                | R – Floppy connector                         |
| D – 256kB Pipe Line Burst L2 cache option | S – Front Panel I/O connectors               |
| E – Audio, Game port connectors           | T – Video Feature connector                  |
| F – Parallel, VGA connectors              | U – S3 Trio PCI graphics controller          |
| G – PS/2 Mouse and keyboard connectors    | V – Up to 2MB graphics memory                |
| H – Serial port connectors                | W – Configuration jumper block               |
| I – Socket 7 Pentium™ Processor socket    | X – National PC87306 I/O controller          |
| J – VRM socket location (optional)        | Y – Auxiliary Fan connector                  |
| K – 82437FX System Controller (TSC)       | Z – Battery for the Real-time clock          |
| L – Primary Power Connector               | AA – 82371FB PCI ISA/IDE Accelerator (PIIX)  |
| M – 82438FX Data Path (TDP)               | BB – Up to 4 PCI full length expansion slots |
| N – Four SIMM sockets (two banks)         | CC – Up to 3 ISA full length expansion slots |
| O – CPU 3.3v voltage regulator            | DD – Crystal CS4232 audio, OPL3 synthesizer  |

Figure 2 - Advanced/ATX ATX Baseboard Features

## CPU

The Advanced/ATX baseboard is designed to operate with 3.3 volt Pentium Processors. A patented on-board voltage regulator circuit provides the required voltage for the processor from the 5 volt output of a standard PC power supply. An on-board jumper enables use of VRE specified processors. Pentium processors which run internally at 75MHz, 90MHz, 100MHz, 120MHz, and 133 MHz, and have iCOMP ratings of 615, 735, 815, 1000, and 1110 respectively are supported.

The Pentium processor maintains full backward compatibility with the 8086, 80286, i386™ and Intel486™ processors. It supports both read and write burst mode bus cycles, and includes separate 8 KB 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.

## **PROCESSOR UPGRADE**

The Advanced/ATX baseboard has a 321-pin Zero Insertion Force (ZIF) processor socket (socket 7) that provides users with an OverDrive processor upgrade path. OverDrive processors being developed for use with socket 7 will provide performance beyond that delivered by the originally installed Pentium Processor.

## **SECOND LEVEL CACHE**

The Pentium processor's internal cache can be complemented by a second level cache using high-performance Pipeline Burst SRAM. Pipeline Burst (PB) SRAM provides performance similar to expensive Synchronous Burst SRAMs for only a slight cost premium over slower performing Asynchronous SRAMs. With the 82430FX chip set, the performance level of PB and Synchronous SRAMs is identical.

Standard configuration for the Advanced/ATX baseboards is an integrated 256 KB direct mapped write-back second level cache implemented with two 32k x 32 Pipeline Burst SRAM devices. A 5v 8Kb x 8 external Tag SRAM provides caching support for up to 64 MB of system memory.

## **SYSTEM MEMORY**

The Advanced/ATX 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. Memory timing requires 70 ns fast page devices or, for optimum performance, 60nS EDO DRAM. If the memory bus speed is 60 Mhz or slower (75MHz, 90MHz, or 120MHz Pentium Processor speed), 70ns EDO DRAM may be used. 36-bit SIMM modules may be used, but parity generation and checking is not supported.

The four sockets are arranged as Bank A and Bank B, 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, although the memory type and size may be different between Banks A and B. 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 A only, Bank B 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 DRAM.

### **EDO DRAM**

Extended Data Out (or Hyper Page) 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 pre-charge for the next cycle. With EDO, the CAS# pre-charge overlaps the data valid time, allowing CAS# to negate earlier while still satisfying the memory data valid window time.

## **EXPANSION SLOTS**

The ATX form-factor allows all six expansion slots on the Advanced/ATX baseboard to be populated with full-length add-in cards. There are three ISA bus expansion connectors and four PCI expansion connectors. One slot is shared by connectors that will accommodate either an ISA or a PCI expansion card, but not both; thus accounting for the disparity between the number of slots and connectors. All four PCI expansion slots accept PCI bus master cards, and fully support the PCI specification version 2.0.

### **PCI 3.3 VOLT CAPABILITIES**

Support for 3.3 Volts to the PCI connectors requires a power supply with a 3.3V DC output. The ATX power connector definition has 3 pins reserved for 3.3V. The on-board voltage regulator only provides 3.3V to the CPU, 82430FX chipset, and cache. No other on-board resources requires 3.3V.

## **PERIPHERAL COMPONENT INTERCONNECT (PCI) PCISSET**

The Intel 82430FX PCISet consists of the 82437FX System Controller (TSC), two 82438FX Data Path (TDP) devices, and one 82371FB PCI ISA/IDE Accelerator (PIIX) bridge chip. Detailed information on the PCISet is available in the Intel 82430FX PCISet data sheet. The 82430FX PCISet provides the following functions:

- CPU interface control
- Integrated L2 write-back cache controller
  - Pipeline Burst SRAM
  - 256kB or 512kB Direct Mapped
- Integrated DRAM controller
  - 64-bit path to Memory
  - Support for EDO and Fast Page DRAM
  - 8 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 to 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
- Plug-n-Play port Audio I/O
  - 2 steerable fast DMA channels with 4-byte buffer
  - Up to 6 steerable interrupts
  - 1 programmable chip select
- Enhanced Fast DMA controller
- Interrupt controller and steering
- Counters/Timers
- SMI interrupt logic and timer with Fast On/Off mode

Note: Not all chip set functions are utilized in the design of the Advanced/ATX.

### **82437FX 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 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. The 82371FB integrates seven 32-bit DMA channels, three 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 together onto the same device. The PIIX comes in a 208 pin QFP package.

### **IDE SUPPORT**

The Advanced/ATX baseboard provides two independent high performance bus-mastering PCI IDE interfaces capable of supporting PIO Mode 3 and Mode 4 devices. The system BIOS supports Logical Block Addressing (LBA) and Extended Cylinder Sector Head (ECHS) translation modes as well as AT API (e.g. CD-ROM) devices on both IDE interfaces. Detection of IDE device transfer rate and translation mode capability is automatically determined by the system BIOS.

In the Windows 95 environment, a driver can allow the IDE interface to operate as a PCI bus master capable of supporting PIO Mode 4 devices with transfer rates up to 16MB/sec while minimizing the system demands upon the processor. Normally, programmed I/O operations require a substantial amount of CPU bandwidth. In true multi-tasking operating systems like Windows 95, the CPU bandwidth freed up by using bus mastering IDE can be used to



complete other tasks while disk transfers are occurring. Microsoft will provide this driver for Windows 95, other software vendors may make drivers available for other operating systems.

## **NATIONAL SEMICONDUCTOR PC87306B 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 PC87306B. 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; Extended 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

The PC87306 is normally configured automatically by the BIOS, but configuration of these interfaces is also possible using the CMOS Setup utility that can be invoked during boot. See the BIOS Setup appendix for details on the specific settings.

## **FLOPPY CONTROLLER**

The PC87306B is software compatible with the DP8473 and 82077 floppy disk controllers. The floppy interface can be configured for 360 KB or 1.2 MB 5¼" media or for 720 KB, 1.44/1.25 MB, or 2.88 MB 3½" media. Configuring the floppy interface for 1.25 MB 3½" (3-mode floppy) requires the use of special floppy drives and a driver for the specific operating system.

## **KEYBOARD INTERFACE**

PS/2 keyboard/mouse connectors are located on the back panel side of the baseboard. The 5V lines to these connectors are 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 or mouse. The system BIOS can detect, and correct keyboards and mice plugged into the wrong PS/2 style connector.

The integrated 8042 microcontroller contains the AMI Megakey keyboard/mouse controller code, which besides providing traditional keyboard and mouse control functions, also 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 an 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 x86 mode under DOS.
- <CTRL><ALT><defined in setup>: A power down hot-key sequence takes 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. A security hot-key sequence provides password protection to the system.

## REAL TIME CLOCK, CMOS RAM AND BATTERY

The integrated Real Time Clock (RTC) is DS1287 and MC146818 compatible and provides a time of day clock, 100-year calendar with alarm features. The RTC can be set via the BIOS SETUP program. The RTC also supports 242-byte battery-backed CMOS RAM in two banks which 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 jumper on the baseboard. Appendix B lists jumper configurations.

An external coin-cell style battery provides power to the RTC and CMOS memory. The battery has an estimated lifetime of three years if the system is not plugged into the wall socket. When the system is plugged in, power is supplied from the ATX power supply's 5v standby current to extend the life of the battery. See Appendix A for information regarding replacement batteries.

## IRDA (INFRA-RED) SUPPORT

A 5-pin interface on the front panel I/O connector is provided to allow connection to a Hewlett Packard HSDSL-1000 compatible Infra-red (IrDA) transmitter/receiver. Once the module is connected to the front panel I/O header, Serial port 2 can be re-directed to the IrDA module. When configured for IrDA, the user can transfer files to or from portable devices such as laptops, PDA's and printers using application software such as LapLink. The IrDA specification provides for data transfers at 115kbps from a distance of 1 meter.

## GRAPHICS SUBSYSTEM

The Advanced/ATX baseboard is available with an S3 Trio64V+ SVGA graphics controller with 1 MB of graphics memory upgradeable to 2 MB. The graphics DRAM can be upgraded to 2 MB by installing two 256kB x 16, SOJ memory devices in the provided sockets. The Trio64V+ has a 64-bit graphics engine and incorporates the S3 Streams Processor™ that enables the device to convert YUV formatted video data to RGB and provides acceleration for scaling the video display without compromising picture quality or frame rate. The on-chip RAMDAC/clock synthesizer is capable of output pixel data rates of 135 Mhz providing non-interlaced screen resolutions of up to 1280x1024x256 colors at 75 Hz with 2MB of DRAM. Hardware acceleration for graphics functions such as BitBLTs with ROPs, 2-point line draws, trapezoidal and polygon fills, clipping and cursor support provide high performance operation under Windows and other GUI environments. In addition, a fast linear addressing scheme based upon DCI reduces software overhead by mapping the display memory into the CPU's upper memory address space and permitting direct CPU access to the display memory.

The Advanced/ATX baseboard supports the 26-pin VESA feature connector for synchronizing graphics output with an external NTSC or PAL signal and a shared frame buffer interface to maximize multimedia performance. Boards configured with the Trio64V+ will have a 34 pin feature connector that supports the VESA requirements as well as the LPB (Local Peripheral Bus) that provides a glueless bi-directional interface to a video companion device such as an MPEG/live video decoder. Advanced/ATX also supports other VESA standards such as the VESA DPMS protocol to put a DPMS compliant monitor into power savings modes and the VESA Display Data Channel (DDC2B) that permits transfer of monitor identification and resolution support data for ease of use.

## RESOLUTIONS SUPPORTED

<i>Resolution</i>	<i>1 MB DRAM</i>	<i>2 MB DRAM</i>	<i>Refresh Rate (Hz)</i>
640x480x4	X	X	
640x480x8	X	X	60,72,75,85
640x480x16	X	X	60,72,75
640x480x24		X	60,72,75
800x600x8	X	X	56,60,72,75,85
800x600x16	X	X	60,72,75
800x600x24		X	60,72,75
1024x768x8	X	X	43(IL),60,70,75,85
1024x768x16		X	43(IL),60,70,75
1280x1024x4	X	X	45(IL),60,72,75
1280x1024x8		X	45(IL),60,72,75

Table 1: Graphics Resolutions

## **GRAPHICS DRIVERS AND UTILITIES**

Graphics drivers and utilities for Windows 3.11, Windows 95, Windows NT 3.51, and OS/2 are available. These drivers come in a compressed form and are extracted by using an installation utility. Also included is a Windows 3.1x control panel applet called Galileo which allows the user to change the screen resolution, number of colors, and large or small fonts while in Windows. Updates for the video drivers may be downloaded from the Intel Applications Support BBS. Drivers for SCO UNIX are available from SCO.

## **CRYSTAL AUDIO SUBSYSTEM**

The Advanced/ATX baseboard features a 16-bit stereo audio sub-system as a factory installed option. The audio subsystem is based upon the Crystal CS4232 multimedia Codec and Yamaha OPL3 FM synthesizer. The CS4232 provides all the digital audio and analog mixing functions required for recording and playing of audio on personal computers. These functions include stereo analog-to-digital and digital-to-analog converters, analog mixing, anti-aliasing and reconstruction filters, line and microphone level inputs, and digital audio compression via selectable A-law/ $\mu$ law, and full digital control of all mixer and volume control functions. Combined with the Yamaha OPL3 FM synthesizer, the CS4232 also provides support for four major sound standards including Adlib™, Sound Blaster Pro 2.0, Windows Sound System and MPU-401 to meet all of the requirements of today's multimedia applications. The CS4232 also supports full-duplex operation which ensures support for future applications such as video conferencing.

The CS4232 includes a full Plug and Play ISA interface and is comprised of four logical devices including the Synthesizer, Game Port, CS4232 device, and MPU-401. Each logical device is configured into the host environment using the ISA Plug and Play configuration methodologies. The audio sub-system requires up to two DMA channels and one interrupt. The system can be configured to use either DMA channels 0, 1, or 3. The interrupt can be mapped to interrupt 5, 7, 9, 11, 12, or 15. (Note: not all interrupts may be available in a specific configuration.)

## **AUDIO I/O ACCESS**

All of the necessary audio jacks (Line OUT, Line IN, Mic IN) and game port plugs are accessible via the I/O panel along the rear of the Advanced/ATX baseboard. The audio connectors are standard 1/8" stereo jacks. To provide an output path that does not require external speakers, the audio output is directed to the standard PC speaker. If external speakers (self-powered) are plugged in, the audio output is redirected to the speakers.

## **CD-ROM AUDIO INPUT**

A four pin connector (J1F1) is provided for interfacing the audio output stream from a CD-ROM reader into the audio sub-system mixer. This connector is compatible with most typical cables that are supplied with CD-ROM readers for interfacing to audio add-in cards.

## **WAVE TABLE UPGRADE**

An eight pin header is provided to connect to a wave table upgrade card, available from several vendors for richer sound quality in both DOS and Windows environments. The upgrade module is simply installed into a standard ISA slot with a small cable routed to the connector (J1F2).

## **TELEPHONY INPUT**

A four pin connector is provided for mixing the speaker output from a voice assisted telephony modem into the MIC IN audio stream to the audio codec and redirecting the MONO OUT audio stream into the telephony modem. Use of this connector allows the telephony modem to be properly configured for use without requiring cables to be installed into the external audio jacks. The connector is compatible with the typical cable that is supplied with CD-ROM readers for interfacing to audio add-in cards.

## **AUDIO DRIVERS**

Audio software and utilities are available for the Advanced/ATX baseboard for DOS, Windows 3.1x, and Windows 95. A setup program installs the appropriate software programs and utilities onto the system hard drive. Included in the audio software are DOS utilities that allow the user to play a CD-ROM, control sound volume and mixer settings, run diagnostics, and switch between Sound Blaster Pro and Windows Sound System modes. Windows 3.11 drivers

and utilities include the Windows sound driver, audio input control panel, audio mixer control panel, and a business audio transport utility. Updates for the audio drivers may be downloaded from the Intel Applications Support BBS.

## **BASEBOARD BIOS**

The Advanced/ATX baseboard uses an Intel BIOS, which is stored in Flash EEPROM and easily upgraded using a floppy disk-based program (see appendix H). BIOS upgrades will be downloadable from the Intel Applications Support electronic bulletin board service. In addition to the Intel BIOS, the Flash EEPROM also contains the Setup utility, Power-On Self Tests (POST), and the PCI auto-configuration utility. This baseboard supports system BIOS shadowing, allowing the BIOS to execute from 64-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. The initial production BIOS in the Advanced/ATX will be identified as 1.00.01.CN0.

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 MEMORY IMPLEMENTATION**

The Intel N28F001BX 1 Mb Flash component is organized as 128K x 8 (128 KB). The code in the FLASH device is compressed. At boot time, the code is decompressed and copied into shadowed DRAM. BIOS Flash recovery is not supported, the recovery code has been removed from the boot block area and that area is now used to implement additional BIOS functionality. A PCI add-in card has been designed that implements the FLASH recovery function.

## **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 down loadable files in from 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 file to ensure the system has the correct 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.

Note: CMOS memory should always be cleared after updating the BIOS. See Appendix K for more details, or see the README files on the BIOS update disk.

## **SETUP UTILITY**

The ROM-based Setup (see appendix H) 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 users to press the <F1> key to access Setup. A jumper setting (see Appendix B) on the baseboard can be set to prevent user access to Setup for security purposes.

## **PCI SUPPORT**

The BIOS supports Version 2.10 of the PCI BIOS specification. Support is also provided for Version 1.0 of the PCI bridge specification. PCI-to-PCMCIA bridging can also be supported via third party expansion cards.

## **ISA PLUG AND PLAY**

The BIOS incorporates ISA Plug and Play capabilities as defined by the Plug and Play Release 1.0A specification (Plug and Play BIOS Ver. 1.0A, ESCD Ver. 1.02). This allows auto-configuration of Plug and Play ISA cards, and resource management for non-plug and play (or legacy) ISA cards, when used in conjunction with Plug and Play

aware operating systems (such as Windows 95), or by using the ISA Configuration Utility (ICU) for non plug and play aware operating systems (such as DOS/Windows 3.1x). System configuration information is stored in non-volatile memory in ESCD format. The ESCD data may be cleared by setting the CMOS clear jumper to ON.

Copies of the IAL Plug and Play specification may be obtained via the Intel BBS (503) 264-7999, or via CompuServe by typing Go PlugPlay.

## ***AUTO-CONFIGURATION CAPABILITIES***

The auto-configuration utility operates in conjunction with the system Setup utility to allow the insertion and removal of PCI and ISA Plug and Play cards to the system without user intervention (Plug & Play). When the system is turned on after adding a PCI or ISA Plug and Play card, the BIOS automatically configures interrupts, DMA channels, I/O space, and memory space. The user does not have to configure jumpers or worry about potential resource conflicts. Because PCI and ISA Plug and Play cards use the same interrupt resources as ISA cards, the user can specify the interrupts used by ISA add-in cards in the Setup utility. Other parameters for legacy cards can be specified using the ICU. If using Windows 95, the auto-configuration utility only initializes the devices required to boot up, Windows 95 initializes all the other devices since it's a Plug and Play aware operating system.

System configuration information is stored in ESCD format. The ESCD data may be cleared by setting the CMOS clear jumper to the ON position.

## ***ADVANCED POWER MANAGEMENT***

The Advanced/ATX BIOS supports power management via System Management Mode (SMM) interrupts to the CPU and Advanced Power Management (APM Ver. 1.1). In general, power management capabilities will allow the system to be put into a power managed, Stand-by mode by either pressing a sleep/resume button on the front of the chassis, by entering a user configurable hot-key sequence on the keyboard, or by the expiration of a hardware timer which detects system inactivity for a user-configurable amount of time. When in the Stand-by mode, the Advanced/ATX baseboard reduces power consumption by utilizing the power saving capabilities of the Pentium processor and also spinning down hard drives and turning off DPMS compliant monitors. 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/ATX supports a 4 KB programmable FLASH user area located at EC000-ECFFF. An OEM may use this area to display a custom logo. The Advanced/ATX BIOS accesses the user area just after completing POST. The utility used to create a logo is available for down loading from the Intel BBS.

## ***SECURITY FEATURES***

### **Administrative Password**

If enabled, the administrative password protects all sensitive Setup options from being changed by a user unless the password is entered (see appendix H).

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

### **User Password**

The User Password feature provides security during the boot process. The user password can be set using the Setup utility, and must be entered prior to peripheral boot or keyboard/mouse operation. (If the unattended boot feature is set to enabled, the system will complete the operating system boot up process, but keyboard and mouse operation will be locked until the user password is entered. See the Security Menu section of Appendix H for more details.)

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

## Setup Enable Jumper

A baseboard configuration jumper (see appendix B) controls access to the BIOS Setup utility. By setting the jumper to the disable 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.

## Floppy Write Protect

A BIOS setup option can prevent writing to all devices attached to the floppy connector. This option is available in the Floppy Options sub-menu.

## FRONT PANEL CONNECTIONS

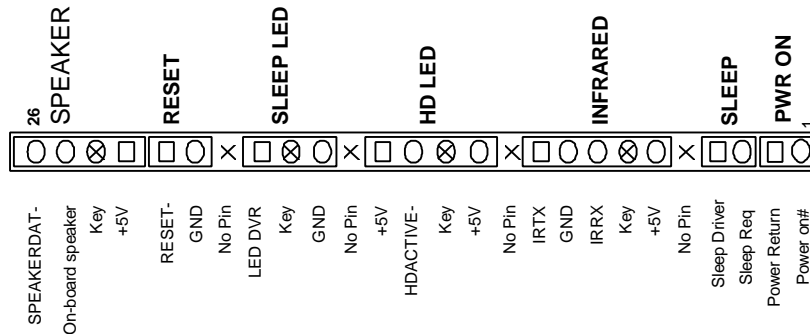


Figure 3: Front Panel I/O Connector, J30 (1 x 26 header)

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

- System Speaker
- System Reset
- Power/Sleep LED
- Hard Drive activity LED
- Infrared (IrDA) port
- Sleep/Resume
- Power Supply Control

### SPEAKER

An on-board piezo speaker manufacturing option is supported. It may be disabled by removing a jumper from the front panel header and an off-board speaker may be connected to the header instead. The external speaker provides error beep code information during the Power-On Self Test if the system cannot use the video interface. In the absence of speakers being plugged into the audio output jack, the audio output is redirected to either the on-board piezo speaker or an external PC speaker.

### RESET

This 2-pin header can be connected to a momentary SPST type jumper that is normally open. When the jumper is closed, the system will hard reset and run POST.

### POWER/SLEEP LED

This 3-pin header can be connected to an LED to provide a light when the system is powered on. This LED will also blink when the system is in a power-managed state.

### HD LED

This 4-pin header can be connected to an LED to provide a light when an IDE hard drive is connected to the onboard IDE controller.

## 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 or from portable devices such as laptops, PDA's, and printers using application software such as LapLink. The IrDA specification provides for data transfers at 115kbps from a distance of 1 meter.

## SLEEP MODE SUPPORT

When Advanced Power Management (APM) is activated in the System BIOS and the Operating System's APM driver is loaded, Sleep mode (Stand-By) can be entered in one of three ways: an optional front panel "Sleep/Resume" switch, a user defined keyboard hot key, or prolonged system inactivity. The Sleep/Resume switch is supported by a 2-pin header located on the front panel I/O connector. Closing the "Sleep" switch will generate an SMI (System Management Interrupt) to the processor which causes the processor to go into System Management Mode (SMM), the so called "Sleep" mode. The front panel "Sleep mode" switch must be a momentary two pin SPST type that is normally open. The function of the Sleep/Resume button can also be achieved via a keyboard hot-key sequence, or by a time-out of the system inactivity timer. Both the keyboard hot-key and the inactivity timer are programmable in the BIOS setup (timer is set to 10 minutes by default). To re-activate the system, or "Resume", the user must simply press the sleep/resume button again, or use the keyboard or mouse. Note that mouse activity will only "wake up" the system if a mouse driver is loaded. While the system is in Stand-By or "sleep" mode it is fully capable of responding to and servicing external interrupts (such as in-coming FAX) even though the monitor will only turn on if a user interrupt occurs as mentioned above.

## REMOTE ON/OFF AND SOFT POWER SUPPORT

For power supplies that support the Remote ON/OFF feature, this 2 pin header (see Figure 3) should be connected to the system power ON/OFF switch. The power ON/OFF button should be a momentary SPST switch that is normally open. The power supply control signal (PS\_ON) is supported via the primary power connector which is defined in appendix G. Traditional power supplies with mechanical ON/OFF switches that do not support remote ON/OFF or "soft-off" will by-pass this circuit.

After turning the system ON by pushing the power ON/OFF button, the Advanced/ATX baseboard (with a power supply that supports remote power on/off) can be turned OFF from one of two sources: the front panel power ON/OFF switch, or a "soft off" signal (coming from the National 82307 I/O controller) that can be controlled by the operating system. In "soft off", an APM command issued to the system BIOS will cause the power supply to turn OFF via the "PS ON" control signal on the power connector. For example, Windows™ 95 will issue this APM command when the user clicks on the Shutdown icon. Power can be restored by simply pressing the power ON/OFF switch at which time the system will power back up and run POST. For more details on "soft-off" see appendix L.

## BACK PANEL CONNECTIONS

The back panel provides external access to PS/2 style keyboard and mouse connectors as well as two serial and one parallel port, which are integrated on the Advanced/ATX baseboard. Audio jacks for Speaker Out, Line In, and Microphone are also provided on the back I/O panel along with a Midi/Game port connector. Figure 4 shows the general location of the I/O connectors (assumes graphics and audio are installed on the baseboard).

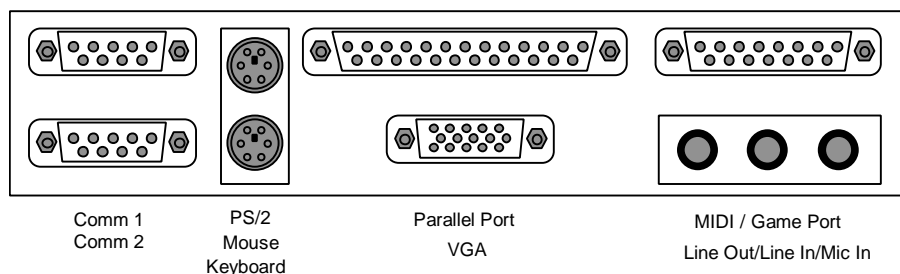


Figure 4: Back Panel I/O Connectors

## AUDIO CONNECTIONS

There are connectors on-board for input from a CD-ROM, use of a wavetable upgrade card, and a telephony input.

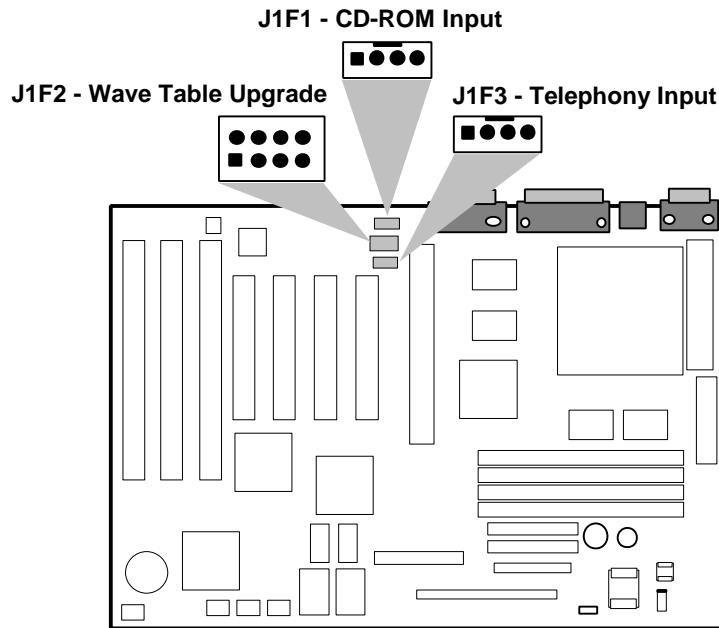


Figure 5: Audio Input Connectors

## BASEBOARD CONNECTIONS

There are connectors on-board for Floppy, IDE, VESA feature connector (if graphics is present), and an auxiliary system fan. There are also sockets for graphics memory upgrade (if graphics is present), SIMMs, battery holder, VRM module socket (manufacturing option).

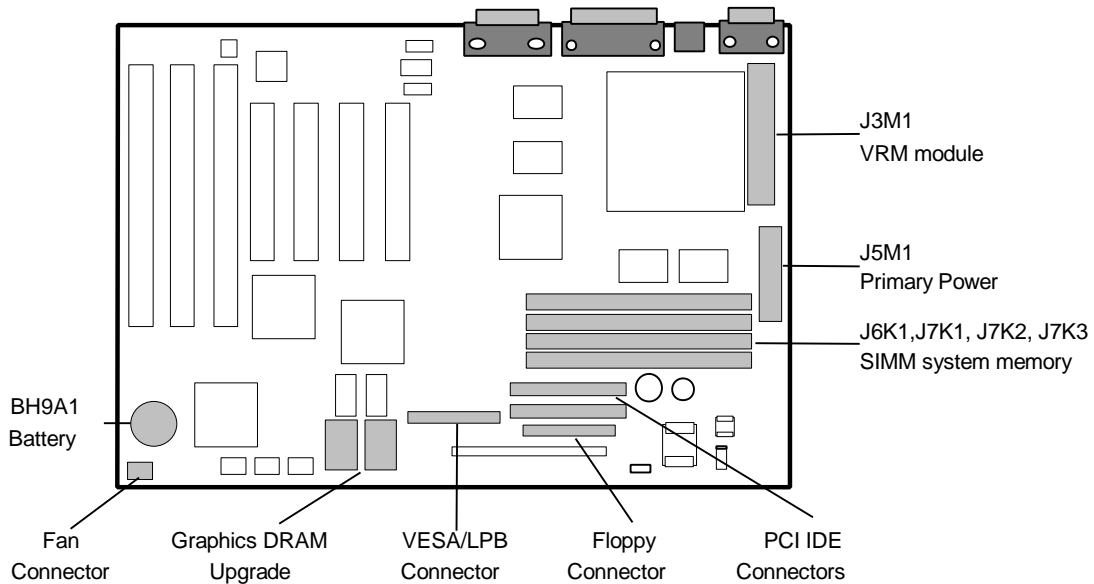


Figure 6: Baseboard connectors



## POWER CONSUMPTION

Table 3 lists the current used by system resources in a configuration which includes 16 MB of DRAM. Table 4 lists the typical power consumed by the same configuration.. This information is preliminary and is provided only as a guide for calculating approximate total system power usage with additional resources added.

### VOLTAGE

<i>DC Voltage</i>	<i>Acceptable tolerance</i>
+3.3V	+/- 5%
+5V	+/- 5%
-5V	+/- 5%
+12V	+/- 5%
-12V	+/- 5%

Table 2. Advanced/ATX Voltage tolerance

### CURRENT

<i>DC Voltage</i>	<i>Typical Current*</i>
+3.3V	tbd
+5V	tbd
-5V	tbd
+12V	tbd
-12V	tbd

Table 3. Advanced/ATX Current Requirements (Preliminary)

\*(Same configuration as in table 4 below)

### WATTS

<i>System Configuration</i>	<i>Typical Power*</i>	<i>Sleep-mode Power*</i>
Advanced/ATX baseboard, 16 MB RAM, 256 KB L2 cache, Floppy drive, 540 MB hard drive, CD-ROM	35 W	22 W

Table 4. Power use by System Resources (Preliminary)

\*(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/ATX 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, but parity SIMMs (x36) may be used. SIMM requirements are 70ns Fast Page Mode or 60nS EDO DRAM (70 ns EDO may be used with a 60mhz or slower external CPU clock) with tin-lead connectors.

<i>SIMM 1,2 (Bank 0) SIMM Type (Amount)</i>	<i>SIMM 3,4 (Bank 1) SIMM Type (Amount)</i>	<i>Total System Memory</i>
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

Note: SIMMs may be parity (x 36) or non-parity (x 32)

## REAL TIME CLOCK BATTERY REPLACEMENT

The battery can be replaced with a Sanyo CR2032, or equivalent, coin cell lithium battery. This battery has a 3V, 220 mAh rating.

## CPU UPGRADE

A Type 7 Zero Insertion Force (ZIF) socket provides users with a performance upgrade path to the Pentium Overdrive Processors.

## GRAPHICS MEMORY UPGRADE

The Advanced/ATX baseboard has 1 MB of Fast Page DRAM installed for graphics and two SOJ type sockets for upgrades up to 2 MB of graphics DRAM. The user can install two 256k x 16, 60 nS DRAM to provide a total of 2 MB of graphics DRAM.

# Appendix B - Jumpers

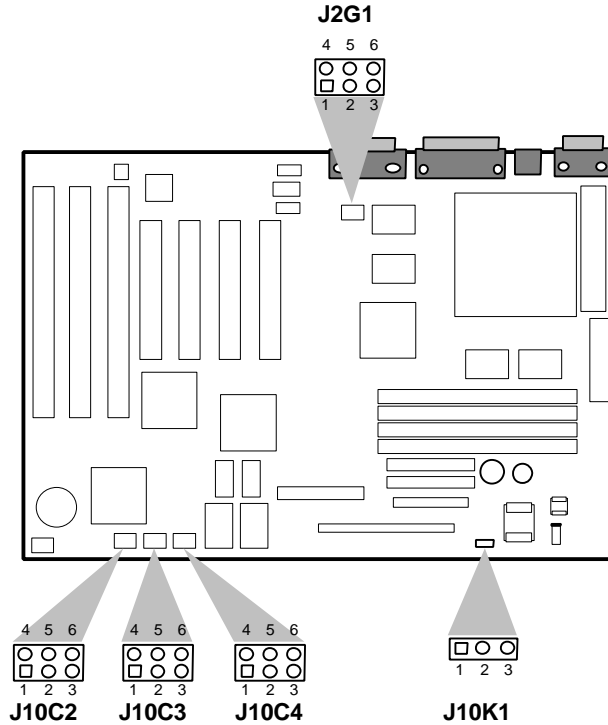


Figure B-1. Jumper locations

## INTERNAL CPU CLOCK SPEED (J10C2)

These jumpers sets the internal CPU clock speed to either 1.5x, 2x, or 2.5x that of the external CPU clock speed. These jumpers should be configured dependant on the speed of the processor.

CPU Clock Multiplier	J10C2
1.5x	2-3,4-5
2.0x	1-2,4-5
2.5x	1-2,5-6
Reserved	2-3,5-6

Table B-1 CPU Clock Multiplier

## VR / VRE (J10K1)

This jumper block changes the output of the on-board voltage regulator. Pins 2-3 should be jumpered for processors that require standard voltage regulation, pins 1-2 should be jumpered for processors that require the VRE specification. This jumper should not be changed by the user unless changing to a new processor type. Some upgrade processors may require a different setting, check the processor's documentation for the correct setting. (Standard = 3.135-3.63V, VR = 3.3-3.465V, VRE = 3.465-3.63V)

## EXTERNAL CPU CLOCK SPEED - 50/60/66 MHZ (J2G1)

This jumper block sets the CPU's external operating frequency to memory at 50, 60, or 66 Mhz. Default setting depends on the specific product code and type of Pentium processor installed.

External Bus Freq.	PCI Bus Freq.	Jumpers
50 MHz	25 MHz	1-2, 5-6
60 MHz	30 MHz	1-2, 4-5
66 MHz	33 MHz	2-3, 5-6
Reserved	na	2-3, 4-5

Table B-2 External Bus Frequency

### **DISABLE / ENABLE SETUP (J10C4)**

Allows access to CMOS Setup Utility to be disabled by jumpering pins 4-5 in J10C4. Default is for access to setup to be enabled, which requires jumpers on 5-6 in J10C4.

### **CLEAR CMOS (J10C3)**

Allows CMOS settings to be reset to default values by jumpering pins 1-2 in J10C3. This will also clear out all plug and play configuration information stored in the ESCD area. The system should then be turned off and the jumper returned to pins 2-3 to restore normal operation.

### **ISA BUS CLOCK (J10C4)**

This jumper changes the clock frequency of the ISA bus. The effect of this jumper on the ISA clock depends upon the setting of the CPU clock speed jumpers. The default setting for this jumper is 2-3. In general, this jumper should only be set to 1-2 if higher ISA performance is required, and the ISA expansion cards can handle the faster bus clock. (A clock frequency of greater than 8.33 MHz violates the ISA specification, although many ISA cards are designed to support higher clock frequencies.)

<i>Bus Frequency</i>	<i>Jumper J10C4</i>	<i>ISA Bus Speed</i>
50 MHz	1-2 or 2-3	8.33 MHz
60 MHz	1-2	10 MHz
	2-3	7.5 MHz
66 MHz	1-2	11 MHz
	2-3	8.25 MHz

Table B-3 ISA Bus Clock Speed

### **PASSWORD CLEAR (J10C3)**

Allows system password to be cleared by jumpering pins 4-5 in J10C3 and turning the system on. The system should then be turned off and the jumper should be returned to 5-6 in J10C3 to restore normal operation. This procedure should only be done if the user password has been forgotten.

## Appendix C - Memory Map

Address Range (Decimal)	Address Range (hex)	Size	Description
1024K-131072K	100000-80000000	127M	Extended Memory
960K-1023K	F0000-FFFFF	64K	AMI System BIOS (not available for UMB)
952K-959K	EE000-EFFFF	8K	Main BIOS (Currently available as UMB)
948K-951K	ED000-EDFFF	4K	ESCD (Plug 'N' Play configuration area)
944-947K	EC000-ECFFF	4K	OEM LOGO (available as UMB)
896K-943K	E0000-EBFFF	47K	BIOS RESERVED (Currently available as UMB)
800-895K	C8000-DFFFF	96K	Available HI DOS memory (open to ISA and PCI bus)
640K-799K	A0000-C7FFF	160K	On-board video memory and BIOS
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 C-1. Advanced/ATX Memory Map

The table above details the Advanced/ATX 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. (Some memory managers may require the user to include the specific ranges.) Parts of this area may be used by future versions of the BIOS to add increased functionality.

## Appendix D - I/O Map

The following table lists the I/O addresses used by baseboard devices. Some of these devices (audio and graphics) may not be present in all configurations. Some devices (serial ports, parallel ports etc.) may be configured for various addresses or disabled. These I/O locations are listed in the Variable Baseboard Resources column. Note: the Crystal audio controller is a plug and play device, only standard audio addresses are listed below.

Address (hex)	Size	Fixed Baseboard Resources	Variable Baseboard Resources
0000 - 000F	16 bytes	PIIX - DMA controller	
0020 - 0021	2 bytes	PIIX - Interrupt Controller 1	
002E - 002F	2 bytes	82306 I/O configuration registers	
0040 - 0043	4 bytes	PIIX - Timer 1	
0060	1 byte	Keyboard Controller Data Byte	
0061	1 byte	PIIX - NMI, speaker control	
0064	1 byte	Kbd Controller, CMD/STAT Byte	
0070, bit 7	1 bit	PIIX - Enable NMI	
0070, bits 6:0	7 bits	87C306 - Real Time Clock,	
0071	1 byte	87C306 - Real Time Clock, Data	
0078	1 byte	Reserved - Brd. Config.	
0079	1 byte	Reserved - Brd. Config.	
0080 - 008F	16 bytes	PIIX - DMA Page Register	
00A0 - 00A1	2 bytes	PIIX - Interrupt Controller 2	
00B2 - 00B3	2 bytes	PIIX - APM Control/StatusInterrupt	
00C0 - 00DE	31 bytes	PIIX - DMA controller	
00F0	1 byte	Reset Numeric Error	
0170 - 0177	8 bytes		Secondary IDE Channel
01F0 - 01F7	8 bytes		Primary IDE Channel
0200 - 0207	8 bytes		Gameport Joystick
0220 - 022F	16 bytes		Audio - WSS
0270 - 0273	4 bytes	I/O read port for Plug and Play	
0278 - 027B	4 bytes		Parallel Port 2

Table D-1 Advanced/ATX I/O Address Map (continued on next page)

## I/O ADDRESS MAP (CONTINUED)

Address (hex)	Size	Fixed Baseboard Resources	Variable Baseboard Resources
02E8 - 02EF	8 bytes		Serial Port 4
02F8 - 02FF	8 bytes		Serial Port 2
0330 - 0331	2 bytes		Audio - MUP-401
0376	1 byte		Sec IDE Chan Cmd Port
0377	1 byte		Sec IDE Chan Stat Port
0378 - 037F	8 bytes		Parallel Port 1
0388 - 038B	4 bytes		Audio - WSS
03B0 - 03BB	4 bytes		S3 Trio64V+
03BC - 03BF	4 bytes		Parallel Port 3 (add-in device)
03C0 - 03DF	16 bytes		S3 Trio64V+
03E8 - 03EF	8 bytes		Serial Port 3
03F0 - 03F5	6 bytes		Floppy Channel 1
03F6	1 bytes		Pri IDE Chan Cmd Port
03F7 (Write)	1 byte		Floppy Chan 1 Cmd
03F7, bit 7	1 bit		Floppy Disk Chg Chan 1
03F7, bits 6:0	7 bits		Pri IDE Chan Status Port
03F8 - 03FF	8 bytes		Serial Port 1
LPT + 400h	3 bytes		ECP regs, LPT base + 400h
4D0 - 4D1	2 bytes	Edge/Level INTR Control Reg.	
608 - 60B	4 bytes		Audio - WSS
0CF8 - 0CFC*	4 bytes	PCI Config Address Reg.	
0CF9	1 byte	Turbo & Reset control Reg.	
0CFC - 0CFF	4 bytes	PCI Config Data Reg	
0F00 - 0F07	8 bytes		Audio - CS4232 support regs
FFA0 - FFA7	8 bytes		Primary Bus Master IDE regs
FFA8 - FFAF	8 bytes		Secondary Bus Master IDE regs
FF00-FF07	8 bytes		IDE Bus Master Reg.

Table D-1. Advanced/ATX I/O Address Map (\*only accessible by DWORD accesses)

I/O Port 78 is reserved for BIOS use. Port 79 is a read only port, the bit definitions are shown below in Table D-2.

Bit #	Description	Bit = 1	Bit = 0
0	Reserved	n/a	n/a
1	Soft Off capable power supply present	No	Yes
2	On-bd Audio present	Yes	No
3	External CPU clock (Jumper 2)	Table B-2	Table B-2
4	External CPU clock (Jumper 1)	Table B-2	Table B-2
5	Setup Disable (Jumper 8)	Enable access	Disable access
6	Clear CMOS (Jumper 5)	Keep values	Clear values
7	Password Clear (Jumper 6)	Keep password	Clear password

Table D-2. Advanced/ATX Port 79 Definition

## Appendix E - PCI Configuration Space Map

The 82430FX chip set uses Configuration Mechanism 1 to access PCI configuration space. The PCI Configuration Address register is a 32-bit i/o register located at 0CF8h, the PCI Configuration Data register is a 32-bit i/o register located at 0CFCh. The PCI Configuration Address register is only accessible by a DWORD access, the PCI Configuration Data register is accessible by DWORD, WORD or BYTE accesses.

### ACCESS TO I/O CONFIGURATION SPACE USING MECHANISM #1

1. Using a DWORD write command, output the desired I/O configuration address to I/O port CF8H
2. Using a DWORD read or write command, read or write data from the I/O port CFCH

NOTE: Any address output to CF8H is always on a 4 byte (DWORD) boundary. You can read or write any BYTE, WORD or DWORD in the four byte range by using the correct offset as follows:

DWORD @ CFCh

WORD @ CFCh or CFEh

BYTE @ CFCh, CFDh, CFEh or CFFh

### CONFIGURATION ADDRESS REGISTER BIT DEFINITION

31	30	24	23	16	15	11	10	8	7	2	1	0
1	RESERVED	BUS NUMBER	DEVICE NUMBER	FUNCTION NUMBER	REGISTER NUMBER	0	0					

CONFIG SPACE ENABLE FLAG (Bit 31): Always 1 to indicate I/O access is to configuration space.

RESERVED (Bits 30-24): Always 00h

BUS NUMBER (Bits 23-16): Always 00h unless a bridge card is installed in a PCI slot

DEVICE NUMBER (Bits 15-11): Used to indicate a specific PCI device. The 82430FX TSC has a predefined device number of 00000h. The PIIX and four PCI slots also have specific device numbers, that device number is determined by which PCI Address/Data line is connected to the device's ID SEL pin. Table E-1 details the specific mapping information.

FUNCTION NUMBER (Bits 10-8): Used to indicate a specific function in multifunction PCI devices. The PIIX is the only multifunction device on ADVANCED/ATX located on the baseboard. Use 00h for the basic PIIX device and 01h for the PCI IDE BUS MASTER FUNCTION. For a multifunction PCI add-in card, refer to the card's documentation to determine the allowable function numbers.

REGISTER NUMBER (Bits 7-2): Defines one of 64 DWORD locations for a specific PCI device.

Note that Bits 1 and 0 must always be 0h for DWORD access.

The table below lists the PCI bus and device numbers used by the baseboard. It also lists the data range that must be written to the I/O Configuration Address register to access the device.

DEVICE	BUS/DEVICE/FUNCTION	ID SEL	I/O CONFIG ADDRESS REGISTER
TSC	00/00/0	N/A	8000 0000 - 8000 00FC
PIIX	00/07/0	AD18	8000 3800 - 8000 38FC
PIIX-IDE BUS MASTER	00/07/1	AD18	8000 3900 - 8000 39FC
S3 Trio 64V+	00/08/0	AD19	8000 4000 - 8000 40FC
PCI SLOT 1 (closest to ISA slots)	00/0D/0	AD24	8000 6800 - 8000 68FC
PCI SLOT 2	00/0E/0	AD25	8000 7000 - 8000 70FC
PCI SLOT 3	00/0F/0	AD26	8000 7800 - 8000 78FC
PCI SLOT 4 (farthest from ISA slots)	00/10/0	AD27	8000 8000 - 8000 80FC

Table E-1. Advanced/ATX PCI Configuration. Space Map

## Appendix F - Interrupts & DMA Channels

The following tables list the Interrupt and DMA Channel configuration options for on-board devices. The serial ports, parallel ports, and IDE controller can be configured via SETUP, the ICU, or any other Plug and Play resource manager (such as the Windows 95 Device Manager). The Audio controller can only be configured via a Plug and Play resource manager. The Graphics interrupt is assigned by the auto-configure utility during boot up.

<i>IRQ</i>	<i>Reserved Interrupts</i>	<i>Serial Port 1</i>	<i>Serial Port 2</i>	<i>Parallel Port</i>	<i>IDE</i>	<i>Audio</i>	<i>Graphics</i>
NMI	I/O Channel Check						
0	Interval Timer						
1	Keyboard buffer full						
2	Cascade interrupt from slave PIC						
3		X	X				X
4		X	X				X
5				X		X	X
6	Floppy Controller						
7				X		X	X
8	Real Time Clock						
9						X	X
10							X
11							X
12	PS/2 Mouse (if present)						
13	Math co-processor						
14					X		
15					X		

Table F-1. Advanced/ATX Interrupts

<i>DMA</i>	<i>Reserved</i>	<i>Parallel Port</i>	<i>Audio</i>
0			X*
1		X*	X*
2	Floppy		
3		X	
4	Cascade channel		
5			
6			
7			

Table F-2. Advanced/ATX DMA Map

\* Note: Not configurable through the BIOS SETUP utility



# Appendix G - Connectors

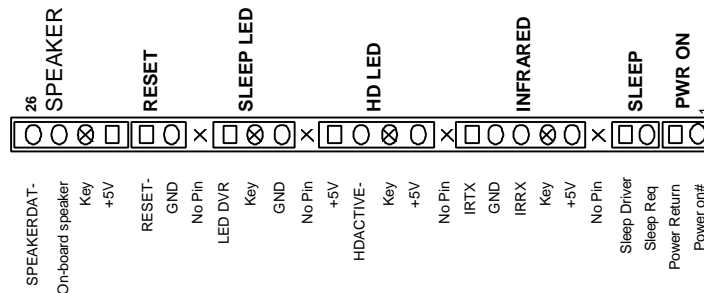
## POWER SUPPLY CONNECTOR

### PRIMARY POWER (J5M1)

Function	Name	Pin
+ 3.3 V for PCI slots	3.3 V	11
- 12 volts	-12 V	12
Ground	GND	13
Power Supply remote ON/OFF control	PS-ON*	14
Ground	GND	15
Ground	GND	16
Ground	GND	17
-5 volts	-5 V	18
+ 5 volts Vcc	+5 V	19
+ 5 volts Vcc	+5 V	20

Pin	Name	Function
1	3.3 V	+ 3.3 V for PCI slots
2	3.3 V	+ 3.3 V for PCI slots
3	GND	Ground
4	+5 V	+ 5 volts Vcc
5	GND	Ground
6	+5 V	+ 5 volts Vcc
7	GND	Ground
8	PWR	Power Good
9	+5	+ 5 volts Stand By for RTC
10	+12 V	+ 12 volts

## FRONT PANEL CONNECTORS - (J10H1, J10A1)



### SPEAKER CONNECTOR

Pin	Signal Name
26	SPKR_DAT
25	Piezo SPKR DAT
24	Key
23	+5V

### INFRA-RED

Pin	Signal Name
10	IR_TX
9	Ground
8	IR_RX
7	Key
6	+5V

### RESET CONNECTOR

Pin	Signal Name
22	RESET
21	Ground

### SLEEP/RESUME

Pin	Signal Name
4	Sleep Pull Up
3	Sleep Req

### POWER/SLEEP LED

Pin	Signal Name
19	LED_PWR
18	Key
17	Ground

### REMOTE ON/OFF

Pin	Signal Name
2	Power Return
1	Power on

### HARD DRIVE LED (DISK)

Pin	Signal Name
15	+5V
14	HD ACTIVE
13	Key
12	+5V

### CARD SLOT FAN POWER (J10A1)

Fast Pin	Slow Pin	Signal Name
1	4	Ground
2	5	+12 V
3	6	Ground

## BACK PANEL CONNECTORS

### SERIAL PORTS

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

### PS/2 KEYBOARD & MOUSE PORTS

Pin	Signal Name
1	Data
2	No Connect
3	Ground
4	Vcc
5	Clock
6	No Connect

### VIDEO MONITOR PORT

Pin	Signal Name
1	Red
2	Green
3	Blue
4	No Connect
5	Ground
6	Ground
7	Ground
8	Ground
9	No Connect
10	Ground
11	No Connect
12	DDC DAT
13	Horizontal Sync.
14	Vertical Sync.
15	DDC Clock

### PARALLEL PORT

Signal Name	Pin	Pin	Signal Name
STROBE-	1	14	AUTO FEED-
Data Bit 0	2	15	ERROR-
Data Bit 1	3	16	INIT-
Data Bit 2	4	17	SLCT IN-
Data Bit 3	5	18	Ground
Data Bit 4	6	19	Ground
Data Bit 5	7	20	Ground
Data Bit 6	8	21	Ground
Data Bit 7	9	22	Ground
ACK-	10	23	Ground
BUSY	11	24	Ground
PE (Paper End)	12	25	Ground
SLCT	13		

### MIDI/GAME PORT

Pin	Signal Name
1	Vcc
2	JSBUT0
3	JSX1R
4	GND
5	GND
6	JSY1R
7	JSBUT1
8	Vcc
9	Vcc
10	JSBUT2
11	JSX2R
12	MIDI-OUT-R
13	JSY2R
14	JSBUT3
15	MIDI-IN-R

## INTERNAL I/O HEADERS

### IDE CONNECTORS (J8H1, J8H2)

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
DDRQ0 (DDRQ1)	21	22	Ground
I/O Write-	23	24	Ground
I/O Read-	25	26	Ground
IOCHRDY	27	28	Vcc pull-up
DDACK0 (DDACK1)-	29	30	Ground
IRQ14 (IRQ15)	31	32	No Connect
Addr 1	33	34	No Connect
Addr 0	35	36	Addr 2
CS 1P (1S)-	37	38	CS 3P (3S)-
Activity-	39	40	Ground

Note: Signals in parenthesis are for the sec. IDE connector.

### FLOPPY CONNECTOR (J9G1)

Signal Name	Pin	Pin	Signal Name
Ground	1	2	DENSEL
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-
MSEN1	17	18	DIR-
Ground	19	20	STEP-
Ground	21	22	Write Data-
Ground	23	24	Write Gate-
Ground	25	26	Track 00-
MSEN0	27	28	Write Protect-
Ground	29	30	Read Data-
Ground	31	32	Side 1 Select-
Ground	33	34	Disk Change-

### VESA FEATURE CONNECTOR (J8G1)

Signal Name	Pin	Pin	Signal Name
Ground	1	2	Data 0
Ground	3	4	Data 1
Ground	5	6	Data 2
Data enable	7	8	Data 3
Sync enable	9	10	Data 4
PCLK enable	11	12	Data 5
No Connect	13	14	Data 6
Ground	15	16	Data 7
Ground	17	18	PCLK
Ground	19	20	BLANK
Ground	21	22	HSYNC
No Connect	23	24	VSYNC
No Connect	25	26	Ground
key	27	28	key
Ground	29	30	IIC CLK
No Connect	31	32	IIC DAT
EN1	33	34	EN0

### CD-ROM AUDIO INTERFACE (J1F1)

Pin	Signal Name
1	Ground
2	CD-Left
3	Ground
4	CD-Right

### WAVETABLE UPGRADE INTERFACE (J1F2)

Pin	Signal Name
1	Wave Right
2	Ground
3	Wave Left
4	Ground
5	No Connect
6	Ground
7	No Connect
8	MIDI_OUT

### VOICE MODEM AUDIO INTERFACE (J1F3)

Pin	Signal Name
1	Ground
2	Tel In
3	Ground
4	Tel Out

## EXPANSION CARD CONNECTORS

### ISA CONNECTORS

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	B10	A10	IOCHRDY
SMEMW-	B11	A11	AEN
SMEMR-	B12	A12	SA19
IOW-	B13	A13	SA18
IOR-	B14	A14	SA17
DACK3-	B15	A15	SA16
DRQ3	B16	A16	SA15
DACK1-	B17	A17	SA14
DRQ1	B18	A18	SA13
REFRESH-	B19	A19	SA12
SYSCLK	B20	A20	SA11
IRQ7	B21	A21	SA10
IRQ6	B22	A22	SA9
IRQ5	B23	A23	SA8
IRQ4	B24	A24	SA7
IRQ3	B25	A25	SA6

Signal Name	Pin	Pin	Signal Name
DACK2-	B26	A26	SA5
TC	B27	A27	SA4
BALE	B28	A28	SA3
Vcc	B29	A29	SA2
OSC	B30	A30	SA1
GND	B31	A31	SA0
	KEY	KEY	
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-	D10	C10	MEMW-
DRQ5	D11	C11	SD8
DACK6-	D12	C12	SD9
DRQ6	D13	C13	SD10
DACK7-	D14	C14	SD11
DRQ7	D15	C15	SD12
Vcc	D16	C16	SD13
Master-	D17	C17	SD14
GND	D18	C18	SD15

## PCI CONNECTORS

Signal Name	Pin	Pin	Signal Name
GND	A1	B1	-12V
+12V	A2	B2	No Connect
No Connect	A3	B3	GND
No Connect	A4	B4	No Connect
Vcc	A5	B5	Vcc
PCIINTA-	A6	B6	Vcc
PCIINTC-	A7	B7	PCIINTB-
Vcc	A8	B8	PCIINTD-
Reserved	A9	B9	No Connect
Vcc	A10	B10	Reserved
Reserved	A11	B11	No Connect
GND	A12	B12	GND
GND	A13	B13	GND
Reserved	A14	B14	Reserved
SPCIRST-	A15	B15	GND
Vcc	A16	B16	PCLKE
AGNT-	A17	B17	GND
GND	A18	B18	REQA-
Reserved	A19	B19	Vcc
AD30	A20	B20	AD31
3.3V	A21	B21	AD29
AD28	A22	B22	GND
AD26	A23	B23	AD27
GND	A24	B24	AD25
AD24	A25	B25	3.3V
AD22 (IDSEL)	A26	B26	CBE3-
3.3V	A27	B27	AD23
AD22	A28	B28	GND
AD20	A29	B29	AD21
GND	A30	B30	AD19
AD18	A31	B31	3.3V

Signal Name	Pin	Pin	Signal Name
AD16	A32	B32	AD17
3.3V	A33	B33	CBE2-
FRAME-	A34	B34	GND
GND	A35	B35	IRDY-
TRDY-	A32	B32	3.3V
GND	A37	B37	DEVSEL-
STOP-	A38	B38	GND
3.3V	A39	B39	PLOCK-
SDONE	A40	B40	PERR-
SBO-	A41	B41	3.3V
GND	A42	B42	SERR-
PAR	A43	B43	3.3V
AD15	A44	B44	CBE1-
3.3V	A45	B45	AD14
AD13	A46	B46	GND
AD11	A47	B47	AD12
GND	A48	B48	AD10
AD9	A49	B49	GND
KEY	A50	B50	KEY
KEY	A51	B51	KEY
CBEO-	A52	B52	AD8
3.3V	A53	B53	AD7
AD6	A54	B54	3.3V
AD4	A55	B55	AD5
GND	A56	B56	AD3
AD2	A57	B57	GND
AD0	A58	B58	AD1
Vcc	A59	B59	Vcc
SREQ64-	A60	B60	SACK64-
Vcc	A61	B61	Vcc
Vcc	A62	B62	Vcc

## Appendix H - BIOS Setup

This section details the BIOS CMOS Setup Utility. The parameters described below are based on BIOS version 1.00.01.CN0; other BIOS versions may differ from the description below as new features are added.

### 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 subscreen. After you have selected an item, use the arrow keys to modify the setting.

<i>Setup Menu Screen</i>	<i>Description</i>
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.

<i>Setup Subscreen</i>	<i>Description</i>
Floppy Options	For configuring your floppy disk drives.
Primary IDE Master	For configuring your Primary IDE Master drive.
Primary IDE Slave	For configuring your Primary IDE Slave drive.
Secondary IDE Master	For configuring your Secondary IDE Master drive.
Secondary IDE Slave	For configuring your Secondary IDE Slave drive.
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.

### OVERVIEW OF THE SETUP KEYS

<i>Setup Key</i>	<i>Description</i>
<F1>	Pressing the <F1> key brings up a help screen for the currently selected item.
<Esc>	Pressing the <Esc> key takes you back to the previous screen. Pressing it 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 screen. Pressing either key in a subscreen 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).

## **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., Floppy options), the Setup program will switch to a subscreen for the selected option. Subscreens 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 subscreen.

### **Primary IDE Master**

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

### **Primary IDE Slave**

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

### **Secondary IDE Master**

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

### **Secondary IDE Slave**

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

### **Language**

This reports the current language of the text strings used in the Setup program and the BIOS. There are no options. The language of the text strings can be changed by using the FLASH Memory Update utility.

### **Boot Options**

When selected, this brings up the Boot Options screen.

### **Video Mode**

This reports the video mode. There are no options.

### **Mouse**

This reports if a PS/2 style mouse is installed or not. There are no options.

### **Base Memory**

This reports the amount of base memory. There are no options.

### **Extended Memory**

This reports the amount of extended memory. There are no options.

## **FLOPPY OPTIONS SUBSCREEN**

### **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; 1.44/1.25 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; 1.44/1.25 MB, 3.5-inch; 2.88 MB, 3.5-inch. The default is Disabled.

### **Floppy Access**

When selected, this brings up a dialog box that allows you to set Read/Write or Read Only access for any attached floppy drives. The default is Read/Write.

## **PRIMARY IDE MASTER SUBSCREEN**

### **IDE Device Configuration**

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, User Definable and Disabled. 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. There are no options.

### **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 528MB total drive size), Logical Block Addressing (LBA), Extended CHS (extended cylinder head sector), and Auto Detected (BIOS detects IDE drive support for LBA). The default is Auto-detected.

Some operating systems do not support LBA and/or ECHS translation modes. In these cases, this parameter should be set to CHS. Check the documentation for your specific operating system to see if it supports these extended modes. (DOS/Windows 3.X and Windows 95 both support LBA and ECHS modes).

Also, if an IDE drive has previously been FDISKed and formatted on another system, you must ensure both systems are set for the same translation mode. Data corruption or erratic operation may result if different translation modes are used.



## 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. 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 maximum speed of the drive and/or the controller (Mode 4).

### *PRIMARY IDE SLAVE SUBSCREEN*

Please refer to “PRIMARY IDE MASTER SUBSCREEN” section described above.

### *SECONDARY IDE MASTER SUBSCREEN*

Please refer to “PRIMARY IDE MASTER SUBSCREEN” section described above.

### *SECONDARY IDE SLAVE SUBSCREEN*

Please refer to “PRIMARY IDE MASTER SUBSCREEN” section described above.

## *BOOT OPTIONS SUBSCREEN*

### First Boot Device

When selected, this brings up a dialog box that allows you to set which device the system checks first to find an operating system to boot from. The options available are: Disabled, Floppy, Hard Disk, CD-ROM, and Network. The default is Floppy.

### Second Boot Device

When selected, this brings up a dialog box that allows you to set which device the system checks second to find an operating system to boot from. The options available are: Disabled, Floppy, Hard Disk, and Network. The default is Hard Disk.

### Third Boot Device

When selected, this brings up a dialog box that allows you to set which device the system checks third to find an operating system to boot from. The options available are: Disabled, Floppy, Hard Disk, and Network. The default is Disabled.

### Fourth Boot Device

When selected, this brings up a dialog box that allows you to set which device the system checks fourth to find an operating system to boot from. The options available are: Disabled, Floppy, Hard Disk, and Network. The default is Disabled.

## 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 (approximately equivalent to 25 MHz PC-AT). This option is functionally equivalent to disabling the L1 and L2 caches.

## 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.

## 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 will enable display of the Typematic Rate Delay and Typematic Rate parameters described below.

## 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 subscreen for the selected option. Subscreens are described in the sections following the description of the Advanced screen options.

### Processor Type

This reports the CPU type. There are no options.

### Processor Speed

This reports the clock speed of the CPU. There are no options.

### Cache Size

This reports the size of the secondary cache. 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 subscreen.

### Advanced Chipset Configuration

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

### Power Management Configuration

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

### Plug and Play Configuration

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

## PERIPHERAL CONFIGURATION SUBSCREEN

### 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, Serial Port2 IR mode, and the Parallel Port Address can not be modified. The settings displayed for those options reflect the current state of the hardware.

If Manual is selected, the options for the PCI IDE Interfaces, Floppy Interface, Serial Port 1 and Serial Port 2 Addresses, Serial Port2 IR mode, 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, IRQ4; COM2, 2F8h, IRQ3; COM3, 3E8h, IRQ4; and COM4, 2E8h, IRQ3. (All options may not be listed if the BIOS detects another serial port.) The default is COM1, 3F8h, IRQ4. 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.)

### 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, IRQ4; COM2, 2F8h, IRQ3; COM3, 3E8h, IRQ4; and COM4, 2E8h, IRQ3. (All options may not be listed if the BIOS detects another serial port.) The default is COM2, 2F8h, IRQ3. 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.)

### 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. The default is Disabled. 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 depend on the setting of the Parallel Port Mode parameter (see below). If the Parallel Port Mode is set to Compatible or Bi-Directional, the options are: Disabled; LPT3, 3BCh, IRQ 7; LPT1, 378h, IRQ 7; LPT2, 278h, IRQ 7; LPT1, 378h, IRQ 5; LPT3, 3BCh, IRQ5; and LPT2, 278h, IRQ5. If the Parallel Port Mode is set to ECP, the options are: Disabled; LPT1, 378h, IRQ 7, DMA 3; LPT2, 278h, IRQ 7, DMA 3; LPT1, 378h, IRQ 5, DMA 3; and LPT2, 278h, IRQ5, DMA 3. If the Parallel Port Mode is set to EPP, the options are: Disabled; LPT1, 378h, IRQ 7; LPT2, 278h, IRQ 7; LPT1, 378h, IRQ 5; and LPT2, 278h, IRQ5. The default is LPT1, 378h, IRQ 7. If the Configuration Mode is set to Auto, the setup program assigns LPT1, 378h 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, which means the parallel port will operate in AT-compatible output mode. Bi-directional means the parallel port will be set for 8-bit bi-directional. When set to ECP, the port will be configured to support the Enhanced Capabilities Port standard. When set to EPP, the parallel port will be configured for the Extended Parallel Port standard.

## ADVANCED CHIPSET CONFIGURATION SUBSCREEN

### Base Memory Size

When selected, 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. *Note: If ISA LFB Size is set to 1 MB, Base Memory cannot be set to 512 KB.*

### ISA LFB Size

When selected, this brings up a dialog box that allows you to access memory on the ISA bus instead of baseboard DRAM in the address range from 15-16 MB. The options are Disabled or 1 MB. The default is Disabled. If this is set to 1 MB, then the ISA LFB Base Address field will appear. *Note: If Base Memory Size is set to 512 KB, ISA LFB cannot be enabled.*

### ISA LFB Base Address

This reports the base address of the LFB. 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 an agent on the PCI bus can hold the bus after another agent has requested the bus. The valid numbers are between 0 and 255. The default is 66.

### PCI Burst

This enables or disables support for PCI-to-memory burst mode data transfers. The options are Enabled or Disabled. The default is Enabled.

### 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. There are no options.

## POWER MANAGEMENT CONFIGURATION

Power Management Configuration enables or disables the Advanced Power Management (APM) support in the 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 subscreen 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.

The **Hot Key** field is used to define a key which when entered will cause the APM BIOS to ask an APM (Advanced Power Management) aware Operating Systems to go into immediate power managed mode. There will be some delay, but the speaker will issue a single tone. The Power LED will blink while the system is in the power managed mode.

If there is a User Password in effect, then upon going into power managed mode the Num Lock, Caps Lock, and Scroll Lock LEDs on the keyboard will flash on and off, indicating to the user that the system is in Secure Mode. In this case the correct password will have to be entered before the user regains control of the system. The user will not be prompted for the password, and the password will not be echoed to the screen nor will a carriage return be required. This is true whether the screen is active or inactive at the time the password is entered. The following table describes how the Power Down hot key interacts with the Security Hot Key.

	<i>Power-Down Hot Key Entered</i>	<i>Security Hot Key Entered</i>
Power-Down Hot Key Only Enabled	System powers down (can include screen blanking if enabled) Powers up when any key/mouse activity is detected	N/A
Security Hot Key Only Enabled	N/A	System Secure Immediately LEDs flash Input accepted when password typed
Both Hot Keys Enabled	System Secure Immediately System powers down (can include screen blanking if enabled) LEDs flash Input accepted when password typed Powers up when any key/mouse activity is detected	System Secure Immediately System powers down (can include screen blanking if enabled) LEDs flash Input accepted when password typed Powers up when any key/mouse activity is detected

## PLUG AND PLAY CONFIGURATION SUBSCREEN

### 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 assumption is some type of Plug and Play configuration utility, rather than the system BIOS, will be used to initialize the system peripherals.

If “Use Setup Utility” is selected, the system peripherals are fully configured by the system BIOS and not the operating system. "Boot With PnP OS" will not be visible in this case.

### Boot With PnP OS

When selected, this brings up a dialog box that allows you to specify how the Plug and Play devices are configured. The options are Disabled, Other, and Windows 95. The default is Windows\* 95.

If set to Disabled, the system peripherals are fully configured by the system BIOS and not the operating system, just like in “Use Setup Utility”.

If the user selects Windows\* 95, it is expected that the user is running Windows\* 95. Resources are assigned in such a way that Windows\* 95 may easily reconfigure them to resolve the potential conflicts. Following is the order in which the devices are allocated resources:

Baseboard fixed - Basic Static ISA Legacy devices such as Keyboard, Video, RTC, etc.

PnP Add in Cards - ISA PnP Devices like some audio solutions, and PnP adapters

Dynamic Baseboard Devices - Relocatable Devices such Comm, and LPT ports

PCI Devices - includes both PCI expansion cards and on-board PCI devices such as the IDE controller.

If the user selects Other, only a few devices are enabled by the system BIOS, and they are: an input device, an output device, and an IPL. The input device will usually be the keyboard, the output device is usually the video, and IPL is the first boot device found. The order at which each set of devices are initialized is as follows:

Baseboard fixed - Basic Static ISA Legacy devices such as Keyboard, Video, RTC, etc.

PnP Add in Cards - ISA PnP Devices like some audio solutions, and PnP adapters

PCI Devices - includes both PCI expansion cards and on-board PCI devices such as the IDE controller.

Dynamic Baseboard Devices - Relocatable Devices such Comm, and LPT ports

## ISA Shared Memory Size

When selected, this brings up a dialog box that allows you to specify a range of memory addresses that will be directed to the ISA bus rather than on-board memory. The options are Disabled, 16 KB, 32 KB, 48 KB, 64 KB, 80 KB and 96 KB. The default is Disabled. If this is set to Disabled, "ISA Shared Memory Base Address", below, will not be visible.

This field should be set to *Enabled* only when a non Plug and Play ISA card (legacy card) is used that requires non-ROM memory space. LAN cards that have on-board memory buffers are one example of this, video capture cards that have video buffer memory are another.

By default, allocation of upper memory is as follows: Memory from C0000-C7FFF is automatically shadowed. (This memory range is typically reserved for Video BIOS.) Memory from C8000-DFFFFh is initially unshadowed. The BIOS will scan this range for any ISA expansion card BIOSes that may be present and note the location and size. The BIOS will then autoconfigure the PCI and Plug and Play devices, shadowing the ROM requirements (other than video) into the area above E0000h until that area is full. It will then assign additional PCI and Plug and Play expansion cards to the area between C8000h and DFFFFh. If an ISA legacy card has non-ROM memory requirements, the autoconfigure routine may write into an area that is needed by the ISA expansion card. The **ISA Shared Memory Size** parameter is used to signify to the autoconfigure routine that this block of memory is reserved and should not be shadowed. (Shadowing is a technique which copies a block of memory from an add in card's ROM to the same address in system DRAM memory to allow faster access to the code and achieve higher performance.)

## 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, and D8000h. 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, and D8000h will not be available.

## 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 specific IRQs. The options are Available and Used By ISA Card. The default is Available. The auto-configuration code looks here to see if these interrupts are available. If an interrupt is available, the auto-configuration code can assign the interrupt to be used by PCI or Plug and Play devices. If your system contains an ISA agent that uses one of these interrupts, select Used By ISA Card for that particular 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 12 for the mouse port.

*Note: If PCI add-in cards are used, all but one IRQ can be set to Used By ISA Card; one must remain available in order for PCI cards which use interrupts to function correctly.*

Note: IRQ 14 and IRQ 15 will not show up as user available. If the on-bd IDE controller is not used, these interrupts are available for use by ISA cards, even though they do not show up in the list above. These interrupts can not be used for PCI cards.

## SECURITY SCREEN

The objectives of the BIOS security system are to:

1. Keep unwanted individuals from accessing the computer.
2. Limit the fields that can be accessed in the CMOS Setup Utility program.
3. Allow the computer to boot while unattended and still be secure.
4. Set up a hot key to invoke the security system immediately.

The security system is implemented using two passwords in tandem, a **User Password** and an **Administrative Password**. The level of security available is dependent on whether one or both passwords are set and which password is used to enter the system. It is assumed that if the **Administrative Password** is used, it is controlled by a central corporate information services or security organization and that the **Administrative Password** and **User Password** will have been set prior to the end user receiving the system.

To meet each of the objectives above, the following procedure is recommended:

1. End user sets/resets **User Password** and sets the **Unattended Start** parameter to Disabled. User will be prompted for a password, and must enter the correct password before the boot process is allowed to complete or before the user is allowed to enter Setup.
2. The **Administrative Password** is set prior to end user receiving system; no action required by end user. No password is required to complete the boot process, the user will be prompted for the correct password before being allowed to enter Setup.
3. End user sets **User Password** then *Enables Unattended Start*. If **User Password** had previously been set, user *Enables Unattended Start*. System will complete the boot process and start the operating system. The user must enter the correct **User Password** (not the **Administrative Password**) before input will be accepted from either the mouse or the keyboard. The password does not need to be followed by a carriage return. The user will not be prompted for a password, however the keyboard LEDs (Num Lock, Caps Lock, and Scroll Lock) will blink indicating the system is in secure mode. The user will be prompted for the correct password before being allowed to enter Setup.
4. End user sets **User Password** then *Enables Security Hot Key*. If **User Password** had previously been set, user *Enables Security Hot Key*. The user can place the system in to secure mode at any time by typing the specified keystroke combination ( <CTL> <ALT> <user specified> ). Once the system is in secure mode, the user will need to enter the correct **User Password** (not the **Administrative Password**) before input will be accepted from either the mouse or the keyboard. The password does not need to be followed by a carriage return. The user will not be prompted for a password, however the keyboard LEDs (Num Lock, Caps Lock, and Scroll Lock) will blink indicating the system is in secure mode.

<i>Password in Effect</i>	<i>Password Needed at Boot?</i>	<i>Password Needed to Access Setup?</i>	<i>Able To Access All Setup Fields?</i>	<i>Able To Set Unattended Start?</i>	<i>Able To Set Security Hot Key?</i>
User only	Yes	Yes	Yes	Yes	Yes
Administrative only	No	Yes	Yes	No	No
Both -- User password used	Yes	Yes	No	Yes	Yes
Both -- Admin password used	Yes	Yes	Yes	Yes	Yes
No password enabled	No	No	Yes	No	No

## **SECURITY SCREEN OPTIONS**

### **User Password is**

This reports if there is a User password set. There are no options.

### **Administrative Password is**

This reports if there is an Administrative password set. 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 I - PCI Configuration Error Messages

The following PCI messages are displayed as a group with bus, device and function information.

```
<'NVRAM Checksum Error, NVRAM Cleared'>, \ ; String
<'System Board Device Resource Conflict'>, \ ; String
<'Primary Output Device Not Found'>, \ ; String
<'Primary Input Device Not Found'>, \ ; String
<'Primary Boot Device Not Found'>, \ ; String
<'NVRAM Cleared By Jumper'>, \ ; String
<'NVRAM Data Invalid, NVRAM Cleared'>, \ ; String
<'Static Device Resource Conflict'>, \ ; String
```

The following messages chain together to give a message such as:

```
"PCI I/O Port Conflict: Bus: 00, Device 0D, Function: 01".
```

If and when more than 15 PCI conflict errors are detected, the log full message is displayed.

```
<'PCI I/O Port Conflict:'>, \ ; String
<'PCI Memory Conflict: '>, \ ; String
<'PCI IRQ Conflict: '>, \ ; String
<' Bus '>, \ ; String
<', Device '>, \ ; String
<', Function '>, \ ; String
<'PCI Error Log is Full.'>, \ ; String
<'Floppy Disk Controller Resource Conflict '>, \ ; Text
<'Primary IDE Controller Resource Conflict '>, \ ; Text
<'Secondary IDE Controller Resource Conflict '>, \ ; Text
<'Parallel Port Resource Conflict '>, \ ; Text
<'Serial Port 1 Resource Conflict '>, \ ; Text
<'Serial Port 2 Resource Conflict '>, \ ; Text
```

## Appendix J - AMIBIOS 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 from continuing 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 Setup Utility.

### BEEP CODES

<i>Beeps</i>	<i>Error Message</i>	<i>Description</i>
1 long, 2 short	No video card found	Applies only to baseboards with no on-bd video.
1 long, 3 short	No Monitor connected	Applies only to baseboards with on-bd video present.
1 long, x short	Video related failure	Other video beep codes may exist and are tied to specific video BIOS implementations. Contact the vendor for details should the need arise.
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	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 Reg Rd/Wrt Error	The shutdown register for CMOS RAM failed.
11	Cache Error / External Cache Bad	The external cache is faulty.

### ERROR MESSAGES

<i>Error Message</i>	<i>Explanation</i>
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 Failure	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	The display jumper is not implemented on this product, this error will not occur.
DMA Error	Error in the DMA controller.

## ERROR MESSAGES (CONT.)

DMA #1 Error	Error in the first DMA channel.
DMA #2 Error	Error in the second DMA channel.
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 <i>Keyboard</i> option in Standard CMOS Setup to <i>Not Installed</i> 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.

## 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 <i>Memory Parity Error ????</i> .
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>I/O Card Parity Error ????</i> .
DMA Bus Time-out	A device has driven the bus signal for more than 7.8 microseconds.

## Appendix K - BIOS Updates

The Advanced/ATX 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.

The latest upgrade utility and BIOS code are available from your service provider or from the Intel Applications Support bulletin board.

### *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.

Prior to starting the update, the user must make a note of the current SETUP parameters. After the update completes, CMOS memory should be reset to default values by entering SETUP and hitting the <F5> key. The user may then re-enter his original values. CMOS memory must be reset to default values because the mapping of the parameters to specific CMOS memory locations may change from one version of BIOS to the next. If CMOS memory is not reset, erratic operation can occur.

### *BIOS Recovery*

In the unlikely event a problem occurs during the FLASH update process and the BIOS is not programmed correctly so that the system cannot boot, the board must be returned to a repair facility since there is no recovery code located in the FLASH device. A PCI card has been designed that allows a recovery process to take place and the BIOS to be programmed correctly.

**NOTE: Flash Recovery Boot option is not supported on the Advanced/ATX.**

## Appendix L - Soft-off Control

The Advanced/ATX design supports Softoff control via the SMM code in the BIOS. The CS1 pin out of the National 82306B I/O controller is connected to the Softoff control line in the power supply circuit.

The registers in the 82306 I/O controller that sets the I/O address and control of the CS1 pin are NOT setup until the SMM code is activated. The code performs the following operations:

- OUT 0Ch to I/O port 2Eh
- OUT 75h to I/O port 2Fh
- OUT 11h to I/O port 2Eh
- OUT 00h to I/O port 2Fh
- OUT 0Dh to I/O port 2Eh
- OUT A0h to I/O port 2Fh

After setting the above registers, any read operation to I/O location 75H will trigger the Softoff circuit and turn the power supply off.

## Appendix M - Environmental Standards

<i>Parameter</i>	<i>Condition</i>	<i>Specification</i>
Temperature	Non-Operating	-40°C to +70°C
	Operating	+0°C to +55°C (min. airflow of 200 LFM)
Voltage		
+5		+/- 5%
-5		+/- 5%
+12		+/- 5%
-12		+/- 5%
+3.3		+/- 5%
Shock	Non-Operating	
	Unpackaged	Trapezoidal, 50.0G, 11ms
	Packaged	Half sine, 2ms, 36" simulated free fall height
Vibration	Unpackaged	5 Hz - 500 Hz, 3.1 gRMS random
	Packaged	10 Hz - 500 Hz, 1.0 gRMS random

Table M-1. Environmental standards

## Appendix N - Reliability Data

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

Advanced/ATX baseboard                      72,748 Hours