TE430VX
Motherboard
Technical Product Specification

Order Number 281817-003

May 1996

Revision History

Revision	Revision History	Date
-003	Fixed drawing designators, added USB module, corrected inaccuracies, reworded sections for clarity, removed reference to Creative Labs Vibra 16S with Yamaha FM Synthesis	5/96
-002	Changed Name of product from Advanced/TE to TE430VX throughout	4/96
-001	Preliminary release of the TE430VX Technical Product Specification.	3/96

This product specification applies only to standard TE430VX ATX motherboards with BIOS identifier 1.00.01.CY0.

Changes to this specification will be published in the TE430VX Motherboard Specification Update before being incorporated into a revision of this document.

Copies of documents which have an ordering number and are referenced in this document, or other Intel literature, may be obtained from:

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or call in North America 1-800-879-4683, Europe 44-0-1793-431-155, France 44-0-1793-421-777,

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1 Motherboard Description

1.1 Overview

The TE430VX design accepts Pentium® processors operating at 75 MHz, 90 MHz, 100 MHz, 120 MHz, 133 MHz, 150 MHz, 166 MHz, and 200MHz. There is an option of having 256 KB of Pipeline Burst SRAM soldered onto the motherboard, or a Card Edge Low Profile (CELP) connector for cache expandability. The memory subsystem is designed to support up to 128 MB of EDO DRAM, or up to 64 MB of a new memory architecture called SDRAM, in standard 168-pin DIMM sockets. A type 7 Pentium OverDrive® socket provides upgrades to future OverDrive processors.

The TE430VX motherboard utilizes Intel's 82430VX PCISet. The 82430VX 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 SMC FDC37C932FR Ultra 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 Creative Labs Vibra16C audio codec is integrated onto the motherboard. The Vibra 16C provides 16-bit stereo, Sound Blaster† Pro compatible audio. Integrated onto the motherboard also is the S3† Trio64† V+ video subsystem. 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.

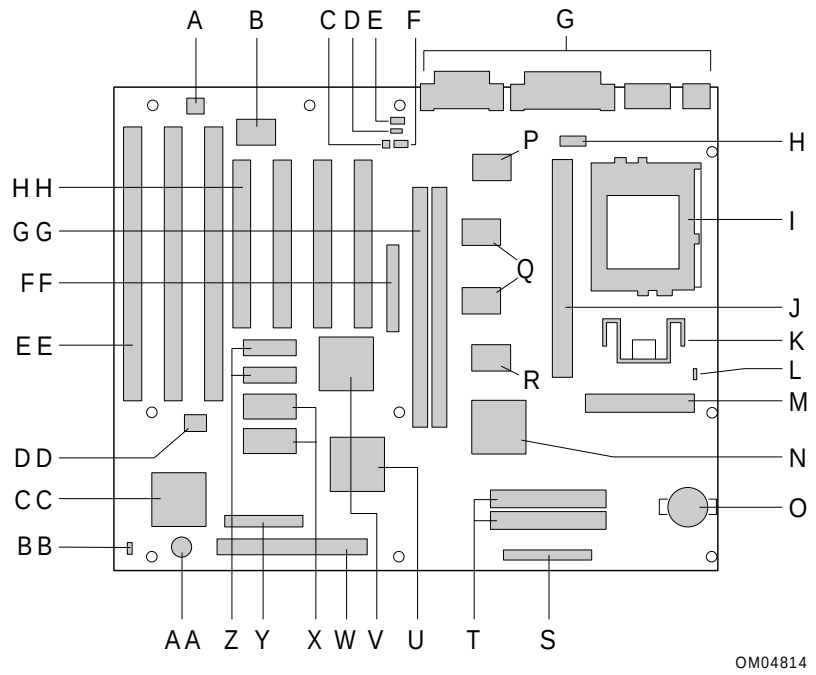

Figure 1. Motherboard Features

Tigereye board diagram

A.	Optional Yamaha† FM synthesizer	R.	82430VX TDX
B.	Optional Creative Labs Audio device	S.	Floppy connector
C.	Optional telephony connector	T	IDE connectors
D.	Optional CD-ROM audio connector	U.	PIIX3 PCI/ISA/IDE Xcelerator
E.	Creative Labs ModemBlaster connector	V.	Optional S3 Trio64V+ graphics controller
F.	Wave Table connector	W.	Front panel connectors
G.	External I/O	X.	Optional video memory sockets
H.	COM 2 connector	Y.	Configuration jumper block
I.	Socket 7	Z.	Optional video memory
J.	Optional CELP socket	AA.	Onboard speaker
K.	Voltage regulator	BB.	Fan connector
L.	Voltage regulator jumper	CC.	SMC FDC37C932FR Ultra I/O controller
M.	Power connector	DD..	Intel 1 Mbit Flash component
N.	82430VX TXC	EE.	ISA add-in board connectors
O.	Battery	FF.	Optional VESA† feature connector
P.	82430VX TDX	GG.	DIMM sockets
Q.	Optional Pipeline Burst SRAM	HH.	PCI add-in board connectors

1.2 Motherboard Manufacturing Options

- Creative Labs Vibra 16C Audio
- S3 Trio64V+ Video
- CELP Module or soldered 256k PBSRAM with GWE
- USB
- Split Plane Voltage Support for Socket 7
- Flash Recovery

1.3 Form Factor

The motherboard is designed to fit standard ATX form factor chassis. Figure 2 illustrates the motherboard's dimensions. The motherboard meets the standard ATX specification guidelines in that the outer dimensions are 12" x 9.6". Location of the I/O connectors, riser slot, and mounting holes also meet the standard ATX specification.

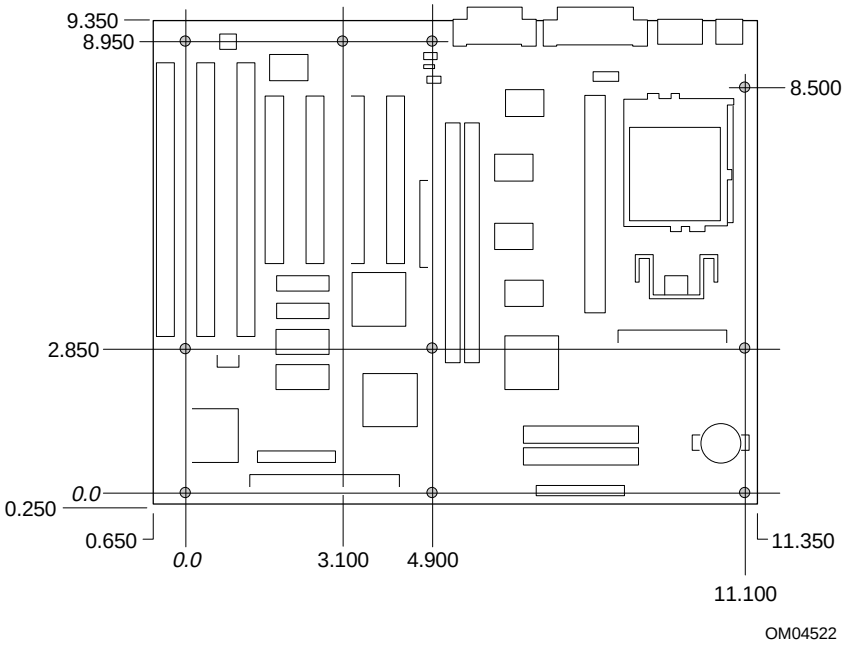

Figure 2. Motherboard Dimensions

1.4 Microprocessor

The motherboard is designed to operate with 3.3 volt Pentium Processors running at 75, 90, 100, 120, 133, 150, 166, and 200MHz. An onboard linear voltage regulator circuit provides the required 3.3 volts from the 5.0 volt tap of the power supply. An on-board jumper enables use of VRE specified processors.

The Pentium processor maintains full backward compatibility with 8086, 80286, i386™ and Intel486™ processors. It supports both read and write burst mode bus cycles and also includes separate 8 KB on-chip code and data caches that employ a write-back policy.

The Pentium processor is an advanced numeric coprocessor that significantly increases the speed of floating point operations, while maintaining backward compatibility with i486DX math coprocessor and complying to ANSI/IEEE standard 754-1985.

This motherboard does not support the keep-out zones around the socket 7 that allow use of a "piano wire" type heatsink clip. Intel recommends using only metal heatsink clips.

1.4.1 Microprocessor Upgrade

The motherboard provides a 321-pin Socket 7 ZIF processor socket. Socket 7 supports upgrades to higher performance Pentium OverDrive processors.

1.5 Memory

1.5.1 System Memory

The motherboard provides two 168-pin DIMM(Dual Inline Memory Module) sites for DRAM memory expansion. The sockets support 1 Meg x 64 (8 MB), 2 Meg x 64 (16 MB), and 4 Meg x 64 (32 MB) SDRAM DIMM modules and 1 Meg x 64 (8 MB), 2 Meg x 64 (16 MB), 4 Meg x 64 (32 MB) and 8 Meg x 64 (64 MB) EDO(Extended Data Out) DIMM modules. For systems configured with EDO or SDRAM DIMM modules, minimum memory size is 8MB for EDO systems. Maximum memory size is 128MB for EDO systems. Maximum memory size is 64MB for SDRAM systems.

The two DIMM sockets are arranged as Bank 0 and Bank 1. Each bank consists of one socket and a 64-bit wide data path. Bank 0 only, Bank 1 only, or both banks may be populated. EDO and SDRAM may be installed in the same system. The system BIOS automatically detects memory size and type so no jumper settings are required. Gold leaded DIMMs are required to be used when adding system memory.

1.5.1.1 EDO DRAM

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

1.5.1.2 SDRAM

Synchronous Dynamic Random Access Memory, (SDRAM) is designed to improve main memory performance. SDRAM is synchronous to the memory clock unlike standard Fast Page DRAM, or EDO DRAM. All the timing is dependent on the number of memory clock cycles. This makes the timing design simpler and makes a faster memory speed easier to achieve. Discrete SDRAM components must meet the 66 MHz PC SDRAM Specification version 1.0 to function correctly.

1.5.2 Second Level Cache

The Pentium processor's internal cache can be complemented by a second level cache using high-performance Pipelined Burst SRAM with GWE (Global Write Enabled) or Asynchronous Cache.

One factory option is an integrated 256 KB direct mapped write-back second level cache implemented with two 32k x 32 Pipeline Burst SRAM devices that take advantage of the Global Write Enable pin. A 5v 8 KB x 8 external Tag SRAM provides caching support for up to 64 MB of system memory.

A second factory option is a Type 1 CELP connector, specified by Intel's COAST Module Specification version 3.0. The Type 1 CELP connector has a keying "hip" located at one end of the connector. This connector allows the use of both a GWE PBSRAM COAST module, and a GWE Asynchronous COAST module. The GWE Asynchronous modules must be built for Intel's 82430VX designs and are not interchangeable with Asynchronous modules built for 82430FX designs. The reason for this incompatibility is the additional logic added to the 82430VX modules to account for the GWE functionality built into the chipset.

1.6 Chipset

The Intel 82430VX PCIset consists of the 82430VX System Controller (TVX), two Data Paths (TDX) and one 82371SB PCI ISA/IDE Xcelerator (PIIX3) bridge chip.

1.6.1 82430VX System Controller (TVX)

The 82430VX TVX provides all control signals necessary to drive a second level cache and the DRAM array, including multiplexed address signals. The TVX also controls system access to memory and generates snoop controls to maintain cache coherency. The TVX comes in a 208-pin QFP package that features:

- CPU interface control
- Integrated L2 write-back cache controller
  - — Pipeline Burst SRAM
  - — 256 or 512 KB direct-mapped
- Integrated DRAM controller
  - — 64 bit path to memory
  - — Support for SDRAM and EDO DRAM
  - — 8 MB to 128 MB main memory
- Fully synchronous PCI bus interface
  - — 25/30/33 MHz
  - — PCI to DRAM > 100 Mbytes/sec
  - — Up to 4 PCI masters in addition to the PIIX3 and IDE

1.6.2 82430VX Data Path (TDX)

Two 82430VX TDX data path components provide a 64-bit microprocessor to memory path. The TDX components are controlled by the TVX. They each add one load to the PCI bus and perform all of the required byte and word swapping. The TDX devices come in a 208 pin QFP package.

1.6.3 PCI ISA/IDE Xcelerator (PIIX3)

The PIIX3 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 PIIX3 integrates seven 32-bit DMA channels, five 16-bit timer/counters, two eight-channel interrupt controllers, PCI-to-AT interrupt mapping circuitry, NMI logic, ISA refresh address generation, and PCI/ISA bus arbitration circuitry together onto the same device. The PIIX3 comes in a 208-pin QFP package that features:

- PCI Bus and ISA Bus interface
- Universal Serial Bus controller
  - — Host/hub controller
- Integrated fast IDE interface
  - — Support for up to 4 devices
  - — PIO Mode 4 transfers up to 16 MB/sec
  - — Integrated 8 x 32-bit buffer for bus master PCI IDE burst transfers
  - — Bus master mode
- PCI 2.1 compliance
- Enhanced fast DMA controller
- Interrupt controller and steering
- Counters/timers
- SMI interrupt logic and timer with fast on/off mode

1.6.4 IDE SUPPORT

The motherboard provides two independent bus-mastering PCI IDE interfaces that support 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 ATAPI (e.g. CD-ROM) devices on both IDE interfaces. The system BIOS automatically detects IDE device transfer rate and translation mode.

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. When used in conjunction with the appropriate driver for the Windows 95 environment, the IDE interface can operate as a PCI bus master capable of supporting PIO Mode 4 devices with transfer rates of up to 16 MB/sec.

1.7 Ultra I/O Interface Controller (SMC FDC37C93FR)

1.7.1 Floppy controller

The SMC FDC37C93FR 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, 1.2 MB, 1.44 MB, or 2.88 MB 3½" media in the BIOS setup. By default, the Floppy A interface is configured for 1.44 MB and Floppy B is disabled. Another setup option prevents the user from being able to write to floppy. Configuring the floppy interface for 1.25 MB 3 ½" (3-mode floppy) requires the use of special floppy drives and a driver to for the specific operating system.

1.7.2 Keyboard and mouse interface

PS/2† keyboard/mouse connectors are located on the back panel side of the motherboard. 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 detectand 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, 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.

1.7.3 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 motherboard.

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.

1.7.4 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.

1.7.5 Consumer IR Support

The motherboard also has a signal pin to support Consumer IR devices(remote controls). A software and hardware interface is required to implement consumer IR on with the motherboard.

1.7.6 Parallel port

A 25-pin D-Sub header is provided on the back panel for a multi-mode bi-directional parallel port. The parallel port operates in standard mode, Enhanced Parallel Port (EPP) version 1.7 mode, with BIOS and Driver support, and a high speed Extended Capabilities Port (ECP) compatible mode. EPP Mode requires a driver provided by the peripheral manufacturer to operate correctly.

1.8 Graphics Subsystem (S3 Trio64V+)

The motherboard is available with an S3 Trio64 V+ 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 256 KB x 16 SOJ memory devices in the provided sockets. The Trio64 V+ 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 2 MB 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 motherboard 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 multi-media performance. Boards configured with the Trio64 V+ 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. The motherboard 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. When a monitor is not plugged into the system on power-up, the video will default to color mode, rather than monochrome. This is a deviation from the VGA† specification.

1.8.1 Resolutions supported

Table 1. Graphics Resolutions

Resolution	Supported by 1 MB DRAM	Supported by 2 MB DRAM	Refresh Rate (Hz)
640x480x16 colors	Yes	Yes	
640x480x256 colors	Yes	Yes	60,72,75,85
640x480x64k colors	Yes	Yes	60,72,75
640x480x16.7m colors	No	Yes	60,72,75
800x600x256 colors	Yes	Yes	56,60,72,75,85
800x600x64k colors	Yes	Yes	60,72,75
800x600x16.7m colors	No	Yes	60,72,75
1024x768x256 colors	Yes	Yes	43(IL),60,70,75,85
1024x768x64k colors	No	Yes	43(IL),60,70,75
1280x1024x16 colors	Yes	Yes	45(IL),60,72,75
1280x1024x256 colors	No	Yes	45(IL),60,72,75

1.8.2 Graphics Drivers and Utilities

Graphics drivers and utilities for Windows 3.11 and Windows 95 are provided on the foundation software CD. 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. Windows NT† drivers are embedded in the O.S.

Graphics drivers for OS/2† 2.11 and OS/2 WARP, MS-DOS† applications such as AutoCAD† and Microstation, and driver updates for Windows 3.11 and Windows NT may be downloaded from the Intel Applications Support BBS. Drivers for SCO UNIX† are available from SCO.

1.9 Audio Subsystem (Creative Labs Vibra 16C)

The motherboard features a 16-bit stereo audio subsystem. The audio subsystem is based upon the Creative Labs Vibra 16C (CT2505) multimedia Codec. The Vibra 16C provides all the digital audio and analog mixing functions required for recording and playing of audio on personal computers. The Creative Labs Vibra 16C is a single chip VLSI solution which integrates FM synthesis, is Sound Blaster compatible and Roland MPU-401 UART mode compatible. Creative Labs Vibra 16C also provides MPCII, Adlib, and Multimedia PC Level 2 compliance to meet all of the requirements of today's multi-media applications.

The Vibra 16C has been implemented as a Plug and Play motherboard device. This means that there is a device node defined for the Vibra 16C and the BIOS must configure it. Although it is not a Plug and Play device, the Vibra 16C is very flexible in that it accommodates a variety of I/O addresses, DMA channels and interrupts.

The audio subsystem requires up to two DMA channels (to support full duplex operation) and one interrupt. When the Vibra 16C is programmed for full duplex operation, two DMA channels are assigned: one of the channels will be a 16-bit channel and the other will be 8 bits. The system can be configured to use either DMA channels 1 or 3 (8 bit channels) and DMA channels 5 or 7 (16 bit channels). The interrupt can be mapped to IRQ 5, 7, 9, or 10. The base address register is also configurable for a variety of base addresses ranging from I/O address 220 through address 280 (see the resource map below for more details). The ICU (ISA Configuration Utility) must be installed and configured before installing the DOS and Windows audio drivers.

1.9.1 Vibra 16C resource map

Device	Interrupt (IRQ)	DMA Channel	I/O Address
Creative Labs 16C Base	2/9	8 bit DMA 1 (default)	220h-233h (default)
	5 (default)	8 bit DMA 3	240h-253h
	7	16 bit DMA 5 (default)	260h-273h
	10	16 bit DMA 7	280h-293h
FM Synthesis			388h-38Bh
Joystick (midi-port)			200h-207h
MPU-401	default is disabled		300h-301h
			330h-331h

1.9.2 Audio Drivers

Audio software and utilities are provided via the foundation software CD for the motherboard 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 drivers and utilities include the Windows sound driver, audio input control panel, audio mixer control panel, and a business audio transport utility.

1.10 Motherboard Connectors

Figure 3 shows the connectors on the motherboard. Pin call outs and signal names follow Figure 3.

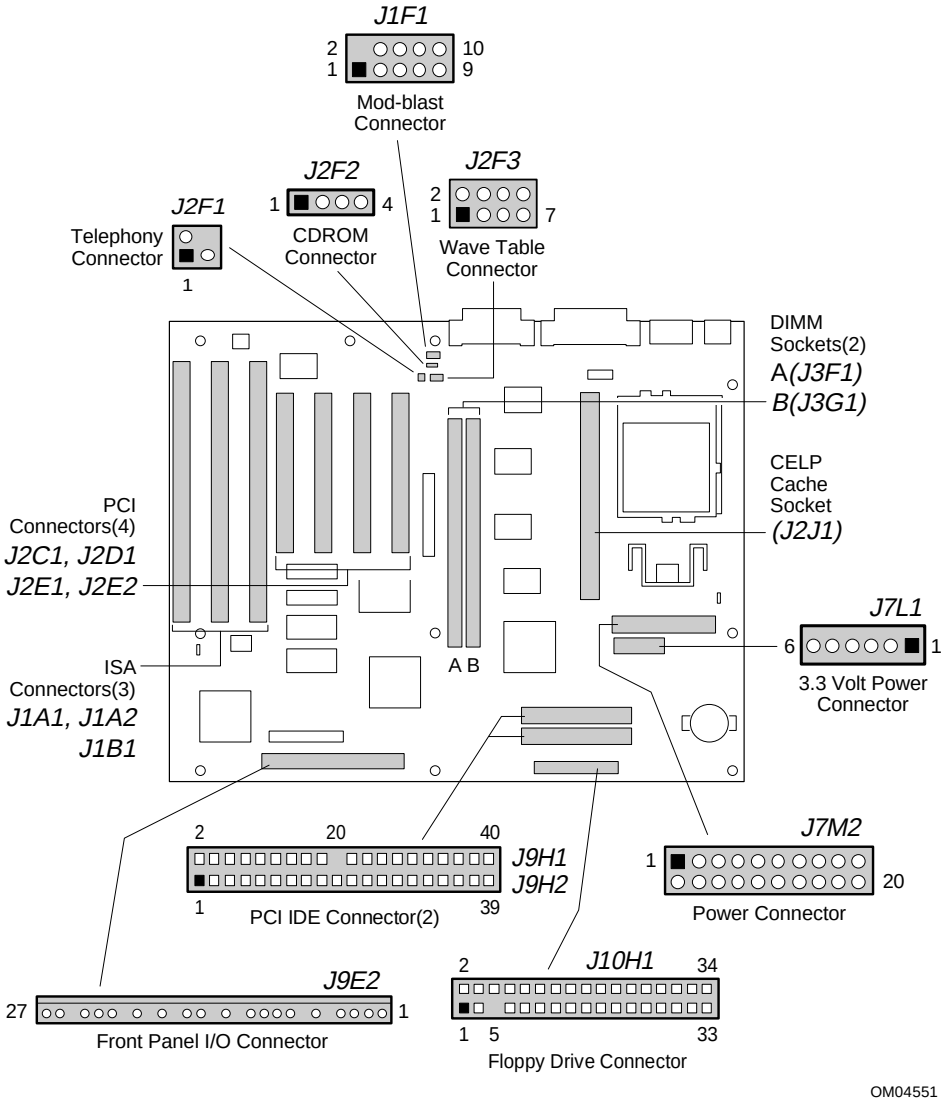

Figure 3. Motherboard Connector Locations

1.10.1 CD-ROM Connector - J2F2

Pin	Signal Name
1	Ground
2	CD Audio Left Speaker
3	Ground
4	CD Audio Right Speaker

1.10.2 Wave Table Connector - J2F3

Pin	Signal Name
1	Wave Right
2	Ground
3	Wave Left
4	Ground
5	Key
6	Ground
7	MIDI_In
8	MIDI Out

1.10.3 Telephony Connector - J2F1

Pin	Signal Name
1	Mic In
2	Ground
3	Mono Out
4	Key

1.10.4 Power Connector - J7M2

Pin	Signal Name	Pin	Signal Name
1	+3.3V	11	+3.3V
2	+3.3V	12	-12V
3	Ground	13	Ground
4	+5V	14	PS-ON
5	Ground	15	Ground
6	+5V	16	Ground
7	Ground	17	Ground
8	PW-OK	18	-5V
9	+5VSB	19	+5V
10	+12V	20	+5V

1.10.5 Floppy Drive Connector - J10H1

Pin	Signal Name	Pin	Signal Name
1	Ground	2	DENSEL
3	Ground	4	Reserved
5	Key	6	FDEDIN
7	Ground	8	Index #
9	Ground	10	Motor Enable A #
11	Ground	12	Drive Select B #
13	Ground	14	Drive Select A #
15	Ground	16	Motor Enable B #
17	MSEN1	18	DIR #
19	Ground	20	STEP #
21	Ground	22	Write Data #
23	Ground	24	Write Gate #
25	Ground	26	Track 00 #
27	MSEN0	28	Write Protect #
29	Ground	30	Read Data #
31	Ground	32	Side 1 Select #
33	Ground	34	Diskette Change #

1.10.6 IDE Connectors - J9H1, J9H2

Pin	Signal Name	Pin	Signal Name
1	Reset IDE	2	Ground
3	Host Data 7	4	Host Data 8
5	Host Data 6	6	Host Data 9
7	Host Data 5	8	Host Data 10
9	Host Data 4	10	Host Data 11
11	Host Data 3	12	Host Data 12
13	Host Data 2	14	Host Data 13
15	Host Data 1	16	Host Data 14
17	Host Data 0	18	Host Data 15
19	Ground	20	Key
21	DDRQ0 (DDRQ1)	22	Ground
23	I/O Write #	24	Ground
25	I/O Read #	26	Ground
27	IOCHRDY	28	Vcc pull-up

continued ☛

IDE Connectors - J9H1, J9H2 (continued)

Pin	Signal Name	Pin	Signal Name
29	DDACK0 (DDACK1) #	30	Ground
31	IRQ14 (IRQ15)	32	Reserved
33	Addr 1	34	Reserved
35	Addr 0	36	Addr 2
37	Chip Select 1P (1S) #	38	Chip Select 3P (3S) #
39	Activity #	40	Ground

1.10.7 Front Panel I/O Connectors - J9E2

Pin	Signal Name
1	Power On
2	Power Return
3	Sleep Req
4	Sleep Driver
5	Key
6	+5V
7	Key
8	IR_RX
9	Ground
10	IR_TX
11	IR_SL1
12	Key
13	+5V
14	Key
15	HD ACTIVE
16	+5V
17	Key
18	Ground
19	Key
20	LED_PWR
21	Key
22	Ground
23	Reset
24	+5V
25	Key
26	SPKR_DAT connect
27	SPKR_DAT

1.10.8 ISA Connectors- J1A1, J1A2, J1B1

Pin	Signal Name	Pin	Signal Name
B1	GND	A1	IOCHK-
B2	RSTDRV	A2	SD7
B3	Vcc	A3	SD6
B4	IRQ9	A4	SD5
B5	-5 V	A5	SD4
B6	DRQ2	A6	SD3
B7	-12 V	A7	SD2
B8	0WS-	A8	SD1
B9	+12 V	A9	SD0
B10	GND	A10	IOCHRDY
B11	SMEMW-	A11	AEN
B12	SMEMR-	A12	SA19
B13	IOW-	A13	SA18
B14	IOR-	A14	SA17
B15	DACK3-	A15	SA16
B16	DRQ3	A16	SA15
B17	DACK1-	A17	SA14
B18	DRQ1	A18	SA13
B19	REFRESH-	A19	SA12
B20	SYSCLK	A20	SA11
B21	IRQ7	A21	SA10
B22	IRQ6	A22	SA9
B23	IRQ5	A23	SA8
B24	IRQ4	A24	SA7
B25	IRQ3	A25	SA6
B26	DACK2-	A26	SA5
B27	TC	A27	SA4
B28	BALE	A28	SA3
B29	Vcc	A29	SA2
B30	OSC	A30	SA1
B31	GND	A31	SA0
KEY		KEY	
D1	MEMCS16-	C1	SBHE-
D2	IOCS16-	C2	LA23
D3	IRQ10	C3	LA22

continued ☛

ISA Connectors (continued)

Pin	Signal Name	Pin	Signal Name
D4	IRQ11	C4	LA21
D5	IRQ12	C5	LA20
D6	IRQ15	C6	LA19
D7	IRQ14	C7	LA18
D8	DACK0-	C8	LA17
D9	DRQ0	C9	MEMR-
D10	DACK5-	C10	MEMW-
D11	DRQ5	C11	SD8
D12	DACK6-	C12	SD9
D13	DRQ6	C13	SD10
D14	DACK7-	C14	SD11
D15	DRQ7	C15	SD12
D16	Vcc	C16	SD13
D17	Master-	C17	SD14
D18	GND	C18	SD15

1.10.9 PCI Connectors - J2C1, J2D1, J2E1, J2E2

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
A1	Vcc	B1	-12 V	A32	AD16	B32	AD17
A2	+12 V	B2	TCK	A33	3.3 V	B33	CBE2-
A3	TMS	B3	GND	A34	FRAME-	B34	GND
A4	TD1	B4	TD0	A35	GND	B35	IRDY-
A5	Vcc	B5	Vcc	A36	TRDY-	B36	3.3 V
A6	INTA-	B6	Vcc	A37	GND	B37	DEVSEL-
A7	INTC-	B7	INTB-	A38	STOP-	B38	GND
A8	Vcc	B8	INTD-	A39	3.3 V	B39	PLOCK-
A9	Reserved	B9	Prsnt1#	A40	SDONE	B40	PERR-
A10	Vcc	B10	Reserved	A41	SBO-	B41	3.3 V
A11	Reserved	B11	Prsnt2#	A42	GND	B42	SERR-
A12	GND	B12	GND	A43	PAR	B43	3.3 V
A13	GND	B13	GND	A44	AD15	B44	CBE1-
A14	Reserved	B14	Reserved	A45	3.3 V	B45	AD14
A15	SPCIRST-	B15	GND	A46	AD13	B46	GND
A16	Vcc	B16	PCLKE	A47	AD11	B47	AD12
A17	AGNT-	B17	GND	A48	GND	B48	AD10

continued ☛

PCI Connectors - J2C1, J2D1, J2E1, J2E2 (continued)

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
A18	GND	B18	REQA-	A49	AD9	B49	GND
A19	Reserved	B19	Vcc	A50	KEY	B50	KEY
A20	AD30	B20	AD31	A51	KEY	B51	KEY
A21	3.3 V	B21	AD29	A52	CBEO-	B52	AD8
A22	AD28	B22	GND	A53	3.3 V	B53	AD7
A23	AD26	B23	AD27	A54	AD6	B54	3.3 V
A24	GND	B24	AD25	A55	AD4	B55	AD5
A25	AD24	B25	3.3 V	A56	GND	B56	AD3
A26	IDSEL	B26	CBE3-	A57	AD2	B57	GND
A27	3.3 V	B27	AD23	A58	AD0	B58	AD1
A28	AD22	B28	GND	A59	Vcc	B59	Vcc
A29	AD20	B29	AD21	A60	SREQ64-	B60	SACK64-
A30	GND	B30	AD19	A61	Vcc	B61	Vcc
A31	AD18	B31	3.3 V	A62	Vcc	B62	Vcc

1.10.10 Power Supply Connectors

When used with a power supply that supports remote power on/off, the motherboard can turn off the system power via software control (“soft-off” is a manufacturing option). The Powerman utility supplied for Windows 3.1x allows for soft-off as does the shutdown icon in Windows 95 Start menu. The system BIOS will turn the system power off when it receives the proper APM command from the OS. For example, Windows 95 will issue this APM command when the user selects “Shutdown the computer” option. APM must be enabled in the system BIOS and OS in order for the soft-off feature to work correctly. In order for the system to recognize the presence of a “soft-off” power supply, the supply must tie pin 14 of the PWS Control connector (J7M2) to ground. If power to the system is interrupted due to a power outage or the power cord being unplugged, when power is reapplied, the system will return to the state it was in when the power was disconnected. If the system was turned on when power was disconnected, the system will turn back on when power is reapplied.

CAUTION

If the coin-cell battery is removed from the motherboard and AC power is disconnected, the next time the system is plugged in, power will automatically be turned on without pushing the “on” button. BIOS can detect this condition, and will attempt to turn off the power supply when this occurs. This is due to functionality of the SMC I/O controller.

1.10.11 Front panel Connectors

The motherboard provides header connectors to support functions typically located on the chassis bezel. Front panel features supported include:

- System Reset
- Power LED
- Hard Drive activity LED
- System Speaker
- Infra-Red (IrDA) port
- Sleep/Resume

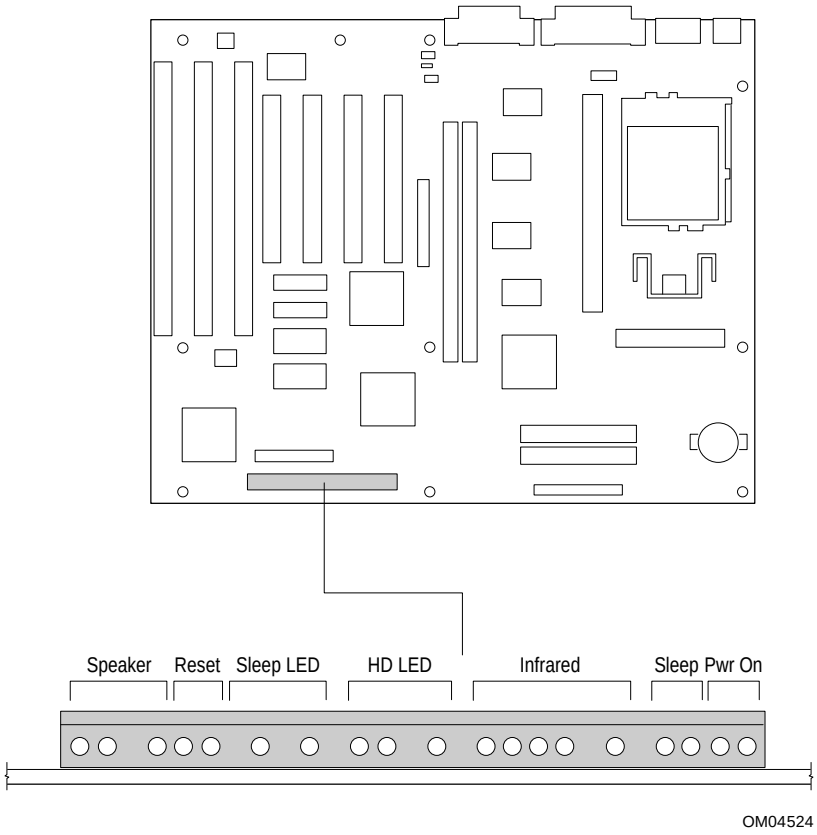

Figure 4. Front Panel I/O Connectors

1.10.11.1 Speaker

The speaker provides error beep code information during the Power-On Self Test if the system cannot use the video interface. As a manufacturing option, an on-board piezoelectric speaker may be present. The on-board speaker may be disabled by removing a jumper from the front panel speaker connector and connecting an off-board speaker in its place. The speaker is not connected to the Creative Labs audio subsystem, so it will not receive output from the audio subsystem.

1.10.11.2 Reset

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

1.10.11.3 Sleep or Power LED

This 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.

1.10.11.4 HD LED

This header can be connected to an LED to provide a visual indicator for when an IDE hard drive connected to the onboard IDE controller is being read or written.

1.10.11.5 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 115 Kbps from a distance of 1 meter. A pin is also designated for hardware Consumer IR support.

1.10.11.6 Sleep / resume

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" button, a user defined keyboard hot key, or prolonged system inactivity. The Sleep/Resume button is supported by a 2-pin header (pins 3 and 4) located on the front panel I/O connector (J9E2). Closing the "Sleep" switch will generate an SMI (System Management Interrupt) to the processor which immediately goes into System Management Mode (SMM), the so called "Sleep" mode.

The front panel "Sleep" 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. Mouse activity will only "wake up" the system if a mouse driver is loaded. While the system is in "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 (keyboard/mouse) occurs as mentioned above

1.10.11.7 Remote ON/OFF and Soft Power Support

For power supplies that support the Remote ON/OFF feature, this 2 pin header (see Figure 4 pins 1 and 2 of J9E2) 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. 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 TE430VX motherboard (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 Super 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.

1.10.12 Back Panel Connectors

The back panel provides external access to PS/2 style keyboard and mouse connectors, two USB connectors, one parallel port, one serial port, a VGA connector, a MIDI/game port, and the external audio jacks which are integrated on the motherboard. Figure 5 shows the general location of the I/O connectors.

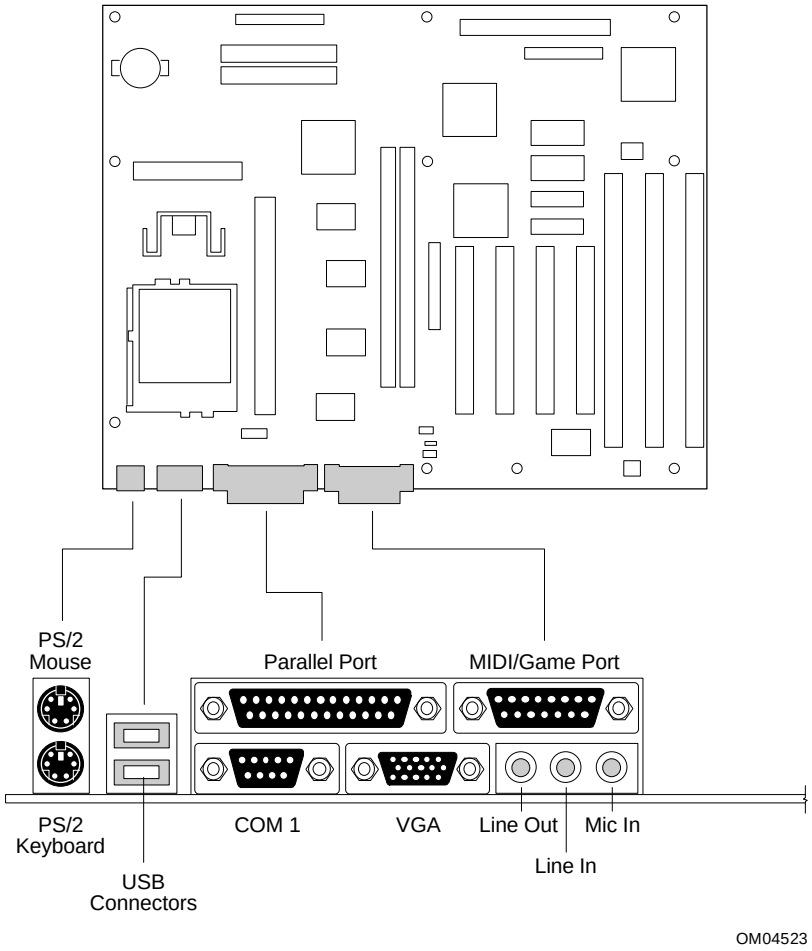

Figure 5. I/O Connections

1.10.13 Add-in Board Expansion Connectors

Expansion Slots support up to four PCI and up to three ISA add-in boards. The PCI bus is fully compliant with the PCI 2.1 specification and supports up to four bus master devices through the four PCI connectors.

1.11 Jumper Settings

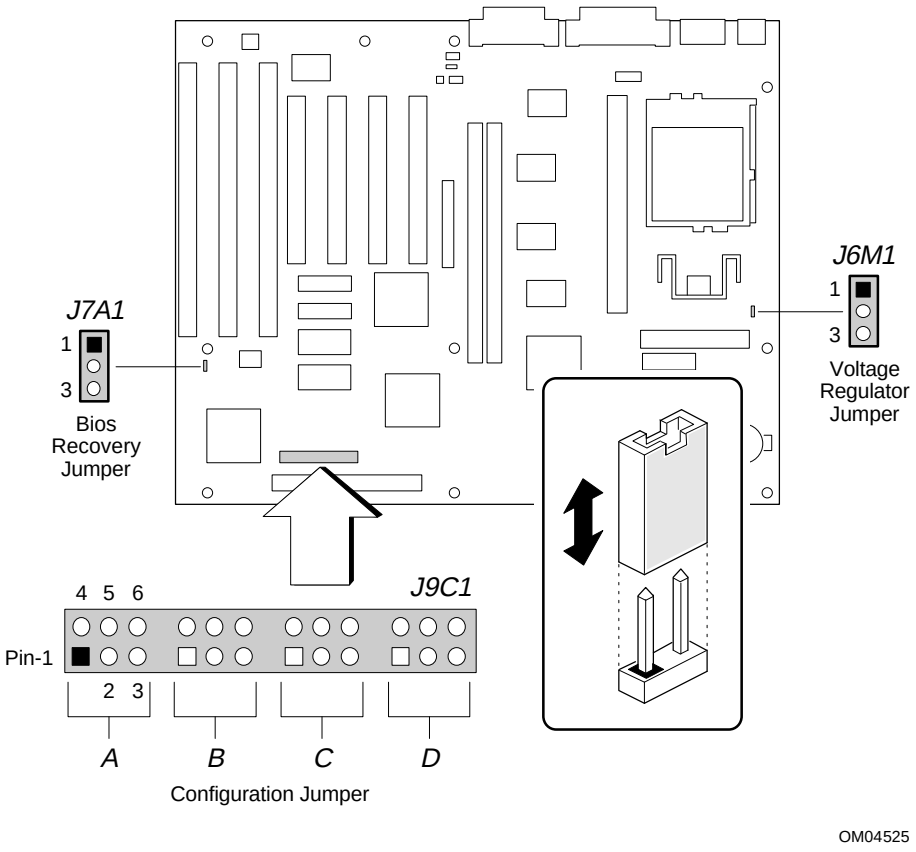

Figure 6. Jumper Locations

Table 2. Configuration Jumper Settings

Function	Jumper	Configuration
Host Bus Speed **(Note: These jumpers also set PCI and ISA clock speeds**.)	J9C1-C	See Table 3
CPU Speed Ratio	J9C1-D	See Table 3
CMOS Clear	J9C1-A	4-5 Keep (**Default**) 5-6 Clear
Password Clear	J9C1-A	1-2 Password Enabled (**Default**) 2-3 Password Clear/Disabled
CMOS Setup Access	J9C1-B	* 1-2 Access Allowed (**Default**) 2-3 Access Denied
Reserved	J9C1-B	Not jumpered

1.11.1 CPU Configuration (J9C1-C, D)

These allow the motherboard to be switched between different speeds of the Pentium processor. These jumpers also affect the PCI and ISA clock speeds according to the following table.

Table 3. CPU/SYSTEM Speed Settings

CPU Freq. (MHz)	Host Bus Freq. (MHz)	J9C1-C	dJ9C1-D
200	66	1-2,5-6	2-3,5-6
166	66	1-2,5-6	1-2,5-6
150	60	2-3,4-5	1-2,5-6
133	66	1-2,5-6	2-3,4-5
120	60	2-3,4-5	2-3,4-5
100	66	1-2,5-6	1-2,4-5
90	60	2-3,4-5	1-2,4-5
75	50	2-3,5-6	1-2,4-5
reserved	-	2-3,5-6	2-3,5-6
reserved	-	2-3,4-5	2-3,5-6
reserved	-	1-2,4-5	1-2,4-5
reserved	-	1-2,4-5	2-3,4-5
reserved	-	1-2,4-5	1-2,5-6

1.11.2 Clear CMOS (J9C1-A, Pins 4,5,6)

Allows CMOS settings to be reset to default values by moving the jumper from pins 4-5 to pins 5-6 and turning the system on. When the system reports that “NVRAM cleared by jumper”, the system can be turned off, and the jumper should be returned to the 4-5 position to restore normal operation. This procedure should be done whenever the system BIOS is updated. Default is for this jumper to be on pins 4-5.

1.11.3 Password clear (J9C1-A, Pins 1,2,3)

Allows system password to be cleared by moving the jumper from pins 1-2 to pins 2-3 and turning the system on. The system should then be turned off and the jumper should be returned to the 3-5 position to restore normal operation. This procedure should only be done if the user password has been forgotten. The password function is effectively disabled if this jumper is in the 1-3 position. Default is for the password to be enabled (3-5 position).

1.11.4 CMOS Setup Access (J9C1-B, Pins 1,2,3)

Allows access to CMOS Setup utility to be disabled by moving this jumper from the 1-2 position to the 2-3 position. Default is for access to setup to be enabled (1-2 position).

1.11.5 CPU Voltage (J6M1)

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, VRE = 3.465-3.63V)

1.11.6 BIOS Recovery (J7A1)

This jumper allows the BIOS to be recovered if it has been corrupted by moving the jumper from the 1-2 position to the 2-3 position and inserting a recovery diskette. Default setting is for normal operation (1-2 position).

1.12 Reliability

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

Motherboard	80,798 hours

1.13 Environmental

Table 4. Motherboard Environmental Specifications

Parameter	Specification
Temperature	
Non-Operating	-40°C to +70°C
Operating	+0°C to +55°C
DC Voltage	
+5 V	±5 %
-5 V	±5 %
+12 V	±5 %
-12 V	±5 %
+3.3 V	±5 %
Vibration	
Unpackaged	5 Hz to 20 Hz : 0.01g² Hz sloping up to 0.02 g² Hz 20 Hz to 500 Hz : 0.02g² Hz (flat)
Packaged	10 Hz to 40 Hz : 0.015g² Hz (flat) 40 Hz to 500 Hz : 0.015g² Hz sloping down to 0.00015 g² Hz

1.14 Power Consumption

Tables 4 and 5 list the voltage and current specifications for a hypothetical system configured with the motherboard and the following components: a 200 MHz Pentium Processor, 16 MB RAM, 256 KB cache, 3.5-inch floppy drive, 1 GB hard drive, and a 4x IDE CD-ROM. This information is preliminary and is provided only as a guide for calculating **approximate** total system power usage with additional resources added.

Table 5. Power Usage

		DC (amps)				
	AC (watts)	+3.3 V	+5 V	-5 V	+12 V	-12 V
APM enabled, Awake Windows 95 installed	28.0	TBD	TBD	TBD	TBD	TBD
APM enabled, Asleep Windows 95 installed	TBD23.5	TBD	TBD	TBD	TBD	TBD

1.15 Regulatory Compliance

This printed circuit assembly complies with the following safety and EMI regulations when correctly installed in a compatible host system:

1.15.1 Safety

1.15.1.1 UL 1950 - CSA 950-95, 3rd edition, dated 3-28-95

The Standard for Safety of Information Technology Equipment including Electrical Business Equipment. (USA & Canada)

1.15.1.2 CSA C22.2 No. 950-93, 3rd Edition

The Standard for Safety of Information Technology Equipment including Electrical Business Equipment. (Canada)

1.15.1.3 EN 60 950, 2nd Edition, 1992 (with Amendments. 1, 2 & 3)

The Standard for Safety of Information Technology Equipment including Electrical Business Equipment. (European Union)

1.15.1.4 IEC 950, 2nd edition, 1991 (with Amendments 1, 2 & 3)

The Standard for safety of Information Technology Equipment including Electrical Business Equipment. (International)

1.15.1.5 EMKO-TSE (74-SEC) 207/94

Summary of Nordic deviations to EN 60950. (Norway, Sweden, Denmark & Finland)

1.15.2 EMI

1.15.2.1 CISPR 22, 2nd Edition, 1993

Limits and methods of measurement of Radio Interference Characteristics of Information Technology Equipment. (International)

1.15.2.2 EN 55 022, 1995

Limits and methods of measurement of Radio Interference Characteristics of Information Technology Equipment. (Europe)

1.15.2.3 EN 50 082-1 (1992)

Generic Immunity Standard; Currently compliance is determined via testing to IEC 801-2, -3 and -4. (Europe)

1.15.2.4 VCCI Class 2 (ITE)

Implementation Regulations for Voluntary Control of Radio Interference by Data Processing Equipment and Electronic Office Machines. (Japan)

1.15.2.5 FCC Class B

This equipment has been verified to be within the energy emission limits for Class B digital devices defined in the FCC Rules, Subpart B.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates and uses energy of about the same frequency as radio and TV signals. Installed correctly, it will not interfere with your radio and TV. However, we do not guarantee that is will not interfere.

For more information about interference, you can order the following booklet from the U.S. Government Printing Office, Washington, DC 20402. Ask for stock number 004-000-00345-4: "How to identify and Resolve Radio-TV interference Problems" (USA)

1.15.2.6 ICES-003, Issue 2

Interference-Causing Equipment Standard, Digital Appartus. (Canada)

1.15.3 Product Certification Markings

1.15.3.1 European CE Marking

Marking on the board or shipping container.

1.15.3.2 UL Recognition

UL Recognized Marking consists of UL File No. E139761 on component side of board PB No. on solder side of board. Board material flammability is 94V-1 or -0.

1.15.3.3 Canadian Compliance

Marking consists of small c followed by a stylized backward UR on component side of board.

1.15.4 Installation Requirements

⚠ **CAUTION**

To avoid an adverse impact on the compliance with safety or regulatory requirements due to installation of this board assembly, the following guidelines must be followed.

1.15.4.1 Follow Installation Instructions

Be sure to read and adhere to all of these instructions, and the instructions supplied with the host system and associated modules. If the instructions of the host system appear to be incompatible with these instructions or the instructions of any associated modules, contact the suppliers' technical support organizations for the products involved to determine the appropriate action for continued safety and regulatory compliance of the resultant system. Failure to read and follow instructions provided by host system and module suppliers may result in increased safety risk and non-compliance with regional laws and regulations.

1.15.4.2 Assure Host System Compatibility

For electromagnetic compatibility, the host system enclosure and power supply should have passed electromagnetic compatibility testing using a board with a microprocessor from the same family as the microprocessor on this board, operating at the same or higher microprocessor speed. Also, only peripherals (computer input/output devices, terminals, printers, etc.) that are CE Marked and certified by the FCC to comply with Class B limits may be attached to this board. Pay particular attention to the installation instructions of the host system and other modules, particularly concerning certifications, external I/O cable shielding and filtering, mounting, grounding and bonding requirements to assure appropriate shielding effectiveness. Otherwise electromagnetic compatibility testing must be repeated on a representative sample of the complete system.

For safety, if mismating of connectors could result in a hazard, assure that all connectors are sufficiently keyed to prevent mismating.

1.15.4.3 Use Only In Intended Applications

This product was evaluated for use in systems installed in offices, homes, schools, computer rooms or similar applications. Other applications, such as medical, industrial, alarm systems and test equipment may necessitate a re-evaluation of the product suitability.

1.15.4.4 Assure Host System & Accessory Certifications

Assure that the host system, any other subassemblies such as board & drive assemblies being added in, and internal or external wiring, are properly certified for the region(s) the end-product will be used in. Proof of certification can be determined by the marks on the product. For example:

Europe

The CE Marking signifies compliance with all relevant EU requirements. If the host system does not bear the CE Marking, obtain a supplier's Declaration of Conformity to the appropriate standards required by the European EMC Directive and Low Voltage Directive. Other Directives, such as the Machinery and Telecommunications Directives, may also apply depending on the type of product. No regulatory assessment is necessary for low voltage DC wiring used internally, or wiring used externally when provided with appropriate overcurrent protection. Appropriate protection is achieved by max. 8 Amp current limiting circuit or a max. 5 Amp fuse or Positive Temperature Coefficient Resistor (PTC). All Intel motherboards presently have PTC's on all external ports which provide DC power externally.

U.S.

For safety, a certification mark by a Nationally Recognized Testing Laboratory (NRTL) such as UL, CSA or ETL. External wiring must be UL Listed and suitable for the use. Internal wiring must be UL Listed or Recognized and rated appropriately for the voltages and temperatures involved. For electromagnetic interference, the FCC mark: Class A for commercial or industrial only; or Class B for all applications other than described in Item 1.14.3.3 above.

Canada

For safety, a nationally recognized certification mark such as CSA or cUL. No regulatory assessment is necessary for low voltage DC wiring used internally, or wiring used externally when provided with appropriate overcurrent protection. Appropriate protection is achieved by max. 8 Amp current limiting circuit or a max. 5 Amp fuse or Positive Temperature Coefficient Resistor (PTC). All Intel motherboards presently have PTC's on all external ports which provide DC power externally.

1.15.4.5 Installation Precautions

During installation and initial test, use caution to avoid personal injury and damage to wiring due to sharp pins on connectors and printed circuit assemblies, rough chassis edges and corners, and hot components. Adhere to warnings and limitations regarding accessibility into areas designated only for authorized technical personnel.

1.15.4.6 Battery Marking

There is insufficient space on this board product to provide the required replacement and disposal instructions for the battery. The following marking must be placed permanently and legibly on the host system as near as possible to the battery:

CAUTION

Danger of explosion if battery is incorrectly replaced

Replace with only the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

1.15.4.7 Overload Protection:

Unless the power supply is provided with inherent overcurrent protection, use caution to avoid overloading the power supply output. This can be accomplished by assuring that the calculated total current load of all the modules within the system is less than the output current rating of the power supply. Failure to accomplish this could result in overheating in the power supply, which could result in a fire or could cause damage to insulation separating hazardous AC line circuitry from low-voltage user accessible circuitry. If the load drawn by a particular module cannot be determined by the markings and instructions supplied with the module, contact the module supplier's technical support organization.

2 Motherboard Resources

2.1 Memory Map

Table 6. Memory Map

Address Range (Decimal)	Address Range (hex)	Size	Description
1024K-131072K	100000-8000000	127M	Extended Memory
960K-1023K	F0000-FFFFF	64K	AMI System BIOS
952K-959K	EE000-EFFFF	8K	Main BIOS (available as UMB)
948K-951K	ED000-EDFFF	4K	ESCD (Plug and Play configuration area)
944K-947K	EC000-ECFFF	4K	OEM LOGO (available as UMB)
896K-943K	E0000-EBFFF	47K	AMI System BIOS
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

2.2 I/O Map

Table 7. I/O Map

Address (hex)	Size	Description
0000 - 000F	16 bytes	PIIX3 - DMA 1
0020 - 0021	2 bytes	PIIX3 - Interrupt Controller 1
0040 - 0043	4 bytes	PIIX3 - Timer 1
0060	1 byte	Keyboard Controller Byte - Reset IRQ
0061	1 byte	PIIX3 - NMI, speaker control
0064	1 byte	Kbd Controller, CMD/STAT Byte
0070, bit 7	1 bit	PIIX3 - Enable NMI
0070, bits 6:0	7 bits	PIIX3 - Real Time Clock, Address
0071	1 byte	PIIX3 - Real Time Clock, Data

continued ☛

Table 7. I/O Map (continued)

Address (hex)	Size	Description
0080 - 008F	16 bytes	PIIX3 - DMA Page Register
0094-009F	12 bytes	PIIX3 - DMA Page Register
00A0 - 00A1	2 bytes	PIIX3 - Interrupt Controller 2
00C0 - 00DE	31 bytes	PIIX3 - DMA 2
00EA - 00EB	2 bytes	Motherboard Resources
00F0 - 00FF	16 byte	Numeric Data Processor
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 - Vibra 16 Base (default)
0270 - 0273	4 bytes	I/O read port for Plug and Play
02F8 - 02FF	8 bytes	On-Board Serial Port 2
0330 - 0331	2 bytes	Audio - MUP-401
0376	1 byte	Sec IDE Chan Cmd Port
0378 - 037B	4 bytes	Parallel Port 1
0388 - 038B	4 bytes	Audio - FM Synthesis
03B0 - 03BB	4 bytes	S3 Trio64 V+
03C0 - 03DF	16 bytes	S3 Trio64 V+
03F0 - 03F5	6 bytes	Floppy Channel 1
03F6	1 byte	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	On-Board Serial Port 1
04D0 - 04D1	2 bytes	Edge/level triggered
LPT + 400h	8 bytes	ECP port, LPT + 400h
0CF8 - 0CFB*	4 bytes	PCI Config Address Reg.
0CF9	1 byte	Turbo & Reset Control Reg.
0CFC-0CFF*	4 bytes	PCI Config Data Reg
FF00 - FF07	8 bytes	IDE Bus Master Reg.
FFA0 - FFA7	8 bytes	Primary Bus Master IDE Registers
FFA8 - FFAF	8 bytes	Secondary Bus Master IDE Registers

* Only by DWORD accesses.

2.3 Soft-Off Control

The motherboard design supports Soft-off control via the SMM code in the BIOS

2.4 PCI Configuration Space Map

Table 8. PCI Configuration Space Map

Bus Number (hex)	Dev Number (hex)	Function Number (hex)	Description
00	00	00	Intel 82430VX (TVX)
00	07	00	Intel 82371FB (PIIX3) PCI/ISA bridge
00	07	01	Intel 82371FB (PIIX3) IDE Bus Master
00	07	02	Intel 82371FB (PIIX3) USB
00	0D	00	PCI Expansion Slot: J2C1
00	0E	00	PCI Expansion Slot: J2D1
00	0F	00	PCI Expansion Slot: J2E1
00	10	00	PCI Expansion Slot: J2E2

2.5 DMA Channels

Table 9. DMA Channels

DMA	Data Width	System Resource
0	8- or 16-bits	Open
1	8- or 16-bits	Audio (default)
2	8- or 16-bits	Floppy
3	8- or 16-bits	Parallel Port
4		Reserved - Cascade channel
5	16-bits	Audio (default)
6	16-bits	Open
7	16-bits	Open

2.6 Interrupts

Table 10. Interrupts

IRQ	System Resource
NMI	I/O Channel Check
0	Reserved, Interval Timer
1	Reserved, Keyboard buffer full
2	Reserved, Cascade interrupt from slave PIC
3	Serial Port 2
4	Serial Port 1
5	Creative 16C Audio (default)
6	Floppy
7	Parallel Port 1
8	Real Time Clock
9	User available
10	User available
11	User available
12	Onboard Mouse Port if present, else user available
13	Reserved, Math coprocessor
14	Primary IDE if present, else user available
15	Secondary IDE if present, else user available

3 Motherboard BIOS and Setup Utility

3.1 Introduction

The motherboard uses an Intel BIOS, which is stored in Flash EEPROM and upgraded using a floppy disk-based program. In addition to the Intel BIOS, the Flash EEPROM also contains the Setup utility, Power-On Self Tests (POST), APM 1.1, the PCI auto-configuration utility, and Windows 95 ready Plug and Play. This motherboard also supports system BIOS shadowing, allowing the BIOS to execute from 64-bit on-board write-protected DRAM.

Hardware has been added to the board so only Intel compiled BIOS can be flashed into the Flash EEPROM. This was done for extended virus protection.

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 motherboard will be identified as 1.00.0x.CY0.

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

3.2 BIOS Flash Memory Organization

The Intel PA28FB100BX 1 Mb Flash component is organized as 128K x 8 (128 KB). The Flash device is divided into four areas, as described in Table 11.

Table 11. Flash Memory Organization

System Address		FLASH Memory Area
FFFFE000H	FFFFFFFFH	8 KB Boot Block (erasable only if jumpered)
FFFFD000H	FFFFDFFFH	4 KB Plug and Play ESCD Storage Area
FFFFC000H	FFFFCFFFH	4 KB Custom LOGO and Vital Product Data
FFFE0000H	FFFFBFFFH	112 KB System BIOS Reserved during boot

3.3 BIOS Upgrades

Flash memory makes distributing BIOS upgrades easy. A new version of the BIOS can be installed from a diskette. BIOS upgrades are available to be down loaded from the secure section on the Intel bulletin board, or Intel's FTP site.

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.

3.4 PCI IDE Support

The two local bus IDE connectors with independent I/O channel support are setup up automatically by the BIOS if the user selects "Autoconfiguration" in setup. The IDE interface supports PIO Mode 3, and Mode 4 hard drives and recognition of ATAPI CD-ROMs, tape drives, and any other ATAPI devices. The BIOS will determine the capabilities of each drive and configure them to optimize capacity and performance. For the high capacity hard drives typically available today, the drive will be automatically be configured for Logical Block Addressing (LBA) for maximum capacity and to PIO Mode 3 or 4 depending on the capability of the drive. The user is able to override the auto-configuration options by using the manual mode setting. The ATAPI Specification Revision 2.5 recommends that an ATAPI device be configured as shown in the table below.

Table 12. Recommendations for Configuring an ATAPI Device

Primary Cable		**Secondary Cable**		
Drive 0	Drive 1	Drive 0	Drive 1	
ATA				Normal, no ATAPI
ATA		ATAPI		Disk and CD-ROM for enhanced IDE systems
ATA	ATAPI			Legacy IDE System with only one cable
ATA		ATAPI	ATAPI	Enhanced IDE with CD-ROM and a tape or two CD-ROMs
ATAPI				ATAPI CD-ROM as only IDE device in the system

3.5 PCI Auto-configuration

The PCI auto-configuration utility operates in conjunction with the system Setup utility to allow the insertion and removal of PCI cards to the system without user intervention (Plug and Play). When the system is turned on after adding a PCI add-in card, the BIOS automatically configures interrupts, I/O space, and other parameters. PCI interrupts are distributed to available ISA interrupts that have been not been assigned to an ISA card, or system resources. Those interrupts left set to "available" in the CMOS setup will be considered free for PCI add-in card use. It is nondeterministic as to which PCI interrupt will be assigned to which ISA IRQ.

The PCI Auto-Configuration function complies with version 2.10 of the PCI BIOS specification. System configuration information is stored in ESCD format. The ESCD data may be cleared by setting the CMOS clear jumper to the ON position.

PCI specification 2.1 for add-in card auto-configuration is also a part of the Plug and Play BIOS. Peer-to-peer hierarchical PCI Bridge 1.0 is supported, and by using an OEM supplied option ROM or TSR, a PCI-to-PCMCIA bridge capability is possible as well.

3.6 ISA Plug and Play

The BIOS incorporates ISA Plug and Play capabilities as delivered by Plug and Play Release 1.0A (Plug and Play BIOS V.. 1.0A, ESCD V.. 1.03). When used in conjunction with the ISA Configuration Utility (ICU) for DOS or Windows 3.x, the system allows auto-configuration of Plug and Play ISA cards, PCI cards, and resource management for legacy ISA cards. Because the BIOS supports configuring devices across PCI bridges, release 1.41 or greater of the ICU must be used with the motherboard to properly view and change system settings. System configuration information is stored in ESCD format. The ESCD data may be cleared by setting the CMOS clear jumper to the ON position.

The BIOS also has a setup option to support the Windows 95 run time Plug and Play utilities. When this option is selected, only devices critical to booting are assigned resources by the BIOS. Device Node information is available for all devices to ensure compatibility with Windows 95.

Copies of the IAL Plug and Play specification may be obtained via the Intel BBS , or via CompuServe† by typing Go PlugPlay.

3.7 Advanced Power Management

The BIOS has support for Advanced Power Management (APM version 1.1). The energy saving Stand By mode can be initiated by a keyboard hot key sequence set by the user, a time-out period set by the user, or by a suspend/resume button tied to the front panel sleep connector.

When in Stand-by mode, the motherboard reduces power consumption by utilizing the Pentium processor's System Management Mode (SMM) capabilities and also spinning down hard drives and turning off VESA DPMS compliant monitors. The user may select which DPMS mode (Stand By, Suspend, or Off) send to the monitor in setup. 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. Any keyboard or mouse activity brings the system out of the energy saving Stand By mode. When this occurs the monitor and IDE drives are turned back on immediately.

APM is enabled in BIOS by default, however, the system must be configured with an APM driver in order for the system power saving features to take effect. Windows 95 will enable APM automatically upon detecting the presence of the APM BIOS.

3.8 Language Support

The BIOS setup screen and help messages are supported in 32 languages. There are 5 languages translated at this time for use; American English, German, Italian, French, and Spanish. Translations of other languages will available at a later date.

With a 1 Mb Flash BIOS, only one language can be resident at a time. The default language is American English, and will always be present unless another language is programmed into the BIOS using the Flash Language Update Program (FLUP) available on the Intel BBS.

3.9 Boot Options

Booting from CD-ROM is supported in adherence to the "El Torito" bootable CD-ROM format specification developed by Phoenix Technologies and IBM. Under the *Boot Options* field in setup, *CD-ROM* is one of four possible boot devices which are defined in priority order. The default setting is for floppy to be the primary boot device and hard drive to be the secondary boot device. If CD-ROM is selected, it must be the first device. The third and fourth devices are set to *disabled* in the default configuration.. The user can add also select *network* as a boot device. The network option allows booting from a network add-in card with a remote boot ROM installed.

NOTE

A copy of "El Torito" is available on Phoenix Web page (http://www.ptltd.com/techs/specs.html).

3.10 Flash LOGO Area

The motherboard supports a 4 KB programmable FLASH user area located at EC000-ECFFF. An OEM may use this area to display a custom logo. The BIOS accesses the user area just after completing POST. A utility is available from Intel to assist with installing a logo into flash for display during POST. Contact your local Intel Sales office or authorized distributor for further information.

3.11 Setup Enable Jumper

A motherboard configuration jumper 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.

3.12 BIOS Setup Program

The ROM-based Setup utility allows the configuration to be modified without opening the system for most basic changes. The Setup utility is accessible only during the Power-On Self Test (POST) by pressing the <F1> key after the POST memory test has begun and before boot begins. A prompt may be enabled that informs users to press the <F1> key to access Setup. A jumper setting on the motherboard can be set to prevent user access to Setup for security purposes.

3.12.1 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 <↓> arrow keys to select items in a screen. Use the <Enter> key 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.

Table 13. Overview of the Setup Menu Screens

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

3.12.2 Main BIOS Setup Screen

This section describes the Setup options found on the main menu screen. If you select certain options from the main screen (e.g., Hard Disk), the Setup program switches to a subscreen for the selected option.

3.12.2.1 System Date

Specifies the current date. Select the month from a pop-up menu.

3.12.2.2 System Time

Specifies the current time.

3.12.2.3 Floppy Options

When selected, this pops up the Floppy Options menu.

3.12.2.4 Primary Master

Reports if an IDE device is connected to the system. When selected, this brings up the IDE Device Configuration subscreen.

3.12.2.5 Primary Slave

Reports if an IDE device is connected to the system. When selected, this brings up the IDE Device Configuration subscreen.

3.12.2.6 Secondary Master

Reports if an IDE device is connected to the system. When selected, this brings up the IDE Device Configuration subscreen.

3.12.2.7 Secondary Slave

Reports if an IDE device is connected to the system. When selected, this brings up the IDE Device Configuration subscreen.

3.12.2.8 Language

Specifies the language of the text strings used in the Setup program and the BIOS. The options are any installed languages.

3.12.2.9 Boot Options

When selected, this brings up the Boot Options subscreen.

3.12.2.10 Video Mode

Reports the video mode. There are no options.

3.12.2.11 Mouse

Reports if a mouse is installed or not. There are no options.

3.12.2.12 Base Memory

Reports the amount of base memory. There are no options.

3.12.2.13 Extended Memory

Reports the amount of extended memory. There are no options.

3.12.3 Floppy Options Subscreen

3.12.3.1 Floppy A:

Reports if a diskette drive is connected to the system. There are no options.

3.12.3.2 Floppy B:

Reports if a second diskette drive is connected to the system. There are no options.

3.12.3.3 Floppy A: Type

Specifies 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 1.44/1.25 MB, 3.5-inch.

3.12.3.4 Floppy B: Type

Specifies 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.

3.12.3.5 Floppy Access

Specifies read/write access for all attached floppy drives. The options are Read/Write and Read Only. The default is Read/Write.

3.12.4 IDE Device Configuration Subscreen

3.12.4.1 IDE Device Configuration

Used to manually configure the 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.

3.12.4.2 Number of Cylinders

If IDE Device Configuration 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.

3.12.4.3 Number of Heads

If IDE Device Configuration 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.

3.12.4.4 Number of Sectors

If IDE Device Configuration 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.

3.12.4.5 Maximum Capacity

Reports the maximum capacity of your IDE Device. It is calculated from the number of cylinders, heads, and sectors. There are no options here.

3.12.4.6 IDE Translation Mode

Specifies the IDE translation mode. The options are Standard CHS (standard cylinder head sector –less than 1024 cylinders), Logical Block, Extended CHS (extended cylinder head sector–greater than 1024 cylinders), and Auto Detected (BIOS detects IDE drive support for LBA). The default is Auto Detected.

CAUTION

Do not change this from the option selected when the hard drive was formatted. Changing the option can result in corrupted data.

3.12.4.7 Multiple Sector Setting

Sets the number of sectors transferred by an IDE drive per interrupt generated. 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 provides optimum performance for your drive.

3.12.4.8 Fast Programmed I/O Modes

Sets how fast transfers on the IDE interface occur. The options are Disabled or Auto Detected. The default is Auto Detected. If set to Disabled, transfers occur at a less than optimized speed. If set to Auto Detected, transfers occur at the drive's maximum speed.

3.12.5 Boot Options Subscreen

This section describes the options available on the Boot Options subscreen.

3.12.5.1 First, Second, Third, Fourth Boot Device

Sets which drives the system checks to find an operating system to boot from. The following options are available:

First Boot Device:	Select Disabled, Floppy, Hard Disk, CD-ROM, Network.
Second, Third, Fourth Device:	Select Disabled, Floppy, Hard Disk, Network.

3.12.5.2 System Cache

Enables or disables both the primary and the secondary cache memory. The options are Enabled or Disabled. The default is Enabled.

3.12.5.3 Boot Speed

Sets 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.

3.12.5.4 Num Lock

Sets the beginning state of the Num Lock feature on your keyboard. The options are On and Off. The default is Off.

3.12.5.5 Setup Prompt

Turns on (or off) 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.

NOTE

This option has no effect on your ability to access the Setup program. It only toggles the prompt.

3.12.5.6 Typematic Rate Programming

Sets the typematic rates. The options are Default and Override. The default is Default. Choosing Override enables Typematic Rate Delay and Typematic Rate.

3.12.5.7 Typematic Rate Delay

Sets 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.

3.12.5.8 Typematic Rate

Sets 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.

3.12.6 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 switches to a subscreen for the selected option. Subscreens are described in the sections following the description of the Advanced screen options.

3.12.6.1 Processor Type

Reports the CPU type. There are no options.

3.12.6.2 Processor Speed

Reports the CPU clock speed. There are no options.

3.12.6.3 Cache Size

Reports the size of the secondary cache. There are no options. If your system contains no L2 cache, this item will not appear.

3.12.6.4 Peripheral Configuration

When selected, this brings up the Peripheral Configuration subscreen.

3.12.6.5 Advanced Chipset Configuration

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

3.12.6.6 Power Management Configuration

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

3.12.6.7 Plug and Play Configuration

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

3.12.7 Peripheral Configuration Subscreen

This section describes the screens for the peripheral configuration subscreen.

3.12.7.1 Configuration Mode

Enables you to choose between setting the peripheral configuration yourself, or having 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 PCI IDE Interface, Floppy Interface, Serial Port 1 and Serial Port 2 Addresses, Serial Port 2 IR Mode, and the Parallel Port Address cannot be modified. The settings displayed for those options reflect the current state of the hardware.

3.12.7.2 PCI IDE Interface

Enables or disables 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.)

3.12.7.3 Floppy Interface

Enables or disables 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.)

3.12.7.4 Serial Port 1 Address

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

3.12.7.5 Serial Port 2 Address

Selects the address of the serial port. The options are Disabled; COM1, 3F8h; COM2, 2F8h; COM3, 3E8h; and COM4, 2E8h. The default is COM2, 2F8h. If the Configuration Mode is set to

Auto, the Setup program assigns the first free COM port (normally COM2, 2F8h) as the serial port 2 address, regardless of what is selected under the Serial Port 2 Address option. (If Configuration Mode is set to Auto, this option cannot be modified.)

NOTE

If either serial port address is set, the address it is set to will not appear in the options dialog box of the other serial port. If an ATI† mach32† or an ATI mach64† video controller is active, the COM4, 2E8h address will not appear in the options dialog box of either serial port.

3.12.7.6 Serial Port 2 IR Mode

Makes Serial Port 2 available to infrared applications. The options are Enabled and Disabled. The default is Disabled. (If Configuration Mode is set to Auto, this option cannot be modified.)

3.12.7.7 Parallel Port Address

Selects the address and IRQ of the parallel port. The options are Disabled; LPT3, 3BCh, IRQ7; LPT1, 378h, IRQ7; LPT1, 378h, IRQ5; and LPT2, 278h, IRQ5. The default is LPT1, 378h, IRQ7. If the Configuration Mode is set to Auto, the setup program assigns LPT1, 378h, IRQ7 as the parallel port address, regardless of what is selected under the Parallel Port Address option. (If Configuration Mode is set to Auto, this option cannot be modified.)

3.12.7.8 Parallel Port Mode

Selects the mode for the parallel port. The options are Compatible, Bi-directional, EPP, and ECP. The default is Compatible. Compatible means the parallel port operates in AT-compatible mode. Bi-directional means the parallel port operates in bi-directional PS/2-compatible mode. EPP and ECP mean the parallel port operates high-speed, bi-directionally. This option is not affected by the Configuration Mode field above.

3.12.8 Advanced Chipset Configuration Subscreen

This section describes the options available on the Advanced Chipset Configuration Subscreen.

3.12.8.1 Base Memory Size

Sets the size of the base memory. The options are 512 KB and 640 KB. The default is 640 KB.

3.12.8.2 ISA LFB Size

Sets the size of the linear frame buffer. The options are Disabled and 1 MB. The default is Disabled. If this is set to 1 MB, then the ISA LFB Base Address field will appear.

3.12.8.3 ISA LFB Base Address

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.

3.12.8.4 Video Palette Snoop

Controls the ability of a primary PCI graphics controller to share a common palette with an ISA add-in video card. The options are Enabled and Disabled. The default is Disabled.

3.12.8.5 Latency Timer (PCI Clocks)

Sets the length of time an agent on the PCI bus can hold the bus when another agent has requested the bus. Valid numbers are between 0 and 256. The default is 66.

3.12.8.6 PCI Burst

Controls the support for PCI to memory burst mode data transfers. The options are Enabled and Disabled. The default is Enabled.

3.12.8.7 DIMM Type Detection

Reports the type of memory found in each of the two memory banks. There are no options.

3.12.9 Power Management Configuration Subscreen

This section describes the options available on the Power Management Subscreen.

3.12.9.1 Advanced Power Management

Enables or disables the Advanced Power Management (APM) support in your system's BIOS. The options are Enabled and Disabled. The default is Enabled. 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.

3.12.9.2 IDE Drive Power Down

Sets any IDE drives to spin down when the system goes into power managed mode. The options are Enabled and Disabled. The default is Enabled.

3.12.9.3 Inactivity Timer

Sets how long the system must be inactive before it enters power managed mode. Enter the number of minutes. The range is 0 to 255 minutes. The default is 10 minutes.

3.12.9.4 VESA Video Power Down

Sets the command issued to your graphics card when the system goes into power managed mode. The options are Disabled, Standby, Suspend, and Sleep. The default is Sleep.

3.12.9.5 Hot Key

Sets the hot key that, when pressed while holding down the <Ctrl> and <Alt> keys, causes the system to enter power managed mode. All alphabetic keys are valid.

3.12.10 Plug and Play Configuration Subscreen

This section describes the options found on the Plug and Play configuration subscreen.

3.12.10.1 Configuration Mode

Sets how the BIOS gets information about ISA cards that do not have Plug and Play capabilities. The options are Use Setup Utility and Use ICU (ISA Configuration Utility). The default is Use Setup Utility.

If Use ICU is selected, the BIOS will depend on run-time software to ensure that there are no conflicts between ISA boards with Plug and Play capabilities and those without. Only Boot With PnP OS will be visible.

3.12.10.2 Boot with PnP OS

Enables the PC to boot with an operating system capable of managing Plug and Play add-in cards. The options are None, Other, and Windows 95. The default is Windows 95.

3.12.10.3 ISA Shared Memory Size

Enables you to “unshadow” a block of the upper memory area. 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, the ISA Shared Memory Base Address (described below) will not be visible.

Shadowing is a technique that copies a block of memory from an add-in card’s ROM to the same address in system memory. This provides faster access and achieves higher performance. By default, all upper memory is shadowed.

3.12.10.4 ISA Shared Memory Base Address

Sets the base address for the ISA Shared Memory. The options are C8000h, CC000h, D0000h, D4000h, D8000h, and DC000h. The default is C8000h. This setting could affect the ISA Shared Memory Size item. The value entered in the ISA Shared Memory Size item cannot extend to the E0000h address. For example, if a size of 64K was selected, options D4000h, D8000h, and DC000h will not be available.

3.12.10.5 IRQ 3, 4, 5, 7, 9, 10, 11, 12, 14, 15

Sets the status of the IRQ. The options are Available and Used By ISA Card. The default is Available. The PCI auto-configuration code looks here to see if these interrupts are available for use by a PCI add-in board. If an interrupt is available, the PCI auto-configuration code can assign the interrupt to be used by the system. If your system contains an ISA agent that uses one of these interrupts, select Used By ISA Card for that interrupt.

NOTE

IRQ 3, 4, 5, and 7 may not be available in this option, depending on the setting chosen for the COM1, COM2 and parallel ports in the Peripheral Configuration Subscreen.

IRQ 14 and 15 will not show up as user available. If the on-board IDE controller is not used, these interrupts will be available to ISA cards. These interrupts can not be used for PCI cards.

3.12.11 Security Screen

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

3.12.11.1 Administrative and User Access Modes

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

In general, Administrative mode has full access to the Setup options, whereas User mode has restricted access to the options. Thus, by setting separate Administrative and User passwords, a system administrator can limit who can change critical Setup values. The actual limitations depend on whether either the Administrative or User passwords or both are set. (See the table below for a description of how the passwords actually work together.)

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

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

Table 14. Administrative and User Password Functions

Password Set	Administrative mode can . . .	User mode can . . .	Password Required During Boot Process
Neither	Can change all options*	Can change all options*	None
Administrative only	Can change all options	Can change a limited number of options	None
User only	N/A	Can change all options	User
Both	Can change all options	Can change a limited number of options	Administrative or User

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

3.12.12 Security Screen Options

3.12.12.1 User Password is

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

3.12.12.2 Administrative Password is

Reports if there is an Administrative password set. There are no options.

3.12.12.3 Set User Password

Sets the User password. The password can be up to seven alphanumeric characters.

3.12.12.4 Set Administrative Password

Sets the Administrative password. The password can be up to seven alphanumeric characters.

3.12.12.5 Unattended Start

Controls 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 boots, but the keyboard will be locked until the User password is entered.

3.12.12.6 Security Hot Key (CTRL-ALT-)

Sets a hot key that, when pressed, locks the keyboard until the User password is entered. The Keyboard LEDs flash to indicate that the keyboard is locked. When you enter the User password, you do not have to press the <Enter> key.

3.12.13 Exit Screen

This section describes the different ways to exit and save or not save changes made in the Setup program.

3.12.13.1 Exit Saving Changes

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

3.12.13.2 Exit Discarding Changes

Exits the Setup program without saving any changes. This means that any changes made while in the Setup program are discarded and NOT SAVED. Pressing the <Esc> key in any of the four main screens will do this.

3.12.13.3 Load Setup Defaults

Resets 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 Setup values from the ROM table.

3.12.13.4 Discard Changes

Discards 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 RAM values that were present when the system was turned on.

4 Error Messages and Beep Codes

4.1 BIOS Beep Codes

Beeps	Error Message	Description
1	Refresh Failure	The memory refresh circuitry on the motherboard 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 motherboard is not functioning.
5	Processor Error	The CPU on the motherboard generated an error.
6	8042 - Gate A20 Failure	The keyboard controller (8042) may be bad. The BIOS cannot switch to protected mode.
7	Processor Exception Interrupt Error	The CPU generated an exception interrupt.
8	Display Memory Read/Write Error	The system video adapter is either missing or its memory is faulty. This is not a fatal error.
9	ROM Checksum Error	ROM checksum value does not match the value encoded in BIOS.
10	CMOS Shutdown Register Rd/Wrt Error	The shutdown register for CMOS RAM failed.
11	Cache Error/ External Cache Bad	The external cache is faulty.

4.2 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
```

4.3 BIOS Error Messages

Error Message	Explanation
8042 Gate - A20 Error	Gate A20 on the keyboard controller is not working.
Address Line Short!	Error in the address decoding circuitry on the motherboard.
Cache Memory Bad, Do Not Enable Cache!	Cache memory is defective.
CH-2 Timer Error	There is an error in timer 2.
CMOS Battery State Low	CMOS RAM is powered by a battery. The battery power is low. Replace the battery.
CMOS Checksum Failure	After CMOS RAM values are saved, a checksum value is generated for error checking. The previous value is different from the current value. Run 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 Setup.
CMOS Memory Size Mismatch	The amount of memory on the motherboard is different than the amount in CMOS RAM. Run Setup.
CMOS Time and Date Not Set	Run 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.

continued ☛

BIOS Error Messages (continued)

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

4.4 ISA NMI Messages

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