VS440FX

Motherboard
Technical Product Specification

Order Number 281812-002

May 1996

int_el.

Revision History

Revision	Revision History	Date
-001	Preliminary release of the VS440FX Technical Product Specification.	4/96
-002	Second release of the VS440FX Technical Product Specification.	5/96

This product specification applies only to standard VS440FX motherboards with BIOS identifier CS1

Changes to this specification will be published in the VS440FX Specification Update before being incorporated into a revision of this document.

Table of Contents

1 Motherboard Description

1.1 Overview

The VS440FX design will accept Intel's Pentium® Pro processors at speeds of 150 MHz, 166 MHz, 180 MHz and 200 MHz. The memory subsystem supports up to 256 MB of DRAM using standard 72-pin SIMM† sockets that accept Fast Page Mode (FPM) and Extended Data Out (EDO) memory. A type 8 Zero Insertion Force (ZIF) socket provides an upgrade path to future Pentium Pro Overdrive® processors.

The VS440FX motherboard utilizes Intel's 82440FX PCIset. The Intel 82371SB PCI/ISA IDE Xccelerator (PIIX3) provides an integrated Bus Mastering IDE controller with two high performance IDE interfaces for up to four devices (such as hard drives or CD-ROM). The National PC87308 Super 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 and Consumer Infra Red compatible interface.

To provide for the increasing number of multimedia applications, a Crystal CS4232 audio CODEC is integrated onto the motherboard. The CS4232 provides 16-bit stereo, Sound Blaster† Pro compatible audio.

Up to four PCI local bus slots provide a high bandwidth data path for data-movement intensive functions such as video or networking. PCI Bridge support in the BIOS allows for further expansion of the system with PCI peripherals. Up to four ISA slots complete the I/O mix. A total of seven expansion slots may be populated with full length add-in cards, since one PCI and ISA slot share the same chassis I/O panel.
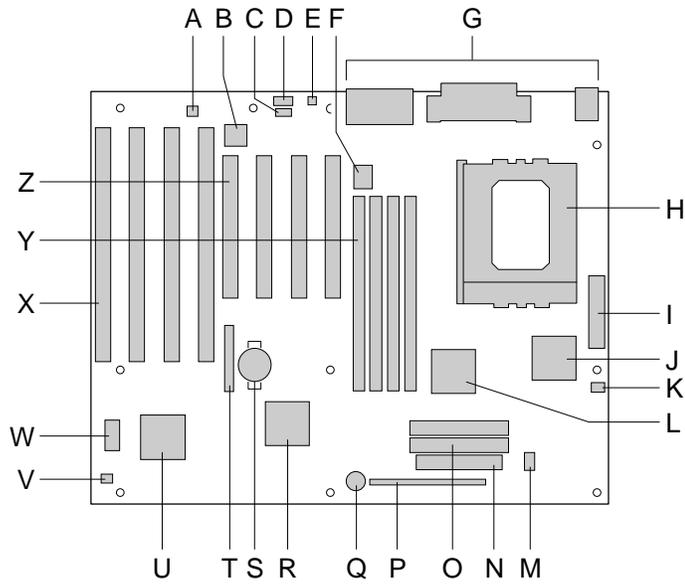
OM04546A

Figure 1. Motherboard Features

A   Optional Yamaha[†] OPL3 synthesizer
B   Optional Crystal Audio device
C   Optional CD-ROM audio connector
D   Optional Wave table connector
E   Optional telephony connector
F   VCCP voltage regulator
G   External I/O connectors
H   Pentium Pro / Socket 8
I   Power connector
J   Intel SB82441FX (PMC)
K   Microprocessor fan connector
L   Intel SB82442FX (DBX)
M   VTT voltage regulator

N   Floppy connector
O   IDE connectors
P   Front panel connectors
Q   Onboard speaker
R   Intel 82371SB (PIIX3)
S   Battery
T   Jumper block
U   National PC87308 Super I/O controller
V   Auxiliary fan connector
W   Flash BIOS
X   ISA add-in board connectors
Y   SIMM connectors
Z   PCI add-in board connectors

1.2 Motherboard Manufacturing Options

–   CS4232 audio CODEC
–   Telephony header
–   CD-ROM header
–   Wave table upgrade header

1.3 Form Factor

The motherboard is designed to fit into a standard ATX form factor chassis. Figure 2 illustrates the mechanical form factor for the motherboard. The ATX form factor adheres to the standard ATX v. 1.1 guidelines in that the outer dimensions are 12" x 9.6" (30.48 cm x 24.38 cm). Location of the I/O connectors, PCI and ISA slots, and mounting holes are in strict compliance with the ATX v. 1.1 specification.
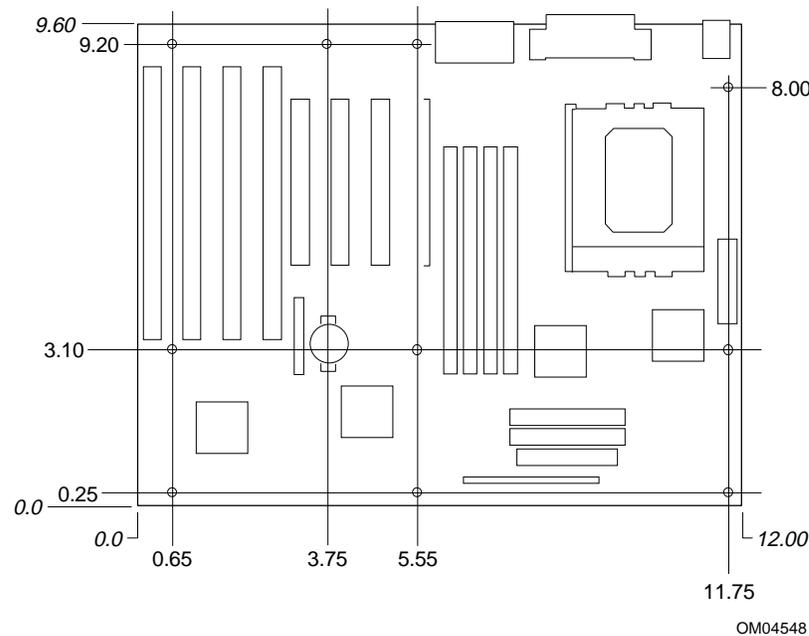
Figure 2. Motherboard Dimensions

1.4 Microprocessor

The VS440FX motherboard operates with 2.1 V to 3.5 V Pentium Pro processors. An on-board voltage regulator circuit provides the required voltages from the 5 V and 3.3 V taps off the power supply. The on-board voltage regulator makes use of the VID capabilities to automatically adjust its voltage output to match that of the installed processor.. Pentium Pro processors running at 150, 166, 180, and 200 MHz are supported.

The Pentium Pro processor integrates second level cache and cache controller that were previously implemented on the motherboard. The internal non-blocking L2 cache on the 150, 180 and 200 MHz processors is 256 KB, while the 166 and a second version of the 200 MHz processors integrate a 512 KB cache.

The Pentium Pro processor maintains full backward compatibility with the 8086, 80286, Intel386™, Intel486™ and Pentium processors. It also has a numeric coprocessor that significantly increases the speed of floating point operations, while maintaining backward compatibility with the i486DX math coprocessor and complying with ANSI/IEEE standard 754-1985.

1.4.1   Microprocessor Upgrade

Socket 8 is a 387-pin, modified staggered pin grid array (SPGA) zero insertion force (ZIF) socket, along with a programmable voltage regulator for the CPU core. It provides users with a performance upgrade path to Pentium Pro OverDrive technology. The voltage regulator programming is automatic and controlled by the VID pins of the processor.

1.4.2   Microprocessor Heatsink and Clips

An approved Pentium Pro heatsink is necessary for proper thermal dissipation in an ATX v. 1.1 compliant chassis. The processor/heatsink assembly must be securely fastened to the Socket 8 ZIF socket by two clips. These clips fit over the heatsink assembly and attach to the outer wide tabs of the Socket 8 assembly.

⚠ CAUTION

Do not use the older style of bail-wire clips for securing the heatsink assembly. These clips have been found to damage the motherboard when installed or removed incorrectly.

1.5 Memory

1.5.1   Main System Memory

The motherboard provides four 72-pin SIMM sockets that make it possible to install up to 256 MB of RAM. The sockets support 1M x 32 (4 MB) single-sided modules, 2M x 32 (8 MB), 4M x 32 (16 MB), 8M x 32 (32 MB) and 16M x 32 (64 MB) single- or double-sided modules. Minimum memory size is 8 MB and maximum memory size, using four 16M x 32 SIMM modules, is 256 MB. Memory timing requires 60 ns fast page devices or, for optimum performance, 60 ns EDO DRAM. Both parity and non-parity memory are supported as well as ECC.

The four sockets are arranged in two banks of two sockets each. The sockets are designated Bank 0 and Bank 1. Each bank provides a 64/72-bit wide data path. Both SIMMs in a bank must be of the same memory size and type, although the different types and sizes of memory may differ between banks. Bank 0 only, Bank 1 only, or both of the banks may be populated. There are no jumper settings required for the memory size or type, which is automatically detected by the system BIOS. Use only tin lead SIMMs when adding DRAM.

⇒ NOTE

64 MB SIMMs using the 16 Mb technology are not qualified for use on the VS440FX motherboard due to electrical loading characteristics. 64 MB SIMMs using 64 MB technology have not been qualified, however, they will be supported by the motherboard when they become available, depending upon the individual characteristics of the memory module.

1.5.1.1 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 memory access cycle, unlike standard fast page mode DRAM that tri-states the memory data when the precharge cycle occurs, prior to the next memory access cycle. EDO DRAM timings are X-2-2-2 compared to FPM timings of X-3-3-3.

1.5.1.2 Parity/ECC DRAM

Memory error checking and correction is supported via parity or ECC SIMMs. Parity or ECC SIMMs are automatically detected. However, the user must enter Setup to configure the SIMMs for either Parity or ECC operation. Parity memory will detect single bit errors. Ecc memory will detect double bit errors and correct single bit errors. Errors may be generated by a defective memory module, different speeds of memory modules, or DMA or memory conflicts.

1.6 Chipset

The Intel 82440FX PCIset consists of the 82441FX PCI Bridge and Memory controller (PMC) and the 82442FX Data Bus Accelerator (DBX). The Intel 82371SB PCI ISA/IDE Xccelerator (PIIX3) bridge, provides the connection between the ISA and PCI buses.

1.6.1 82441FX PCI Bridge and Memory Controller (PMC)

The 82441FX comes in a 208 pin QFP package and provides the following features:

- CPU interface control
  - Pentium Pro processor up to 66 MHz
  - 32-bit addressing
- Integrated DRAM controller
  - 64/72-bit Non-Interleaved path to memory w/ ECC support
  - Support for EDO and Fast Page DRAM
  - 8 MB to 256 MB main memory
- Fully synchronous PCI bus interface
  - PCI Rev. 2.1 - 5 V interface compliant
  - 25/30/33 MHz
  - PCI to DRAM > 100 MBps
- Data Buffering
  - Pentium Pro-to-DRAM and PCI-to-DRAM write data buffering
  - Write combining support for Pentium Pro-to-PCI burst writes

1.6.2 82442FX Data Bus Accelerator (DBX)

The DBX connects to the 64 bit Pentium Pro data bus, the 64/72 bit memory data bus and the 16 bit PMC private data bus. The DBX works in parallel with the PMC to provide a high performance memory subsystem for Pentium Pro based systems. The DBX comes in a 208 pin PQF package.

1.6.3   82371SB PCI/ISA IDE Xccelerator (PIIX3)

The 82371SB provides the interface between the PCI and ISA buses and integrates a dual channel fast IDE interface capable of supporting up to four devices. The 82371SB integrates four 8-bit and three 16-bit DMA channels, three 8-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 into the same device. The PIIX3 comes in a 208-pin QFP package and provides the following features:

- Interface between the PCI bus and ISA bus
- Universal Serial Bus (USB)
  - Host/Hub Controller
  - Support for 2 USB ports
- Integrated fast IDE interface
  - Support for up to 4 devices with separate Master/Slave mode support
  - PIO Mode 4 transfers up to 16 MB/sec
  - Integrated 8 x 32-bit buffer for Bus Master IDE PCI burst transfers
- Enhanced DMA controller with Fast Type-F DMA
- Counters/Timers
- Power Management
  - Programmable system management interrupt (SMI)

1.6.4   IDE Support

The motherboard 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 ATAPI (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.

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.

Detailed information on the PCIset is available in the Intel 82440FX PCISet data sheet

1.7 PC87308 Super I/O Controller

Control for the integrated serial ports, parallel port, floppy drive, RTC and keyboard controller is incorporated into a single component, the National Semiconductor PC87308. The PC87308 is a fully Plug-N-Play device which provides:

- Two NS16C550-compatible UARTs with send/receive 16 byte FIFO
  - Support for an IrDA and Consumer IR compliant Infrared 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 with Century calendar functionality
- Integrated 8042 compatible keyboard controller

The PC87308 is normally configured automatically by the BIOS, but configuration of these interfaces also is possible using the CMOS Setup utility that can be invoked during boot. The serial ports can be enabled as COM1, COM2, COM2 as IrDA, or disabled. The parallel port can be configured as compatible, bi-directional, EPP/ECP, or disabled. The floppy interface can be configured for 360 KB or 1.2 MB 5¼ in. media or for 720 KB, 1.2 MB, 1.44 MB, or 2.88 MB 3½ in. media.

1.7.1   Floppy Controller

The PC87308 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. Configuring the floppy interface for 1.2 MB 3½" (3-mode floppy) requires the use of a driver to operate correctly.

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 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> <defined in setup>: Power down and coffee-break key sequences take advantage of the SMM features of the Pentium Pro processor to greatly reduce the system's power consumption while maintaining the responsiveness necessary to service external interrupts.
- <CTRL> <ALT> <defined in setup>: Keyboard secure hot-keys lock the keyboard until user specified password is given.

13

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, a 100-year calendar with alarm features, and a century register. 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 seven years and is socketed for easy replacement. When the system is on, the life of the battery is extended by a trickle current from the power supply.

1.7.4   Infrared 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. Support for Consumer Infra Red (ASK-IR and DASK-IR options for SHARP-IR) is also included.

1.7.5   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 Audio Subsystem

The VS440FX motherboard 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 playing and recording 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 / µlaw, 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[†] and 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-N-Play ISA interface and is comprised of seven logical devices including the Synthesizer, Game Port, Sound Blaster, Sound System, MPU-401, CD-ROM and the CS4232 device itself. Each logical device is configured into the host environment using the ISA Plug-N-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 and can be mapped to interrupt 5, 7, 9, 11, 12, or 15.

1.9 Motherboard Connectors

There are connectors on-board for Floppy, IDE, SIMMs, battery holder and front panel I/O connectors.
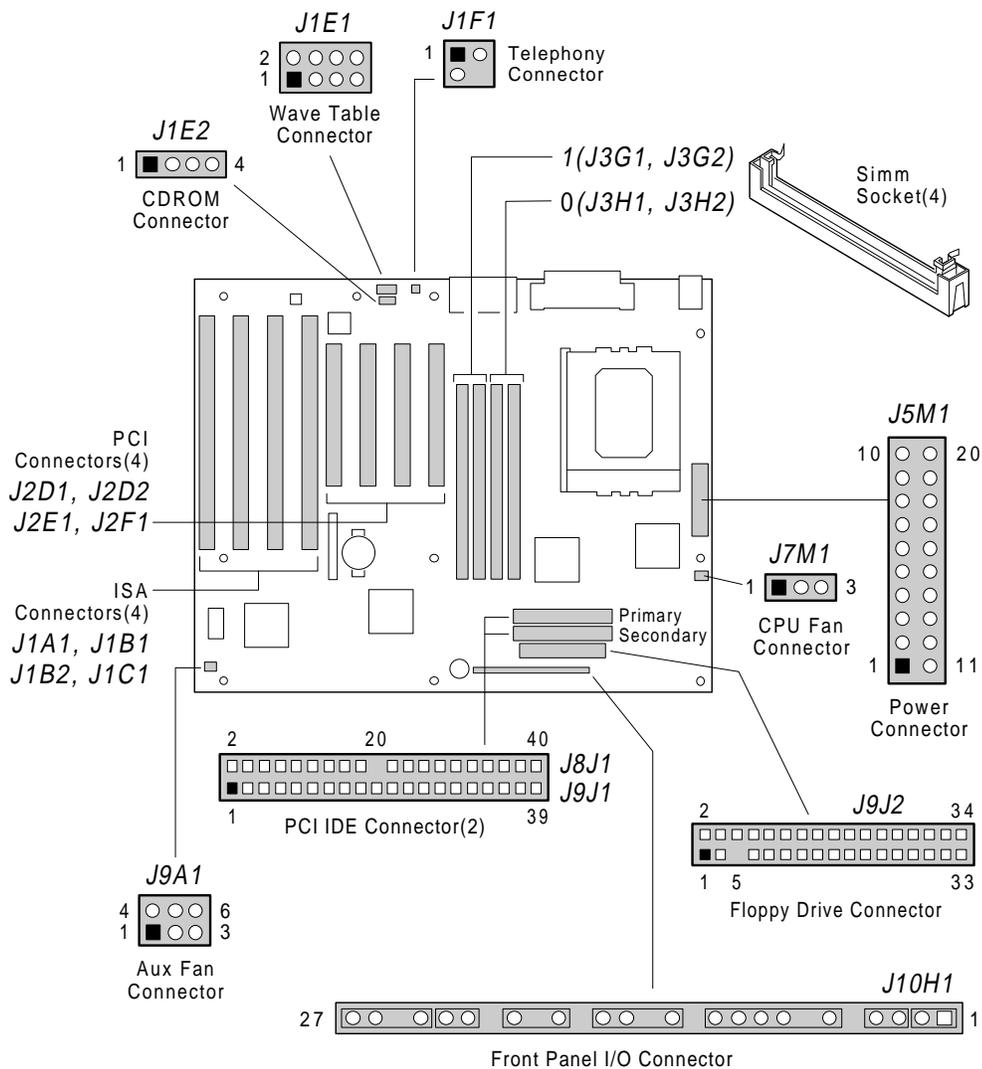
Figure 3. Motherboard Connector Locations

1.9.1   CD-ROM Connector - J1E2

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

1.9.2   Wave Table Connector - J1E1

Pin	Signal Name
1	Wave Right
2	Ground
3	Wave Left
4	Ground
5	Key
6	Ground
7	NC
8	MIDI_Out

1.9.3   Telephony Connector - J1F1

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

1.9.4   Power Connector - J5M1

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

1.9.5   Microprocessor Fan Connector - J7M1

Pin	Signal Name
1	Ground
2	+12V
3	Ground

1.9.6   Floppy Drive Connector - J9J2

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 #

1.9.7   Auxiliary Fan Connector - J9A1

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

1.9.8   IDE Connectors - J8J1, J9J1

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-down
29	DDACK0 (DDACK1) #	30	Ground
31	IRQ14 (IRQ15)	32	Reserved
33	DAG1	34	Reserved
35	DAG0	36	DAG2
37	Chip Select 1P (1S) #	38	Chip Select 3P (3S) #
39	Activity #	40	Ground

1.9.9   Front Panel I/O Connectors - J10H1

Pin	Signal Name
1	SW_ON
2	FPPWR_ON
3	SLEEP_REQ
4	FPSLP
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	PWRDVR
21	Key
22	Ground
23	FP_RESET
24	+5V
25	Key
26	SPKR_DAT connect
27	PC_SPKROUT

1.9.10   ISA Connectors

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

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

1.9.11 PCI Connectors

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	GND	A33	3.3 V	B33	C/BE
A3	Vcc	B3	GND	A34	FRAME-	B34	GND
A4	Vcc	B4	TD0	A35	GND	B35	IRDY-
A5	Vcc	B5	Vcc	A36	PTRDY-	B36	3.3 V
A6	PCIINT3-	B6	Vcc	A37	GND	B37	DEVSEL-
A7	PCIINT1-	B7	PCIINT4-	A38	STOP-	B38	GND
A8	Vcc	B8	PCIINT2-	A39	3.3 V	B39	PLOCK-
A9	GND	B9	PRSNT1C	A40	SDONE	B40	PERR-
A10	GND	B10	Reserved	A41	SBO-	B41	3.3 V
A11	Reserved	B11	PRSNT2C	A42	GND	B42	SERR-
A12	GND	B12	GND	A43	PAR	B43	3.3 V
A13	GND	B13	GND	A44	AD15	B44	C/BE
A14	Reserved	B14	Reserved	A45	3.3 V	B45	AD14
A15	PCIRST-	B15	GND	A46	AD13	B46	GND
A16	Vcc	B16	SL_3PCICLK	A47	AD11	B47	AD12
A17	PCIGNT-	B17	GND	A48	GND	B48	AD10
A18	GND	B18	PCIREQ2	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	C/BE	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	C/BE	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	REQ64C-	B60	ACK64C-
A30	GND	B30	AD19	A61	Vcc	B61	Vcc
A31	AD18	B31	3.3 V	A62	Vcc	B62	Vcc

1.9.12 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. 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. The user has the ability to determine the state of the power supply, so if the system was turned on when power was disconnected, the system will turn back on when power is reapplied or remain off, depending on the user setup configuration in CMOS.

1.9.13 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
- CPU fan
- Infra-Red (IrDA) port
- Sleep/Resume
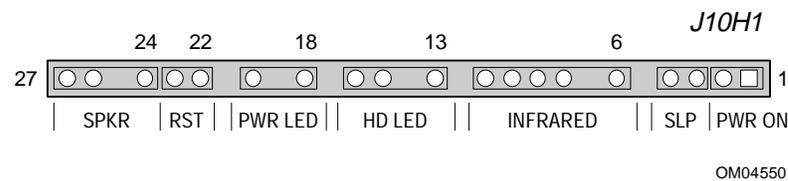
Figure 4. Front Panel I/O Connectors

1.9.13.1 Speaker

The speaker provides error beep code information during the Power-On Self Test, if the system cannot use the video interface. Jumpering pins 26-27 (the last two pins of J10H1) enables the onboard speaker. To disable the onboard speaker, remove the jumper from these pins or disable the on-board speaker via a CMOS setup option.

1.9.13.2 Sleep/Resume

When Advanced Power Management (APM) is activated in the system BIOS and the Operating System's APM driver is loaded, Sleep mode (Standby) 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 located on the front panel I/O connector. Closing the "Sleep" switch will generate an SMI (System Management Interrupt) to the processor which immediately goes into System Management Mode (SMM).

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 PS/2 mouse. Mouse activity will only "wake up" the system if a mouse driver is

loaded. While the system is in Standby 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 (keyboard/mouse) occurs as mentioned above

1.9.13.3   Infra-Red 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. Consumer IR is also supported by the same connector.

1.9.13.4   Reset

This 2-pin 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.

1.9.14   Back Panel Connectors

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

OM04547
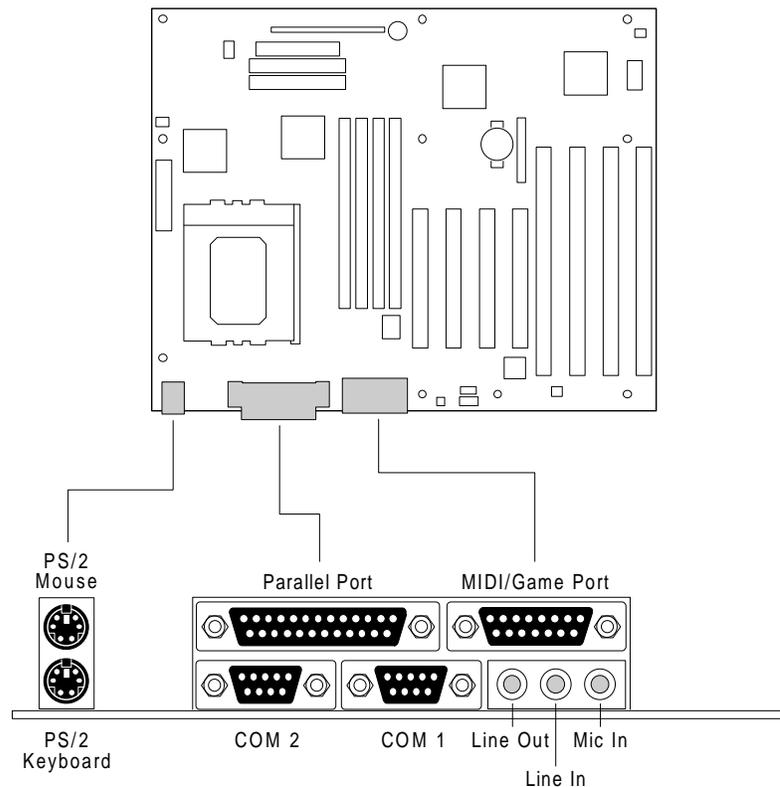
Figure 5. I/O Connections

1.10 Jumper Settings
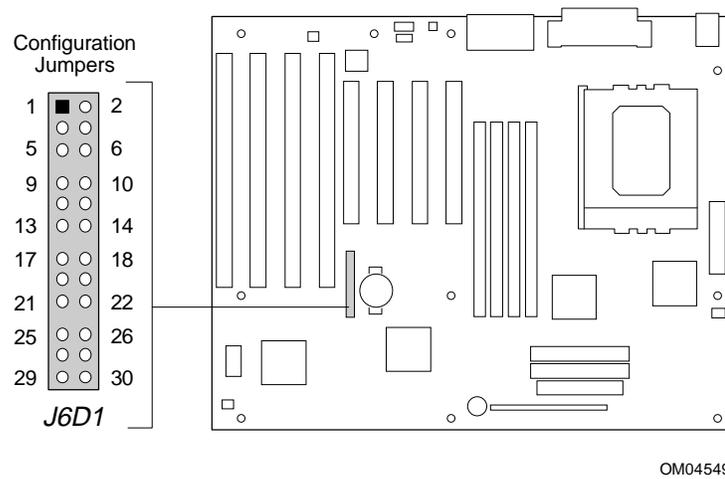
Figure 6. Jumper Locations

Table 1.   Configuration Jumper Settings

Function	Jumper	Configuration
Host Bus Speed **(Note: These jumpers also set PCI and ISA clock speeds**.)	J6D1	See Table 2
CPU Speed Ratio	J6D1	See Table 2
CMOS Clear	J6D1	20-22 Keep (**Default**) 18-20 Clear
Password Clear	J6D1	27-29 Password Enabled (**Default**) 25-27 Password Clear/Disabled
CMOS Setup Access	J6D1	28-30 Access Allowed (**Default**) 26-28 Access Denied
BIOS Recovery	J6D1	4-6 Normal Operation (**Default**) 2-4 Recovery Mode

1.10.1   Microprocessor Configuration (J6D1)

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 2.   CPU/SYSTEM Speed Settings

Microprocessor Freq. (MHz)	Host Bus Freq. (MHz)	J6D1	Microprocessor Clock Multiplier	PCI Bus Freq. (MHz)	ISA Bus Freq. (MHz)
200	66	19-21, 12-14, 9-11	3	33	8.33
180	60	17-19, 12-14, 9-11	3	30	7.5
166	66	19-21, 10-12, 11-13	2.5	33	8.33
150	60	17-19, 10-12, 11-13	2.5	30	7.5
reserved	-	17-19, 10-12, 9-11	-	-	-
reserved	-	17-19, 12-14, 11-13	-	-	-
reserved	-	19-21, 10-12, 9-11	-	-	-
reserved	-	19-21, 12-14, 11-13	-	-	-

1.11 Reliability

The Mean-Time-Between-Failures (MTBF) data is calculated from predicted data @55°C in accordance with the *Intel Reliability Policy and Procedures Handbook*.

Motherboard   61,354 Hours

1.12 Environmental

Table 3.   Motherboard Environmental Specifications

Parameter	Specification
Temperature	
Non-Operating	-40°C to +70°C
Operating	+0°C to +55°C
DC Voltage	
+3.3 V	±5 %
+5 V	±5 %
-5 V	±5 %
+12 V	±5 %
-12 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

1.13 Power Consumption

Tables 4 list the voltage and current specifications for a hypothetical system configured with the motherboard and the following components: a 200 MHz Pentium Pro processor w/ 256 KB Cache, 32 MB EDO DRAM, 3.5-inch floppy drive, 1.6 GB IDE hard drive, 4X IDE CD-ROM, and a PCI graphics card. This information is preliminary and is provided only as a guide for calculating **approximate** total system power usage with additional resources added.

Table 4.   Power Usage

		DC (amps)				
	AC (watts)	+3.3 V	+5 V	-5 V	+12 V	-12 V
APM disabled						
DOS prompt	53.1	0.5	5.8	0.1	0.6	0.1
Windows 95	54.8	0.8	6.1	0. 1	0.6	0.1
Windows NT†	31.6	0.4	2.2	0.1	0.6	0.1
APM enabled (Typical)						
DOS prompt	53.1	0.5	5.8	0.1	0.6	0.1
Windows 95	31.5	0.8	2.3	0. 1	0.6	0.1
Windows NT	31.6	0.4	2.2	0.1	0.6	0.1
APM enabled (SMM)						
DOS prompt	27.3	0.4	1.9	0.1	0.4	0.1
Windows 95	26.6	0.8	1.9	0. 1	0.4	0. 1
Windows NT	N/A	N/A	N/A	N/A	N/A	N/A

1.13.1   Power Supply Considerations

The VS440FX is designed to operate with a 200 W ATX power supply. Specifications for power supply requirements can be found in the Intel document 636646 Rev 06 titled *PWR SUPPLY, 200W, ATX, 5 Output*.

1.14 Regulatory Compliance

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

1.14.1   Safety

1.14.1.1   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)

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

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

1.14.1.3   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)

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

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

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

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

1.14.2   EMI

1.14.2.1   CISPR 22, 2nd Edition, 1993

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

1.14.2.2   EN 55 022, 1995

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

1.14.2.3   EN 50 082-1 (1992)

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

1.14.2.4   VCCI Class 2 (ITE)

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

1.14.2.5   1FCC 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)

1.14.2.6   1ICES-003, Issue 2

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

1.14.3   Product Certification Markings

1.14.3.1   European CE Marking

Marking on the board or shipping container.

1.14.3.2   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.

1.14.3.3   Canadian Compliance

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

1.14.4   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.

1.14.4.1   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 organization 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.

1.14.4.2   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.

1.14.4.3 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.

1.14.4.4 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.

1.14.4.5   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.

1.14.4.6   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.

1.14.4.7   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 5.   Memory Map

Address Range (Decimal)	Address Range (hex)	Size	Description
1024K-262144K	100000-10000000	2M	Extended Memory
960k-1023k	F0000-FFFFF	64k	AMI System BIOS
944K-959K	EC000-EFFFF	16K	Boot Block
936K-943K	EA000-EBFFF	8K	ESCD (Plug-N-Play configuration area)
932K-935K	E9000-E9FFF	4K	Reserved for BIOS
928K-931K	E8000-E8FFF	4K	OEM LOGO Area
896K-927K	E0000-E7FFF	32K	BIOS Reserved
800-895K	C8000-DFFFF	96K	Available HI DOS memory (open to ISA and PCI bus)
640K-799K	A0000-C7FFF	160K	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 6.   I/O Map

Address (hex)	Size	Description	Address (hex)	Size	Description
0000 - 000F	16 bytes	PIIX3 - DMA 1	0330 - 0331	1 byte	MPU-401 (MIDI)
0020 - 0021	2 bytes	PIIX3 - Interrupt Controller 1	0376	1 byte	Sec IDE Chan Cmd Port
002E - 002F	2 bytes	87308B Base Configuration	0377	1 byte	Sec IDE Chan Stat Port
0040 - 0043	4 bytes	PIIX3 - Timer 1	0378 - 037F	8 bytes	Parallel Port 1
0048 - 004B	4 bytes	PIIX3 - Timer 2	0388 - 038B	4 bytes	CS4232 Audio
0060	1 byte	Keyboard Controller Byte - Reset IRQ	03BC - 03BF	4 bytes	Parallel Port 3
0061	1 byte	PIIX3 - NMI, speaker control	03E8 - 03EF	8 bytes	Serial Port 3
0064	1 byte	Kbd Controller, CMD/STAT Byte	03F0 - 03F5	6 bytes	Floppy Channel 1
0070, bit 7	1 bit	PIIX3 - Enable NMI	03F6	1 byte	Pri IDE Chan Cmd Port
0070, bits 6:0	7 bits	PIIX3 - Real Time Clock, Address	03F7 (Write)	1 byte	Floppy Chan 1 Cmd
0071	1 byte	PIIX3 - Real Time Clock, Data	03F7, bit 7	1 bit	Floppy Disk Chg Chan 1
0078	1 byte	Reserved - Brd. Config.	03F7, bits 6:0	7 bits	Pri IDE Chan Status Port
0079	1 byte	Reserved - Brd. Config.	03F8 - 03FF	8 bytes	On-Board Serial Port 1
0080 - 008F	16 bytes	PIIX3 - DMA Page Register	04D0 - 04D1	2 bytes	Edge/level triggered
00A0 - 00A1	2 bytes	PIIX3 - Interrupt Controller 2	LPT + 400h	8 bytes	ECP port, LPT + 400h
00C0 - 00DE	31 bytes	PIIX3 - DMA 2	0608 - 060B	4 bytes	CS4232 Audio
00F0	1 byte	Reset Numeric Error	0CF8*	1 byte	PCI Config Address Reg.
0170 - 0177	8 bytes	Secondary IDE Channel	0CF9	1 byte	Turbo & Reset control Reg.
01F0 - 01F7	8 bytes	Primary IDE Channel	0CFC-0CFF*	4 bytes	PCI Config Data Reg
0200 - 0207	8 bytes	Game Port	FF00 - FF07	8 bytes	IDE Bus Master Reg.
0220-022F	8 bytes	CS4232 Audio	FFA0 - FFA7	8 bytes	IDE primary Channel
0278 - 027B	4 bytes	Parallel Port 2	FFA8 - FFAF	8 bytes	IDE secondary channel
02F8 - 02FF	8 bytes	On-Board Serial Port 2	0FF0-0FF7	4 bytes	CS4232 Audio

*   Only by DWORD accesses.

2.3 PCI Configuration Space Map

Table 7.   PCI Configuration Space Map

Bus Number (hex)	Dev Number (hex)	Function Number (hex)	Description
00	00	00	Intel 82440FX (PMC) Host Bridge
00	07	00	Intel 82371SB (PIIX3) ISA bridge
00	07	01	Intel 82371SB (PIIX3) IDE Controller
00	13	00	PCI Expansion Slot: J2D1
00	11	00	PCI Expansion Slot: J2D2
00	0F	00	PCI Expansion Slot: J2E1
00	0B	00	PCI Expansion Slot: J2F1

2.4 DMA Channels

Table 8.   DMA Channels

DMA	Data Width	System Resource
0	8- or 16-bits	Open
1	8- or 16-bits	Open
2	8- or 16-bits	Floppy
3	8- or 16-bits	Parallel Port (for ECP/EPP Config.)
4		Reserved - Cascade channel
5	16-bits	Open
6	16-bits	Open
7	16-bits	Open

2.5 Interrupts

Table 9.   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	User available
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 easily 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-N-Play 1.0a. This motherboard also 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 motherboard will be identified as 1.00.01.CS1.

3.2 BIOS Flash Memory Organization

The Intel PA28FB002BX 2 Mb Flash component is organized as 256K x 8 (256 KB). The Flash device is divided into seven areas, as described in Table 10.

Table 10.   Flash Memory Organization

System Address		FLASH Memory Area
FFFF0000H	FFFFFFFFH	64 KB Main BIOS
FFFEC000H	FFFEFFFFH	16 KB Boot block (Not FLASH erasable)
FFFEA000H	FFFEBFFFH	8 KB ESCD Area (Plug-N-Play data storage area)
FFFE9000H	FFFE9FFFH	4 KB Reserved for BIOS
FFFE8000H	FFFE8FFFH	4 KB OEM Logo Area
FFFE0000H	FFFE7FFFH	32 KB Reserved for BIOS
FFFD0000H	FFFDFFFFH	64 KB Reserved for BIOS
FFFC0000H	FFFCFFFFH	64 KB Reserved for BIOS

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 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 11.   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

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-N-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 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.

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-N-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-N-Play

The BIOS incorporates ISA Plug-N-Play capabilities as delivered by Plug-N-Play Release 1.0A (Plug-N-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-N-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-N-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-N-Play specification may be obtained via the Intel BBS , or via CompuServe by typing Go PlugPlay.

3.7 Desktop Management Interface

Desktop Management Interface (DMI) is a method of managing computers in an enterprise. The main component of DMI is the Management Information Format Database (MIF), which contains information about the computing system and its components. Using DMI, a system administrator can obtain the types, capabilities, operational status, installation date and other information about the system components. The DMI specification requires that certain information about the system's motherboard be made available to an applications program. This user-defined information will be located in a series of data structures which are accessed in various ways by means of the DMI service layer. Component instrumentation allows the service layer to gain access to the information stored in the GPNV. The included MIF database defines the data a provides the method for accessing the information.

The VS440FX BIOS provides the first stage of DMI v. 2.0 support, including static system configuration information, including motherboard and peripheral data. Future VS440FX product releases will provide event detection and error logging, achieving the maximum benefit of DMI with applications such as LANDesk® Client Manager.

3.8 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 Standby mode, the motherboard reduces power consumption by utilizing the Pentium Pro 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 (Standby, Suspend, or Off) send to the monitor in setup. The ability to respond to external interrupts is fully maintained while in Standby mode allowing the system to service requests such

as an in-coming fax or network message while unattended. Any keyboard or mouse activity brings the system out of the energy saving Standby 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.

3.9 Advanced Power Control

The BIOS supports Advanced Power Control (APC) through the National 308 Super I/O controller. Two features that have been implemented are Auto Start On AC Loss and Power-On COM1 Ring. Auto Start On AC Loss sets the control for returning to the last known state of the system, or powering down upon AC power loss to the motherboard. Power-On COM1 Ring sets the control for allowing the system to be powered on upon an incoming POTS call to a telephony device configured for operation on COM1.

3.10 Language Support

The BIOS setup screen and help messages are supported in 32 languages. There are 5 languages available at this time: American English, German, Italian, French, and Spanish. Translation to other languages may become available at a later date.

3.11 Boot Options

Booting from CD-ROM is supported in adherence to the "El Torito" v. 1.0 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" v. 1.0 is available on the Phoenix Web page (http://www.ptltd.com/techs/specs.html).

3.12 Flash LOGO Area

The motherboard supports a 4 KB programmable flash user area located at E8000-E8FFF. 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.

3.13 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.

3.14 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 12. 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-N-Play Configuration	For modifying options that affect the system's Plug-N-Play capabilities.

3.14.1 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.

3.14.1.1 System Date

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

3.14.1.2 System Time

Specifies the current time.

3.14.1.3 Floppy Options

When selected, this brings up the Floppy Options menu.

3.14.1.4 Primary IDE Master

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

3.14.1.5 Primary IDE Slave

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

3.14.1.6 Secondary IDE Master

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

3.14.1.7 Secondary IDE Slave

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

3.14.1.8 Language

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

3.14.1.9 Boot Options

When selected, this brings up the Boot Options subscreen.

3.14.1.10 Video Mode

Reports the video mode. There are no options.

3.14.1.11 Mouse

Reports if a PS/2 mouse is installed or not. There are no options.

3.14.1.12 Base Memory

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

3.14.1.13 Extended Memory

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

3.14.1.14   BIOS Version

Reports the BIOS identification string. There are no options.

3.14.2   Floppy Options Subscreen

3.14.2.1   Floppy A:

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

3.14.2.2   Floppy B:

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

3.14.2.3   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.

3.14.2.4   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.

3.14.3   IDE Device Configuration Subscreen

There are separate configuration subscreens for the Primary IDE Master, Primary IDE Slave, Secondary IDE Master and Secondary IDE Slave devices.

3.14.3.1   IDE Device Configuration

Used to manually configure the IDE device 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.

3.14.3.2   Number of Cylinders

If IDE Device Configuration is set to User Definable, you must type the correct number of cylinders for your IDE device. If IDE Device Configuration is set to Auto Configured, this reports the number of cylinders for your IDE device and cannot be modified.

3.14.3.3   Number of Heads

If IDE Device Configuration is set to User Definable, you must type the correct number of heads for your IDE device. If IDE Device Configuration is set to Auto Configured, this reports the number of heads for your IDE device and cannot be modified.

3.14.3.4 Number of Sectors

If IDE Device Configuration is set to User Definable, you must type the correct number of sectors for your IDE device. If IDE Device Configuration is set to Auto Configured, this reports the number of sectors for your IDE device and cannot be modified.

3.14.3.5 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.

3.14.3.6 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.

3.14.3.7 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 IDE device drive to determine which setting provides optimum performance for your drive.

3.14.3.8 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.

3.14.4 Boot Options Subscreen

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

3.14.4.1 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. Default setting is for Floppy.
Second, Third, Fourth Device:	Select Disabled, Floppy, Hard Disk, Network. Default for Second, Third and Fourth Devices are Hard Disk, Disabled and Disabled respectively.

3.14.4.2   System Cache

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

3.14.4.3   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.

3.14.4.4   Num Lock

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

3.14.4.5   Speaker

Turns the on-board speaker control to on or off. The options are Enabled and Disable. The default is Enabled.

3.14.4.6   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.

3.14.4.7   Hard Disk Pre-Delay

Sets the hard disk drive pre-delay. The options are Disabled, 3, 6, 9, 12, 15, 21, or 30 seconds. The default is Disabled. When enabled, this option causes the BIOS to wait the specified time before it accesses the first hard drive. If your system contains a hard drive, and you don't see the drive type displayed during boot-up, the hard drive may need more time before it is able to communicate with the controller. Setting a pre-delay provides additional time for the hard drive to initialize.

3.14.4.8   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.

3.14.4.9   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.

3.14.4.10 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.

3.14.5 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.

3.14.5.1 Processor Type

Reports the CPU type. There are no options.

3.14.5.2 Processor Speed

Reports the CPU clock speed. There are no options.

3.14.5.3 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.

3.14.5.4 Peripheral Configuration

When selected, this brings up the Peripheral Configuration subscreen.

3.14.5.5 Advanced Chipset Configuration

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

3.14.5.6 Power Management Configuration

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

3.14.5.7 Plug-N-Play Configuration

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

3.14.6 Peripheral Configuration Subscreen

This section describes the screens for the peripheral configuration subscreen.

3.14.6.1 Primary IDE Interface

Enables or disables the Primary IDE hard disk interface. The options are Auto and Disabled. The default is Auto.

3.14.6.2   Secondary IDE Interface

Enables or disables the Secondary IDE hard disk interface. The options are Auto and Disabled. The default is Auto.

3.14.6.3   Floppy Interface

Enables or disables the diskette drive interface. The options are Auto and Disabled. The default is Auto.

3.14.6.4   Serial Port 1 Address

Selects the address of the serial port. The options are Disabled; COM1, 3F8h, IRQ4; COM2, 2F8h, IRQ3; COM3, 3E8h, IRQ4 and Auto. The default is Auto. 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.

3.14.6.5   Serial Port 2 Address

Selects the address of the serial port. The options are Disabled; COM1, 3F8h, IRQ4; COM2, 2F8h, IRQ3; COM3, 3E8h, IRQ4; and Auto. The default is Auto. 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.

⟹ **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.

3.14.6.6   Serial Port 2 IR Mode

Makes Serial Port 2 available to infrared applications. The options are Enabled and Disabled. The default is Disabled.

3.14.6.7   Parallel Port Address

Selects the address and IRQ of the parallel port. The options are Disabled; LPT3, 3BCh, IRQ7; LPT1, 378h, IRQ7; LPT2, 278h, IRQ7; LPT3, 3BCh, IRQ5; LPT1, 378h, IRQ5; LPT2, 278h, IRQ5 and Auto. The default is Auto. 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.

3.14.6.8   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.

3.14.6.9   Primary IDE Status

Displays the current status of the Primary IDE Interface from the selectable setting above. This is an informational field and is not accessible.

3.14.6.10   Secondary IDE Status

Displays the current status of the Secondary IDE Interface from the selectable setting above. This is an informational field and is not accessible.

3.14.6.11   Floppy Status

Reports the current status of the floppy drive from the selectable setting above. There are no options.

3.14.6.12   Serial Port 1 Status

Reports the current status of serial port 1 from the selectable setting above. There are no options.

3.14.6.13   Serial Port 2 Status

Reports the current status of serial port 2 from the selectable setting above. There are no options.

3.14.6.14   Parallel Port Status

Reports the current status of the parallel port from the selectable setting above. There are no options.

3.14.7   Advanced Chipset Configuration Subscreen

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

3.14.7.1   Base Memory Size

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

3.14.7.2   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.

3.14.7.3   ISA LFB Base Address

Reports the base address of the LFB. There are no options. The base address is 15 MB. This field will not appear if the ISA LFB Size is set to Disabled.

3.14.7.4   Video Palette Snoop

Controls the ability of a primary PCI graphics controller to share a common palette with an ISA add-in video card. Some add-in cards that use the VESA feature connector may need this feature enabled. The options are Enabled and Disabled. The default is Disabled.

3.14.7.5   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.

3.14.7.6   Memory Error Detection

Sets the type of error detection or correction. The options are Disabled, ECC and Parity. The default is Disabled. This field will appear if either ECC or Parity SIMMs are detected. Parity and ECC SIMMs may be configured to run either as Parity or ECC (e.g. Parity SIMMs may be configured to run in ECC mode.)

3.14.7.7   Onboard Audio

Controls the onboard audio (if present) on the motherboard. The options are Enabled and Disabled. Default setting is Enabled. This field will not appear if the onboard audio solution is not present.

3.14.7.8   Bank 0 SIMM Detected

Reports the type of memory found in the Bank 0 SIMM slots. There are no options.

3.14.7.9   Bank 1 SIMM Detected

Reports the type of memory found in the Bank 1 SIMM slots. There are no options.

3.14.8   Power Management Configuration Subscreen

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

3.14.8.1   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.

3.14.8.2   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.

3.14.8.3   VESA Video Power Down

Sets any VESA compliant monitor to be power managed when the system goes into power managed mode. The options are Disabled, Standby, Suspend and Sleep. The default is Sleep.

3.14.8.4   Inactivity Timer (Minutes)

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.

3.14.8.5   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 alphanumeric keys are valid.

3.14.8.6   Auto Start On AC Loss

Enables returning to the last known state of the system, or powering down upon AC power loss to the motherboard. The options are Disabled and Enabled. The default is Enabled.

3.14.8.7   Power-On COM1 Ring

Enables the system to power on upon an incoming POTS call to a telephony device configured for operation on COM1. The options are Disabled and Enabled. The default is Disabled.

3.14.9   Plug-N-Play Configuration Subscreen

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

3.14.9.1   Configuration Mode

Sets how the BIOS gets information about ISA cards that do not have Plug-N-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-N-Play capabilities and those without. Only Boot With PnP OS will be visible.

3.14.9.2   Boot with PnP OS

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

3.14.9.3   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.

3.14.9.4   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.

3.14.9.5   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 may not be available if the Primary and Secondary IDE ports are enabled.

3.14.10   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.

3.14.10.1   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 13.   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.

3.14.11   Security Screen Options

3.14.11.1   User Password is

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

3.14.11.2   Administrative Password is

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

3.14.11.3   Set User Password

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

3.14.11.4   Set Administrative Password

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

3.14.11.5   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.

3.14.11.6   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.

3.14.12   Exit Screen

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

3.14.12.1   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.

3.14.12.2   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.

3.14.12.3   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.

3.14.12.4   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.
3	Memory Failure	Memory failure in the first memory block checked.
4	Timer Not Operational	Memory failure in the first 64 KB of memory, or Timer 1 on the motherboard is not functioning.
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.

4.2 PCI Configuration Error Messages

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

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

4.3 BIOS Error Messages

Error Message	Explanation
CH-2 Timer Error	Most systems include two timers. There is an error in timer 2.
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.
Memory Size Decreased	The total amount of memory on the motherboard is less than the previous boot.
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.
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. 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 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.
Parity Error -- System Halted	Fatal Error has occurred - System halted.

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 ????.
DMA Bus Time-out	A device has driven the bus signal for more than 7.8 microseconds.