SUPER®

Pentium®System

P5MMA
P5MMS

USER'S MANUAL

Revision 1.3

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Do not upgrade the BIOS unless you are notified to do so. Please call technical support first before upgrading the boot-block BIOS.

SUPER BBS # (408) 895-2022 (24 hours)
Baud Rate: 1200-14400 bps, Data Bits: 8, Stop Bit: 1, Parity: None

Preface

About This Manual

This manual is written for system houses, PC technicians and knowledgeable PC end users. It provides information for the installation and use of the SUPER® P5MMA/P5MMS motherboard, which supports the 75/90/100/120/133/150/166/180/200 MHz Intel® Pentium® processors, OverDrive™ P54CT, Cyrix, IBM-M1, AMD-K5, AMD-K6, MMX™ and future Pentium processors.

The Intel Pentium processor will take personal computer systems to a new level of performance. The emergence of the PCI local bus will also have a significant impact on PCs. Memory and I/O components have also made significant strides in both performance and integration, enhancing the CPU's ability to move data quickly. Putting these all together creates the next generation of PC systems.

Manual Organization

Chapter 1, Introduction, describes the features, specifications and performance of the SUPER P5MMA/P5MMS system board, provides detailed information about the chipset, cache memory, main memory system, and offers warranty information.

Refer to Chapter 2, Installation, for a list of the equipment needed for a system based on Pentium chips. This chapter provides you with the instructions for handling static-sensitive devices, checking and/or configuring the jumpers for manufacturing. Read this chapter when you want to install or remove SIMM/DIMM memory modules, and to mount the system board in the chassis. Also refer to this chapter to connect the floppy and hard disk drives, enhanced IDE configurations, Infra-Red, USB, parallel port, serial ports, as well as the cables for the power supply, reset cable, Keylock/Power LED, speaker and keyboard.

If you encounter any problem, please see Chapter 3, Troubleshooting, which describes troubleshooting procedures for video, memory, and the setup configuration stored in memory. Instructions are also included on contacting a technical assistance support representative and returning merchandise for service and the BBS# for BIOS upgrading.

Table of Contents

Chapter 1
Introduction

1-1 Overview

SUPER™ P5MMA/P5MMS is a high performance, function-enhanced ATX (P5MMA) motherboard based on Intel® Pentium®, Cyrix, IBM-M1, AMD-K5, AMD-K6 and MMX™ processors. Intel's Pentium processors combine the performance traditionally associated with minicomputers and workstations with the flexibility and compatibility that characterize the personal computer platform. The Pentium processor is Intel's top-of-the-line generation of power for high-end server and desktop computers. The Pentium processor is fully compatible with the entire range of Intel 486™ and Intel 386™ microprocessors. SUPER P5MMA/P5MMS is designed for high-end personal computers to achieve higher levels of performance in multimedia applications such as 3D graphics and animations, virtual reality and video conferencing.

Peripheral Component Interconnect (PCI) provides industry-leading performance and compatibility. The 32-bit, 33 MHz pathway to the CPU offers performance unmatched by other bus architectures. The PCI standard is clearly defined to ensure complete compatibility. A PCI add-on card available today will work in any PC-compliant system in the future — a competitive advantage that other local bus technologies can't offer.

In addition to the security of a true standard, PCI add-on cards feature auto-configurability for easy integration. The user-friendly BIOS automatically allocates system resources for add-on cards and configures hard disk, memory, and other peripherals. No more hassles with settings, jumpers, or switches. Just plug in the card and go (Plug and Play or PnP).

The motherboard's four 32-bit slots with industry standard PCI design have a very high performance capability that provides an ideal system board solution for a wide range of demanding applications; such as networking multiuser environments, computer aided design (CAD), computer aided manufacturing (CAM), computer-aided engineering (CAE), database management, desktop publishing, image processing, and artificial intelligence. The motherboard's additional four ISA slots provide standard 16-bit compatibility for AT-type add-on card expansion.

This highly integrated system board achieves the highest reliability and yet is small enough for all of its features to be supported in an ATX/AT size. These features include: a Pentium central processing unit with built-in 16 KB internal cache memory (32 KB for P55C MMX), 512 KB pipelined burst synchronous secondary cache, up to 256 MB of on-board memory, three 16-bit ISA slots (four for P5MMS), four 32-bit PCI slots, EIDE support, floppy interface, USB, two Fast UART 16550 serial ports, an EPP (Enhanced Parallel Port) and ECP (Extended Capabilities Port) parallel port, PS/2 keyboard and mouse, and a "Socket 7" for future Intel Pentium processors.

The motherboard supports 'write-back' cache control for an Intel Pentium processor, with EDO (Extended Data Output), Fast Page Mode, or 3.3V SDRAM for the integrated DRAM controller. The minimum memory size is 8 MB and maximum memory size is 256 MB. EDO DRAM holds the memory data valid until the next CAS# falling edge. The standard page mode DRAM tri-state the memory data when CAS# negates to precharge. So, the EDO CAS# precharge overlaps the memory data valid time. This will improve the DRAM read performance. SDRAM provides synchronous transfer X111 at 66MHz and up to 533 MB/s peak memory transfer rate.

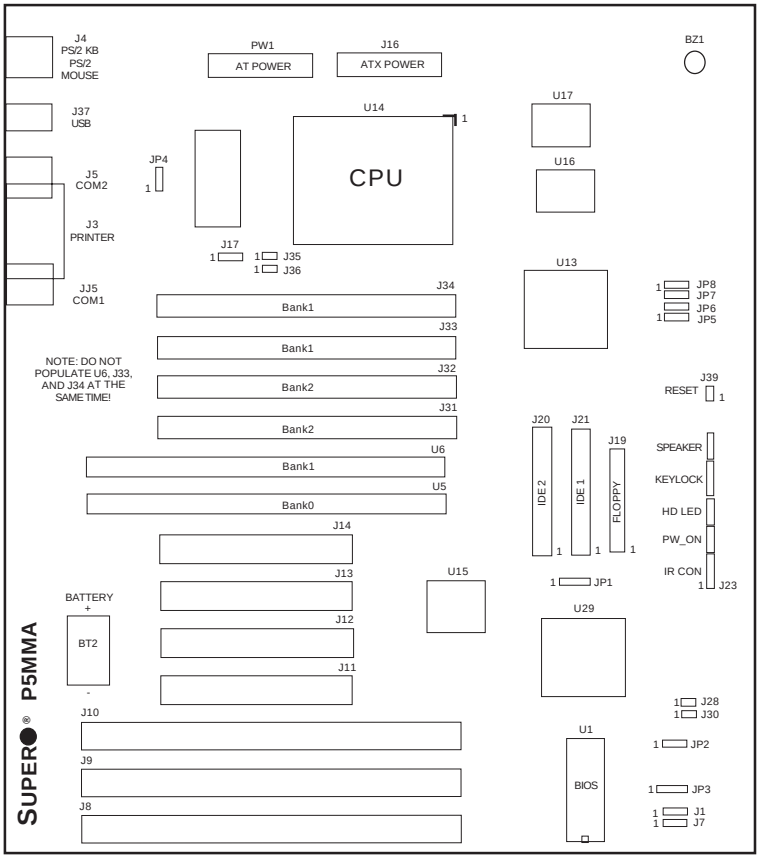
The EDO Detect Mode Enable bit in the Intel 430 TX chipset DRAM control register enables a special timing mode for the BIOS to detect the DRAM type on a row by row basis. The motherboard's BIOS uses this register bit to autodetect between EDO, fast page or SDRAM memory.

The Pentium processor implements several enhancements to increase performance. The two instruction pipelines and the floating-point unit on the Pentium processor are capable of independent operation. Each pipeline issues frequently used instructions in a single clock. Together, the dual pipes can issue two integer instructions in one clock, or one floating-point instruction (under certain circumstances, two floating-point instructions) in one clock.

The Pentium processor includes separate code and data caches integrated on-chip to meet its performance goals. Each cache is 8 Kbytes in size with a 32-byte line size, and is 2-way set associative. The Pentium processor has increased the data bus to 64 bits to improve the data transfer rate. Burst read and burst write-back cycles are supported by the Pentium processor. In addition, bus cycle pipelining has been added to allow two bus cycles to be in progress simultaneously. Figure 1-1 shows the layout of the SUPER P5MMA motherboard. Figure 1-2 shows the layout of the SUPER P5MMS motherboard. Figure 1-3 shows the architecture of the SUPER P5MMA motherboard. Figure 1-4 shows the architecture of the SUPER P5MMS motherboard.

1-2 System Overheat Thermal Control (P5MMS)

A back-up cooling fan can be hooked up to JP15. If the power supply fan or the processor cooling fan goes down, the circuitry will detect an overheat temperature depending on the user setting. It will then trigger the backup cooling fan or an LED connected to J45. The user can set the temperature range using J44. A buzzer can also be connected on JP16 that will sound off that it is time to replace the power supply fan or the CPU cooling fan. It is important that the back-up cooling fan be installed correctly in such a way that it will not only cool down the processor but the whole system as well.



——————— Manufacturer Settings ———————

J1:	1-2	J17:	OFF
J7:	2-3	J28:	OFF
JP2:	1-2 (default)	J30:	OFF

2-3 CMOS Clear
To clear the CMOS completely, disconnect the power source.

———CPU Voltage Adjust ———

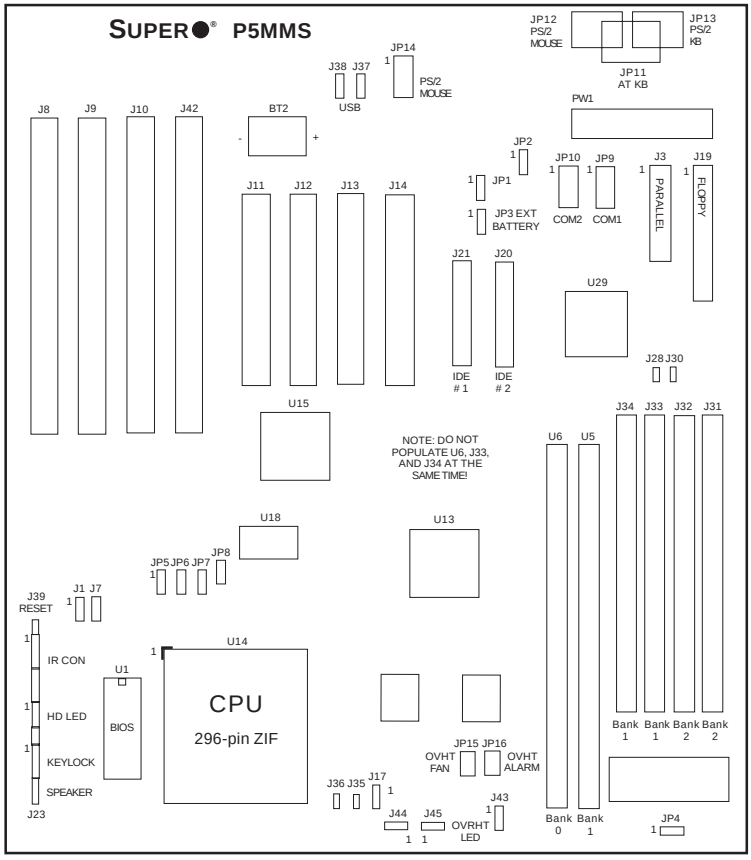
JP4: 1-2 (3.5V)
OFF (3.3V)
2-3 (2.8V) default for MMX

——————————Intel CPU Speed——————————

	J36	J35	JP5	JP6	JP7
233	OFF	OFF	1-2	2-3	2-3 (MMX)
200	OFF	ON	1-2	2-3	2-3
180	OFF	ON	2-3	2-3	1-2
166	ON	ON	1-2	2-3	2-3
150	ON	ON	2-3	2-3	1-2 (60 MHz Bus)
150	ON	OFF	2-3	1-2	1-2 (75 MHz Bus)
133	ON	OFF	1-2	2-3	2-3
120	ON	OFF	2-3	2-3	1-2
100	OFF	OFF	1-2	2-3	2-3
90	OFF	OFF	2-3	2-3	1-2
75	OFF	OFF	2-3	2-3	2-3

Refer to p. 2-4 for IBM/Cyrix/AMD-K5, K-6 jumper settings

Figure 1-1. SUPER P5MMA Motherboard Layout



Manufacturer Settings			
J1:	1-2	J17:	OFF
J7:	2-3	J28:	OFF
JP2:	1-2 (default)	J30:	OFF
	2-3 CMOS Clear		

CPU Voltage Adjust	
JP4:	1-2 (3.5V)
	OFF (3.3V)
	2-3 (2.8V) default for MMX

Intel CPU Speed

	J36	J35	JP5	JP6	JP7
233	OFF	OFF	1-2	2-3	2-3 (MMX)
200	OFF	ON	1-2	2-3	2-3
180	OFF	ON	2-3	2-3	1-2
166	ON	ON	1-2	2-3	2-3
150	ON	ON	2-3	2-3	1-2 (60 MHz Bus)
150	ON	OFF	2-3	1-2	1-2 (75 MHz Bus)
133	ON	OFF	1-2	2-3	2-3
120	ON	OFF	2-3	2-3	1-2
100	OFF	OFF	1-2	2-3	2-3
90	OFF	OFF	2-3	2-3	1-2
75	OFF	OFF	2-3	2-3	2-3

Refer to p. 2-4 for IBM/Cyrix/AMD-K5, K-6 jumper settings

Figure 1-2. SUPER P5MMS Motherboard Layout

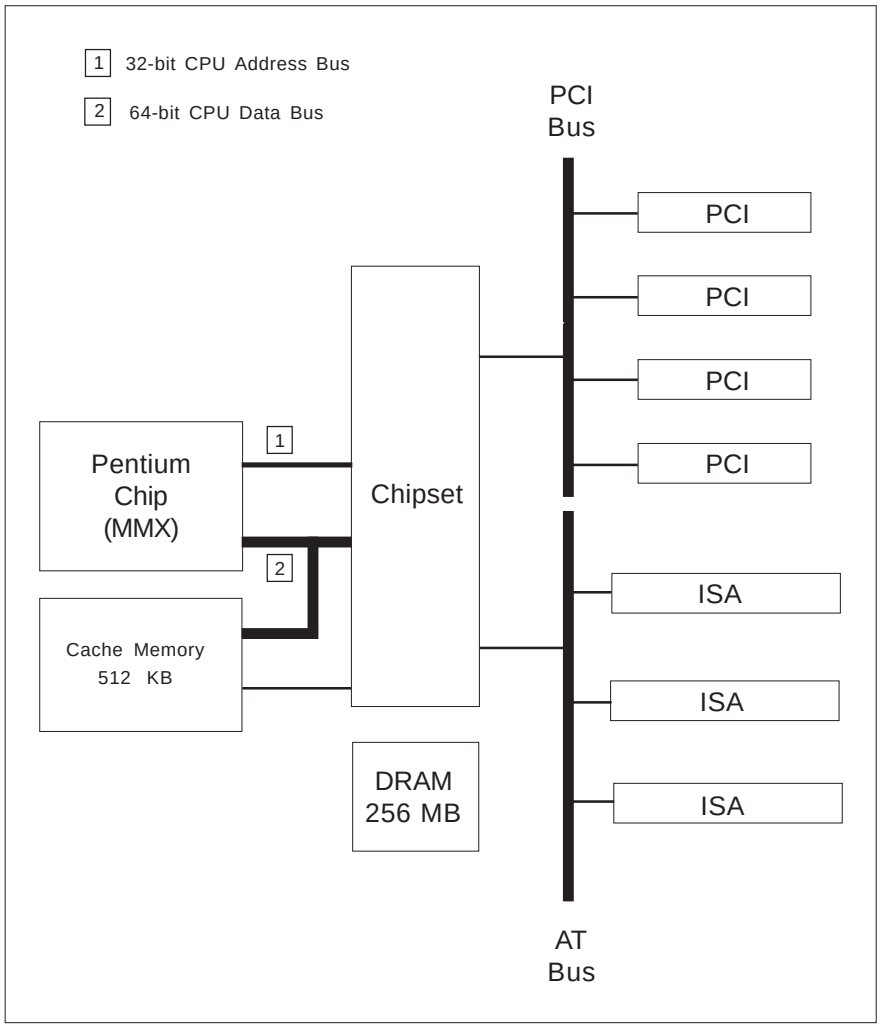


Figure 1-3. P5MMA System Board Architecture

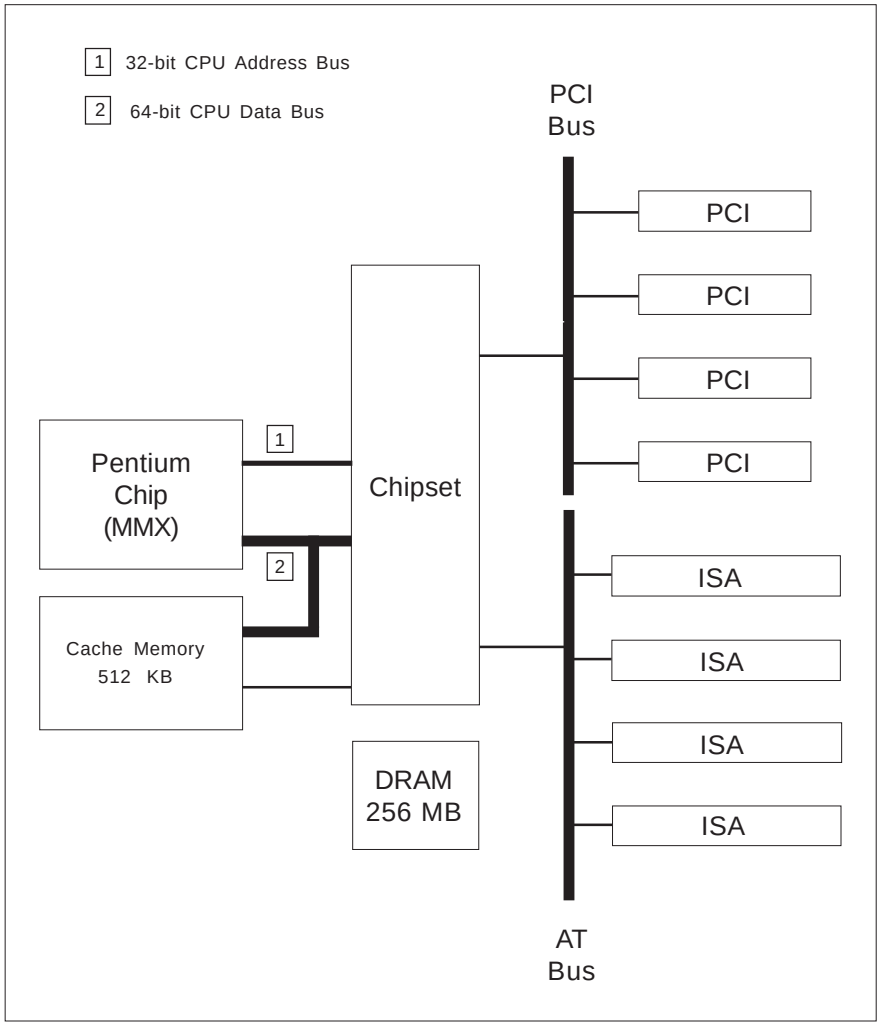


Figure 1-4. P5MMS System Board Architecture

SUPER P5MMA Features

The following list covers the general features of the SUPER P5MMA motherboard.

CPU

- Pentium 75, 90, 100, 120, 133, 150, 166, 180, 200 MHz processors, Cyrix, IBM-M1, AMD-K5, AMD-K6 and MMX™ processors and future Pentium processors with 64-bit data bus and 32-bit address bus
- 296-pin ZIF (Zero Insertion Force) socket 7

Math Coprocessor

- Enhanced on-chip, floating-point unit that incorporates sophisticated seven-stage pipelining and hardwired functions

Speed

- Designed to work at 75/90/100/120/133/150/166/180/200 MHz and future Pentium processors (and low speed in Power-Saving mode when system is idle)

Cache

- 16 KB on-chip, 2-way set associative internal cache
- 64-bit wide data bus with write-back external cache that supports either 512 KB pipelined burst synchronous secondary cache

Memory

- 64-bit wide data bus with up to 256 MB of memory on the motherboard
- 4 72-pin SIMM sockets and 2 168-pin DIMM sockets support 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, and 32 MB (60ns or 70ns, 32 bit) SDRAM, EDO or Fast Page DRAM memory

Enhanced IDE support

- Integrated Bus Mastering PCI IDE controller provides two IDE interfaces for hard disks and CD ROMs
- Ultra DMA Modes 0, 1, 2 with IDE transfer rates up to 33 MB/s
- Supports PIO timing modes 0, 1, 2, 3, and 4

NS 87307 Super I/O

- Supports USB, Infra-Red interface, EPP and ECP parallel port, floppy interface and Fast UART 16550 serial ports

Turbo/Non-turbo Function

- BIOS turbo speed selectable by the keyboard in DOS mode (<Ctrl>+<Alt>+<Shift> and <+> or <->)

Bus

- Three 16-bit AT ISA slots
- Four PCI master slots that are fully compliant with the PCI 2.1 specification

BIOS

- AMI® Flash BIOS with built-in setup
- Advanced Power Management (APM) Green PC Function
- Windows™ 95 Ready Plug and Play (PnP) with boot block support
- DMI (Desktop Management Interface) support

Board Type

- ATX

Software Compatibility

- 100% IBM® PC/AT® compatible
- DOS, OS/2, UNIX®, Novell®, Windows™, Windows NT™ and Windows™ 95

Testing

- 50°C, 48-hour, dynamic burn-in with system-level testing

Manufacturing and Support

- Made in U.S.A.
- Technical Support and Service in U.S.A.

SUPER P5MMS Features

The following list covers the general features of the SUPER P5MMS motherboard.

CPU

- Pentium 75, 90, 100, 120, 133, 150, 166, 180, 200 MHz processors, Cyrix, IBM-M1, AMD-K5, AMD-K6 and MMX™ processors and future Pentium processors with 64-bit data bus and 32-bit address bus
- 296-pin ZIF (Zero Insertion Force) socket 7

Math Coprocessor

- Enhanced on-chip, floating-point unit that incorporates sophisticated seven-stage pipelining and hardwired functions

Speed

- Designed to work at 75/90/100/120/133/150/166/180/200 MHz and future Pentium processors (and low speed in Power-Saving mode when system is idle)

Cache

- 16 KB on-chip, 2-way set associative internal cache
- 64-bit wide data bus with write-back external cache that supports either 512 KB pipelined burst synchronous secondary cache

Memory

- 64-bit wide data bus with up to 256 MB of memory on the motherboard
- 4 72-pin SIMM sockets and 2 168-pin DIMM sockets support 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, and 32 MB (60ns or 70ns, 32 bit) SDRAM, EDO or Fast Page DRAM memory

Enhanced IDE support

- Integrated Bus Mastering PCI IDE controller provides two IDE interfaces for hard disks and CD ROMs
- Ultra DMA Modes 0, 1, 2 with IDE transfer rates up to 33 MB/s
- Supports PIO timing modes 0, 1, 2, 3, and 4

System Overheat Temperature Control

- Built-in alarm
- Back-up fan controller

Winbond 83967 AF Super I/O

- Supports USB, fast IR, EPP and ECP parallel port, floppy interface and Fast UART 16550 serial ports

Turbo/Non-turbo Function

- BIOS turbo speed selectable by the keyboard in DOS mode (<Ctrl>+<Alt>+<Shift> and <+> or <->)

Bus

- Four 16-bit AT ISA slots
- Four PCI master slots that are fully compliant with the PCI 2.1 specification

BIOS

- AMI® Flash BIOS with built-in setup
- Advanced Power Management (APM) Green PC Function
- Windows™ 95 Ready Plug and Play (PnP) with boot block support
- DMI (Desktop Management Interface) support

Software Compatibility

- 100% IBM® PC/AT® compatible
- DOS, OS/2, UNIX®, Novell®, Windows™, Windows NT™ and Windows™ 95

Board Type

- AT

Testing

- 50°C, 48-hour, dynamic burn-in with system-level testing

Manufacturing and Support

- Made in U.S.A.
- Technical Support and Service in U.S.A.

1-3 Power Supply

As with all computer products, a stable power source is necessary for proper and reliable operation. It is even more important for high CPU clock rates like 75, 90, 100, 120, 133, 150, 166, 180, 200 MHz and future Pentium processors for the SUPER P5MMA/P5MMS system board.

SUPER P5MMA can accomodate ATX or AT power supplies. The AT power connecter is an optional feature for P5MMA. SUPER P5MMS can accomodate AT power supplies. Although most power supplies generally meet the specifications required by the CPU, some power supplies are not adequate. To obtain the highest system reliability, be certain that your power supply provides +5 VDC with a voltage range between +4.95 VDC (minimum) and +5.25 VDC (maximum).

It is highly recommended that you use a high quality power supply. Additionally, in areas where noisy power transmission is present, you may choose to install a line filter to separate noise from the computer. You can also install a power surge protector to help avoid problems caused by power surges.

1-4 Chipset Overview

The Intel 82430 TX chipset consists of the TX System Controller 82439 TX (MTXC) and the PCI ISA IDE Xcelerator 82371 (PIIX 4). The chipset forms a host-to-PCI bridge and provides the second level cache control and a full function 64-bit data path to the main memory. The MTXC integrates the cache and main memory DRAM control functions and provides bus control to transfers between the CPU, cache, main memory, and the PCI bus. It is highly integrated by including the data path into the same BGA chip. Using the snoop ahead feature, the MTXC allows PCI masters to achieve full PCI bandwidth. For increased system performance, it integrates posted write and read prefetch buffers. The 430 TX chipset integrates many power management features that will enable the system to save power whenever the system resources become idle.

1-5 Super I/O Controller

SUPER P5MMA uses National Semiconductor 87307 Super I/O Controller which incorporates an IDE control logic, two full function serial ports, an IEEE 1284 parallel port, industry standard floppy disk controller with 16 byte FIFO, Real Time Clock and an 8042 compatible keyboard controller all in one chip.

The IDE interface provides ultra-DMA control up to 33 MB/s. The two serial ports are software compatible with the Fast UART 16550. The parallel port is EPP (Enhanced Parallel Port) and ECP (Extended Capabilities Port) compatible, including level 2 support. It includes a protection circuit against damage caused when the printer is powered up. EPP mode provides for greater throughput than Compatible or Extended modes by supporting faster transfer rates and a mechanism that allows the host to address peripheral device registers directly. Faster transfers are achieved by automatically generating the address and data strobes. EPP is compatible with both Compatible and Extended mode parallel-port devices.

SUPER P5MMS uses the Winbond W83967AF Super I/O Controller which integrates W83877AF Winbond I/O, RTC (Real Time Clock) with Advanced Power Management, W83C45 keyboard controller with PS/2 mouse support, 14 general purpose I/O ports, two serial ports, a serial infrared port, and ISA plug-and-play standard (version 1.0a) in 160 pin QFP.

The wide range of functions integrated onto the W83967AF greatly reduces the number of components required to interface with floppy disk drives. There are three high-speed serial communication ports (UARTs) on it. The UARTs include 16-byte send/receive FIFOs, a programmable baud rate generator, complete modem control capability, and a processor interrupt system. The parallel port supports standard parallel port, IEEE 1284 EPP and ECP.

1-6 Voltage Regulator

The Voltage Regulator supports P54 and P55 CPUs. For MMX CPUs, set JP4 to default, 2.8V. For the VCore, it can support 3.5V, 3.3V or 2.8V.

1-7 Warranty, Technical Support, and Service

The manufacturer will repair or exchange any unit or parts free of charge due to manufacturing defects for one year (12 months) from the original invoice date of purchase.

Parts

Defective parts will be exchanged or repaired within one year (12 months) from the manufacturer's original invoice purchase date.

BIOS

The manufacturer will exchange the BIOS (shipping and handling excluded) due to existing incompatibility issues within one year from the manufacturer's original invoice purchase date.

Labor

Mail-in or carry-in service is available for one year (12 months) from the manufacturer's original invoice purchase date.

Returns

If you must return products for any reason, refer to Chapter 3 in this manual, "Returning Merchandise for Service."

Chapter 2
Installation

2-1 SUPER P5MMA/P5MMS System Components

The equipment listed in this section is required to build a high performance system based on the SUPER P5MMA/P5MMS motherboard. The minimum configuration for a standard system is listed below. To create the full enhanced configuration, add the enhanced system configuration equipment listed on the next page to the equipment listed below.

Standard System Configuration

- 230 watt (minimum) 5V power supply
- Chassis with a speaker connected to a 4-pin connector, a push button switch with 2-pin connector for the reset function, and a keylock connected to a 5-pin connector
- SUPER P5MMA/P5MMS system board
- AT-compatible keyboard (84 or 101 style keyboard)
- 8 MB or 16 MB of system memory
- One 1.2 MB 5.25" and/or one 1.44 MB 3.5" floppy disk drive
- Use PCI Bus Fast SCSI card and hard disk drive or the on-board PCI Bus ultra-DMA IDE controller
- PCI Bus VGA card

Enhanced System Configuration

- Tape drive (for backups)
- Sound card
- Modem/FAX card
- CD-ROM drive
- Add SIMM/DIMM modules for 32 MB, 64 MB, or 128 MB of system memory
- Use one or two PCI Bus Ultra Wide Fast SCSI cards
- Use up to four PCI Bus Fast Network cards

2-2 Static-Sensitive Devices

Static-sensitive electric discharge can damage electronic components. To prevent damage to your system board, it is important to handle it very carefully. The following measures are generally sufficient to protect your equipment from static discharge.

Precautions

- Use a grounded wrist strap designed for static discharge.
- Touch a grounded metal object before you remove the board from the anti-static bag.
- Handle the board by its edges only; do not touch its components, peripheral chips, memory modules, or gold contacts.
- When handling chips or modules, avoid touching their pins.
- Put the system board and peripherals back into their anti-static bags when not in use.
- Be sure your computer system's chassis allows excellent conductive contacts between its power supply, case, mounting fasteners, and the system board for grounding purposes.

Unpacking

The system board is shipped in anti-static packaging to avoid static damage. When unpacking the board, be sure the person handling the board is static-protected.

2-3 Configuring System Board Jumpers

Use the following settings to configure your system board. Refer to Figure 1-1 for an illustration of the jumpers.

Manufacturer Settings

Manufacturing jumpers are permanently fixed or preset in place on the system board. You cannot move them. These jumpers are labeled on the system board and are listed below as Manufacturer Settings.

Manufacturer Settings

J1:	1-2
J7:	2-3
J17:	OFF
J28:	OFF
J30:	OFF
JP2:	1-2 (default) 2-3 CMOS Clear * For P5MMA, you need to completely shut down the system, then use JP2 to clear the CMOS. Do not use the PW_ON connector to clear the CMOS.

Changing the CPU Speed

SUPER P5MMA/P5MMS supports Intel Pentium® 75/90/100/120/133/150/166/180/200 MHz, Cyrix, IBM, AMD-K5, AMD-K6, MMX™ and future Pentium processors.

Table 2-1a. Intel CPU Speed Selection

	75	90	100	120	133	150 /75	150 /60	166	180	200
JP5	2-3	2-3	1-2	2-3	1-2	2-3	2-3	1-2	2-3	1-2
JP6	2-3	2-3	2-3	2-3	2-3	1-2	2-3	2-3	2-3	2-3
JP7	2-3	1-2	2-3	1-2	2-3	1-2	1-2	2-3	1-2	2-3
J35	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON
J36	OFF	OFF	OFF	ON	ON	ON	ON	ON	OFF	OFF

Table 2-1b. Intel MMX CPU Speed Selection

	JP5	JP6	JP7	J35	J36
233	1-2	2-3	2-3	OFF	OFF

Table 2-2. Cyrix/IBM-M1 CPU Speed Selection

	JP5	JP6	JP7	J35	J36
P150+	2-3	2-3	1-2	OFF	ON
P166+	1-2	2-3	2-3	OFF	ON
P200+	2-3	1-2	1-2	OFF	ON

Table 2-3a. AMD-K6 CPU Speed Selection

	JP5	JP6	JP7	J35	J36
PR166	1-2	2-3	2-3	ON	ON
PR200	1-2	2-3	2-3	ON	OFF
PR233	1-2	2-3	2-3	OFF	OFF

Table 2-3b. AMD-K5 CPU Speed Selection

	JP5	JP6	JP7	J35	J36
PR75	2-3	2-3	2-3	OFF	OFF
PR90	2-3	2-3	1-2	OFF	OFF
PR100	1-2	2-3	2-3	OFF	OFF
PR120	2-3	2-3	1-2	OFF	ON
PR133	1-2	2-3	2-3	OFF	ON
PR166	1-2	2-3	2-3	ON	ON

On-Board Memory

There are no jumpers to configure the on-board memory. Do not populate U6, J33 and J34 at the same time. Two banks of memory totaling 8 MB are required for a minimum system configuration. Memory timing requires 70ns fast page devices or, for optimum performance, 60 ns EDO DRAM or 3.3V synchronous DRAM.

Cache Size Selection

The SUPER P5MMA/P5MMS motherboard supports 512 KB cache. There are no jumpers to configure the cache size. SUPER P5MMA/P5MMS uses pipelined burst synchronous SRAMs.

Green PC Function

The SUPER P5MMA/P5MMS motherboard supports APM (Advanced Power Management). APM is a layered approach that defines a cooperative environment where the BIOS, operating system, and application programs work together to reduce power consumption. The operating system can provide precise power management information to the BIOS, permitting the BIOS to intelligently conserve power use. Advanced Power Management is enabled using the BIOS setup.

2-4 Connecting Cables

After you have securely mounted the motherboard to the chassis, you are ready to connect the cables.

Power Supply Connectors

Attach power supply cables to PW1 for a P5MMA/P5MMS 5V power supply or J16 for P5MMA ATX power. Do not force the cables, but make sure they are fully seated. The AT power connecter is an optional feature. The two black wires on each power cable for PW1 sit next to each other when correctly installed. See Table 2-4 for pin definitions of a 5V power supply. See Table 2-5 for pin definitions of an ATX power supply.

Table 2-4. 5V Power Supply Connector Pin Definitions (Optional for P5MMA)

Connector Number	Pin Number	Function
J81	1	Power Good (Power on reset, TTL signal)
	2	+5 VCC
	3	+12 VCC
	4	-12 VCC
	5	Ground (Black wire to be connected)
	6	Ground (Black wire to be connected)
	7	Ground (Black wire to be connected)
	8	Ground (Black wire to be connected)
	9	-5 VCC
	10	+5 VCC
	11	+5 VCC
	12	+5 VCC

Table 2-5. ATX Power Supply Connector Pin Definitions

Connector Number	Pin Number	Function	Pin Number	Function
J16	1	3.3V	11	3.3V
	2	3.3V	12	-12V
	3	COM	13	COM
	4	5V	14	PS-ON
	5	COM	15	COM
	6	5V	16	COM
	7	COM	17	COM
	8	PW-OK	18	-5V
	9	5VSB	19	5V
	10	12V	20	5V

PS/2 Keyboard and Mouse Ports

The PS/2 keyboard and the PS/2 mouse are located on J4 for P5MMA. See Table 2-6 for pin definitions. For P5MMS, the PS/2 mouse port is on JP14. See Table 2-7 for pin definitions.

Table 2-6. PS/2 Keyboard and Mouse Pin Definitions (P5MMA)

Pin Number	Function
1	Data
2	NC
3	Ground
4	VCC
5	Clock
6	NC

Table 2-7. P5MMS PS/2 Mouse (JP14) Pin Definitions

Pin Number	Function	Pin Number	Function
1	NC	2	NC
3	NC	4	CLK
5	NC	6	VCC
7	Data	8	NC
9	GND	10	NC (key)

Keyboard Connector (P5MMS)

The keyboard connector JP11 has five pins. See Table 2-8 for pin definitions.

Table 2-8. Keyboard Connector Pin Definitions

Pin Number	Function
1	Keyboard clock
2	Keyboard data
3	Spare
4	Ground
5	+5 VDC

Reset Cable Connector

The reset cable connector on J39 has two pins. The connector attaches to the hardware Reset switch on the computer case. See Table 2-9 for pin definitions

Table 2-9. Reset Pin Definitions

Pin Number	Definition
1	Reset
2	Ground

Keylock/Power LED Cable Connector

The keylock/power LED cable connector on J23 has five pins. See Table 2-10 for pin definitions. (NOTE: pins 1 and 3 are for LED power connection, pins 4 and 5 are for keyboard connection.)

Table 2-10. Keylock/Power LED Pin Definitions

Pin Number	Function	Definition
18	+	Red wire, LED power
19	Key	No connection
20	GND	Black wire
21		Keyboard inhibit
22	GND	Black wire

Hard Drive LED

The hard drive LED on J23 has four pins. Attach the hard drive LED cable to pins 1 and 2. See Table 2-11 for pin definitions.

Table 2-11. Hard Drive LED Pin Definitions

Pin Number	Function
12	Pull_Up_330
13	Key
14	HD Active
15	Pull_Up_330

Speaker Cable Connector

The speaker cable connector J39 has four pins. See Table 2-12 for pin definitions.

Table 2-12. Speaker Connector Pin Definitions

Pin Number	Function	Definition
23	+5V	Red wire
24	NC	No connection
25	NC	No connection
26	Key	Speaker data

Serial Ports

Serial port COM1 is located on JJ5 and serial port COM2 is located on J5 for P5MMA. They are located on JP9 and JP10 for P5MMS. See Table 2-13 for pin definitions.

Table 2-13. Serial Ports Pin Definitions

Pin Number	Function	Pin Number	Function
1	DCD	6	DSR
2	Serial In	7	RTS
3	Serial Out	8	CTS
4	DTR	9	RI
5	GND	10	NC

USB Connectors

USB stands for Universal Serial Bus. It simplifies PC peripheral connectivity. Its robust serial interface supports low and medium speed transfers which can either be isochronous or asynchronous. The USB ports are located on J37/J38. See Table 2-14 for pin definitions of a USB port.

Table 2-14. J37/J38 Universal Serial Bus Pin Definitions

Pin Number	Function
1	+5V
2	P0-
3	P0+
4	GND

Infra-Red Connector

The infra-red connector is on J23. See Table 2-15 for pin definitions.

Table 2-15. Infra-Red Pin Definitions

Pin Number	Definition
1	+5 V
2	Key
3	IR_RX
4	Ground
5	IR_TX
6	Mode

PW_ON Connector (P5MMA)

The PW-ON connector on J23 is for the ATX power supply switch. Momentary contacting pins 1 & 2 will power on/off the system. See Table 2-16 for pin definitions of the PW_ON connector.

Table 2-16. PW_ON Connector Pin Definitions

Pin Number	Definition
9	PW_ON
10	Ground

Back-up Cooling Fan and Buzzer Connectors*

Connect the back-up cooling fan to JP15 and the buzzer to JP16. These connectors are DC direct when triggered. See Table 2-17 for pin definitions.

Table 2-17. Back-up Cooling Fan and Buzzer Connectors

Pin Number	Definition
1	+12 V
2	GND

Thermal Control Connector*

Use the settings on Table 2-18 to set the system temperature condition for J44. Once the temperature cools down, the back-up fan will automatically shut down.

Table 2-18. Thermal Control Connector

Setting	Turn on (°C)	Shut down (°C)
1-2	62	58
2-3	57	51
OFF	69	65

* For P5MMS only.

2-5 Installing/Removing the SIMM Modules

The SUPER P5MMA/P5MMS motherboard can accommodate a maximum of 256 MB of on-board memory, using standard 72-pin SIMM or 168-pin DIMM memory modules. You can use any 1 MB, 2 MB, 4 MB, 8 MB, 16 MB, or 32 MB 32/36 bit EDO (Extended Data Output), Fast Page Mode, or SDRAM modules. Do not populate U6, J33 and J34 at the same time. U6 is Bank 1 for the SDRAM (synchronous DRAM). J33 and J34 are Bank 1 for the FPM/EDO DRAM. You can put any 3.3V SDRAM/EDO/FPM on U5 and U6.

Refer to Figure 2-1 and the instructions below for installing or removing SIMM/DIMM modules.

CAUTION

Exercise extreme care when installing or removing the SIMM/DIMM modules to prevent any possible damages.

SIMM/DIMM Module Installation

1. Insert SIMM/DIMM modules in Bank 0 through Bank 1 as required for the desired system memory.
2. Insert each SIMM/DIMM module into its socket at an angle away from the AT slots.
3. Gently press the SIMM/DIMM module in the direction of the AT slots until it snaps upright into place in the socket.

Removing SIMM/DIMM Modules

1. Remove SIMM/DIMM modules in correct descending order — from Bank 1 through Bank 0.
2. Gently push the edge of the sockets to the side to release the module. Remove one side of the SIMM module first, and then the other side, to prevent breaking the socket.

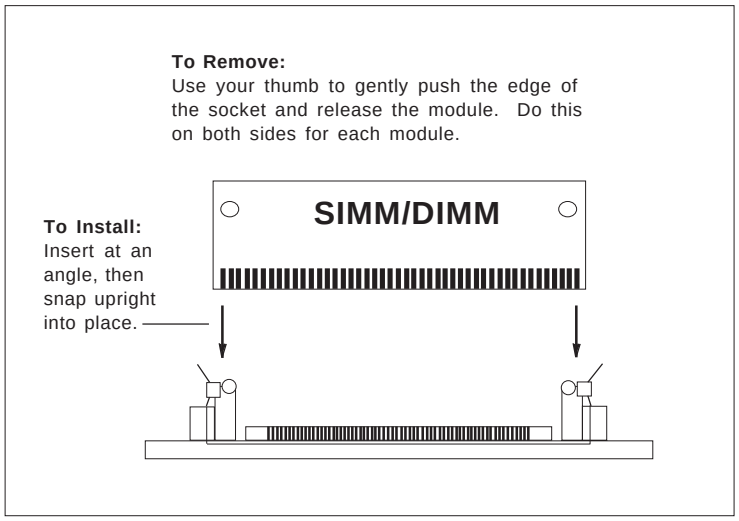


Figure 2-1. Installing/Removing a SIMM/DIMM Memory Module

2-6 Mounting the Motherboard in the Chassis

The motherboard has five standard mounting holes to fit different types of chassis. Chassis may come with a variety of mounting fasteners, made of metal or plastic. Although a chassis may have both metal and plastic fasteners, metal fasteners are the most highly recommended because they ground the system board to the chassis. Therefore, use as many metal fasteners as possible for better grounding.

2-7 Connecting Parallel, Floppy and Hard Disk Drives

Use the following information to connect the floppy and hard disk drive cables.

- The floppy disk drive cable has seven twisted wires.
- A red mark on a wire typically designates the location of pin 1.
- A single floppy disk drive ribbon cable has 34 wires and two connectors to provide for two floppy disk drives. The connector with twisted wires always connects to drive A, and the connector that does not have the twisted wires always connects to drive B.
- An IDE hard disk drive requires a data ribbon cable with 40 wires, and a SCSI hard disk drive requires a SCSI ribbon cable with 50 wires.
- A single IDE hard disk drive cable has two connectors to provide for two drives. To select an IDE disk drive as C, you would normally set the drive select jumper on the drive to DS1. To select an IDE disk drive as D, you would normally set the drive select jumper on the drive to DS2. Consult the documentation that came with your disk drive for details on actual jumper locations and settings.
- A single SCSI ribbon cable typically has three connectors to provide for two hard disk drives and the SCSI adapter. (Note: most SCSI hard drives are single-ended SCSI devices.) The SCSI ID is determined by jumpers or a switch on the SCSI device. The last internal (and external) SCSI device cabled to the SCSI adapter must be terminated.
- Some drives require a special controller card. Read your disk drive manual for details.

Parallel Port Connector

The parallel port is located on J3. See Table 2-19 for pin definitions.

Table 2-19. Parallel Port Pin Definitions

Pin Number	Function	Pin Number	Function
1	Strobe-	2	Auto Feed-
3	Data Bit 0	4	Error-
5	Data Bit 1	6	Init-
7	Data Bit 2	8	SLCT IN-
9	Data Bit 3	10	GND
11	Data Bit 4	12	GND
13	Data Bit 5	14	GND
15	Data Bit 6	16	GND
17	Data Bit 7	18	GND
19	ACJ-	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT		

Floppy Connector

The floppy connector is located on J19. See Table 2-20 for pin definitions.

Table 2-20. Floppy Connector Pin Definitions

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

2-8 Enhanced IDE Configurations

There are no jumpers to configure the on-board enhanced IDE controllers. J21 is the primary IDE connector and J20 is the secondary IDE connector. Refer to Table 2-21 for the pin definitions.

Table 2-21. IDE Connectors Pin Definitions

Pin Number	Function	Pin Number	Function
1	Reset IDE	2	GND
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	GND	20	Key
21	DRQ	22	GND
23	I/O Write-	24	GND
25	I/O Read-	26	GND
27	IOCHRDY	28	BALE
29	DACK-	30	GND
31	IRQ	32	IOCS16-
33	Addr 1	34	GND
35	Addr 0	36	Addr 2
37	Chip Select 0	38	Chip Select 1-
39	Activity	40	GND

Chapter 3
Troubleshooting

3-1 Troubleshooting Procedures

Use the following procedures to troubleshoot your system. If you have followed all of the procedures below and still need assistance, refer to the 'Technical Support Procedures' and/or 'Returning Merchandise for Service' section(s) in this chapter.

No Video

Use the following steps for troubleshooting your system configuration.

1. If you have no video, follow the flowchart in Figure 3-1

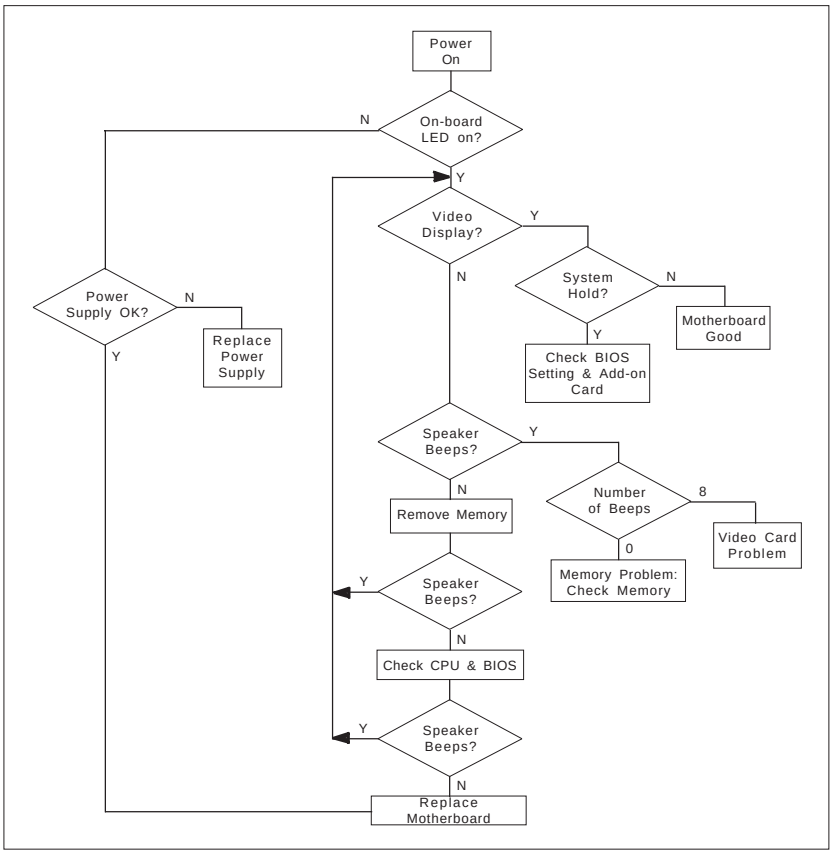


Figure 3-1. Troubleshooting Flowchart

2. Check for missing jumpers or improper installation of the ROM BIOS.
3. Make sure the video card and its jumper setting (as appropriate) match the monitor type.
4. Ensure that all peripheral cards are properly installed in their slots.
5. Ensure that the I/O bus speed is running in the standard 8 MHz range.

6. Use the speaker to determine if any beep codes exist. Refer to Appendix C of the AMI BIOS Reference Manual for details about beep codes.

NOTE

If you are a system integrator, VAR or OEM, a POST diagnostics card is recommended for port 80h codes. Refer to Appendix D.

Memory Error

If you encounter memory error, follow the procedures below.

1. Check to determine if SIMM/DIMM modules are improperly installed.
2. Make sure that different types of SIMMs have not been installed in different banks (e.g., a mixture of 2MB x 36 and 1 MB x 36 SIMMs in Banks 0).
3. Determine if different speeds of SIMMs have been installed in the same or different banks, and the BIOS setup is configured for the fastest speed of RAM used. It is recommended to use the same RAM speed for SIMMs in different banks.
4. Check for bad SIMM/DIMM modules or chips.

Losing the System's Setup Configuration

1. Ensure that you are using a high quality power supply. A poor quality power supply may cause the system to lose CMOS setup. Refer to Chapter 1 of this manual for details.
2. If the above step does not fix the Setup Configuration problem, contact your vendor for repair.

3-2 Technical Support Procedures

1. Go through the 'Troubleshooting Procedures' section in this chapter of the manual before calling Technical Support.
2. BIOS upgrades can be downloaded from the SUPER BBS# (408) 895-2022, 24 hours a day, using 1200-14400 baud, 8 data bits, 1 stop bit and no parity.
3. If you still cannot get the problem resolved, have the following information ready before you call for technical support:
   - BIOS release date/version
   - System board serial number
   - Product model name
   - Invoice number and date
   - Cache size
   - System configuration

3-3 Returning Merchandise for Service

A receipt or copy of your invoice marked with the date of purchase is required before any warranty service will be rendered. You can obtain service by calling your vendor for a Returned Merchandise Authorization (RMA) number. When returning to the manufacturer, the RMA number should be prominently displayed on the outside of the shipping carton, and mailed prepaid or hand-carried. Shipping and handling charges will be applied for all orders that must be mailed when service is complete.

This warranty only covers normal consumer use and does not cover damages incurred in shipping or from failure due to the alternation, misuse, abuse, or improper maintenance of products.

During the warranty period, contact your distributor first for any product problems.