

## ***V70MA System Board***

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The V70MA is an all-in-one, high-performance system board that supports the Intel Pentium processor with MMX (MultiMedia eXtensions) technology. The MMX feature enables the system to handle multimedia functions and enhance the performance of 32-bit applications.

The system memory is upgradable to 256 MB via the onboard two 168-pin DIMM (Double In-line Memory Module) sockets. These sockets accommodate 8-, 16-, 32-, 64- and 128-MB DIMMs. The system board also comes with 512-KB second-level cache already integrated in the CPU.

To fully support multimedia functions, the board incorporates a high-performance 3-D video controller with AGP (Accelerated Graphics Port) feature, 2- or 4-MB SGRAM (Synchronous Graphics Random Access Memory), and a 3-D audio controller.

Onboard I/O (input/output) interfaces are comprised of two UART (Universal Asynchronous Receiver-Transmitter) 16C550 serial interfaces (one port and one connector), a parallel port with SPP (Standard Parallel Port)/ECP (Extended Capabilities Port)/EPP (Enhanced Parallel Port) support, and PS/2 keyboard and mouse ports. Two USB (Universal Serial Bus) ports, one VGA (Video Graphics Accelerator) port, one Feature connector, one Microphone-in port, one Line-in port, one Line-out port, and one Game/MIDI (Musical Instrument Digital Interface) port are also added to the board design to enable the system to support additional peripherals.

For expansion, the board comes with two ISA (Industry Standard Architecture) slots and one PCI (Peripheral Component Interface) slot.

Special features such as PnP (Plug-and-Play) support, Power Management, Wireless Communication, Hardware Monitoring, Wake-on Ring, and Wake-on LAN (Local Area Network) functions are also supported. These functions are individually discussed in this chapter.

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The system is fully compatible with MS-DOS V6.X, OS/2, SCO UNIX, Windows NT, and Windows 95/98 operating systems.

## **1 Major Components**

The system board has the following major components:

- A Zero Insertion Force (ZIF) CPU socket that accommodates Intel, AMD, or Cyrix/IBM Pentium CPU with MMX technology, running at 233, 250, 266, 300, 333, or 350 MHz
- Two DIMM sockets that accept 8-, 16-, 32-, 64-, and 128-MB Standard DRAMs, with Parity Check or Error Correction Code (ECC) feature. These sockets allow memory upgrade of up to 256 MB
- 512-KB second-level cache
- PCI local bus IDE (Integrated Device Electronics) controller
- 3-D audio controller
- AGP-compliant 3-D video graphics accelerator with 2- or 4-MB SGRAM
- One Feature connector
- One Wake-on LAN connector
- One Modem ring-in connector
- One CD-in connector
- One PCI audio upgrade connector
- One Voice Modem connector
- One IrDA (InfraRed Data Association) connector for Wireless Communication support
- Two PCI enhanced IDE interfaces that support up to four IDE devices
- External ports
  - PS/2 keyboard and mouse ports

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- One buffered high-speed serial port
  - One SPP/ECP/EPP high-speed parallel port
  - Two USB ports
  - One standard VGA port
  - One Microphone-in port
  - One Line-in port
  - One Line-out port
  - One Game/MIDI port
  - Two ISA slots and one PCI slot (one PCI-/ISA-shared)

## 2 System Board Layout

Figure 1 shows the locations of the major components on the system board.

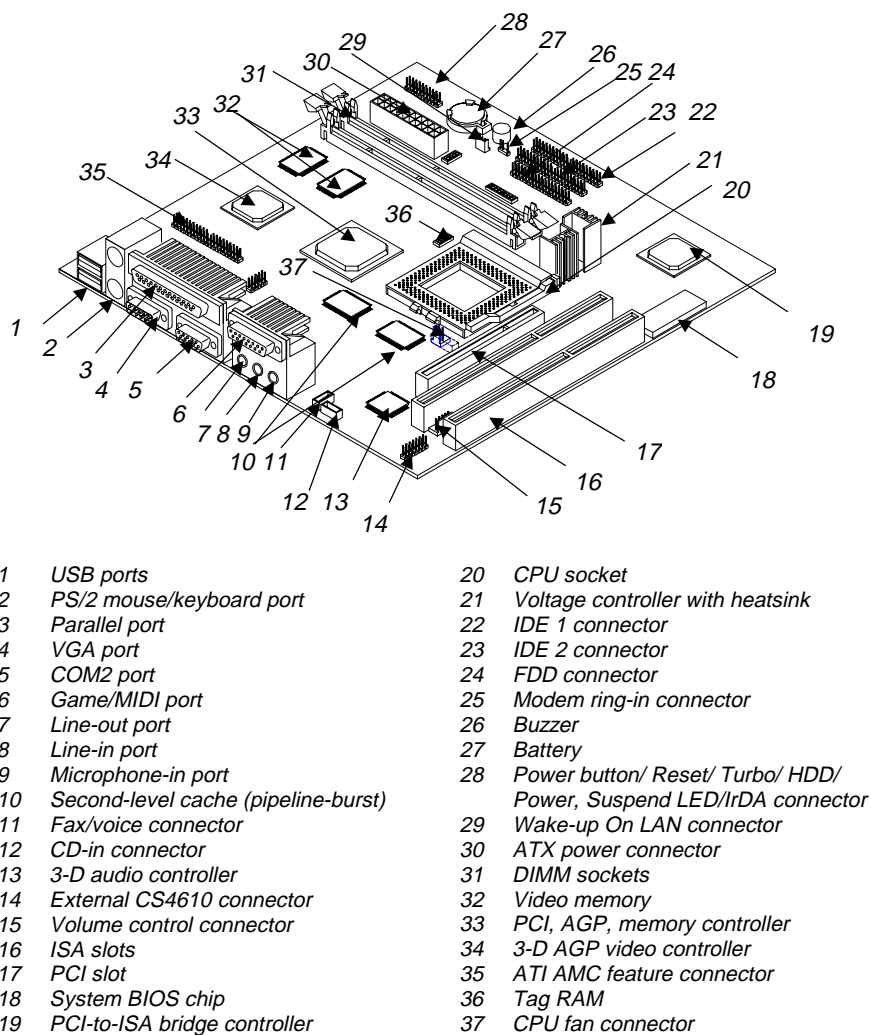


Figure 1 System Board Layout

## 3 Jumpers and Connectors

### 3.1 Jumper and Connector Locations

Figure 2 shows the jumper and connector locations on the system board.

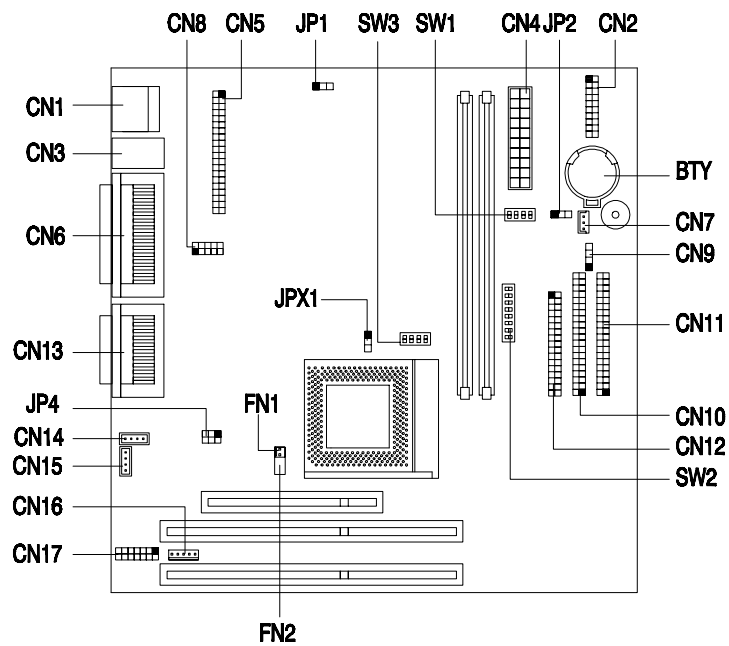


Figure 2 System Board Jumper and Connector Locations



The blackened pin of a jumper or a connector represents pin 1.

## 3.2 Jumper Settings

The following table lists the possible jumper settings:

Table 1 Jumper Settings

Jumper	Setting	Function									
JP1	1-2 * 2-3	VGA Interrupt Disabled Enabled									
JP2	1-2 2-3 *	Wake-on LAN Active low Active high									
JP4	1-2, 4-5 2-3, 5-6 *	Audio Line-in Source AMC connector Line-in connector									
JPX1	1-2 2-3 *	CPU Type AMD K6S-300 Other CPUs									
SW1 Settings											
B1	On Off *	Hardware Monitor Enabled Disabled									
Bus Frequency (MHz)											
CY2283-1						ICS9148-16					
B2	B3	B4	CPU Clk.	AGP Clk.	PCI Clk.	B2	B3	B4	CPU Clk.	AGP Clk.	PCI Clk.
Off	On	Off	66	66	33	Off	On	On	66	66	33
Off	Off	Off	75	60	30	On	On	Off	75	60	30
On	On	Off	83	66	33	Off	On	Off	83	66	33
On *	Off *	Off *	100	66	33	Off	Off	Off	100	66	33

\* Default setting

Table 1 Jumper Settings (continued)

SW2 Settings						
CPU Core Clock Multiplier					CPU Type	
B1	B2	B3	K6	M2	P55C	
Off	Off	Off	3.5	3.5	3.5	
On	Off	On	4.0	2.0	2.0	
Off *	On *	Off *	3.0 *	3.0	3.0	
On	On	Off	2.5	2.5	2.5	
On	On	On	4.5	--	--	
On	Off	Off	2.0	--	--	
Off	On	On	5.0	--	--	
Off	Off	On	5.5	--	--	
CPU Core Voltage						
B4	B5	B6	B7	B8	Voltage	
Off	On	On	Off	On	3.3	
Off	On	On	Off	Off	3.2	
Off	On	Off	Off	On	2.9	
Off	On	Off	Off	Off	2.8	
Off	Off	Off	On	On	2.3	
Off *	Off *	Off *	On *	Off *	2.2 *	
SW3 Settings						
AMD K6S-300 Voltage Select						
B1	Voltage					
On *	3.45V					
Off	3.6V					
Password Checking						
B2	Function					
On	Check password					
Off *	Bypass password					
M1542 Bus Frequency						
B3	B4	Frequency				
Off	Off	66				
On *	On *	100				

\* Default setting

### 3.3 Onboard Connector Functions

Table 2 lists the onboard connectors and their respective functions.

*Table 2      System Board Connectors*

Connector	Function
CN1	USB port
CN2	Power LED (pins 1-3) HDD LED (pins 4-7) Reset button (pins 8-9) Power button (pins 10, 20) IrDA connector (pins 14-19) Turbo LED (pins 11-13)
CN3	<b>Upper:</b> PS/2 mouse port <b>Lower:</b> PS/2 keyboard port
CN4	ATX power connector
CN5	ATI AMC feature connector
CN6	<b>Upper:</b> Parallel port <b>Lower:</b> VGA port (right) COM2 port (left)
CN7	Wake-on LAN connector
CN8	COM1 port
CN9	Modem ring-in connector
CN10	IDE2 connector
CN11	IDE1 connector
CN12	Floppy disk drive connector
CN13	<b>Upper:</b> Game/MIDI port <b>Lower:</b> (R-to-L) Microphone-in port Stereo line-in port Stereo line-out port
CN14	Fax/voice connector
CN15	CD-in connector
CN16	Volume control connector
CN17	External CS4610 connector
FN1	2-pin CPU fan connector
FN2	5-pin CPU fan connector



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## **4 Installation Precautions**

Before you install any system component, we recommend that you read the following sections. These sections contain important ESD precautions, pre- and post-installation instructions.

### **4.1 ESD Precautions**

Electrostatic discharge (ESD) can damage your processor, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component:

1. Do not remove a component from its protective packaging until you are ready to install it.
2. Wear a wrist grounding strap and attach it to a metal part of the system unit before handling components. If a wrist strap is not available, maintain contact with the system unit throughout any procedure requiring ESD protection.

### **4.2 Pre-installation Instructions**

Always observe the following before you install a system component:

1. Turn off the system power and all the peripherals connected to the unit before opening it.
2. Open the system according to the instructions in the housing installation manual.
3. Follow the ESD precautions in section 4.1 before handling a system component.
4. Remove any expansion boards or peripherals that block access to the DIMM sockets or CPU connector.
5. See the following sections for specific instructions on the component you wish to install.



*Do not attempt the procedures described in the following sections unless you are a qualified service technician.*

### **4.3 Post-installation Instructions**

Observe the following after installing a system component:

1. See to it that the components are installed according to the step-by-step instructions in their respective sections.
2. Make sure you have set all the required jumpers. See section 3.2 for the correct jumper settings.
3. Replace any expansion boards or peripherals that you removed earlier.
4. Replace the system cover.
5. Connect the necessary cables and turn on the system.

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## 5 Memory Configurations

The system board comes with two 168-pin DIMM sockets that allow you to expand memory to a maximum of 256 MB. The DIMM sockets support SDRAMs (Synchronous Direct Random Access Memory) and EDO (Extended Data Out) DRAMs with 8-, 16-, 32-, 64-, and 128-MB capacities, 60 ns (nanoseconds) or less access time, and with ECC feature.

Table 3 lists possible memory configurations.

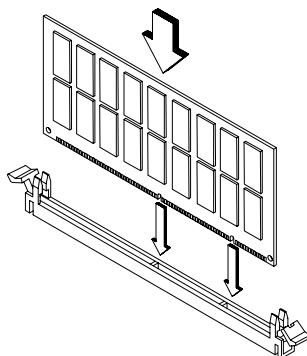
*Table 3 Memory Configurations*

DIMM1	DIMM2	Total Memory
8 MB		8 MB
16 MB		16 MB
32 MB		32 MB
64 MB		64 MB
128 MB		128 MB
	8 MB	8 MB
	16 MB	16 MB
	32 MB	32 MB
	64 MB	64 MB
	128 MB	128 MB
8 MB	16 MB	24 MB
16 MB	32 MB	48 MB
32 MB	64 MB	96 MB
64 MB	128 MB	192 MB
8 MB	8 MB	16 MB
16 MB	16 MB	32 MB
32 MB	32 MB	64 MB
64 MB	64 MB	128 MB
128 MB	128 MB	256 MB

### 5.1 Installing a DIMM

Follow these steps to install a DIMM:

- 
1. Open the clips on the socket.
  2. Align the DIMM with the socket.
  3. Press the DIMM into the socket until the clips lock into the DIMM.



*Figure 3      Installing a DIMM*



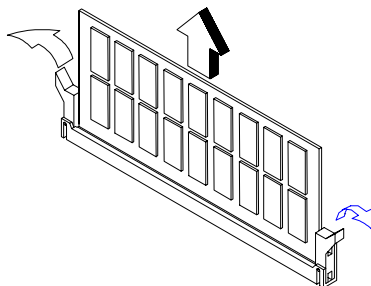
*The DIMM socket is slotted to ensure proper installation. If you insert a DIMM but it does not fit easily into the socket, you may have inserted it incorrectly. Turn the DIMM around and try to insert it again.*

## **5.2      Removing a DIMM**

To remove a DIMM:

1. Press the holding clips on both sides of the socket outward to release the DIMM.

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2. Gently pull the DIMM out of the socket.



*Figure 4*      *Removing a DIMM*

### **5.3 Reconfiguring the System**

The system automatically detects the amount of memory installed. Run Setup to view the new value for total system memory and make a note of it.

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## 6 Second-level Cache

The board may come with either 256-KB or 512-KB pipelined-burst second-level cache. Cacheless design is also supported. Refer to the following table for the possible cache configurations.

*Table 4 Second-level Cache Configurations*

Cache Size	Data RAM (12 ns)	Location	Tag RAM (12 ns) (U22)	Cacheable Memory
256 KB	32K x 32 x 2 pcs.	U23, U26	32K x 8 x 1 pc (external)	256 MB
256 KB	32K x 32 x 2 pcs.	U23, U26	16 x 10 x 1 pc (internal)	256 MB
512 KB	64K x 32 x 2 pcs.	U23, U26	32K x 8 x 1 pc (external)	128 MB
512 KB	64K x 32 x 2 pcs.	U23, U26	16 x 10 x 1 pc (internal)	256 MB

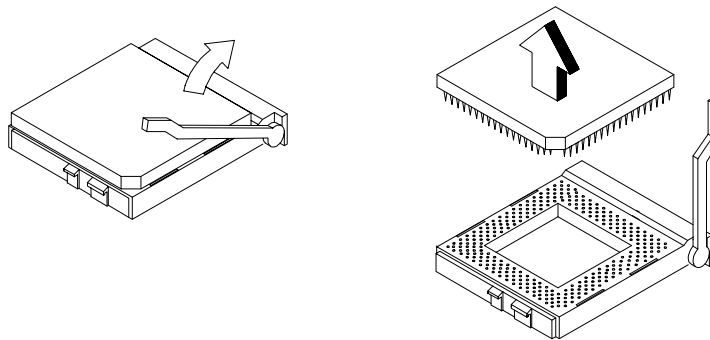
## 7 Upgrading the CPU

### 7.1 Removing the CPU

In case you want to replace or upgrade your CPU, you need to remove the previously installed CPU first.

Follow these steps to remove the CPU:

1. Locate the CPU socket with CPU mounted on the system board.
2. Detach the fan cable connector.
3. Pull up the socket lever. The CPU pins will be automatically released from the socket holes.
4. Detach the CPU from the socket.



*Figure 5 Removing the CPU*

## **7.2 Installing the Upgrade CPU**

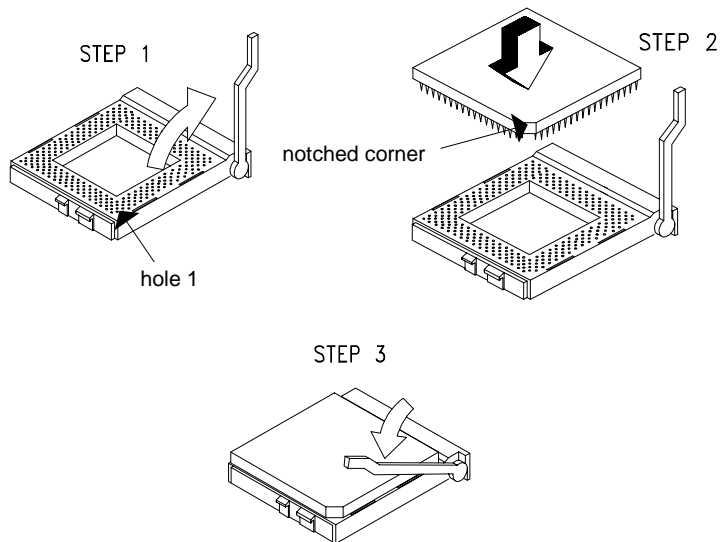


*Observe the ESD precautions when installing components.*

Before you proceed, make sure that there is no CPU installed in the CPU socket.

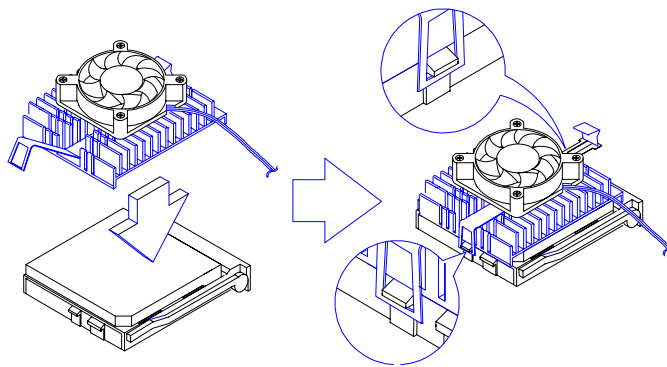
Follow these steps to install the upgrade CPU:

1. Pull up the socket lever.
2. Insert the CPU, making sure that pin 1 (indicated by a notched corner) of the CPU connects to hole 1 of the socket.
3. Pull down the socket lever to lock the CPU into the socket.



*Figure 6*      *Installing a CPU*

4. Attach the heatsink and fan to the CPU.



*Figure 7*      *Attaching the Heatsink and Fan to the CPU*



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5. Plug the fan cable to the fan connector to its corresponding connector on the system board. See Table 2 for the list of onboard connectors and their functions.

## 8 IDE Hard Disk Support

The board comes with an enhanced PCI IDE controller that supports PIO mode 4 and Ultra DMA (Direct Memory Access) mode data transfers. In addition, two PCI IDE interfaces are mounted on the riser card to enable the system to support a maximum of four IDE hard disks, or any other IDE devices. See Figure 2 for the location of the IDE interfaces.

Connect the cables according to the IDE hard disk configuration in Table 5. Follow the instructions in the housing installation manual on how to install a hard disk in the system.

*Table 5 IDE Hard Disk Configuration*

IDE Connector	Master	Slave
IDE 1 (CN11)	Hard disk 0	Hard disk 1
IDE2 (CN10)	Hard disk 2/ IDE CD-ROM drive	Hard disk 3

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## 9 Video Function

The onboard video controller is capable not only of enhancing video display, but supporting 3-D video applications as well. The video controller features the Accelerated Graphics Port (AGP) design - the latest bus architecture that is considered to be the best solution for 3-D applications. AGP offers greater bandwidth; thus, it is capable of speeding up the VGA bus in order to meet the requirement of 3-D applications.

The board may come with 2-MB upgradable to 4-MB video memory. Larger video memory allows you to display higher resolutions and more colors.

The following table lists the video resolutions supported by the onboard VGA:

*Table 6 Supported Video Resolutions*

Resolution	Refresh Rate (Hz)	Horizontal Freq. (KHz)	Pixel Clock (MHz)
640 x 480	60	31.4	25.2
640 x 480	72	37.7	32.0
640 x 480	75	37.5	31.5
640 x 480	85	43.3	36.0
640 x 480	90	48.0	39.9
640 x 480	100	52.9	44.9
640 x 480	120	63.7	55.0
640 x 480	160	81.0	70.0
640 x 480	200	100.2	81.0
800 x 600	48	33.8	36.0
800 x 600	56	35.1	36.0
800 x 600	60	37.8	39.9
800 x 600	70	44.5	44.9
800 x 600	72	48.0	50.0
800 x 600	75	46.9	49.5
800 x 600	85	53.7	56.3
800 x 600	90	63.9	56.6
800 x 600	100	76.1	67.5
800 x 600	120	101.9	81.0

**Table 6**      *Supported Video Resolutions*

<b>Resolution</b>	<b>Refresh Rate (Hz)</b>	<b>Horizontal Freq. (KHz)</b>	<b>Pixel Clock (MHz)</b>
800 x 600	60	37.8	135.0
1024 x 768	43	35.5	44.9
1024 x 768	60	48.4	65.0
1024 x 768	70	56.1	75.0
1024 x 768	72	57.9	75.0
1024 x 768	75	60.0	78.8
1024 x 768	85	68.7	94.5
1024 x 768	90	76.2	100.0
1024 x 768	100	80.4	110.0
1024 x 768	120	96.7	130.0
1024 x 768	140	113.1	157.5
1024 x 768	150	120.6	160.0
1152 x 864	43	45.9	65.0
1152 x 864	47	44.9	65.0
1152 x 864	60	54.9	80.0
1152 x 864	70	66.1	100.0
1152 x 864	75	75.1	110.0
1152 x 864	80	76.4	110.0
1152 x 864	85	77.1	121.5
1152 x 864	100	90.2	135.0
1152 x 864	120	108.6	172.0
1280 x 1024	43	50.0	80.0
1280 x 1024	47	50.0	80.0
1280 x 1024	60	64.0	110.0
1280 x 1024	70	74.6	126.0
1280 x 1024	74	77.9	135.0
1280 x 1024	75	80.0	135.0
1280 x 1024	85	91.2	157.5
1280 x 1024	90	96.4	160.0
1280 x 1024	100	106.4	172.0
1600 x 1200	52	68.0	135.0
1600 x 1200	58	75.0	135.0
1600 x 1200	60	76.2	156.0
1600 x 1200	66	82.7	172.0
1600 x 1200	72	89.7	194.4
1600 x 1200	75	93.8	202.5
1600 x 1200	76	95.2	198.0
1600 x 1200	85	106.2	229.5

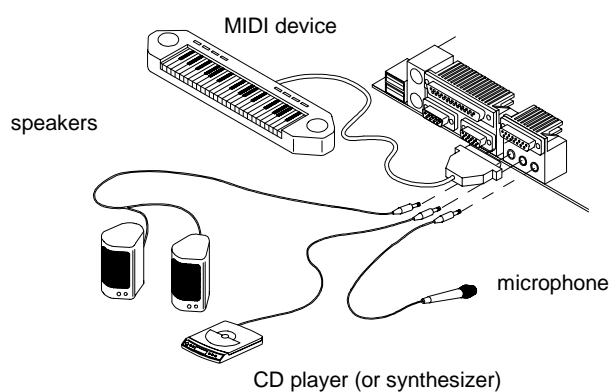
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## 10 Audio Function

The board provides a complete 3-D audio solution via the onboard 3-D video controller and the following audio interfaces:

- Microphone port
- Line-in port
- Line-out port
- Game/MIDI port
- CD-in connector
- Voice Modem connector

These connectors enable the system to accommodate external audio devices. To connect an audio device, simply plug in the device's connector to its corresponding onboard audio port. See the following figure:



*Figure 8 Connecting External Audio Peripherals*

Refer to Figure 1 or Figure 2 for the location of the audio connectors.

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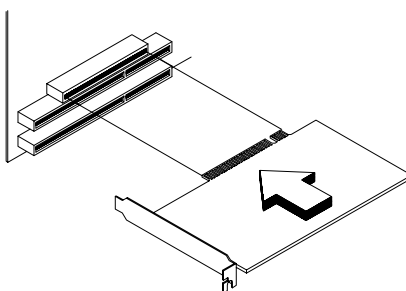
## 11 Expansion Cards

### 11.1 Installing a PCI Card

To install a PCI card:

1. Locate the PCI slot(s) on the system board.
2. Remove the bracket on the housing opposite to the empty PCI slot.
3. Insert a PCI card into the slot. Make sure that the card is properly seated.
4. Secure the card to the housing with a screw.

When you turn on the system, BIOS automatically detects and assigns resources to the PCI devices.



*Figure 9      Installing a PCI Card*

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## 11.2 Installing ISA Cards

Both PnP and non-PnP ISA cards require specific IRQs (Interrupt ReQuests). When installing ISA cards, make sure that the IRQs required by these cards are not previously assigned to PCI devices to avoid resource conflicts.

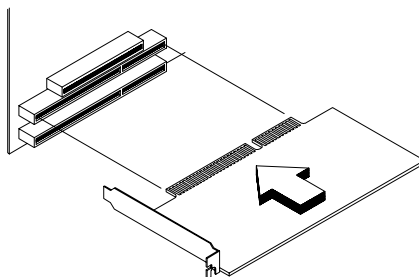
Follow these steps when installing ISA cards:

1. Turn off the system.
2. Open the system and remove all PnP cards installed in the system, if any.
3. Install non-PnP ISA cards.
4. Turn on the system.
5. Use Windows 95 or ICU (ISA Configuration Utility) to manually assign the appropriate IRQs to the cards. This ensures that BIOS will not use the resources assigned to the non-PnP ISA cards.



*BIOS detects and configures only PnP cards.*

6. Turn off the system.
7. Locate the expansion slots and install the PnP ISA and PCI cards.
8. Turn on the system. This time PnP BIOS automatically configures the PnP ISA and PCI cards with the available resources.



*Figure 10*      *Installing an ISA Card*

## **12      USB**

USB (Universal Serial Bus) is a new serial bus design that is capable of cascading low-/medium-speed peripherals (less than 12 Mbps) such as a keyboard, mouse, joystick, scanner, printer and modem/ISDN. With USB, complex cable connections at the back panel of your PC can be eliminated.

The board comes with two USB ports (CN1). See Figure 1 or Figure 2 for the location of the ports.

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## **13 Wireless Communication Feature**

The system supports Wireless Communication via an onboard infrared interface (CN2 - see Figure 2). This feature enables the system to communicate with SIR (Serial InfraRed)-aware peripherals without the aid of cables.

The onboard infrared interface is IrDA-compliant, allowing data transfer at a rate of 115.2 kilobits per second (Kbps) at a maximum distance of one meter.

## **14 Hardware Monitoring Function**

The Hardware Monitoring function allows you to check the system resources, either locally or in a computer network, by using software such as Intel LDCM (LAN Desk Client Manager). ADM and Intel LDCM are desktop management programs that offer the SMART (System Monitoring Analysis and Reporting Technology) monitor function for checking local or network connected systems. In addition, it also enables the PC products and applications to be OS (operating system) independent.

To enable the Hardware Monitoring function, you need to install Intel LDCM. Contact your dealer for information on the availability of the software. Refer to the software documentation for more details on the Hardware Monitoring function.

## **15 Wake-on Ring-in Function**

The Wake-on Ring-in function enables the system to resume from suspend mode by monitoring the fax/modem (or any device of similar type) activities. Any signal or activity detected from the Modem ring-in connector automatically returns the system to normal operation. Refer to Figure 2 for the location of the Modem ring-in connector (CN9) on the system board.



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## **16 Wake-on LAN Function**

The system supports the Wake-on LAN feature via the onboard Wake-on LAN connector (CN7). This special feature allows the system to be activated on via a network. Common network functions, such as remote access, file sharing, etc. are also supported.

## **17 Error Messages**

In the event that you receive an error message, do not continue using the computer. Note the message and take corrective action immediately. This section describes the different types of error messages and suggests corrective measures.

There are two general types of error messages:

- Software
- System

### **17.1 Software Error Messages**

Software error messages are returned by your operating system or application. These messages typically appear after you boot the operating system or when you run your applications. If you receive this type of message, consult your application or operating system manual for help.

### **17.2 System Error Messages**

A system error message indicates a problem with the computer itself. These messages normally appear during the power-on self-test, before the operating system prompt appears. Table 7 lists the system error messages.

**Table 7**      *System Error Messages*

Error Message	Corrective Action
Memory Error at MMMM:SSSS:OOOOh (R:xxxxh, W:xxxxh)	Replace the DRAM chips or the DIMMs.
System Management Memory Bad	Replace the DRAM chips or the DIMMs.
Keyboard Interface Error	Check the keyboard interface circuit or change the keyboard.
Keyboard Error or Keyboard Not Connected	Reconnect or replace the keyboard.
Pointing Device Error	Reconnect or replace the pointing device.
Pointing Device Interface Error	Check the keyboard interface circuit.
Pointing Device IRQ Conflict	Enter SETUP and change the setting of IRQ12.
IDE Drive 0 Error IDE Drive 1 Error IDE Drive 2 Error IDE Drive 3 Error	Replace the disk drive or the HDD (hard disk drive) controller. Check the HDD cable connections and CMOS setup configuration.
IDE Drive 0 (1, 2, 3) Auto Detection Failed	Replace the disk drive or the hard disk drive controller. Check the HDD cable connections and CMOS setup configuration.
Floppy Drive A Error Floppy Drive B Error	Replace the floppy drive.

**Table 7**      *System Error Messages (continued)*

Error Message	Corrective Action
Floppy Disk Controller Error	Check the floppy drive cable and its connections. If the cable is good and properly connected, the floppy disk controller may be the problem. Change the floppy disk controller or disable the onboard controller by installing another add-on card with a controller.
CPU Clock Mismatch	When the user changes the CPU frequency, this message will be shown once. Then the BIOS will adjust the CPU clock automatically.
Serial Port 1 Conflict Serial Port 2 Conflict	Change the onboard serial port address in Setup or change the add-on card serial port address.
Parallel Port Conflict	Change the onboard parallel port address in CMOS Setup or the parallel port address of the add-on card.
Real Time Clock Error	Check the RTC circuit or replace the RTC.
CMOS Battery Bad	Replace the onboard lithium battery.
CMOS Checksum Error	Run Setup again and reconfigure the system.
NVRAM checksum Error	Run the ECU (Extended ISA Configuration Utility) to restore the original EISA configuration data.
On Board xxx ... Conflict(s)	Try to reassign or disable onboard device resources.
PCI Device Error	Check the PCI card. Replace it if bad.
System Resource Conflict	Run Setup to reconfigure the system.
IRQ Setting Error	Run Setup to reconfigure the system.
Expansion ROM Allocation Fail	Change the I/O expansion ROM address.

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## 17.3 Correcting Error Conditions

As a general rule, the "Press F1 to continue" error message is caused by a configuration problem which can be easily corrected. An equipment malfunction is more likely to cause a fatal error, i.e., an error that causes complete system failure.

Here are some corrective measures for error conditions:

1. Run Setup. You must know the correct configuration values for your system before you enter Setup, which is why you should write these values down when the system is correctly configured. An incorrect Setup configuration is a major cause of power-on error messages, especially for a new system.
2. Remove the system cover according to the directions in the system housing installation guide. Check that the system board and any expansion boards are set correctly.
3. Check that all connectors and boards are secure. Consult the system housing installation guide for assistance.



*If you have purchased a new hard disk drive and cannot access it, it may be because your disk is not physically formatted. Physically format the disk using the FDISK and FORMAT commands.*

If you follow the corrective steps above and still receive an error message, the cause may be an equipment malfunction.

If you are sure that your configuration values are correct and your battery is in good condition, the problem may lie in a damaged or defective chip. Contact an authorized service center for assistance.