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## Chapter 1

# Overview

MX58 Plus is an all-in-one Pentium®-based motherboard that features an **onboard video graphics accelerator and a 16-bit sound processor**. This motherboard utilizes the PCI/ISA architecture and ATX form factor and integrates the **SIS 5598** PCIsset, a Super I/O controller, and a PCI mode 4 enhanced IDE controller with bus master and Ultra DMA/33 to enhance system performance. It has **512KB** pipelined-burst second-level cache onboard and supports two single in-line memory module (SIMM) plus two Dual in-line memory module (DIMM) that allows to **mix EDO and SDRAM** memory and expansion up to a maximum of **256MB**.

In addition, MX58 Plus also implements many special features.

**Full-range CPU core voltage** This motherboard supports the CPU core voltage from 1.3V to 3.5V, that can be applied to various CPU type in future.

**High Efficient Synchronous Switching Power Regulator** Most of the current switching designs are asynchronous mode, which from the technical point of view, still consumes very high power as well as heat. This motherboard implements high efficient Synchronous switching design that the temperature of MOS FET is less than 36 degree C comparing with 57 degree Schottky diode of Asynchronous design.

**RTC Wake Up Timer** The Wake Up Timer is more like an alarm, which wakes up and power on your system at a pre-defined time for specific application. It can be set to wake up everyday or on specific date within a month. The date/time accurate is second.

**Over Current Protection Circuit** The Over Current Protection was very popular implemented on the Baby AT or ATX +5V/+12V switching power supply. It is very useful to prevent accidental short circuit when you install the mainboard, HDD, add-on cards into housing. But unfortunately, the new generation CPU and chipset use 3.3V/2.8V Voltage which has regulator to transfer 5V to 3.3V (Vcpuio, chipset, PBSRAM, SDRAM) and 2.8V (CPU Vcore), and makes 5V Over Current Protection useless. AOpen MX58 Plus

## Overview

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supports 3.3V and 2.8V Over Current Protection, in conjunction with 5V/12V power supply provide the full line Over Current Protection.

**FCC DoC certificate** MX58 Plus has passed FCC DoC test. The radiation is very low, you can use any kind of housing.

**Powerful utility software supported** AOpen Bonus Pack bundled CD contains many useful utilities, such as ADM (Advanced Desktop Manager), AOchip, Hardware Monitor utility, Suspend to Hard Drive utility, and BIOS flash utility.

## 1.1 Specifications

<b>Form Factor</b>	ATX
<b>Board Size</b>	245 mm x 245 mm
<b>CPU</b>	Intel Pentium Processor P54C, PP/MT (P55C), AMD K5/ K6/K6-II, Cyrix 6x86/M2 and IDT C6.
<b>System Memory</b>	FPM (Fast Page Mode) or EDO (Extended Data Output) 72-pin SIMM x2, and SDRAM 168-pin x2 maximum 256MB.
<b>Second-level Cache</b>	512KB pipelined-burst cache onboard
<b>Chipset</b>	SIS 5598 PCIset
<b>Expansion Slots</b>	ISA x2 and PCI x3
<b>Serial Port</b>	Two serial ports UART 16C550 compatible
<b>Parallel Port</b>	One parallel port supports standard parallel port (SPP), enhanced parallel port (EPP) or extended capabilities port (ECP).
<b>Floppy Interface</b>	Floppy interface supports 3.5 inches drives with 720KB, 1.44MB or 2.88MB format or 5.25 inches drives with 360KB, 1.2MB format
<b>IDE Interface</b>	Dual-channel IDE interface support maximum 4 IDE hard disks or CDROM, mode 4 , bus master hard disk drives and Ultra DMA/33 mode hard drives are also supported.
<b>USB Interface</b>	Two USB ports supported by USB bracket, the BIOS also supports USB driver to simulate legacy keyboard.
<b>PS/2 Mouse</b>	Mini-Din PS/2 mouse connector onboard.
<b>Keyboard</b>	Mini-Din PS/2 keyboard connector onboard.
<b>RTC and Battery</b>	RTC build in chipset, Lithium (CR-2032) battery.
<b>BIOS</b>	AWARD Plug-and-Play, 2M bit Flash ROM BIOS. Multi-language versions supported.

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## Chapter 2

# Hardware Installation

This chapter gives you a step-by-step procedure on how to install your system. Follow each section accordingly.



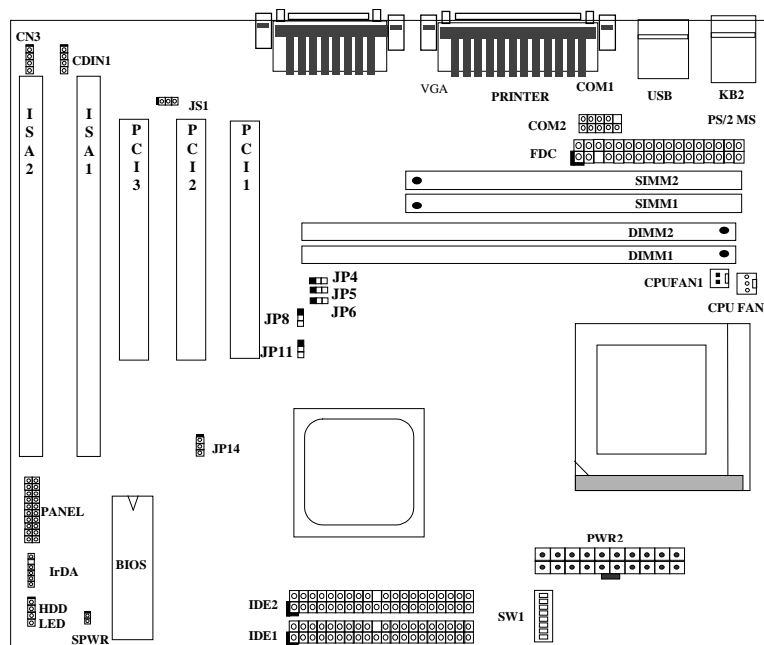
**Caution:** *Electrostatic discharge (ESD) can damage your processor, disk drives, expansion boards, and other components. Always observe the following precautions before you install a system component.*

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

# Hardware Installation

## 2.1 Jumper and Connector Locations

The following figure shows the locations of the jumpers and connectors on the system board:



# Hardware Installation

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## Jumpers:

<b>JP14:</b>	Clear CMOS
<b>JS1:</b>	Disable Onboard Audio

## Connectors:

<b>PS2:</b>	PS/2 mouse connector
<b>KB:</b>	PS/2 keyboard connector
<b>COM1:</b>	COM1 connector
<b>COM2:</b>	COM2 connector
<b>PRINTER:</b>	Printer connector
<b>PWR2:</b>	ATX power connector
<b>USB:</b>	USB connector
<b>FDC:</b>	Floppy drive connector
<b>IDE1:</b>	IDE1 primary channel
<b>IDE2:</b>	IDE2 secondary channel
<b>VGA:</b>	VGA connector
<b>CPUFAN1:</b>	CPU fan connector
<b>CDUFAN2:</b>	CPU fan connector
<b>IrDA:</b>	IrDA (Infrared) connector
<b>HDD LED:</b>	HDD LED connector
<b>PANEL:</b>	Front panel (Multifunction) connector
<b>SPWR:</b>	ATX Soft-Power Switch Connector
<b>CDIN1:</b>	CD-audio connector
<b>CN3:</b>	Mono in (Pin 1-2) and Mic out (Pin 3-4)

# Hardware Installation

## 2.2 Jumpers

Jumpers are made by pin headers and plastic connecting caps for the purpose of customizing your hardware. Doing so requires basic knowledge of computer hardware, be sure you understand the meaning of the jumpers before you change any setting. The onboard jumpers are normally set to their default with optimized settings.

On the mainboard, normally there is a bold line marked beside pin 1 of the jumper, sometimes, there are numbers also. If we connect (short) plastic cap to pin 1 and 2, we will say set it at 1-2, and when we say jumper is open, that means no plastic cap connected to jumper pins.



Open



Short

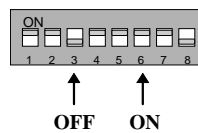


Jumper set at 1-2



Jumper set at 2-3

For your convenience to install a CPU, this motherboard also use a DIP switch to set CPU voltage and frequency ratio. The following figure simply shows you how to set this DIP switch, please see also to next sections for more details.

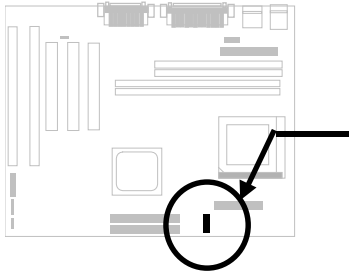


# Hardware Installation

## 2.2.1 Setting the CPU Voltage

<u>S4</u>	<u>S5</u>	<u>S6</u>	<u>S7</u>	<u>S8</u>	<u>Vcore</u>
ON	ON	ON	ON	OFF	3.52V
OFF	ON	ON	ON	OFF	3.45V
OFF	OFF	ON	ON	OFF	3.2V
ON	OFF	OFF	ON	OFF	2.9V
OFF	OFF	OFF	ON	OFF	2.8V
OFF	ON	OFF	OFF	OFF	2.2V
OFF	ON	OFF	ON	ON	1.8V

**SW1** is used to select CPU core voltage (Vcore) and ratio, there are totally eight switches on the DIP. After installing CPU, remember to set the switch 4-8 to specify a proper Vcore.



**3.2V**

K6-233



**2.9V**

K6-166/200 or M2



**2.8V**

P55C (MMX)



**3.52V**

6x86 or K5



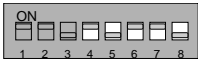
**3.45V**

P54C



**2.2V**

K6-266/300 or K6-II



**3.3V**

IDT C6



## Hardware Installation

The following table lists possible settings of current CPU available on the market. Note that the correct setting may vary because of new CPU product, please see to your CPU specification for more details.

CPU	Type	Vcore	S4	S5	S6	S7	S8
INTEL P54C	Single Voltage	3.45V	OFF	ON	ON	ON	OFF
INTEL P55C	Dual Voltage	2.8V	OFF	OFF	OFF	ON	OFF
AMD K5	Single Voltage	3.52V	ON	ON	ON	ON	OFF
AMD K6-166/200	Dual Voltage	2.9V	ON	OFF	OFF	ON	OFF
AMD K6-233	Dual Voltage	3.2V	OFF	OFF	ON	ON	OFF
AMD K6-266/300	Dual Voltage	2.2V	OFF	ON	OFF	OFF	OFF
AMD K6-II	Dual Voltage	2.2V	OFF	ON	OFF	OFF	OFF
Cyrix 6x86	Single Voltage	3.52V	ON	ON	ON	ON	OFF
Cyrix 6x86L	Dual Voltage	2.8V	OFF	OFF	OFF	ON	OFF
Cyrix M2	Dual Voltage	2.9V	ON	OFF	OFF	ON	OFF
IDT C6	Single Voltage	3.52V 3.3V	ON ON	ON OFF	ON ON	ON ON	OFF OFF



**Warning:** Please make sure that you have installed CPU fan properly if Intel PP/MT-233 or AMD K6 CPU is being selected to use. It may cause your system unstable if you can not meet the heat dissipation requirement from above CPU type. It is recommended to adopt larger fan on these CPU for better air flow in the system.



**Tip:** Normally, for single voltage CPU, Vcpuio (CPU I/O Voltage) is equal to Vcore, but for CPU that needs dual voltage such as PP/MT (P55C) or Cyrix 6x86L, Vcpuio is different from Vcore and must be set to Vio (PBSRAM and Chipset Voltage). The single or dual voltage CPU is automatically detected by hardware circuit.

**Tip:** For supporting more different CPUs in future, this motherboard uses five switches to specify Vcore. There are 32 settings totally, and the range is from 1.3V to 3.5V.

## Hardware Installation

This motherboard supports the CPU core voltage from 1.3V to 3.5V, that can be applied to the various CPU type in future. For your reference, all settings are listed in the following table.

<u>Vcore</u>	<u>S4</u>	<u>S5</u>	<u>S6</u>	<u>S7</u>	<u>S8</u>
1.30V	OFF	OFF	OFF	OFF	ON
1.35V	ON	OFF	OFF	OFF	ON
1.40V	OFF	ON	OFF	OFF	ON
1.45V	ON	ON	OFF	OFF	ON
1.50V	OFF	OFF	ON	OFF	ON
1.55V	ON	OFF	ON	OFF	ON
1.60V	OFF	ON	ON	OFF	ON
1.65V	ON	ON	ON	OFF	ON
1.70V	OFF	OFF	OFF	ON	ON
1.75V	ON	OFF	OFF	ON	ON
1.80V	OFF	ON	OFF	ON	ON
1.85V	ON	ON	OFF	ON	ON
1.90V	OFF	OFF	ON	ON	ON
1.95V	ON	OFF	ON	ON	ON
2.00V	OFF	ON	ON	ON	ON
2.05V	ON	ON	ON	ON	ON
2.1V	ON	OFF	OFF	OFF	OFF
2.2V	OFF	ON	OFF	OFF	OFF
2.3V	ON	ON	OFF	OFF	OFF
2.4V	OFF	OFF	ON	OFF	OFF
2.5V	ON	OFF	ON	OFF	OFF
2.6V	OFF	ON	ON	OFF	OFF
2.7V	ON	ON	ON	OFF	OFF
2.8V	OFF	OFF	OFF	ON	OFF
2.9V	ON	OFF	OFF	ON	OFF
3.0V	OFF	ON	OFF	ON	OFF
3.1V	ON	ON	OFF	ON	OFF
3.2V	OFF	OFF	ON	ON	OFF
3.3V	ON	OFF	ON	ON	OFF
3.4V	OFF	ON	ON	ON	OFF
3.5V	ON	ON	ON	ON	OFF

# Hardware Installation

## 2.2.2 Selecting the CPU Frequency

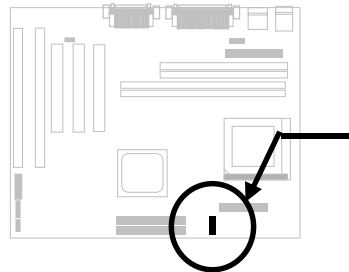
<b>S1</b>	<b>S2</b>	<b>S3</b>	<b>CPU Frequency Ratio</b>
OFF	OFF	OFF	1.5x (3.5x)
ON	OFF	OFF	2x
ON	ON	OFF	2.5x (1.75x)
OFF	ON	OFF	3x
ON	OFF	ON	4x
ON	ON	ON	4.5x
OFF	ON	ON	5x
OFF	OFF	ON	5.5x

Intel Pentium, Cyrix 6x86 and AMD K5/K6 CPU are designed to have different Internal (Core) and External (Bus) frequency. The ratio of Core/Bus frequency is selected by the switch 1-3 of **SW1**.



**Note:** Intel PP/MT MMX 233MHz is using 1.5x jumper setting for 3.5x frequency ratio, and AMD PR166 is using 2.5x setting for 1.75x frequency ratio.

**Core frequency = Ratio \* External bus clock**



**3x**



**4x**



**4.5x**



**5x**



**5.5x**



**1.5x (3.5x)**



**2x**



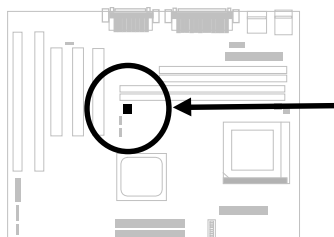
**2.5x (1.75x)**

## Hardware Installation

JP4	JP5	JP6	CPU External Clock
2-3	2-3	1-2	50MHz
2-3	2-3	2-3	55MHz
1-2	2-3	1-2	60MHz
2-3	1-2	1-2	66MHz
1-2	2-3	2-3	75MHz
2-3	1-2	2-3	83MHz

JP4, JP5 and JP6 are the selections of CPU external clock (bus clock), which is actually the clock from clock generator.

JP4, JP5, JP6 and J25 are the selections of CPU external clock (bus clock), AGP Clock and PCI Clock.



JP4 & JP5 & JP6



1 2 3

50MHz

JP4 & JP5 & JP6



1 2 3

66MHz

JP4 & JP5 & JP6



1 2 3

55MHz

JP4 & JP5 & JP6



1 2 3

75MHz

JP4 & JP5 & JP6



1 2 3

60MHz

JP4 & JP5 & JP6



1 2 3

83MHz



**Warning:** SIS 5598 chipset supports maximum 75 MHz external CPU bus clock, the 83MHz settings are for internal test only, set to 83MHz exceeds the specification of the chipset, which may cause serious system damage.



**Caution:** The following table are possible settings of current CPU available on the market. The correct setting may vary because of new CPU product, refer to your CPU specification for more details.

INTEL	CPU Core	Ratio	External	S1	S2	S3	JP4 & JP5 & JP6
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## Hardware Installation

Pentium	Frequency		Bus Clock				
P54C 75	75MHz =	1.5x	50MHz	OFF	OFF	OFF	2-3 & 2-3 & 1-2
P54C 90	90MHz =	1.5x	60MHz	OFF	OFF	OFF	1-2 & 2-3 & 1-2
P54C 100	100MHz =	1.5x	66MHz	OFF	OFF	OFF	2-3 & 1-2 & 1-2
P54C 120	120MHz =	2x	60MHz	ON	OFF	OFF	1-2 & 2-3 & 1-2
P54C 133	133MHz =	2x	66MHz	ON	OFF	OFF	2-3 & 1-2 & 1-2
P54C 150	150MHz =	2.5x	60MHz	ON	ON	OFF	1-2 & 2-3 & 1-2
P54C 166	166MHz =	2.5x	66MHz	ON	ON	OFF	2-3 & 1-2 & 1-2
P54C 200	200MHz =	3x	66MHz	OFF	ON	OFF	2-3 & 1-2 & 1-2

INTEL Pentium MMX	CPU Core Frequency	Ratio	External Bus Clock	S1	S2	S3	JP4 & JP5 & JP6
PP/MT 150	150MHz =	2.5x	60MHz	ON	ON	OFF	1-2 & 2-3 & 1-2
PP/MT 166	166MHz =	2.5x	66MHz	ON	ON	OFF	2-3 & 1-2 & 1-2
PP/MT 200	200MHz =	3x	66MHz	OFF	ON	OFF	2-3 & 1-2 & 1-2
PP/MT 233	233MHz =	3.5x	66MHz	OFF	OFF	OFF	2-3 & 1-2 & 1-2

Cyrix 6x86 & 6x86L	CPU Core Frequency	Ratio	External Bus Clock	S1	S2	S3	JP4 & JP5 & JP6
P120+	100MHz =	2x	50MHz	ON	OFF	OFF	2-3 & 2-3 & 1-2
P133+	110MHz =	2x	55MHz	ON	OFF	OFF	2-3 & 2-3 & 2-3
P150+	120MHz =	2x	60MHz	ON	OFF	OFF	1-2 & 2-3 & 1-2
P166+	133MHz =	2x	66MHz	ON	OFF	OFF	2-3 & 1-2 & 1-2
P200+	150MHz =	2x	75MHz	ON	OFF	OFF	1-2 & 2-3 & 2-3

Cyrix M2	CPU Core Frequency	Ratio	External Bus Clock	S1	S2	S3	JP4 & JP5 & JP6
MX-PR166	150MHz =	2.5x	60MHz	ON	ON	OFF	1-2 & 2-3 & 1-2
MX-PR200	166MHz =	2.5x	66MHz	ON	ON	OFF	2-3 & 1-2 & 1-2
	150MHz =	2x	75MHz	ON	OFF	OFF	1-2 & 2-3 & 2-3
MX-PR233	200MHz =	3x	66MHz	OFF	ON	OFF	2-3 & 1-2 & 1-2
	166MHz =	2x	83MHz	ON	OFF	OFF	2-3 & 1-2 & 2-3
MX-PR266	233MHz =	3.5x	66MHz	OFF	OFF	OFF	2-3 & 1-2 & 1-2
MX-PR300	225MHz =	3x	75MHz	OFF	ON	OFF	1-2 & 2-3 & 2-3
	233MHz =	3.5x	66MHz	OFF	OFF	OFF	2-3 & 1-2 & 1-2
	240MHz	4x	60MHz	ON	OFF	ON	1-2 & 2-3 & 1-2

AMD K5	CPU Core	Ratio	External	S1	S2	S3	JP4 & JP5 & JP6
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## Hardware Installation

	Frequency		Bus Clock				
PR75	75MHz=	1.5x	50MHz	OFF	OFF	OFF	2-3 & 2-3 & 1-2
PR90	90MHz =	1.5x	60MHz	OFF	OFF	OFF	1-2 & 2-3 & 1-2
PR100	100MHz =	1.5x	66MHz	OFF	OFF	OFF	2-3 & 1-2 & 1-2
PR120	90MHz =	1.5x	60MHz	OFF	OFF	OFF	1-2 & 2-3 & 1-2
PR133	100MHz =	1.5x	66MHz	OFF	OFF	OFF	2-3 & 1-2 & 1-2
PR166	116MHz =	1.75x	66MHz	ON	ON	OFF	2-3 & 1-2 & 1-2

AMD K6	CPU Core Frequency	Ratio	External Bus Clock	S1	S2	S3	JP4 & JP5 & JP6
PR2-166	166MHz =	2.5x	66MHz	ON	ON	OFF	2-3 & 1-2 & 1-2
PR2-200	200MHz =	3x	66MHz	OFF	ON	OFF	2-3 & 1-2 & 1-2
PR2-233	233MHz =	3.5x	66MHz	OFF	OFF	OFF	2-3 & 1-2 & 1-2
PR2-266	266MHz=	4x	66MHz	ON	OFF	ON	2-3 & 1-2 & 1-2
PR2-300	300MHz=	4.5x	66MHz	ON	ON	ON	2-3 & 1-2 & 1-2

IDT C6	CPU Core Frequency	Ratio	External Bus Clock	S1	S2	S3	JP4 & JP5 & JP6
C6-150	150MHz =	2x	75MHz	ON	OFF	OFF	1-2 & 2-3 & 2-3
C6-180	180MHz =	3x	60MHz	OFF	ON	OFF	1-2 & 2-3 & 1-2
C6-200	200MHz =	3x	66MHz	OFF	ON	OFF	2-3 & 1-2 & 1-2



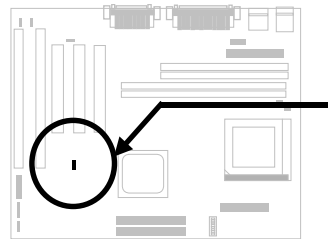
**Note:** Cyrix 6x86, 6x86MX (M2) and AMD K5 CPU use P-rating for the reference of CPU benchmark compared with INTEL P54C, their internal core frequency is not exactly equal to P-rating marked on the CPU. For example, Cyrix P166+ is 133MHz but performance is almost equal to P54C 166MHz and AMD PR133 is 100MHz but performance is almost equal to INTEL P54C 133MHz.

## Hardware Installation

### 2.2.4 Clearing the CMOS

<b>JP14</b>	<b>Clear CMOS</b>
1-2	Normal operation (default)
2-3	Clear CMOS

You need to clear CMOS if you forget your system password. To clear the CMOS, follow the procedures listed below:



**JP14**



Normal Operation  
(default)

**JP14**



Clear CMOS

#### The procedure to clear CMOS:

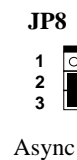
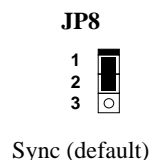
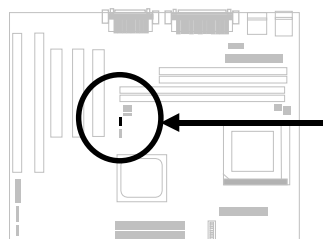
1. Turn off the system and unplug the AC power.
2. Remove ATX power cable from connector PWR2.
3. Locate **JP14** and short pins 2-3 for a few seconds.
4. Return **JP14** to its normal setting by shorting pins 1-2.
5. Connect ATX power cable back to connector PWR2.
6. Turn on the system power.
7. Press **DEL** during bootup to enter the BIOS Setup Utility and specify a new password, if needed.

# Hardware Installation

## 2.2.5 Setting PCI Clock

<b>JP8</b>	<b>Setting PCI Clock</b>
1-2	Sync (default)
2-3	Async

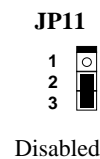
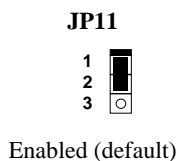
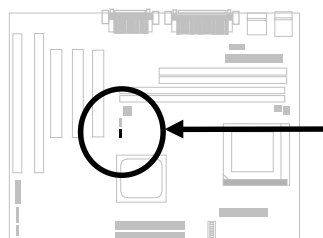
**JP8** is used to set PCI clock. The default setting is synchronous, that means PCI clock will be half of external clock. (For example, if CPU external clock is set to 66MHz, then the PCI clock will be 33MHz.) However, the specification of PCI clock is maximum 33 MHz. In order to avoid system unstable, we recommend you set the PCI clock to Async if the CPU external clock is set to 75/83 MHz.



## 2.2.5 Disable Onboard VGA

<b>JP11</b>	<b>Disable Onboard VGA</b>
1-2	Enabled (default)
2-3	Disabled

You have to set this jumper to Disabled if you want to install another VGA card.



**Note:** The onboard VGA shares a part of system memory, you can set the shared memory size from BIOS Setup. In addition, you have to install your DIMM on DIMM1 slot if you have only a single DIMM. The same idea is also applied to insert a single SIMM, you should install the SIMM on SIMM1 slot.



## Hardware Installation

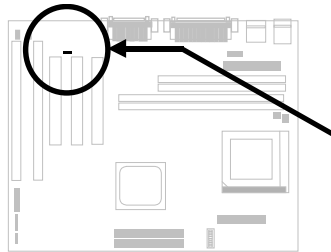


**Note:** The AOpen Bonus Pack CD-ROM contains VGA drivers for this board. For more information, please see the Readme.txt file in the CDROM.

### 2.2.5 Disable Onboard Audio

<b>JS1</b>	<b>Disable Onboard Audio</b>
1-2	Enabled (default)
2-3	Disabled

If you want to install other sound card, you have to disable the onboard audio by setting this jumper to Disabled.



**JS1**



Enabled (default)

**JS1**



Disabled

# Hardware Installation

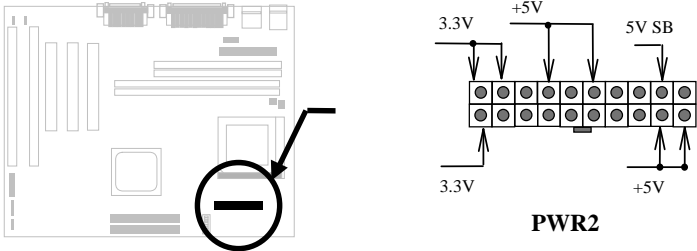
## 2.3 Connectors

### 2.3.1 Power Cable

The ATX power supply uses 20-pin connector shown below. Make sure you plug in the right direction.

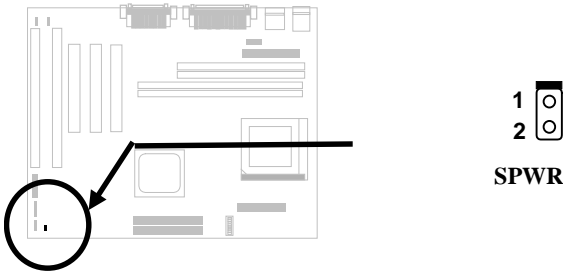


**Caution:** Make sure that the power supply is off before connecting or disconnecting the power cable.



### 2.3.2 ATX Soft-Power Switch Connector

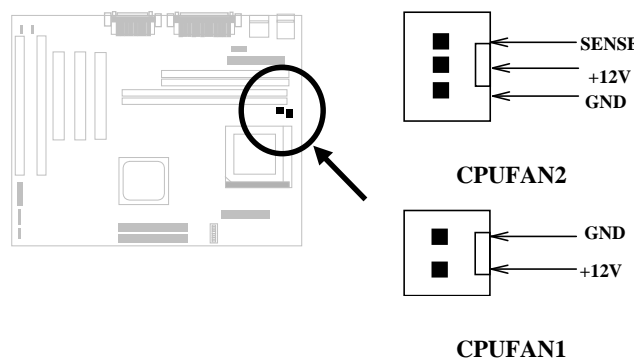
The ATX soft-power switch connector is a 2-pin header on the system board. Locate the power switch cable from your ATX housing. It is 2-pin female connector from the housing front panel. Plug this connector to the soft-power switch connector marked **SPWR**.



## Hardware Installation

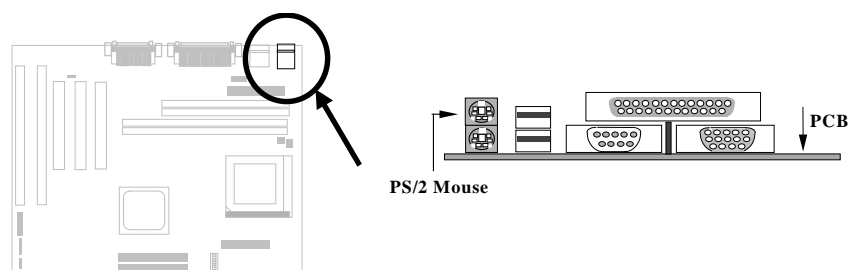
### 2.3.3 Fan

Plug in the fan cable to the fan connectors onboard. The fan connectors are marked as **CPUFAN1** and **CPUFAN2** on the system board. You can plug the CPU fan cable to both the 2-pin fan connector CPUFAN1 and the 3-pin fan connector CPUFAN2. Note that only CPUFAN2 supports the fan monitoring function, because 3-pin fan has an extra pin called SENSE, which periodically sends fan signal out.



### 2.3.4 PS/2 Mouse

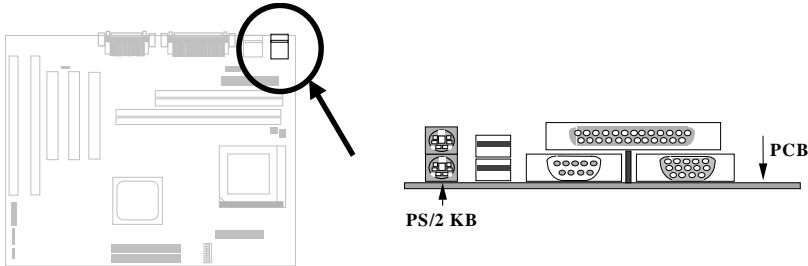
The onboard PS/2 mouse connector is a 6-pin Mini-Din connector marked **PS2**. The view angle of drawing shown here is from back panel of the housing.



# Hardware Installation

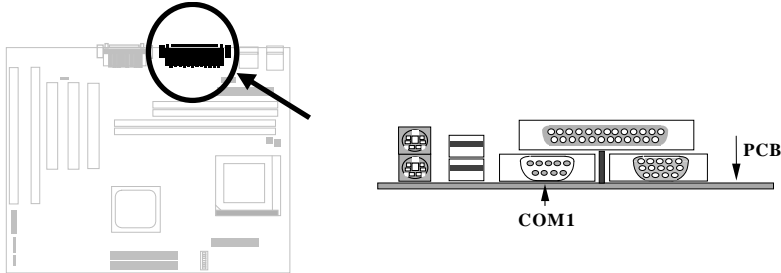
## 2.3.5 Keyboard

The onboard PS/2 keyboard connector is a 6-pin Mini-Din connector marked **KB2**. The view angle of drawing shown here is from back panel of the housing.



## 2.3.6 Serial Devices (COM1)

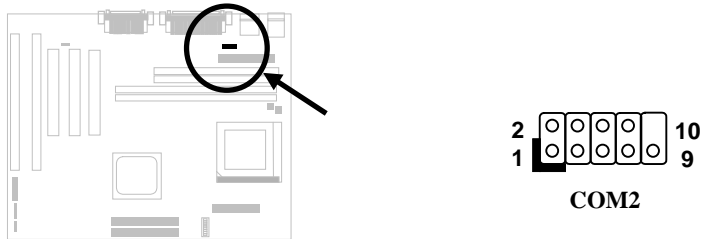
The onboard serial connector **COM1** is a 9-pin D-type connector on the back panel of the mainboard.



## Hardware Installation

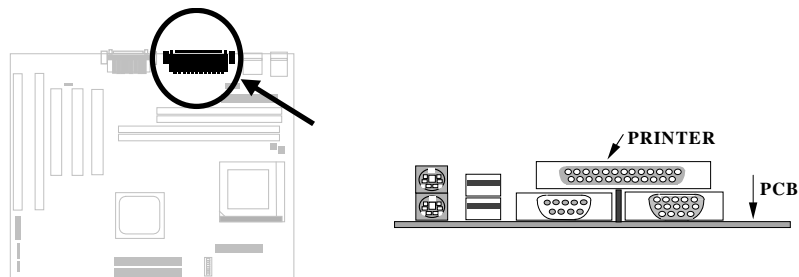
### 2.3.6 Serial Devices (COM2)

Plug in the 10-pin flat cable to the **COM2** connectors.



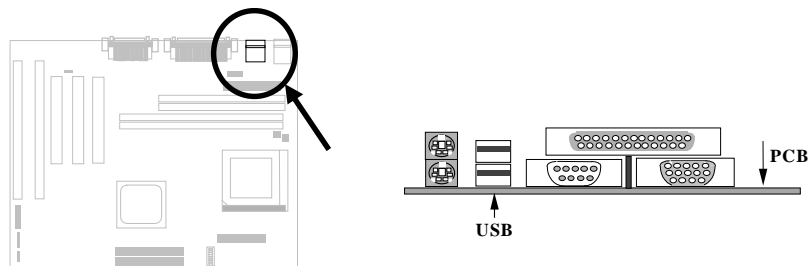
### 2.3.7 Printer

The onboard printer connector is a 25-pin D-type connector marked **PRINTER**. The view angle of drawing shown here is from back panel of the housing.



### 2.3.8 USB Device

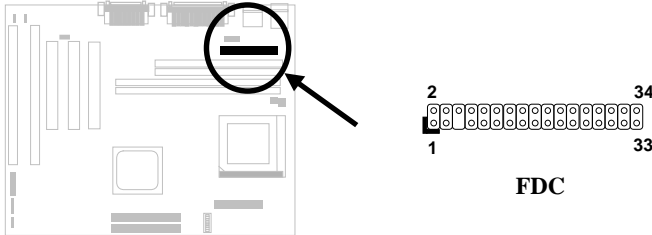
You can attach USB devices to the USB connector. The motherboard contains two USB connectors, which are marked as **USB**.



# Hardware Installation

## 2.3.9 Floppy Drive

Connect the 34-pin floppy drive cable to the floppy drive connector marked as **FDC** on the system board.

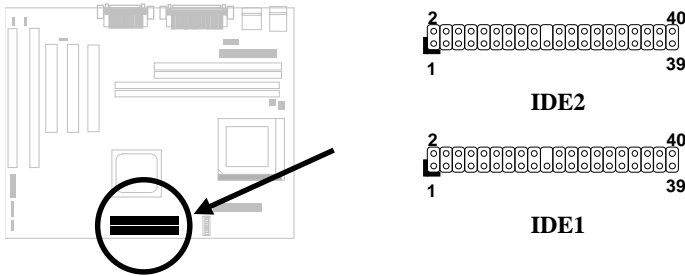


## 2.3.10 IDE Hard Disk and CD ROM

This mainboard supports two 40 pin IDE connectors marked as **IDE1** and **IDE2**. IDE1 is also known as primary channel and IDE2 as secondary channel, each channel supports two IDE devices that makes total of four devices.

In order to work together, the two devices on each channel must be set differently to master and slave mode, either one can be hard disk or CDROM. The setting as master or slave mode depends on the jumper on your IDE device, please refer to your hard disk and CDROM manual accordingly.

Connect your first IDE hard disk to master mode of the primary channel. If you have second IDE device to install in your system, connect it as slave mode on the same channel, and the third and fourth device can be connected on secondary channel as master and slave mode respectively.

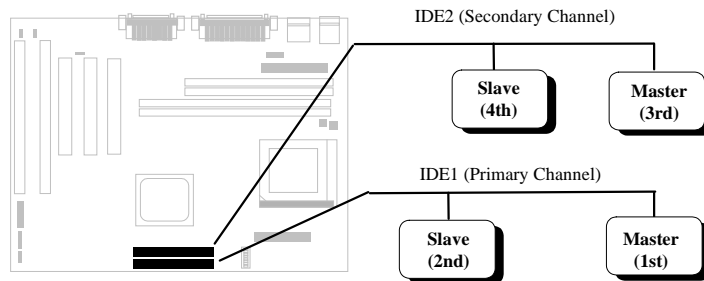


## Hardware Installation



**Caution:** The specification of IDE cable is maximum 46cm (18 inches), make sure your cable does not exceed this length.

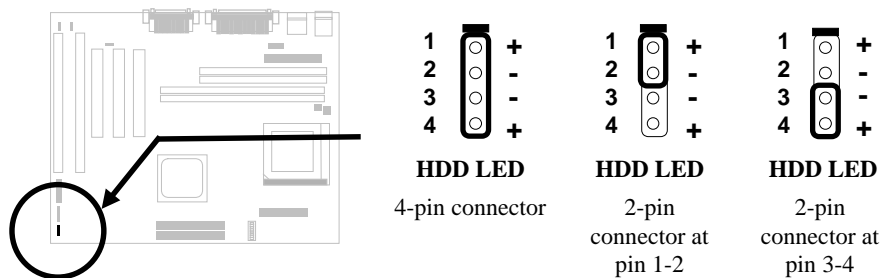
**Caution:** For better signal quality, it is recommended to set far end side device to master mode and follow the suggested sequence to install your new device. Please refer to the following figure.



### 2.3.11 Hard Disk LED

The HDD LED connector is marked as **HDD LED** on the board. This connector is designed for different type of housing, actually only two pins are necessary for the LED. If your housing has four pin connector, simply plug it in. If you have only two pin connector, please connect to pin 1-2 or pin 3-4 according to the polarity.

Pin	Description
1	HDD LED
2	GND
3	GND
4	HDD LED

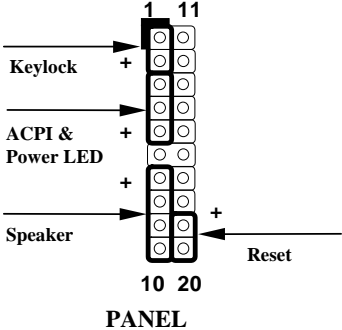
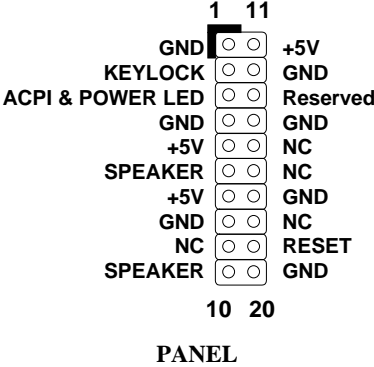
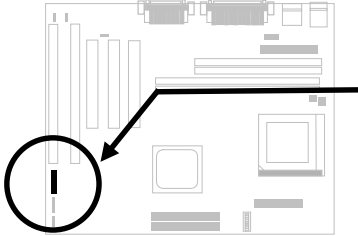


# Hardware Installation

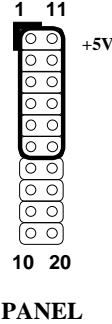
## 2.3.12 Panel Connector

The Panel (multifunction) connector is a 20-pin connector marked as **PANEL** on the board. Attach the power LED, keylock, speaker, and reset switch to the corresponding pins as shown in the figure.

Some housings have a five-pin connector for the keylock and power LED. Since power LED and keylock are aligned together, you can still use this kind of connector.



Other housings may have a 12-pin connector. If your housing has this type of connector, connect it to **PANEL** as shown in the figure. Make sure that the red wire of the connector is connected to +5V.





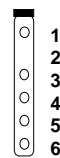
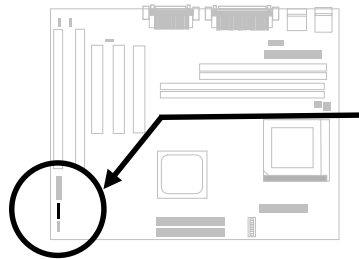
## Hardware Installation

### 2.3.13 IrDA Connector

The IrDA connector can be configured to support wireless infrared module, with this module and application software such as Laplink or Win95 Direct Cable Connection, user can transfer files to or from laptops, notebooks, PDA and printers. This connector supports HPSIR (115.2Kbps, 2 meters), ASK-IR (56Kbps) and Fast IR (4Mbps, 2 meters).

Install infrared module onto **IrDA** connector and enable infrared function from BIOS setup, make sure to have correct orientation when you plug onto IrDA connector.

<b>Pin</b>	<b>Description</b>
1	+5V
2	NC
3	IRRX
4	GND
5	IRTX
6	NC

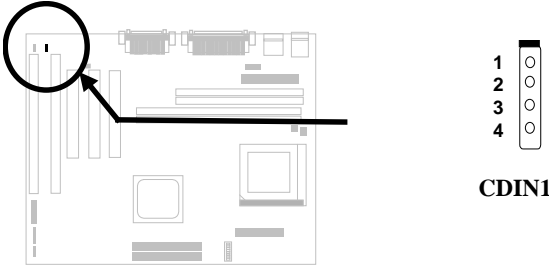


**IrDA**

# Hardware Installation

## 2.3.16 CD Audio Connector

This connector is used to connect CD audio cable.



## 2.3.16 Mono In/Mic Out Connector

This connector is used to connect Mono In/Mic Out connector of an internal modem card. The pin 1-2 is **Mono In**, and the pin 3-4 is **Mic Out**. Please note that there is no standard for this kind of connector yet, only some internal modem cards implement this connector.

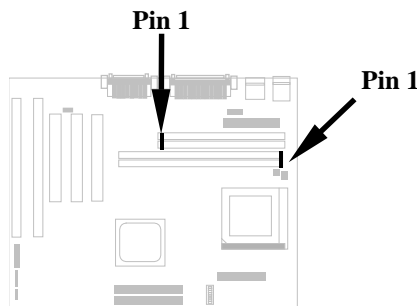
Please see the pin definitions to connect the cable.

<u>Pin</u>	<u>Description</u>
1	Mono In
2	GND
3	GND
4	Mic Out



# Hardware Installation

## 2.4 Configuring the System Memory



This mainboard has two 168 pin DIMM sockets (Dual-in-line Memory Module) and two 72 pin SIMM sockets that allow you to install system memory up to **256MB**.

If you want to install DRAMs on DIMM2 and SIMM at the same time, it is very important to identify single/double side. Under this configuration, only single side DRAMs are acceptable.

The SIMM supported by this mainboard can be identified by 4 kinds of factors:

- I. **Size:** single side, 1Mx32 (4MB), 4Mx32 (16MB), 16Mx32 (64MB), and double side, 1Mx32x2 (8MB), 4Mx32x2 (32MB), 16Mx32x2 (128MB).
- II. **Speed:** 60ns or 70ns access time
- III. **Type:** FPM (Fast page mode) or EDO (Extended data output)
- IV. **Parity:** without parity (32 bit wide) or with parity (36 bit wide).

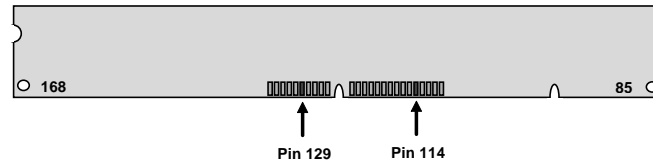
The DIMM supported by this motherboard are always 64-bit wide SDRAM, which can be identified by the following factors:

- I. **Size:** single side, 1Mx64 (8MB), 2Mx64 (16MB), 4Mx64 (32MB), 8Mx64 (64MB), 16Mx64 (128MB), and double side, 1Mx64x2 (16MB), 2Mx64x2 (32MB), 4Mx64x2 (64MB), 8Mx64x2 (128MB).



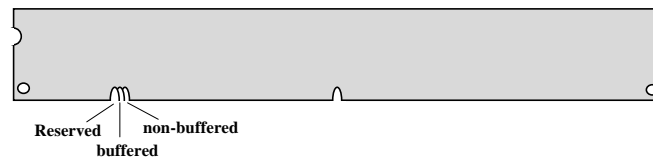
**Tip:** Here is a trick to check if your DIMM is single-side or double-side -- if there are traces connected to golden finger pin 114 and pin 129 of the DIMM, the DIMM is probably double-side; otherwise, it is single-side. Following figure is for your reference.

## Hardware Installation



**Warning:** If you want to install DRAMs on DIMM2 and DIMM3 at the same time, it is very important to identify single/double side. Under this configuration, only single side DRAMs are acceptable.

- II. **Speed:** Normally marked as -12, which means the clock cycle time is 12ns and maximum clock of this SDRAM is 83MHz. Sometimes you can also find the SDRAM marked as -67, which means maximum clock is 67MHz.
- III. **Buffered and non-buffered:** This motherboard supports non-buffered DIMMs. You can identify non-buffered DIMMs and buffered DIMMs according to the position of the notch, following figure is for your reference:



Because the positions are different, only non-buffered DIMMs can be inserted into the DIMM sockets on this motherboard. Although most of DIMMs on current market are non-buffered, we still recommend you to ask your dealer for the correct type.

- IV. **2-clock and 4-clock signals:** Although both of 2-clock and 4-clock signals are supported by this motherboard, we strongly recommend choosing a 4-clock SDRAM in consideration of reliability.



**Tip:** To identify 2-clock and 4-clock SDRAM, you may check if there are traces connected to golden finger pin 79 and pin 163 of the SDRAM. If there are traces, the SDRAM is probably 4-clock; Otherwise, it is 2-clock.

- V. **Parity:** This motherboard supports standard 64 bit wide (without parity) DIMM modules.

## Hardware Installation

There is no jumper setting required for the memory size or type. It is automatically detected by the system BIOS. You can use any single side SIMM and DIMM combination list below for SIMM or DIMM socket, and the total memory size is to add them together. This motherboard supports maximum **256MB** system memory.

SIMM1	SIMM2	Subtotal of Bank0
None	None	0MB
4MB	4MB	8MB
8MB	8MB	16MB
16MB	16MB	32MB
32MB	32MB	64MB
64MB	64MB	128MB

DIMM1	Size of DIMM1
None	0MB
8MB	8MB
16MB	16MB
32MB	32MB
64MB	64MB
128MB	128MB

DIMM2	Size of DIMM2
None	0MB
8MB	8MB
16MB	16MB
32MB	32MB
64MB	64MB
128MB	128MB

**Total Memory Size = Subtotal of SIMM1 + Subtotal of SIMM2  
+ Size of DIMM1 + Size of DIMM2**



**Warning:** It is not recommended to use SIMM and SDRAM DIMM together unless you have 5V tolerance SDRAM (such as Samsung or TI). The FPM/EDO operate at 5V while SDRAM operates at 3.3V. If you combine them together the system will temporary work fine; however after a few months, the SDRAM 3.3V data input will be damaged by 5V FPM/EDO data output line.



**Caution:** Make sure that you install the same SIMM type and size for each bank.

**Caution:** There are some old DIMMs made by EDO or FPM memory chip, they can only accept 5V power and probably can not fit into the DIMM socket, make sure you have 3.3V true SDRAM DIMM before your insert it.

## Hardware Installation

The driving capability of new generation chipset is limited because the lack of memory buffer (to improve performance). This makes DRAM chip count an important factor to be taking into consideration when you install SIMM. Unfortunately, there is no way that BIOS can identified the correct chip count, you need to calculate the chip count by yourself. The simple rule is: By visual inspection, use only SIMM with chip count less than 24 chips.



**Warning:** Do not install any SIMM that contains more than 24 chips. SIMMs contain more than 24 chips exceed the chipset driving specification. Doing so may result in unstable system behavior.

**Warning:** Although Intel SIS chipset supports x4 SDRAM chip. Due to loading issue, it is not recommended to use this kind of SDRAM.



**Tip:** The SIMM/DIMM chip count can be calculated by following example:

1. For 32 bit non-parity SIMM using 1M by 4 bit DRAM chip,  $32/4=8$  chips.
2. For 36 bit parity SIMM using 1M by 4 bit DRAM chip,  $36/4=9$  chips.
3. For 36 bit parity SIMM using 1M by 4 bit and 1M by 1 bit DRAM, the chip count will be 8 data chips( $8= 32/4$ ) plus 4 parity chips( $4=4/1$ ), total is 12 chips.
4. For 64 bit DIMM using 1M by 16 bit SDRAM, the chip count is  $64/16=4$  chips.

## Hardware Installation

There is an important parameter affects SDRAM performance, CAS Latency Time. It is similar as CAS Access Time of EDO DRAM and is calculated as number of clock state. The SDRAM that AOpen had tested are listed below. If your SDRAM has unstable problem, go into BIOS "Chipset Features Setup", change CAS Latency Time to 3 clocks.

Manufacturer	Model	Suggested CAS Latency Time	5V Tolerance
Samsung	KM416511220AT-G12	2	Yes
NEC	D4S16162G5-A12-7JF	2	No
Hitachi	HM5216805TT10	2	No
Fujitsu	81117822A-100FN	2	No
TI	TMX626812DGE-12	2	Yes
TI	TMS626812DGE-15	3	Yes
TI	TMS626162DGE-15	3	Yes
TI	TMS626162DGE-M67	3	Yes

Following table list the recommended DRAM combinations of SIMM and DIMM:

SIMM Data chip	SIMM Parity chip	Bit size per side	Single/ Double side	Chip count	SIMM size	Recommended
1M by 4	None	1Mx32	x1	8	4MB	Yes
1M by 4	None	1Mx32	x2	16	8MB	Yes
1M by 4	1M by 1	1Mx36	x1	12	4MB	Yes
1M by 4	1M by 4	1Mx36	x1	9	4MB	Yes
1M by 4	1M by 4	1Mx36	x2	18	8MB	Yes
1M by 16	None	1Mx32	x1	2	4MB	Yes
1M by 16	None	1Mx32	x2	4	8MB	Yes
1M by 16	1M by 4	1Mx36	x1	3	4MB	Yes
1M by 16	1M by 4	1Mx36	x2	6	8MB	Yes
4M by 4	None	4Mx32	x1	8	16MB	Yes
4M by 4	None	4Mx32	x2	16	32MB	Yes
4M by 4	4M by 1	4Mx36	x1	12	16MB	Yes
4M by 4	4M by 1	4Mx36	x2	24	32MB	Yes

## Hardware Installation

SIMM Data chip	SIMM Parity chip	Bit size per side	Single/Double side	Chip count	SIMM size	Recommended
16M by 4	None	16Mx32	x1	8	64MB	Yes, but not tested.
16M by 4	None	16Mx32	x2	16	128MB	Yes, but not tested.
16M by 4	16M by 4	16Mx36	x1	9	64MB	Yes, but not tested.
16M by 4	16M by 4	16Mx36	x2	18	128MB	Yes, but not tested.

DIMM Data chip	Bit size per side	Single/Double side	Chip count	DIMM size	Recommended
1M by 16	1Mx64	x1	4	8MB	Yes
1M by 16	1Mx64	x2	8	16MB	Yes
2M by 8	2Mx64	x1	8	16MB	Yes
2M by 8	2Mx64	x2	16	32MB	Yes
4M by 16	4Mx64	x2	8	64MB	Yes
4M by 16	4Mx64	x1	4	32MB	Yes
8M by 8	8Mx64	x1	8	64MB	Yes
8M by 8	8Mx64	x2	16	128MB	Yes

DIMM Data chip	Bit size per side	Single/Double side	Chip count	DIMM size	Recommended
2M by 32	2Mx64	x1	2	16MB	Yes, but not tested.
2M by 32	2Mx64	x2	4	32MB	Yes, but not tested.



**Warning:** 64MB SIMMs using 16M by 4 bit chip (64M bit technology) are not available in the market and are not formally tested by AOpen quality test department yet. However they are supported by design specification from Intel and they will be tested as soon as they are available. Note that 64MB SIMMs using 16M by 1 bit chip (16M bit technology) have chip count exceed 24 and are strongly not recommended.



## Hardware Installation



**Tip:** 8 bit = 1 byte, 32 bit = 4 byte. The SIMM size is represented by number of data byte (whether with or without parity), for example, the size of single side SIMM using 1M by 4 bit chip is 1Mx32 bit, that is, 1M x 4 byte= 4MB. For double side SIMM, simply multiply it by 2, that is, 8MB.

Following table are possible DRAM combinations that is **NOT** recommended:

SIMM Data chip	SIMM Parity chip	Bit size per side	Single/ Double side	Chip count	SIMM size	Recommended
1M by 1	None	1Mx32	x1	32	4MB	No
1M by 1	1M by 1	1Mx36	x1	36	4MB	No
1M by 4	1M by 1	1Mx36	x2	24	8MB	No
4M by 1	None	4Mx32	x1	32	16MB	No
4M by 1	4M by 1	4Mx36	x1	36	16MB	No
16M by 1	None	16Mx32	x1	32	64MB	No
16M by 1	16M by 1	16Mx36	x1	36	64MB	No

DIMM Data chip	Bit size per side	Single/ Double side	Chip count	DIMM size	Recommended
4M by 4	4Mx64	x1	16	32MB	No
4M by 4	4Mx64	x2	32	64MB	No
16M by 4	16Mx64	x1	16	128MB	No

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## Chapter 3

# Award BIOS

This chapter tells you how to configure the system parameters. You may update your BIOS via AWARD Flash Utility.



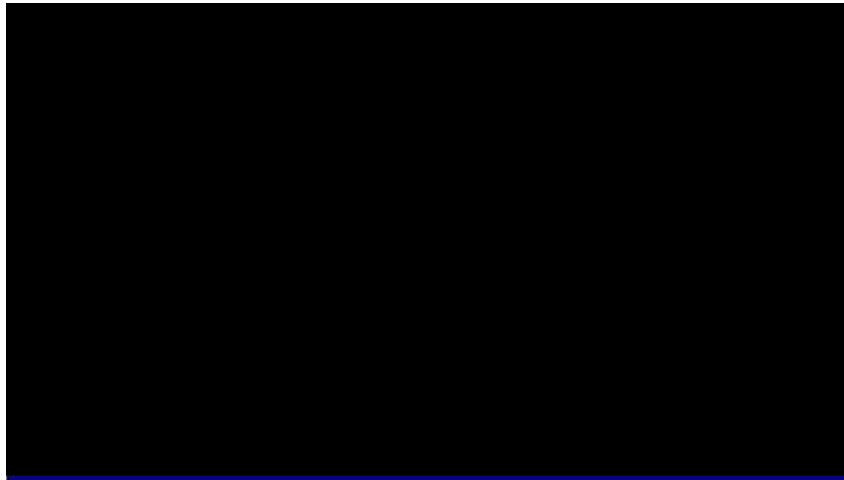
**Important:** Because the BIOS code is the most often changed part of the mainboard design, the BIOS information contained in this chapter (especially the Chipset Setup parameters) may be a little different compared to the actual BIOS that came with your mainboard. These changes are implemented to further enhance system performance.

# AWARD BIOS

---

## 3.1 Entering the Award BIOS Setup Menu

The BIOS setup utility is a segment of codes/routines residing in the BIOS Flash ROM. This routine allows you to configure the system parameters and save the configuration into the 128 byte CMOS area, (normally in the RTC chip or directly in the main chipset). To enter the BIOS Setup, press **DEL** during POST (Power-On Self Test). The BIOS Setup Main Menu appears as follows.





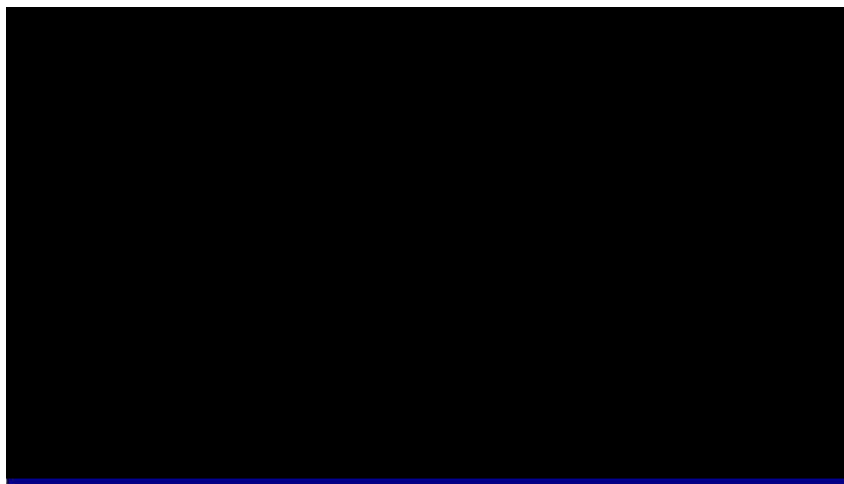
**Tip:** Choose "Load Setup Defaults" for recommended optimal performance. Choose "Load Turbo Defaults" for best performance with light system loading.

The section at the bottom of the screen tells how to control the screen. Use the arrow keys to move between items, **F2** to color scheme of the display, **F10** to exit, and **F10** to save the changes before exit. Another section at the bottom of the screen displays a brief description of the highlighted item.



After selecting an item, press **Enter** to select or enter a submenu.

## 3.2 Standard CMOS Setup



The "Standard CMOS Setup" sets the basic system parameters such as the date, time, and the hard disk type. Use the arrow keys to highlight an item and  or  to select the value for each item.



### Standard CMOS à Date

To set the date, highlight the Date parameter. Press  or  to set the current date. The date format is month, date, and year.

### Standard CMOS à Time

To set the time, highlight the Time parameter. Press  or  to set the current time in hour, minute, and second format. The time is based on the 24 hour military clock.

## AWARD BIOS

---

**Standard CMOS à Primary Master à Type**  
**Standard CMOS à Primary Slave à Type**  
**Standard CMOS à Secondary Master à Type**  
**Standard CMOS à Secondary Slave à Type**

Type
Auto
User
None
1
2
...
45

This item lets you select the IDE hard disk parameters that your system supports. These parameters are Size, Number of Cylinder, Number of Head, Start Cylinder for Pre-compensation, Cylinder number of Head Landing Zone and Number of Sector per Track. The default setting is **Auto**, which enables BIOS to automatically detect the parameters of installed HDD at POST (Power-On Self Test). If you prefer to enter HDD parameters manually, select **User**. Select **None** if no HDD is connected to the system.

The IDE CDROM is always automatically detected.



***Tip:** For an IDE hard disk, we recommend that you use the "IDE HDD Auto Detection" to enter the drive specifications automatically. See the section "IDE HDD Auto Detection".*

**Standard CMOS à Primary Master à Mode**  
**Standard CMOS à Primary Slave à Mode**  
**Standard CMOS à Secondary Master à Mode**  
**Standard CMOS à Secondary Slave à Mode**

Mode
Auto
Normal
LBA
Large

The enhanced IDE feature allows the system to use a hard disk with a capacity of more than 528MB. This is made possible through the Logical Block Address (LBA) mode translation. The LBA is now considered as a standard feature of current IDE hard disk on the market because of its capability to support capacity larger than 528MB. Note that if HDD is formatted with LBA On, it will not be able to boot with LBA Off.

# AWARD BIOS

---

## Standard CMOS à Drive A

### Standard CMOS à Drive B

#### Drive A

None  
360KB 5.25"  
1.2MB 5.25"  
720KB 3.5"  
1.44MB 3.5"  
2.88MB 3.5"

These items select floppy drive type. The available settings and types supported by the mainboard are listed on the left.

## Standard CMOS à Video

#### Video

EGA/VGA  
CGA40  
CGA80  
Mono

This item specifies the type of video card in use. The default setting is VGA/EGA. Since current PCs use VGA only, this function is almost useless and may be disregarded in the future.

## Standard CMOS à Halt On

#### Halt On

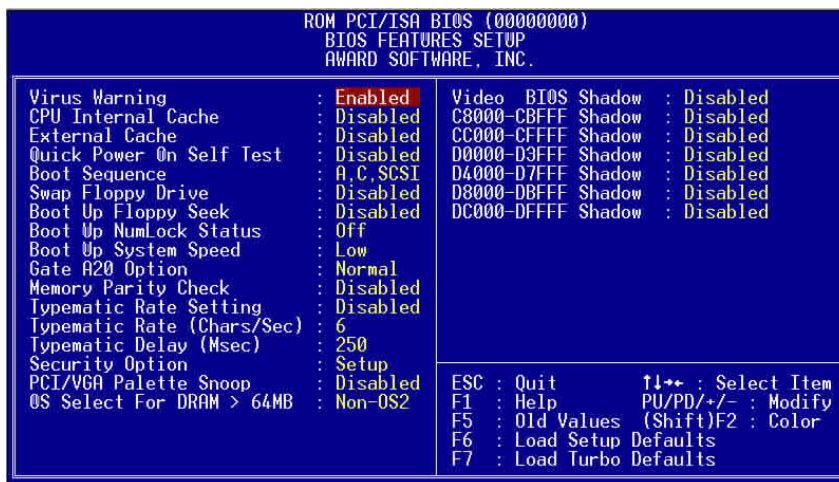
No Errors  
All Errors  
All, But Keyboard  
All, But Diskette  
All, But Disk/Key

This parameter enables you to control the system stops in case of Power-On Self Test (POST) error.

# AWARD BIOS

## 3.3 BIOS Features Setup

This screen appears when you select the option "BIOS Features Setup" from the main menu.



### BIOS Features à Virus Warning

#### Virus Warning

Enabled  
Disabled

Set this parameter to Enabled to activate the warning message. This feature protects the boot sector and partition table of your hard disk from virus intrusion.

Any attempt during boot up to write to the boot sector of the hard disk drive stops the system and the following warning message appears on the screen. Run an anti-virus program to locate the problem.

```
! WARNING !  
  
Disk Boot Sector is to be modified  
Type "Y" to accept write, or "N" to abort write  
  
Award Software, Inc.
```

# AWARD BIOS

## BIOS Features à External Cache

<b><u>External Cache</u></b> Enabled Disabled
---

Enabling this parameter activates the secondary cache (currently, PBSRAM cache). Disabling the parameter slows down the system. Therefore, we recommend that you leave it enabled unless you are troubleshooting a problem.

## BIOS Features à Power-On Self-Test

<b><u>Quick Power-on Self-test</u></b> Enable Disabled
--

This parameter speeds up POST by skipping some items that are normally checked.

## BIOS Features à Boot Sequence

<b><u>Boot Sequence</u></b> A,C,SCSI C,A,SCSI C,CDROM,A CDROM,C,A D,A,SCSI E,A,SCSI F,A,SCSI SCSI,A,C SCSI,C,A C only LS/ZIP,C
---

This parameter allows you to specify the system boot up search sequence. The hard disk ID are listed below:

- C: Primary master
- D: Primary slave
- E: Secondary master
- F: Secondary slave
- LS: LS120
- Zip: IOMEGA ZIP Drive

## BIOS Features à Swap Floppy Drive

<b><u>Swap Floppy Drive</u></b> Enabled Disabled
--

This item allows you to swap floppy drives. For example, if you have two floppy drives (A and B), you can assign the first drive as drive B and the second drive as drive A or vice-versa.



# AWARD BIOS

---

## BIOS Features à Boot Up Floppy Seek

**Boot Up Floppy Seek**

Enabled  
Disabled

When enabled, the BIOS issues the seek command to the floppy drive during POST to move floppy drive head forward and backward.

## BIOS Features à Boot Up NumLock Status

**Boot Up NumLock Status**

On  
Off

Setting this parameter to On enables the numeric function of the numeric keypad. Set this parameter to Off to disregard the function. Disabling the numeric function allows you to use the numeric keypad for cursor control.

## BIOS Features à Boot Up System Speed

**Boot Up System Speed**

High  
Low

Select High or Low system speed after boot.

## BIOS Features à Gate A20 Option

**Gate A20 Option**

Normal  
Fast

This item is used to select Gate A20 Option.

## BIOS Features à Memory Parity Check

**Memory Parity Check**

Disabled  
Enabled

This item is used to enable or disable DRAM parity check function.

## BIOS Features à Typematic Rate Setting

**Typematic Rate Setting**

Enabled  
Disabled

Set this parameter to Enable/Disable the keyboard repeat function. When enabled, continually holding down a key on the keyboard will generate repeatedly keystrokes.

# AWARD BIOS

## BIOS Features à Typematic Rate (Chars/Sec)

<b>Typematic Rate</b>
6
8
10
12
15
20
24
30

This item allows you to control the speed of repeated keystrokes. The default is 30 characters/sec.

## BIOS Features à Typematic Delay (Msec)

<b>Typematic Delay</b>
250
500
750
1000

This parameter allows you to control the delay time between the first and the second keystroke (where the repeated keystrokes begin). The typematic delay settings are 250, 500, 750, and 1000 msec.

## BIOS Features à Security Option

<b>Security Option</b>
Setup
System

The **System** option limits access to both the System boot and BIOS setup. A prompt asking you to enter your password appears on the screen every time you boot the system.

The **Setup** option limits access only to BIOS setup.

To disable the security option, select Password Setting from the main menu, don't type anything and just press <Enter>.

## BIOS Features à PCI/VGA Palette Snoop

<b>PCI/VGA Palette Snoop</b>
Enabled
Disabled

Enabling this item informs the PCI VGA card to keep silent (and to prevent conflict) when palette register is updated (i.e., accepts data without responding any communication signals). This is useful only when two display cards use the same palette address and plugged in the PCI bus at the same time (such as MPEQ or Video capture). In such case, PCI VGA is silent while MPEQ/Video capture is set to function normally.

# AWARD BIOS

---

## BIOS Features à OS Select for DRAM > 64MB

<b><u>OS Select for DRAM &gt; 64MB</u></b>
--

OS/2 Non-OS/2
------------------

Set to OS/2 if your system is utilizing an OS/2 operating system and has a memory size of more than 64 MB.

## BIOS Features à Video BIOS Shadow

<b><u>Video BIOS Shadow</u></b>
-------------------------------------

Enabled Disabled
---------------------

VGA BIOS Shadowing means to copy video display card BIOS into the DRAM area. This enhances system performance because DRAM access time is faster than ROM.

## BIOS Features à C800-CBFF Shadow

## BIOS Features à CC00-CFFF Shadow

## BIOS Features à D000-D3FF Shadow

## BIOS Features à D400-D7FF Shadow

## BIOS Features à D800-DBFF Shadow

## BIOS Features à DC00-DFFF Shadow

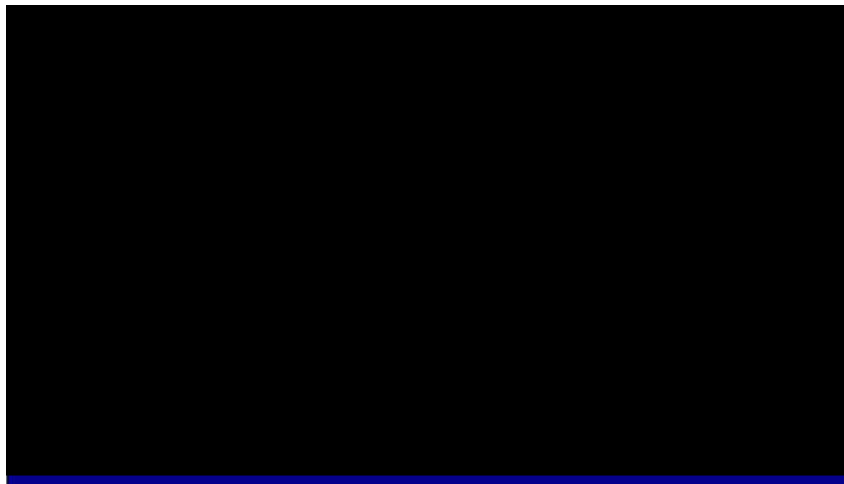
<b><u>C800-CBFF Shadow</u></b>
------------------------------------

Enabled Disabled
---------------------

These six items are for shadowing ROM code on other expansion cards. Before you set these parameters, you need to know the specific addresses of that ROM code. If you do not know this information, enable all the ROM shadow settings. Note that the F000 and E000 segments are always shadowed because BIOS code occupies these areas.

### 3.4 Chipset Features Setup

The "Chipset Features Setup" includes settings for the chipset dependent features. These features are related to system performance.



**Caution:** Make sure you fully understand the items contained in this menu before you try to change anything. You may change the parameter settings to improve system performance. However, it may cause system unstable if the setting are not correct for your system configuration.

# AWARD BIOS

---

## Chipset Features à EDO/FPM DRAM Control

### EDO/FPM Timing Control

Fast  
Normal

This item is used to control EDO/FPM timing. If you find system unstable, please try to set this item to Normal.

## Chipset Features à SDRAM Control

### SDRAM Timing Control

Fast  
Normal

This item is used to control SDRAM timing. If you find system unstable, please try to set this item to Normal.

## Chipset Features à Refresh Cycle Time (us)

### Refresh Cycle Time (us)

15.6  
62.4  
124.8  
187.2

This option lets you set the cycle time for the chipset to refresh DRAM to avoid losing data. The unit is micro second (us).

## Chipset Features à RAMW# Assertion Timing

### RAMW# Assertion Timing

2T  
3T

This parameter specifies the number of clocks required to assert the DRAM write control signal when read cycle followed by write cycle.

## Chipset Features à SDRAM CAS Latency

### SDRAM CAS Latency

2T  
3T

This parameter specifies the number of clocks of SDRAM CAS Latency. This is very important parameter affects SDRAM performance. If your SDRAM has unstable problem, set to 3T.

## AWARD BIOS

### Chipset Features à SDRAM Wait State Control

#### SDRAM Wait State Control

0WS  
1WS

This parameter specifies the number of clocks of SDRAM Wait State Control during Precharge.

0WS: zero wait state.  
1WS: one wait state.

### Chipset Features à Read Prefetch Memory RD

#### Read Prefetch Memory RD

Enabled  
Disabled

This item lets you control the Read Prefetch of the memory read of PCI bus command. When enabled, Memory Read Multiple and Memory Read Line of PCI commands always do prefetch.

### Chipset Features à CPU to PCI Post Write

#### CPU to PCI Post Write

3T  
4T  
Disabled

This parameter specifies the number of clocks for CPU to PCI Post Write cycle.

### Chipset Features à CPU to PCI Burst Mem. WR

#### CPU to PCI Burst Mem. WR

Enabled  
Disabled

This item lets you control the CPU to PCI Burst Memory Write.

### Chipset Features à ISA Bus Clock Frequency

#### ISA Bus Clock Frequency

PCICLK/3  
PCICLK/4  
7.159MHz

This item lets you select the ISA bus clock. Normally, the PCI bus clock is the CPU bus (external) clock divided by 2,  $PCICLK = CPUCLK/2$ . For example,  $CPUCLK = 66\text{MHz}$ ,  $PCICLK = 66/2 = 33\text{MHz}$ ,  $ISA\ bus\ CLK = 33/4 = 8.25\text{MHz}$ .

# AWARD BIOS

---

## Chipset Features à System BIOS Cacheable

**System BIOS  
Cacheable**

Enabled  
Disabled

Enabling this item allows you to cache the system BIOS to further enhance system performance.

## Chipset Features à Video BIOS Cacheable

**Video BIOS  
Cacheable**

Enabled  
Disabled

Allows the video BIOS to be cached to allow faster video performance.

## Chipset Features à Memory Hole At 15M-16M

**Memory Hole At  
15M-16M**

Enabled  
Disabled

This option lets you reserve system memory area for special ISA cards. The chipset accesses code/data of these areas from the ISA bus directly. Normally, these areas are reserved for memory mapped I/O card.

## Chipset Features à VGA Shared Memory Size

**VGA Shared  
Memory Size**

0.5MB  
1MB  
1.5MB  
2MB  
2.5MB  
3MB  
3.5MB  
4MB

The onboard VGA need to share a memory size with the system memory. You may set a larger size for getting better performance. The shared memory size is up to 4MB.

## Chipset Features à VGA Memory Clock (MHz)

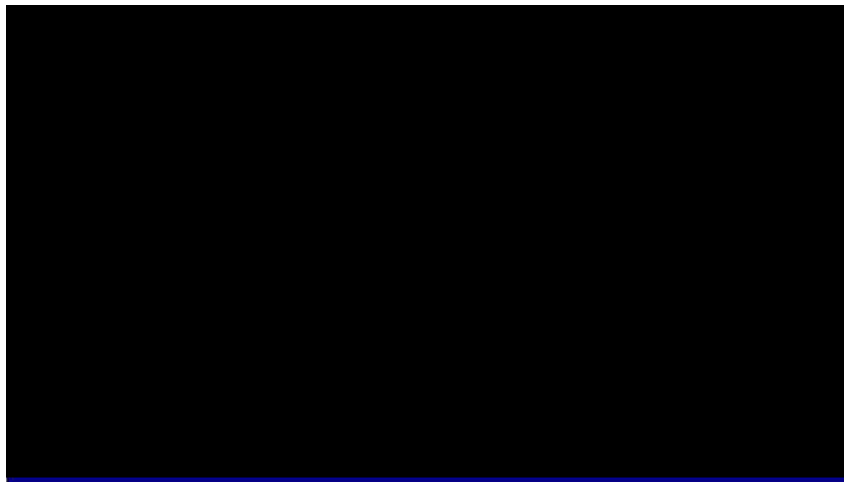
**VGA Memory Clock**

55  
60  
66

This item is used to set the VGA memory clock. You can get the best performance by setting this item to 66.

### 3.5 Power Management Setup

The Power Management Setup screen enables you to control the mainboard's green features. See the following screen.



#### Power Management à Power Management

<b>Power Management</b>
Max Saving
Mix Saving
User Defined
Disabled

This function allows you to set the default parameters of power-saving modes. Set to **Disable** to turn off power management function. Set to User Defined to choose your own parameters.

Mode	Doze	Standby	Suspend
Min Saving	40 min	40 min	40 min
Max Saving	20 sec	20 sec	20 sec



# AWARD BIOS

---

## Power Management à PM Controlled by APM

<b><u>PM Controlled by APM</u></b>
Yes
No

If "Max Saving" is selected, you can turn on this item, transfer power management control to APM (Advanced Power Management) and enhance power saving function. For example, stop CPU internal clock.

## Power Management à Video Off Option

<b><u>Video Off Option</u></b>
Always On
All Modes à Off
Suspend à Off
Susp, Standby à Off

To turn off video monitor at which power down mode.

## Power Management à Video Off Method

<b><u>Video Off Method</u></b>
Blank Screen
V/H SYNC+Blank
DPMS

This determines the way that monitor is off. Blank Screen writes blanks to video buffer. V/H SYNC+Blank allows BIOS to control VSYNC and HSYNC signals. This function applies only for DPMS (Display Power Management Standard) monitor. The DPMS mode uses DPMS function provided by VGA card.

## Power Management à Doze Speed (div by)

## Power Management à Stdby Speed (div by)

<b><u>Doze Speed (div by)</u></b>
1
2
3
4
5
6
7
8

These items let you set the system speed divisor to specify the rate at which the system speed will slow down once it enters the **Doze Mode** or **Standby Mode**. The options are from 1 to 8. To determine the exact rate of the system in Doze mode, take 2 as the divisor and 133MHz as the normal system speed.  $133\text{MHz}/2 = 66\text{MHz}$  - this is the system speed in Doze mode.

# AWARD BIOS

## Power Management à Modem Use IRQ

<u>Modem Use IRQ</u>
NA
3
4
5
6
7
9
10
11

This item tells BIOS/Chipset the IRQ of your modem. This allows BIOS/Chipset to monitor the activities of the modem connected to your system.

## Power Management à HDD Power Down

<u>HDD Power Down</u>
Disabled
1 Min
.....
15 Min

This option lets you specify the IDE HDD idle time before the device enters the power down state. This item is independent from the power states described in this section (Standby and Suspend).

## Power Management à Doze Mode

<u>Doze Mode</u>
Disabled
20 Sec
1 Min
5 Min
10 Min
15 Min
20 Min
30 Min
40 Min

This item lets you set the period of time after which the system enters into Doze mode. In this mode, the CPU clock slows down. The ratio is specified in the "Throttle Duty Cycle". Any activity detected returns the system to full power. The system activity (or event) is detected by monitoring the IRQ signals.

# AWARD BIOS

---

## Power Management à Standby Mode

### Standby Mode

Disabled  
20 Sec  
1 Min  
5 Min  
10 Min  
15 Min  
20 Min  
30 Min  
40 Min

This item lets you set the period of time after which the system enters into Standby mode. In this mode, CPU clock slows down, hard disk will be shut off and the monitor power-saving feature activates. Any activity detected returns the system to full power. The system activity (or event) is detected by monitoring the IRQ signals.

## Power Management à Suspend Mode

### Suspend Mode

Disabled  
20 Sec  
1 Min  
5 Min  
10 Min  
15 Min  
20 Min  
30 Min  
40 Min

This item lets you set the period of time after which the system enters into Suspend mode. In this mode, CPU clock stops, all other devices will be shut off. Any activity detected returns the system to full power. The system activity(or event) is detected by monitoring the IRQ signals.

## Power Management à COM Ports Activity

## Power Management à LPT Ports Activity

## Power Management à HDD Ports Activity

## Power Management à VGA Activity

### COM Ports Activity

Enabled  
Disabled

To enable or disable the detection of COM port, LPT, HDD, VGA activities for power down state transition.

## AWARD BIOS

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Power Management à IRQ3 (COM2)  
Power Management à IRQ4 (COM1)  
Power Management à IRQ5 (LPT2)  
Power Management à IRQ6 (Floppy Disk)  
Power Management à IRQ8 (RTC Alarm)  
Power Management à IRQ9 (IRQ2 Redir)  
Power Management à IRQ10 (Reserved)  
Power Management à IRQ11 (Reserved)  
Power Management à IRQ12 (PS/2 Mouse)  
Power Management à IRQ13 (Coprocessor)  
Power Management à IRQ14 (Hard Disk)  
Power Management à IRQ15 (Reserved)

<b><u>IRQ2 (COM2)</u></b>
---------------------------

Enabled
---------

Disabled
----------

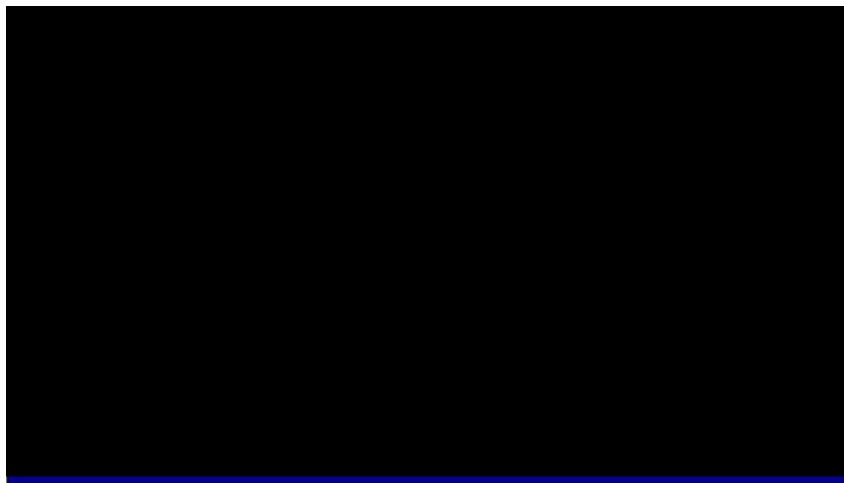
To enable or disable the detection of IRQ event for power down state transition. Note that OS2 has periodically IRQ8 (RTC) interruptions, If IRQ8 is not set to **Disabled**, OS/2 may fail to go into Doze/Standby/Suspend mode.

# AWARD BIOS

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## 3.6 PNP/PCI Configuration Setup

The PNP/PCI Configuration Setup allows you to configure the ISA and PCI devices installed in your system. The following screen appears if you select the option "PNP/PCI Configuration Setup" from the main menu.



### PNP/PCI Configuration à PnP OS Installed

<b><u>PnP OS Installed</u></b>
Yes
No

Normally, the PnP resources are allocated by BIOS during POST (Power-On Self Test). If you are using a PnP operating system (such as Windows 95), set this item to **Yes** to inform BIOS to configure only the resources needed for booting (VGA/IDE or SCSI). The rest of system resources will be allocated by PnP operating system.

# AWARD BIOS

## PNP/PCI Configuration à Resources Controlled By

<b><u>Resources Controlled by</u></b>
Auto
Manual

Setting this option to Manual allows you to individually assign the IRQs and DMAs to the ISA and PCI devices. Set this to **Auto** to enable the auto-configuration function.

## PNP/PCI Configuration à Reset Configuration Data

<b><u>Reset Configuration Data</u></b>
Enabled
Disabled

In case conflict occurs after you assign the IRQs or after you configure your system, you can enable this function, allow your system to automatically reset your configuration and reassign the IRQs.

- PNP/PCI Configuration à IRQ3 (COM2) assigned to**
- PNP/PCI Configuration à IRQ4 (COM1) assigned to**
- PNP/PCI Configuration à IRQ5 (Network/Sound) assigned to**
- PNP/PCI Configuration à IRQ7 (Printer or Others) assigned to**
- PNP/PCI Configuration à IRQ9 (Video or Others) assigned to**
- PNP/PCI Configuration à IRQ10 (SCSI or Others) assigned to**
- PNP/PCI Configuration à IRQ11 (SCSI or Others) assigned to**
- PNP/PCI Configuration à IRQ12 (PS/2 Mouse) assigned to**
- PNP/PCI Configuration à IRQ14 (IDE1) assigned to**
- PNP/PCI Configuration à IRQ15 (IDE2) assigned to**

<b><u>IRQ 3 assigned to</u></b>
Legacy ISA
PCI/ISA PnP

If your ISA card is not PnP compatible and requires a special IRQ to support its function, set the selected IRQ to **Legacy ISA**. This setting informs the PnP BIOS to reserve the selected IRQ for the installed legacy ISA card. The default is **PCI/ISA PnP**. Take note that PCI cards are always PnP compatible (except old PCI IDE card).

## AWARD BIOS

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**PNP/PCI Configuration à DMA 0 assigned to**  
**PNP/PCI Configuration à DMA 1 assigned to**  
**PNP/PCI Configuration à DMA 3 assigned to**  
**PNP/PCI Configuration à DMA 5 assigned to**  
**PNP/PCI Configuration à DMA 6 assigned to**  
**PNP/PCI Configuration à DMA 7 assigned to**

**DMA 0**  
**assigned to**  
Legacy ISA  
PCI/ISA PnP

If your ISA card is not PnP compatible and requires a special DMA channel to support its function, set the selected DMA channel to **Legacy ISA**. This setting informs the PnP BIOS to reserve the selected DMA channel for the installed legacy ISA card. The default is **PCI/ISA PnP**. Take note that PCI card does not require DMA channel.

**Power Management à PCI IDE 2nd Channel**

**PCI IDE 2nd**  
**Channel**  
Disabled  
Enabled

This item is used to enable or disable the 2nd IDE channel.

**PNP/PCI Configuration à PCI IDE IRQ Map To**

**PCI IDE IRQ Map**  
**To**  
ISA  
PCI-Slot1  
PCI-Slot2  
PCI-Slot3  
PCI-Slot4  
PCI-Auto

Some old PCI IDE add-on cards are not fully PnP compatible. These cards require you to specify the slot in use to enable BIOS to properly configure the PnP resources. This function allows you to select the PCI slot for any PCI IDE add-on card present in your system. Set this item to **Auto** to allow BIOS to automatically configure the installed PCI IDE card(s).

**PNP/PCI Configuration à Primary IDE INT#**

**PNP/PCI Configuration à Secondary IDE INT#**

**Primary IDE INT#**  
A  
B  
C  
D

These two items, in conjunction with item "PCI IDE IRQ Map To", specify the IRQ routing of the primary or secondary channel of the PCI IDE add-on card (not the onboard IDE). Each PCI slot has four PCI interrupts aligned as listed in the table below. You must specify the slot in the "PCI IDE IRQ Map To", and set the PCI interrupt (INTx) here according to the interrupt connection on the card.

## AWARD BIOS

PCI Slot	Location 1 (pin A6)	Location 2 (pin B7)	Location 3 (pin A7)	Location 4 (pin B8)
Slot 1	INTA	INTB	INTC	INTD
Slot 2	INTB	INTC	INTD	INTA
Slot 3	INTC	INTD	INTA	INTB
Slot 4	INTD	INTA	INTB	INTC
Slot 5 (if any)	INTD	INTA	INTB	INTC

### PNP/PCI Configuration à Used MEM Base Addr

<u>Used MEM base addr</u>
N/A
C800
CC00
D000
D400
D800
DC00

This item, in conjunction with the "Used MEM Length", lets you set a memory space for non-PnP compatible ISA card. This item specifies the memory base (start address) of the reserved memory space. The memory size is specified in the "Used MEM Length" .

### PNP/PCI Configuration à Used MEM Length

<u>Used MEM Length</u>
8K
16K
32K
64K

If your ISA card is not PnP compatible and requires special memory space to support its function, specify the memory size in this parameter to inform the PnP BIOS to reserve the specified memory space for installed legacy ISA card.



# AWARD BIOS

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## 3.7 Load Setup Defaults

The "Load Setup Defaults" option loads optimized settings for optimum system performance. Optimal settings are relatively safer than the Turbo settings. We recommend you to use the Optimal settings if your system has large memory size and fully loaded with add-on card (for example, a file server using double-sided 8MB SIMM x4 and SCSI plus Network card occupying the PCI and ISA slots).

Optimal is not the slowest setting for this mainboard. If you need to verify a unstable problem, you may manually set the parameter in the "BIOS Features Setup" and "Chipset Features Setup" to get slowest and safer setting.

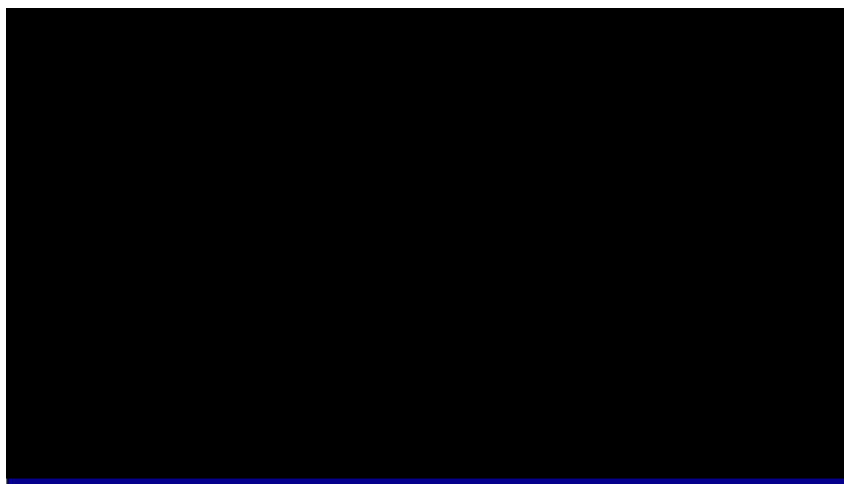
## 3.8 Load Turbo Defaults

The "Load Turbo Defaults" option gives better performance than Optimal values. However, Turbo values may not be the best setting of this mainboard but these values are qualified by the AOpen RD and QA department as the reliable settings especially if you have limited loading of add-on card and memory size (for example, a system that contains only a VGA/Sound card and two SIMMs).

To attain the best system performance, you may manually set the parameters in the "Chipset Features Setup" to get proprietary setting. Make sure that you know and understand the functions of every item in Chipset Setup menu. The performance difference of Turbo from Optimal is normally around 3% to 10%, depending on the chipset and the application.

### 3.9 Integrated Peripherals

The following screen appears if you select the option "Integrated Peripherals" from the main menu. This option allows you to configure the I/O features.



#### Integrated Peripherals à Internal PCI/IDE

<b>Internal PCI IDE</b>
Disabled
Primary
Secondary
Both

This parameter lets you enable or disable the on-chip primary or secondary IDE device.

- Integrated Peripherals à IDE Primary Master PIO
- Integrated Peripherals à IDE Primary Slave PIO
- Integrated Peripherals à IDE Secondary Master PIO
- Integrated Peripherals à IDE Secondary Slave PIO

## AWARD BIOS

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### IDE Primary Master PIO

Auto  
Mode 0  
Mode 1  
Mode 2  
Mode 3  
Mode 4

Setting this item to **Auto** activates the HDD speed auto-detect function. The PIO mode specifies the data transfer rate of HDD. For example: mode 0 data transfer rate is 3.3MB/s, mode 1 is 5.2MB/s, mode 2 is 8.3MB/s, mode 3 is 11.1MB/s and mode 4 is 16.6MB/s. If your hard disk performance becomes unstable, you may manually try the slower mode.



**Caution:** *It is recommended that you connect the first IDE device of each channel to the endmost connector of the IDE cable. Refer to section 2.3 "Connectors" for details on how to connect IDE device(s).*

### **Integrated Peripherals à Primary Master UDMA**

### **Integrated Peripherals à Primary Slave UDMA**

### **Integrated Peripherals à Secondary Master UDMA**

### **Integrated Peripherals à Secondary Slave UDMA**

#### Primary Master UDMA

Auto  
Disabled

This item allows you to set the Ultra DMA/33 mode supported by the hard disk drive connected to your primary IDE connector.

### **Integrated Peripherals à IDE Burst Mode**

#### IDE Burst Mode

Enabled  
Disabled

This item lets you control the bottom address of the ISA address hole.

### **Integrated Peripherals à IDE Data Port Post Write**

#### IDE Data Port Post Write

Enabled  
Disabled

This item lets you control the IDE Data Port Write function.

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## Integrated Peripherals à IDE HDD Block Mode

**IDE HDD Block Mode**  
Enabled  
Disabled

This feature enhances disk performance by allowing multisector data transfers and eliminates the interrupt handling time for each sector. Most IDE drives, except with old designs, can support this feature.

## Integrated Peripherals à Onboard FDD Controller

**Onboard FDD Controller**  
Enabled  
Disabled

Setting this parameter to **Enabled** allows you to connect your floppy disk drives to the onboard floppy disk connector instead of a separate controller card. Change the setting to Disabled if you want to use a separate controller card.

## Integrated Peripherals à Onboard Serial Port 1 Integrated Peripherals à Onboard Serial Port 2

**Onboard Serial Port 1**  
Auto  
3F8/IRQ4  
2F8/IRQ3  
3E8/IRQ4  
2E8/IRQ3  
Disabled

This item allow you to assign address and interrupt for the board serial port. Default is **Auto**.



**Note:** If you are using an network card, make sure that the interrupt does not conflict.

## Integrated Peripherals à UART 2 Mode

**UART 2 Mode**  
Standard  
HPSIR  
ASKIR

This item is configurable only if the "Onboard UART 2" is enabled. This allows you to specify the mode of serial port2. The available mode selections are:

- **Standard** - Sets serial port 2 to operate in normal mode. This is the default setting.

## AWARD BIOS

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- **HPSIR** - Select this setting if you installed an Infrared module in your system via IrDA connector (refer to section 2.3 "Connectors"). This setting allows infrared serial communication at a maximum baud rate of 115K baud.
- **ASKIR** - Select this setting if you installed an Infrared module via IrDA connector (refer to section 2.3 "Connectors"). This setting allows infrared serial communication at a maximum baud rate of 19.2K baud.

### Integrated Peripherals à IR Function Duplex

#### **IR Function Duplex**

Full  
Half

This item lets you set the duplex mode for the IR communication. Full - Allows IR communication in bidirectional mode. Half - Allows IR communication in single direction only.



**Note:** This option appears only if the IR function is activated and the Onboard UART 2 Mode parameter is NOT set to Standard.

### Integrated Peripherals à Onboard Parallel Port

#### **Onboard Parallel Port**

3BC/IRQ7  
378/IRQ7  
278/IRQ7  
Disabled

This item controls the onboard parallel port address and interrupt.



**Note:** If you are using an I/O card with a parallel port, make sure that the addresses and IRQ do not conflict.

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## Integrated Peripherals à Onboard Parallel Mode

<b>Onboard Parallel Mode</b>
Normal
EPP
ECP
ECP + EPP

This item lets you set the parallel port mode. The mode options are **Normal** (Standard and Bidirection Parallel Port), EPP (Enhanced Parallel Port) and ECP (Extended Parallel Port). Normal is the IBM AT and PS/2 compatible mode. EPP enhances the parallel port throughput by directly writing/reading data to/from parallel port without latch. ECP supports DMA and RLE (Run Length Encoded) compression and decompression.

## Integrated Peripherals à ECP Mode Use DMA

<b>ECP Mode Use DMA</b>
3
1

This item lets you set the DMA channel of ECP mode.

## Integrated Peripherals à Parallel Port EPP Type

<b>Parallel Port EPP Type</b>
EPP1.7
EPP1.9

This item is used to select EPP type.

## Integrated Peripherals à PS/2 mouse function

<b>PS/2 mouse function</b>
Disabled
Enabled

This item is used to enable or disable PS/2 mouse function.

## Integrated Peripherals à USB Controller

<b>USB Controller</b>
Enabled
Disabled

USB device is default to use PCI INTD#, the same as PCI slot4. If you installed PCI card on slot4 and require to use INTD#, set this item to Disabled. The USB device will then be disabled.



**Note:** Normally, PCI VGA does not need PCI interrupt, you may put PCI VGA on slot4.

# AWARD BIOS

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## Integrated Peripherals à USB Keyboard Support

### USB Legacy Support

Enabled  
Disabled

This item lets you enable or disable the USB keyboard driver within the onboard BIOS. The keyboard driver simulates legacy keyboard command and let you use USB keyboard during POST or after boot if you don't have USB driver in the operating system.



**Caution:** You can not use both USB driver and USB legacy keyboard at the same time. Disable "USB Legacy Support" if you have USB driver in the operating system.

## Integrated Peripherals à Power Button Over Ride

### Power Button Over Ride

Enabled  
Disabled

This is a specification of ACPI and supported by hardware. When **Enabled**, the soft power switch on the front panel can be used to control power On, Suspend and Off. If the switch is pressed less than 4 sec during power On, the system will go into Suspend mode. If the switch is pressed longer than 4 sec, the system will be turned Off. The default setting is **Disabled**, soft power switch is only used to control On and Off, there is no need to press 4 sec, and there is no Suspend.

## 3.10 Password Setting

Password prevents unauthorized use of your computer. If you set a password, the system prompts for the correct password before boot or access to Setup.

To set a password:

1. At the prompt, type your password. Your password can be up to 8 alphanumeric characters. When you type the characters, they appear as asterisks on the password screen box.
2. After typing the password, press **Enter**.
3. At the next prompt, re-type your password and press **Enter** again to confirm the new password. After the password entry, the screen automatically reverts to the main screen.

To disable the password, press **Enter** when prompted to enter the password. The screen displays a message confirming that the password has been disabled.

## 3.11 IDE HDD Auto Detection

If your system has an IDE hard drive, you can use this function to detect its parameters and enter them into the "Standard CMOS Setup" automatically.

This routine only detects one set of parameters for your IDE hard drive. Some IDE drives can use more than one set of parameters. If your hard disk is formatted using different parameters than those detected, you have to enter the parameters manually. If the parameters listed do not match the ones used to format the disk, the information on that disk will not be accessible. If the auto-detected parameters displayed do not match those that used for your drive, ignore them. Type **N** to reject the values and enter the correct ones manually from the Standard CMOS Setup screen.

## 3.12 Save & Exit Setup

This function automatically saves all CMOS values before leaving Setup.



## AWARD BIOS

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### 3.13 Exit without Saving

Use this function to exit Setup without saving the CMOS value changes. Do not use this option if you want to save the new configuration.

### 3.14 NCR SCSI BIOS and Drivers

The NCR 53C810 SCSI BIOS resides in the same flash memory chip as the system BIOS. The onboard NCR SCSI BIOS is used to support NCR 53C810 SCSI control card without BIOS code. The NCR SCSI BIOS directly supports DOS, Windows 3.1 and OS/2. For better system performance, you may use the drivers that come with the NCR SCSI card or with your operating system. For details, refer to the installation manual of your NCR 53C810 SCSI card.

### 3.15 BIOS Flash Utility

The BIOS Flash utility allows you to upgrade the system BIOS. To get the AOpen Flash utility and the upgrade BIOS file, contact your local distributor or visit our homepage at <http://www.aopen.com.tw>. Please make sure that you have the correct BIOS ready, the BIOS filename is normally like MX58R110.BIN, which means model MX58 BIOS revision 1.10.

There are two useful programs, Checksum utility CHECKSUM.EXE and AOpen Flash utility AOFLASH.EXE. Follow the procedures below to upgrade your BIOS.

#### [CHECKSUM.EXE]

This utility will help you to determine if the BIOS has been downloaded correctly or not.

1. Execute  
C:> CHECKSUM Biosfile.bin  
Biosfile.bin is the filename of the BIOS code. (for example, MX58R110.BIN)
2. The utility will show "Checksum is ssss".

## AWARD BIOS

3. Compare the "ssss" with original checksum posted on Web or BBS. If they are different, please do not proceed any further and try to download the BIOS again.

### [AOFLASH.EXE]

This utility will try to check the mainboard model, BIOS version and Super/Ultra IO chip model. To ensure the correct BIOS file for the correct mainboard and IO chip. This utility will permanently replace your original BIOS content after flashing.

1. Bootup DOS from floppy without loading any memory manager (HIMEM, EMM386, QEMM386, ...).
2. Execute  
C:> AOFLASH Biosfile.bin  
Biosfile.bin is the filename of the BIOS code. (for example, MX58R110.BIN)
3. After loading the new BIOS code, the utility will prompt you to save original BIOS code into your HDD or floppy. Please press "Y" to store it as "BIOS.OLD".
4. After the old BIOS has been successfully saved, press "Y" to replace BIOS.
5. DO NOT turn off the power during "FLASHING".
6. Reboot the system by turn off the power after "FLASHING".
7. Press "DEL" key to enter BIOS setup during POST.
8. Reload the "BIOS SETUP DEFAULT" and reconfigure other items as previous set.
9. Save & Exit. Done!



**Warning:** DO NOT turn off the power during "FLASHING". If the BIOS programming is not successfully finished, the system will not be boot again, and you may need to physically replace the BIOS chip.



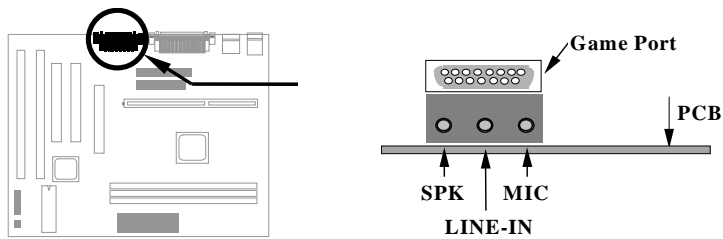
**Tip:** You may load back original BIOS "BIOS.OLD" by the same procedure.

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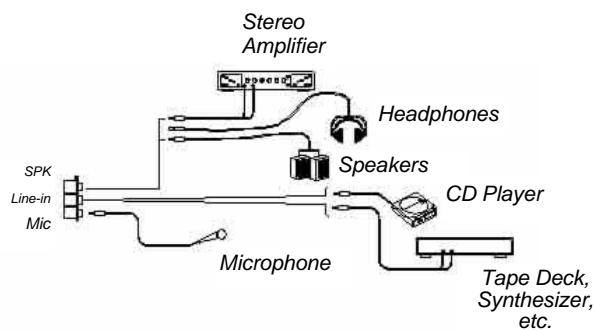
## Chapter 4

# Audio

This motherboard comes with a 16-bit sound processor (Crystal CX4235) onboard.



To fully utilize the audio functions, you may connect various peripheral devices that the audio chip supports. The following figure shows the different devices that you can connect.



# Audio

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## 4.1 Features

The onboard audio has the following features:

### **Advanced technology support**

- Microsoft Direct Sound
- Plug and Play

### **MIDI interface**

- Built-in MIDI interface for external MIDI devices

### **Software-controllable audio**

- Supports various audio devices all controllable through software
- Adjusts master volume, CD audio, line-in, and microphone inputs
- Software setting of I/O address, DMA and IRQ

### **Stereo digitized voice channel**

- Full-duplex, 16-bit digital audio playback and recording in both stereo and mono modes
- Programmable sampling rate from 8 KHz to 44.1 KHz

### **3D Sound-Surround**

- Adjustable Space effect via software
- Preset capability (maximum of three different settings)

## 4.2 Setting Up in Windows 95

An Open Bonus Pack CD-ROM contains the Windows 95 drivers and software (including the Music Center application). Please see the online help for details.



**Note:** Refer to your Windows 95 manual or online help for any questions on Windows 95.

### 4.2.1 Installing the Drivers and the Application

After turning on the system, Windows 95 begins loading and starts detecting new hardware installed on the system.

1. When Windows 95 detects the presence of the onboard audio chip, it begins to build the CX4235 driver database. The New Hardware Found dialog box displays.
2. Select **Driver from disk provided by hardware manufacturer** and click on **OK**. Windows 95 prompts you for the driver disk.
3. Specify the path of the Win95 driver from your CD-ROM drive, then click on **OK**. The system will copy the necessary driver files to your hard disk drive.



**Tip:** Prepare the Windows 95 CD-ROM disk before setting up the onboard audio. Windows 95 will prompt you to insert the Windows 95 CD-ROM disk when you install the joystick or MIDI device.



**Note:** If the file being copied is older than the file currently existing in your system, we suggest you to keep the existing file.

4. Windows 95 makes changes to the system settings and begins detecting the following new hardware components:
  - Crystal PnP Audio System Joystick
  - Crystal PnP Audio System Control Registers
  - Crystal PnP Audio System MPU-401 Compatible

## Audio

---

- Crystal PnP Audio System CODEC

5. Upon initial installation, the setup process begins setting up the software.

Windows 95 makes final changes to the system settings.

### 4.2.2 Removing the Drivers

Follow these steps to remove or uninstall the drivers:

1. Execute **SETUP.EXE** on driver disk & click on **Uninstall Driver**.
2. Click on **Uninstall Crystal Drivers** to uninstall the drivers.

The uninstallation process automatically removes the drivers and changes the system registry settings.



**Important:** After removing the drivers, remember to remove the audio chip when you shutdown from the current Windows 95 session; otherwise, Windows 95 will again detect the audio chip at the next startup.

## 4.3 Setting Up in DOS and Windows 3.x

### 4.3.1 Installing the Drivers and the Application

Follow these steps to install the drivers and the application:

1. Insert AOpen Bonus Pack into the appropriate CDROM drive.
2. At the DOS prompt, type

```
x:\Mx58plus\Sound\Driver\Win31\setup e
```

depending on your CD-ROM drive.

3. Select the **install** option to start the installation process. A confirmation screen displays.
4. This screen describes the files setup will modify during installation. Read this message carefully. Select **Yes** to proceed with the installation. The install path confirmation screen displays.
5. Confirm the installation path by selecting **Begin Installation**. You can modify the source and destination directories. The Windows applications installation screen displays.
6. Press **e** if you want to install the Windows applications and drivers. Otherwise, press **m**. The hardware settings screen displays.
7. Select **Accept the above settings** to install the drivers and applications. You can modify any of the options before you begin installation. If you selected to install the Windows drivers and applications, the Windows-specific hardware settings screen displays.
8. Select **Accept the above settings** to install the Windows drivers and applications. You can modify any of the options before you begin installation. Skip this step if you did not select to install the Windows drivers and applications.
9. Follow the screen instructions to complete the installation. The installation program automatically updates your profiles (AUTOEXEC.BAT, CONFIG.SYS, and SYSTEM.INI) so that your hardware and software work properly.

## Audio

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**Note:** Before any changes are made to your AUTOEXEC.BAT, CONFIG.SYS, WIN.INI and SYSTEM.INI files, backups of your original files are copied to the audio directory and are renamed as AUTOEXEC.###, CONFIG.###, WIN.### and SYSTEM.### respectively.

10. Reboot the system after installation.



**Important:** You must reboot the system. The onboard audio does not work unless you reboot.

### 4.3.2 Removing the Drivers

Follow these steps to remove or uninstall the drivers:

1. Change the directory to where the audio driver files are located and type the following at the DOS prompt:

```
setup c
```

2. Select the **uninstall** option to start the uninstallation process. Follow the screen instructions to complete the process.



### 4.4 Setting Up in NT3.51 / NT4.0

#### 4.4.1 Installing the Audio Drivers

Follow these steps to install the audio drivers:

1. For NT3.51, select **DRIVERS** from control panel.  
For NT4.0, select **MULTIMEDIA** from control panel and click on the Devices tab.
2. Press the **ADD** button. Select **Unlisted or Updated Drivers** and press **OK**.
3. Browse and select X:\Mx58plus\Sound\Driver\WinNT.  
(X: is your CD-ROM drive.)
4. Press **OK** to continue with the installation.
5. An Audio Setup dialog box will appear. Please select the default configuration resource and press **OK**.
6. Click on the **Restart Now** button.

#### 4.4.2 Install MPU-401/Joystick Driver

Follow these steps to install the MPU401 or joystick drivers:

1. For NT3.51, select **DRIVERS** from control panel.  
For NT4.0, select **MULTIMEDIA** from control panel and click on the Devices tab.
2. Press the **ADD** button. Select **MPU-401 Compatible Driver /Microsoft Sidewinder 3D Pro Joystick** and press **OK**.
3. Place your NT4.0/NT3.51 installation CD and press **OK** (the default path is the i386 directory).
4. The Generic MPU-401/Joystick Setup dialog box will pop up. Select the default configuration resource and press **OK**.
5. Click on the **Restart Now** button.

# Audio

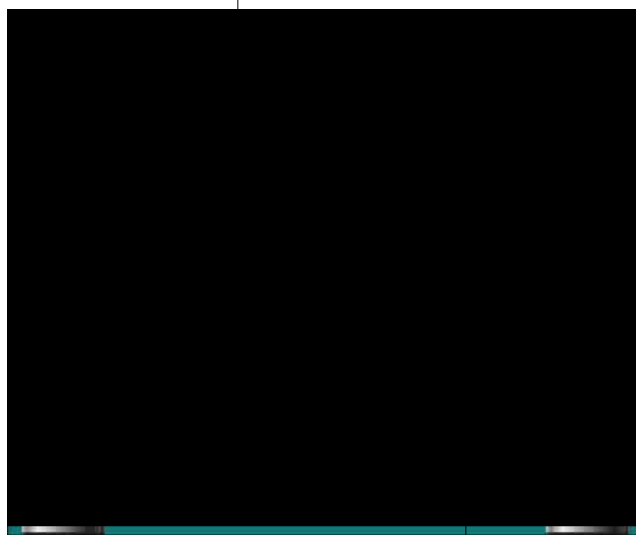
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## 4.5 Applications

### 4.5.1 Music Center

To startup this application, please click the Music Center Icon.

*MIDI Player: plays MIDI audio files*



**3D Controller:**  
*controls the 3D effects*

**CD Player:**  
*plays audio CDs*

**Wave Player:**  
*plays and records waveform audio files*

**Multimedia Mixer:** *controls the combination and balance of sound output from different channels*

For more information, please refer to the online help.

### 4.5.2 MIDI Board

To startup this application software, please click the MIDI Board Icon.

**Tone Button:** Sharp or diminish background music by the 12 tone buttons. **Rhythm & Tempo:** To play several types of background music. **Menu Button:** Turn on/off Menu.



**MIDI Board Notes:** Move cursor over the screen keyboard and click for playing or strick corospondence key on PC keyboard to play specific tone. **Program Tuner:** Drag the yellow point to select specific program for different instrument tune. **HotKey Button:** Show keyboard mapping.

### 4.5.3 MIDI Player

MIDI player is very similar as Media Player that comes with Windows 95, but it is able to dynamic switch MIDI devices from one to another while playing MIDI file, so you can enjoy the sound quality between different MIDI device obviously.

---

## *Appendix A*

# Frequently Asked Question

**Q: How can I identify the mainboard BIOS version?**

A: The AOpen mainboard BIOS version appears on the upper-left corner of the POST (Power-On Self Test) screen. Normally, it starts with R and is found in between the model name and the date. For example:

AP53/AX53 R3.80 Oct.22.1996

↙  
BIOS revision

**Q: How can I identify the model name & revision of the mainboard from PCB?**

A: The AOpen mainboard revision appears as REV:X.X on the PCB, usually it is under beneath of AOpen Logo & mainboard model name. For example, "AX6L REV:1.2" shall appear on the PCB as follows:



**Q: What is MMX?**

A: MMX is the new single-line multiple-instruction technology of the new Intel Pentium PP/MT (P55C) and Pentium II CPU. The AMD K6 and Cyrix M2 will support MMX, too. The MMX instructions are specifically useful for multimedia applications (such as 3D video, 3D sound, video conference). The performance can be improved if applications use these instructions. All AOpen MBs have at least dual power onboard to support MMX. It is not necessary to have special chipset for MMX CPU.

## Frequently Asked Questions

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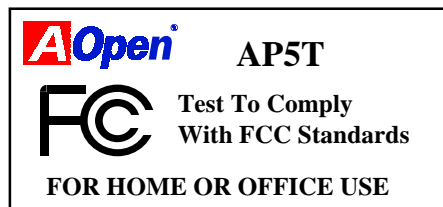
**Q: What is USB (Universal Serial Bus)?**

A: USB is a new 4-pin serial peripheral bus that is capable of cascading low/medium speed peripherals (less than 10Mbit/s) such as keyboard, mouse, joystick, scanner, printer and modem/ISDN. With USB, the traditional complex cables from back panel of your PC can be eliminated.

You need the USB driver to support USB device(s). AOpen MBs are all USB ready, you may get latest BIOS from AOpen web site (<http://www.aopen.com.tw>). Our latest BIOS includes the keyboard driver (called Legacy mode), that simulates USB keyboard to act as AT or PS/2 keyboard and makes it possible to use USB keyboard if you don't have driver in your OS. For other USB devices, you may get the drivers from your device vendor or from OS (such as Win95). Be sure to turn off "USB Legacy Support" in BIOS "Chipset Setup" if you have another driver in your OS.

**Q: What is FCC DoC (Declaration of Conformity)?**

A: The DoC is new certification standard of FCC regulations. This new standard allows DIY component (such as mainboard) to apply DoC label separately without a shielding of housing. The rule to test mainboard for DoC is to remove housing and test it with regulation 47 CFR 15.31. The DoC test of mainboard is more difficult than traditional FCC test. If the mainboard passes DoC test, that means it has very low EMI radiation and you can use any kind of housing (even paper housing). Following is an example of DoC label.



## Frequently Asked Questions

**Q: What is Bus Master IDE (DMA mode)?**

A: The traditional PIO (Programmable I/O) IDE requires the CPU to involve in all the activities of the IDE access including waiting for the mechanical events. To reduce the workload of the CPU, the bus master IDE device transfers data from/to memory without interrupting CPU, and releases CPU to operate concurrently while data is transferring between memory and IDE device. You need the bus master IDE driver and the bus master IDE HDD to support bus master IDE mode. Note that it is different with master/slave mode of the IDE device connection. For more details, refer to section 2.3 "Connectors".

**Q: What is the Ultra DMA/33?**

A: This is the new specification to improve IDE HDD data transfer rate. Unlike traditional PIO mode, which only uses the rising edge of IDE command signal to transfer data, the DMA/33 uses both rising edge and falling edge. Hence, the data transfer rate is double of the PIO mode 4 or DMA mode 2. (16.6MB/s x2 = 33MB/s).

The following table lists the transfer rate of IDE PIO and DMA modes. The IDE bus is 16-bit, which means every transfer is two bytes.

Mode	Clock per 33MHz PCI	Clock count	Cycle time	Data Transfer rate
PIO mode 0	30ns	20	600ns	(1/600ns) x 2byte = 3.3MB/s
PIO mode 1	30ns	13	383ns	(1/383ns) x 2byte = 5.2MB/s
PIO mode 2	30ns	8	240ns	(1/240ns) x 2byte = 8.3MB/s
PIO mode 3	30ns	6	180ns	(1/180ns) x 2byte = 11.1MB/s
PIO mode 4	30ns	4	120ns	(1/120ns) x 2byte = 16.6MB/s
DMA mode 0	30ns	16	480ns	(1/480ns) x 2byte = 4.16MB/s
DMA mode 1	30ns	5	150ns	(1/150ns) x 2byte = 13.3MB/s
DMA mode 2	30ns	4	120ns	(1/120ns) x 2byte = 16.6MB/s
DMA/33	30ns	4	120ns	(1/120ns) x 2byte x2 = 33MB/s

**Q: What is ACPI (Advanced Configuration & Power Interface) and OnNow?**

A: The ACPI is new power management specification of 1997 (PC97). It intends to save more power by taking full control of power management to operating system and not through BIOS. Because of this, the chipset or super I/O chip needs to provide standard register interface to OS (such as Win97) and provides the ability for OS to shutdown and resume power of different part of chip. The idea is a bit similar to the PnP register interface.

## Frequently Asked Questions

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ACPI defines momentary soft power switch to control the power state transition. Most likely, it uses the ATX form factor with momentary soft power switch. The most attractive part of ACPI for desktop user is probably the "OnNow" feature, an idea from notebook. This feature allows you to immediately resume to your original work without the long time waiting from bootup, entering Win95 and running Winword. The AX5T with Intel TX chipset can support ACPI.

**Q: What is ATX Soft Power On/Off and Momentary Switch?**

A: The Soft Power On of the ATX specification means to provide a standby current for special circuit to wait for wakeup event when main power is off. For example, Infrared wakeup, modem wakeup, or voice wakeup. Currently, the most simple usage is to provide standby current for power switch circuit so that power switch can turn on/off the main power through soft power control pin. The ATX power specification does not mention anything about the power switch type. You can use toggle or momentary switch, note that ACPI specification requires momentary switch for power state control. All the AOpen ATX MBs support momentary switch.

Soft Power Off means to turn off system through software, Windows 95 Shutdown function can be used to verify if your mainboard supports soft power off.

**Q: What is the AGP (Accelerated Graphic Port)?**

A: AGP is a PCI-like bus interface targeted for high-performance 3D graphic. AGP supports only memory read/write operation and single-master single-slave one-to-one only. The AGP uses both rising and falling edge of the 66MHz clock and produces  $66\text{MHz} \times 4\text{byte} \times 2 = 528\text{MB/s}$  data transfer rate.

**Q: Does Pentium, Pentium Pro or Pentium II support Deturbo mode?**

A: The Deturbo mode was originally designed to slow down CPU speed for old applications (especially old games). It uses programming loop to wait or delay special event. This programming method is considered very bad since the delay of loop highly depends on the CPU speed and the application fails at high-speed CPU. Almost all new applications (including games) use RTC or interrupt to wait event. There is no need for Deturbo mode now. The Turbo switch is now used as Suspend switch. However, some MBs still support Turbo/Deturbo function via keyboard. You can set the system to Deturbo by pressing <Ctrl> <Alt> <->. To back to Turbo mode, press <Ctrl> <Alt> <+>. Note that the Deturbo mode has been removed in new MBs since these require more code space in Flash ROM.

**Q: Power Management Icon does not appear in the Windows 95 Control Panel even though the APM under BIOS Setup is enabled.**

## Frequently Asked Questions

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A: This problem occurs if you did not enable the APM function before you install Windows 95. If you have already installed Windows 95, re-install it after the BIOS APM function is enabled.

**Q: Why does the system fail to go into suspend mode under Win95?**

A: This problem may be caused by your CDROM settings. The CDROM Auto Insert Notification of Win95 is default enabled, the system will continue to monitor your CDROM, auto-execute application when a CD diskette is loaded, and prevents the system from entering into suspend mode. To resolve this, go into Control Panel → System → Device Manager → CDROM → Setting, and disable the "Auto Insert Notification" function.

**Q: Which version of the Windows '95 that I am using?**

A: You may determine the version of Windows '95 by following steps.

1. Double click "System" in "Control Panel".
2. Click "General".
3. Look for "System" heading & refer to following,

4.00.950	Windows 95
4.00.950A	Windows 95 + Service Pack or OEM Service Release 1
4.00.950B	OEM Service Release 2 or OEM Service Release 2.1

If you are running OSR 2.1, you may tell it from by checking "USB Supplement to OSR2" in the list of installed program of Add/Remove program tool under Control Panel, and checking for version 4.03.1212 of the Ntkern.vxd file in the Windows\System\Vmm32 folder.

**Q: What is LDCM (LAN Desktop Client Manager)?**

A: This is a software of Intel. The major goal is to provide an easy way for corporate network administrator to monitor the status of all the clients (workstation). You need at least DMI BIOS for LDCM. AOpen BIOS is also DMI ready but unfortunately, Intel LDCM needs Intel network card and ATI VGA to work properly. It is obviously not suitable for home user to pay LDCM extra cost.



## Frequently Asked Questions

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**Q: What is ADM (Advanced Desktop Manager)?**

A: This is a desktop client and server management software developed by AOpen. It is similar as Intel LDCM with some improvement. ADM is not only for corporate network management, it can also be used as system status monitoring utility, for example, CPU fan, thermal and system voltage monitoring.

Features	ADM 2.1	LDCM 3.0
VGA card	No limitation	Only ATI
Network card	No limitation	Only Intel
Support DMI BIOS 2.0	Yes	Yes
Support Win95	Yes	Yes
Support Win NT	Yes	Yes
Real-Time CPU/Memory Utilization Monitoring	Yes	No
Multi-Machine Monitoring on One Screen	Yes	No
Remote Management Protocol	Standard SNMP protocol	Intel proprietary RAP protocol
Standard SNMP Trap	Yes (so that can work with standard software such as HP Open View)	No
Remote File Transfer	No	Yes

---

## *Appendix B*

# Troubleshooting

In case you encounter any of the troubles listed below, follow the procedures accordingly to resolve the problem. If the first corrective action listed did not work, then try the next one.



**Tip:** *There are many useful information in our homepage, such as jumper settings, latest BIOS, drivers, and more FAQs. Visit our homepage to see if there is answer of your problem.*

**Taiwan** <http://www.aopen.com.tw>

**USA** <http://www.aopen-usa.com>

<http://www.aopenamerica.com>

**Europe** <http://www.aopen.nl>



**Important:** *Make sure that you have tried listed procedures in this appendix before you call your distributor. If the problem still exist, fill out the attached **Technical Problem Report Form**. Please write down your configuration and error symptoms as detailed as possible. The more detailed information you give us, the faster we can identify and solve your problem. You can copy this form and fax it to your distributor or send the form via e-mail. For getting better efficiency, we don't recommend you report the problem through phone.*

## Troubleshooting

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### **No display.**

- a. Check all jumper settings to make sure that you have set the proper jumpers, especially those for CPU type, single/dual voltage (P54C/MMX), CPU frequency and ratio.
- b. Check the power cord or power switch of your system. The simple way to identify power failure is to check the CPU fan and the power supply fan. If these are not working, then the power is down.
- c. Is there a short on the motherboard? (Is the fan of the power supply working properly?)
- d. Turn off the power and remove all add-on cards, IDE cables and floppy cables from your mainboard. Only install the VGA card to simplify the problem.
- e. If you use a PCI VGA card, reinstall it to other PCI slot or try another card.
- f. Check if the memory (SIMM/DIMM) were installed properly. Reinstall the SIMM/DIMM to other socket or try another SIMM/DIMM.
- g. Make sure the flat cable matches pin1 of IDE connector and your IDE device.

### **There is display, but can 't enter BIOS Setup.**

- a. For checking if the keyboard works properly, press the <Num Lock> key to enable/disable the Num Lock function, and check if the LED will ON and OFF accordingly.
- b. Check if Turbo Switch was released, don 't use Turbo Switch before system boots. (In fact, there is no Turbo function after Pentium machine. Now Turbo Switch usually acts as Suspend Switch.)

### **System sometimes auto reboots.**

- a. Clear CMOS. BIOS will load default setting, use the slowest and most reliable setting.
- b. Repeat the steps in "No display" section carefully.

## Troubleshooting

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### **There is display, but can 't boot.**

- a. Check BIOS Setup if the HDD is set to LBA (more than 540MB) format.
- b. Load default setting.
- c. Boot system from floppy drive. If pass, the problem should be caused by the IDE cable or HDD itself.

### **HDD Controller Fail, can't detect HDD.**

- a. Make sure the Master/Slaver setting for HDD is correct.
- b. Check IDE cable or try another HDD.

### **Mouse/Printer/Floppy is not working properly.**

- a. Check if Serial/Parallel/Floppy cable was installed properly.
- b. If possible, use another peripheral to double check if the mainboard is defective.

### **Keyboard has no response when system boots, or BIOS shows the message "Keyboard Controller Error".**

- a. Press the <Num Lock> key to enable and disable Num Lock function, check if the LED will ON and OFF accordingly.
- b. Is the mainboard fuse burned? (Use an multi-meter to check. The fuse is usually located near the keyboard socket. It is usually green and marked as F1,3A/125V.)

### **COMS data lost, or Battery Low**

- a. Does the voltage of the onboard battery is lower than 2.5V?
- b. Make sure the Clear CMOS jumper is set correctly.

## Troubleshooting

---

Technical Problem Report Form	
<b>Model Name:</b> <b>Serial Number:</b>	
<b>Contact:</b>	<b>Name:</b> <b>TEL:</b> <b>FAX:</b> <b>Email Address:</b>
<b>Error Symptom:</b>	
<b>System Configuration:</b> (Please list model name and version.)	<b>OS:</b> <b>BIOS:</b> <b>CPU:</b> <b>SIMM:</b> <b>HDD:</b> <b>CDROM:</b> <b>VGA:</b> <b>Sound:</b> <b>Modem:</b> <b>Others:</b>

## Appendix C

# Jumper Table Summary

### Setting the CPU Voltage

CPU	Type	Vcore	S4	S5	S6	S7	S8
INTEL P54C	Single Voltage	3.45V	OFF	ON	ON	ON	OFF
INTEL P55C	Dual Voltage	2.8V	OFF	OFF	OFF	ON	OFF
AMD K5	Single Voltage	3.52V	ON	ON	ON	ON	OFF
AMD K6-166/200	Dual Voltage	2.9V	ON	OFF	OFF	ON	OFF
AMD K6-233	Dual Voltage	3.2V	OFF	OFF	ON	ON	OFF
AMD K6-266/300	Dual Voltage	2.2V	OFF	ON	OFF	OFF	OFF
AMD K6-II	Dual Voltage	2.2V	OFF	ON	OFF	OFF	OFF
Cyrix 6x86	Single Voltage	3.52V	ON	ON	ON	ON	OFF
Cyrix 6x86L	Dual Voltage	2.8V	OFF	OFF	OFF	ON	OFF
Cyrix M2	Dual Voltage	2.9V	ON	OFF	OFF	ON	OFF
IDT C6	Single Voltage	3.52V 3.3V	ON ON	ON OFF	ON ON	ON ON	OFF OFF



**Warning:** Make sure that you have installed CPU fan properly if Intel PP/MT-233 or AMD K6 is being selected to use. It may cause your system unstable if you can not meet the heat dissipation requirement from above CPU. It is recommended to adopt larger fan on these CPU for better air flow in the system.



**Tip:** Normally, for single voltage CPU, Vcpuio (CPU I/O Voltage) is equal to Vcore, but for CPU that needs dual voltage such as PP/MT (P55C) or Cyrix 6x86L, Vcpuio is different from Vcore and must be set to Vio (PBSRAM and Chipset Voltage). The single or dual voltage CPU is automatically detected by hardware circuit.

## Jumper Table Summary

### Selecting the CPU Frequency

<b>S1</b>	<b>S2</b>	<b>S3</b>	<b>CPU Frequency Ratio</b>
OFF	OFF	OFF	1.5x (3.5x)
ON	OFF	OFF	2x
ON	ON	OFF	2.5x (1.75x)
OFF	ON	OFF	3x
ON	OFF	ON	4x
ON	ON	ON	4.5x
OFF	ON	ON	5x
OFF	OFF	ON	5.5x

<b>JP4</b>	<b>JP5</b>	<b>JP6</b>	<b>CPU External Clock</b>
2-3	2-3	1-2	50MHz
2-3	2-3	2-3	55MHz
1-2	2-3	1-2	60MHz
2-3	1-2	1-2	66MHz
1-2	2-3	2-3	75MHz
2-3	1-2	2-3	83MHz



**Warning:** SIS 5598 chipset supports maximum 75 MHz external CPU bus clock, the 83MHz settings are for internal test only, set to 83MHz exceeds the specification of the chipset, which may cause serious system damage.

<b>INTEL Pentium</b>	<b>CPU Core Frequency</b>	<b>Ratio</b>	<b>External Bus Clock</b>	<b>S1</b>	<b>S2</b>	<b>S3</b>	<b>JP4 &amp; JP5 &amp; JP6</b>
P54C 75	75MHz =	1.5x	50MHz	OFF	OFF	OFF	2-3 & 2-3 & 1-2
P54C 90	90MHz =	1.5x	60MHz	OFF	OFF	OFF	1-2 & 2-3 & 1-2
P54C 100	100MHz =	1.5x	66MHz	OFF	OFF	OFF	2-3 & 1-2 & 1-2
P54C 120	120MHz =	2x	60MHz	ON	OFF	OFF	1-2 & 2-3 & 1-2
P54C 133	133MHz =	2x	66MHz	ON	OFF	OFF	2-3 & 1-2 & 1-2
P54C 150	150MHz =	2.5x	60MHz	ON	ON	OFF	1-2 & 2-3 & 1-2
P54C 166	166MHz =	2.5x	66MHz	ON	ON	OFF	2-3 & 1-2 & 1-2
P54C 200	200MHz =	3x	66MHz	OFF	ON	OFF	2-3 & 1-2 & 1-2

<b>INTEL</b>	<b>CPU Core</b>	<b>Ratio</b>	<b>External</b>	<b>S1</b>	<b>S2</b>	<b>S3</b>	<b>JP4 &amp; JP5 &amp; JP6</b>
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## Jumper Table Summary

Pentium MMX	Frequency		Bus Clock				
PP/MT 150	150MHz =	2.5x	60MHz	ON	ON	OFF	1-2 & 2-3 & 1-2
PP/MT 166	166MHz =	2.5x	66MHz	ON	ON	OFF	2-3 & 1-2 & 1-2
PP/MT 200	200MHz =	3x	66MHz	OFF	ON	OFF	2-3 & 1-2 & 1-2
PP/MT 233	233MHz =	3.5x	66MHz	OFF	OFF	OFF	2-3 & 1-2 & 1-2

Cyrix 6x86 & 6x86L	CPU Core Frequency	Ratio	External Bus Clock	S1	S2	S3	JP4 & JP5 & JP6
P120+	100MHz =	2x	50MHz	ON	OFF	OFF	2-3 & 2-3 & 1-2
P133+	110MHz =	2x	55MHz	ON	OFF	OFF	2-3 & 2-3 & 2-3
P150+	120MHz =	2x	60MHz	ON	OFF	OFF	1-2 & 2-3 & 1-2
P166+	133MHz =	2x	66MHz	ON	OFF	OFF	2-3 & 1-2 & 1-2
P200+	150MHz =	2x	75MHz	ON	OFF	OFF	1-2 & 2-3 & 2-3

Cyrix M2	CPU Core Frequency	Ratio	External Bus Clock	S1	S2	S3	JP4 & JP5 & JP6
MX-PR166	150MHz =	2.5x	60MHz	ON	ON	OFF	1-2 & 2-3 & 1-2
MX-PR200	166MHz =	2.5x	66MHz	ON	ON	OFF	2-3 & 1-2 & 1-2
	150MHz =	2x	75MHz	ON	OFF	OFF	1-2 & 2-3 & 2-3
MX-PR233	200MHz =	3x	66MHz	OFF	ON	OFF	2-3 & 1-2 & 1-2
	166MHz =	2x	83MHz	ON	OFF	OFF	2-3 & 1-2 & 2-3
MX-PR266	233MHz =	3.5x	66MHz	OFF	OFF	OFF	2-3 & 1-2 & 1-2
MX-PR300	225MHz =	3x	75MHz	OFF	ON	OFF	1-2 & 2-3 & 2-3
	233MHz =	3.5x	66MHz	OFF	OFF	OFF	2-3 & 1-2 & 1-2
	240MHz =	4x	60MHz	ON	OFF	ON	1-2 & 2-3 & 1-2

AMD K5	CPU Core Frequency	Ratio	External Bus Clock	S1	S2	S3	JP4 & JP5 & JP6
PR75	75MHz =	1.5x	50MHz	OFF	OFF	OFF	2-3 & 2-3 & 1-2
PR90	90MHz =	1.5x	60MHz	OFF	OFF	OFF	1-2 & 2-3 & 1-2
PR100	100MHz =	1.5x	66MHz	OFF	OFF	OFF	2-3 & 1-2 & 1-2
PR120	90MHz =	1.5x	60MHz	OFF	OFF	OFF	1-2 & 2-3 & 1-2
PR133	100MHz =	1.5x	66MHz	OFF	OFF	OFF	2-3 & 1-2 & 1-2
PR166	116MHz =	1.75x	66MHz	ON	ON	OFF	2-3 & 1-2 & 1-2

AMD K6	CPU Core Frequency	Ratio	External Bus Clock	S1	S2	S3	JP4 & JP5 & JP6
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## Jumper Table Summary

PR2-166	166MHz =	2.5x	66MHz	ON	ON	OFF	2-3 & 1-2 & 1-2
PR2-200	200MHz =	3x	66MHz	OFF	ON	OFF	2-3 & 1-2 & 1-2
PR2-233	233MHz =	3.5x	66MHz	OFF	OFF	OFF	2-3 & 1-2 & 1-2
PR2-266	266MHz =	4x	66MHz	ON	OFF	ON	2-3 & 1-2 & 1-2
PR2-300	300MHz =	4.5x	66MHz	ON	ON	ON	2-3 & 1-2 & 1-2

IDT C6	CPU Core Frequency	Ratio	External Bus Clock	S1	S2	S3	JP4 & JP5 & JP6
C6-150	150MHz =	2x	75MHz	ON	OFF	OFF	1-2 & 2-3 & 2-3
C6-180	180MHz =	3x	60MHz	OFF	ON	OFF	1-2 & 2-3 & 1-2
C6-200	200MHz =	3x	66MHz	OFF	ON	OFF	2-3 & 1-2 & 1-2



**Note:** Cyrix 6x86, 6x86MX (M2) and AMD K5 CPU use P-rating for the reference of CPU benchmark compared with INTEL P54C, their internal core frequency is not exactly equal to P-rating marked on the CPU. For example, Cyrix P166+ is 133MHz but performance is almost equal to P54C 166MHz and AMD PR133 is 100MHz but performance is almost equal to INTEL P54C 133MHz.

### Clear CMOS

<b>JP14</b>	<b>Clear CMOS</b>
1-2	Normal operation (default)
2-3	Clear CMOS

### Setting PCI Clock

<b>JP8</b>	<b>Setting PCI Clock</b>
1-2	Sync (default)
2-3	Async

### Disable Onboard VGA

<b>JP11</b>	<b>Disable Onboard VGA</b>
1-2	Enabled (default)
2-3	Disabled