Chapter 1

INTRODUCTION

The MS-6195 ATX IR3 mainboard is a high-performance personal computer mainboard based on the AMD Athlon® processor. This mainboard provides onboard Creative® CT5880 PCI technology in audio. The AMD Athlon® processor is the newest microprocessor in the AMD K86™ family of microprocessors.

The mainboard uses the highly integrated AMD® 751 system controller and AMD 756 peripheral controller. The AMD-751 system controller features: the S2k system interface supports a 100Mhz clock and double-data rate (DDR) transfers, the 33MHz 32-bit bus interface supports up to six PCI masters, the 66MHz AGP 1.0 compliant interface supports 2x data transfer mode, and High Speed memory designed to support a 100MHz SDRAM (PC-100-compatible-DIMM) with serial presence detect(SPD). The AMD-756 peripheral bus controllers feature an integrated ISA bus controller, an enhanced IDE controller with Ultra DMA-66 support, and a keyboard/mouse controller.

The MS-6195 ATX IR3 mainboard is one of our system board to implement the AMD-750 chipset (AMD-751 and AMD-756), which supports a single Slot A for AMD Athlon® processor.

1.1 Mainboard Features

CPU
- Slot A for AMD® Athlon™ processor.
- Support 500MHz, 550MHz, 600MHz, 650MHz or higher processor

Chipset
- AMD® Irongate chipset. (Northbridge)
  - 200MHz EV6 System Interface speed
  - 100MHz SDRAM
  - 1x/2x AGP
  - Status - Silicon currently in bring-up
- AMD® 756™ (Viper) chipset. (Southbridge)
  - OHCI USB
  - APIC
  - ACPI Power Management

Front Side Bus (FSB)
- 100MHz clock is supported. (200MHz Internal System Bus)

Main Memory
- Supports three memory banks using three 168-pin unbuffered DIMM sockets.
- Supports a maximum memory size of 768MB for SDRAM.
- Supports 3.3v PC100 SDRAM DIMM.

Slots
- One AGP (Accelerated Graphics Port) slot.
  - AGP specification compliant
  - AGP 66/133MHz 3.3v device support
- Six 32-bit Master PCI Bus slots and one 16-bit ISA bus slots
- Supports 3.3v/5v PCI bus Interface.

On-Board IDE
- An IDE controller on the AMD® 756 chipset provides IDE HDD/CD-ROM with PIO and Ultra DMA/66 operation modes.
- Can connect up to four IDE devices.

On-Board Peripherals
● On-Board Peripherals include:
     - 1 floppy port supports 2 FDD with 360K, 720K, 1.2M, 1.44M and
       2.88Mbytes.
     - 2 serial ports (COMA + COMB)
     - 1 parallel port supports SPP/EPP/ECP mode
     - 4 USB ports
     - 1 IrDA connector for SIR.

Audio
● Creative CT5880. (optional)
     - 64 Voice WaveTable Synthesizer
     - Sound Library of over 4000 different sounds
     - Support SPDIF (AC3)
     - Support Microsoft Direct Sound, Direct Sound 3D, Direct Music,
       and A3DAPI.

BIOS
● The mainboard BIOS provides "Plug & Play" BIOS which detects the
   peripheral devices and expansion cards of the board automatically.
● The mainboard provides a Desktop Management Interface(DMI) function
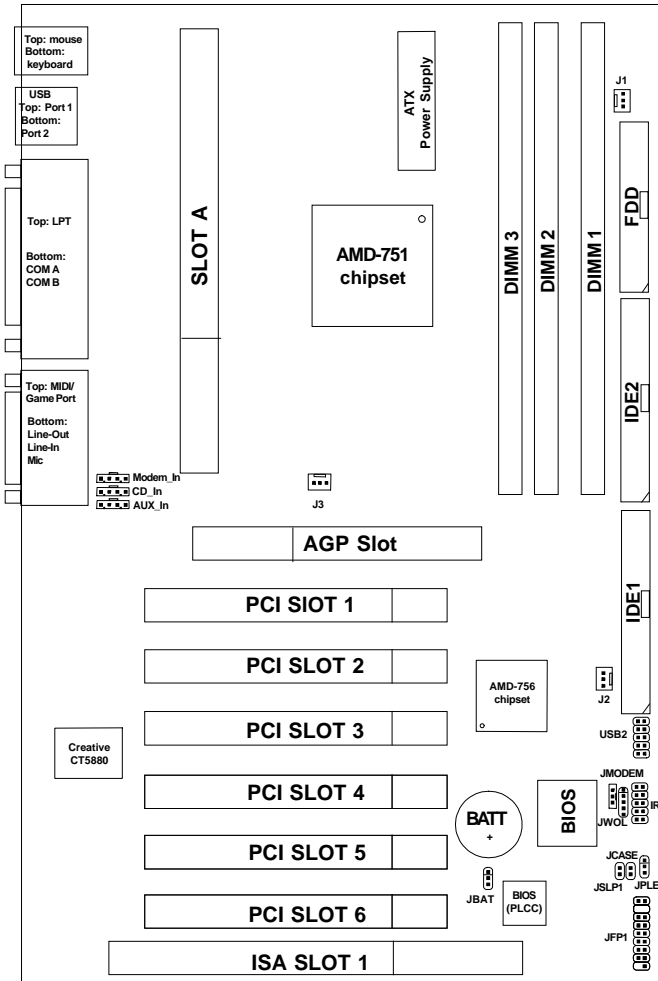   which records your mainboard specifications.

Dimension
● ATX Form Factor : 30.5cm x 19.2cm x 4 layers PCB

Mounting
● 7 mounting holes.

1.2 Mainboard Layout

MS-6195 ATX IR3 Mainboard
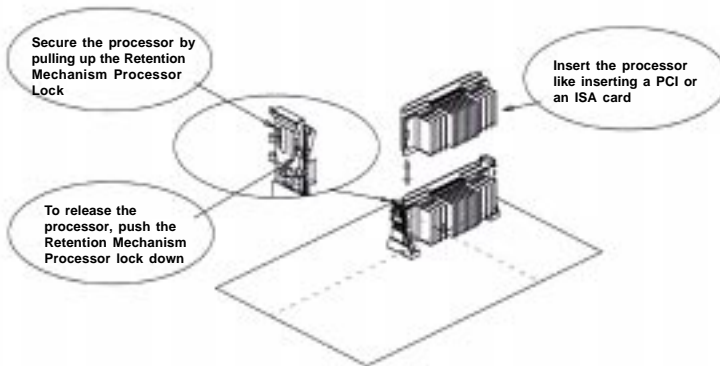
Chapter 2

HARDWARE INSTALLATION

2.1 Central Processing Unit: CPU

2.1-1   Processor Installation Procedure

Step 1: Install the Retention Mechanism.
Attach the Retention Mechanism to the Mainboard. Push the Plastic lock to secure the Retention Mechanism into the mainboard.

Step 2: Install the Processor.
Insert the Processor like inserting a PCI or an ISA card.

Step 3: Lock the Processor.
Lock the processor by pulling up the Retention Mechanism processor lock shown above.

2.1-2 CPU Core Speed Derivation Procedure

The Mainboard can auto-detect the processor speed. Just insert the AMD Athlon processor into Slot A.

If	CPU Clock	=	100MHz
	Core/Bus ratio	=	5
then	CPU core speed	=	Host Clock x Core/Bus ratio
		=	100MHz x 5
		=	500MHz

2.1-4 Fan Power Connectors: J1, J2, & J3

These connectors support system cooling fan with + 12V. It supports three pin head connector.   When connecting the wire to the connector, always take note that the red wire is the positive and should be connected to the +12V, the black wire is Ground and should be connected to GND. **If your mainboard has System Hardware Monitor chipset on-board, you must use a specially designed fan with speed sensor to take advantage of this function.**
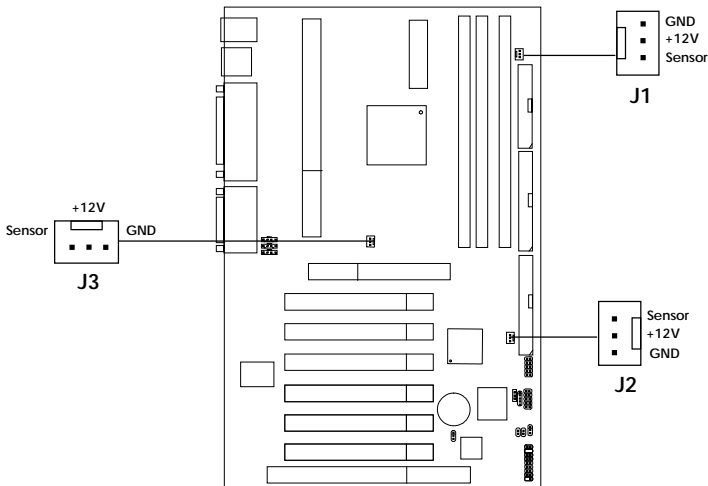

J1: Processor Fan
J2: System Fan
J3: Power Fan

Note: For fans with fan speed sensor, every rotation of the fan will send out 2 pulses. System Hardware Monitor will count and report the fan rotation speed. This is an optional function for System Hardware Monitor.

2.2 Clear CMOS Jumper: JBAT

A battery must be used to retain the mainboard configuration in CMOS RAM. Short 1-2 pins of JBAT to store the CMOS data.

JBAT
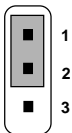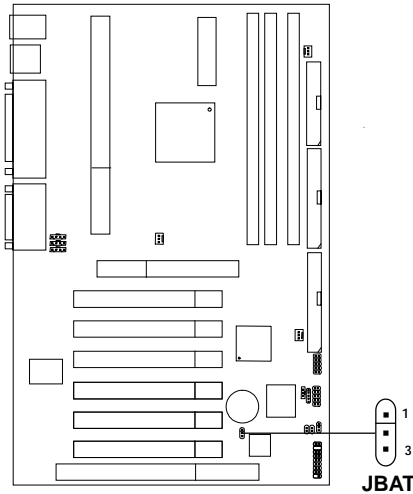
Keep Data
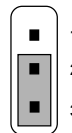
Clear Data

Note: You can clear CMOS by shorting 2-3 pin, while the system is off. Then, return to 1-2 pin position. Avoid clearing the CMOS while the system is on, it will damage the mainboard. Always unplug the power cord from the wall socket.

2.3 Memory Installation

2.3-1 Memory Bank Configuration

The mainboard supports a maximum memory size of 768MB for SDRAM: It provides three 168-pin **unbuffered** DIMMs (Double In-Line Memory Module) sockets. It supports 8 MB to 256 Mbytes DIMM memory module.
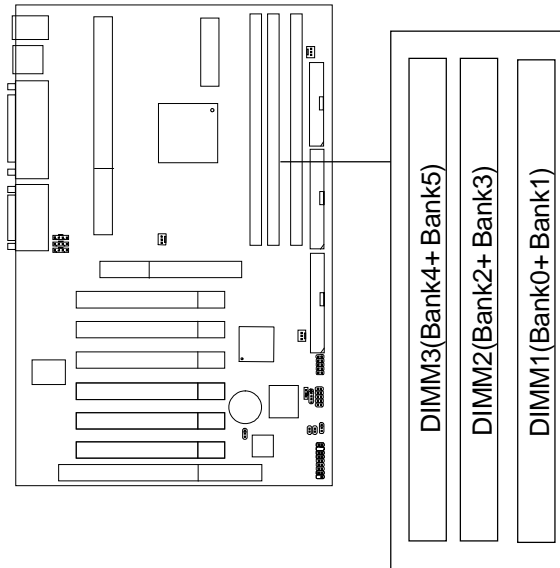
2.3-2   Memory Installation Procedures

A. How to install a DIMM Module
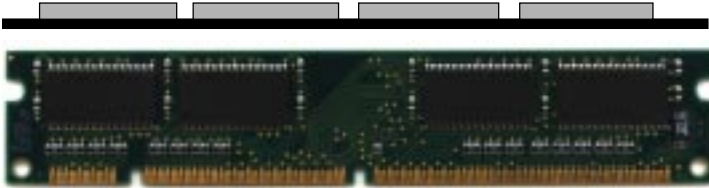
Single Sided DIMM

Double Sided DIMM

1. The DIMM slot has 2 Notch Keys "VOLT and DRAM", so the DIMM memory module can only fit in one direction.

2. Insert the DIMM memory module vertically into the DIMM slot. Then push it in.

DRAM   VOLT

3. The plastic clip at the side of the DIMM slot will automatically close.

2.3-3 Memory Population Rules

1. Supports only PC100 SDRAM DIMM.

2. To operate properly, at least one 168-pin DIMM module must be in-
   stalled.

3. This mainboard supports Table Free memory, so memory can be installed
   on DIMM1, DIMM 2, or DIMM3 in any order.

4. Supports 3.3 volt DIMM.

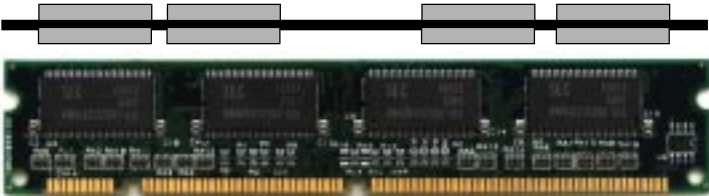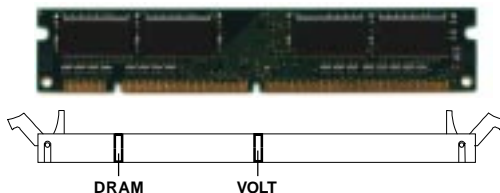5. The DRAM addressing and the size supported by the mainboard is
   shown below:

Table 2.3-1 SDRAM Memory Addressing

DRAM Tech.	DRAM Density & Width	DRAM Addressing	Address Size		MB/DIMM	
			Row	Column	Single no. Side(S) pcs.	Double no. Side(D) pcs.
16M	1Mx16	ASYM	11	8	8MBx4	16MBx8
	2Mx8	ASYM	11	9	16MBx8	32MBx16
64M	2Mx32	ASYM	11	9	32MBx2	64MBx4
	2Mx32	ASYM	12	8	16MBx2	32MBx4
	4Mx16	ASYM	11	10	32MB	64MB
	4Mx16	ASYM	13	8	32MB	64MB
	8Mx8	ASYM	13	9	64MB	128MB
64M	2Mx32	ASYM	11	8	16MB	32MB
	4Mx16	ASYM	12	8	---	---
	8Mx8	ASYM	12	9	---	---

2.4 Case Connector: JFP1

The Keylock, Power Switch, Reset Switch, Power LED, Speaker, and HDD
LED are all connected to the JFP1 connector block.
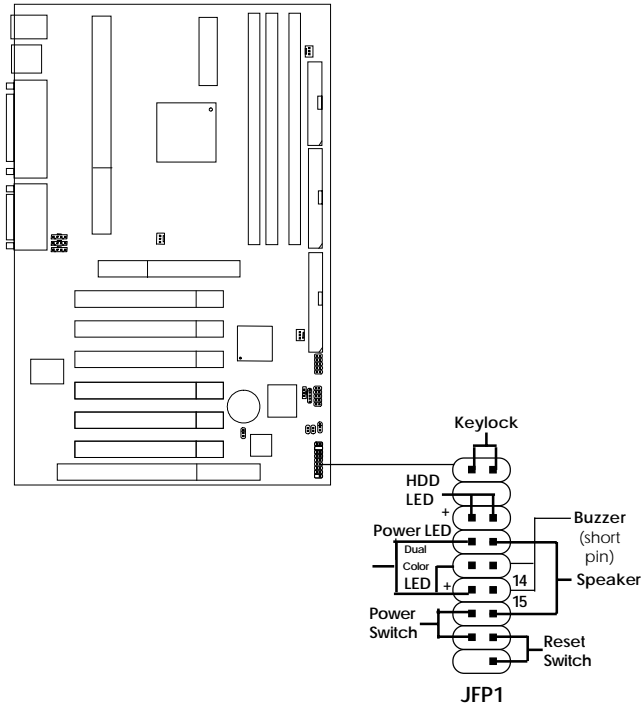
2.4-1 Power Switch

Connect to a 2-pin push button switch. This switch is used to power ON/ Off the system.

2.4-2 Reset Switch

Reset switch is used to reboot the system rather than turning the power ON/ OFF. Avoid rebooting while the HDD LED is lit. You can connect the Reset switch from the system case to this pin.

2.4-3 Power LED

The Power LED is lit while the system power is on. Connect the Power LED from the system case to this pin. There are two types of LED that you can use: 3-pin single color LED or 2-pin dual color LED(ACPI request).

> **a.** 3 pin single color LED connect to pin 4, 5, & 6. This LED will lit when the system is on.
> **b.** 2 pin dual color LED connect to pin 5 & 6.
> > **GREEN** Color: Indicate the system is in full on mode.
> > **ORANGE** Color: Indicate the system is in suspend mode.

2.4-4 Speaker

Speaker from the system case is connected to this pin.
If on-board Buzzer is available:
Short pin 14-15:   On-board Buzzer Enabled.
Open pin 14-15:   On-board Buzzer Disabled.

2.4-5 HDD LED

HDD LED shows the activity of a hard disk drive. Avoid turning the power off while the HDD led is lit. You can connect the HDD LED from the system case to this pin.

2.4-6 Keylock

Keylock allows you to disable the keyboard for security purposes. You can connect the keylock to this pin.

2.5 Floppy Disk Connector: FDD

The mainboard also provides a standard floppy disk connector FDD that supports 360K, 720K, 1.2M, 1.44M and 2.88M floppy disk types. This connector supports the provided floppy drive ribbon cables.
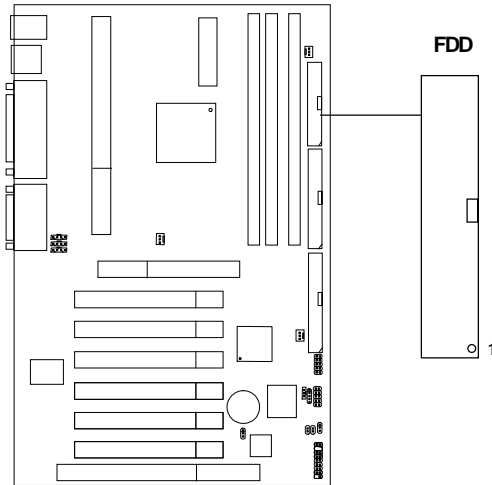
2.6 Hard Disk Connectors: IDE1 & IDE2

The mainboard has a 32-bit Enhanced PCI IDE and Ultra DMA/66 (ICH)/ Ultra DMA/33(ICH0) Controller that provides PIO mode 0~4, Bus Master, and Ultra DMA/33 function. It has two HDD connectors IDE1 (primary) and IDE2 (secondary). You can connect up to four hard disk drives, CD-ROM, 120MB Floppy (reserved for future BIOS) and other devices to IDE1 and IDE2. These connectors support the provided IDE hard disk cable.
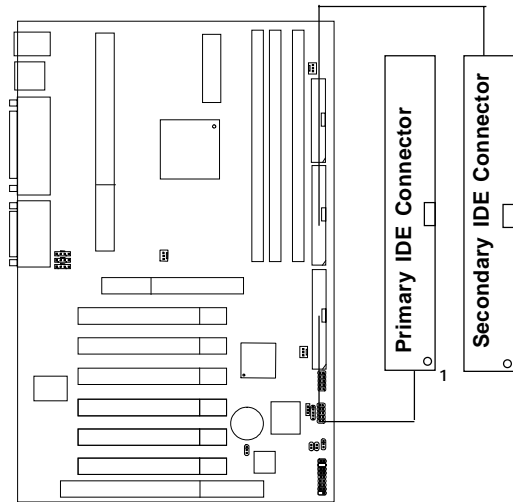
     IDE1(Primary IDE Connector)

     The first hard drive should always be connected to IDE1. IDE1 can connect a Master and a Slave drive. You must configure second hard drive to Slave mode by setting the jumper accordingly.

     IDE2(Secondary IDE Connector)

     IDE2 can also connect a Master and a Slave drive.

2.7 Power Supply

2.7-1 ATX 20-pin Power Connector: JPWR1

This connector supports the power button on-board. Using the ATX power supply, functions such as Modem Ring Wake-Up and Soft Power Off are supported by this mainboard. This power connector supports instant power on function which means that system will boot up instantly when the power connector is inserted on the board.

**ATX
Power Connector**
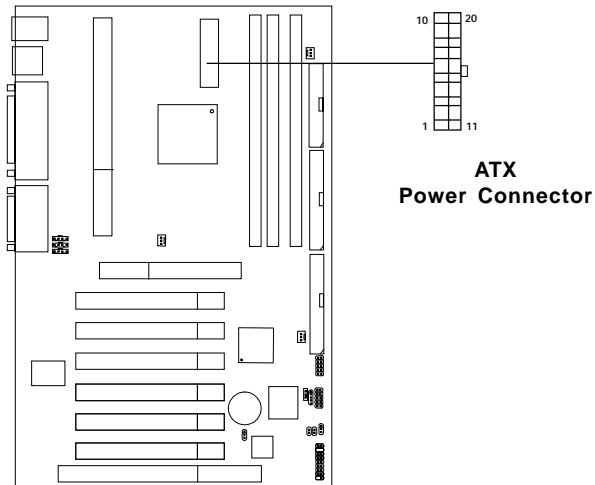
PIN DEFINITION

PIN	SIGNAL	PIN	SIGNAL
1	3.3V	11	3.3V
2	3.3V	12	-12V
3	GND	13	GND
4	5V	14	PS_ON
5	GND	15	GND
6	5V	16	GND
7	GND	17	GND
8	PW_OK	18	-5V
9	5V_SB	19	5V
10	12V	20	5V

Warning: Since the mainboard has the instant power on function, make sure that all components are installed properly before inserting the power connector to ensure that no damage will be done.

2.8 IrDA Infrared Module Connector: IR

The mainboard provides one infrared (IR) connector for IR modules. This connector is for optional wireless transmitting and receiving infrared module. You must configure the setting through the BIOS setup to use the IR function.
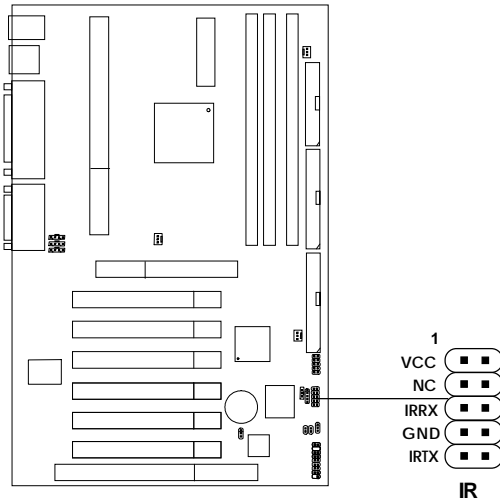
2.9 Serial Port Connectors: COM A and COM B

The mainboard provides two 9-pin male DIN connector for serial port COM A and COM B. These port are 16550A high speed communication port that send/receive 16 bytes FIFOs. You can attach a mouse or a modem cable directly into this connector.

COM A   COM B

Serial Port (9-pin Male)
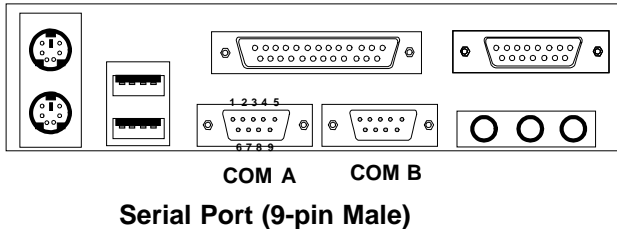
PIN DEFINITION

PIN	SIGNAL
1	**DCD**(Data Carry Detect)
2	**SIN**(Serial In or Receive Data)
3	**SOUT**(Serial Out or Transmit Data)
4	**DTR**(Data Terminal Ready)
5	**GND**
6	**DSR**(Data Set Ready)
7	**RTS**(Request To Send)
8	**CTS**(Clear To Send)
9	**RI**(Ring Indicate)

2.10 Parallel Port Connector: LPT1

The mainboard provides a 25 pin female centronic connector for LPT. A parallel port is a standard printer port that also supports Enhanced Parallel Port(EPP) and Extended capabilities Parallel Port(ECP). See connector and pin definition below:

Parallel Port (25-pin Female)

LPT 1
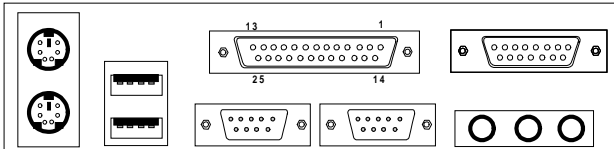
PIN DEFINITION

PIN	SIGNAL	PIN	SIGNAL
1	STROBE	14	AUTO FEED#
2	DATA0	15	ERR#
3	DATA1	16	INIT#
4	DATA2	17	SLIN#
5	DATA3	18	GND
6	DATA4	19	GND
7	DATA5	20	GND
8	DATA6	21	GND
9	DATA7	22	GND
10	ACK#	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SELECT		

2.11 Mouse Connector: JKBMS1

The mainboard provides a standard PS/2® mouse mini DIN connector for attaching a PS/2® mouse. You can plug a PS/2® mouse directly into this connector. The connector location and pin definition are shown below:
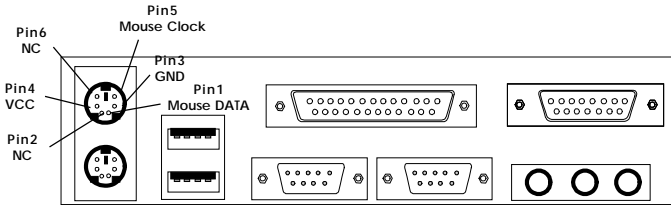
PS/2 Mouse (6-pin Female)

2.12 Keyboard Connector: JKBMS1

The mainboard provides a standard PS/2® keyboard mini DIN connector for attaching a keyboard. You can plug a keyboard cable directly to this connector.
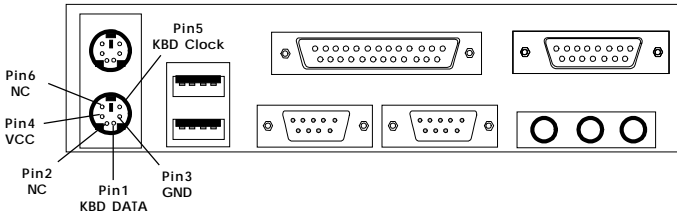
PS/2 Keyboard (6-pin Female)

2.13 USB Connectors

The mainboard provides a **UHCI(Universal Host Controller Interface) Universal Serial Bus root** for attaching USB devices like: keyboard, mouse and other USB devices. You can plug the USB device directly to this connector.
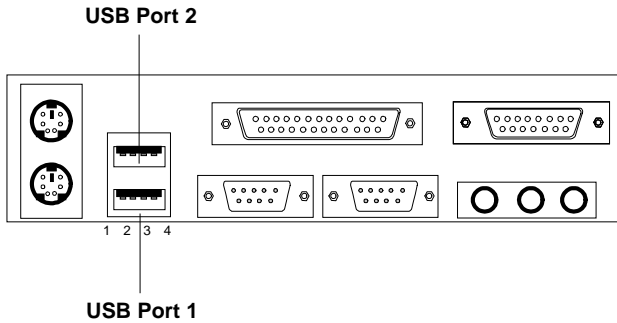
PIN	SIGNAL
1	VCC
2	-Data0
3	GND
4	+Data0

2.14 Joystick/Midi Connectors

You can connect joystick or game pad to this connector.

Joystick/MIDI
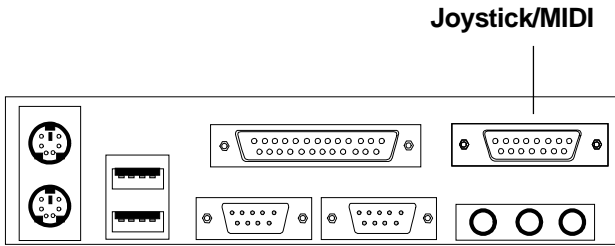
2.15 Audio Port Connectors

Line Out is a connector for Speakers or Headphones. **Line In** is used for external CD player, Tape layer, or other audio devices. **Mic** is a connector for the microphones.

Line Out   Line In   Mic
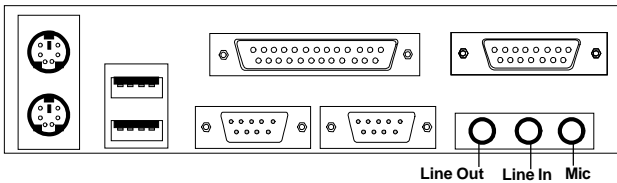
1/8" Stereo Audio Connectors

2.16 USB Front Connector (optional)

The mainboard provides a **front Universal Serial Bus connector**. This is an optional USB connector for Front Panel.

USB2
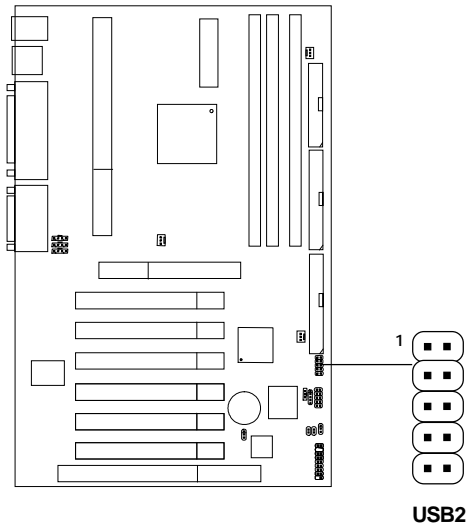
2.17 Wake-Up on LAN Connector: JWOL

The JWOL connector is for use with LAN add-on cards that supports Wake Up on LAN function. To use this function, you need to set the "Wake-Up on LAN" to enable at the BIOS Power Management Setup.
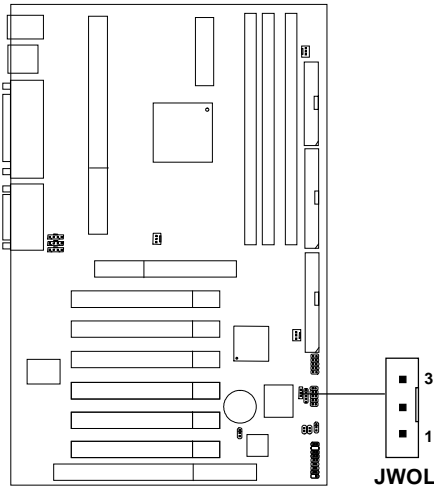
PIN	SIGNAL
1	5VSB
2	GND
3	MP_WAKEUP

Note: LAN wake-up signal is active "high".

Note: To be able to use this function, you need a power supply that provide enough power for this feature. (Power supply with 750mA 5V Stand-by)

2.18 Power Saving Switch Connector: JSLP1

Attach a power saving switch to **JSLP1**. When the switch is pressed, the system immediately goes into suspend mode. Press any key and the system wakes up.

JSLP1
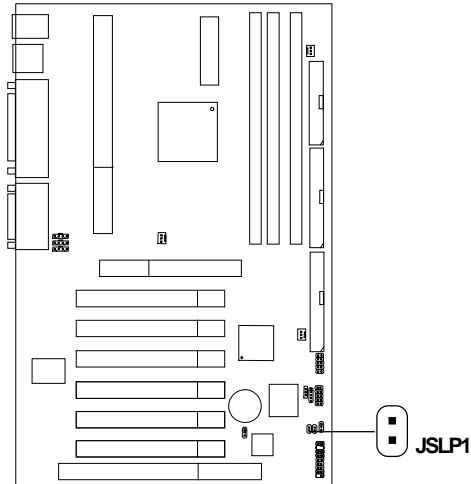
2.19 Modem Wake Up Connector: JMODEM

The JMODEM connector is for use with Modem add-on card that supports the Modem Wake Up function. To use this function, you need to set the "Power On By Ring" to enable at the BIOS Power Management Setup.
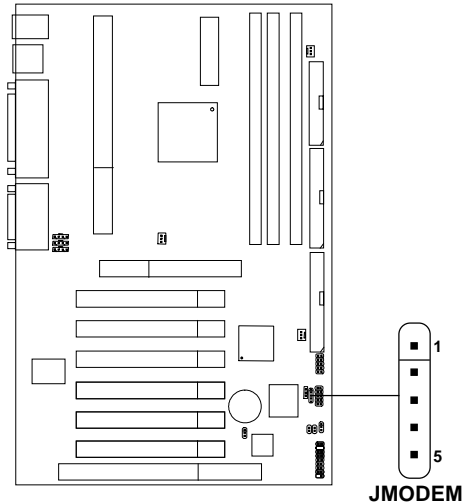
JMODEM

PIN	SIGNAL
1	NC
2	GND
3	MDM_WAKEUP
4	NC
5	5VSB

Note: Modem wake-up signal is active "low".

Note: To be able to use this function, you need a power supply that provide enough power for this feature.
(Power supply with 750mA 5V Stand-by)

2.20 Modem-In: J4 (optional)

The connector is for Modem with internal voice connector.
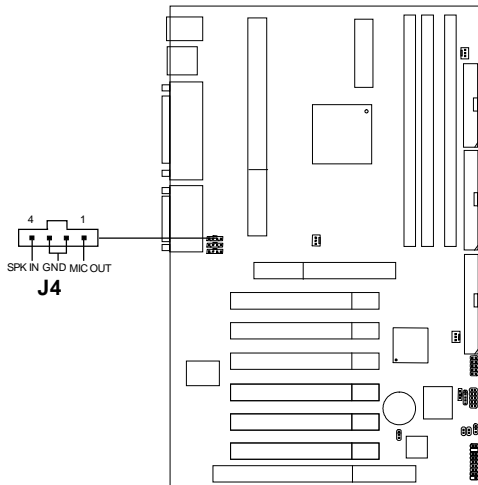
SPK_IN is connected to the Modem Speaker Out connector.
MIC_OUT is connected to the Modem Microphone In connector.

2.21 CD-In Connector: J5 (optional)

This connector is for CD-ROM Audio Connector.
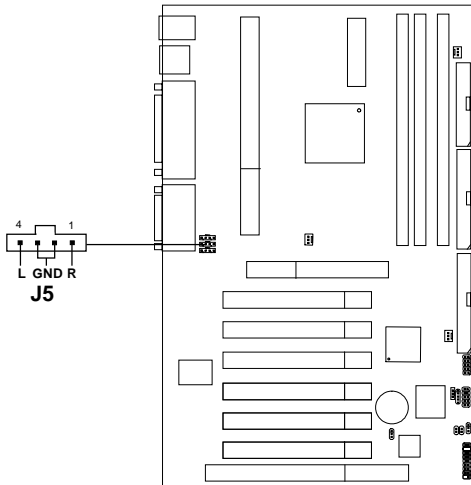
2.22 Aux Line In Connector: J6 (optional)

This connector is used for DVD Add on Card with Line In connector.
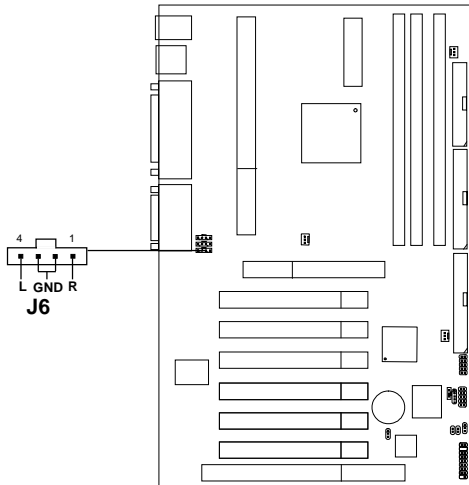
2.23 Chassis Intrusion Switch Case: JCASE

This connector is connected to a 2-pin connector chassis switch. If the Chassis is open, the switch will be open. The system will record this status. To clear the warning, you must enter the BIOS settting and clear the status.

JCASE
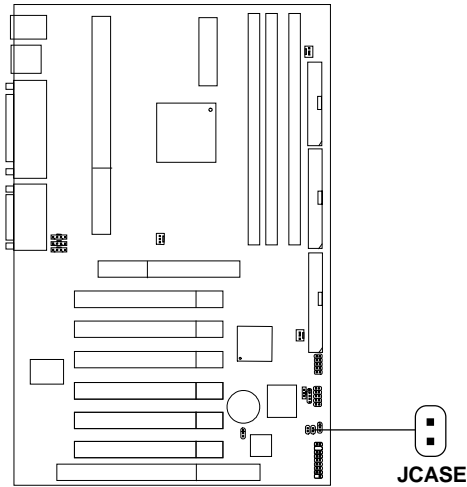
2.24 Power Saving LED Connector: JPLED

 JPLED can be connected with a LED. When the 2-pin LED is connected to
JPLED, the light will turn green, when system is On. During sleep mode,
the 2-pin LED will change color from Green to Orange.

JPLED
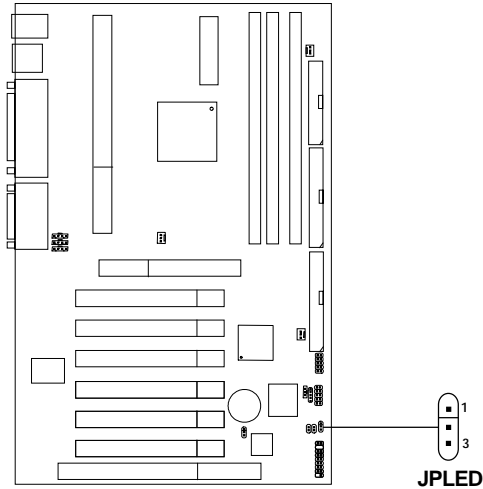
Chapter 3

AMI® BIOS USER'S GUIDE

The system configuration information and chipset register information is stored in the CMOS RAM. This information is retained by a battery when the power is off. Enter the BIOS setup (if needed) to modify this information.

The following pages will describe how to enter BIOS setup, and all about options.

3.1 Enter BIOS Setup

Enter the AMI® setup Program's Main Menu as follows:

1. Turn on or reboot the system. The following screen appears with a series of diagnostic check.

```
AMIBIOS (C) 1999 American Megatrends Inc.
A6195 VXXX XXXXXX

Hit <DEL> if you want to run setup




(C) American Megatrends Inc.
61-XXXX-001169-00111111-071592-i82440FX-H
```

2. When the "Hit <DEL>" message appears, press <DEL> key to enter the BIOS setup screen.

3. After pressing <DEL> key, the BIOS setup screen will appear.

Note: *If you don't want to modify CMOS original setting, then don't press any key during the system boot.*

```
        AMIBIOS SIMPLE SETUP UTILITIES - VERSION 1.21a
        (C) 1999 American Megatrends, Inc. All Rights Reserved

Standard CMOS Setup          Peripheral Setup

Advanced CMOS Setup          Hardware Monitor Setup

Advanced Chipset Setup       Change Supervisor Password

Power Management Setup       Change User Password

PCI/Plug and Play Setup      Auto-Detect Hard Disks

Load Fail Safe Settings      Save Settings and Exit

Load Optimal Settings        Exit Without Saving

Esc :Quit        ↑↓→←  : Select Item    (Shift)F2: Change Color
F5  :Old Values       F7 :Load Setup Defaults  F10    : Save & Exit


     Standard CMOS Setup for changing time, date , hard disk, etc.
```

4. Use the <Up> and <Down> key to move the highlight scroll up or down.

5. Use the <ENTER> key to select the option.

6. To exit, press <ESC>. To save and exit, press <F10>.

7. Section 3.2 to 3.7 will explain the option in more details.

3.2 Standard CMOS Setup

1. Press <ENTER> on "Standard CMOS Setup" of the main menu screen .

```
               AMIBIOS SETUP - STANDARD CMOS SETUP
         (C)1999 American Megatrends,Inc.All Rights Reserved


Date (mm/dd/yyyy):     Fri Oct 29, 1999
Time (hh/mm/ss):       17:09:25
                                          LBA    Blk    PIO    32Bit
              Type  Size  Cyln  Head  WPcom Sec   Mode   Mode   Mode   Mode
Pri Master :Auto                          ON     ON     AUTO   ON
Pri Slave  :Auto                          ON     ON     AUTO   ON
Sec Master :Auto                          ON     ON     AUTO   ON
Sec Slave  :Auto                          ON     ON     AUTO   ON


Floppy Drive A:         1.44 MB 3 1/2
Floppy Drive B:         Not Installed        Base Memory : 0 Kb
                                            Other Memory : 384 Kb
Boot Sector Virus Protection  Disabled    Extended Memory : 0 Mb
                                            Total Memory : 1 Mb

 Available  Options:                      ESC:Exit
 Disabled                                 ↑↓:Select Item
 Enabled                                  PU/PD/+/-:Modify
                                          (Shift)F2:Color

```

2. Use <Up> and <Down> to choose the item and <PgUp> and <PgDn> keys to modify the highlighted item.

3. After you have finished with the Standard CMOS Setup,   press <ESC> to go back to the main menu.

3.3 Advanced CMOS Setup

1. Press <ENTER> on "Advanced CMOS Setup" of the main menu

```
          AMIBIOS SETUP - ADVANCED CMOS SETUP
     (C) 1999 American Megatrends, Inc. All Rights Reserved

Quick Boot              Disabled    External Cache          WriteBack
                                    L2 Cache ECC            TableDefault
1st Boot Device         Floppy      System BIOS Cacheable   Disabled
2nd Boot Device         CD-ROM      C000, 32k Shadow        Disabled
3rd Boot Device         IDE0        C800, 16K Shadow        Disabled
4th Bood Device         Disabled    CC00, 16K Shadow        Disabled
Try Other Boot Devices  Yes         D000, 16K Shadow        Disabled
                                    D400, 16K Shadow        Disabled
Initial Display Mode    BIOS        D800, 16K Shadow        Disabled
Add-On ROM Init         Force-BIOS  DC00, 16K Shadow        Disabled
Hard Disk Access Control Read-Write
S.M.A.R.T. For Hard Disk Enabled
BootUp Num-Lock         On
Floppy Drive Swap       Disabled
Floppy Drive Seek       Enabled     ESC:Exit       ↑↓→← :Select Item
PS/2 Mouse Support      Enabled     F1 :Help       PU/PD/+/-:Modify
Primary Display         VGA/EGA     F5 :Old Values (Shift)F2:Color
Password Check          Setup       F6 :Load BIOS Defaults
Boot to OS/2 > 64M      No          F7 :Load Setup Defauls
Internal Cache          WriteBack
```

2. Use <Up> and <Down> to choose the item and <PgUp> and
    <PgDn> keys to modify the highlighted item.

3. After you have finished with the Advanced CMOS Setup, press
    <ESC> to go back to the main menu.

Description of the item on screen follows:

Quick Boot

Set this option to Enabled to permit AMI® BIOS to boot within 5 seconds. This option replaces the old ABOVE 1 MB Memory Test option. The Optimal default setting is Enabled. The Fail-Safe default setting is Disabled.

1st Boot Device/2nd Boot Device/3rd Boot Device/4th Bood Device

This option sets the sequence of boot drives.
The settings are:

IDE0	The system will boot from the first HDD.
IDE1	The system will boot from the Second HDD.
IDE2	The system will boot from the Third HDD.
IDE3	The system will boot from the Fourth HDD.
F(optical)	The system will boot from LS-120(120M Floppy).
SCSI	The system will boot from the SCSI.
Network	The system will boot from the Network drive.
CD-ROM	The system will boot from the CD-ROM.
Disable	Disable this sequence.

Try other Boot Devices

This option sets the device boot, if all the Four Boot Devices failed.

Initial Display Mode

This option sets the device boot, if all the Four Boot Devices failed.

Add-On ROM Init

This option sets the device boot, if all the Four Boot Devices failed.

Hard Disk Access Control

This option sets the Hard Disk to Read-only or Read-Write. During Read-Only, if you try to write on the Hard Disk, the system will halt.

S.M.A.R.T. for Hard Disks

This option sets the SMART Function for the hard disk. The hard disk need to have SMART function for this feature to work.

Boot up Num Lock

When this option is set to Off, AMI® BIOS turns off the Num Lock key when the system is powered on. The end user can then use the arrow keys on both the numeric keypad and the keyboard. The settings are On or Off. The optimal default and Fail-Safe default settings are On.

Floppy Drive Swap

Set this option to Enabled to specify that floppy drives A: and B: are swapped. The setting are Enabled and Disabled. The Optimal and Fail-Safe default settings are Disabled.

Floppy Drive Seek

When this option is set to Enabled, AMI® BIOS performs a Seek command on floppy drive A: before booting the system. The settings are Enabled and Disabled. The Optimal and Fail-Safe default settings are Disabled.

PS/2® Mouse Support

When this option is set to Enabled, AMI® BIOS supports a PS/2® mouse. The settings are Enabled and Disabled. The Optimal and Fail-Safe default settings are Enabled.

Primary Display

This option configures the primary display subsytem in the computer. The settings are Mono(monochrome), 40CGA, 80CGA or VGA/EGA. The optimal and Fail-Safe default settings are VGA/EGA.

Password Check

This option specifies the type of AMI® BIOS password protection that is implemented. The Optimal and Fail-Safe default settings are Setup.

Boot To OS/2® > 64MB

Set this option to Enabled to permit the BIOS to run properly, if OS/2® is to be used with > 64MB of DRAM. The settings are Enabled or Disabled. The Optimal and Fail-safe default settings are Disabled.

Internal Cache

This option Enabled or Disabled the Internal Cache.

External Cache

This option Enabled or Disabled the External Cache.

L2 CacheECC

This option enables the Level 2 Cache memory ECC(Error Check Correction).

System BIOS Cacheable

AMI® BIOS always copies the system BIOS from ROM to RAM for faster execution. Set this option to Enabled to permit the contents of the F0000h RAM memory segment to be written to and read from cache memory. The settings are Enabled or Disabled. The Optimal default setting is Disabled. The Fail-Safe default setting is Disabled.

C000, 32K Shadow

These options specify how the contents of the video ROM are handled. The settings are:

Disabled - the Video ROM is not copied to RAM.

Cached - the contents of the video ROM from C0000h - C7FFFh are not only copied from ROM to RAM; it can also be written to or read from cache memory.

Shadow - the Contents of the video ROM from C0000h - C7FFFh are copied(shadowed) from ROM to RAM for faster execution.

The Optimal and Fail-Safe default setting is Disabled.

3.4 Advanced Chipset Setup

1. Press <ENTER> on "Advanced Chipset Setup" of the main menu
    screen.

```
              AMIBIOS SETUP - ADVANCED CHIPSET SETUP
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******** SDRAM Timing ********
Configure SDRAM Timing by SPD   Disabled
 PH Limit                       32 Cycles
 Idle Cycle Limit               8 Cycles
 TRC Bank Cycle Timing          8 Cycles
 TRP SRAS Precharge             3 Cycles
 TRAS Timing                    5 Cycles
 TRCD Timing                    2 Cycles
 CAS Latency                    3 Cycles

DRAM Integrity Mode             Disabled
DRAM Burst Refresh              Enabled
Memory Hole                     Disabled
Graphics Aperture Size          32MB
MDA Support                     No          ESC:Exit       ↑↓→← :Select Item
USB Function                    Disabled    F1 :Help       PU/PD/+/-:Modify
USB KB/Mouse Legacy Support     Disabled    F5 :Old Values (Shift)F2:Color
                                            F6 :Load BIOS Defaults
                                            F7 :Load Setup Defauls
```

2. Use <Up> and <Down> to choose the item and <PgUp> and
    <PgDn> keys to modify the highlighted item.

3. After you have finished with the Advanced Chipset Setup, press
    <ESC> to go back to the main menu.

Description of the item on screen follows:

Configure SDRAM Timing By SPD

Choose Enabled, will automatically configure the DRAM Timing depending on the "DRAM Speed" selection. Choose Disabled, to customize the setup.

PH Limit

This item specify the number of consecutive Page-Hit requests to allow before choosing a non Page-Hit request. The settings are: 1/4/32/64 cycles.

Idle Cycle Limit

This item specify the number of idel cycles to wait before precharging an idle bank. The settings are: 0/8/12/16/24/32/48 cycles or disabled.

TRC Bank Cycle Timing

This item specify the minimum time to activate the same bank. The settings are: 3/4/5/6/7/8 cycles or reserved.

TRP SRAS Precharge

This item specify the delay from precharge command to activate command. The settings are 2/3 cycles.

Tras Timing

This item specify the minimum bank active time. The settings are: 2/3/4/5/6/7 cycles or reserved.

Trcd Timing

This item specify the delay from activation of a bank to the time that a read or write command is accepted. The settings are: 1/2/3/4 cycles.

CAS Latency

When synchronous DRAM is installed, the number of clock cycles of CAS Latency depends on the DRAM timing. The settings are: 2/3 cycles.

DRAM Integrity Mode
Set this option to Enabled or Disabled the DRAM integrity mode. The Optional and Fail-Safe default settings are Disabled.

DRAM Burst Refresh
Set this option to Enabled or Disabled the DRAM burst refresh.

Memory Hole
This option allows the end user to specify the location of a memory hole. The cycle matching the selected memory hole will be passed to the ISA bus. If Enabled, the selected hole is not remapped.

Graphics Aperture Size
This option determines the effective size of the graphics aperture used in the particular PAC configuration. The AGP aperture is memory-mapped, while graphics data structure can reside in a graphics aperture. The aperture range should be programmed as not cacheable in the processor cache, accesses with the aperture range are forwarded to the main memory, then PAC will translate the original issued address via a translation table that is maintained on the main memory. The option allows the selection of an aperture size of 4MB, 8MB, 16MB, 32MB, 64MB, 128MB, and 256MB.

MDA Support
This option determines whether the VGA card can support the monochrome. During Enabled, the VGA can support monochrome. The default setting is Disabled.

USB Function
Set this option to Enabled or Disabled the on-chip USB controller. The Optional and Fail-Safe default settings are Enabled.

USB KB/Mouse Legacy Support
Set this option to Enabled or Disabled USB Mouse & keyboard. The Optional and Fail-Safe default settings are Disabled.

3.5 Power Management Setup

1. Press <ENTER> on "Power Management Setup" of the main menu
    screen.

```
        AMIBIOS SETUP - POWER MANAGEMENT SETUP
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ACPI Aware O/S              Yes
Power Management/APM        Enabled
Video Off Method            Suspend
Video Off After             Suspend
HDD power Down Mode          Suspend
Suspend Time Out (Minute)    Disabled
Modem Use IO Port            N/A
Modem Use IRQ                N/A
Power Button Function        On/Off
Green PC LED Status          Dual Color
Restore on AC/Power Loss     Power Off
Ring Resume from Soft Off    Disabled
PME# Resume from Soft Off    Disabled
LAN Resume from Soft Off     Disabled
Resume By Alarm              Disabled   ESC:Exit      ↑↓→← :Select Item
RTC Alarm Date               15         F1 :Help        PU/PD/+/-:Modify
RTC Alarm Hour               12         F5 :Old Values (Shift)F2:Color
RTC ALarm Minute             30         F6 :Load BIOS Defaults
RTC Alarm Second             30         F7 :Load Setup Defauls
```

2. Use <Up> and <Down> to choose the item and <PgUp> and
    <PgDn> keys to modify the highlighted item.

3. After you have finished with the Power Management Setup, press
    <ESC> to go back to the main menu.

Description of the item on screen follows:

ACPI Aware O/S
This option sets the ACPI Power Management to be active or not. The settings are yes or no.

Power Management/APM
Set this option to enable the chipset's power management features and APM(Advanced Power Management). The settings are Enabled, Inst-On(instant-on) or Disabled. The Optimal default settings are Enabled. The Fail-Safe Default is Disabled

Video Off Method
This determines the manner in which the monitor is blanked.

V/H SYNC+Blank	This selection will cause the system to turn off the vertical and horizontal synchronization ports and write blanks to the video buffer.
Blank Screen	This option only writes blanks to the video buffer.
DPMS (default)	Initial display power management signaling.

Video Off After
This option specifies the power conserving state that the VESA VGA video subsystem enters after the specified period of display inactivity has expired. The settings are Disabled, Standby or Suspend. The Optimal and Fail-Safe default settings are Suspend.

HDD Power Down Mode
This option specifies the power conserving state that the hard disk drive enters after the specified period of hard drive inactivity has expired. The settings are Disabled, Standby or Suspend. The Optimal and Fail-Safe default settings are Suspend.

Suspend Time Out (Minute)

This option specifies the length of a period of system inactivity while in Suspend state. When this length of time expires, the computer enters Suspend power state. The settings are Disabled, 1 min, 2 min, 4 min, 8 min, 10 min, 20 min, 30 min, 40 min, 50 min or 60 min. The Optimal and Fail-Safe default settings are Disabled.

Modem Use IO Port

This indicates which I/O port will be used by the Modem (if there is a modem installed)

Modem Use IRQ

This indicates which IRQ number will be used by the Modem (if there is a modem installed).

Power Button Function

During Suspend, if you push the switch once, the system goes into suspend mode and if you push it more than 4 seconds, the system will be turned off. During On/Off, the system will turn off once you push the switch.

Green PC LED Status

This item determines which state the Power LED will use. The settings are Blinking, Dual, and Single. During blinking, the power LED will blink when the system enters the suspend mode. When the mode is in Dual, the power LED will change its color. Choose the single and the power LED will always remain lit.

Restore on AC/Power Loss

The settings are power on, power off or last state. During power on, after every AC power loss, the system will be turned on. During last status, after every AC power losss, whatever the system status, it will be the same when the AC power returns.

Ring Resume from Soft-Off

During Disabled, the system will ignore any incoming call from the modem. During Enabled, the system will boot up if there's an incoming call from the modem.

Note: If you have change the setting, you must let the system boot up until it goes to the operating system. Then, power off the system. This function will work the next time you power on.

PME# Resume from Soft Off

During Disabled, the system will ignore any event on PME (Power Management Event). During Enabled, the system wull boot up if there's an event on PME. The default setting is Disabled.

LAN Resume from Soft-Off

During Disabled, the system will ignore any incoming signal from the LAN network card. During Enabled, the system will boot up if there's an incoming signal from the LAN network card.

Note: If you have change the setting, you must let the system boot up until it goes to the operating system. Then, power off the system. This function will work the next time you power on.

Resume by Alarm

This function is for setting the Date, Hour, Minute, and Second for your computer to boot up. During Disabled, you cannot use this function. During Enabled, Choose the Date, Hour, Minute, and Second:

RTC Alarm Date	Choose which day the system will boot up.
RTC Alarm Hour	Choose which hour the system will boot up.
RTC Alarm Minute	Choose which minute the system will boot up.
RTC Alarm Second	Choose which second the system will boot up.

Note: If you have change the setting, you must let the system boot up until it goes to the operating system. Then, power off the system. This function will work the next time you power on.

3.6 PCI/Plug and Play Setup

1. Press <ENTER> on "PCI/Plug and Play Setup" of the main menu screen.

```
              AMIBIOS SETUP - PCI/Plug and Play Setup
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Plug and Play Aware O/S    No      Reserved Memory Size        Disabled
Clear NVRAM                No      Reserved Memory Address     C8000
PCI Latency Timer          32
Primary Graphics Adapter   PCI
PCI VGA Palette Snoop      Disabled
DMA Channel 0              PnP
DMA Channel 1              PnP
DMA Channel 3              PnP
DMA Channel 5              PnP
DMA Channel 6              PnP
DMA Channel 7              PnP
IRQ3                       PCI/PnP
IRQ4                       PCI/PnP
IRQ5                       PCI/PnP
IRQ7                       PCI/PnP  ESC:Exit      ↑↓→← :Select Item
IRQ9                       PCI/PnP  F1 :Help         PU/PD/+/-:Modify
IRQ10                      PCI/PnP  F5 :Old Values (Shift)F2:Color
IRQ11                      PCI/PnP  F6 :Load BIOS Defaults
IRQ14                      PCI/PnP  F7 :Load Setup Defauls
IRQ15                      PCI/PnP
```

2. Use <Up> and <Down> to choose the item and <PgUp> and <PgDn> keys to modify the highlighted item.

3. After you have finished with the PCI/Plug and Play Setup, press <ESC> to go back to the main menu.

Description of the item on screen follows:

Plug and Play Aware O/S
Set this option to Yes if the operating system in this computer is aware of and follows the Plug and Play specification. Currently, only Windows® 95 is PnP-aware. The settings are Yes or No. The Optimal and Fail-Safe default settings No.

Clear NVRAM
During Yes, this will clear NVRAM data on every boot.

PCI Latency Timer
This option specifies the latency timings (in PCI clocks) for all PCI devices on the PCI bus. The settings are 32, 64, 96, 128, 160, 192, 224 or 248. The Optimal and Fail-Safe default settings are 64.

Primary Graphics Adapter
This option is for selecting which VGA card is to be your primary display graphics adapter.

PCI VGA Palette Snoop
When this option is set to Enabled, multiple VGA devices operating on different buses can handle data from the CPU on each set of palette registers on every video device. Bit 5 of the command register in the PCI device configuration space is the VGA Palette Snoop bit (0 is disabled). For example, if there are two VGA devices in the computer (one PCI and ISA) and the Bit settings are:

    Disabled - Data read and written by the CPU is only directed to the
        PCI VGA device's palette registers.
    Enabled - Data read and written by the CPU is directed to
        both the PCI VGA device's palette registers and the
        ISA VGA device palette registers, permitting the
palette registers of both devices to be identical.

This option must be set to Enabled if an ISA adapter card requires VGA palette snooping. The settings are Enabled or Disabled. The Optimal and Fail-Safe default settings are Disabled.

DMA Channel 0/1/3/5/6/7

These options specify the bus that the specified DMA channel is used. These options allow you to reserve DMAs for legacy ISA adapter cards.

These options determine if AMI® BIOS should remove a DMA from the available DMAs passed to devices that are configurable by the system BIOS. The available DMA pool is determined by reading the ESCD NVRAM. If more DMAs must be removed from the pool, the end user can use these options to reserve the DMA by assigning an ISA/EISA setting to it.

IRQ3/IRQ4/IRQ5/RQ7/IRQ9/IRQ10/IRQ11/IRQ14/IRQ15

These options specify the bus that the specified IRQ line is used on. These options allow you to reserve IRQs for legacy ISA adapter cards.

These options determine if AMI® BIOS should remove an IRQ from the pool of available IRQs passed to devices that are configurable by the system BIOS. The available IRQ pool is determined by reading the ESCD NVRAM. If more IRQs must be removed from the pool, the end user can use these options to reserve the IRQ by assigning an ISA/EISA setting to it. Onboard I/O is configured by AMI® BIOS. All IRQs used by onboard I/O are configured as PCI/PnP. If all IRQs are set to ISA/EISA and IRQ14 and 15 are allocated to the onboard PCI IDE, IRQ9 will still be available for PCI and PnP devices, because at least one IRQ must be available for PCI and PnP devices. The settings are ISA/EISA or PCI/PnP. The Optimal and Fail-Safe default settings are PCI/PnP.

Reserved Memory Size

This option allows the user to reserved the memory size for old add-on card. The settings are 16k/23k/64k/Disabled.

Reserved Memory Address

This option allows the user to reserved the memory size of the old add-on card in the reserved memory address. The default setting is C8000.

3.7 Peripheral Setup

1. Press <ENTER> on "Peripheral Setup" of the main menu screen.

```
               AMIBIOS SETUP - Peripheral SETUP
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Onboard FDC                   Auto
Onboard Serial Port A         Auto
Onboard Serial Port B         Auto
  Serial Port B Mode          Normal
  IrDA Protocol               N/A
  Ir I/O pin Select           IRRX/IRTX
Onboard Parallel Port         Auto
  Parallel Port Mode          ECP
  EPP Version                 N/A
  Parallel Port IRQ           Auto
  Parallel Port DMA Channel   Auto
Onboard IDE                   Both
Onboard Sound                 Enabled

                                     ESC:Exit      ↑↓→← :Select Item
                                     F1 :Help       PU/PD/+/-:Modify
                                     F5 :Old Values (Shift)F2:Color
                                     F6 :Load BIOS Defaults
                                     F7 :Load Setup Defauls
```

2. Use <up> and <down> to choose the item and <PgUp> and <PgDn> keys to modify the highlighted item.

3. After you have finished with the Peripheral Setup, press <ESC> to go back to the main menu.

Description of the item on screen follows:

Onboard FDC

Choose Auto, for the BIOS to automatically detect the device

If the ISA add-on card has	Onboard FDC to be set at
FDC exist	Disabled
none FDC exist	Enabled

Choose Enabled, Enabling onboard FDC.
Choose Disabled, Disabling onboard FDC.
The Optimal and Fail-Safe default settings are Auto.

Onboard Serial Port A/Onboard Serial Port B

Choose 3F8, for the BIOS to automatically detect the device.

If the ISA add-on card has				Onboard Serial port to be set at			
COM1 (I/O:3F8H)	COM2 (I/O:3F8H)	COM3 (I/O:3E8H)	COM4 (I/O:2E8H)	PORT1	IRQ ASSIGNED	PORT2	IRQ ASSIGNED
✓	✓	✓	✓	DISABLED	X	DISABLED	X
✓	✓	X	X	COM3	4	COM4	3
X	X	✓	✓	COM1	4	COM2	3
✓	X	X	✓	COM2	3	COM3	4
X	✓	✓	X	COM1	4	COM4	3
✓	✓	✓	X	COM4	3	DISABLED	X
✓	✓	X	✓	COM3	4	DISABLED	X
✓	X	✓	✓	COM2	3	DISABLED	X
X	✓	✓	✓	COM1	4	DISABLED	X
X	X	X	X	COM1	4	COM2	3
✓	X	X	X	COM2	3	COM3	4
X	✓	X	X	COM1	4	COM3	4
X	X	✓	X	COM1	4	COM2	3
X	X	X	✓	COM1	4	COM2	3

> **Note:** *If the onboard serial port interrupt and ISA add-on card interrupt are in conflict, the serial port will not work properly. Please disable one of the devices.*

Serial PortB Mode/IrDA Protocol/Ir I/O pin Select

This items allows the user to determine which InfraRed (IR) function of the onboard I/O chip.

Onboard Parallel Port

Choose Auto, the BIOS automatically assigned onboard parallel port to the available parallel port or disabled.

If the ISA add-on card has			Onboard parallel port to be set as	
LPT1 I/O:378H	LPT2 I/O:278H	LPT3 I/O:3BCH	PORT ASSIGNED	IRQ ASSIGNED
✓	✓	✓	Disabled	X
✓	✓	X	LPT3	5
✓	X	✓	LPT2	5
X	✓	✓	LPT1	7
✓	X	X	LPT2	5
X	✓	X	LPT1	7
X	X	✓	LPT1	7
X	X	X	LPT1	7

Note: *If the onboard parallel port interrupt and ISA add-on card interrupt are in conflict, the parallel port will not work properly. Please disable one of the devices.*

Parallel Port Mode

This option allows user to choose the operating mode of the onbaord parallel port. The settings are Normal, SPP/EPP or ECP mode.

EPP Version

This option is for setting which EPP version will be used. The settings are 1.7 and 1.9.

Parallel Port IRQ

If the onboard parallel mode is not on auto mode, the user can select the interrupt line for onboard parallel port. We suggest that the user select the interrupt for the onboard parallel port as shown below:

Onboard parallel port set at	Parallel Port IRQ
LPT1(378H)	7
LPT2(278H)	5
LPT3(3BCH)	5

Parallel Port DMA Channel

This option allows user to choose DMA channel 1 to 3 for the onboard parallel port on ECP mode.

Onboard IDE

Set this option to enable or disable on board IDE controller.

Onboard Sound

This item allows you to enable/disable the onboard Aureal audio chipset. The settings are Enabled, Disabled.

3.8 Hardware Monitor Setup

1. Press <ENTER> on "Hardware Monitor Setup" of the main menu screen.

```
              AMIBIOS SETUP - Hardware Monitor Setup
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-= Hardware Monitor =-              +5VSB                      5.028V
Spread Spectrum            Enabled
Stop Un-used PCI Clock     Enabled
CPU Frequency Selection    100MHz
CPU Voltage Selection      1.60V
  Chassis Intrusion        Disabled
  CPU Temperature          350C/950F
  System Temperature       330C/910F
  CPU Fan Speed            6683RPM
  Power Fan Speed          0 RPM
  System Fan Speed         0 RPM
  CPU VID                   1.60V
  Vcore                    1.616V
  Vsram                    3.312V
  3.3V                     3.360V    ESC:Exit      ↑↓→← :Select Item
  +5.000V                  5.08V     F1 :Help      PU/PD/+/-:Modify
  +12.000V                 11.851    F5 :Old Values (Shift)F2:Color
  -12.000V                 -12.646V  F6 :Load BIOS Defaults
  -5.000V                  -5.127    F7 :Load Setup Defauls
  Battery                  3.025V
```

2. Use <up> and <down> to choose the item and <PgUp> and <PgDn> keys to modify the highlighted item.

3. After you have finished with the Peripheral Setup, press <ESC> to go back to the main menu.

Description of the item on screen follows:

Spread Spectrum
This item allows you to select the clock generator Spread Spectrum function. When overclocking the processor, always set this item to Disabled. The defualt setting is Enabled.

Stop Un-Used PCI Clock
This item allows the clock generator to auto-detect the interface of DIMM/PCI. If there's no PCI card present, then the clock will be shutdown. The default setting is Enabled.

CPU Frequency Selection
Before setting this item, check the mainboard clock generator first. This mainboard comes with two kind of clock generator: ICS9248-64 and ICS9248-110. ICS9248-64 CPU Frquencies are: 100,120,133. ICS9248-110 CPU Frequencies are: 90, 95, 100~125, 133, 140, 150.. Check your processor and set this function. If you set this to Manual, you can set the CPU Frequency accordingly.

CPU Voltage Selection
Check your processor and set this function accordingly. If you set this to Manual, you can set the CPU voltage accordingly.
CPU voltage are: 1.40, 1.45, 1.50, 1.55, 1.60, 1.65, 1.70, 1.75.

Chassis Intrusion Detect
Set this option to Enabled, Reset, or Disabled the chassis intrusion detector. During Enabled, any intrusion on the system chassis will be recorded. The next time you turn on the system, it will show a warning message. To be able to clear those warning, choose Reset. After clearing the message it will go back to Enabled.

3.9 Auto-Detect Hard Disks

You can use this utility to automatically detect the characteristics of most hard drives.

```
            AMIBIOS SETUP - STANDARD CMOS SETUP
      (C)1999 American Megatrends,Inc.All Rights Reserved

Date (mm/dd/yyyy):    Fri Oct 29, 1999
Time (hh/mm/ss):      17:09:25
                                          LBA   Blk   PIO   32Bit
            Type  Size  Cyln  Head  WPcom Sec  Mode  Mode  Mode  Mode
Pri Master :Auto                          ON    ON    AUTO  ON
Pri Slave  :Auto                          ON    ON    AUTO  ON
Sec Master :Auto                          ON    ON    AUTO  ON
Sec Slave  :Auto                          ON    ON    AUTO  ON


Floppy Drive A:        1.44 MB 3 1/2      ┌─────────────────────────┐
Floppy Drive B:        Not Installed      │  Base Memory : 0 Kb     │
                                          │  Other Memory : 384 Kb  │
Boot Sector Virus Protection  Disabled    │ Extended Memory : 0 Mb  │
                                          │  Total Memory : 1 Mb    │
                                          └─────────────────────────┘
Available Options:                        ESC:Exit
Disabled                                  ↑↓:Select Item
Enabled                                   PU/PD/+/-:Modify
                                          (Shift)F2:Color
```

3.10 Change User/Supervisor Password

This Main Menu item lets you configure the system so that a password is required each time the system boots or an attempt is made to enter the Setup program. Supervisor Password allows you to change all CMOS settings but the User Password setting doesn't have this function. The way to set up the passwords for both Supervisor and User are as follow:

1. Choose "Change Password" in the Main Menu and press <Enter>. The following message appears:

"Enter Password:"

2. The first time you run this option, enter your password up to 6 characters only and press <Enter>. The screen will not display the entered characters. For no password, just press <Enter>.

3. After you enter the password, the following message appears prompting you to confirm the password:

"Retype Password:"

4. Enter exactly the same password you just typed in to confirm the password and press <Enter>.

5. Move the cursor to Save Settings and Exit to save the password.

6. If you need to delete the password you entered before, choose the Supervisor Password and press <Enter>. It will delete the password that you had before.

7. Move the cursor to Save Settings and Exit to save the option you did. Otherwise, the old password will still be there when you turn on your machine next time.

Chapter 4

CREATIVE® AUDIO DRIVER (OPTIONAL)

1. Overview

The Creative® CT5880-DBO digital controller provides the next generation of audio performance to the PC market.

1.1 Features

- SoundScape WaveTable Synthesizer.
- Full DOS Game Compatibility.
- PCI Bus Master for fast DMA.
- Fully Compliant with PC97 Power Management Specification.

1.2 System Requirements

This section describes system requirements for the Audio Driver installation and Usage.

Computer	AMD®Athlon ® processor or higher
Operating system	DOS 5.0 or higher, Windows® 95/98, Windows® NT 3.51 or 4.0, or OS/2®
CD-ROM	Double Speed or Higher
Chipset	Creative® CT5880-DBO

2. Audio Driver Setup & Usage Procedures

Insert the CD-title into your CD-ROM drive. This CD will auto-run. This will display installation for VGA driver and sound driver. Just click the button for automatic installation for audio driver.
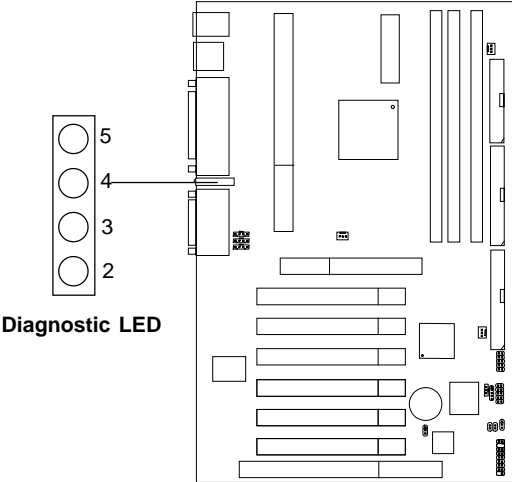
2.1 Windows® 95/98/NT 4.0

If you start Windows® 95/98/NT 4.0, this will automatically detect this hardware onboard "PCI Multimedia Audio Device" and "Gameport Joystick". You need to click "Next", then "Finish". Do not click on the "Cancel". The driver need these ID.

2.1-1 Audio Driver Installation Procedure:

Step 1: Insert the provided CD_ROM disk into the CD-ROM drive.

Step 2: Look for the CD_ROM drive, double click on the CD_ROM icon. This will show the setup screen.

Step 3: Click on " Creative AudioPCI" icon.

Step 4: This will copy the audio drivers into the hard drive.

Step 5: A message will appear stating you must restart the Windows® 95/98/NT 4.0 system, select **yes** to restart.

Diagnostic LED

The mainboard provides a Special Diagnostic LED for users to be aware of their mainboard conditions. The LED helps user determine the problem of the mainboard.

Diagnostic LED

Addendum

Diagnostic LED Function

Diagnostic LED				Description	Possible Problem/ Solution
5	**4**	**3**	**2**		
0	0	0	0	System Power ON. This will start BIOS Initialization	System D-LED will hang here The Processor might be damage or not installed properly Damage/Discharge Lithium Battery
0	0	0	1	Early Chipset Initialization	***
0	0	1	0	Memory Detection Test Testing Onboard memory size	System D-LED will hang here The Memory module might be damage or not installed properly.
0	0	1	1	Decompressing BIOS image to RAM for fast booting.	***
0	1	0	0	Initializing Keyboard Controller	***
0	1	0	1	Testing VGA BIOS This will start writing VGA sign-on messages to the screen.	System D-LED will produce Beep sound The VGA card might be damage or not inserted properly.
0	1	1	0	Processor Initialization This will show information regarding the processor (like brand name, system bus, etc...)	***
0	1	1	1	Testing RTC (Real Time Clock)	Low Lithium Battery
1	0	0	0	Initializing Video Interface This will start detecting CPU clock, checking type of video onboard. Then, detect and initialize the video adapter	***
1	0	0	1	BIOS Sign On This will start showing information about Logo, processor brand name, etc.....	***
1	0	1	0	Testing Base and Extended Memory Testing base memory from 240K to 640K and extended memory above 1MB using various patterns.	***
1	0	1	1	Assign Resource to all ISA	***
1	1	0	0	Initializing Hard Drive Controller This will initialize IDE drive and controller	Check IDE cable for proper installation
1	1	0	1	Initializing Floppy Drive Controller This will initialize Floppy Drive and controller	System D-LED will hang here The Floppy Drive Cable might not be installed properly
1	1	1	0	Boot Attempt This will set low stack and boot via INT19h.	***
1	1	1	1	Operating System Booting.	***

1 = GREEN 0 = RED   *** Check local Vendor for possible internal mainboard problem.