



2808190



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## Revision History

Revision	Revision History	Date
V1.0	First release	May 2008

## Safety Instructions

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1. Always read the safety instructions carefully.
2. Keep this User's Manual for future reference.
3. Keep this equipment away from humidity.
4. Lay this equipment on a reliable flat surface before setting it up.
5. The openings on the enclosure are for air convection hence protects the equipment from overheating. DO NOT COVER THE OPENINGS.
6. Make sure the voltage of the power source and adjust properly 110/220V before connecting the equipment to the power inlet.
7. Place the power cord such a way that people can not step on it. Do not place anything over the power cord.
8. Always Unplug the Power Cord before inserting any add-on card or module.
9. All cautions and warnings on the equipment should be noted.
10. Never pour any liquid into the opening that could damage or cause electrical shock.
11. If any of the following situations arises, get the equipment checked by service personnel:
  - † The power cord or plug is damaged.
  - † Liquid has penetrated into the equipment.
  - † The equipment has been exposed to moisture.
  - † The equipment does not work well or you can not get it work according to User's Manual.
  - † The equipment has dropped and damaged.
  - † The equipment has obvious sign of breakage.
12. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT UNCONDITIONED, STORAGE TEMPERATURE ABOVE 60°C (140°F), IT MAY DAMAGE THE EQUIPMENT.



**CAUTION** Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.



警告使用者：  
這是甲類的資訊產品，在居住的環境中使用時，可能會造成無線電干擾，在這種情況下，使用者會被要求採取某些適當的對策。



廢電池請回收

For better environmental protection, waste batteries should be collected separately for recycling or special disposal.

## FCC-B Radio Frequency Interference Statement

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This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part



15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the measures listed below.

- † Reorient or relocate the receiving antenna.
- † Increase the separation between the equipment and receiver.
- † Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- † Consult the dealer or an experienced radio/television technician for help.

### Notice 1

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### Notice 2

Shielded interface cables and A.C. power cord, if any, must be used in order to comply with the emission limits.

VOIR LA NOTICE D'INSTALLATION AVANT DE RACCORDER AU RESEAU.

*This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:*

- (1) this device may not cause harmful interference, and*
- (2) this device must accept any interference received, including interference that may cause undesired operation.*

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# Chapter 1

## Product Overview

Thank you for choosing the 2808190 Mini ITX mainboard.

Based on the innovative **Intel® Q35 & ICH9DO** controllers for optimal system efficiency, the 2808190 accommodates the latest **Intel® Core™ 2 Quad/Core™ 2 Duo/Pentium® Dual-Core /Celeron®** processors in Socket 775 and supports two 240-pin DDR2 DIMM slots to provide the maximum of 4GB memory capacity.

In the entry-level and mid-range market segment, the 2808190 can provide a high-performance solution for today's front-end and general purpose workstation, as well as in the future.

## Mainboard Specifications

### Processor Support

- Intel® Core™ 2 Quad/Core™ 2 Duo/Pentium® Dual-Core /Celeron® processors in the LGA775 package
- Supports Intel® Yorkfield, Wolfdale
- Supports up to 95W processors only.

### Supported FSB

- 1333/1066/ 800 MHz

### Chipset

- North Bridge: Intel® Q35 chipset
- South Bridge: Intel® ICH9DO chipset

### Memory Support

- DDRII 667/800 non-ECC memory (4GB Max)
- 2 \* DDRII DIMMs (240pin / 1.8V)

### LAN

- Supports PCIe GbE LAN by Intel® 82566DM for vPro
- Supports PCIe GbE LAN by Intel® 82573L

### Audio

- Realtek ALC888 HD audio codec
- Flexible 5.1 channel audio with jack sensing

### IDE

- 1 \* IDE port
- Supports Ultra DMA 66/100/133 mode
- Supports PIO, Bus Master operation mode

### SATA

- 4 \* SATAII ports by ICH9DO
- Supports storage and data transfers at up to 3Gb/s

### RAID

- SATA1~4 supports RAID 0/ 1/ 5/ 10 by ICH9DO
- Supports Intel® Matrix Storage Technology.

### Connectors

- **Back panel**
  - 1 \* PS/2 mouse port
  - 1 \* PS/2 keyboard port
  - 2 \* RJ45 Gigabit LAN
  - 4 \* USB 2.0 ports
  - 1 \* RS-232 port
  - 1 \* VGA port
  - 3 \* flexible audio jacks



● **On-Board Pinheaders/ Connectors**

- 2 \* USB 2.0 pin headers
- 1 \* Chassis Intrusion Switch pin header
- 1 \* RS-232 connector
- 1 \* Front Panel Audio pin header
- 1 \* TPM connector

**Slots**

- 1 \* PCIe x16 slot
- 1 \* Mini-PCIe slot

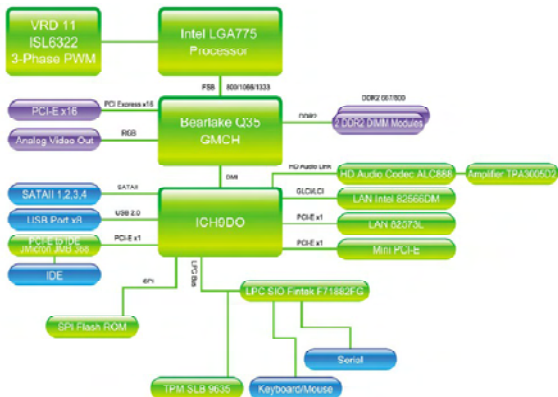
**Form Factor**

- Mini-ITX (17.0cm X 17.0cm)

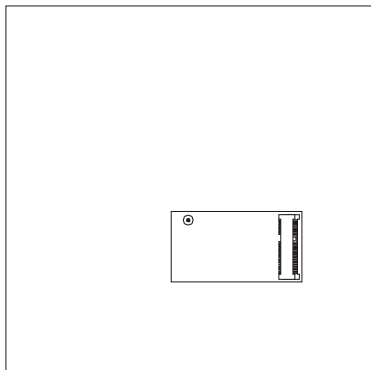
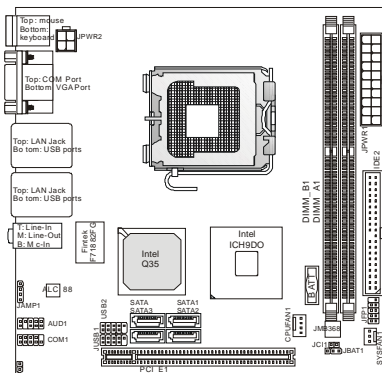
**Mounting**

- 4 \* mounting holes

## Block Diagram

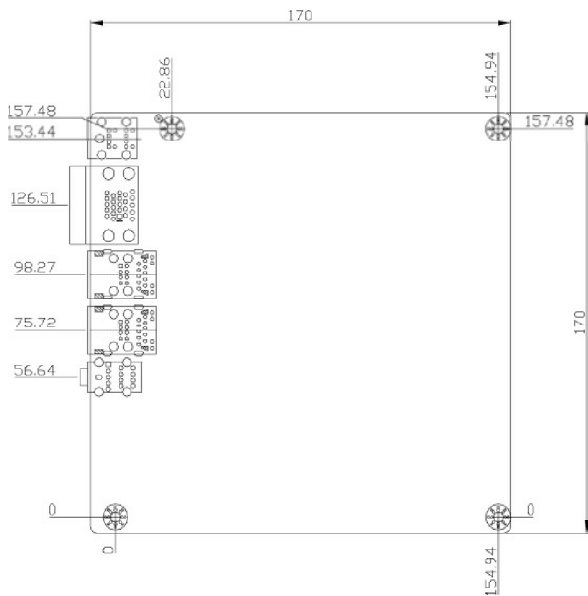


## Mainboard Layout

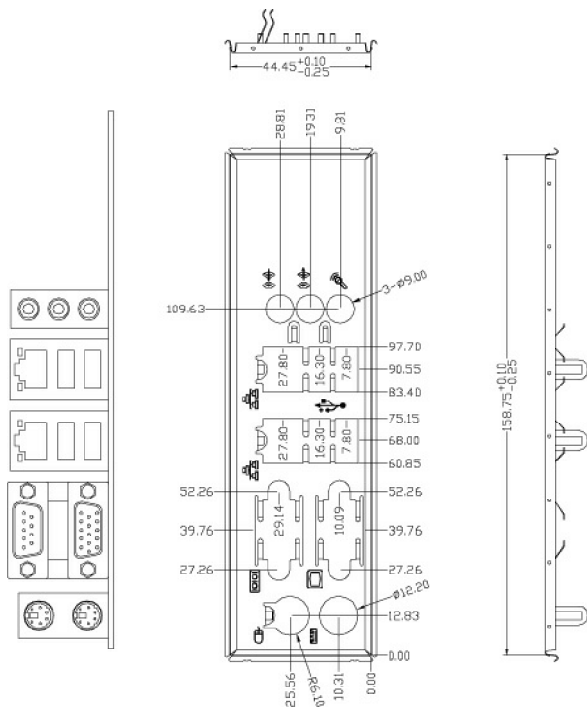


2808190 Mainboard (Mini ITX)

## Board Dimension



## Back Panel & I/O Shield Drawing



## Power Consumption

MS-9820	3.3V	5V	12V	12V Main Connector	5V Standby	(-)12V
	Current(A)	Current(A)	Current(A)	Current(A)	Current(A)	Current(A)
Enter DOS(Stable)	0.86	3.4	2.35	0.46	0.068	0.037
Enter BIOS(Stable)	0.89	3.38	2.58	0.48	0.083	0.038
Idle	0.86	3.39	0.89	0.51	0.091	0.016
CPU Stress 100%	0.9	3.47	5.92	0.5	0.075	0.016
Windows stress(3dMARK2006)	0.89	4.82	3.34	0.5	0.075	0.029
Windows Desktop Standby S1 with/without two LANs connected (stable)	0.67	2.5	1.87	0.29	0.065	0.026
Windows Desktop Standby S3 with/without two LANs connected (stable)	0	0	0	0	0.666	0
Windows Desktop Hibernate S4 with/without two LANs connected (stable)	0	0	0	0	0.453	0
Windows Desktop Soft Off S5 with/without two LANs connected (stable)	0	0	0	0	0.457	0

### Condition

Mainboard 2808190  
 CPU Yorkfield Q9450 2.66G  
 Memory DDRII 1GB\*2  
 HDD WD 40G

## Safety Compliance & MTBF

Certification	Standard number		Title of standard
CE	RFI	EN 55022:1998+A1:2000+A2:2003 Class B	Product family standard
		EN 6100-3-2:2000 Class D	Limits for harmonic current emission
		EN 6100-3-3:1995+A1:2001	Limitation of voltage fluctuation and flicker in low-voltage supply system
	Immunity	EN 55024:1998+A1:2001+A2:2003	Product family standard
BSMI	CNS 13438 乙類(1997年版)		
C-Tick	AS/NZS CISPR 22:2004		
FCC	FCC CFR Title 47 Part 15 Subpart B: 2005 Class B		
	CISPR 22: 2005		
VCCI	VCCI V-3:2004, Class B		
	VCCI V-4:2004, Class B		





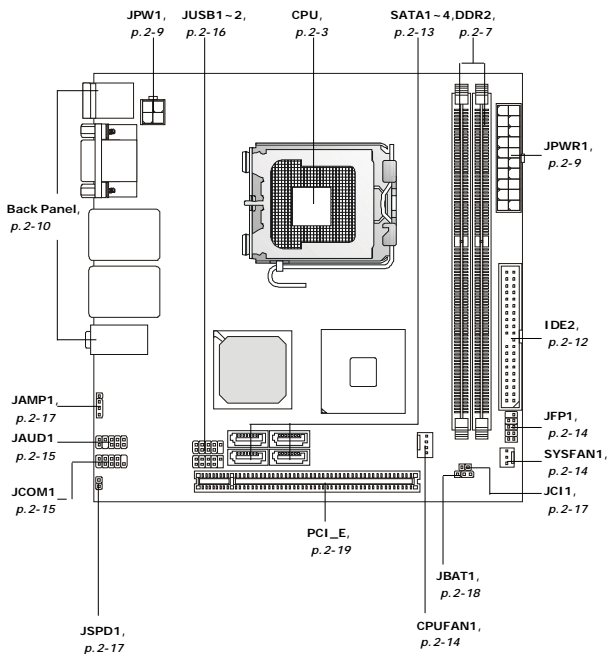
## Chapter 2

# Hardware Setup

This chapter provides you with the information about hardware setup procedures. While doing the installation, be careful in holding the components and follow the installation procedures. For some components, if you install in the wrong orientation, the components will not work properly.

Use a grounded wrist strap before handling computer components. Static electricity may damage the components.

## Quick Components Guide



## CPU (Central Processing Unit)

When you are installing the CPU, **make sure to install the cooler to prevent overheating**. If you do not have the CPU cooler, consult your dealer before turning on the computer.



### Important

#### **Overheating**

*Overheating will seriously damage the CPU and system. Always make sure the cooling fan can work properly to protect the CPU from overheating. Make sure that you apply an even layer of thermal paste (or thermal tape) between the CPU and the heatsink to enhance heat dissipation.*

#### **Replacing the CPU**

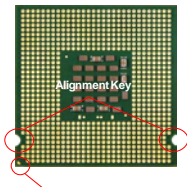
*While replacing the CPU, always turn off the ATX power supply or unplug the power supply's power cord from the grounded outlet first to ensure the safety of CPU.*

#### **Overclocking**

*This mainboard is designed to support overclocking. However, please make sure your components are able to tolerate such abnormal setting, while doing overclocking. Any attempt to operate beyond product specifications is not recommended. **We do not guarantee the damages or risks caused by inadequate operation or beyond product specifications.***

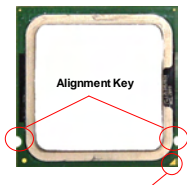
### Introduction to LGA 775 CPU

The pin-pad side of LGA 775 CPU.



Yellow triangle is the Pin 1 indicator

The surface of LGA 775 CPU. Remember to apply some thermal paste on it for better heat dispersion.

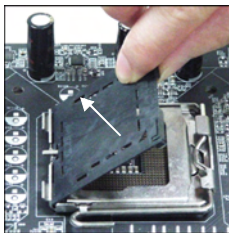
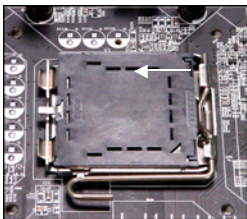


Yellow triangle is the Pin 1 indicator

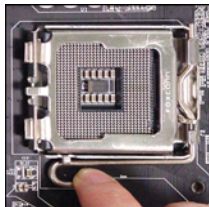
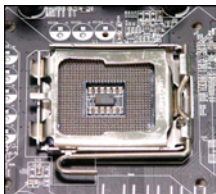
## CPU & Cooler Installation

When you are installing the CPU, **make sure the CPU has a cooler attached on the top to prevent overheating.** Meanwhile, do not forget to apply some thermal paste on CPU before installing the heat sink/cooler fan for better heat dispersion. Follow the steps below to install the CPU & cooler correctly. Wrong installation will cause the damage of your CPU & mainboard.

1. The CPU socket has a plastic cap on it to protect the contact from damage. Before you install the CPU, always cover it to protect the socket pin.
2. Remove the cap from lever hinge side (as the arrow shows).



3. The pins of socket reveal.
4. Open the load lever.

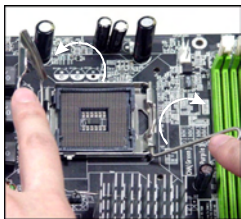


### Important

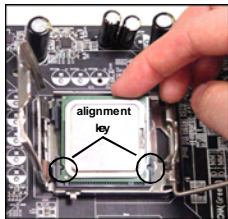
1. Confirm if your CPU cooler is firmly installed before turning on your system.
2. Do not touch the CPU socket pins to avoid damaging.
3. The availability of the CPU land side cover depends on your CPU packing.

## Hardware Setup

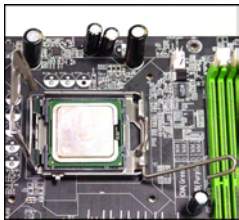
- Lift the load lever up and open the load plate.



- After confirming the CPU direction for correct mating, put down the CPU in the socket housing frame. Be sure to grasp on the edge of the CPU base. Note that the alignment keys are matched.



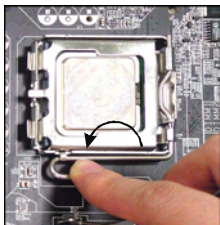
- Visually inspect if the CPU is seated well into the socket. If not, take out the CPU with pure vertical motion and reinstall.



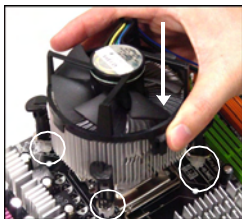
- Cover the load plate onto the package.



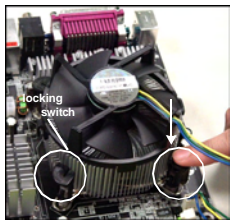
9. Press down the load lever lightly onto the load plate, and then secure the lever with the hook under retention tab.



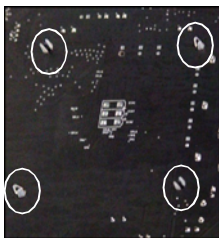
10. Align the holes on the mainboard with the heatsink. Push down the cooler until its four clips get wedged into the holes of the mainboard.



11. Press the four hooks down to fasten the cooler. Then rotate the locking switch (refer to the correct direction marked on it) to lock the hooks.



12. Turn over the mainboard to confirm that the clip-ends are correctly inserted.

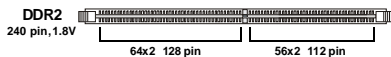


### Important

1. Read the CPU status in BIOS (Chapter 3).
2. Whenever CPU is not installed, always protect your CPU socket pin with the plastic cap covered (shown in Figure 1) to avoid damaging.
3. Mainboard photos shown in this section are for demonstration of the CPU/cooler installation only. The appearance of your mainboard may vary depending on the model you purchase.

## Memory

These DIMM slots are used for installing memory modules.



**Single Channel** All DIMMs in GREEN

**Dual Channel** Channel A in GREEN; Channel B in ORANGE

### Dual-Channel mode Population Rule

In Dual-Channel mode, the memory modules can transmit and receive data with two data bus lines simultaneously. Enabling Dual-Channel mode can enhance the system performance. Please refer to the following illustrations for population rules under Dual-Channel mode.



## Installing Memory Modules

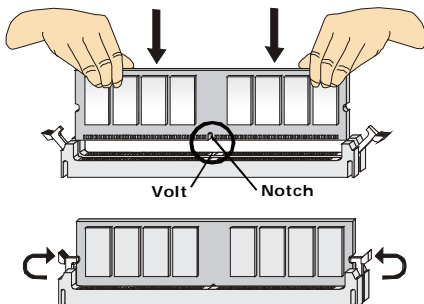
1. The memory module has only one notch on the center and will only fit in the right orientation.
2. Insert the memory module vertically into the DIMM slot. Then push it in until the golden finger on the memory module is deeply inserted in the DIMM slot.



### Important

You can barely see the golden finger if the memory module is properly inserted in the DIMM slot.

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



### Important

- DDR2 memory modules are not interchangeable with DDR and the DDR2 standard is not backwards compatible. You should always install DDR2 memory modules in the DDR2 DIMM slots.
- In Dual-Channel mode, make sure that you install memory modules of **the same type and density** in different channel DIMM slots.
- To enable successful system boot-up, always insert the memory modules into the **DIMM\_A1** first.

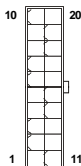


## Power Supply

### ATX 20-Pin System Power Connector: JPWR1

This connector allows you to connect to an ATX power supply. To connect to the ATX power supply, make sure the plug of the power supply is inserted in the proper orientation and the pins are aligned. Then push down the power supply firmly into the connector.

JPWR1



ATX1 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	NC
9	5V_SB	19	5V
10	12V	20	5V

### ATX 12V Power Connector: JPW1

This 12V power connector is used to provide power to the CPU.

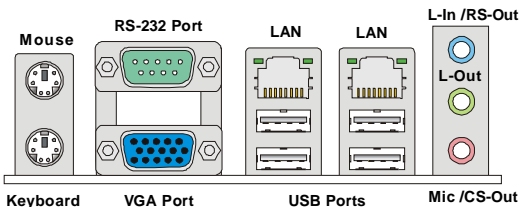
JPW1



Pin Definition

PIN	SIGNAL
1	GND
2	GND
3	12V
4	12V

## Back Panel



### ► Mouse/Keyboard

The standard PS/2<sup>®</sup> mouse/keyboard D N connector is for a PS/2<sup>®</sup> mouse/keyboard.

### ► RS-232 Port

The serial port is a 16550A high speed communications port that sends/ receives 16 bytes FIFOs. You can attach a serial mouse or other serial devices directly to the connector.

### ► VGA Port

The DB15-pin female connector is provided for monitor.

### ► LAN

The standard RJ-45 LAN jack is for connection to the Local Area Network (LAN). You can connect a network cable to it.



LED	Color	LED State	Condition
Left	Yellow	Off	LAN link is not established.
		On (steady state)	LAN link is established.
		On (brighter & pulsing)	The computer is communicating with another computer on the LAN.
Right	Green	Off	10 Mbit/sec data rate is selected.
	On	100 Mbit/sec data rate is selected.	
	Orange	On	1000 Mbit/sec data rate is selected.

### ► USB Port

The USB (Universal Serial Bus) port is for attaching USB devices such as keyboard, mouse, or other USB-compatible devices.

### ► Audio Ports

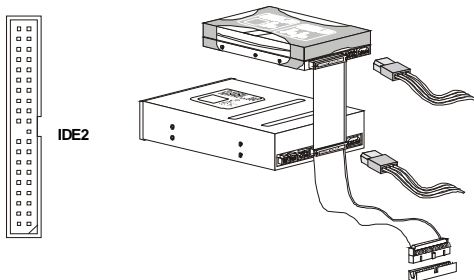
These audio connectors are used for audio devices. You can differentiate the color of the audio jacks for different audio sound effects.

- **Line-In / RS-Out (Blue)** - Line In is used for external CD player, tapeplayer or other audio devices. Rear-Surround Out in 4/5.1 channel mode.
- **Line-Out (Green)** - Line Out, is a connector for speakers or headphones.
- **Mic / CS-Out (Pink)** - Mic, is a connector for microphones. Center/Subwoofer Out in 5.1 channel mode.

## Connectors

### IDE Connector: IDE2

This connector supports IDE hard disk drives, optical disk drives and other IDE devices.

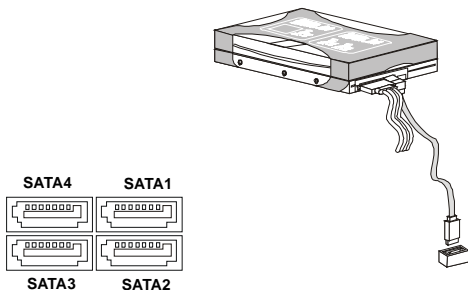


### Important

*If you install two IDE devices on the same cable, you must configure the drives separately to master / slave mode by setting jumpers. Refer to IDE device's documentation supplied by the vendors for jumper setting instructions.*

**Serial ATA Connector: SATA1 ~ SATA4**

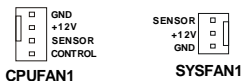
This connector is a high-speed Serial ATA interface port. Each connector can connect to one Serial ATA device.

**Important**

*Please do not fold the Serial ATA cable into 90-degree angle. Otherwise, data loss may occur during transmission.*

## Fan Power Connectors: CPUFAN1, SYSFAN1

The fan power connectors support system cooling fan with +12V. When connecting the wire to the connectors, always 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 the mainboard has a System Hardware Monitor chipset onboard, you must use a specially designed fan with speed sensor to take advantage of the CPU fan control.

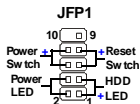


### Important

Please refer to the recommended CPU fans at Intel® official website or consult the vendors for proper CPU cooling fan.

## Front Panel Connector: JFP1

The mainboard provides one front panel connector for electrical connection to the front panel switches and LEDs. The JFP1 is compliant with Intel® Front Panel I/O Connectivity Design Guide.

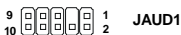


JFP1 Pin Definition

PN	SIGNAL	PN	SIGNAL
1	HDDLED+	2	PWRLED+/PWRLED+
3	HDDLED-	4	PWRLED-/SLPLED+
5	RESET-	6	PWRBTN-
7	RESET+	8	PWRBTN+
9	N/A	10	Key(no pin)

## Front Panel Audio Connector: JAUD1

This connector allows you to connect the front panel audio and is compliant with Intel® Front Panel I/O Connectivity Design Guide.



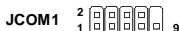
HD Audio Pin Definition

PIN	SIGNAL	DESCRIPTION
1	MIC_L	Microphone - Left channel
2	GND	Ground
3	MIC_R	Microphone - Right channel
4	PRESENCE#	Active low signal-signals BIOS that a High Definition Audio dongle is connected to the analog header. PRESENCE# 0 when a High Definition Audio dongle is connected
5	LINEout_R	Analog Port - Right channel
6	MIC_JD	Jack detection return from front panel microphone JACK1
7	Front_JD	Jack detection sense line from the High Definition Audio CODEC jack detection resistor network
8	NC	No control
9	LINEout_L	Analog Port - Left channel
10	LINEout_JD	Jack detection return from front panel JACK2

## RS-232 Port Connector: JCOM 1

This connector is a 16550A high speed communication port that sends/receives 16 bytes F FOs. You can attach a serial device.

Pin Definition



PIN	SIGNAL	DESCRIPTION
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	Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	RI	Ring Indicate

## Front USB Connector: JUSB1 ~ 2

These connectors, compliant with Intel® I/O Connectivity Design Guide, is ideal for connecting high-speed USB interface peripherals such as **USB HDD, digital cameras, MP3 players, printers, modems and the like.**



**JUSB1**

**JUSB1 Pin Definition**

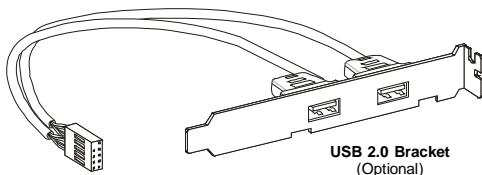
PIN	SIGNAL	PIN	SIGNAL
1	VCC	2	VCC
3	USB4-	4	USB5-
5	USB4+	6	USB5+
7	GND	8	GND
9	Key (no pin)	10	USBOC



**JUSB2**

**JUSB2 Pin Definition**

PIN	SIGNAL	PIN	SIGNAL
1	VCC	2	VCC
3	USB6-	4	USB7-
5	USB6+	6	USB7+
7	GND	8	GND
9	Key (no pin)	10	USBOC



**USB 2.0 Bracket**  
(Optional)



### Important

*Note that the pins of VCC and GND must be connected correctly to avoid possible damage.*



### Audio Amplifier Connector: JAMP1

The JAMP1 is used to connect audio amplifiers to enhance audio performance.



Pin Definition

PIN	SIGNAL
1	AMP_L-
2	AMP_L+
3	AMP_R-
4	AMP_R+

### Chassis Intrusion Connector: JCI1

This connector connects to the chassis intrusion switch cable. If the chassis is opened, the chassis intrusion mechanism will be activated. The system will record this status and show a warning message on the screen. To clear the warning, you must enter the BIOS utility and clear the record.



JCI1

### S/PDIF-Out Connector: JSPD1 (Optional, for HDMI ADD2 card only)

This connector is used to connect S/PD F (Sony & Philips Digital Interconnect Format) interface for digital audio transmission to the HDMI ADD2 card.



JSPD1

## Jumper

### Clear CMOS Jumper: JBAT1

There is a CMOS RAM onboard that has a power supply from an external battery to keep the data of system configuration. With the CMOS RAM, the system can automatically boot OS every time it is turned on. If you want to clear the system configuration, set the jumper to clear data.



### Important

*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.*

## Slots

### PCI (Peripheral Component Interconnect) Express Slot

The PCI Express slot supports the PCI Express interface expansion card.

The PCI Express x 16 slot supports up to 4 0 GB/s transfer rate.

The CON1 is Mini PCI-E connector for wireless LAN, TV tuner, and Robson NAND Flash.



PCI Express x16 Slot

Mounting hole



Mini PCI-E Slot



## Chapter 3

# BIOS Setup

This chapter provides information on the BIOS Setup program and allows you to configure the system for optimum use.

You may need to run the Setup program when:

- ▶ An error message appears on the screen during the system booting up, and requests you to run SETUP.
- ▶ You want to change the default settings for customized features.

## Entering Setup

Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press <Del> key to enter Setup.

### Press Del to enter SETUP

If the message disappears before you respond and you still wish to enter Setup, restart the system by turning it OFF and On or pressing the RESET button. You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.



### Important

- 1. The items under each BIOS category described in this chapter are under continuous update for better system performance. Therefore, the description may be slightly different from the latest BIOS and should be held for reference only.*
- 2. Upon boot-up, the 1st line appearing after the memory count is the BIOS version. It is usually in the format:*

*A9820IMS V1.0 031508 where:*

*1st digit refers to BIOS maker as A = AMI, W = AWARD, and P = PHOENIX.*

*2nd - 5th digit refers to the model number.*

*6th digit refers to the chipset as I = Intel, N = nVidia, and V = VIA.*

*7th - 8th digit refers to the customer as MS = all standard customers.*

*V1.0 refers to the BIOS version.*

*031508 refers to the date this BIOS was released.*

## Control Keys

<↑>	Move to the previous item
<↓>	Move to the next item
<←>	Move to the item in the left hand
<→>	Move to the item in the right hand
<Enter>	Select the item
<Esc>	Jumps to the Exit menu or returns to the main menu from a submenu
<+/PU>	Increase the numeric value or make changes
<-/PD>	Decrease the numeric value or make changes
<F6>	Load Optimized Defaults
<F7>	Load Fail-Safe Defaults
<F10>	Save all the CMOS changes and exit

## Getting Help

After entering the Setup menu, the first menu you will see is the Main Menu.

### Main Menu

The main menu lists the setup functions you can make changes to. You can use the arrow keys (↑↓) to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

### Sub-Menu

If you find a right pointer symbol (as shown in the right view) appears to the left of certain fields that means a sub-menu can be launched from this field. A sub-menu contains additional options for a field parameter. You can use arrow keys (↑↓) to highlight the field and press <Enter> to call up the sub-menu. Then you can use the control keys to enter values and move from field to field within a sub-menu. If you want to return to the main menu, just press the <Esc>.

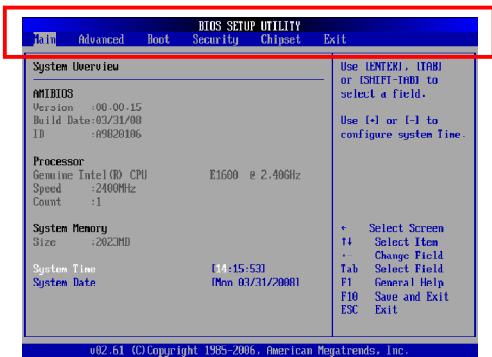


▶ CPU Configuration  
▶ IDE Configuration

## General Help <F1>

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.

## The Menu Bar



### ► Main

Use this menu for basic system configurations, such as time, date etc.

### ► Advanced

Use this menu to set up the items of special enhanced features.

### ► PCIPnP

This entry appears if your system supports PC /PnP.

### ► Boot

Use this menu to specify the priority of boot devices.

### ► Security

Use this menu to set supervisor and user passwords.

### ► Chipset

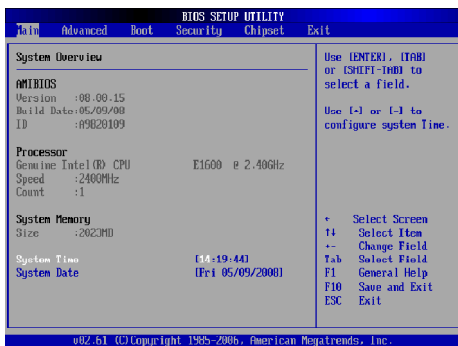
This menu controls the advanced features of the onboard Northbridge and Southbridge.

### ► Exit

This menu allows you to load the BIOS default values or factory default settings into the BIOS and exit the BIOS setup utility with or without changes.



## Main



► **AMI BIOS, Processor, System Memory**

These items show the firmware and hardware specifications of your system. Read only.

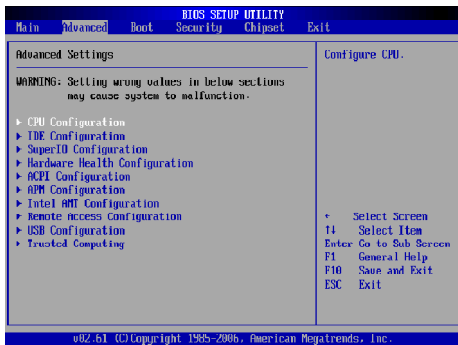
► **System Time**

The time format is <Hour> <Minute> <Second>.

► **System Date**

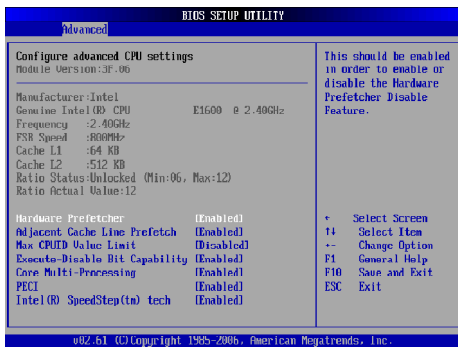
The date format is <Day>, <Month> <Date> <Year>.

## Advanced



## ► CPU Configuration

These items show the advanced specifications of your CPU. Read only.



**▶ Hardware Prefetcher**

Setting to [Enabled], the processor's hardware prefetcher will be enabled and allowed to automatically prefetch data and code for the processor.

**▶ Adjacent Cache Line Prefetch**

Setting to [Enabled], the processor will retrieve the currently requested cache line, as well as the subsequent cache line.

**▶ Max CPUID Value Limit**

This item allows you to circumvent problems with older operating systems that do not support the Intel Pentium 4 processor with Hyper-Threading Technology. Setting to [Enabled], the processor will limit the maximum CPU D input value to 03h when queried, even if the processor supports a higher CPUID input value.

**▶ Execute-Disable Bit Capability**

Intel's Execute Disable Bit functionality can prevent certain classes of malicious "buffer overflow" attacks when combined with a supporting operating system. This functionality allows the processor to classify areas in memory by where application code can execute and where it cannot. When a malicious worm attempts to insert code in the buffer, the processor disables code execution, preventing damage or worm propagation.

**▶ Core Multi-Processing**

Enable this feature, if your processor supports multi-core.

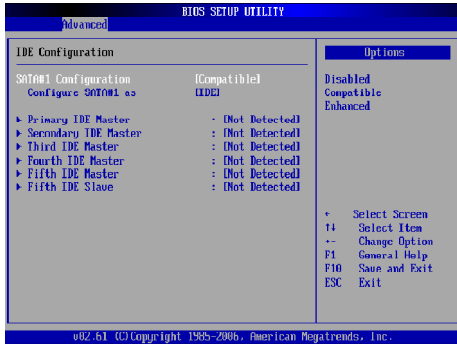
**▶ PECI**

Platform Environment Control Interface (PECI) is able to provide digital data concerning processor temperature information.

**▶ Intel(R) SpeedStep(tm) tech**

This feature is used to enable/disable the Intel SpeedStep Technology.

## ► IDE Configuration



## ► SATA#1 Configuration

This item allows you to configurare IDE device mode.

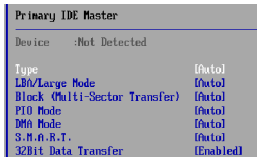
[Compatible] If Compatible selected, Legacy IDE Channels will be presented for configuration.

[Enhanced] If Enhanced selected, "Configure SATA as" will be presented for setup.

## ► Configure SATA#1 as

This setting specifies the function of the on-chip SATA controller.

## ► Primary/Secondary/Third/Fourth/Fifth IDE Master/Slave



[Type]

Press PgUp/<+> or PgDn/<-> to select [Manual], [None] or [Auto] type. Note that the

[LBA/Large Mode]	specifications of your drive must match with the drive table. The hard disk will not work properly if you enter improper information for this category. If your hard disk drive type is not matched or listed, you can use [Manual] to define your own drive type manually. Enabling LBA causes Logical Block Addressing to be used in place of Cylinders, Heads and Sectors
[Block(Multi-Sector Transfer)]	Any selection except Disabled determines the number of sectors transferred per block
[PIO Mode]	Indicates the type of PIO (Programmed Input/Output)
[DMA Mode]	Indicates the type of Ultra DMA
[S.M.A.R.T.]	This allows you to activate the S.M.A.R.T. (Self-Monitoring Analysis & Reporting Technology) capability for the hard disks. S.M.A.R.T is a utility that monitors your disk status to predict hard disk failure. This gives you an opportunity to move data from a hard disk that is going to fail to a safe place before the hard disk becomes offline.
[32 Bit Data Transfer]	Enables 32-bit communication between CPU and DE card

► **Super IO Configuration**

Configure F71802F Super IO Chipset	
Serial Port1 Address	[3F8/IRQ4]
Serial Port2 Address	[2F8/IRQ3]
Serial Port2 Mode	[Normal]
Watch Dog	[Disabled]
Chassis Intrusion	[Disabled]

► **Serial Port 1 / 2 Address**

Select an address and a corresponding interrupt for the serial port 1/2.

► **Serial Port2 Mode**

This item allows you to select mode for Serial Port2.

► **Watch Dog**

This feature is used to enable/disable the Watch Dog feature.

► **Chassis Intrusion**

The field enables or disables the feature of recording the chassis intrusion status and issuing a warning message if the chassis is once opened. To clear

the warning message, set the field to [Reset]. The setting of the field will automatically return to [Enabled] later.

#### ► Hardware Health Configuration

Hardware Health Configuration	
CPU Temperature	: 44°C/111°F
System Temperature	: 30°C/86°F
CPU FAN Speed	: 3816 RPM
System FAN Speed	: 1614 RPM
CPU Vcore	: 1.272 V
5V	: 5.084 V
12V	: 12.320 V
CPU Smart FAN Mode	[Temperature Mode]
CPU Smart Fan Target	[90°C]
CPU Smart Fan Tolerance	[2°C]
System Smart FAN Mode	[Temperature Mode]
System Smart Fan Target	[35°C]
System Smart Fan Tolerance	[2°C]

#### ► CPU Temperature, System Temperature, CPU FAN Speed, System FAN Speed, CPU Vcore, 5V, 12V

These items display the current status of all of the monitored hardware devices/components such as CPU voltage, temperatures and all fans' speeds.

#### ► CPU/System Smart FAN Mode

These items allow you to select the smart FAN mode.

#### ► CPU/System Smart FAN Target

The mainboard provides the Smart Fan function which can control the CPU/system fan speed automatically depending on the current temperature to keep it with in a specific range. You can select a fan target value here. If the current CPU/system fan temperature reaches to the target value, the smart fan function will be activated. It provides several sections to speed up for cooling down automatically.

#### ► CPU/System Smart Fan Tolerance

When a particular temperature setting is selected for the previous item, CPU/System Smart Fan Temperature, a temperature tolerance value between 1 to 5 can be adjusted here.

#### ► ACPI Configuration

ACPI Settings	
Suspend mode	[Auto]
USB Device Wakeup From S3/S4	[Disabled]
ACPI Version Features	[ACPI v1.0]

### ► Suspend mode

This item specifies the power saving modes for ACPI function. If your operating system supports ACPI, you can choose to enter the Standby mode in S1 (POS) or S3 (STR) fashion through the setting of this field.

Options are:

- [S1 (POS)]      The S1 sleep mode is a low power state. In this state, no system context is lost (CPU or chipset) and hardware maintains all system context.
- [S3 (STR)]      The S3 sleep mode is a lower power state where the information of system configuration and open applications/files is saved to main memory that remains powered while most other hardware components turn off to save energy. The information stored in memory will be used to restore the system when a "wake up" event occurs.

### ► USB Device Wakeup from S3/S4

This setting allows the activity of the USB device to wake up the system from S3/S4 sleep state.

### ► ACPI Version Features

This setting allows you to select the ACPI version.

### ► APM Configuration

APM Configuration	
Advanced Resume Event Controls	
Resume On PME#	[Disabled]
Resume On RTC Alarm	[Disabled]
Restore on AC Power Loss	[Power Off]

### ► Resume On PME#

When setting to [Enabled], this setting allows your system to be awakened from the power saving modes through any event on PME (Power Management Event).

### ► Resume On RTC Alarm

When [Enabled], you can set the date and time at which the RTC (real-time clock) alarm awakens the system from suspend mode.

### ► Restore On AC Power Loss

This item specifies whether your system will reboot after a power failure or interrupt occurs. Settings are:

- [Power Off]      Always leaves the computer in the power off state.
- [Power On]      Always leaves the computer in the power on state.
- [Last State]     Restores the system to the status before power failure or interrupt occurred.

### ► Intel AMT Configuration

Configure Intel AMT Parameters	
Intel AMT Support	[Enabled]

#### ► Intel AMT Support

This setting allows you to enable/disable the Intel Active Management Technology(AMT) support.

### ► Remote Access Configuration

Configure Remote Access type and parameters	
Remote Access	[Enabled]
Serial port number	[COM1]
Base Address, IRQ	[3F8h, 4]
Serial Port Mode	[115200 8.n.1]
Flow Control	[None]
Redirection After BIOS POST	[Always]
Terminal Type	[ANSI]
UT-UTF8 Combo Key Support	[Enabled]
Sredir Memory Display Delay	[No Delay]

#### ► Remote Access

This setting allows you to enable/disable remote access.

#### ► Serial port number

This setting specifies the serial port for console redirection.

#### ► Serial Port Mode

This setting allows you to select the serial port mode.

#### ► Flow Control

This item specifies how the transfer via the port is controlled. The setting must be the same on both the terminal and the server.

[None]	The port is operated without transfer control.
[XON/XOFF]	The port transfer control is carried out by software.
[CTS/RTS]	The port transfer control is carried out by hardware. This mode must be supported by the cable.

#### ► Redirection After BIOS POST

This item specifies whether or not the console redirection is run after the Power-On Self Test (POST).

[Always]	Redirection is always active. (Some operating systems may not work if this item is set to Always.)
[Boot Loader]	Redirection is only active during POST.
[Disabled]	Redirection is deactivated.



► **Terminal Type**

This setting specifies the terminal type (ANSI, VT100, VT-UTF8). This setting must be identical on both the terminal and the server.

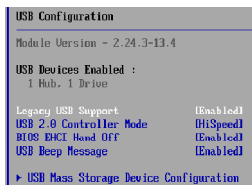
► **VT-UTF8 Combination Key Support**

This setting allows you to enable/disable the VT-UTF8 combination key support for ANSI/VT100 terminals.

► **Sredir Memory Display Delay**

This setting allows you to select the delay before memory information is displayed.

► **USB Configuration**



► **Legacy USB Support**

Select [Enabled] if you need to use a USB-interfaced device in the operating system.

► **USB 2.0 Controller Mode**

This setting allows you to select the USB 2.0 controller mode HiSpeed (480 Mbps) or Full Speed (12 Mbps).

► **BIOS EHCI Hand-Off**

This setting allows you to enable/disable BIOS EHCI Hand-Off.

► **USB Beep Message**

This setting allows you to enable/disable USB Beep Message.

► **USB Mass Storage Device Configuration**



### ► USB Mass Storage Reset Delay

This option specifies amount of time the BIOS should wait after issuing a reset to the USB mass storage devices.

### ► Emulation Type

This option specifies the type of emulation has to provide for the device.

### ► Trusted Computing

Trusted Computing	
TCG/TPM SUPPORT	[Yes]
Execute TPM Command	[Don't change]
Clearing the TPM	[Press Enter]
TPM Enable/Disable Status	[Enabled]
TPM Owner Status	[Owned]

### ► TCG/TPM Support

This setting controls the Trusted Platform Module (TPM) designed by the Trusted Computing Group (TCG). TPMs are special-purpose integrated circuits (ICs) built into a variety of platforms to enable strong user authentication and machine attestation—essential to prevent inappropriate access to confidential and sensitive information and to protect against *compromised networks*.

### ► Excute TPM Command

This item allows you to enable or disable the TPM security chip.

### ► Clearing the TPM

This item allows you to clear the user information saved in the TPM security chip. When you press <Enter>, a warning message will appear to ask if you want to clear the user information in the security chip. Use the left / right arrow key to select between [OK] and [Cancel], then press <Enter> to confirm your choice.

### ► TPM Enable/Disable Status

This item is not configurable.

### ► TPM Owner Status

This item is not configurable.

## Boot



### ▶ Boot Settings Configuration

Boot Settings Configuration	
Quick Boot	[Enabled]
Bootup Num-Lock	[On]
Wait For 'F1' If Error	[Enabled]
Flash Write Protection	[Enabled]

#### ▶ Quick Boot

Enabling this setting will cause the BIOS power-on self test routine to skip some of its tests during bootup for faster system boot.

#### ▶ Bootup Num-Lock

This setting is to set the Num Lock status when the system is powered on. Setting to [On] will turn on the Num Lock key when the system is powered on. Setting to [Off] will allow users to use the arrow keys on the numeric keypad.

#### ▶ Wait For 'F1' If Error

When this setting is set to [Enabled] and the boot sequence encounters an error, it asks you to press F1. If disabled, the system continues to boot without waiting for you to press any keys.

#### ▶ Flash Write Protection

This function protects the BIOS from accidental corruption by unauthorized users or computer viruses. When enabled, the BIOS data cannot be changed when attempting to update the BIOS with a Flash utility. To successfully update the BIOS, you will need to disable this Flash Protection function.

► **Boot Device Priority**



► **1st Boot Device**

The items allow you to set the sequence of boot devices where BIOS attempts to load the disk operating system. First press <Enter> to enter the sub-menu. Then you may use the arrow keys to select the desired device, then press <+>, <-> or <PageUp>, <PageDown> key to move it up/down in the priority list.

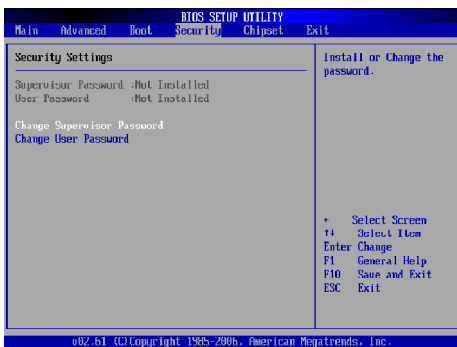
► **Removable Drives**



► **1st Drive**

This setting allows users to set the priority of the removable devices. First press <Enter> to enter the sub-menu. Then you may use the arrow keys ( - ) to select the desired device, then press <+>, <-> or <PageUp>, <PageDown> key to move it up/down in the priority list.

## Security



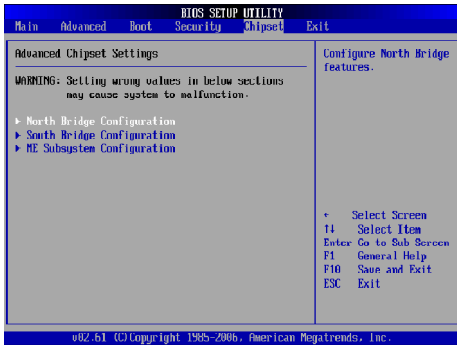
### ► Supervisor Password / Change Supervisor Password

Supervisor Password controls access to the BIOS Setup utility. These settings allow you to set or change the supervisor password.

### ► User Password / Change User Password

User Password controls access to the system at boot. These settings allow you to set or change the user password.

## Chipset



### ► North Bridge Configuration

North Bridge Chipset Configuration	
Initiate Graphic Adapter	[PEG/PCI]
Internal Graphics Mode Select	[Enabled, GMB]
DVMT Mode Select	[DVMT Mode]
DVMT/FIXED Memory	[256MB]

### ► Initiate Graphics Adapter

This item specifies which VGA card is your primary graphics adapter.

### ► Internal Graphics Mode Select

The field specifies the size of system memory allocated for video memory.

### ► DVMT Mode Select

Intel's Dynamic Video Memory Technology (DVMT) allows the system to dynamically allocate memory resources according to the demands of the system at any point in time. The key idea in DVMT is to improve the efficiency of the memory allocated to either system or graphics processor.

It is recommended that you set this BIOS feature to DVMT Mode for maximum performance. Setting it to DVMT Mode ensures that system memory is dynamically allocated for optimal balance between graphics and system performance.

### ► DVMT/FIXED Memory

When set to DVMT/FIXED Mode, the graphics driver will allocate a fixed amount of memory as dedicated graphics memory, as well as allow more system memory to be dynamically allocated between the graphics processor and the operating system.

### ► South Bridge Chipset Configuration

South Bridge Chipset Configuration	
USB Functions	[8 USB Ports]
USB 2.0 Controller	[Enabled]
GbE LAN(82566DM) Controller	[Enabled]
GbE LAN Boot	[Disabled]
GbE Wake Up From S5	[Disabled]
GbE LAN(82573L) Controller	[Enabled]
GbE LAN Boot	[Disabled]
ASF Support	[Enabled]
Audio Amplifier Control	[Disabled]

### ► USB Functions

This setting specifies the function of the onboard USB controller.

### ► USB 2.0 Controller

Set to [Enabled] if you need to use any USB 2.0 device in the operating system that does not support or have any USB 2.0 driver installed, such as DOS and SCO Unix.

### ► GbE LAN(82566DM) Controller

This setting disables/enables the onboard 82566DM Gigabit Ethernet controller.

#### ► GbE LAN Boot

When [Enabled], the BIOS attempts to boot from a LAN boot image before it attempts to boot from a local storage device.

#### ► GbE Wake Up From S5

This field specifies whether the system will be awakened from the S5 power saving mode when activity or input signal of onboard LAN is detected.

### ► GbE LAN(82573L) Controller

This setting disables/enables the onboard 82573L Gigabit Ethernet controller.

### ► ASF Support

This feature serves to control the ASF functions. When set to [Enabled], the ASF controller will be activated and allowed to communicate with a remote management server, if and when one queries it.

### ► Audio Amplifier Control

This setting disables/enables the Audio Amplifier Control.

### ► ME Subsystem Configuration

ME Subsystem Configuration	
BootBlock HECI Message	[Enabled]
HECI Message	[Enabled]
End Of Post S5 HECI Message	[Enabled]
ME HECI Configuration	
ME-HECI	[Enabled]
ME-IDER	[Disabled]
ME-KT	[Disabled]

### ► BootBlock HECI Message

Do not modify these options unless you are an advanced user. The default setting is Enabled.

### ► HECI Message

Do not modify these options unless you are an advanced user. The default setting is Enabled.

### ► EndOf Post S5 HECI Message

Do not modify these options unless you are an advanced user. The default setting is Enabled.

### ► ME-HECI

When this setting is set to [Enabled], Host Embedded Communication Interface (HECI) provides an interface for the exchange of message between the host software and the ME firmware.

### ► ME-IDER

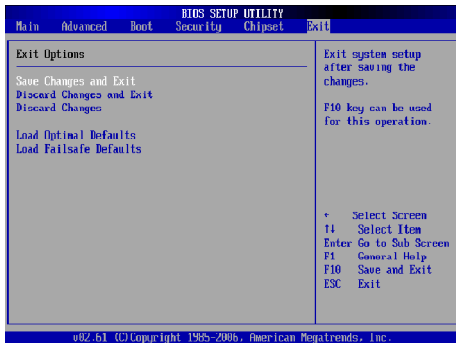
This setting disables/enables the IDE Redirection interface by which the remote management console is able to direct the client PC to boot.

### ► ME-KT

When this setting is set to [Enabled], the KT function help redirect keyboard and POST message to the remote management console and thus facilitates the control of the client machine through the network.



## Exit



### ► Save Changes and Exit

Save changes to CMOS and exit the Setup Utility.

### ► Discard Changes and Exit

Abandon all changes and exit the Setup Utility.

### ► Discard Changes

Abandon all changes and continue with the Setup Utility.

### ► Load Optimal Defaults

Use this menu to load the default values set by the mainboard manufacturer specifically for optimal performance of the mainboard.

### ► Load Failsafe Defaults

Use this menu to load the default values set by the BIOS vendor for stable system performance.



## Chapter 4

# System Resources

This chapter provides information on the following system resources:

1. Watch Dog Timer Setting (p.4-2);
2. AMI POST Code (p.4-3);
3. Resource List (p.4-7).

## Watch Dog Timer Setting

### Software code

SIO\_IDX equ 4EH

SIO\_DTA equ 4FH

Timer equ 10; reset after 10 minutes

1. Enter configuration mode  
mov dx,SIO\_DX  
mov al,87h  
out dx,al  
out dx,al
2. Set to LDN 07  
mov dx,SIO\_DX  
mov al,07h  
out dx,al  
mov dx,SIO\_DTA  
mov al,07h  
out dx,al
3. Set WatchDog Timer  
mov dx,SIO\_DX  
mov al,0f6h  
out dx,al  
mov dx,SIO\_DTA  
mov al,Timer  
out dx,al
4. Exit configuration mode  
mov dx,SIO\_DX  
mov al,0AAh  
out dx,al

## AMI POST Code

### Bootblock Initialization Code Checkpoints

Checkpoint	Description
Before D0	If boot block debugger is enabled, CPU cache-as-RAM functionality is enabled at this point. Stack will be enabled from this point.
D0	Early Boot Strap Processor (BSP) initialization like microcode update, frequency and other CPU critical initialization. Early chipset initialization is done.
D1	Early super I/O initialization is done including RTC and keyboard controller. Serial port is enabled at this point if needed for debugging. NMI is disabled. Perform keyboard controller BAT test. Save power-on CPUID value in scratch CMOS. Go to flat mode with 4GB limit and GA20 enabled.
D2	Verify the boot block checksum. System will hang here if checksum is bad.
D3	Disable CACHE before memory detection. Execute full memory sizing module. If memory sizing module not executed, start memory refresh and do memory sizing in Boot block code. Do additional chipset initialization. Re-enable CACHE. Verify that flat mode is enabled.
D4	Test base 512KB memory. Adjust policies and cache first 8MB. Set stack.
D5	Bootblock code is copied from ROM to lower system memory and control is given to it. BIOS now executes out of RAM. Copies compressed boot block code to memory in right segments. Copies BIOS from ROM to RAM for faster access. Performs main BIOS checksum and updates recovery status accordingly.
D6	Both key sequence and OEM specific method is checked to determine if BIOS recovery is forced. If BIOS recovery is necessary, control flows to checkpoint E0. See <i>Bootblock Recovery Code Checkpoints</i> section of document for more information.
D7	Restore CPUID value back into register. The Bootblock-Runtime interface module is moved to system memory and control is given to it. Determine whether to execute serial flash.
D8	The Runtime module is uncompressed into memory. CPUID information is stored in memory.
D9	Store the Uncompressed pointer for future use in PMM. Copying Main BIOS into memory. Leaves all RAM below 1MB Read-Write including E000 and F000 shadow areas but closing SMRAM.
DA	Restore CPUID value back into register. Give control to BIOS POST (ExecutePOSTKernel). See <i>POST Code Checkpoints</i> section of document for more information.
DC	System is waking from ACPI S3 state
E1-E8 EC-EE	OEM memory detection/configuration error. This range is reserved for chipset vendors & system manufacturers. The error associated with this value may be different from one platform to the next.

### Bootblock Recovery Code Checkpoints

Checkpoint	Description
E0	Initialize the floppy controller in the super I/O. Some interrupt vectors are initialized. DMA controller is initialized. 8259 interrupt controller is initialized. L1 cache is enabled.
E9	Set up floppy controller and data. Attempt to read from floppy.
EA	Enable ATAPI hardware. Attempt to read from ARMD and ATAPI CDROM.
EB	Disable ATAPI hardware. Jump back to checkpoint E9.
EF	Read error occurred on media. Jump back to checkpoint EB.
F0	Search for pre-defined recovery file name in root directory.
F1	Recovery file not found.
F2	Start reading FAT table and analyze FAT to find the clusters occupied by the recovery file.
F3	Start reading the recovery file cluster by cluster.
F5	Disable L1 cache.
FA	Check the validity of the recovery file configuration to the current configuration of the flash part.
FB	Make flash write enabled through chipset and OEM specific method. Detect proper flash part. Verify that the found flash part size equals the recovery file size.
F4	The recovery file size does not equal the found flash part size.
FC	Erase the flash part.
FD	Program the flash part.
FF	The flash has been updated successfully. Make flash write disabled. Disable ATAPI hardware. Restore CPUID value back into register. Give control to F000 ROM at F000:FFF0h.

## POST Code Checkpoints

Checkpoint	Description
03	Disable NMI, Parity, video for EGA, and DMA controllers. Initialize BIOS, POST, Runtime data area. Also initialize BIOS modules on POST entry and GPNV area. Initialize CMOS as mentioned in the Kernel Variable "wCMOSFlags."
04	Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. Verify CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A. Initializes data variables that are based on CMOS setup questions. Initializes both the 8259 compatible PICs in the system
05	Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table.
06	Do R/W test to CH-2 count reg. Initialize CH-0 as system timer. Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt. Traps INT1Ch vector to "POSTINT1ChHandlerBlock."
07	Fixes CPU POST interface calling pointer.
08	Initializes the CPU. The BAT test is being done on KBC. Program the keyboard controller command byte is being done after Auto detection of KB/MS using AML KB-5.
C0	Early CPU Init Start -- Disable Cache -- Init Local APIC
C1	Set up boot strap processor Information
C2	Set up boot strap processor for POST
C5	Enumerate and set up application processors
C6	Re-enable cache for boot strap processor
C7	Early CPU Init Exit
0A	Initializes the 8042 compatible Key Board Controller.
0B	Detects the presence of PS/2 mouse.
0C	Detects the presence of Keyboard in KBC port.
0E	Testing and initialization of different Input Devices. Also, update the Kernel Variables. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Uncompress all available language, BIOS logo, and Silent logo modules.
13	Early POST initialization of chipset registers.
20	Relocate System Management Interrupt vector for all CPU in the system.
24	Uncompress and initialize any platform specific BIOS modules. GPNV is initialized at this checkpoint.
2A	Initializes different devices through DIM. See <i>DIM Code Checkpoints</i> section of document for more information.
2C	Initializes different devices. Detects and initializes the video adapter installed in the system that have optional ROMs.
2E	Initializes all the output devices.
31	Allocate memory for ADM module and uncompress it. Give control to ADM module for initialization. Initialize language and font modules for ADM. Activate ADM module.
33	Initializes the silent boot module. Set the window for displaying text information.
37	Displaying sign-on message, CPU information, setup key message, and any OEM specific information.
38	Initializes different devices through DIM. See <i>DIM Code Checkpoints</i> section of document for more information. USB controllers are initialized at this point.

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39	Initializes DMAC-1 & DMAC-2.
3A	Initialize RTC date/time.
3B	Test for total memory installed in the system. Also, Check for DEL or ESC keys to limit memory test. Display total memory in the system.
3C	Mid POST initialization of chipset registers.
40	Detect different devices (Parallel ports, serial ports, and coprocessor in CPU, ... etc.) successfully installed in the system and update the BDA, EBDA...etc.
52	Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory. Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed.
60	Initializes NUM-LOCK status and programs the KBD typematic rate.
75	Initialize Int-13 and prepare for IPL detection.
78	Initializes IPL devices controlled by BIOS and option ROMs.
7C	Generate and write contents of ESCD in NVRam.
84	Log errors encountered during POST.
85	Display errors to the user and gets the user response for error.
87	Execute BIOS setup if needed / requested. Check boot password if installed.
8C	Late POST initialization of chipset registers.
8D	Build ACPI tables (if ACPI is supported)
8E	Program the peripheral parameters. Enable/Disable NMI as selected
90	Initialization of system management interrupt by invoking all handlers. <i>Please note this checkpoint comes right after checkpoint 20h</i>
A1	Clean-up work needed before booting to OS.
A2	Takes care of runtime image preparation for different BIOS modules. Fill the free area in F000h segment with 0FFh. Initializes the Microsoft IRQ Routing Table. Prepares the runtime language module. Disables the system configuration display if needed.
A4	Initialize runtime language module. Display boot option popup menu.
A7	Displays the system configuration screen if enabled. Initialize the CPU's before boot, which includes the programming of the MTRR's.
A9	Wait for user input at config display if needed.
AA	Uninstall POST INT 1Ch vector and INT09h vector.
AB	Prepare BBS for Int 19 boot. Int MP tables.
AC	End of POST initialization of chipset registers. De-initializes the ADM module.
B1	Save system context for ACPI. Prepare CPU for OS boot including final MTRR values.
00	Passes control to OS Loader (typically INT19h).



## Resource List

### PCI Device

Device	Vender ID	Device ID	Bus#	Dev#	Func#
Host Bridge	8086	29B0	0	0	0
VGA Controller	8086	29B2	0	2	0
Communications Device	8086	29B4	0	3	0
IDE Controller	8086	29B6	0	3	2
16550 Controller	8086	29B7	0	3	3
Ethernet Controller	8086	10BD	0	19	0
USB UHCI	8086	2937	0	1A	0
USB EHCI	8086	293C	0	1A	7
High Definition Audio	8086	293E	0	1B	0
PCI/PCI Bridge	8086	2940	0	1C	0
PCI/PCI Bridge	8086	2942	0	1C	1
PCI/PCI Bridge	8086	2944	0	1C	2
USB UHCI	8086	2934	0	1D	0
USB UHCI	8086	2935	0	1D	1
USB UHCI	8086	2936	0	1D	2
USB EHCI	8086	293A	0	1D	7
Decode PCI/PCI Bridge	8086	244E	0	1E	0
ISA Bridge	8086	2914	0	1F	0
IDE Controller	8086	2920	0	1F	2
SMBus Controller	8086	2930	0	1F	3
IDE Controller	8086	2926	0	1F	5
Other Data Acquisition	8086	2932	0	1F	6
Ethernet Controller	8086	109A	2	0	0
IDE Controller	197B	2368	3	0	0

Any advice or comments about our products and service, or anything we can help you with please don't hesitate to contact with us. We will do our best to support you for your products, projects and business.

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