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User's Manual

2808060 Mini-ITX Mainboard

Version 1.0, October 2008

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Chapter 1
Product Overview

Thank you for choosing the 2808060 Mini ITX mainboard from Global American Inc.

Based on the innovative **Intel® GM45** & **ICH9M-E** controllers for optimal system efficiency, the 2808060 accommodates the latest **Intel® Penryn/Core 2 Duo/ Celeron M** processors and supports two DDR2 667/ 800MHz SO-DIMM slots to provide the maximum of 4GB memory capacity.

In the entry-level and mid-range market segment, the 2808060 can provide a high-performance solution for today's front-end and general purpose workstation, as well as in the future.

Mainboard Specifications

Processor
- Intel Penryn/Core 2 Duo/Celeron M CPU
- Supports 4-pin CPU fan pin-header with Fan Speed Control
- Supports Intel Dual Core Technology to 667/800/1066MHz and up

FSB
- 667/800/1066MHz

Chipset
- North Bridge: Intel GM45 chipset
- South Bridge: Intel ICH9M-E chipset

Memory
- Unbuffer Non-ECC DDR2 667/800 SDRAM (4GB Max)
- 2 DDR2 SO-DIMM slots (200-pin / 1.8V)

LAN
- Supports Gigabit Ethernet by Intel 82567LM & 82574L

Audio
- HDA Codec by Realtek ALC888 7.1 channel
- Compliant with Azalia 1.0 specs
- 6 watt amplifier

IDE
- 1 IDE port by JMicron JMB368
- Supports Ultra DMA 66/100 mode
- Supports PIO, Bus Master operation mode

CF (Optional)
- 1 CF Type II socket (Master) by JMicron JMB368

SATA
- 4 SATA II ports by ICH9M-E
- Supports storage and data transfers at up to 3Gb/s
- ICH9M-E supports RAID 0, 1

Connectors

► **Back Panel**
- 1 PS/2 mouse port
- 1 PS/2 keyboard port
- 1 RS-232/422/485 serial port
- 1 HDMI port
- 1 D-Sub VGA port
- 1 DVI port
- 2 RJ-45 LAN jacks
- 4 USB 2.0 ports
- 3 audio jacks

► **Onboard Connectors**
- 1 front panel audio pinheader
- 2 USB 2.0 pinheaders (4 ports)
- 4 RS-232 serial port connectors
- 1 SPI Flash ROM pinheader (for debugging)
- 1 S/PDIF-out pinheader
- 1 LVDS connector
- 1 amplifier connector

Slots

- 1 Mini PCI-E slot
- 1 PCI Express x1 slot
- 1 32-bit/33MHz PCI slot
- 1 CF socket (optional)

Form Factor

- Mini ITX: 170mm x 170mm

Mounting

- 4 mounting holes

Environmental

► **Storage Environment**
- Temperature: -20°C ~ 80°C

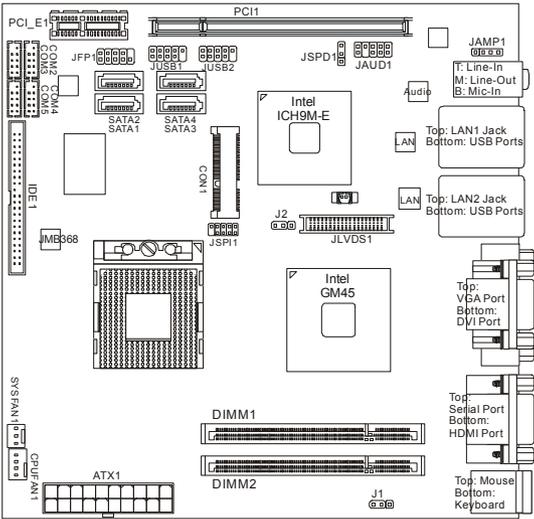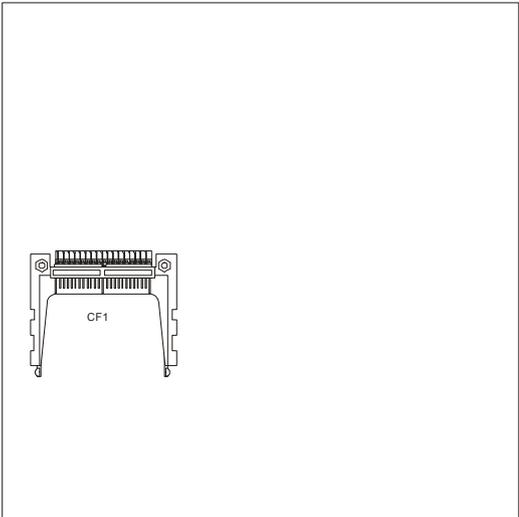- Humidity: 5% ~ 90% non condensing

► **Operation Environment**
- Temperature: 0°C ~ 60°C
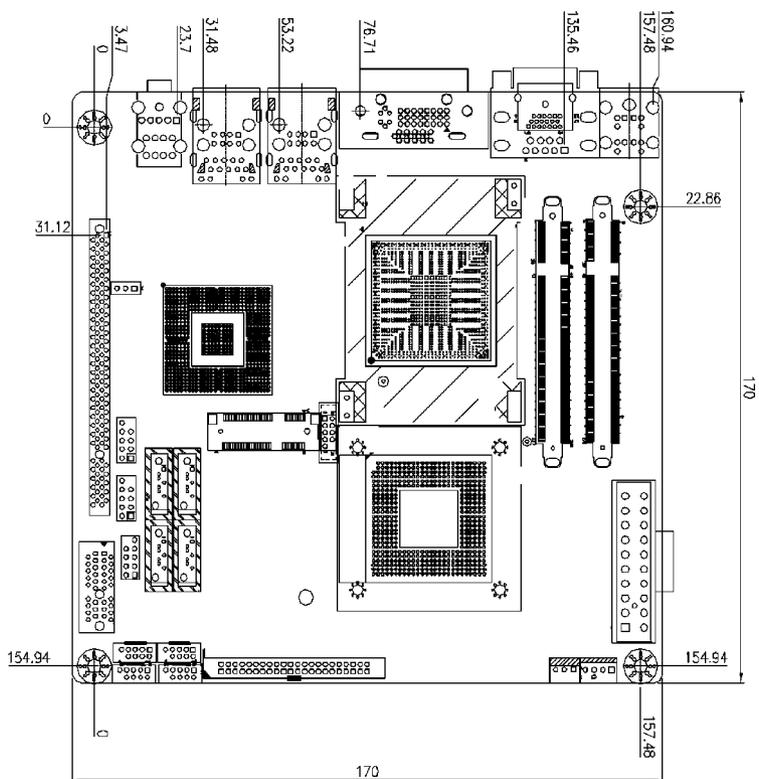- Humidity: 5% ~ 90% non condensing

Block Diagram
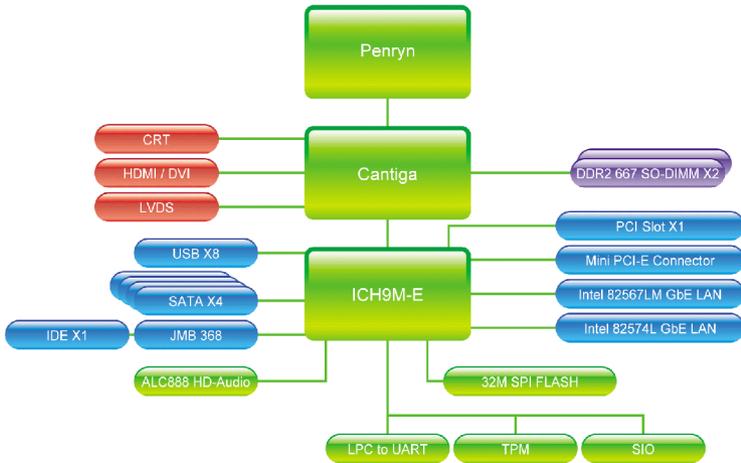
NOTE: Please refer to page 3-14 for configurations of the optional Intel AMT (Active Management Technology) function.

Mainboard Layout

2808060 Mini ITX Mainboard

Board Dimension

Back Panel & I/O Shield Drawing
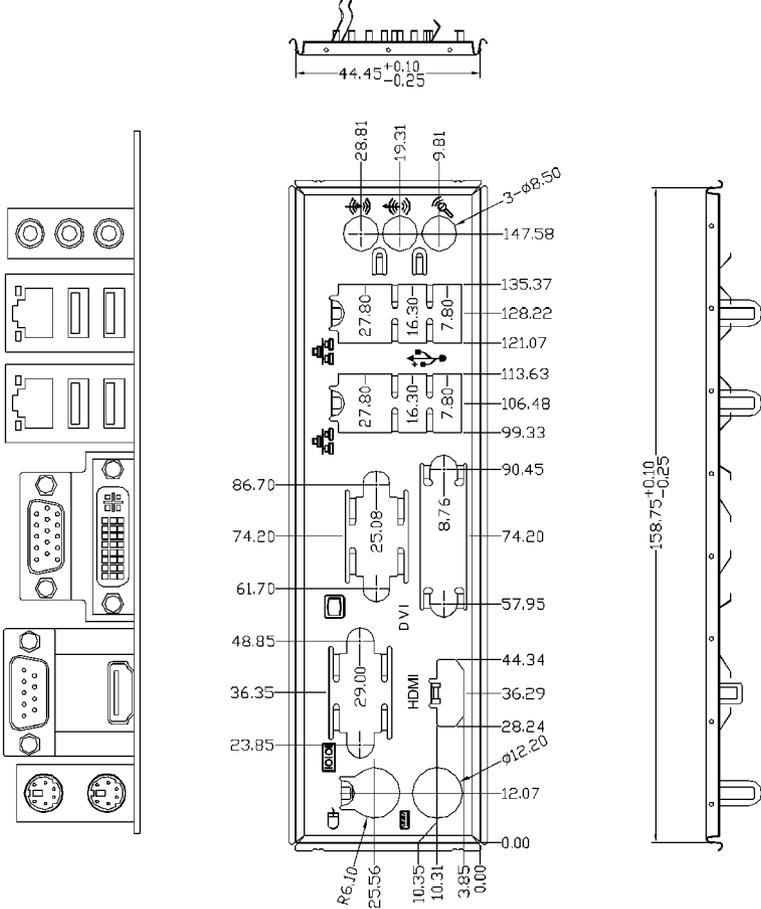
Power Consumption

Component	Description
CPU	Intel Core 2 Duo 2.2G CPU
Memory	Transcend 667MHz DDR2 1GB
Add-On VGA	NA
Hard Disk	Seagate Momentus 5400.3 160 GB SATA Hard Drive
Operating system	Microsoft Windows XP Professional SP2

	Idle		Stress utility		3DMARK		Xcopy	
	Current		Current		Current		Current	
+3.3V	0.700	A	0.720	A	0.700	A	0.69	A
+5V	1.540	A	1.620	A	2.970	A	2.62	A
+12V	0.390	A	2.530	A	1.400	A	0.56	A
+5VSB	56.00	mA	54.00	mA	56.00	mA	57.000	mA
-12V	42.00	mA	45.00	mA	36.00	mA	44.00	mA
Power line @115VoltsAC	0.170	A	0.470	A	0.310	A	0.40	A
TOTAL POWER	15.474	Watts	41.646	Watts	34.672	Watts	22.910	Watts

	S1		S3		Soft Off	
	Current		Current		Current	
+3.3V	0.64	A		A		A
+5V	1.36	A		A		A
+12V	0.42	A		A		A
+5VSB	52.000	mA	345.000	mA	218.000	mA
-12V	40.00	mA		mA		mA
Power line @115VoltsAC	0.20	A	63.00	mA	50.00	mA
TOTAL POWER	14.692	Watts	1.725	Watts	1.090	Watts

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	

MTBF - Reliability Prediction

Calculation Model	Operation Temperature (℃)	Operating Environment	Duty Cycle	MTBF(hr.)
Telcordia Issue 1	35	GF, GU –Ground Fixed, Uncontrolled	13,575.994631	73,659

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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

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JUSB1~2, *p.2-14*

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PCI_E1, *p.2-17*

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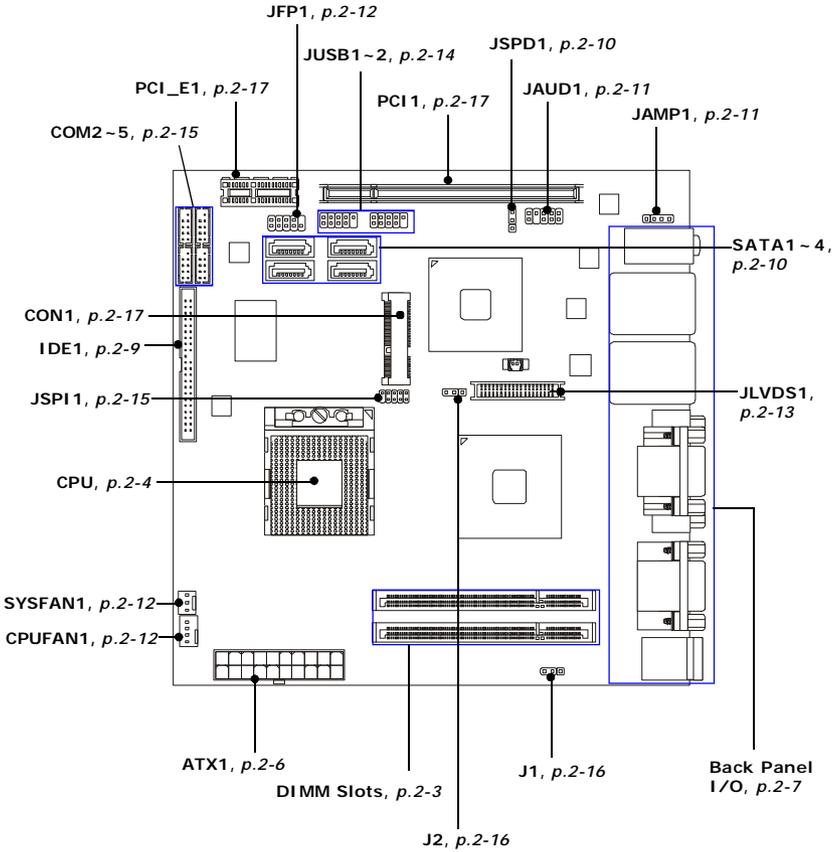
Memory

The DIMM slots are intended for system memory modules.
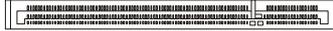
DDR2 SO-DIMM Slot
200-pin, 1.8V

Installing Memory Modules

1. Locate the SO-DIMM slots on the mainboard.
2. Align the notch on the DIMM with the key on the slot. Insert the DIMM vertically into the SO-DIMM slot. Then push it in until the golden finger on the DIMM is deeply inserted in the SO-DIMM slot.
3. Manually check if the DIMM has been locked in place by the retaining clips at the sides.

Important

*1. Make sure that you **install the memory modules first** before installing the CPU and cooler set.*
*2. Always insert the memory module into **the DIMM1 first**.*

CPU (Central Processing Unit)

The mainboard supports **Intel® Penryn/Core 2 Duo/Celeron M** processors in Socket P. When you are installing the CPU, **make sure the CPU has a heat sink and a cooling fan attached on the top to prevent overheating.** If you do not have the heat sink and cooling fan, contact your dealer to purchase and install them before turning on the computer.

Important

1. *Overheating will seriously damage the CPU and system. Always make sure the cooling fan can work properly to protect the CPU from overheating.*
2. *Make sure that you apply an even layer of heat sink paste (or thermal tape) between the CPU and the heatsink to enhance heat dissipation.*
3. *While replacing the CPU, always turn off the power supply or unplug the power supply's power cord from the grounded outlet first to ensure the safety of CPU.*

Socket P CPU Installation

1. Locate the CPU socket on the mainboard.

2. Place the CPU on top of the socket. Make sure that you align the gold arrow on the CPU with the arrow key on the socket.
3. Push the CPU down until its pins securely fit into the socket.

4. On the front end of the CPU socket is a locking mechanism designed into the form of a screw head. Make sure that you actuate or deactuate this mechanism with a screwdriver before and after installing the CPU.
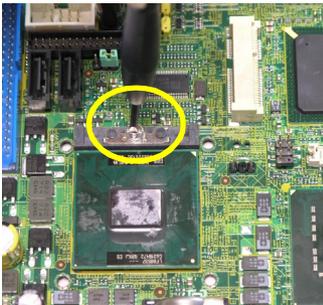
Important

Mainboard photos shown in this section are for demonstration only and may differ from the actual look of your mainboard.

Power Supply

ATX 20-Pin System Power Connector: ATX1

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.

ATX1

```
 1 ┌─────────────────┐ 10
11 └─────────────────┘ 20
```
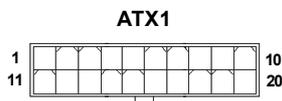
Pin Definition

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

Important

*Power supply of **200watts** (and above) is highly recommended for system stability.*

Back Panel
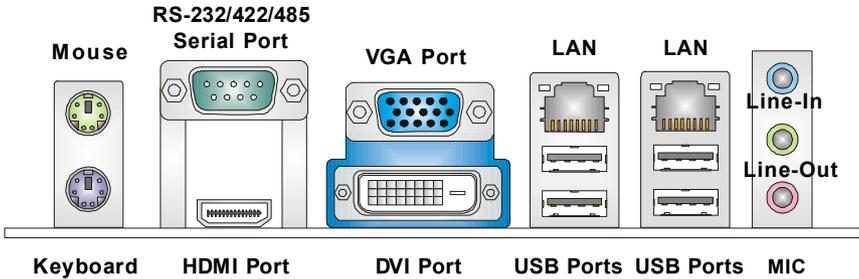
▶ **Mouse/Keyboard**
The standard PS/2® mouse/keyboard DIN connector is for a PS/2® mouse/keyboard.

▶ **Serial 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.

▶ **HDMI Port**
The High-Definition Multimedia Interface (HDMI) is an all-digital audio/video interface capable of transmitting uncompressed streams. HDMI supports all TV format, including standard, enhanced, or high-definition video, plus multi-channel digital audio on a single cable.

▶ **VGA Port**
The DB15-pin female connector is provided for monitor.

▶ **DVI-D Port**
The DVI-D (Digital Visual Interface-Digital) connector allows you to connect an LCD monitor. It provides a high-speed digital interconnection between the computer and its display device. To connect an LCD monitor, simply plug your monitor cable into the DVI connector, and make sure that the other end of the cable is properly connected to your monitor (refer to your monitor manual for more information.)

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

► LAN

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

Activity Indicator ———— Speed Indicator
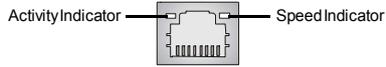
		Left LED	Right LED
		Active LED	**100M/1000M Speed LED**
LED Color		Yellow	Green/Orange
10M Cable Plug-in	**No Transmission**	OFF	OFF
	Transition	Yellow(Blinking)	OFF
100M Cable Plug-in	**No Transmission**	OFF	Green(Lighting)
	Transition	Yellow(Blinking)	Green(Lighting)
1000M Cable Plug-in	**No Transmission**	OFF	Orange(Lighting)
	Transition	Yellow(Blinking)	Orange(Lighting)
In S3/S4/S5 Standby State		Green (Lighting)	OFF

► 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 (Blue)** - Line In, is used for external CD player, tapeplayer or other audio devices.

■ **Line-Out (Green)** - Line Out, is a connector for speakers or headphones.

■ **Mic (Pink)** - Mic, is a connector for microphones.

Connector

IDE Connector: IDE1

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

IDE1
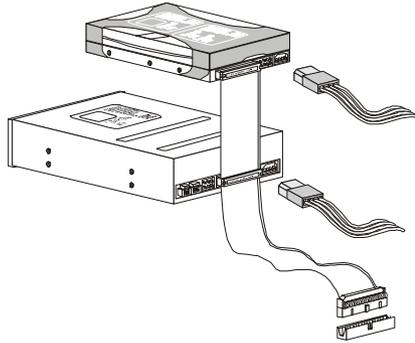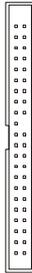
> ### Important
>
> *If you install two IDE devices on the same cable, you must configure the drives separately to master / slave mode by setting jumpers. Refer to IDE device's documentation supplied by the vendors for jumper setting instructions.*

S/PDIF-Out Connector: JSPD1 (Optional)

This connector is used to connect S/PDIF (Sony & Philips Digital Interconnect Format) interface for digital audio transmission.

JSPD1

GND ——
S/PDIF-Out ——
5V ——

S/PDIF Bracket (Optional)
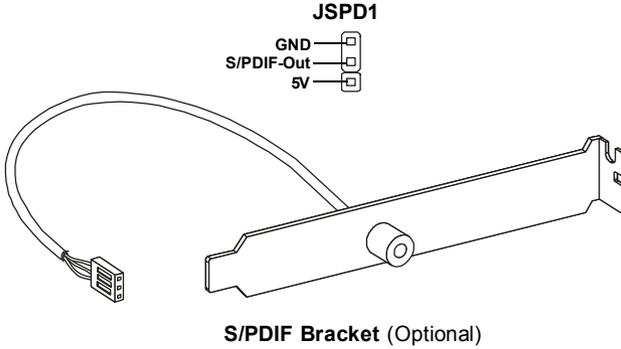
Serial ATA II Connector: SATA1 ~ SATA4

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

SATA2   SATA4

SATA1   SATA3
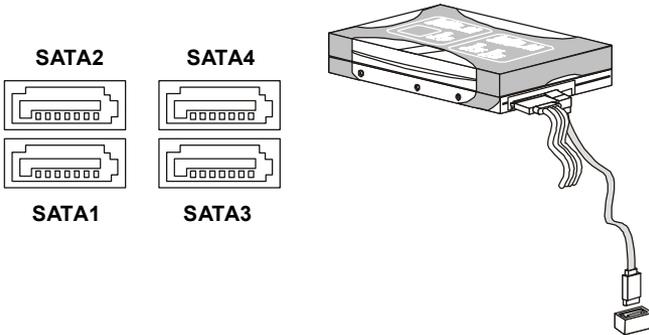
Important

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

Audio Amplifier Connector: JAMP1

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

Pin Definition

JAMP1

1 □ □ □ □

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

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.

JAUD1

9 □ □ □ □ □ 1
10 □ □ □ □ □ 2
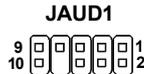
HD Audio Pin Definition

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	LINE out_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	LINE out_L	Analog Port - Left channel
10	LINEout_JD	Jack detection return from front panel JACK2

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.

CONTROL		SENSOR	
SENSOR		+12V	
+12V		GND	
GND			

CPUFAN1   **SYSFAN1**

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.

Power Power
LED   Switch

JFP1   2   10
       1   9

HDD Reset
LED Switch
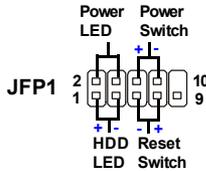
JFP1 Pin Definition

PIN	SIGNAL	DESCRIPTION
1	HD_LED +	Hard disk LED pull-up
2	FP PWR/SLP	MSG LED pull-up
3	HD_LED -	Hard disk active LED
4	FP PWR/SLP	MSG LED pull-up
5	RST_SW -	Reset Switch low reference pull-down to GND
6	PWR_SW+	Power Switch high reference pull-up
7	RST_SW +	Reset Switch high reference pull-up
8	PWR_SW-	Power Switch low reference pull-down to GND
9	RSVD_DNU	Reserved. Do not use.

LVDS Flat Panel Connector: JLVDS1

The LVDS (Low Voltage Differential Signal) connector provides a digital interface typically used with flat panels. After connecting an LVDS interfaced flat panel to the JLVDS1, be sure to check the panel datasheet and set the J2 jumper (p. 2-16) for proper power voltage.

JLVDS1
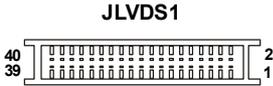
Display Matrix

	CRT	LVDS	DVI	HDMI
CRT		V	V	V
LVDS	V		V	V
DVI	V	V		V
HDMI	V	V	V	

SIGNAL	PIN		SIGNAL
+12V	2	1	+12V
+12V	4	3	+12V
GND	6	5	+12V
GND	8	7	VCC3/VCC5
LCD_VDD	10	9	LCD_VDD
LDDC_DATA	12	11	LDDC_CLK
LVDS_VDDEN	14	13	L_BKLTCTL
GND	16	15	L_BKLTEN
LA_DATA0	18	17	LA_DATA0#
LA_DATA1	20	19	LA_DATA1#
LA_DATA2	22	21	LA_DATA2#
LA_CLK	24	23	LA_CLK#
LA_DATA3	26	25	LA_DATA3#
GND	28	27	GND
LB_DATA0	30	29	LB_DATA0#
LB_DATA1	32	31	LB_DATA1#
LB_DATA2	34	33	LB_DATA2#
LB_CLK	36	35	LB_CLK#
LB_DATA3	38	37	LB_DATA3#
GND	40	39	GND

Front USB Connector: JUSB1, JUSB2

This connector, 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**.

Pin Definition

JUSB1/2

PIN	SIGNAL	PIN	SIGNAL
1	VCC	2	VCC
3	USB0-	4	USB1-
5	USB0+	6	USB1+
7	GND	8	GND
9	Key(no pin)	10	NC

USB 2.0 Bracket
(Optional)
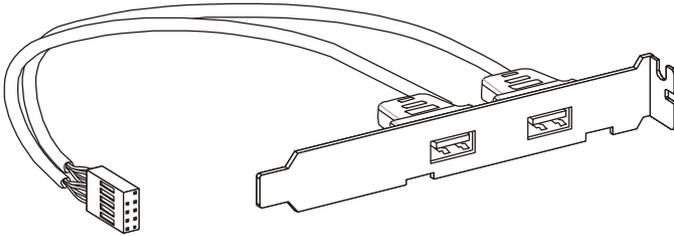
Important

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

RS-232 Serial Port Connector: COM2 ~ COM5

This connector is a 16550A high speed communications port that sends/receives 16 bytes FIFOs. You can attach a serial device to it through the optional serial port bracket.

COM2/3/4/5

```
10 [ . . ] 9
   [ . . ]
   [ . . ]
2  [ . . ] 1
```

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	VCC_COM3	Power Source

SPI Flash ROM Connector: JSPI1

This connector is used to flash SPI flash ROM.

JSPI1

```
9  [□□□□□] 1
10 [□□□□□] 2
```

Pin Definition

Pin	Description	Pin	Description
1	VCC3_SB	2	VCC3_SB
3	SPI_MISO_F	4	SPI_MOSI_F
5	SPI_CS0_F#	6	SPI_CLK_F
7	GND	8	GND
9	SPI_HOLD#	10	NC

Jumper

Serial Port Power Jumper: J1

This jumper specifies the operation voltage of the onboard serial ports.

J1

+12V

+5V
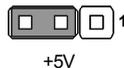
LVDS Power Jumper: J2

Use this jumper to specify the LVDS power.

J2

+3V

+5V
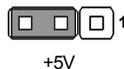
Slot

PCI (Peripheral Component Interconnect) Express Slot

The PCI Express slot supports PCI Express interface expansion cards.
The PCI Express x 1 slot supports up to 250 MB/s transfer rate.
The CON1 is Mini PCI-E connector for wireless LAN, TV tuner, and Robson NAND Flash.

Mini PCI-E Slot

PCI Express x1 Slot

PCI (Peripheral Component Interconnect) Slot

The PCI slot supports LAN card, SCSI card, USB card, and other add-on cards that comply with PCI specifications.

32-bit PCI Slot

CompactFlash Card Slot: CF1 (Optional)

This CompactFlash slot shares one channel of the IDE controller. **The default setting is Master.**

CF1
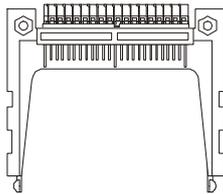
Important

When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to configure any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.

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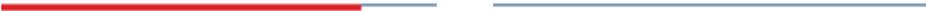
Chapter 3
BIOS Setup

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:

   A9818IMS V1.0 081508 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.
   081508 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 >.

▶ Primary IDE Master
▶ Secondary IDE Master

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

```
                         BIOS SETUP UTILITY
 Main    Advanced    Boot    Security    Chipset    Exit

 System Overview                          Use [ENTER], [TAB]
                                          or [SHIFT-TAB] to
 AMIBIOS                                  select a field.
 Version    :08.00.15
 Build Date:08/01/08                      Use [+] or [-] to
 ID         :A981810H                     configure system Time.

 Processor
 Genuine Intel(R) CPU          @ 2.40GHz
 Speed      :2400MHz
 Count      :1

 System Memory                            ←     Select Screen
 Size       :989MB                        ↑↓    Select Item
                                          +-    Change Field
 System Time          [16:38:45]          Tab   Select Field
 System Date          [Sun 01/06/2002]    F1    General Help
                                          F10   Save and Exit
                                          ESC   Exit

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```

► **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.

► **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

```
                    BIOS SETUP UTILITY
  Main    Advanced    Boot    Security    Chipset    Exit

  System Overview                              Use [ENTER], [TAB]
                                               or [SHIFT-TAB] to
  AMIBIOS                                      select a field.
  Version   :08.00.15
  Build Date:08/01/08                          Use [+] or [-] to
  ID        :A981810H                          configure system Time.

  Processor
  Genuine Intel(R) CPU           @ 2.40GHz
  Speed     :2400MHz
  Count     :1

  System Memory                            ←   Select Screen
  Size      :989MB                         ↑↓  Select Item
                                           +-  Change Field
  System Time            [16:38:45]        Tab Select Field
  System Date            [Sun 01/06/2002]  F1  General Help
                                           F10 Save and Exit
                                           ESC Exit

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```

▶ **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

```
                    BIOS SETUP UTILITY
 Main   Advanced   Boot   Security   Chipset   Exit

 Advanced Settings                          Configure CPU.

 WARNING: Setting wrong values in below sections
          may cause system to malfunction.

 ▶ CPU Configuration
 ▶ IDE Configuration
 ▶ SuperIO Configuration
 ▶ Hardware Health Configuration
 ▶ ACPI Configuration
 ▶ ASF Configuration
 ▶ Intel AMT Configuration
 ▶ MPS Configuration                        ←    Select Screen
 ▶ Remote Access Configuration              ↑↓   Select Item
 ▶ Trusted Computing                        Enter Go to Sub Screen
 ▶ USB Configuration                        F1    General Help
                                            F10   Save and Exit
                                            ESC   Exit

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```
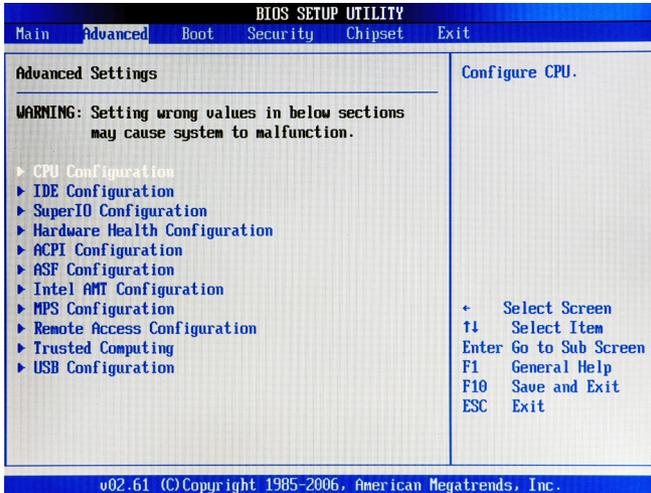
► **CPU Configuration**

```
                    Advanced

 Configure advanced CPU settings
 Module Version:3F.0D

 Manufacturer:Intel
 Genuine Intel(R) CPU              @ 2.40GHz
 Frequency    :2.40GHz
 FSB Speed    :1068MHz
 Cache L1     :64 KB
 Cache L2     :6144 KB
 Ratio Actual Value:9

 Hardware Prefetcher              [Enabled]
 Adjacent Cache Line Prefetch     [Enabled]
 Max CPUID Value Limit            [Disabled]
 Intel(R) Virtualization Tech     [Enabled]
 Execute-Disable Bit Capability   [Enabled]
 Core Multi-Processing            [Enabled]
```

► Hardware Prefetcher

The processor has a hardware prefetcher that automatically analyzes its requirements and prefetches data and instructions from the memory into the Level 2 cache that are likely to be required in the near future. This reduces the latency associated with memory reads. When enabled, the processor's hardware prefetcher will be enabled and allowed to automatically prefetch data and code for the processor. When disabled, the processor's hardware prefetcher will be disabled.

► Adjacent Cache Line Prefetch

The processor has a hardware adjacent cache line prefetch mechanism that automatically fetches an extra 64-byte cache line whenever the processor requests for a 64-byte cache line. This reduces cache latency by making the next cache line immediately available if the processor requires it as well. When enabled, the processor will retrieve the currently requested cache line, as well as the subsequent cache line. When disabled, the processor will only retrieve the currently requested cache line.

► Max CPUID Value Limit

The Max CPUID Value Limit BIOS feature allows you to circumvent problems with older operating systems that do not support the Intel Pentium 4 processor with Hyper-Threading Technology. When enabled, the processor will limit the maximum CPUID input value to 03h when queried, even if the processor supports a higher CPUID input value. When disabled, the processor will return the actual maximum CPUID input value of the processor when queried.

► Intel(R) Virtualization Tech

Virtualization enhanced by Intel Virtualization Technology will allow a platform to run multiple operating systems and applications in independent partitions. With virtualization, one computer system can function as multiple "virtual" systems.
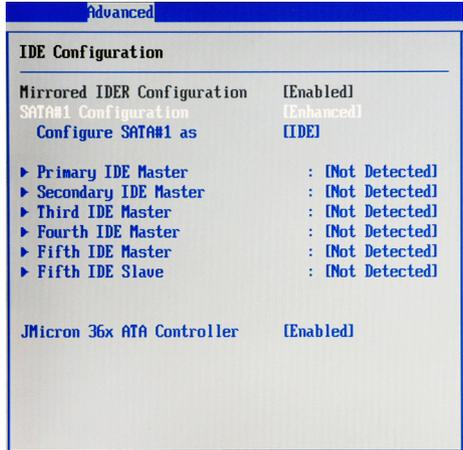
► Execute Disable Bit Capability

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

CMP (Core Multi Processing) is the ability to have many independent processing cores on a single die, each with their own L1 Code & Data caches, Local APICs & thermal controls, while having a shared L2 cache, power management & bus interface. Intel multi-core architecture has a single Intel processor package that contains two or more processor "execution cores," or computational engines to enable enhanced performance and more-efficient simultaneous processing of multiple tasks.

►IDE Configuration

```
                    Advanced

 IDE Configuration

 Mirrored IDER Configuration   [Enabled]
 SATA#1 Configuration          [Enhanced]
   Configure SATA#1 as         [IDE]

 ▶ Primary IDE Master           : [Not Detected]
 ▶ Secondary IDE Master         : [Not Detected]
 ▶ Third IDE Master             : [Not Detected]
 ▶ Fourth IDE Master            : [Not Detected]
 ▶ Fifth IDE Master             : [Not Detected]
 ▶ Fifth IDE Slave              : [Not Detected]


 JMicron 36x ATA Controller    [Enabled]
```

► Mirrored IDER Configuration
This setting enables/disables the mirrored IDE RAID drive.

► SATA#1 Configuration
This setting specifies the operation mode of SATA ports.

► Configure SATA#1 as
This setting specifies the function of the on-chip SATA controller.

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

|	
[Type]	Press PgUp/<+> or PgDn/<-> to select [Manual], [None] or [Auto] type. Note that the 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.
[LBA/Large Mode]	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 IDE controller

► JMicron 36x ATA Controller
This setting enables/disables the onboard JMicron IDE controller.

► Super IO Configuration
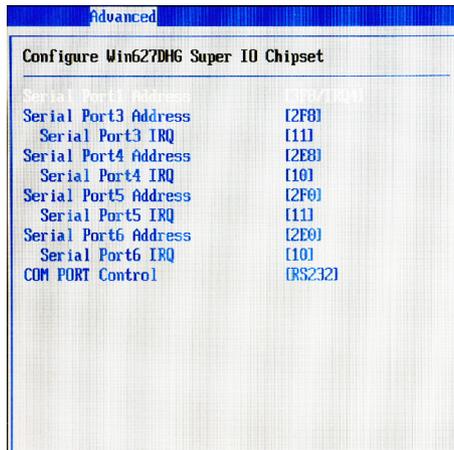
► Serial Port 1/3/4/5/6 Address/IRQ
Select an address and a corresponding interrupt for the specified serial ports.

► COM Port Control
This setting specifies the operation mode of the serial port on the back panel.

► **Hardware Health Configuration**

These items display the current status of the monitored hardware devices/components such as voltages and temperatures.

```
┌─────────────────────────────────────────────────┐
│              Advanced                            │
├─────────────────────────────────────────────────┤
│ Hardware Health Configuration               ▲    │
│                                                  │
│ CPU Temperature            :60°C/140°F           │
│ System Temperature         :36°C/96°F            │
│                                                  │
│ CPUFAN0 Speed              :7670 RPM             │
│                                                  │
│ Vcore                      :1.128 V              │
│ 3.3V                       :3.232 V              │
│ 5V                         :4.940 V              │
│ +12V                       :11.932 V             │
│ 3.3VSB                     :3.232 V              │
│ VBAT                       :3.152 V              │
│ AUXFAN Mode Setting        [Speed Cruise Mode]   │
│   AUXFAN TargetSpeed Value [055]                 │
│   AUXFAN Tolerance Value   [03]                  │
│ CPUFAN1 Mode Setting       [Thermal Cruise Mod]  │
│   CPUFAN1 TargetTemp Value [100]                 │
│   CPUFAN1 Tolerance Value  [03]                  │
│   CPUFAN1 StartUp Value    [096]               ▼ │
│   CPUFAN1 Stop Value       [064]                 │
│   CPUFAN1 StopTime Value   [060]               ▼ │
└─────────────────────────────────────────────────┘
```

► **CPUFAN1 Mode Setting, SYSFAN1 Mode Setting**

This item enables or disables the Smart Fan feature. Smart Fan is an excellent feature which will adjust the CPU/system fan speed automatically depending on the current CPU temperature to prevent your system from overheating.
Available options are: [Manual Mode], [Thermal Cruise Mode], [Speed Cruise Mode].

[Manual Mode]

  ► **CPUFAN1 PWM Control, SYSFAN1 PWM Control**

  This setting allows users to control the fan speed by changing the duty cycle of the fan PWM (Pulse-Width Modulation) output.

[Speed Cruise Mode]

  ► **CPUFAN1 TargetSpeed Value, SYSFAN1 TargetSpeed Value,**

  Select a fan speed setting here, and if the fan speed of the CPU/system fans climbs up to the selected fan speed setting, the system will automatically increase the speed of the CPU/system fan to cool down the overheated CPU.

  ► **CPUFAN1 Tolerance Value, SYSFAN1 Tolerance Value**

  You can select a fan tolerance value here for the specific range for the "CPUFAN1/SYSFAN1/SYSFAN2 TargetSpeed Value" items. If the current fan

speeds reach the maximum threshold (the fan speed set in the "CPUFAN1/ SYSFAN1 TargetSpeed Value" plus the tolerance values you set here), the fans will speed up for cooling down. On the contrary, if the current fan speeds reach to the minimum threshold (the set fan speeds minus the toler- ance values), the fans will slow down to keep the temperatures stable.

[Thermal Cruise Mode]

▶ **CPUFAN1 TargetTemp Value, SYSFAN1 TargetTemp Value**
Select a temperature setting here, and if the temperature of the CPU climbs up to the selected temperature setting, the system will automatically in- crease the speed of the CPU/system fan to cool down the overheated CPU.

▶ **CPUFAN1 Tolerance Value, SYSFAN1 Tolerance Value**
You can select a fan tolerance value here for the specific range for the "CPUFAN1/SYSFAN1 TargetTemp Value" items. If the current temperatures of the 3 fans reach to the maximum threshold (the temperatures set in the "CPUFAN1/SYSFAN1 TargetTemp Value" plus the tolerance values you set here), the fans will speed up for cooling down. On the contrary, if the current temperatures reach to the minimum threshold (the set temperatures minus the tolerance values), the fans will slow down to keep the tempera- tures stable.
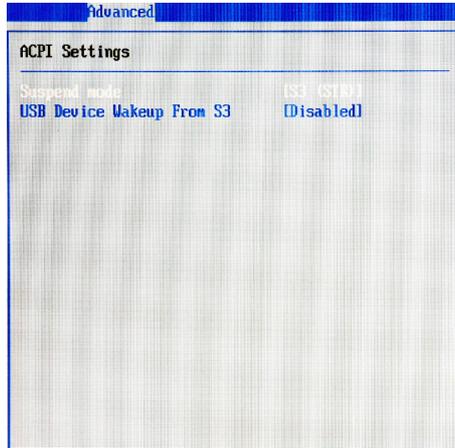
▶ **CPUFAN1/SYSFAN1 StartUp Value, CPUFAN1/SYSFAN1 Stop Value**
Use these settings to select the startup/stop temperature value for the CPUFAN1 & SYSFAN1.

▶ **CPUFAN1/SYSFAN1 Stop Time Value**
Use these settings to select the stop time value for the CPUFAN1 & SYSFAN1.

► ACPI Configuration

### ► 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.
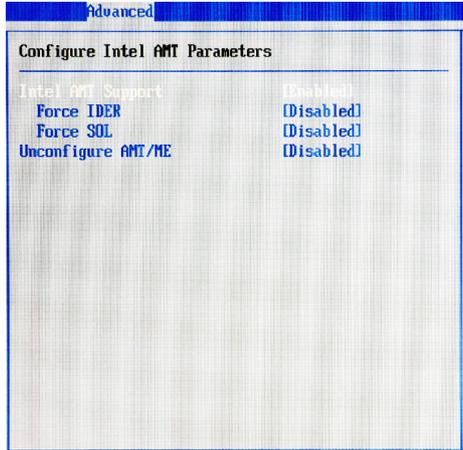
► USB Device Wakeup From S3
This setting allows the activity of the USB device to wake up the system from the S3 sleep state.

▶ **ASF Configuration**

Advanced

Configure ASF Parameters

ASF Support   [Enabled]
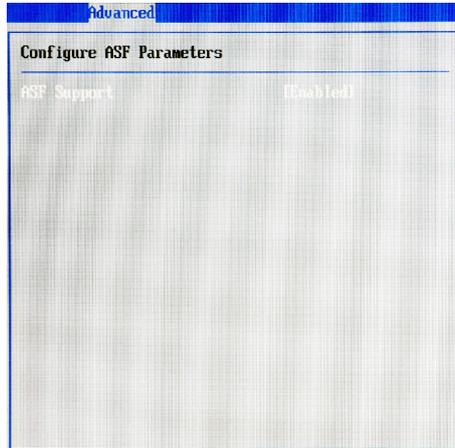
▶ **ASF Support**
Alert Standard Format (ASF) is an industry standard protocol used with Local
Area Network (LAN) controllers. This protocol is designed for use with system
management through the network to improve system health monitoring, asset
protection and remote administration. ASF helps define the interfaces that pro-
vide access and manageability to operating system absent environments.

► **Intel AMT Configuration** *(Optional)*

```
                    Advanced

        Configure Intel AMT Parameters

        Intel AMT Support              [Enabled]
          Force IDER                   [Disabled]
          Force SOL                    [Disabled]
        Unconfigure AMT/ME             [Disabled]
```

► **Intel AMT Support**
Intel Active Management Technology (AMT) is hardware-based technology for remotely managing and securing PCs out-of-band.

► **Force IDER, Force SOL**
SOL/ IDER (Serial Over LAN/ IDE-Redirection) is a protocol defined for Intel Active Management Technology that allows redirecting the keyboard/text or floppy disk/CD transfers from a local host to a remote workstation. In order to manage a system remotely we need a capability to send console text to a remote destination and to receive keystrokes from a remote source and this capability is referred to as Serial Over LAN. The platform can also be configured to read from or write to a remote floppy disk or CD by redirecting the IDE interface.

► **Unconfigure AMT/ME**
To finish the unconfiguration of AMT, set this setting to [Enabled] and the BIOS will unconfigure all of AMT/ME settings and all the passwords are reset.

► MPS Configuration

```
          Advanced

MPS Configuration

MPS Revision              [1.4]
```
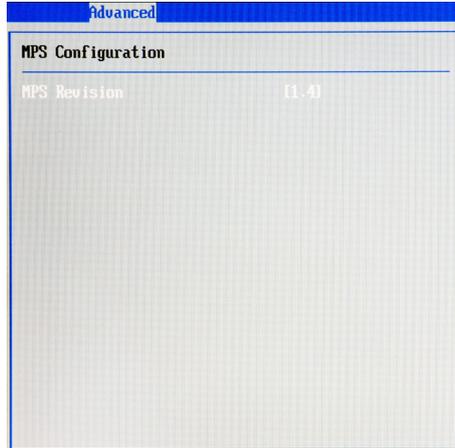
► MPS Revision
This field allows you to select which MPS (Multi-Processor Specification) version to be used for the operating system. You need to select the MPS version supported by your operating system. To find out which version to use, consult the vendor of your operating system.
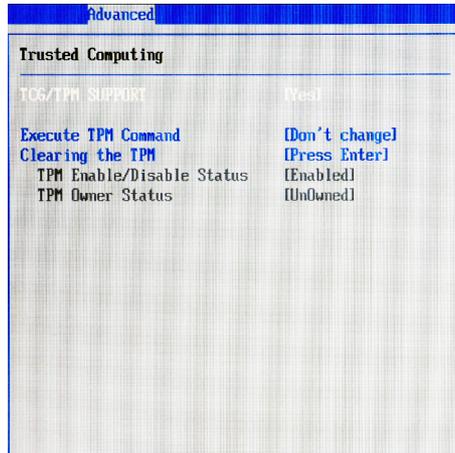
► **Remote Access Configuration**
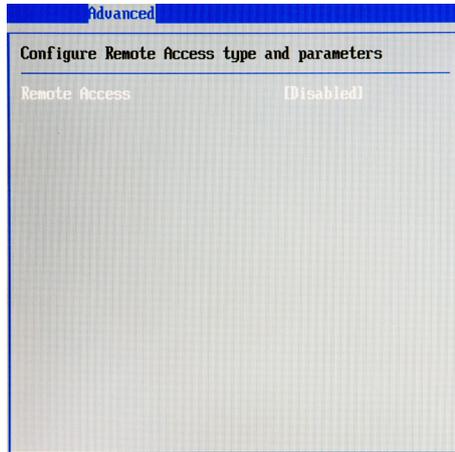
► **Remote Access**
The setting enables/disables the remote access function. When set to [Enabled], users may configure the following settings for remote access type and parameters.

► **Trusted Computing**

► **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.*

► **Execute TPM Command**
TPM commands are managed through a child node of the TPM Management console named Command Management. To block or allow a TPM command is a task that local administrators can perform during the setup or re-configuration of a TPM-equipped computer.

► **Clearing the TPM**
When the TPM is cleared, all the keys you previously had stored on your vault will be lost. You should create an archive of your TPM Keys before clearing the TPM. To recover your TPM keys, you will need to restore your keys from an archive.
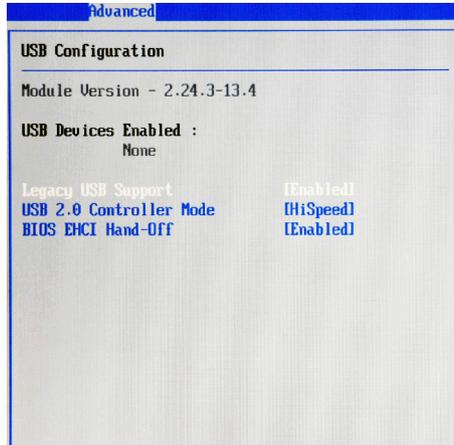
► **TPM Enable/Disable Status**
This setting displays the TPM enable/disable status. Read only.

► **TPM Owner Status**
This setting shows the TPM ownership. Read only.

►USB Configuration

```
┌─────────────────────────────────────────────────┐
│ Advanced                                          │
├─────────────────────────────────────────────────┤
│ USB Configuration                                 │
│                                                   │
│ Module Version - 2.24.3-13.4                      │
│                                                   │
│ USB Devices Enabled :                             │
│           None                                    │
│                                                   │
│ Legacy USB Support              [Enabled]         │
│ USB 2.0 Controller Mode         [HiSpeed]         │
│ BIOS EHCI Hand-Off              [Enabled]         │
│                                                   │
│                                                   │
│                                                   │
│                                                   │
│                                                   │
│                                                   │
└─────────────────────────────────────────────────┘
```

► Legacy USB Support
Set to [Enabled] if you need to use any USB 1.1/2.0 device in the operating system that does not support or have any USB 1.1/2.0 driver installed, such as DOS and SCO Unix.
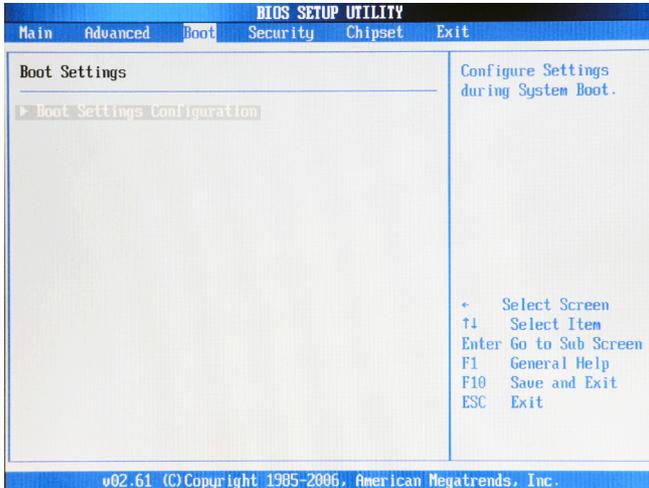
► USB 2.0 Controller Mode
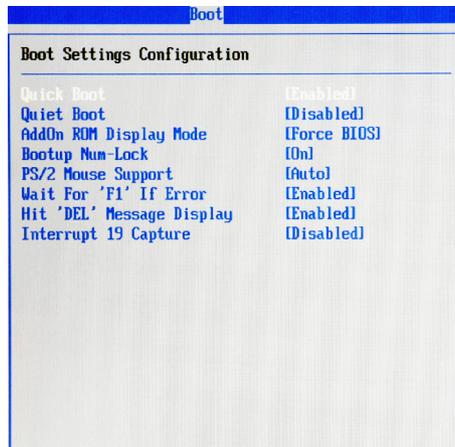This setting specifies the operation mode of the onboard USB 2.0 controller.

► BIOS EHCI Hand-Off
This setting allows you to enable or disable a workaround for operating systems without EHCI (Enhanced Host Controller Interface) hand-off support. The Enhanced Host Controller Interface (EHCI) specification describes the register-level interface for a Host Controller for the Universal Serial Bus (USB) Revision 2.0.

Boot

```
                    BIOS SETUP UTILITY
 Main    Advanced    Boot    Security    Chipset    Exit

 Boot Settings                              Configure Settings
                                            during System Boot.
 ▶ Boot Settings Configuration



                                            ←     Select Screen
                                            ↑↓    Select Item
                                            Enter  Go to Sub Screen
                                            F1     General Help
                                            F10    Save and Exit
                                            ESC    Exit

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```

► **Boot Settings Configuration**

```
                         Boot

 Boot Settings Configuration

 Quick Boot                      [Enabled]
 Quiet Boot                      [Disabled]
 AddOn ROM Display Mode          [Force BIOS]
 Bootup Num-Lock                 [On]
 PS/2 Mouse Support              [Auto]
 Wait For 'F1' If Error          [Enabled]
 Hit 'DEL' Message Display       [Enabled]
 Interrupt 19 Capture            [Disabled]
```

▶ 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.

▶ Quiet Boot
This BIOS feature determines if the BIOS should hide the normal POST messages with the motherboard or system manufacturer's full-screen logo.
When it is enabled, the BIOS will display the full-screen logo during the boot-up sequence, hiding normal POST messages.
When it is disabled, the BIOS will display the normal POST messages, instead of the full-screen logo.
Please note that enabling this BIOS feature often adds 2-3 seconds of delay to the booting sequence. This delay ensures that the logo is displayed for a sufficient amount of time. Therefore, it is recommended that you disable this BIOS feature for a faster boot-up time.

▶ AddOn ROM Display Mode
This item is used to determine the display mode when an optional ROM is initialized during POST. When set to [Force BIOS], the display mode used by AMI BIOS is used. Select [Keep Current] if you want to use the display mode of optional ROM.

▶ 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.

▶ PS/2 Mouse Support
Select [Enabled] if you need to use a PS/2-interfaced mouse in the operating system.

▶ 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.

▶ Hit 'DEL' Message Display
Set this option to [Disabled] to prevent the message as follows:
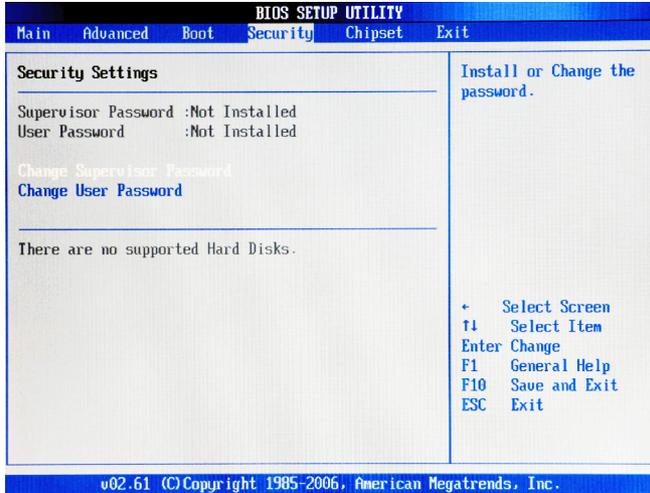*Hit Del if you want to run setup*
It will prevent the message from appearing on the first BIOS screen when the computer boots. Set it to [Enabled] when you want to run the BIOS Setup Utility.

▶ Interrupt 19 Capture
Interrupt 19 is the software interrupt that handles the boot disk function. When enabled, this BIOS feature allows the ROM BIOS of these host adaptors to "capture" Interrupt 19 during the boot process so that drives attached to these adaptors can function as bootable disks. In addition, it allows you to gain access to the host adaptor's ROM setup utility, if one is available.
When disabled, the ROM BIOS of these host adaptors will not be able to "capture" Interrupt 19. Therefore, you will not be able to boot operating systems from any bootable disks attached to these host adaptors. Nor will you be able to gain access to their ROM setup utilities.
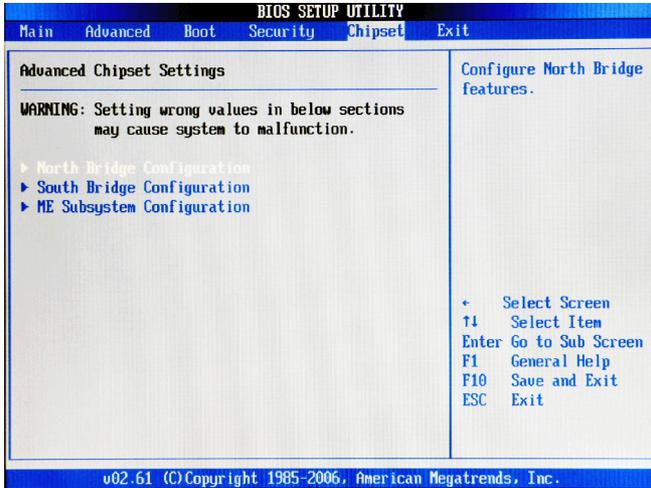
Security

```
                        BIOS SETUP UTILITY
 Main    Advanced    Boot    Security    Chipset    Exit

 Security Settings                             Install or Change the
 ─────────────────────────────────            password.
 Supervisor Password :Not Installed
 User Password       :Not Installed

 Change Supervisor Password
 Change User Password

 ─────────────────────────────
 There are no supported Hard Disks.


                                              ←      Select Screen
                                              ↑↓     Select Item
                                              Enter  Change
                                              F1     General Help
                                              F10    Save and Exit
                                              ESC    Exit


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```

▶ **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

```
                    BIOS SETUP UTILITY
 Main    Advanced    Boot    Security    Chipset    Exit

 Advanced Chipset Settings                      Configure North Bridge
                                                features.
 WARNING: Setting wrong values in below sections
          may cause system to malfunction.

  ▶ North Bridge Configuration
  ▶ South Bridge Configuration
  ▶ ME Subsystem Configuration

                                                ←    Select Screen
                                                ↑↓   Select Item
                                                Enter Go to Sub Screen
                                                F1    General Help
                                                F10   Save and Exit
                                                ESC   Exit

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```

► **North Bridge Configuration**

```
                                    Chipset

 North Bridge Chipset Configuration

 DVMT Mode Select                [DVMT Mode]
   DVMT/FIXED Memory             [256MB]
 PAVP Mode                       [Disabled]

 Boot Display Device             [CRT + HDMI]
 Flat Panel Type                 [Type 3]
```

► 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.

► PAVP Mode

This setting enables/disables the Protected Audio/Video Path (PAVP) mode.

► Boot Display Device

Use the field to select the type of device you want to use as the display(s) of the system.

► Flat Panel Type

This setting allows you to set your preferences for the boot display device.

► South Bridge Configuration

► USB Functions, USB Port Configure
These settings specify 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 Controller
This setting disables/enables the onboard 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.

► HDA Controller
This setting controls the High Definition Audio interface integrated in the Southbridge.

► Restore on AC Power Loss
This setting specifies whether your system will reboot after a power failure or interrupt occurs. Available settings are:
  [Power Off] Leaves the computer in the power off state.
  [Power On] Leaves the computer in the power on state.
  [Last State] Restores the system to the previous status before power failure or interrupt occurred.

▶ **ME Subsystem Configuration**
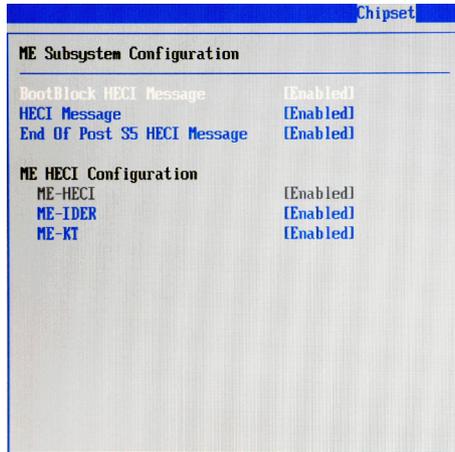
▶ **BootBlock HECI Message, HECI Message, End of Post S5 HECI Message, ME HECI Configuration**

These settings control the Host Embedded Communication Interface (HECI). Only advanced users are advised to change the settings.

Exit
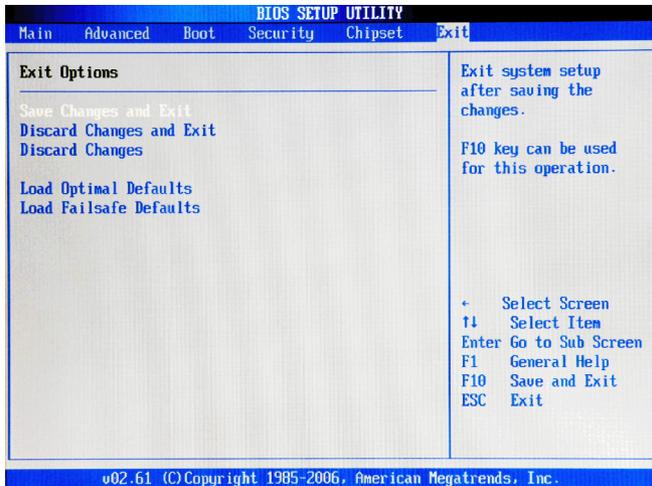
▶ **Save Changes and Exit**
Save changes to CMOS and exit the Setup Utility.

▶ **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 seconds

1. Enter configuration mode
   ```
   mov dx,SIO_IDX
   mov al,87h
   out dx,al
   out dx,al
   ```

2. Set to LDN 08
   ```
   mov dx,SIO_IDX
   mov al,07h
   out dx,al
   mov dx,SIO_DTA
   mov al,08h
   out dx,al
   ```

3. Set WatchDog Timer
   ```
   mov dx,SIO_IDX
   mov al,0f6h
   out dx,al
   mov dx,SIO_DTA
   mov al,Timer
   out dx,al
   ```

4. Exit configuration mode
   ```
   mov dx,SIO_IDX
   mov al,0AAh
   out dx,al
   ```

AMI POST Code

Bootblock Initialization Code Checkpoints

The Bootblock initialization code sets up the chipset, memory and other components before system memory is available. The following table describes the type of checkpoints that may occur during the bootblock initialization portion of the BIOS:

Checkpoint	Description
Before D1	Early chipset initialization is done. Early super I/O initialization is done including RTC and keyboard controller. NMI is disabled.
D1	Perform keyboard controller BAT test. Check if waking up from power management suspend state. Save power-on CPUID value in scratch CMOS.
D0	Go to flat mode with 4GB limit and GA20 enabled. Verify the bootblock checksum.
D2	Disable CACHE before memory detection. Execute full memory sizing module. Verify that flat mode is enabled.
D3	If memory sizing module not executed, start memory refresh and do memory sizing in Bootblock 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.
D6	Both key sequence and OEM specific method is checked to determine if BIOS recovery is forced. Main BIOS checksum is tested. If BIOS recovery is necessary, control flows to checkpoint E0.
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 *POST Code Checkpoints* section of document for more information.

POST Code Checkpoints

The POST code checkpoints are the largest set of checkpoints during the BIOS pre-boot process. The following table describes the type of checkpoints that may occur during the POST portion of the BIOS:

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. Initialized 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."
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 AMI KB-5.
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.

POST Code Checkpoints

Checkpoint	Description
13	Early POST initialization of chipset registers.
24	Uncompress and initialize any platform specific BIOS modules.
30	Initialize System Management Interrupt.
2A	Initializes different devices through DIM. See *DIM Code Checkpoints* 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 *DIM Code Checkpoints* section of document for more information.
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.
50	Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed.
52	Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory.
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.
7A	Initializes remaining 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.
8C	Late POST initialization of chipset registers.
8E	Program the peripheral parameters. Enable/Disable NMI as selected
90	Late POST initialization of system management interrupt.
A0	Check boot password if installed.
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.
A7	Displays the system configuration screen if enabled. Initialize the CPU's before boot, which includes the programming of the MTRR's.
A8	Prepare CPU for OS boot including final MTRR values.
A9	Wait for user input at config display if needed.
AA	Uninstall POST INT1Ch vector and INT09h vector. Deinitializes the ADM module.
AB	Prepare BBS for Int 19 boot.
AC	End of POST initialization of chipset registers.
B1	Save system context for ACPI.
00	Passes control to OS Loader (typically INT19h).

Resource List

ICH9 GPIO

Pin	GPIO	Type	Function	Power	Description
	GPIO1	I	IDE cable detect	3.3V	
	GPIO6	I	PCB version identify	3.3V	<table><tr><td>PCB VER</td><td>GPIO7</td><td>GPIO6</td></tr><tr><td>A1</td><td>0</td><td>0</td></tr><tr><td>1G</td><td>0</td><td>1</td></tr></table>
	GPIO7	I	PCB version identify	3.3V	<table><tr><td>PCB VER</td><td>GPIO7</td><td>GPIO6</td></tr><tr><td>A1</td><td>0</td><td>0</td></tr><tr><td>1G</td><td>0</td><td>1</td></tr></table>
	GPIO8	O	USB port power enable pin 1: enable USB port power 0:disable USB port power	3VSB	Set to 1 at S0,S3 Set to 0 at S4,S5
	GPIO13	I	LPC_PME#	3VSB	For SIO PME#
	GPIO27	O	Audio Amp volume control Gain0	3.3V	<table><tr><td>GAIN1</td><td>GAIN0</td><td>AV(dB)</td></tr><tr><td>0</td><td>0</td><td>15.3</td></tr><tr><td>0</td><td>1</td><td>21.2</td></tr><tr><td>1</td><td>0</td><td>27.2</td></tr><tr><td>1</td><td>1</td><td>31.8</td></tr></table>
	GPIO28	O	Audio Amp volume control Gain1	3.3V	<table><tr><td>GAIN1</td><td>GAIN0</td><td>AV(dB)</td></tr><tr><td>0</td><td>0</td><td>15.3</td></tr><tr><td>0</td><td>1</td><td>21.2</td></tr><tr><td>1</td><td>0</td><td>27.2</td></tr><tr><td>1</td><td>1</td><td>31.8</td></tr></table>

A8	GP34	O	#EN485 Default high for RS232 function	3VSB	**COM Type Select** 		RS232	RS422	RS485
232	1	0	0
#422	1	0	1
#485	1	1	0	
B8	GP35	O	#EN422 Default high for RS232 function	3VSB	**COM Type Select** 		RS232	RS422	RS485
232	1	0	0
#422	1	0	1
#485	1	1	0	
C7	GP36	O	EN232 Default high for RS232 function	3VSB	**COM Type Select** 		RS232	RS422	RS485
232	1	0	0
#422	1	0	1
#485	1	1	0	

I/O Map

I/O Port	Description
0000-000F	DMA Controller 1
0020-0021	Interrupt Controller 1
0040-0043	System Timer
004E-004F	SIO Port
0060, 0064	Keyboard Controller
0070-0073	RTC and CMOS
0080-0090	DMA Controller Page Registers
0092	Port 92h
00A0-00A1	Interrupt Controller 2
00B2-00B3	APM Register
00C0-00DF	DMA Controller 2
00F0-00FF	Numeric Data Processor
01F0-01F7	Primary IDE Controller
02E0-02FF	COM
0376	Secondary IDE Controller
0378-037F	LPT1
03F6	Primary IDE Controller
0400-045F	ACPI I/O Space
0500-050F	SMBus I/O Space
0CF8-0CFF	PCI Configuration Port

PCI Devices

Device	Ven. ID	Dev. ID	Bus#	Dev#	Func#
VGA-compatible Controller	8086	2A40	00	02	00
Other Display Controller	8086	2A43	00	02	01
Other Communications Device	8086	2A44	00	03	00
IDE Controller	8086	2A46	00	03	02
Serial Device	8086	2A47	00	03	03
Ethernet Controller	8086	10F5	00	19	00
UHCI USB Controller	8086	2937	00	1A	00
UHCI USB Controller	8086	2938	00	1A	01
UHCI USB Controller	8086	2939	00	1A	022
PCI-to-PCI Bridge	8086	2940	00	1C	00
PCI-to-PCI Bridge	8086	2942	00	1C	01
UHCI USB Controller	8086	2934	00	1D	00
UHCI USB Controller	8086	2935	00	1D	01
UHCI USB Controller	8086	2936	00	1D	02
Subtractive Decode P2P Bridge	8086	2448	00	1E	00
ISA Bridge	8086	2917	00	1F	00
IDE Controller	8086	2928	00	1F	02
SMBus	8086	2930	00	1F	03
IDE Controller	8086	292D	00	1F	05
Ethernet Controller	8086z	10D3	02	00	00

ISA Interrupt Allocation

IRQ	Description
IRQ0	System Timer
IRQ1	Keyboard Controller
IRQ2	Cascade Interrupt
IRQ4	COM1
IRQ5	PCI Device
IRQ6	PCI Device
IRQ7	LPT1
IRQ8	RTC
IRQ9	ACPI Controller Interrupt
IRQ10	COM4 COM6
IRQ11	COM3 COM5
IRQ12	PS/2 Mouse
IRQ13	Numeric Data Processor
IRQ14	Primary IDE Controller
IRQ15	Secondary IDE Controller

ISA DMA Channel Allocation

DMA Channel	Description
Channel 0	Unassigned 8-bit channel
Channel 1	Unassigned 8-bit channel
Channel 2	Unassigned 8-bit channel
Channel 3	Unassigned 8-bit channel
Channel 4	Cascade channel
Channel 5	Unassigned 8-bit channel
Channel 6	Unassigned 8-bit channel
Channel 7	Unassigned 8-bit channel

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