

MX945GSE

**Intel® Atom N270 CPU with
945GSE/ICH7M Chipsets
Mini ITX Motherboard**

User's Manual v1.1



BCM Advanced Research
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WARNING:

Replace your system's CMOS RAM battery only with the identical CR-2032 3V Lithium-Ion coin cell (or equivalent) battery type to avoid risk of personal injury or physical damage to your equipment. Always dispose of used batteries according to the manufacturer's instructions, or as required by the local ordinance (where applicable).

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Compliance & Certificate

ISO 9001 Certificate:

This device was produced in our plant with advanced quality system certified by DNV QA Ltd. in according to ISO 9001. The Certificate is valid for:

DESIGN & MANUFACTURE OF MOTHERBOARD AND PERSONAL COMPUTERS.

CE Declaration:

CE marking is a visible declaration by the manufacturer or his authorized representatives that the electrical equipment to which it relates satisfies all the provisions of the 1994 Regulations.

FCC Compliance:

FCC stands for **Federal Communications Commission**.

This product complies with FCC Rules Part 15 and has been tested, and complied with the EMI rules by a certified body. In normal operation, there shall be no harmful interference caused by this device nor shall this device accept any interference received, including interference that may cause undesired operation of this product.

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Motherboard Specifications**System**

Processor	- Intel® Atom processor N270 (1.6GHz single core with HT)
FSB	- 533MHz
Chipset	- Northbridge: Intel® 945GSE chipset - Southbridge: Intel® ICH7M chipset
Memory	- 1 unbuffered non-ECC DDR2 533/667/800 SO-DIMM slot - Up to 1GB memory capacity
LAN	- 2x Gigabit Ethernet by Intel® 82574L Controller
Audio	- HDA Codec by Realtek ALC888 7.1 channel (compliant with Azalia 1.0 specs) - TPA3005D2 amplifier
IDE	- 1x IDE port by Intel® ICH7M - Supports Ultra DMA 66/100 mode - Supports PIO, Bus Master operation mode
SATA	- 2x SATA ports by Intel® ICH7M - Supports 2x SATA devices - Supports up to 1.5Gb/s data transfer rate
Graphics	- Onboard graphics integrated in Intel® 945GSE

Connectors

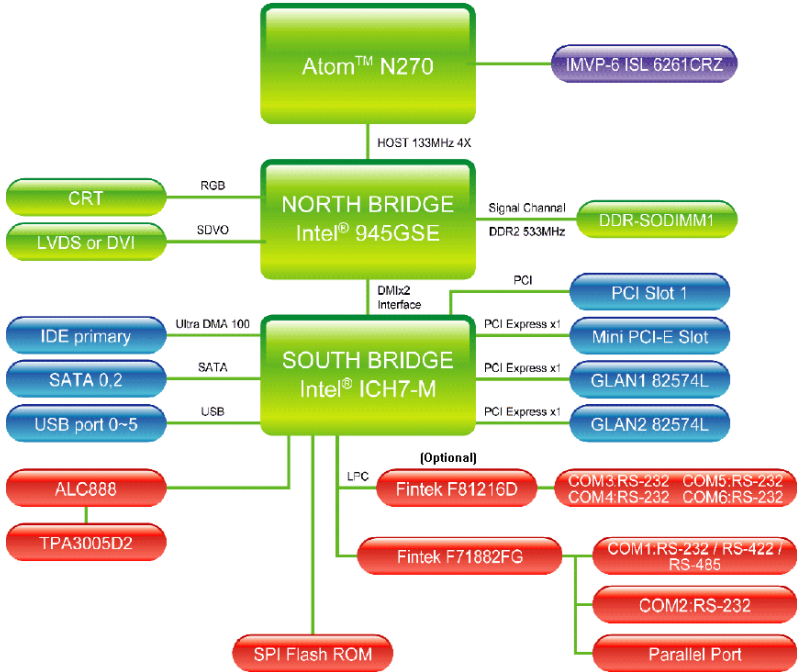
Back Panel	- 1x double stack DB-9 connector - 1x VGA connector - 1x stack up RJ45 and USB connector - 1x double stack USB connector - 1x RJ45 jack - 3 audio jacks - 1x front audio header
Onboard Connectors	- 1x USB 2.0 header (2 ports) - 1x parallel port connector - 1x SPI Flash ROM header (for debugging)

- 1x chassis intrusion switch header
- 1x S/PDIF-Out header
- 1x amplifier header
- 1x LVDS connector
- 1x 20-pin ATX power connector

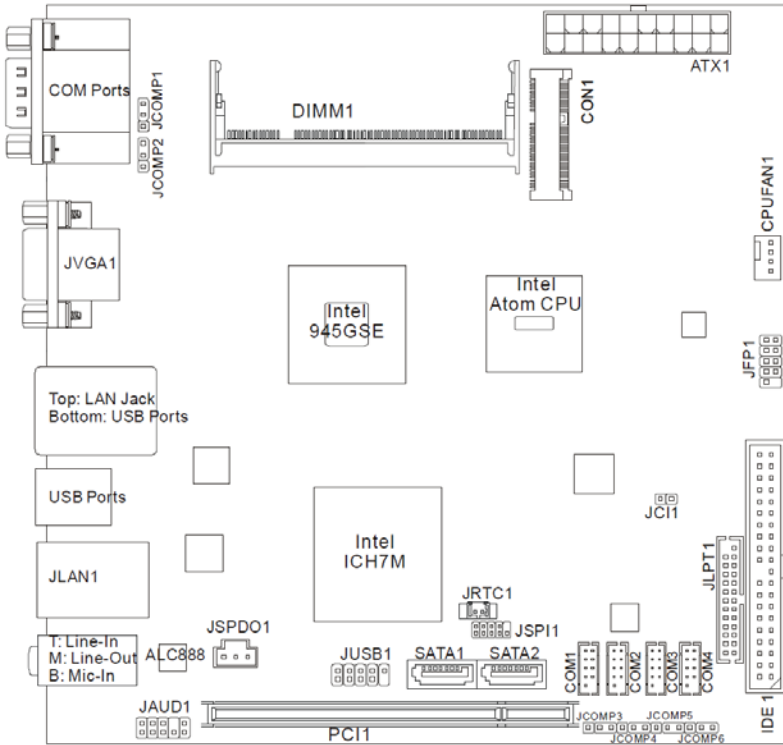
Environmental

Slots	<ul style="list-style-type: none"> - 1 Mini PCI-E slot - 1 32-bit/33MHz PCI slot
Form Factor	<ul style="list-style-type: none"> - Mini ITX: 170mm x 170mm
Mounting	<ul style="list-style-type: none"> - 4 mounting holes
Storage Environment	<ul style="list-style-type: none"> - Temperature: -20°C ~ 80°C - Humidity: 5% ~ 90% non condensing
Operation Environment	<ul style="list-style-type: none"> - Temperature: 0°C ~ 60°C - Humidity: 5% ~ 90% non condensing

Block Diagram

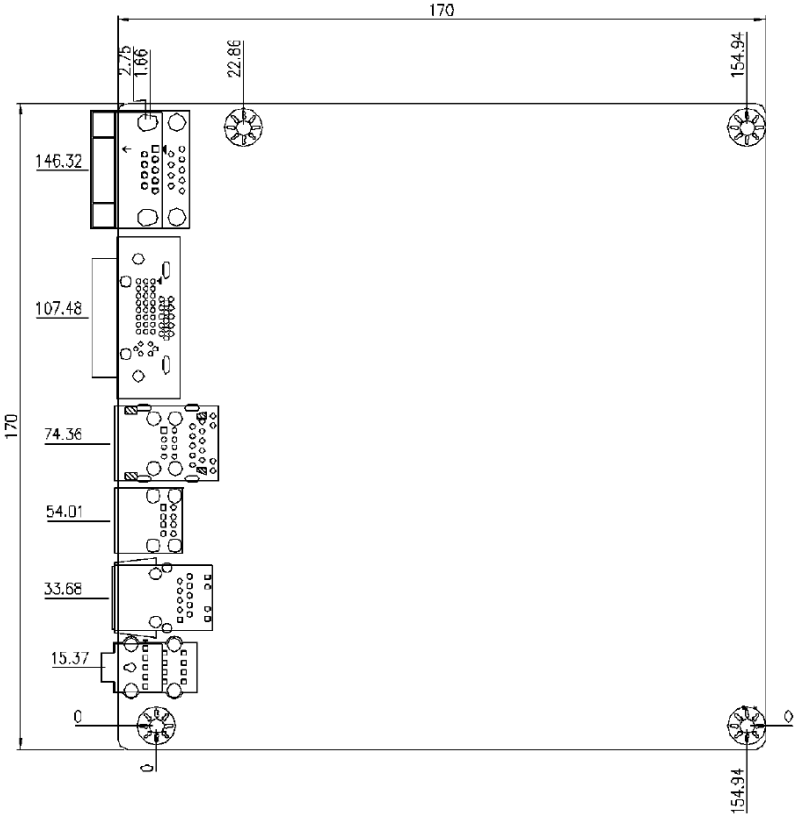


Motherboard Layout

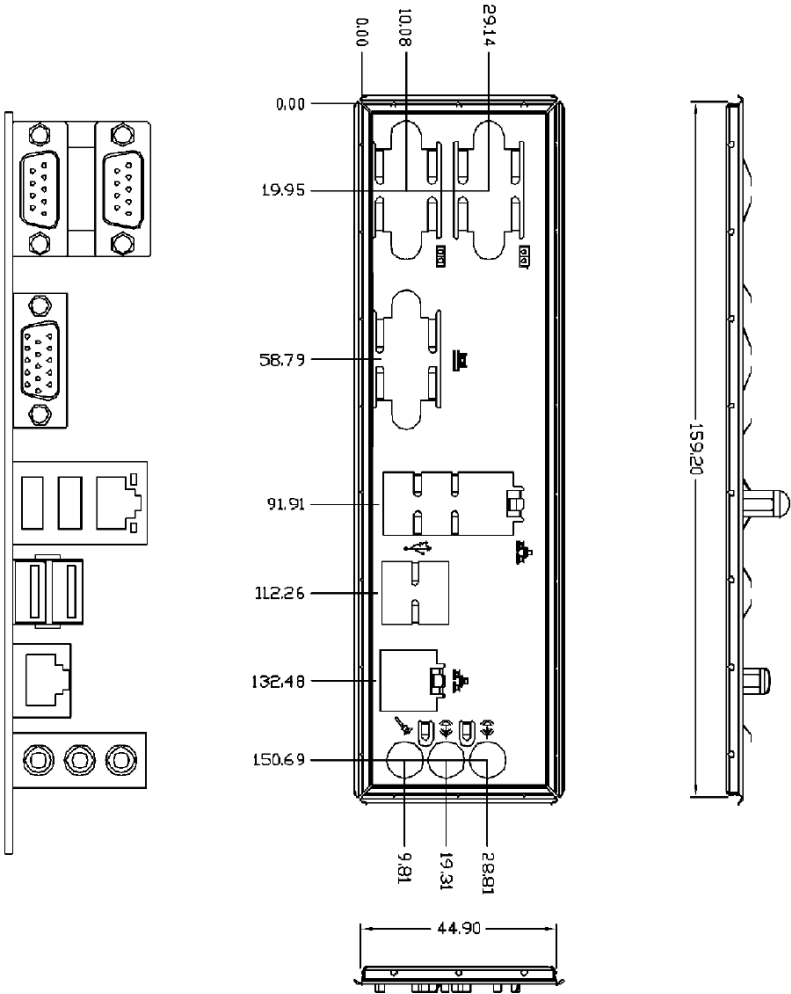


MX945GSE Mini ITX Mainboard

Board Dimension



Back Panel & I/O Shield Drawing



Power Consumption

Component	Description
CPU	Intel® Atom Processor 200 Series
Memory	Corsair 1G DDR2-800 x1
Hard Disk	Western Digital 80G IDE 7200rpm HDD x1
Operating System	Microsoft Windows XP Professional SP2

MX945GSE (ATX)	3.3V input	5V input	12V input	5VSB	Total Watt
	Current (A)	Current (A)	Current (A)	Current (A)	Watt
Enter DOS (stable)	0.54	1.03	0.30	0.06	10.83W
Enter BIOS (stable)	0.56	1.03	0.30	0.06	10.90W
Idle	0.54	1.10	0.27	0.05	10.77W
CPU Stress 100%	0.54	1.18	0.31	0.05	11.65W
Windows stress (3dMARK2006)	0.55	1.11	0.36	0.05	11.94 W
Windows Desktop Standby S1 without LAN connected (stable)	0.48	1.03	0.25	0.05	9.98W
Windows Desktop Standby S3 without LAN connected (stable)	0	0	0	0.22	1.10W
Windows Desktop Hibernate S4 without LAN connected (stable)	0	0	0	0.13	0.65W
Windows Desktop Soft Off S5 without LAN connected (stable)	0	0	0	0.15	0.75W

Safety Compliance & MTBF

Safety Compliance

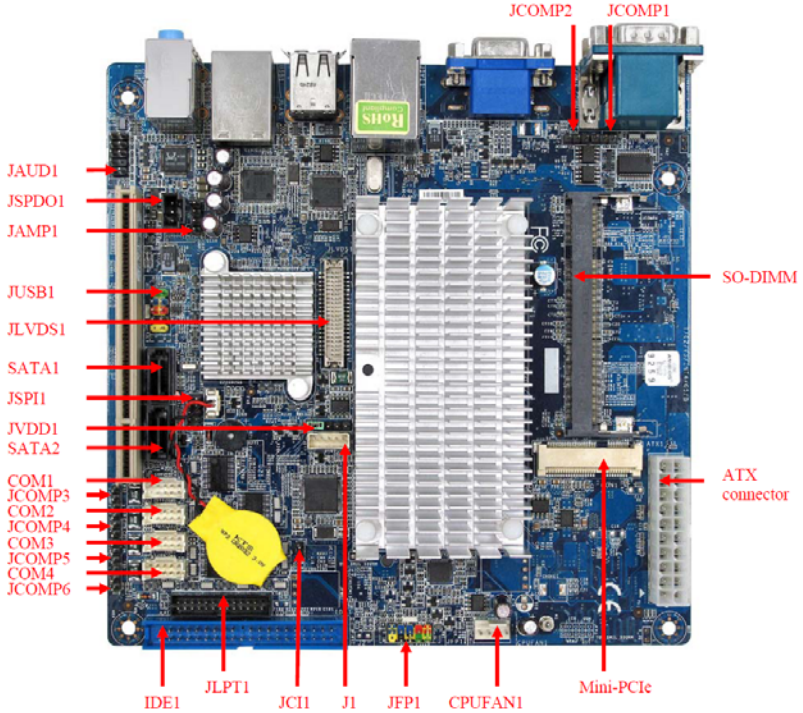
Certification	Standard number		Title of standard
		EN 55022: 2006	Product family standard
CE	RFI	EN 2006	Limits for harmonic current emission
		EN 1995+A1:2001+A2:2005	Limitation of voltage fluctuation and flicker in low-voltage supply system
	Immunity	EN 55024:1998+A1:2001+A2:2003	Product family standard
BSMI	CNS 13438 乙類(1995年6月版)		
C-Tick	AS/NZS CISPR 22:2006		
FCC	FCC CFR Title 47 Part 15 Subpart B: 2005 Class B		
	CISPR 22: 2006		
VCCI	VCCI V-3:2008 Class B		
	VCCI V-4:2008 Class B		

MTBF -Reliability Prediction

Calculation Model	Operation Temperature (°C)	Operation Environment	Duty Cycle	MTBF (hr.)
Telcordia Issue 1	40	GB, GC Ground Benign, Controlled	6,841.490152	146,167

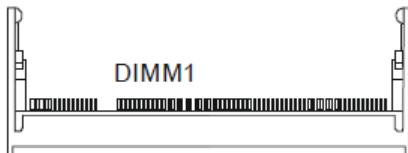
Chapter 2 Hardware Setup

Quick Components Guide



Memory

The DIMM slot is intended for system memory modules.



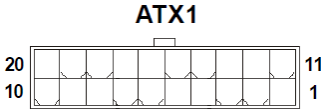
Installing Memory Modules

1. Locate the SO-DIMM slot on the mainboard.
2. Align the notch on the DIMM with the key on the slot. Insert the DIMM at a 45 degrees into the SO-DIMM slot. Then push it in until the golden finger on the DIMM is deeply inserted in the SO-DIMM slot. Push the module towards the board until it is horizontal with the board.
3. Manually check if the DIMM has been locked in place by the retaining clips at the sides.

Power Supply

System Power Connector: ATX1

This connector allows you to connect a 20-pin power supply. To connect the power supply, make sure the power supply connector is inserted in the proper orientation and the pins are aligned. Then push down the power supply firmly into the connector.



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	PWROK	18	Res
9	5VSB	19	+5V
10	+12V	20	+5V

Back Panel I/O



►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.

►VGA Port

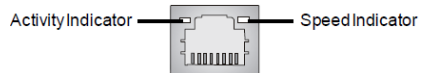
The DB15-pin female connector is provided for monitor.

►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.



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

► **Audio Ports**

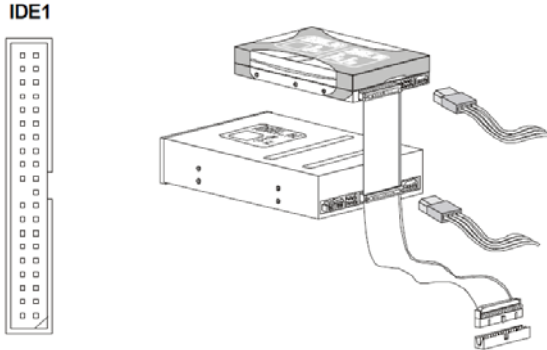
These audio connectors are used for audio devices. You can differentiate the color of the audio jacks for different audio sound effects.

- **Line-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.

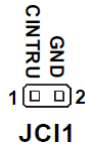


Important

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.

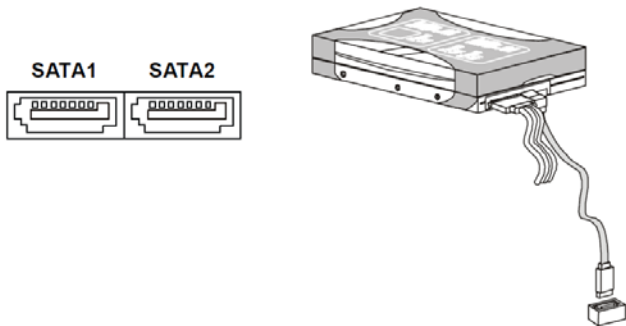
Chassis Intrusion Connector: JCI1

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.



Serial ATA Connector: SATA1, SATA2

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.

SPI Flash ROM Header: JSPI1

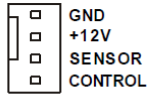
This header is used to flash SPI flash ROM.



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

Fan Power Connector: CPUFAN1

The fan power connector supports 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.



CPUFAN1



Important

Please refer to the recommended CPU fans at CPU vendor's official website or consult the mainboard vendor for proper CPU cooling fan.

Backlight Connector: J1

This connector is provided for LCD backlight options.

J1



PIN	SIGNAL
1	12V
2	GND
3	InverterOn
4	BacklightControl
5	5V

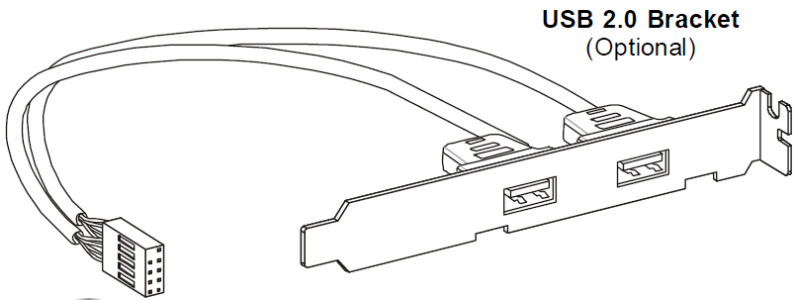
Front USB Header: JUSB1

This header, 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



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



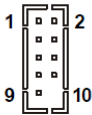
Important

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

Serial Port Connector: COM1, COM2, COM3, COM4

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.

COM1~4

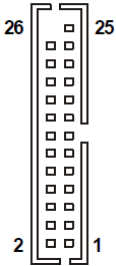


PIN	SIGNAL	DESCRIPTION
1	DCD	Data Carry Detect
2	SIN	Serial In or Receive Data
3	SOUT	Serial Out or Transmit Data
4	DTR	Data Terminal Ready
5	GND	Ground
6	DSR	Data Set Ready
7	RTS	Request To Send
8	CTS	Clear To Send
9	VCC_COM	Power Source

Parallel Port Header: JLPT1

The mainboard provides a 26-pin header for connection to an optional parallel port bracket. The parallel port is a standard printer port that supports Enhanced Parallel Port (EPP) and Extended Capabilities Parallel Port (ECP) mode.

JLPT1



PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL	PIN	SIGNAL
1	RSTB#	2	AFD#	15	PRND6	16	GND
3	PRND0	4	ERR#	17	PRND7	18	GND
5	PRND1	6	PINIT#	19	ACK#	20	GND
7	PRND2	8	LPT_SLIN#	21	BUSY	22	GND
9	PRND3	10	GND	23	PE	24	GND
11	PRND4	12	GND	25	SLCT	26	KEY
13	PRND5	14	GND				

Audio Amplifier Connector: JAMP1

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

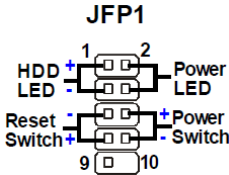
JAMP1



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

Front Panel Connector: JFP1

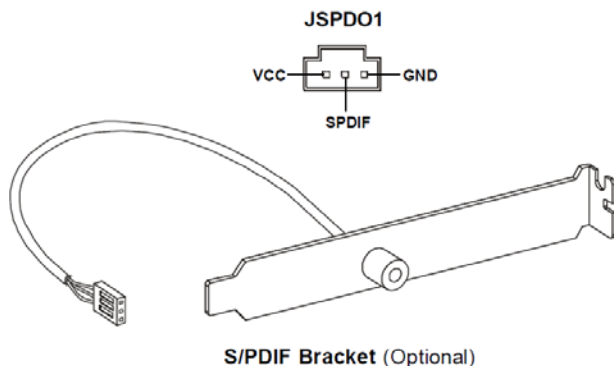
The mainboard provides one front panel connector for electrical connection to the front panel switches and LEDs. The JFP1 is compliant with Intel® Front Panel I/O Connectivity Design Guide.



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

S/PDIF-Out Connector: JSPDO1

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



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.

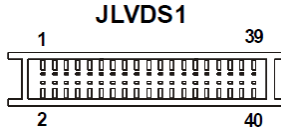
JAUD1



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 connection
9	LINE_OUT_L	Analog Port -Left channel
10	LINE_OUT_JD	Jack detection return from front panel JACK2

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 **JVDD1 LVDS Power Selection Jumper** to a proper voltage.

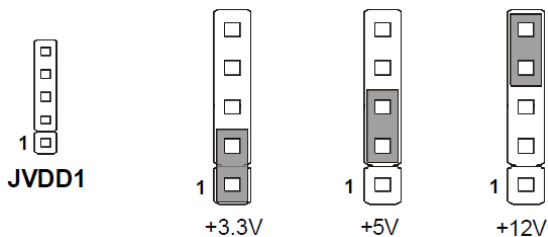


SIGNAL	PIN		SIGNAL
+12V	2	1	+12V
+12V	4	3	+12V
GND	6	5	+12V
GND	8	7	VCC3
LCD_VDD	10	9	LCD_VDD
LDDC_DATA	12	11	LDDC_CLK
LVDS_VDDEN	14	13	L_BKLTCTL
GND	16	15	L_BKLTEN
LA_DATA0	18	17	LA_DATA0#
LA_DATA1	20	19	LA_DATA1#
LA_DATA2	22	21	LA_DATA2#
LA_CLK	24	23	LA_CLK#
LA_DATA3	26	25	LA_DATA3#
GND	28	27	GND
LB_DATA0	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

Jumper

LVDS Power Selection Jumper: JVDD1

Use this jumper to specify the operation voltage of the LVDS interfaced flat panel.



COM Port Power Jumper: JCOMP1~6

These jumpers specify the operation voltage of the onboard serial ports.



Slot

PCI (Peripheral Component Interconnect) Express Slot

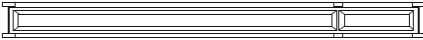
The CON1 is Mini PCI-E connector for wireless LAN, TV tuner, and Intel® Turbo Memory (Robson NAND Flash).



Mini PCI-E 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



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.

Chapter 3 BIOS Setup

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 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.

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.

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
<F9>	Load Optimized Defaults
<F8>	Load Fail-Safe Defaults
<F10>	Save all the CMOS changes and exit

Getting Help

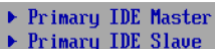
After entering the Setup menu, the first menu you will see is the Main Menu.

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.



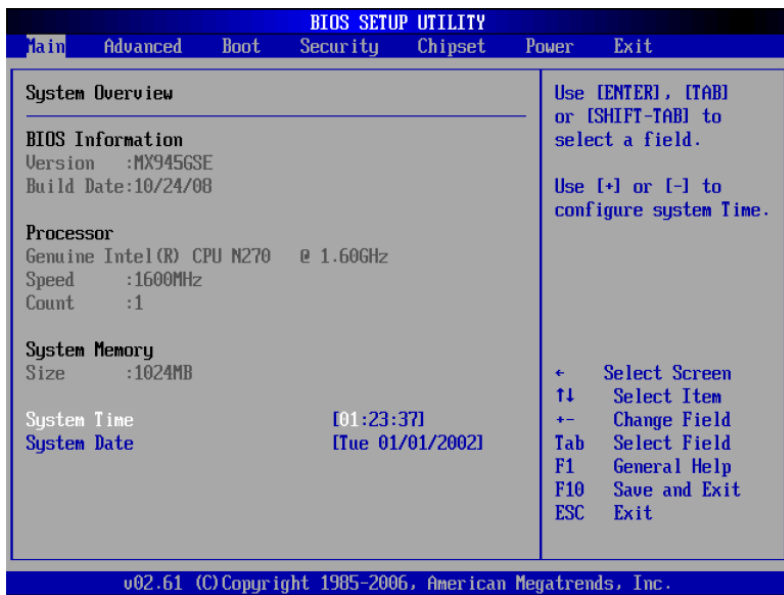
▶ Primary IDE Master
▶ Primary IDE Slave

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 >.

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.

►Boot

Use this menu to specify the priority of boot devices.

►Security

Use this menu to set supervisor and user passwords.

►Chipset

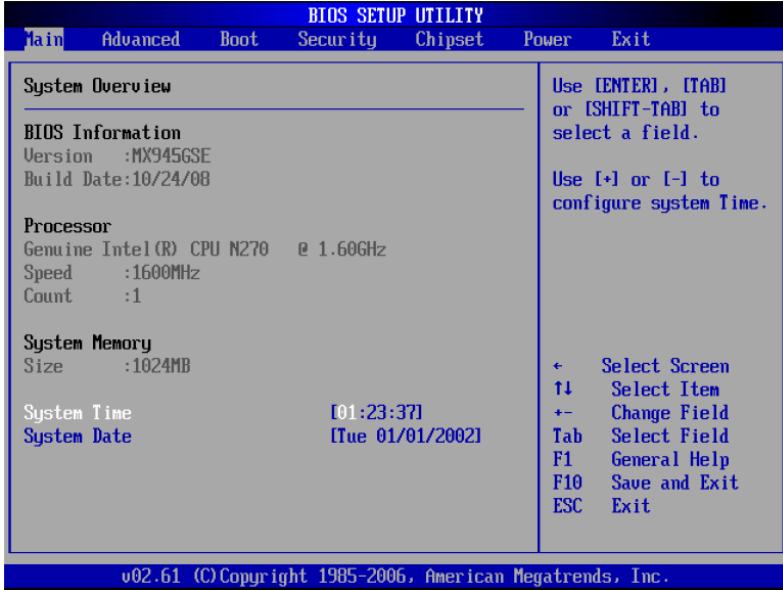
This menu controls the advanced features of the onboard Northbridge and Southbridge.

▶**Power**

Use this menu to specify your settings for power management.

▶**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 Information, 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

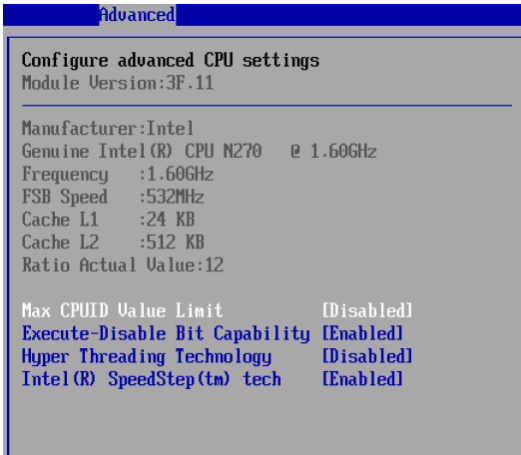
The date format is <Day>, <Month> <Date> <Year>.

Advanced



►CPU Configuration

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



►Max CPUID Value Limit

The Max CPUID Value Limit BIOS feature allows you to circumvent problems with older operating systems that do not support 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.

►Execute Disable Bit Capability

Intel's Execute Disable Bit functionality, when combined with a supporting operating system, can prevent certain classes of malicious "buffer overflow" attacks. 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.

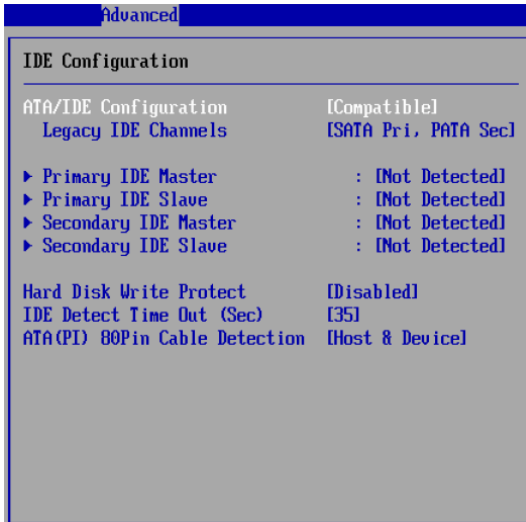
►Hyper Threading Technology

The processor uses Hyper Threading technology to increase transaction rates and reduces end-user response times. The technology treats the two cores inside the processor as two logical processors that can execute instructions simultaneously. In this way, the system performance is highly improved. If you disable the function, the processor will use only one core to execute the instructions. ***Please disable this item if your operating system doesn't support HT Function, or unreliability and instability may occur.***

►Intel(R) SpeedStep(tm) Tech

EIST (Enhanced Intel® SpeedStep Technology) allows the system to dynamically adjust processor voltage and core frequency, which can result in decreased average power consumption and decreased average heat production.

► IDE Configuration



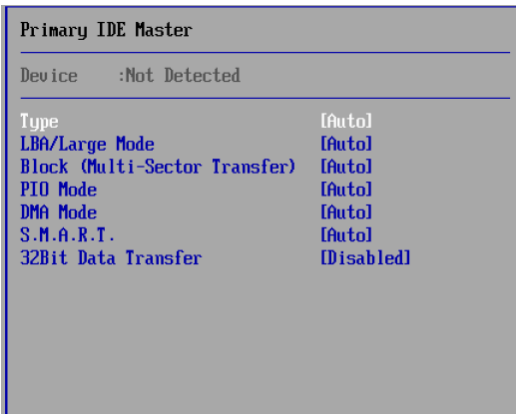
►ATA/IDE Configuration

This setting specifies the operation mode of the onboard ATA/IDE controller.

►Legacy IDE Channels

This setting specifies the IDE channels.

►Primary/Secondary 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 device

►Hard Disk Write Protect

This option allows users to write protect boot sector on hard disk to protect against viruses.

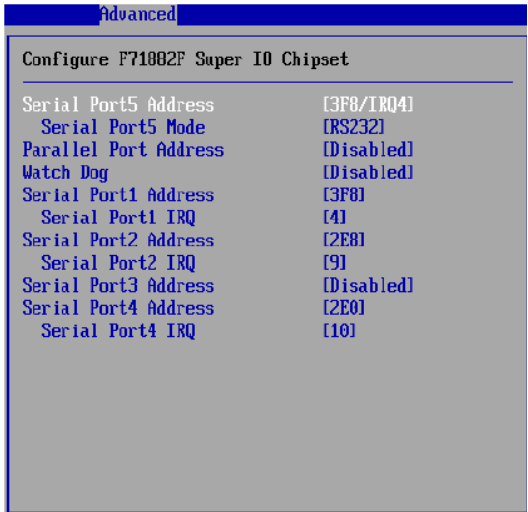
►IDE Detect Time Out (Sec)

This setting allows you to set the time out value for the BIOS to delay the initialization of IDE devices.

►ATA(PI) 80Pin Cable Detection

This BIOS feature allows you to control whether both IDE controller and IDE device should be allowed to detect the type of IDE cable used.

► Super IO Configuration



►Serial Port Address, Serial Port IRQ

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

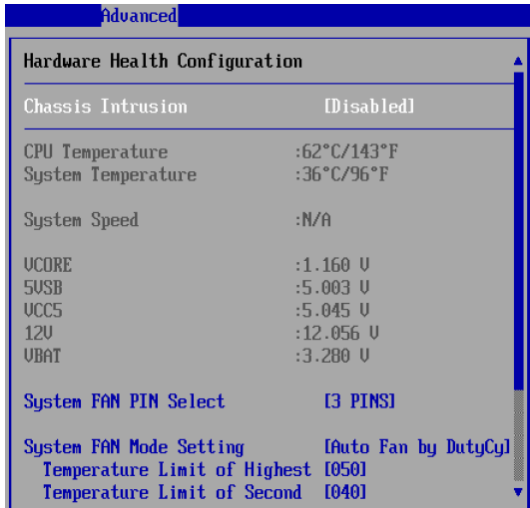
►Parallel Port Address

Select an address for the parallel port.

►Watch Dog

You can enable the system watch-dog timer, a hardware timer that generates either an NMI or a reset when the software that it monitors does not respond as expected each time the watch dog polls it.

► **Hardware Health Configuration**



► **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.

► **CPU Temperature, System Temperature, System Speed, VCORE, 5VSB, VCC5, 12V, VBAT**

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

► **System Fan Pin Select**

This setting specifies the pin numbers of the system fan power connector.

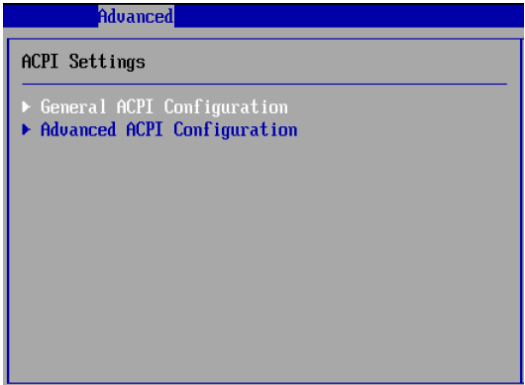
► **System Fan Mode Setting**

This setting controls 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 CPU from overheating.

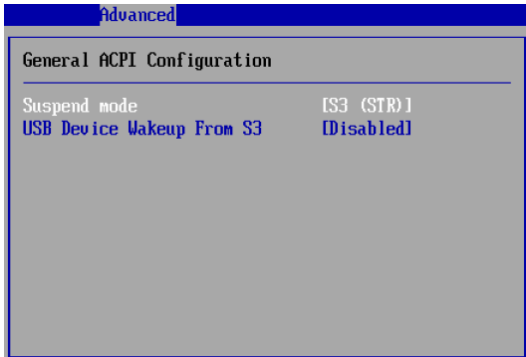
► **Temperature Limit of Highest, Temperature Limit of Second**

You can select a temperature tolerance value here for the specific range of the Smart Fan function.

► **ACPI Settings**



► **General ACPI Configuration**



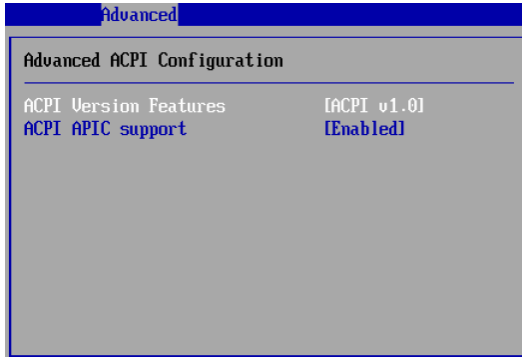
► **Suspend Mode**

This item specifies the power saving modes for ACPI function. If your operating system supports ACPI, such as Windows 98SE, Windows ME and Windows 2000, 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**

The item allows the activity of the USB device to wake up the system from S3 (Suspend to RAM) sleep state.

► **Advanced ACPI Configuration**



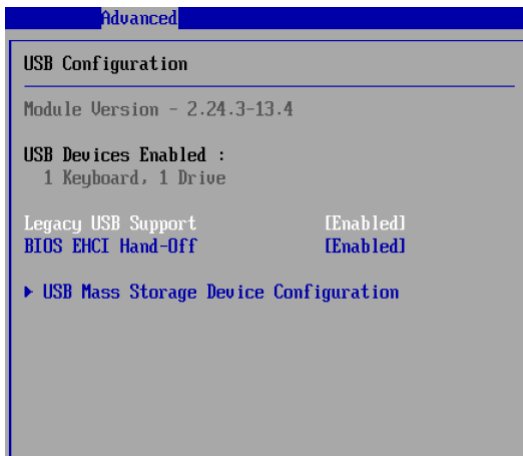
► **ACPI Version Features**

This setting allows you to select the ACPI version.

► **ACPI APIC Support**

This BIOS feature is used to enable or disable the motherboard's APIC (Advanced Programmable Interrupt Controller). The APIC provides multiprocessor support, more IRQs and faster interrupt handling.

► **USB Configuration**



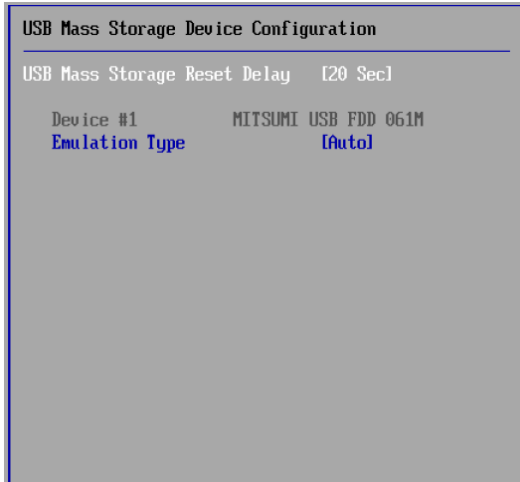
► **Legacy USB Support**

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

► **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.

► **USB Mass Storage Device Configuration**



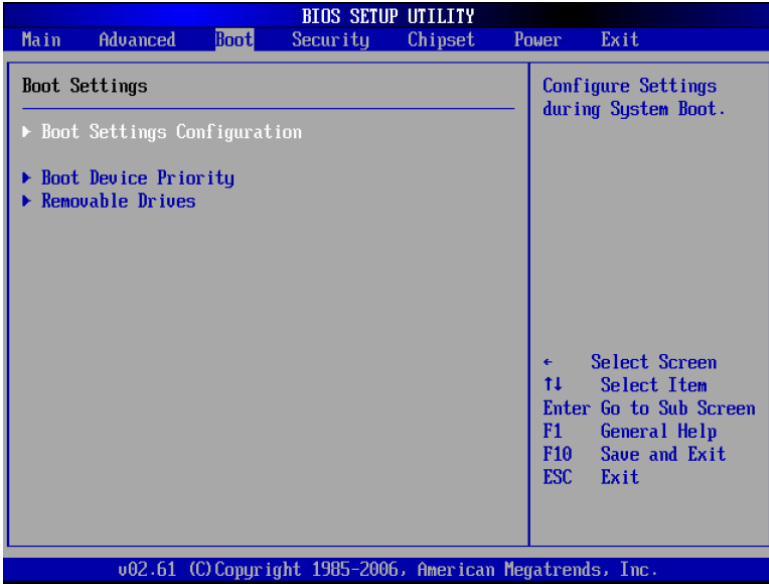
► **USB Mass Storage Reset Delay**

This setting controls the number of seconds the POST waits for the USB mass storage device after the start unit command is sent.

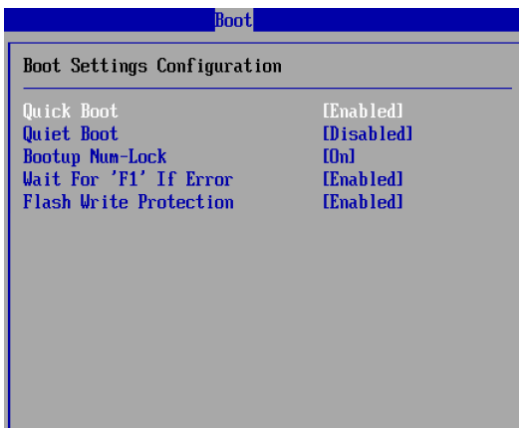
► **Emulation Type**

This setting enables you to set the type of device you want the USB mass storage device to emulate.

Boot



► Boot Settings Configuration



►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.

►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.

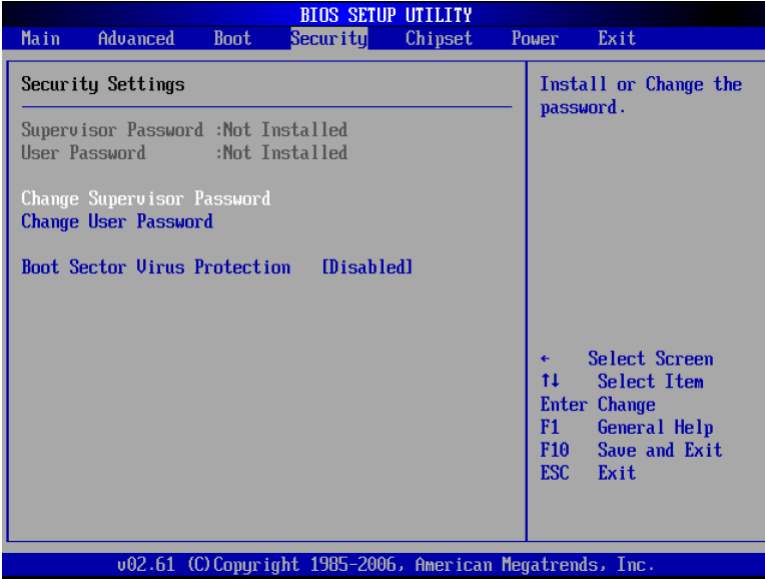
►Flash Write Protection

This function protects the BIOS from accidental corruption by unauthorized users or computer viruses.

►Boot Device Priority, Removable Drives

The items allow you to set the sequence of boot devices/removable drives. 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.

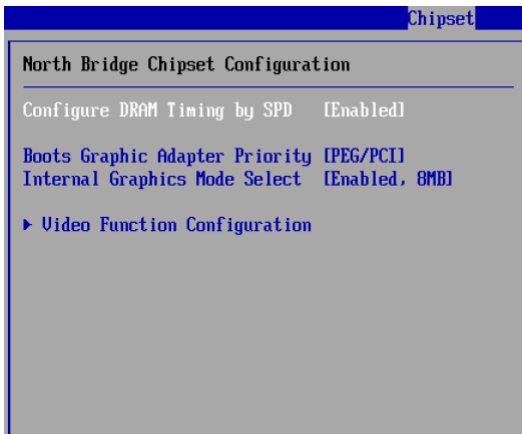
►Boot Sector Virus Protection

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'll need to disable this Flash BIOS Protection function. You should enable this function at all times. The only time when you need to disable it is when you want to update the BIOS. After updating the BIOS, you should immediately re-enable it to protect it against viruses.

Chipset



▶ North Bridge Configuration



► **Configure DRAM Timing by SPD**

Selects whether DRAM timing is controlled by the SPD (Serial Presence Detect) EEPROM on the DRAM module. Setting to [Auto By SPD] enables DRAM timings and the following related items to be determined by BIOS based on the configurations on the SPD. Selecting [Manual] allows users to configure the DRAM timings and the following related items manually.

► **Boot Graphics Adapter Priority**

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.

► **Video Function Configuration**

Video Function Configuration	
DVMT Mode Select	[DVMT Mode]
Boot Display Device	[CRT]
Flat Panel Type	[1024 * 768 18bit]

► **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.

► **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**

Use the field to select the resolution of the flat panel display.

► **South Bridge Configuration**



► **USB Functions**

This setting specifies the function of the onboard USB controller.

► **USB 2.0 Controller, Audio Controller, PRO-NIC Controller, SMBUS Controller**

These settings enable/disable the specified onboard controllers.

Power



►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.

►Resume On LAN

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

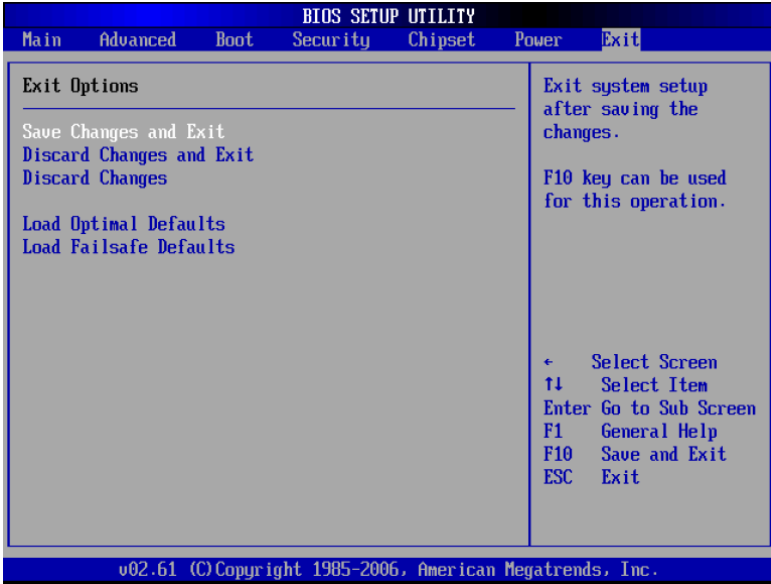
►Resume On PME#

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.

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.

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 07
 Mov dx, SIO_IDX
 mov al, 07h out dx, al
 mov dx, SIO_DTA
 mov al, 07h
 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 Recovery Code Checkpoints

The Bootblock recovery code gets control when the BIOS determines that a BIOS recovery needs to occur because the user has forced the update or the BIOS checksum is corrupt. The following table describes the type of checkpoints that may occur during the Bootblock recovery portion of the BIOS:

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.
E9 or EA	Determine information about root directory of recovery media.
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

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
3	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."
4	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
5	Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table.
6	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."
8	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.
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.
24	Uncompress and initialize any platform specific BIOS modules.
30	Initialize System Management Interrupt.
2A	Initialize different buses and perform the following functions: Reset, Detect,
2C	Initializes different devices. Detects and initializes the video adapter installed
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	Initialize different buses and perform the following functions: Boot Input Device Initialization (function 3); IPL Device Initialization (function 4); General Device Initialization (function 5). Function 3 searches for and configures PCI input devices and detects if system has standard keyboard controller. Function 4 searches for and configures all PnP and PCI boot devices. Function 5 configures all onboard peripherals that are set to an automatic configuration and configures all remaining PnP and PCI devices.
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.
8D	Build ACPI tables (if ACPI is supported)
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).