SBC84831 Series

Intel® Atom™ Processor N270

Capa Board with LVDS

User's Manual

Disclaimers

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Caution

If you replace wrong batteries, it causes the danger of explosion. It is recommended by the manufacturer that you follow the manufacturer's instructions to only replace the same or equivalent type of battery, and dispose of used ones.

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ESD Precautions

Computer boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

Trademarks Acknowledgments

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CHAPTER 1
INTRODUCTION

The **SBC84831**, a Capa board, supports Intel® Atom™ processor N270, at FSB 533 MHz. The board integrates chipsets Intel® 945GSE and ICH7M that deliver outstanding system performance through high-bandwidth interfaces, multiple I/O functions for interactive applications and various embedded computing solutions. There is one 200-pin unbuffered SO-DIMM sockets for singe channel DDR2-400/533 MHz memory, maximum memory capacity up to 1GB. It also features two Gigabit/Fast Ethernet, two serial ATA channels for total two Serial ATA hard drives at maximum transfer rate up to 150MB/sec, four USB 2.0 high speed compliant, built-in AC'97 audio codec that can achieve the best stability and reliability for industrial applications. Additionally, it provides you with unique embedded features, such as 6 serial ports and 3.5" form factor that applies an extensive array of PC peripherals.

1.1 Specifications

- **CPU**
  - **Intel® Atom™ processor N270**
- **System Chipset**
  - **Intel® 945GSE & ICH7M**
- **Front-Side Bus**
  - **533 MHz**
- **BIOS**
  - American Megatrends Inc. BIOS.
  - 8Mbit SPI Flash, DMI, Plug and Play
  - "Load Optimized Default" to backup customized Setting in the BIOS flash chip to prevent from CMOS battery fail
- **System Memory**
  - One 200-pin unbuffered DDR2 SO-DIMM sockets
  - Maximum to 1GB DDR2 400/533 MHz memory
- **Onboard Multi I/O**
  - Controller: Winbond W83627UHG
  - Serial Ports: Six ports for RS-232
  - Two SATA-150 connectors
- **CompactFlash™ Socket**
  - One CompactFlash™ Type II Socket
- **USB Interface**
  - Four USB ports with fuse protection and complies with USB Spec. Rev. 2.0
- **Display**
  - CRT connector
  - One 40-pin connector for 24-bit dual channel LVDS via Chrontel CH7308B from SDVO as EFP port and one 7-pin inverter connector(Optional)

- **Watchdog Timer**
  - 1~255 seconds; up to 255 levels

- **Ethernet**
  - Dual port with RTL8111B for Gigabit/Fast Ethernet
- **Audio**
  - AC'97 Audio compliant (with Speaker/line-out & MIC-in) via ALC203
  - Internal Audio features for speaker-out & MIC-in & Line-in via Box Header connector
- **Power Management**
  - ACPI (Advanced Configuration and Power Interface)
- **Form Factor**
  - 3.5" form factor

NOTE *All specifications and images are subject to change without notice.*

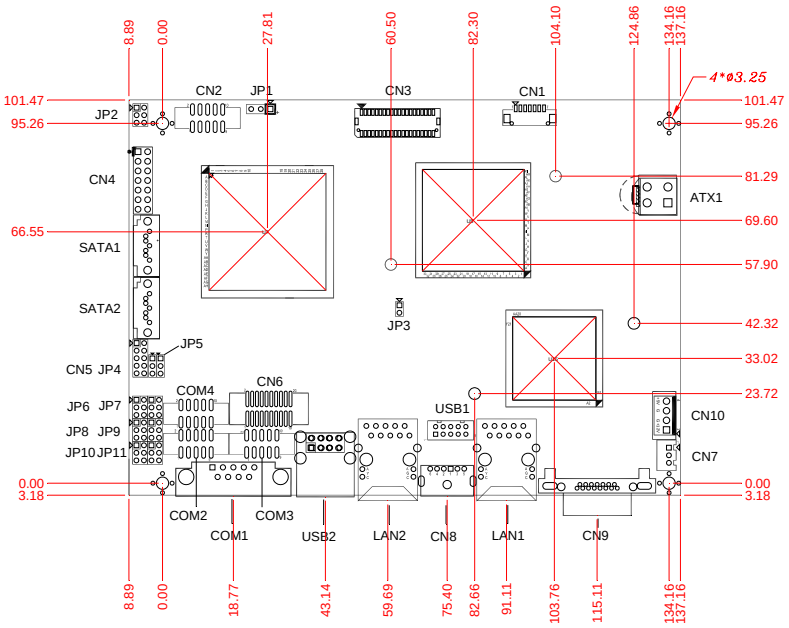
1.2 Utilities Supported

- Chipset Driver
- Ethernet Driver
- Graphic Driver
- Audio Driver

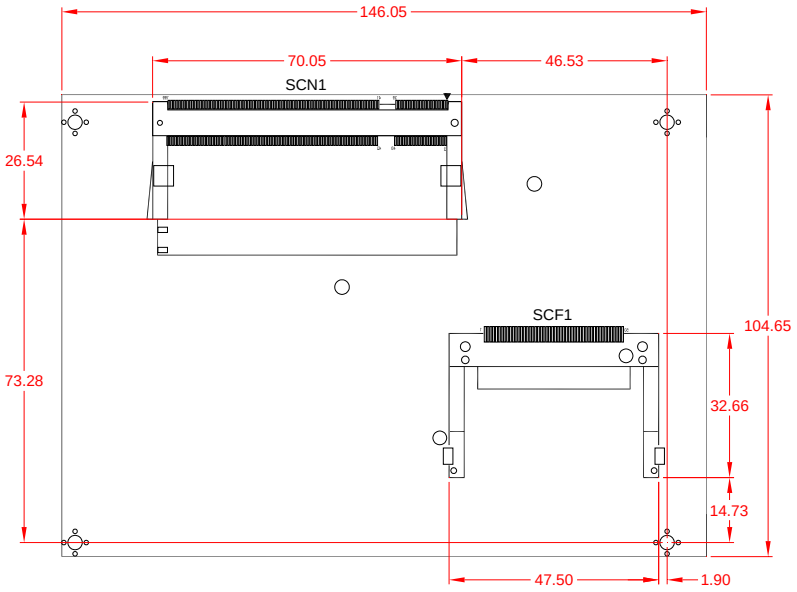
MEMO

CHAPTER 2
JUMPERS AND CONNECTORS

2.1 Board Dimensions and Fixing Holes

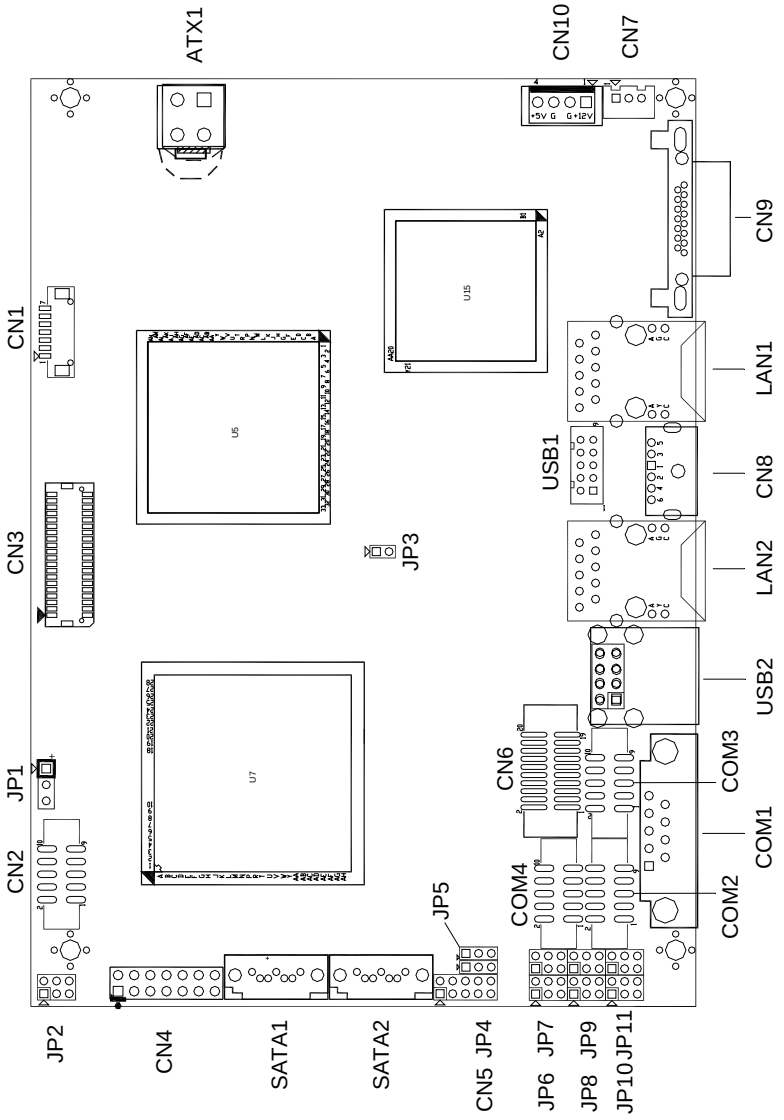


Component Side

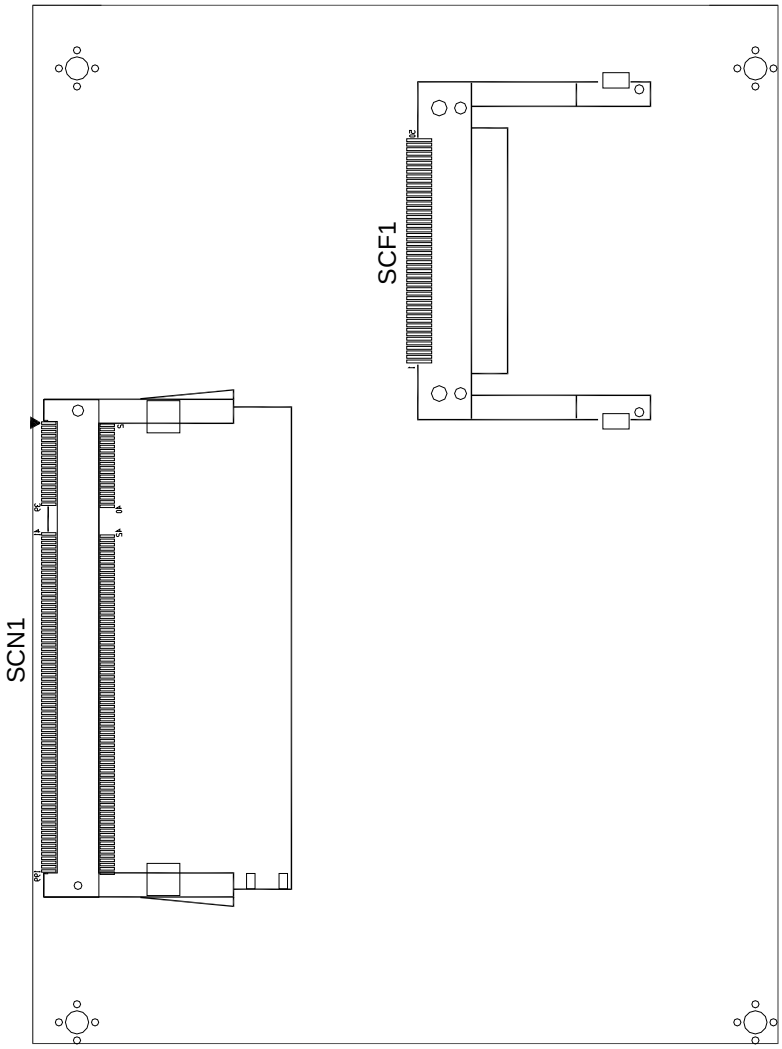


Solder Side

2.2 Board Layout



Component Side



Solder Side

2.3 Jumper Settings

Proper jumer settings configure the **SBC84831** to meet your application purpose. We are herewith listing a summary table of all jumpers and default settings for onboard devices, respectively.

Jumper	Default Setting		Jumper Setting
JP1	LVDS Voltage Selection Default: 3.3V		Short 1-2
JP2	Audio Speak Out/Line Out Selection Default: Line Out		Short 1-3, 2-4
JP3	Auto Power ON Default: Disable		Short
JP4	Compact Flash Voltage Selection Default: 3.3V		Short 1-2
JP5	Normal Operation/Clear CMOS setting Default: Normal Operation		Short 1-2
JP6	COM5 Mode Select	CN6 Pin 1: DCD	Short 3-5
		CN6 Pin 8: RI	Short 4-6
JP7	COM6 Mode Select	CN6 Pin 11: DCD	Short 3-5
		CN6 Pin 18: RI	Short 4-6
JP8	COM3 Mode Select	COM3 Pin 1: DCD	Short 3-5
		COM3 Pin 8: RI	Short 4-6
JP9	COM4 Mode Select	COM4 Pin 1: DCD	Short 3-5
		COM4 Pin 8: RI	Short 4-6
JP10	COM1 Mode Select	COM1 Pin 1: DCD	Short 3-5
		COM1 Pin 9: RI	Short 4-6
JP11	COM2 Mode Select	COM1 Pin 1: DCD	Short 3-5
		COM1 Pin 8: RI	Short 4-6

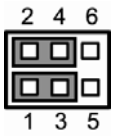
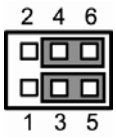
2.3.1 LCD Voltage Selection Jumper (JP1)

The board supports +3.3V or +5V flat panel displays. Configure the jumper **JP1** to the appropriate voltage of the flat panel.

Description	Function	Jumper Setting
LCD Voltage Selection	3.3V (Default)	
	5V	

2.3.2 Audio Output Jumper (JP2)

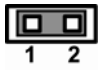
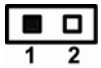
This jumper is to select the Audio output.

Description	Function	Jumper Setting
Audio Output	Line Out (Default)	
	Speaker Out	

2.3.3 Auto Power On Jumper (JP3)

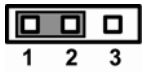
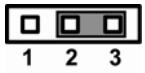
When Jumper JP3 is set OPEN for AC power input, the system will be automatically power ON without pressing soft power button; when JP3 is SHORT for AC power input, it is necessary to manually press soft power button to make the system power ON.

Note *This function is similar to the feature of Power On after Power Failed, which is controlled by hardware circuitry instead of BIOS.*

Description	Function	Jumper Setting
Auto Power On	Disable (Default)	
	Enable	

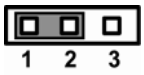
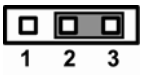
2.3.4 CompactFlash™ Voltage Jumper (JP4)

The jumper is to select the voltage for CompactFlash™ interface.

Description	Function	Jumper Setting
Compact Flash Voltage Selection	3.3V (Default)	
	5V	

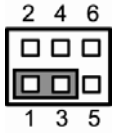
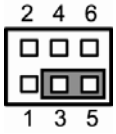
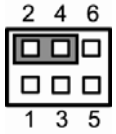
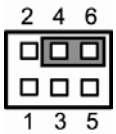
2.3.5 CMOS Clear Jumper (JP5)

You may need to use this jumper is to clear the CMOS memory if incorrect settings in the Setup Utility.

Description	Function	Jumper Setting
CMOS Clear	Normal (Default)	
	Clear CMOS	

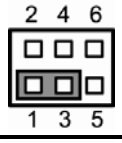
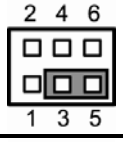
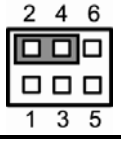
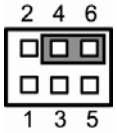
2.3.6 COM5 Mode Selection Jumper (JP6)

The jumper selects the CN6 COM5 ports' DCD and RI mode.

Description	Function	Jumper Setting
COM5	CN6 Pin 1=5V	
	CN6 Pin 1=DCD (Default)	
	CN6 Pin 8=12V	
	CN6 Pin 8=RI (Default)	

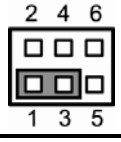
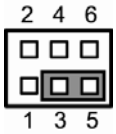
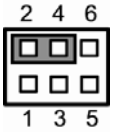
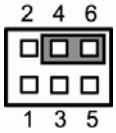
2.3.7 COM6 Mode Selection Jumper (JP7)

The jumper selects the CN6 COM6 ports' DCD and RI mode.

Description	Function	Jumper Setting
COM6	CN6 Pin 11=5V	
	CN6 Pin 11=DCD (Default)	
	CN6 Pin 18=12V	
	CN6 Pin 18=RI (Default)	

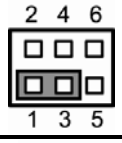
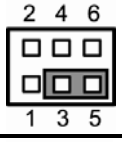
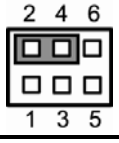
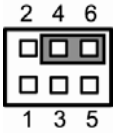
2.3.8 COM3 Mode Selection Jumper (JP8)

The jumper selects the COM3 ports' DCD and RI mode.

Description	Function	Jumper Setting
COM3	Pin 1=5V	
	Pin 1=DCD (Default)	
	Pin 8=12V	
	Pin 8=RI (Default)	

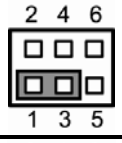
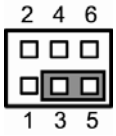
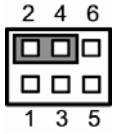
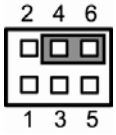
2.3.9 COM4 Mode Selection Jumper (JP9)

The jumper selects the COM4 ports' DCD and RI mode.

Description	Function	Jumper Setting
COM4	Pin 1=5V	
	Pin 1=DCD (Default)	
	Pin 8=12V	
	Pin 8=RI (Default)	

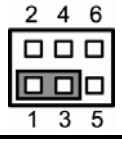
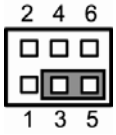
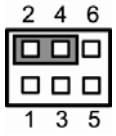
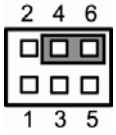
2.3.10 COM1 Mode Selection Jumper (JP10)

The jumper selects the COM1 ports' DCD and RI mode.

Description	Function	Jumper Setting
COM1	Pin 1=5V	
	Pin 1=DCD (Default)	
	Pin 9=12V	
	Pin 9=RI (Default)	

2.3.11 COM2 Mode Selection Jumper (JP11)

The jumper selects the COM2 ports' DCD and RI mode.

Description	Function	Jumper Setting
COM2	Pin 1=5V	
	Pin 1=DCD (Default)	
	Pin 8=12V	
	Pin 8=RI (Default)	

2.4 Connectors

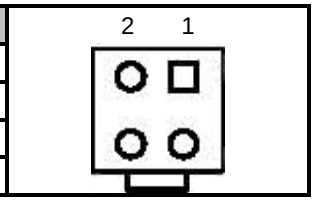
Connectors connect the board with other parts of the system. Loose or improper connection might cause problems. Make sure all connectors are properly and firmly connected. Here is a summary table shows you all connectors on the **SBC84831** Series.

Connector	Label	Connector	Label
ATX 4 Pin 12V In	ATX1	Power output Connector	CN10
LVDS Backlight Connector	CN1	Ethernet1 Connector	LAN1
Audio Connector	CN2	Ethernet2 Connector	LAN2
LVDS Connector	CN3	SATA1 Connector	SATA1
Front Panel Connector	CN4	SATA2 Connector	SATA2
2*5pin DIO Connector	CN5	USB2, USB3 Connector	USB1
COM5, COM6 Connector	CN6	USB0, USB1 Connector	USB2
SMBus Connector	CN7	CF Connector	SCF1
PS/2 Connector	CN8	DDRII SO-DIMM Connector	SCN1
VGA Connector	CN9		
COM1 Connector	COM1		
COM2 Connector	COM2		
COM3 Connector	COM3		
COM4 Connector	COM4		

2.4.1 ATX 4 Pin 12V Connector (ATX1)

Connect it to the power supply ATX12V power.

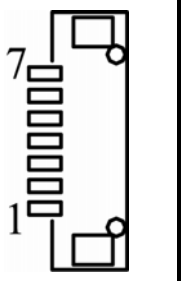
Pin	Signal
1	GND
2	GND
3	+12V
4	+12V



2.4.2 LVDS Backlight Connector (CN1)

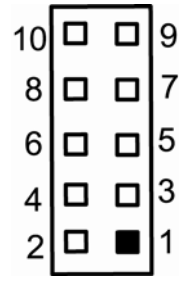
The **CN1** is DF13-7S-1.25C 7-pin connectors for inverter that we strongly recommend you to use the matching DF13-7S-1.25C connector.

Pin	Signal
1	+12V
2	+12V
3	+5V
4	ENABLE
5	GND
6	GND
7	GND



2.4.3 Audio Phone Jack Connector (CN2)

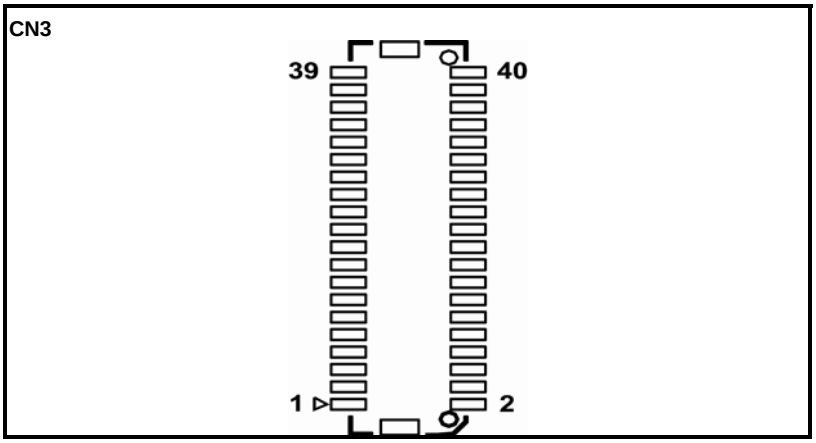
Pin	Signal	Pin	Signal
1	MIC_IN	2	Ground (GND)
3	LINE_IN_L	4	Ground (GND)
5	LINE_IN_R	6	Ground (GND)
7	AUDIO_OUT_L	8	Ground (GND)
9	AUDIO_OUT_R	10	Ground (GND)



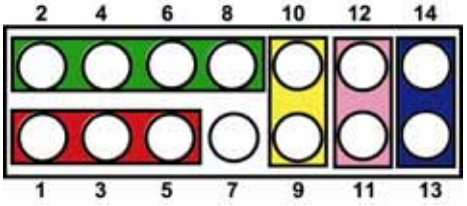
2.4.4 LVDS Flat Panel Connector (CN3)

The board has a 40-pin connector **CN3** for LVDS Interface LCD. It is strongly recommended to use the matching GLA1001WV-S-2x20P 40-pin connector for LVDS on the board.

Pin	Signal	Pin	Signal
1	VCCM	2	VCCM
3	VCCM	4	VCCM
5	VCCM	6	VCCM
7	N.C.	8	N.C.
9	GND	10	GND
11	Channel B D3- (24-Bit support)	12	Channel B D0-
13	Channel B D3+ (24-Bit support)	14	Channel B D0+
15	GND	16	GND
17	Channel B CLK-	18	Channel B D1-
19	Channel B CLK+	20	Channel B D1+
21	GND	22	GND
23	Channel A D0-	24	Channel B D2-
25	Channel A D0+	26	Channel B D2+
27	GND	28	GND
29	Channel A D1-	30	Channel A D3- (24-Bit support)
31	Channel A D1+	32	Channel A D3+ (24-Bit support)
33	GND	34	GND
35	Channel A D2-	36	Channel A CLK-
37	Channel A D2+	38	Channel A CLK+
39	GND	40	GND



2.4.5 Flat Panel Bezel Connector (CN4)



- **Power LED**

  This 3-pin connector has Pin 1 and Pin 5 that connect the system power LED indicator to its corresponding switch on the case. Pin 1 is assigned as +, and Pin 3, Pin 5 as -. The Power LED lights up when the system is powered ON. Pin 3 is defined as GND

- **External Speaker and Internal Buzzer Connector**

  Pin 2, 4, 6 and 8 can be connected to the case-mounted speaker unit or internal buzzer. While connecting the CPU card to an internal buzzer, please short pins 2-4; while connecting to an external speaker, you need to set pins 2-4 to Open and connect the speaker cable to pin 8 (+) and pin 6 (-).

- **ATX Power On/Off Button**

  This 2-pin connector named as Pin 9 and 10 connect the front

panel's ATX power button to the CPU card, which allows users to control ATX power supply to be power on/off.

- **System Reset Switch**
  Pin 11 and 12 can be connected to the case-mounted reset switch that reboots your computer, not turns OFF the power switch. It is a better way to reboot your system for a longer life of the system's power supply.

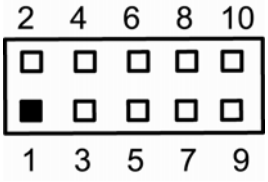
- **HDD Activity LED**

  This connection is linked to hard drive activity LED on the control panel. LED flashes when HDD is being accessed. Pin 13 and 14 connect the hard disk drive to the front panel HDD LED, Pin 13 assigned as -, and Pin 14 as +.

2.4.6 Digital I/O Port Connector (CN5)

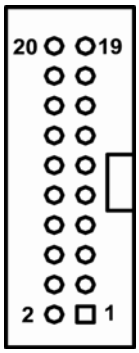
The board is equipped an 8-channel (3in, 5out) digital I/O connector that meets requirements for a system customary automation control. The digital I/O can be configured to control cash drawers and sense warning signals from an Uninterrupted Power System (UPS), or perform store security control. The digital I/O is controlled via software programming.

Pin	Signal	Pin	Signal
1	Digital Input 0	2	Digital Output 0
3	Digital Input 1	4	Digital Output 1
5	Digital Input 2	6	Digital Output 2
7	Ground (GND)	8	Digital Output 3
9	Ground (GND)	10	Digital Output 4



2.4.7 Serial Port5 & Serial Port6 (CN6)

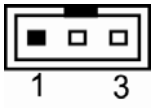
Pin	Signal	Pin	Signal
1	DCD5	2	DSR5
3	RXD5	4	RTS5
5	TXD5	6	CTS5
7	DTR5	8	RI5
9	GND	10	N.C.
11	DCD6	12	DSR6
13	RXD6	14	RTS6
15	TXD6	16	CTS6
17	DTR6	18	RI6
19	GND	20	N.C.



2.4.8 SMBus Connector (CN7)

Connector CN7 is for SMBUS interface support.

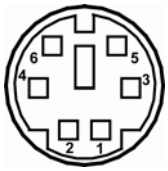
Pin	Signal
1	CLOCK
2	DATA
3	GND



2.4.9 Keyboard and PS/2 Mouse Connector (CN8)

The board supports a keyboard and Mouse interface. Connector is a DIN connector for PS/2 keyboard Connection VIA "Y" Cable.

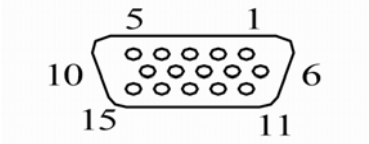
Pin	Signal
1	Keyboard Data
2	Mouse Data
3	GND
4	VCC
5	Keyboard Clock
6	Mouse Clock



2.4.10 VGA Connector (CN9)

The board has three connectors to support CRT VGA and flat panel displays, individually or simultaneously. Connector is a slim type 15-pin D-Sub connector commonly for the CRT VGA display. The VGA interface configuration is done via the software utility, and no jumper setting is required.

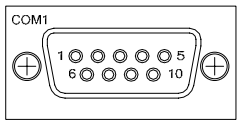
Pin	Signal	Pin	Signal	Pin	Signal
1	Red	2	Green	3	Blue
4	N.C.	5	GND	6	DETECT
7	GND	8	GND	9	VCC
10	GND	11	N.C.	12	DDC DATA
13	Horizontal Sync	14	Vertical Sync	15	DDC CLK



2.4.11 Serial Port1 Connector (COM1)

The COM 1 Port connector is a standard DB-9 connector.

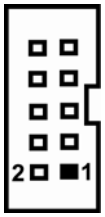
Pin	Signal
1	DCD, Data carrier detect
2	RXD, Receive data
3	TXD, Transmit data
4	DTR, Data terminal ready
5	GND, ground
6	DSR, Data set ready
7	RTS, Request to send
8	CTS, Clear to send
9	RI, Ring indicator



2.4.12 Serial Port 2, 3, 4 Connectors (COM2, COM3, COM4)

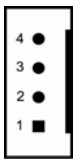
Here is the pin assignment list for your reference.

Pin	Signal	Pin	Signal
1	Data Carrier Detect (DCD)	2	Data Set Ready (DSR)
3	Receive Data (RXD)	4	Request to Send (RTS)
5	Transmit Data (TXD)	6	Clear to Send (CTS)
7	Data Terminal Ready (DTR)	8	Ring Indicator (RI)
9	Ground (GND)	10	N.C.



2.4.13 Power output Connector (CN10)

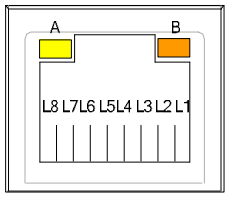
Pin	Signal
1	+12V
2	GND
3	GND
4	+5V



2.4.14 Ethernet Connectors (LAN1, LAN2)

The RJ-45 connector is for Ethernet. To connect the board to a 1000/100/10 Base-T hub, just plug one end of the cable into connector and connect the other end (phone jack) to a 1000/100/10-Base-T hub.

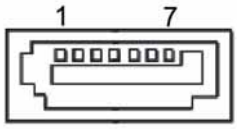
Pin	Signal	Pin	Signal
L1	MDI0+	L5	MDI2-
L2	MDI0-	L6	MDI1-
L3	MDI1+	L7	MDI3+
L4	MDI2+	L8	MDI3-
A	Active LED (Yellow)		
B	100 LAN LED (Green)/ 1000 LAN LED (Orange)		



2.4.15 SATA Connectors (SATA1, SATA2)

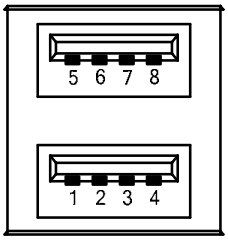
These SATA connectors are for high-speed SATA interface ports and they can be connected to hard disk devices.

Pin	Signal
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND



2.4.16 USB Port Connector (USB2)

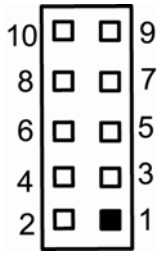
Pin	Signal	Pin	Signal
1	USB VCC0 (5VSBY)	5	USB VCC0 (5VSBY)
2	USB D0-	6	USB D1-
3	USB D0+	7	USB D1+
4	Ground (GND)	8	Ground (GND)



2.4.17 Internal USB Connector (USB1)

These Universal Serial Bus (USB) connectors on this board are for installing versatile USB interface peripherals. This is a 10-pin standard USB connector**.**

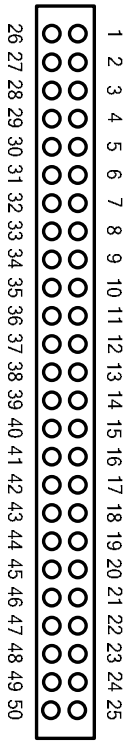
Pin	Signal	Pin	Signal
1	USB VCC1 (5VSBY)	2	USB VCC1 (5VSBY)
3	USB D2-	4	USB D3-
5	USB D2+	6	USB D3+
7	Ground (GND)	8	Ground (GND)
9	Ground (GND)	10	Ground (GND)



2.4.18 CompactFlash™ Socket (SCF1)

The board is equipped with a CompactFlash™ disk type-II socket on the solder side to support an IDE interface CompactFlash™ disk card with DMA mode supported. The socket is especially designed to avoid incorrect installation of the CompactFlash™ disk card. When installing or removing the CompactFlash™ disk card, please make sure the system power is off. The CompactFlash™ disk card is defaulted as the C: or D: disk drive in your PC system.

Pin	Signal	Pin	Signal
1	GND	26	N.C.
2	Data 3	27	Data 11
3	Data 4	28	Data 12
4	Data 5	29	Data 13
5	Data 6	30	Data 14
6	Data 7	31	Data 15
7	CS0#	32	CS1#
8	GND	33	N.C.
9	ATASEL	34	IORD#
10	GND	35	IOWR#
11	GND	36	WE#
12	GND	37	INTR
13	CF_VCC	38	CF_VCC
14	GND	39	CSEL#
15	GND	40	N.C.
16	GND	41	RESET#
17	GND	42	IORDY#
18	Address 2	43	DMAREQ
19	Address 1	44	DMAACK-
20	Address 0	45	DASP#
21	Data 0	46	PDIAG#
22	Data 1	47	Data 8
23	Data 2	48	Data 9
24	N.C.	49	Data 10
25	GND	50	GND



CHAPTER 3
HARDWARE DESCRIPTION

3.1 Microprocessors

The **SBC84831** Series supports Intel® Atom™ processor N270, which make your system operated under Windows XP and Windows VISTA environments.The system performance depends on the microprocessor. Make sure all correct settings are arranged for your installed microprocessor to prevent the CPU from damages.

3.2 BIOS

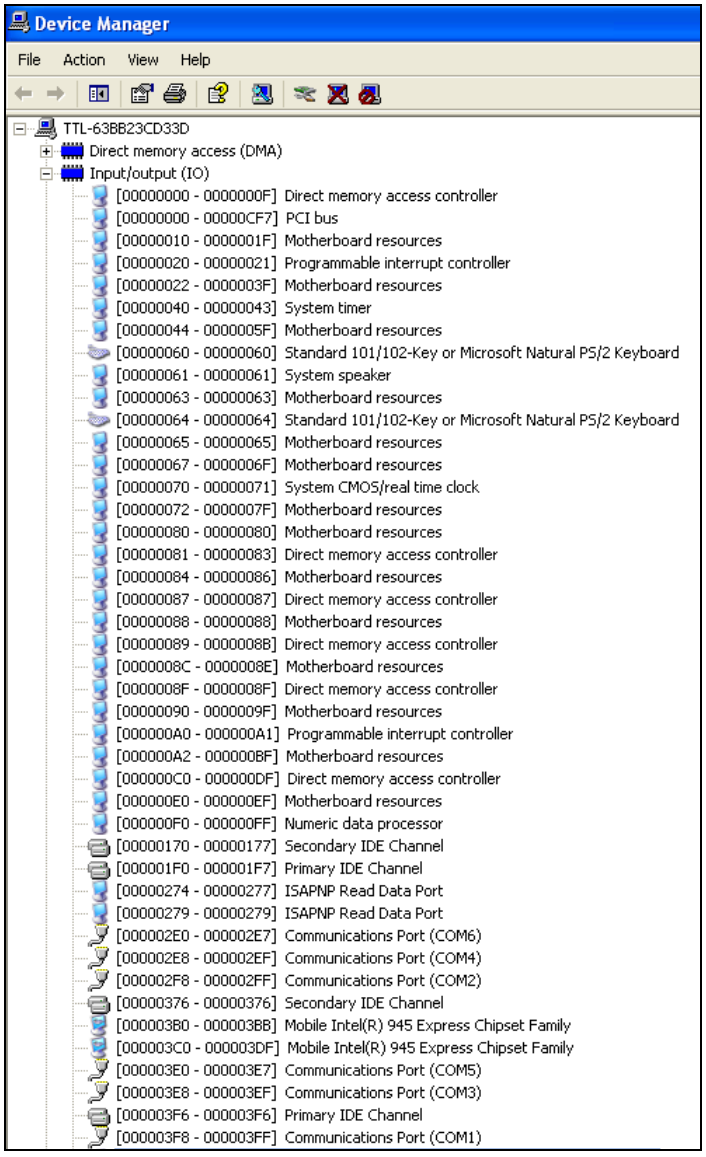
The **SBC84831** Series uses AMI Plug and Play BIOS with a single 8Mbit SPI Flash, DMI, Plug and Play.

3.3 System Memory

The **SBC84831** Series industrial CPU card supports one 200-pin unbuffered DDR2 SO-DIMM sockets for a maximum memory of 1GB DDR2 SDRAMs. The memory module can come in sizes of 128MB, 256MB, 512MB and 1GB.

3.4 I/O Port Address Map

There are total 1KB port addresses (under OS WinXP) available for assignment to other devices via I/O expansion cards.



3.5 Interrupt Controller

The **SBC84831 Series** is a 100% PC compatible control board. It consists of 16 interrupt request lines, and four out of them can be programmable. The mapping list of the 16 interrupt request lines is shown as the following table.

IRQ	Parity check error
IRQ0	System Timer Output
IRQ1	Keyboard
IRQ2	Interrupt rerouting from IRQ8 through IRQ15
IRQ3	Serial port #2
IRQ4	Serial port #1
IRQ5	PCI Device Share
IRQ6	PCI Device Share
IRQ7	PCI Device Share
IRQ8	Real time clock
IRQ9	ACPI Controller
IRQ10	Serial port #4, Serial port #6
IRQ11	Serial port #3, Serial port #5
IRQ12	PS/2 Mouse
IRQ13	Math coprocessor
IRQ14	SATA Primary (Legacy Mode)
IRQ15	SATA Secondary (Legacy Mode)

MEMO

CHAPTER 4
AMI BIOS SETUP UTILITY

This chapter provides users with detailed description how to set up basic system configuration through the AMIBIOS8 BIOS setup utility.

4.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press the <Del> key immediately.
2. After you press the <Delete> key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Chipset and Power menus.

4.2 Navigation Keys

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process.
These keys include <F1>, <F10>, <Enter>, <ESC>, <Arrow> keys, and so on.

Note *Some of navigation keys differ from one screen to another.*

← Left/Right	The Left and Right <Arrow> keys allow you to select a setup screen.
↑↓ Up/Down	The Up and Down <Arrow> keys allow you to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow you to change the field value of a particular setup item.
Tab	The <Tab> key allows you to select setup fields.
F1	The <F1> key allows you to display the General Help screen.

F10	The <F10> key allows you to save any changes you have made and exit Setup. Press the <F10> key to save your changes.
Esc	The <Esc> key allows you to discard any changes you have made and exit the Setup. Press the <Esc> key to exit the setup without saving your changes.
Enter	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens.

4.3 Main Menu

When you first enter the Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.

- **System Time/Date**
  Use this option to change the system time and date. Highlight *System Time* or *System Date* using the <Arrow> keys. Enter new

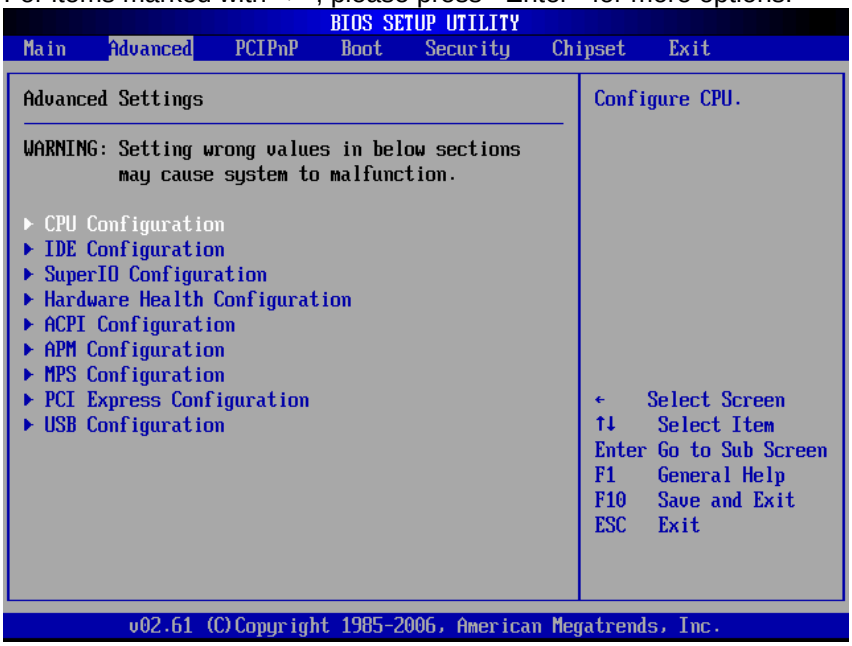
values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

4.4 Advanced Menu

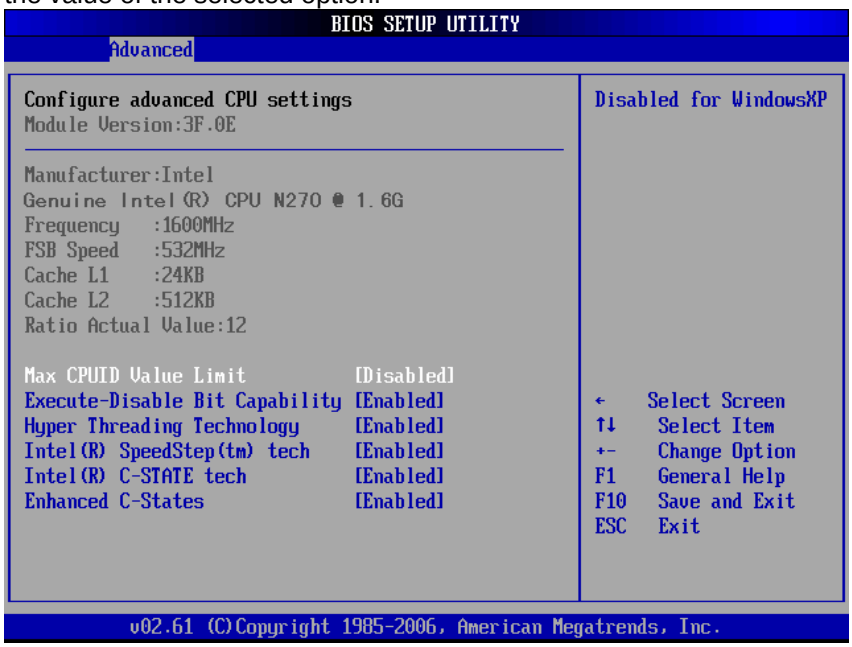
The Advanced menu allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

- CPU Configuration
- IDE Configuration
- SuperIO Configuration
- Hardware Health Configuration
- ACPI Configuration
- APM Configuration
- MPS Configuration
- PCI Express Configuration
- USB Configuration

For items marked with "►", please press <Enter> for more options.



- **Configure advanced CPU settings**
  This screen shows the CPU Configuration, and you can change the value of the selected option.

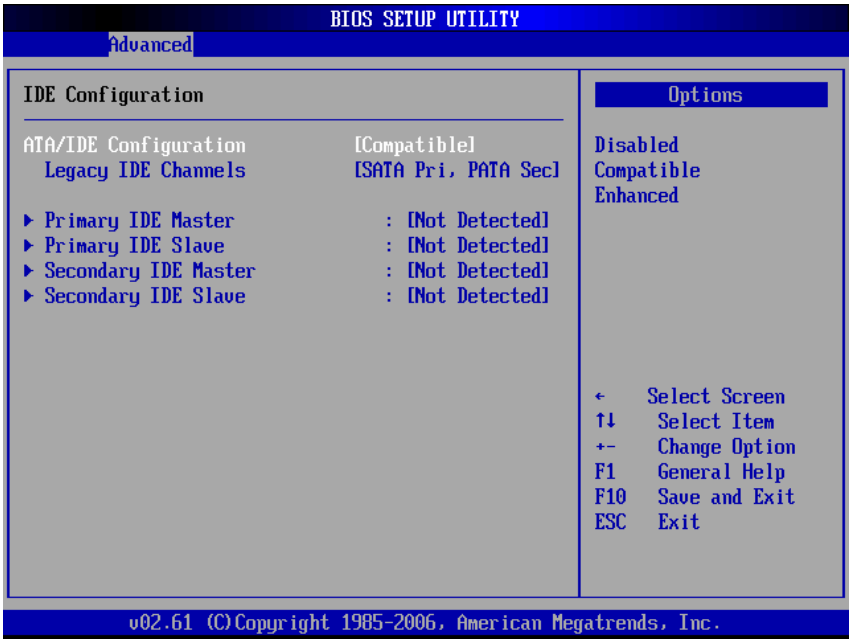


  - **Max CPUID Value Limit**
    You can enable this item to let legacy operating systems boot even without support for CPUs with extended CPU ID functions.
  - **Execute-Disable Bit Capability**
    This item helps you enable or disable the No-Execution Page Protection Technology.
  - **Hyper Threading Technology**
    Use this item to enable or disable Hyper-Threading Technology, which makes a single physical processor perform multi-tasking function as two logical ones.
  - **Intel (R) SpeedStep (tm) tech**
    This item helps you enable or disable the Intel SpeedStep Technology.
  - **Intel (R) C-STATE tech**
    Use this item to enable or disable the C-State

technology.

- **Enhanced C-States**
  This item allows you to enable or disable any available enhanced C-states (C1E, C2E, C3E, C4E and Hard C4E).

- **IDE Configuration**
  You can use this screen to select options for the IDE Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "►", please press <Enter> for more options.

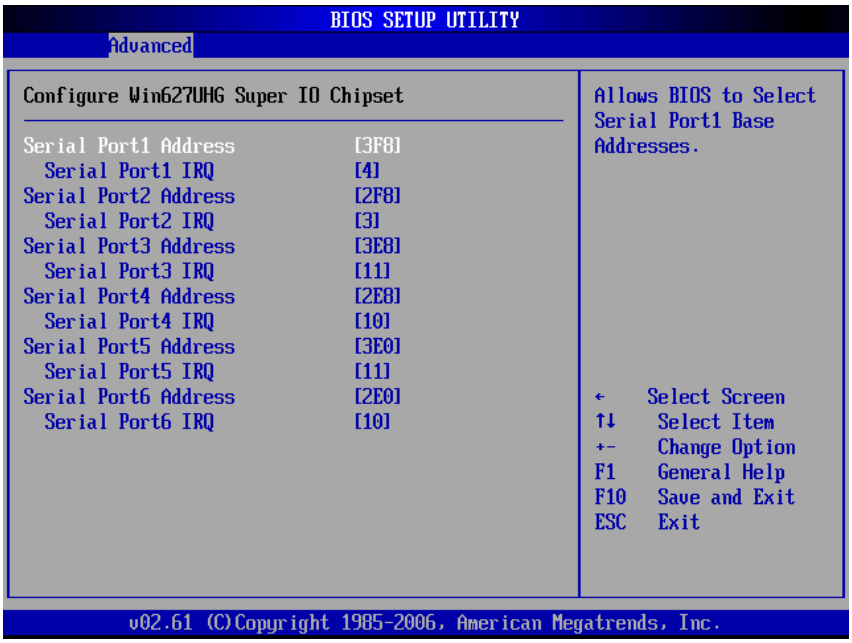


- **ATA/IDE Configuration**
  Use this item to specify the integrated IDE controller. There are three options for your selection: *Disabled*, *Compatible* and *Enhanced*.

- **Legacy IDE Channels**
  When the ATA/IDE Configuration is set to *Compatible*, this item will be displayed.

- **Primary/Secondary/Third IDE Master/Slave**
  Select one of the hard disk drives to configure IDE devices installed in the system by pressing <Enter> for more options.

- **SuperIO Configuration**
  You can use this screen to select options for the SuperIO Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.



- **Serial Port1 Address**
  This item specifies the base I/O port address and Interrupt Request address of serial port 1. The Optimal setting is *3F8/IRQ4*. The Fail-Safe default setting is *Disabled*.

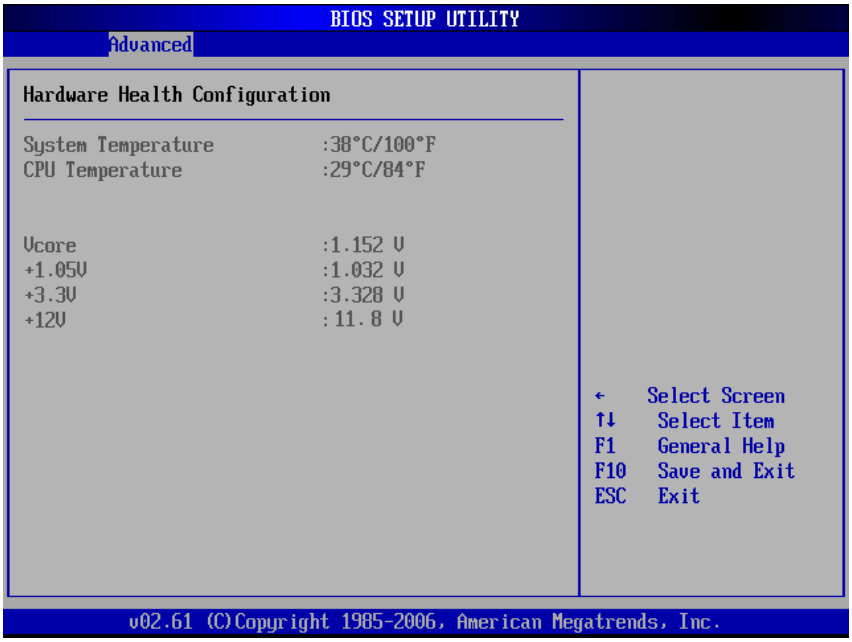
- **Serial Port1 IRQ**
  This item specifies the IRQ used by the serial port 1.

- **Serial Port2 Address**
  This item specifies the base I/O port address and

Interrupt Request address of serial port 2. The Optimal setting is *2F8/IRQ3*. The Fail-Safe setting is *Disabled*.

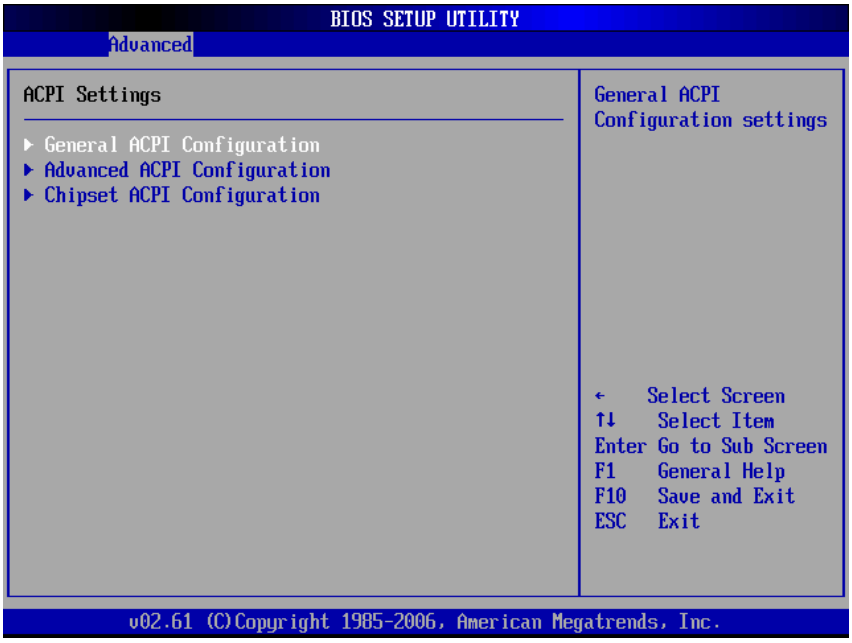
- **Serial Port2 IRQ**
  This item specifies the IRQ used by the serial port 2.
- **Serial Port2 Mode**
  This item specifies the mode used by the serial port 2.
- **Serial Port3 Address**
  This item specifies the base I/O port address and Interrupt Request address of serial port 3.
- **Serial Port3 IRQ**
  This item specifies the IRQ used by the serial port 3.
- **Serial Port4 Address**
  This item specifies the base I/O port address and Interrupt Request address of serial port 4.
- **Serial Port4 IRQ**
  This item specifies the IRQ used by the serial port 4.
- **Serial Port5 Address**
  This item specifies the base I/O port address and Interrupt Request address of serial port 5.
- **Serial Port5 IRQ**
  This item specifies the IRQ used by the serial port 5.
- **Serial Port6 Address**
  This item specifies the base I/O port address and Interrupt Request address of serial port 6.
- **Serial Port6 IRQ**
  This item specifies the IRQ used by the serial port 6.

- **Hardware Health Configuration**
  This screen shows the Hardware Health Configuration, and a description of the selected item appears on the right side of the screen.

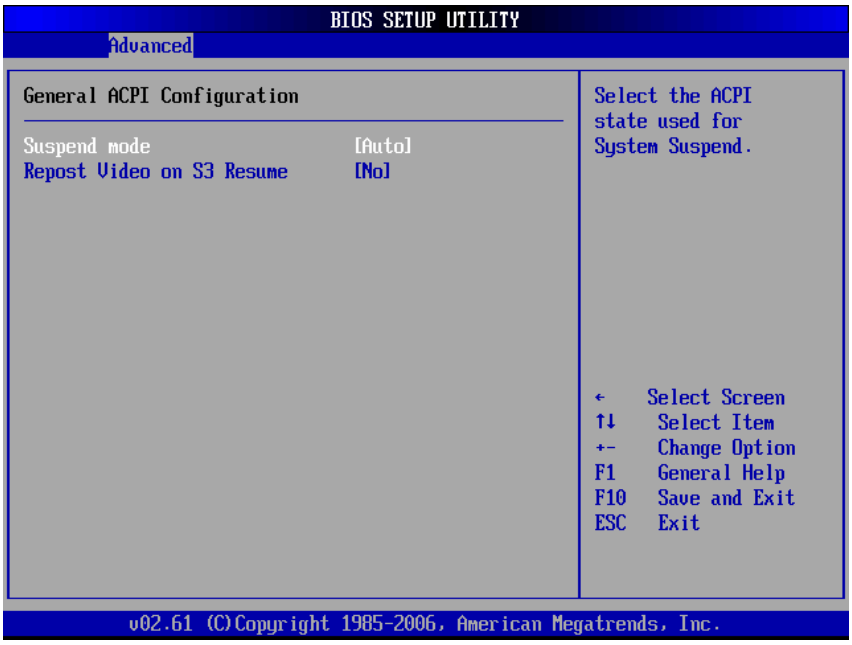


  - **System Temperature/CPU Temperature**
    These items display the temperature of CPU and System, Vcore, etc.

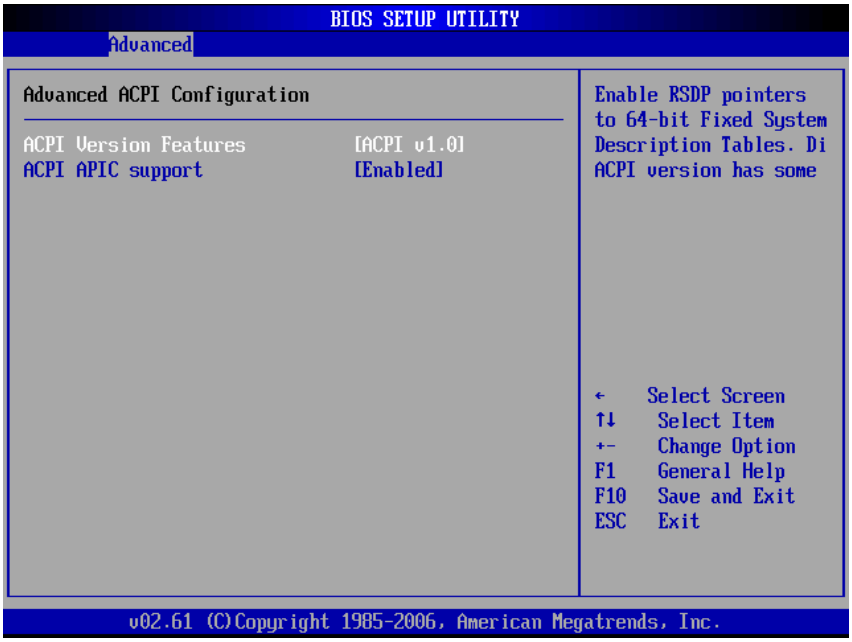
- **ACPI Settings**
  You can use this screen to select options for the ACPI Settings, and change the value of the selected option. A description of the selected item appears on the right side of the screen.



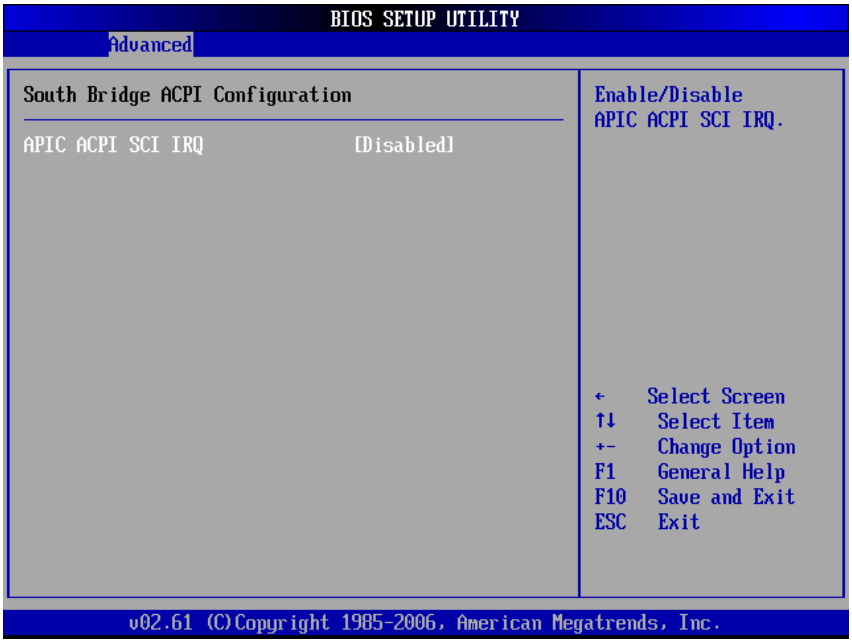
- **General ACPI Configuration**
  Scroll to this item and press <Enter> to view the General ACPI Configuration sub menu, which contains General ACPI (Advanced Configuration and Power Management Interface) options for your configuration.



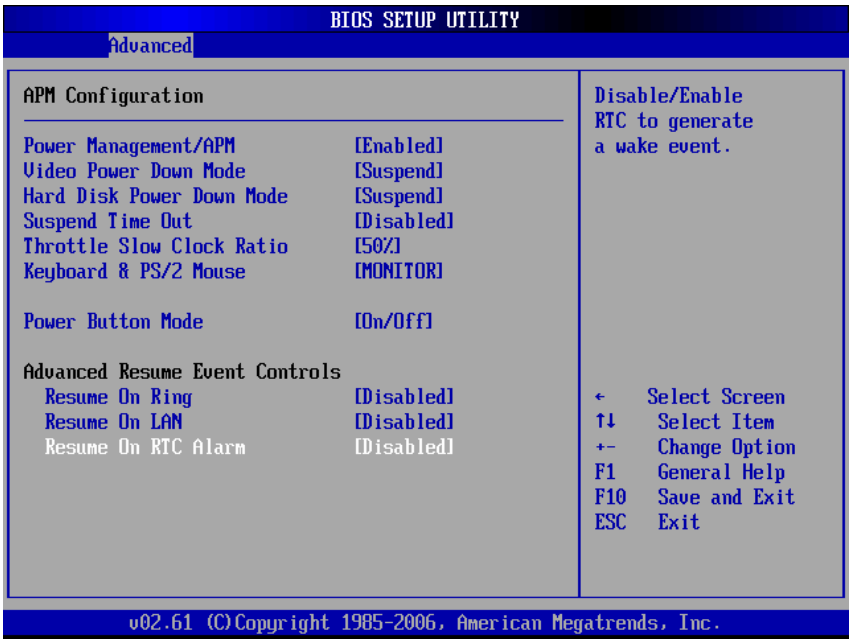
- **Advanced ACPI Configuration**
  Scroll to this item and press <Enter> to view the Advanced ACPI Configuration sub menu, which contains Advanced ACPI (Advanced Configuration and Power Management Interface) options for your configuration.



- **Chipset ACPI Configuration**
  Scroll to this item and press <Enter> to view the Chipset ACPI Configuration sub menu, which contains Chipset ACPI (Advanced Configuration and Power Management Interface) options for your configuration.



- **APM Configuration**
  You can use this screen to select options for the APM Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.



  - **Power Management/APM**
    Set this item to allow Power Management/APM support. The default setting is *Enabled*.

Disabled	Set this item to prevent the chipset power management and APM (Advanced Power Management) features.
Enabled	Set this item to allow the chipset power management and APM (Advanced Power Management) features. This is the default setting.

  - **Video Power Down Mode**
    This option specifies the Power State that the video subsystem enters when the BIOS places it in a power saving state after the specified period of display

inactivity has expired. The default setting is *Suspend*.

Disabled	This setting prevents the BIOS from initiating any power saving modes concerned with the video display or monitor.
Suspend	This option places the monitor into suspend mode after the specified period of display inactivity has expired. This means the monitor is not off. The screen will appear blacked out. The standards do not cite specific power ratings because they vary from monitor to monitor, but this setting use less power than Standby mode. This is the default setting.

- **Hard Disk Drive Power Down Mode**
  This option specifies the power conserving state that the hard disk drive enters after the specified period of hard drive inactivity has expired. The default setting is *Suspend*.

Disabled	This setting prevents hard disk drive power down mode.
Suspend	This option cuts the power to the hard disk drives during a system suspend. This is the default setting.

- **Suspend Time Out (Minute)**
  This option specifies the length of time the system waits before it enters suspend mode. The default setting is *Disabled*.

Disabled	This setting prevents the system from entering suspend mode. This is the default setting.
1 Min	Set this item to allow the computer system to enter suspend mode after being inactive for 1 minute.
4 Min	Set this item to allow the computer system to enter suspend mode after being inactive for 4 minutes.
10 Min	Set this item to allow the computer system to enter suspend mode after being inactive for 10 minutes.

- **Throttle Slow Clock Ratio**
  Use this item to specify the speed of the system clock when running the power saving states.

- **Power Button Mode**
  This option specifies how the externally mounted

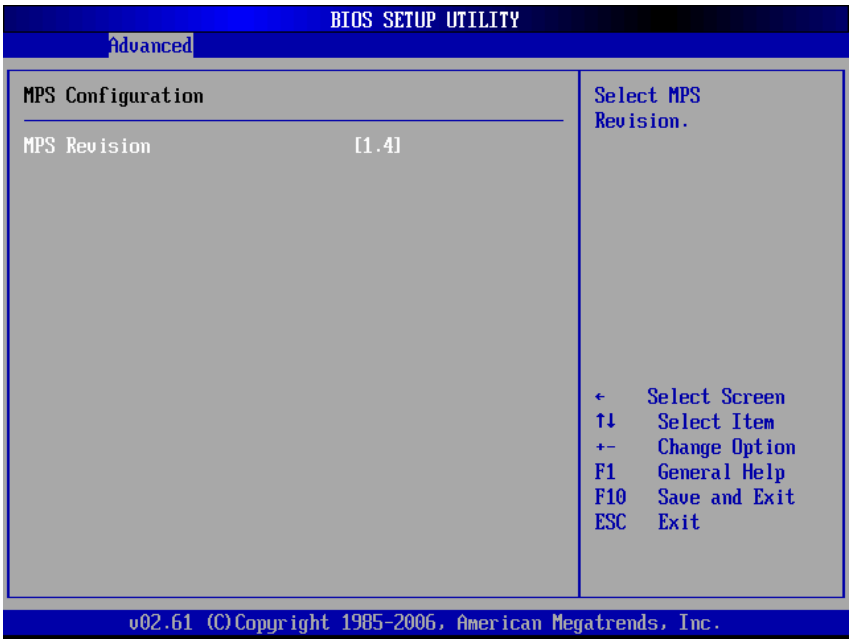
power button on the front of the computer chassis is used. The default setting is *On/Off*.

On/Off	Pushing the power button turns the computer on or off. This is the default setting. This is the default setting.
Suspend	Pushing the power button places the computer in Suspend mode or Full On power mode.

***** Advanced Resume Event Controls *****

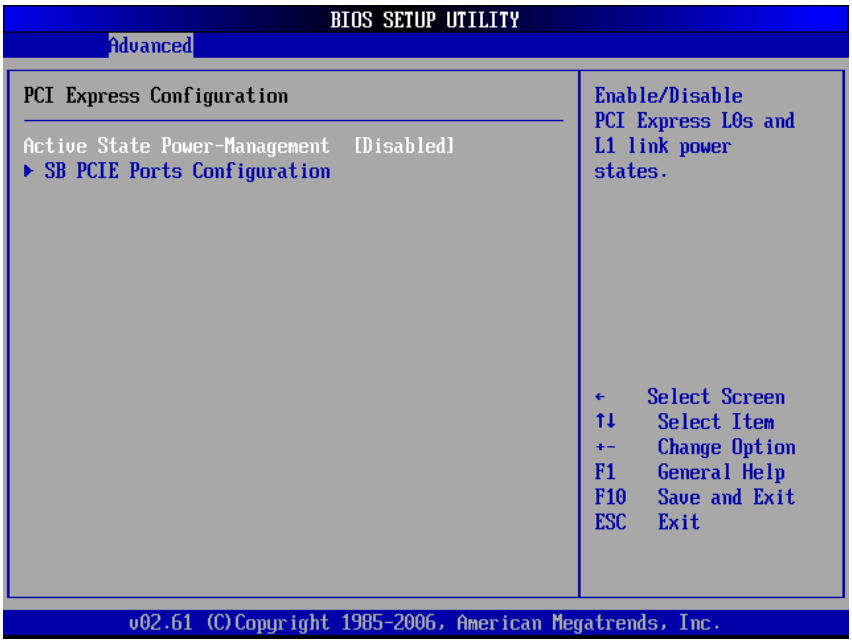
- **Resume On Ring**
  This item enables or disables the function of Resume On Ring that resumes the system through incoming calls.
- **Resume On LAN**
  This item enables or disables the function of Resume On LAN that resumes the system through the network.
- **Resume On RTC Alarm**
  You can set "Resume On RTC Alarm" item to enabled and key in Data/time to power on system.

- **MPS Configuration**
  This screen shows the MPS (Multi Processor Specification) Configuration, and you can change its value. A description of the selected item appears on the right side of the screen.



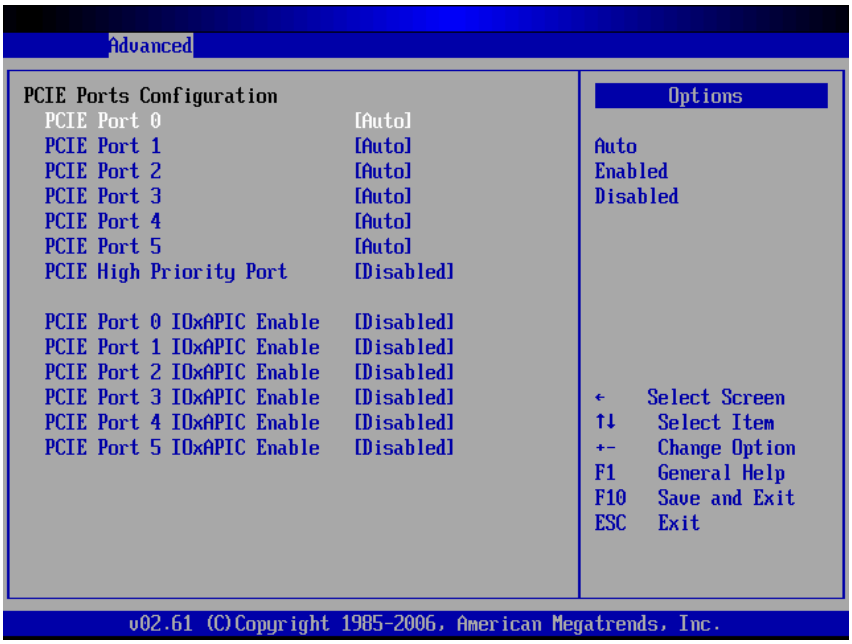
  - **MPS Revision**
    Use this item to select MPS (Multi Processor Specification) Revision 1.1 or 1.4. The default setting is *1.4*.

- **PCI Express Configuration**
  This screen shows the PCI Express Configuration, and you can change its value. A description of the selected item appears on the right side of the screen.

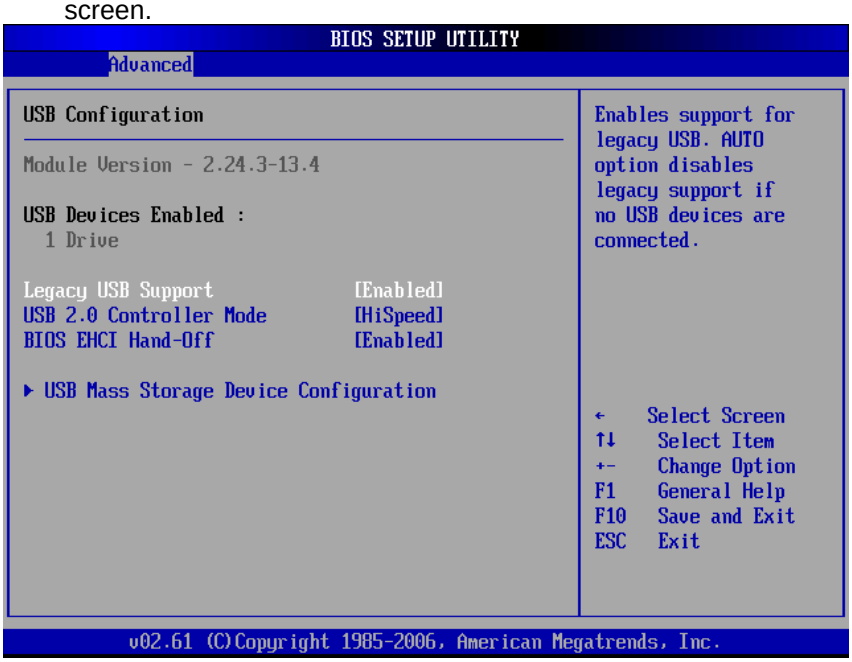


  - **Active State Power-Management**
    Use this item to enable or disable the function of Active State Power-Management to provide you with lower power consumption. The default setting is *Disabled*.

- **SB PCIE Ports Configuration**
  Scroll to this item and press <Enter> to view the SB PCIE Ports Configuration sub menu, which contains several options for your configuration.

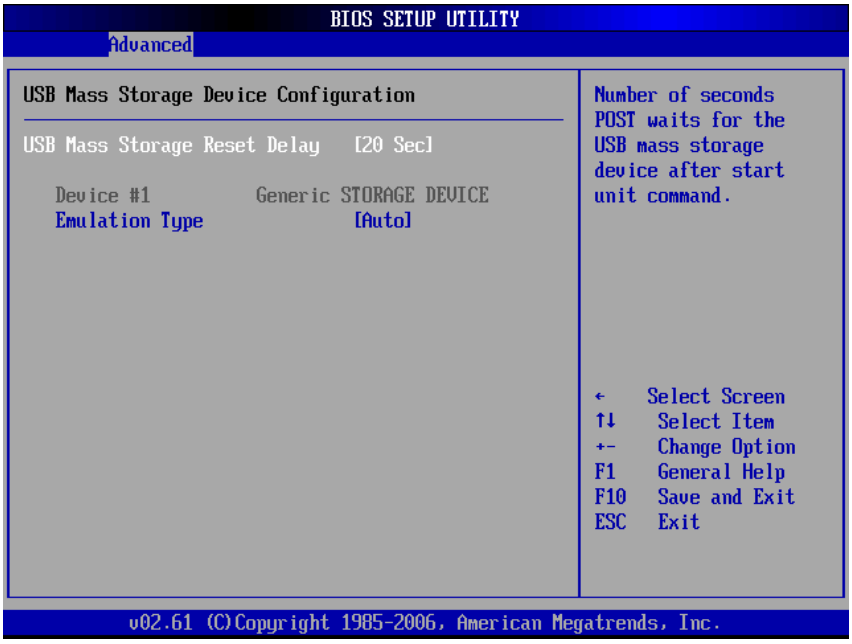


- **USB Configuration**
  You can use this screen to select options for the USB Configuration, and change the value of the selected option. A description of the selected item appears on the right side of the screen.



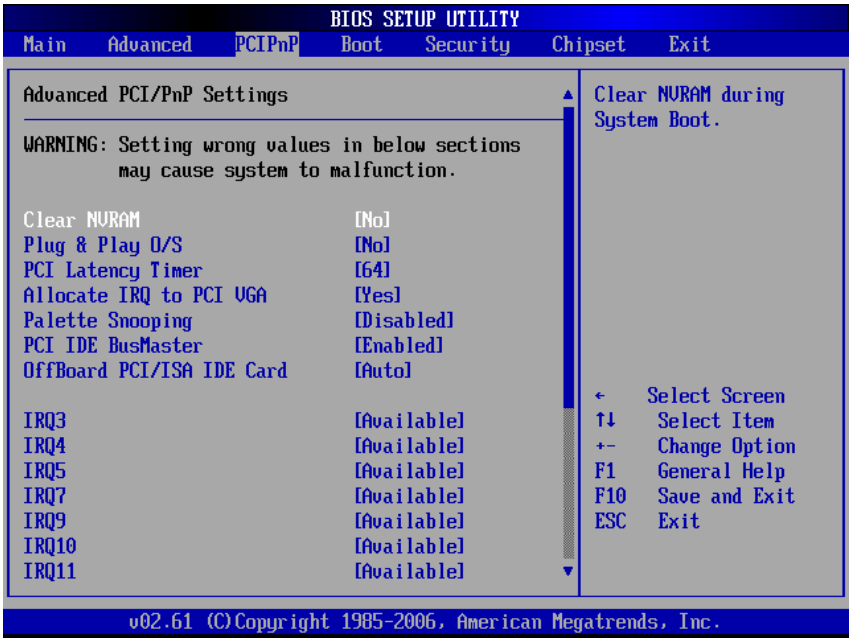
  - **Legacy USB Support**
    Use this item to enable or disable support for USB device on legacy operating system. The default setting is *Enabled*.
  - **USB 2.0 Controller Mode**
    Use this item to configure the USB 2.0 controller. The default setting is *HiSpeed*.
  - **BIOS EHCI Hand-Off**
    Enabling this item provide the support for operating systems without an EHCI hand-off feature. The default setting is *Enabled*.

- **USB Mass Storage Device Configuration**
  Scroll to this item and press <Enter> to view the USB Mass Storage Device Configuration sub menu, which contains several options for your configuration.



4.5 PCI PnP Menu

The PCI PnP menu allows users to change the advanced settings for PCI/PnP devices.



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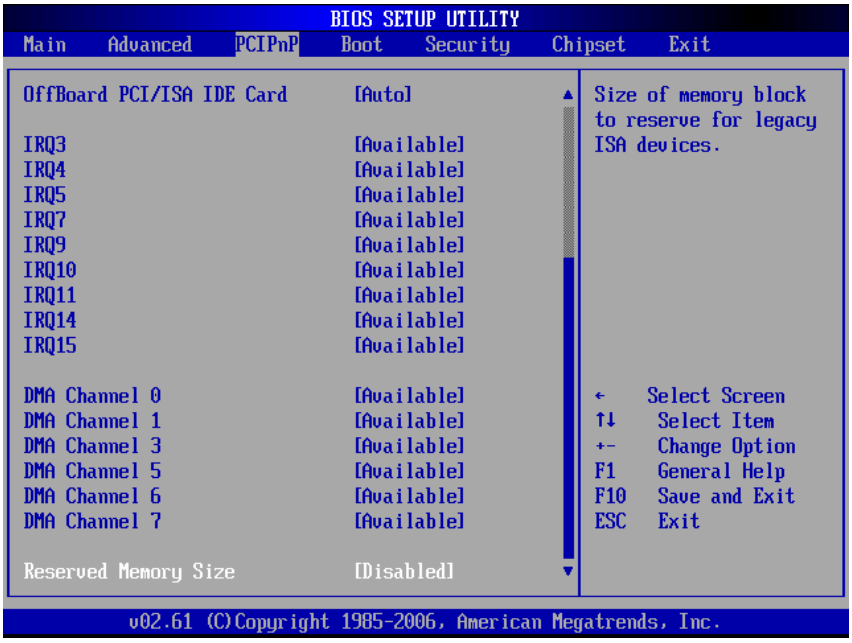


(2)

- **Clear NVRAM**
  Use this item to clear the data in the NVRAM (CMOS). Here are the options for your selection, *No* and *Yes*.

- **Plug & Play O/S**
  When the setting is No, Use this item to configure all the devices in the system. When the setting is Yes and if you install a Plug and Play operating system, the operating system configures the Plug and Play devices not required for boot. The default setting is *No*.

- **PCI Latency Timer**
  This item controls how long a PCI device can hold the PCI bus before another takes over. The longer the latency, the longer the PCI device can retain control of the bus before handing it over to another PCI device. There are several options for your selection.

- **Allocate IRQ to PCI VGA**
  This item allows BIOS to choose an IRQ to assign for the PCI VGA card. Here are the options for your

selection, *No* and *Yes*.

- **Palette Snooping**
  Some old graphic controllers need to "snoop" on the VGA palette, and then map it to their display as a way to provide boot information and VGA compatibility. This item allows such snooping to take place. Here are the options for your selection, *Disabled* and *Enabled*.

- **PCI IDE BusMaster**
  This item is a toggle for the built-in driver that allows the onboard IDE controller to perform DMA (Direct Memory Access) transfer. Here are the options for your selection, *Disabled* and *Enabled*.

- **OffBoard PCI/ISA IDE Card**
  This item is for any other non-onboard PCI/ISA IDE controller adapter. There are several options for your selection.

- **IRQ3/4/5/7/9/10/11/14/15**
  These items will allow you to assign each system interrupt a type, depending on the type of device using the interrupt. The option "Available" means the IRQ is going to assign automatically. Here are the options for your selection, *Available* and *Reserved*.

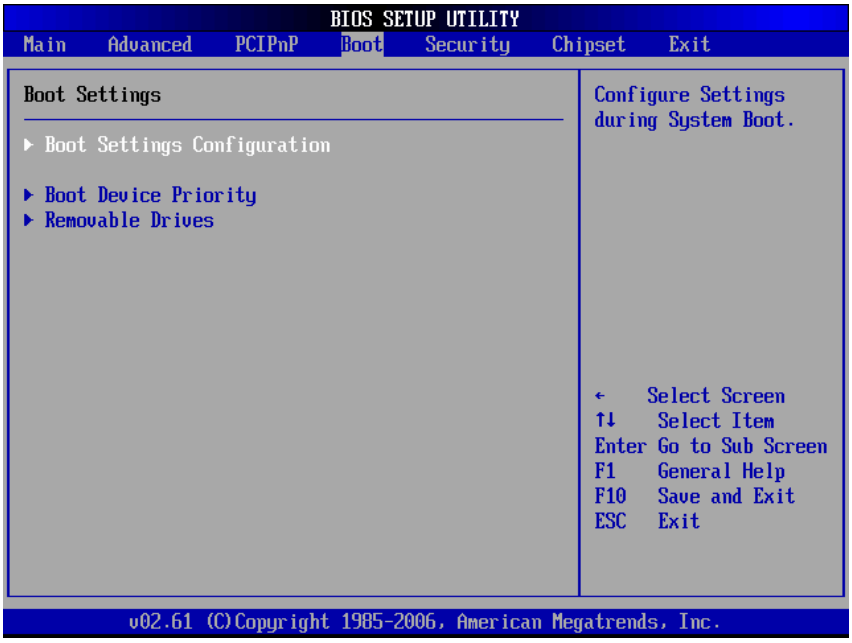
- **DMA Channel 0/1/3/5/6/7**
  These items will allow you to assign each DMA channel a type, depending on the type of device using the channel. The option "Available" means the channel is going to assign automatically. Here are the options for your selection, *Available* and *Reserved*.

4.6 Boot Menu

The Boot menu allows users to change boot options of the system. You can select any of the items in the left frame of the screen to go to the sub menus:

- Boot Settings Configuration
- Boot Device Priority
- Removable Drives

For items marked with "►", please press <Enter> for more options.



- **Boot Settings Configuration**

  - **Quick Boot**
    Enabling this item lets the BIOS skip some power on self tests (POST). The default setting is *Enabled*.

  - **LAN1/LAN2 Boot**
    Use these items to enable or disable the Boot ROM function of the onboard LAN chip when the system boots up.

  - **Quiet Boot**

Disabled	Set this item to allow the computer system to display the POST messages.
Enabled	Set this item to allow the computer system to display the OEM logo. This is the default setting.

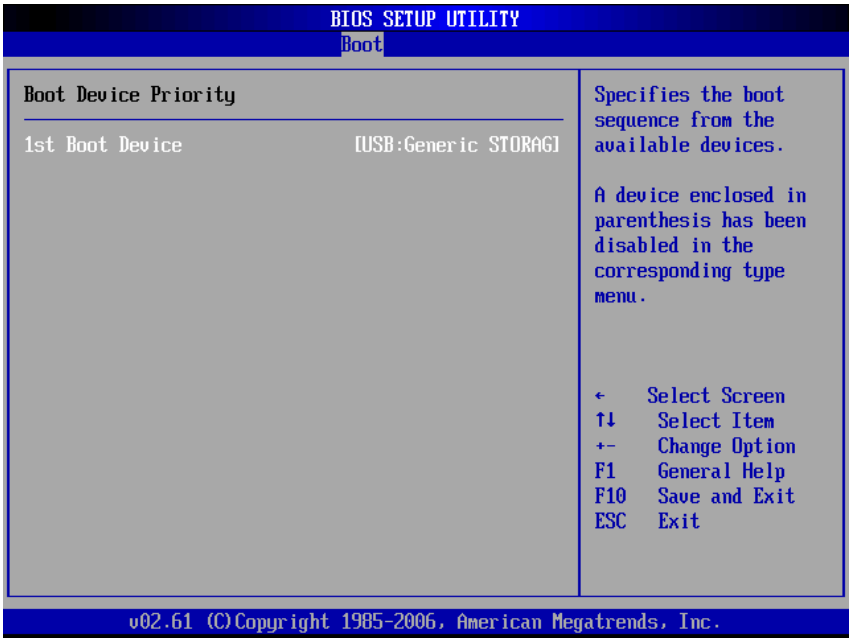
  - **AddOn ROM Display Mode**
    This item selects the display mode for option ROM. The default setting is *Force BIOS*.

  - **Boot Num-Lock**
    Use this item to select the power-on state for the

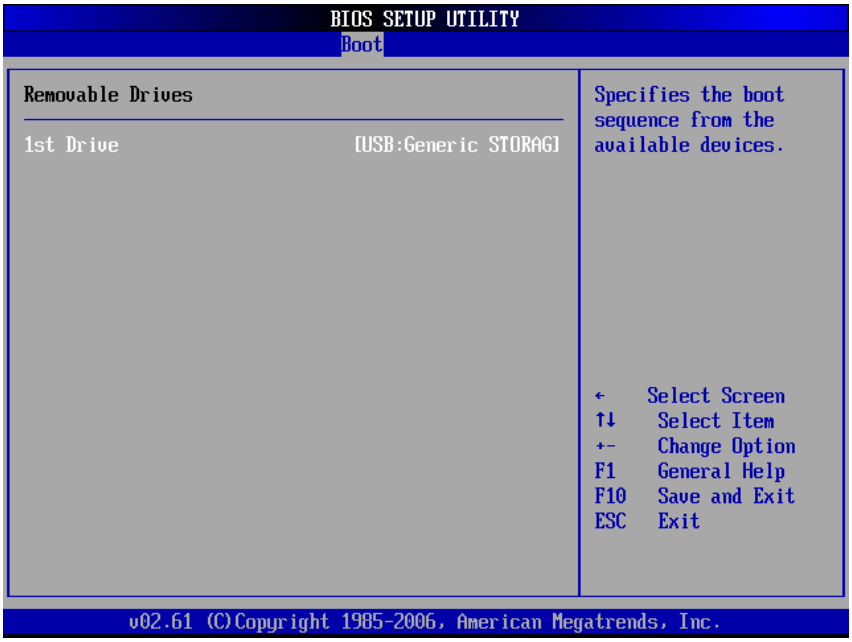
NumLock. The default setting is *On*.

- **PS/2 Mouse Support**
  This item determines if the BIOS should reserve IRQ12 for the PS/2 mouse or allow other devices to make use of this IRQ. Here are the options for your selection, *Auto*, *Enabled* and *Disabled*.
- **Wait For 'F1' If Error**
  If this item is enabled, the system waits for the F1 key to be pressed when error occurs. The default setting is *Enabled*.
- **Hit 'DEL' Message Display**
  If this item is enabled, the system displays the message "Press DEL to run Setup" during POST. The default setting is *Enabled*.

- **Boot Device Priority**
  The Boot Device Priority screen specifies the the boot device priority sequence from the available devices.

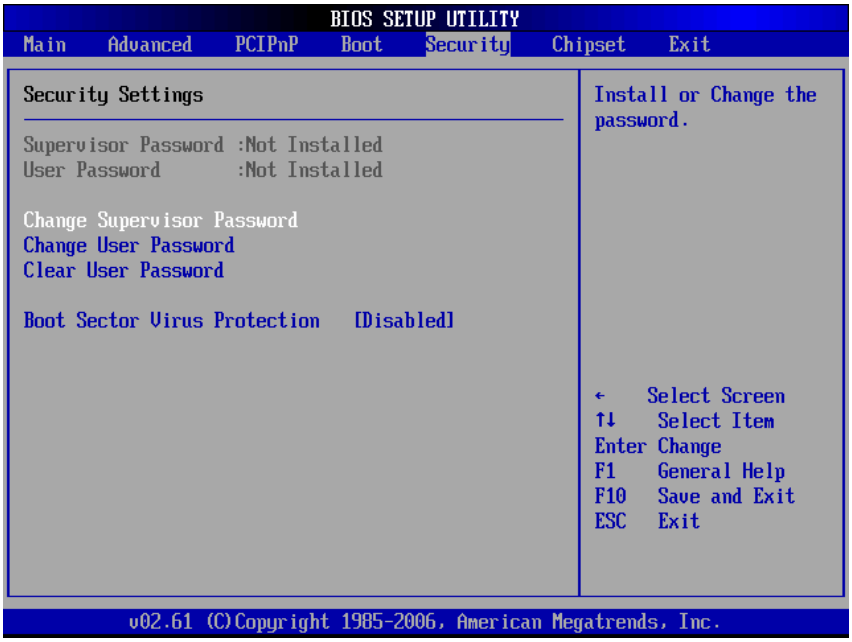


- **Removable Drives**
  Use this screen to view the removable drives in the system. The BIOS will attempt to arrange the removable drive boot sequence automatically. You can also change the booting sequence.



4.7 Security Menu

The Security menu allows users to change the security settings for the system.



- **Supervisor Password**
  This item indicates whether a supervisor password has been set. If the password has been installed, Installed displays. If not, Not Installed displays.

- **User Password**
  This item indicates whether a user password has been set. If the password has been installed, Installed displays. If not, Not Installed displays.

- **Change Supervisor Password**
  Select this option and press <Enter> to access the sub menu. You can use the sub menu to change the supervisor password.

- **Change User Password**
  Select this option and press <Enter> to access the sub menu. You can use the sub menu to change the user

password.

- **Clear User Password**
  Select this option and press <Enter> to access the sub menu. You can use the sub menu to clear the user password.

- **Boot Sector Virus Protection**
  This option is near the bottom of the Security Setup screen. The default setting is *Disabled*.

Disabled	Set this item to prevent the Boot Sector Virus Protection. This is the default setting.
Enabled	Select Enabled to enable boot sector protection. It displays a warning when any program (or virus) issues a Disk Format command or attempts to write to the boot sector of the hard disk drive. If enabled, the following appears when a write is attempted to the boot sector. You may have to type N several times to prevent the boot sector write. Boot Sector Write! Possible VIRUS: Continue (Y/N)? _ The following appears after any attempt to format any cylinder, head, or sector of any hard disk drive via the BIOS INT 13 Hard disk drive Service: Format!!! Possible VIRUS: Continue (Y/N)?

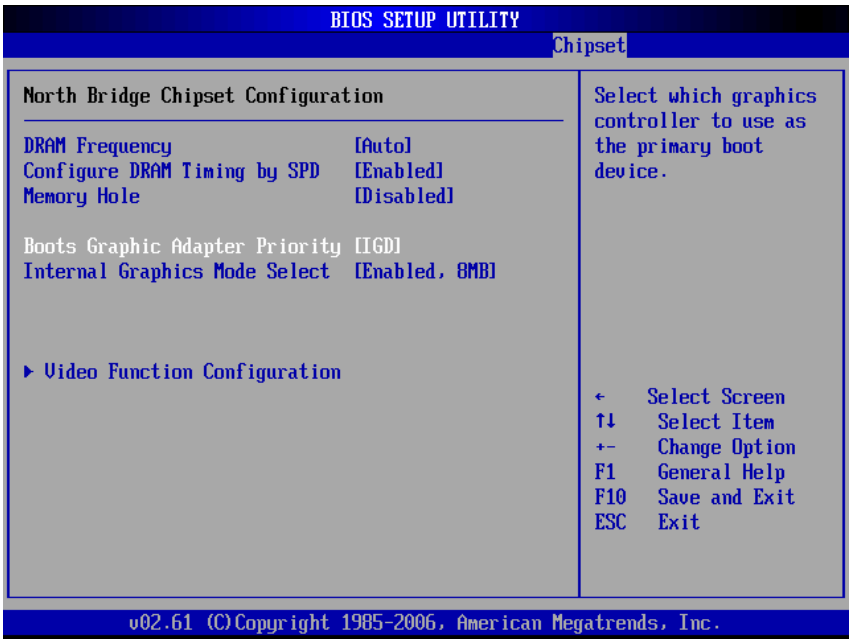
4.8 Chipset Menu

The Chipset menu allows users to change the advanced chipset settings. You can select any of the items in the left frame of the screen to go to the sub menus:

- North Bridge Configuration
- South Bridge Configuration

For items marked with "►", please press <Enter> for more options.

- **North Bridge Configuration**

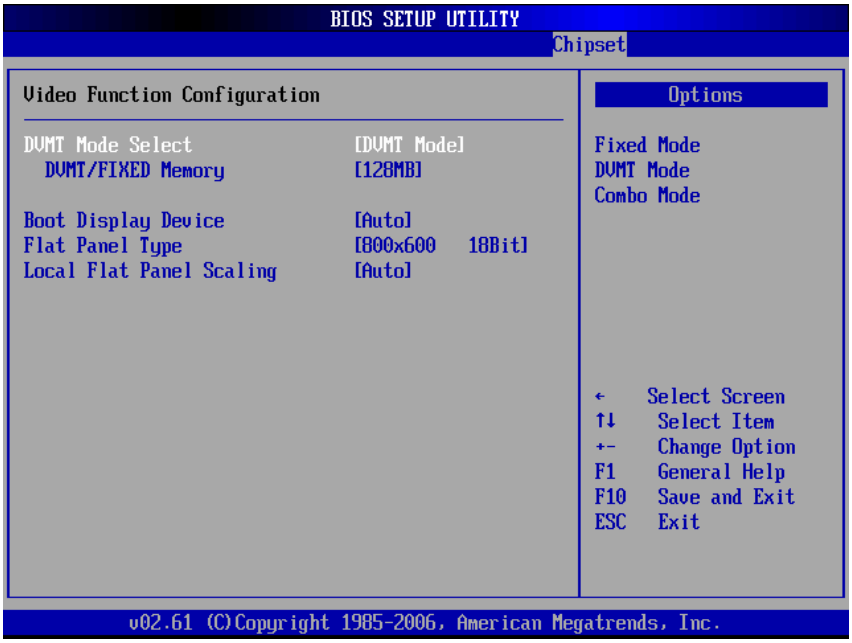


  - **DRAM Frequency**
    This item allows you to control the Memory Clock.
  - **Configure DRAM Timing by SPD**
    This item can enable or disable DRAM timing by SPD (Serial Presence Detect) device, which is a small EEPROM chip on the memory module, containing important information about the module speed, size, addressing mode and various parameters.
  - **Memory Hole**
    You can reserve this area of system memory for ISA adapter ROM. When this area is reserved it cannot be cached. Check the user information of peripherals that need to use this area o f system memory for the memory requirements. Here are the options, *Disabled* and *15M-16M*.
  - **Boot Graphic Adapter Priority**
    This item allows you to select the graphics controller

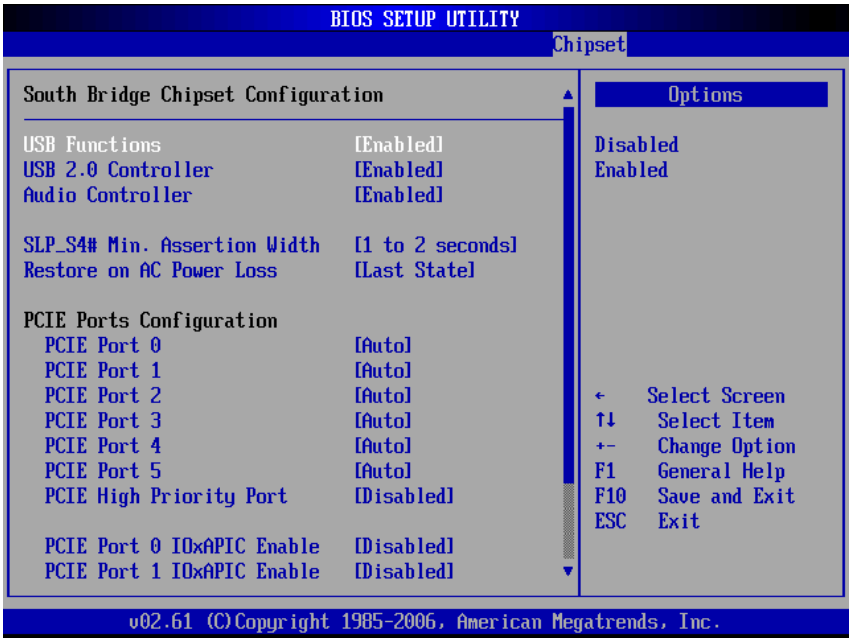
as the primary boot device.

- **Internal Graphics Mode Select**
  This item allows you to select the amount of system memory used by the internal graphics device.

- **Video Function Configuration**
  Press <Enter> for the sub-menu for setting up video function.



- **South Bridge Configuration**



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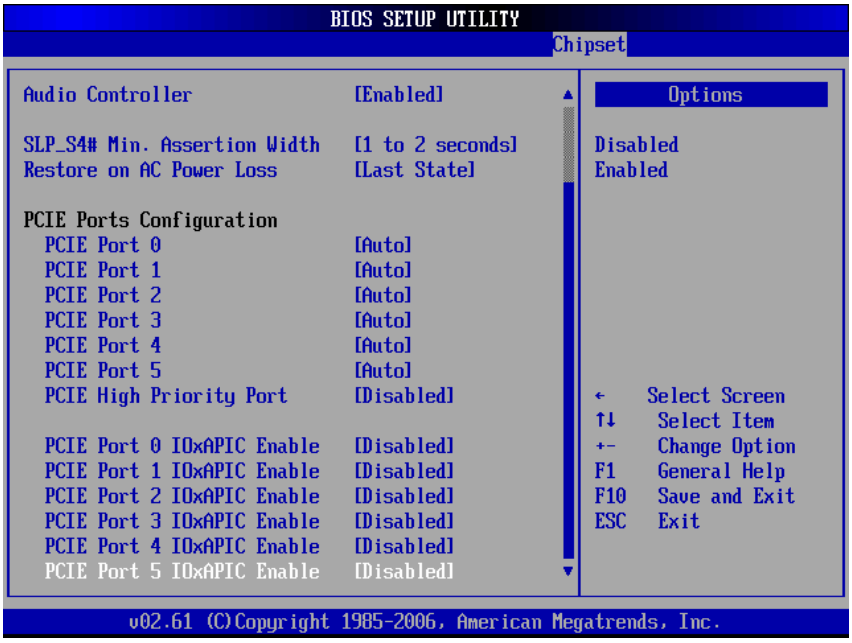


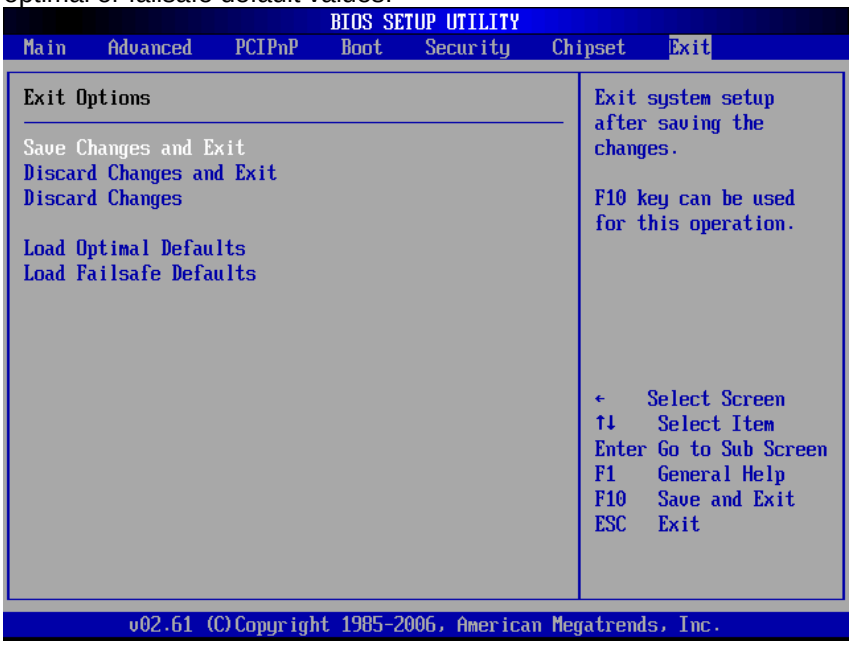
(2)

- **USB Function**
  This item allows you to enable or disable USB function.
- **USB 2.0 Controller**
  This item allows you to enable or disable the USB 2.0 controller.
- **Audio Controller**
  This item allows you to enable or disable the audio support.
- **SLP_S4# Min. Assertion Width**
  This item allows you to set the SLP_S4# Assertion Width.
- **Restore on AC Power Loss**
  This item can control how the PC will behave once power is restored following a power outage, or other unexpected shutdown.

- **PCIE Port Configuration**
  This item allows you to set or disable the PCI Express Ports.

4.9 Exit Menu

The Exit menu allows users to load your system configuration with optimal or failsafe default values.



- **Save Changes and Exit**
  When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect. Select *Save Changes and Exit* from the Exit menu and press <Enter>. Select Ok to save changes and exit.

- **Discard Changes and Exit**
  Select this option to quit Setup without making any permanent changes to the system configuration. Select *Discard Changes and Exit* from the Exit menu and press <Enter>. Select Ok to discard changes and

exit.

- **Discard Changes**
  Use this item to abandon all changes.

- **Load Optimal Defaults**
  It automatically sets all Setup options to a complete set of default settings when you select this option. The Optimal settings are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Setup options if your computer is experiencing system configuration problems. Select Load Optimal Defaults from the Exit menu and press <Enter>.

- **Load Fail-Safe Defaults**
  It automatically sets all Setup options to a complete set of default settings when you select this option. The Fail-Safe settings are designed for maximum system stability, but not maximum performance. Select the Fail-Safe Setup options if your computer is experiencing system configuration problems.
  Select Load Fail-Safe Defaults from the Exit menu and press <Enter>. Select Ok to load Fail-Safe defaults.

APPENDIX A
WATCHDOG TIMER

Watchdog Timer Setting

After the system stops working for a while, it can be auto-reset by the Watchdog Timer. The integrated Watchdog Timer can be set up in the system reset mode by program.

Using the Watchdog Function

Start
↓
Un-Lock WDT:
O 2E 87 ; Un-lock super I/O
O 2E 87 ; Un-lock super I/O
↓
Select Logic device:
O 2E 07
O 2F 08
↓
Activate WDT:
O 2E 30
O 2F 01
↓
Set Second or Minute :
O 2E F5
O 2F N N=00 or 08
↓
Set base timer :
O 2E F6
O 2F M=00,01,02,…FF(Hex) ,Value=0 to 255
↓

; IF to disable WDT:
O 2E 30
O 2F 00 ; Can be disable at any time

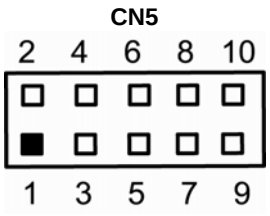
- **Timeout Value Range**
  - 1 to 255
  - Minute / Second

- **Program Sample**

O 2E 87	
O 2E 87	
O 2E 07	
O 2F 08	Logical Device 8
O 2E 30	Activate
O 2F 01	
O 2E F5	
O 2F N	Set Minute or Second N=08 (Min),00(Sec)
O 2E F6	
O 2F M	Set Value M = 00 ~ FF

APPENDIX B
DIGITAL I/O

Pin	Signal	Pin	Signal
1	Digital Input 0 (48D / Bit4)	2	Digital Output 0 (Value M / Bit0)
3	Digital Input 1 (48D / Bit5)	4	Digital Output 1 (Value M / Bit1)
5	Digital Input 2 (48D / Bit6)	6	Digital Output 2 (Value M / Bit2)
7	Ground (GND)	8	Digital Output 3 (Value M / Bit3)
9	Ground (GND)	10	Digital Output 4 (Value M / Bit4)



Digital I/O Software Programming

- GPI program sample:

I 48D	Read Bit4~Bit6 Status (GPI0~2)

- GPO program sample:

O 2E 87	
O 2E 87	
O 2E 07	
O 2F 08	Select Device 8
O 2E 30	
O 2F 04	Set GPIO6
O 2E E4	
O 2F 00	GPIO6 pins are programmed as output pins.
O 2E E5	
O 2F M	Set output value M Bit 0 ~ Bit 4 (1 High , 0 Low) (GPO0~4)