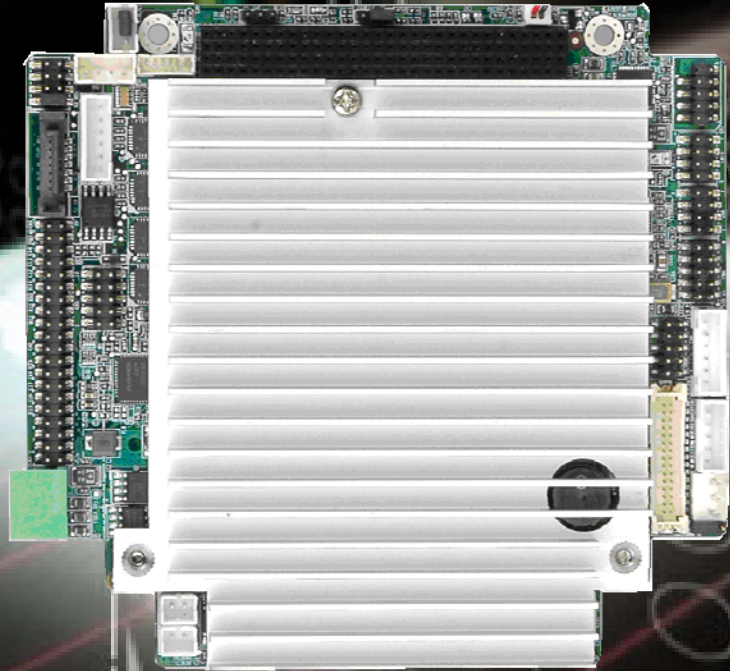**IEI Technology Corp.**

MODEL:

PM-945GSE-N270

PCI-104 SBC with Intel® Atom™ N270 1.6 GHz CPU, Ethernet, USB 2.0, Audio, CF Card Type 2, RS-232, RS-422/485, IDE, RoHS Compliant

User Manual

Rev. 1.02 – 17 August, 2011

RoHS Lead Free

Revision

Date	Version	Changes
17 August, 2011	1.02	Minor revision to Figure 3-4: ATX Power Supply Enable Connector Location Updated formatting throughout document
26 March, 2010	1.01	Minor edit
28 August, 2009	1.00	Initial release

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Chapter

1

Introduction

1.1 Introduction
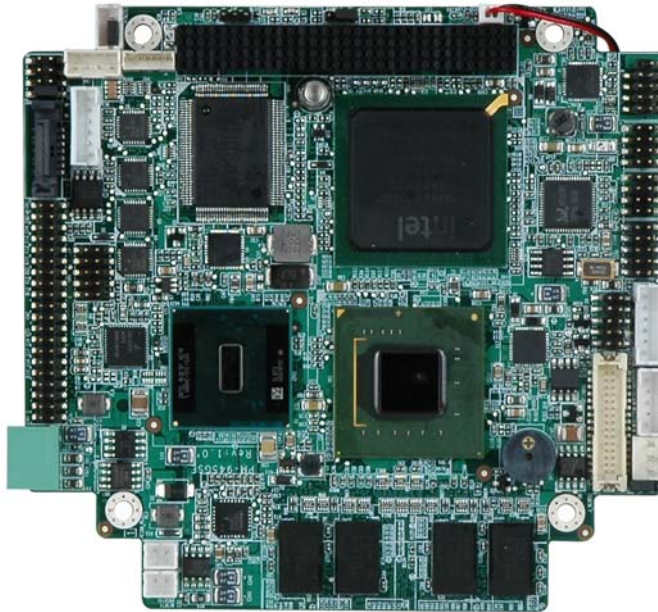
Figure 1–1: PM-945GSE-N270

The PCI-104 form factor PM-945GSE-N270 is a highly integrated embedded computer specifically optimized for multi-media applications requiring minimum installation space. The PM-945GSE-N270 is particularly suitable for low power and fan-less applications. The PM-945GSE-N270 supports a full range of functions for an AT compatible industrial computer in a space-saving 109 mm x 116 mm profile. The PM-945GSE-N270 is equipped with an on-board low-power consumption and high performance Intel® Atom™ N270 1.6 GHz processor. It also includes 1 GB of DDR2 SDRAM memory on-board.

1.1.1 Applications

The PM-945GSE-N270 motherboard has been designed for use in industrial applications where board expansion is critical and operational reliability is essential.

1.1.2 Benefits

Some of the PM-945GSE-N270 motherboard benefits include,

- Operating reliably in harsh industrial environments with ambient temperatures

ranging from 0°C to 60°C

- Rebooting automatically if the BIOS watchdog timer detects that the system is no longer operating

1.1.3 Features

Some of the PM-945GSE-N270 motherboard features are listed below:

- Complies with RoHS
- Supports Intel® Atom™ N270 CPU
- Supports a maximum front side bus (FSB) speed up to 533MHz
- 1 GB on-board DDR 533 SDRAM
- Complete I/O support with SATA, CF Type II, PCI-104, LAN, and 4 x USB2.0 and 4 x RS-232, 1 x RS-422/485 support shared with COM2
- Supports 18-bit dual channel LVDS + VGA, dual independent display

1.2 Overview
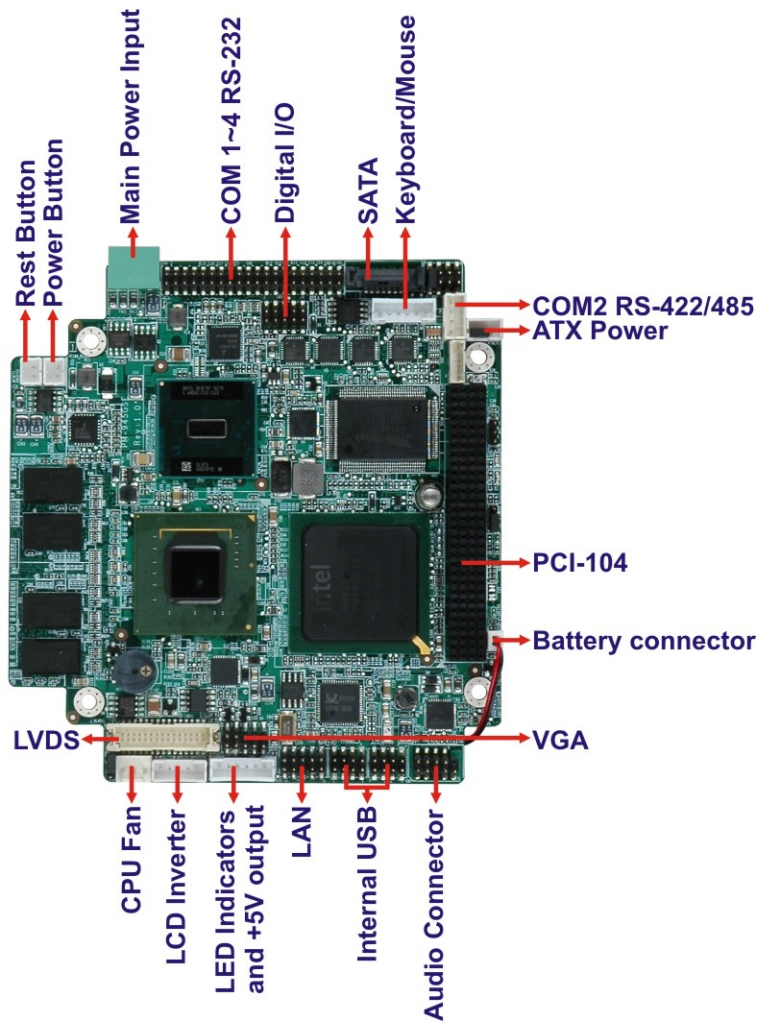
Figure 1-2: PM-945GSE-N270 Motherboard Overview

CF Card Interface Slot
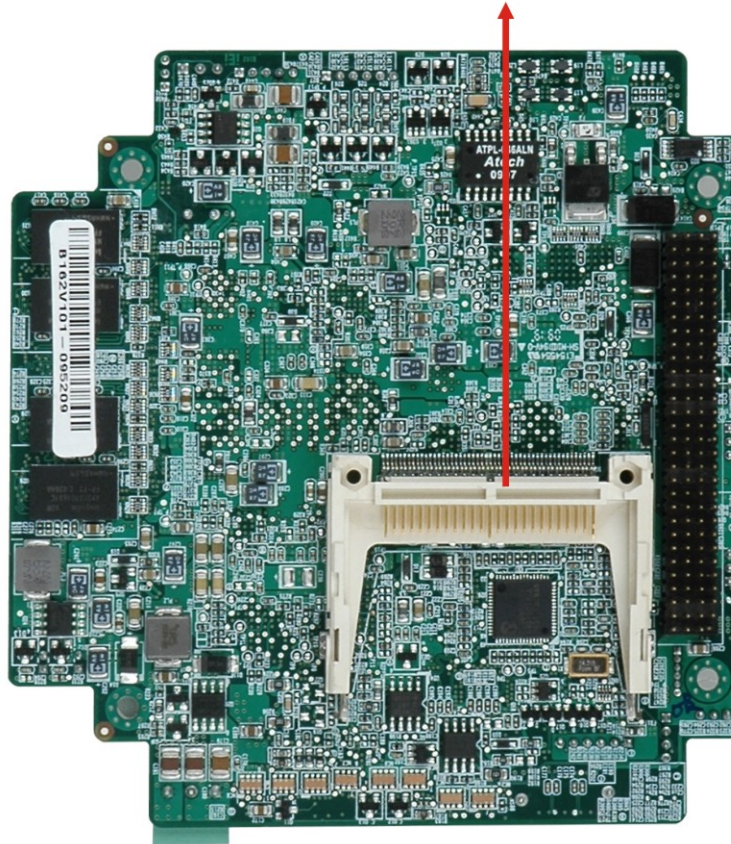
Figure 1-3: PM-945GSE-N270 Motherboard Solder Side Overview

1.2.1 Connectors

The PM-945GSE-N270 motherboard has the following connectors on-board (described in **Chapter 3**):

- 1 x AT/ATX 12V/5V connector
- 1 x CompactFlash® connector (solder side)
- 1 x Digital I/O connector
- 1 x Audio connector (supported via optional 5.1 channel audio kit with Realtek ALC655 AC'97 codec or 7.1 channel HD audio kit with Realtek ALC883 codec)
- 1 x Keyboard/mouse connector
- 1 x LAN connector
- 1 x LCD Inverter connector

- 1 x LED connector

- 1 x LVDS LCD connector

- 1 x PCI-104 connector

- 4 x RS-232 connectors

- 1 x RS-422/485 connector (shared with COM2)

- 1 x SATA connector

- 4 x USB connectors

- 1 x VGA connector

1.3 Dimensions

The dimensions of the board are listed below:

- **Length**:   116 mm
- **Width**:   108.59 mm
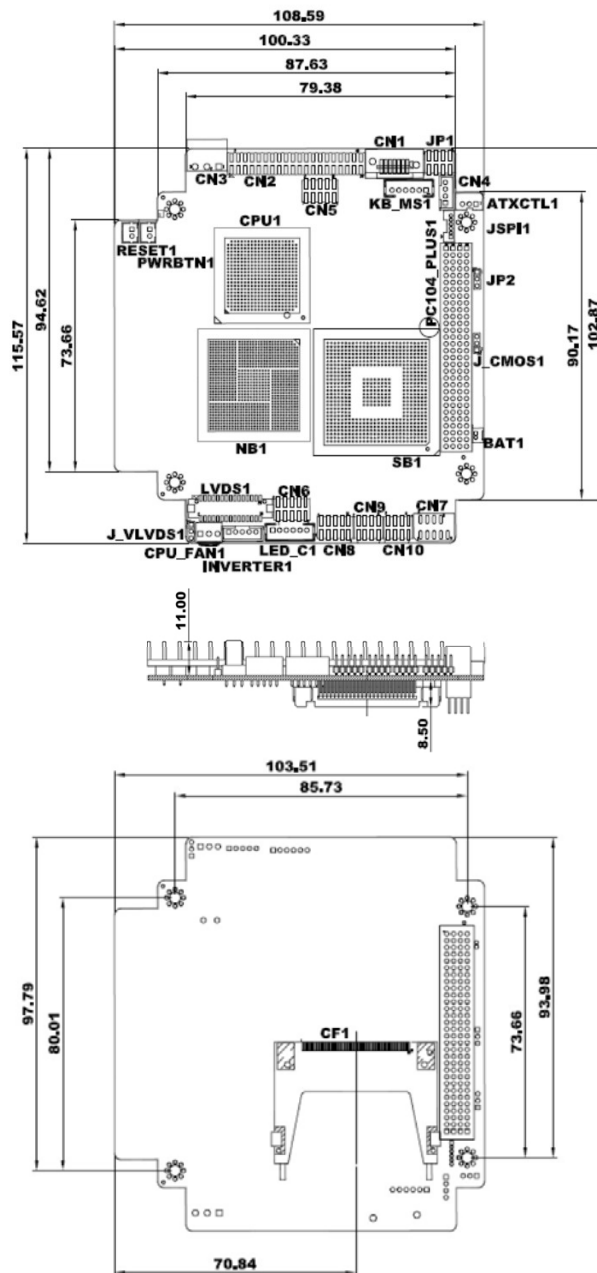
Figure 1-4: PM-945GSE-N270 Dimensions (mm)

1.4 Data Flow

The PM-945GSE-N270 motherboard comes with an Intel® Atom™ N270 processor and an Intel® 945GSE Northbridge. **Figure 1-5** shows the data flow between the system chipset, the CPU and other components installed on the motherboard.
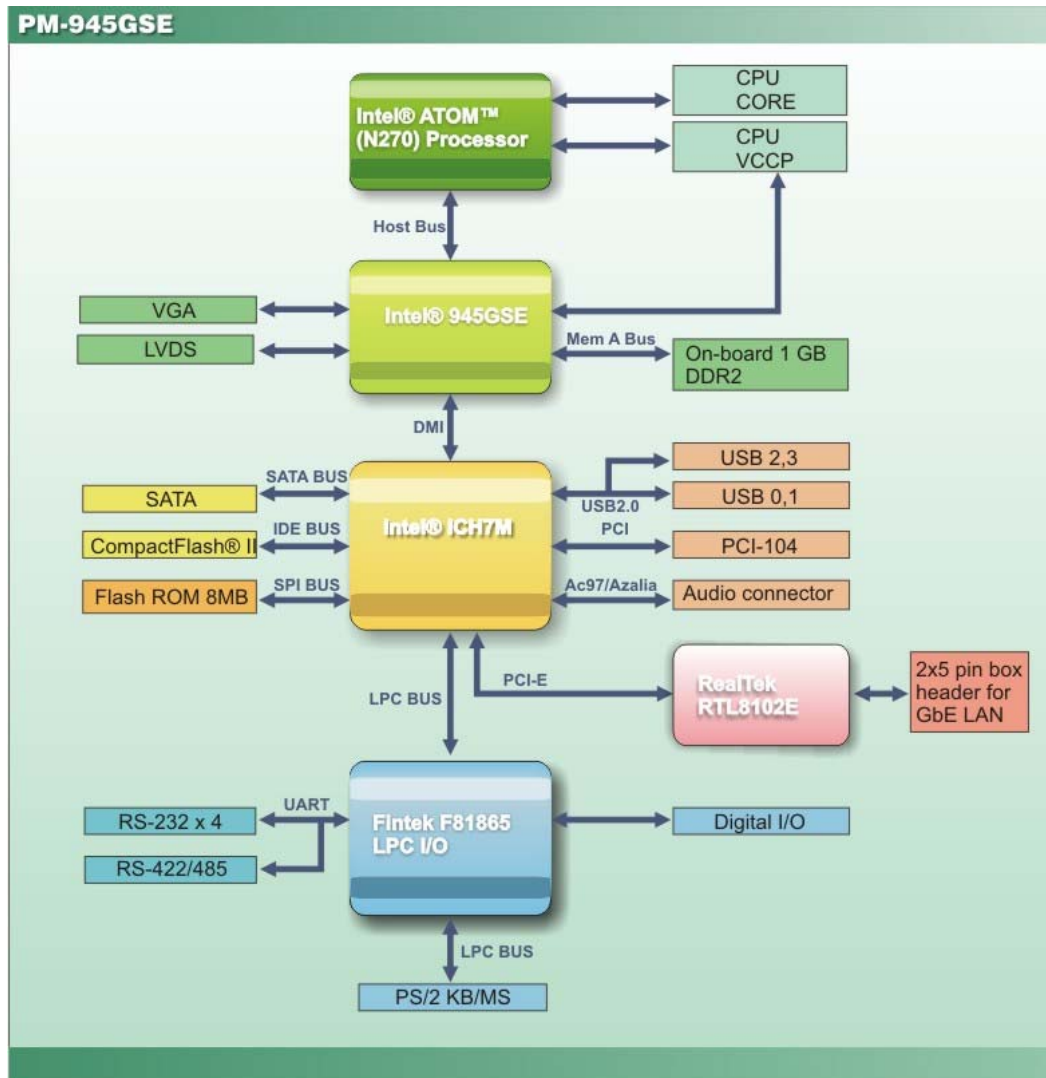
Figure 1-5: Data Flow Block Diagram

1.4.1 Technical Specifications

PM-945GSE-N270 motherboard technical specifications are listed in the table below.

Specification/Model	PM-945GSE-N270
Form Factor	PCI-104 Module
CPU	Intel® Atom™ N270 1.6 GHz with 533 MHz FSB
Integrated Graphics	Intel® 945GSE
Memory	1 GB DDR2 SDRAM on-board (8 x 64 MB x16)
System Controller Hub Chipset	Intel® ICH7M
BIOS	AMI BIOS
Compatible OS	Microsoft Windows XP SP2 Microsoft Windows Vista Business (32bit) Linux Ubuntu 8.10 Linux Fedora Core 6
Digital I/O	8-bit digital I/O, 4-bit input/ 4-bit output
Ethernet Controller	Realtek RTL8102E
Super I/O Controller	Fintek F81865
Real Time Clock	256 bytes of battery-backed RAM, 32.768 KHz crystal, 3 V battery
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansion	
PCI	One PCI-104
I/O Interface Connectors	
Audio	One audio connector supported via optional 5.1 channel audio kit with Realtek ALC655 AC'97 codec or 7.1 channel HD audio kit with Realtek ALC883 codec (supports dual audio streams)
Display	18-bit dual channel LVDS + VGA, dual independent display supported
Ethernet	One LAN connector
Keyboard/Mouse	One KB/MS connector

Specification/Model	PM-945GSE-N270
Serial	Four RS-232 One RS-422/485 (shared with COM2)
USB 2.0/1.1	Four USB 2.0
Storage	
SATA	One SATA connector
CF	One CF card slot
Environmental and Power Specifications	
Power Supply	5V only, AT/ATX support
Power Consumption	5 V @ 2.6A (Intel® Atom™ N270 1.6 GHz with on-board 1 GB DDR2)
Operating temperature	0ºC ~ 60ºC
Humidity	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	108.59 mm x 115.57 mm
Weight GW/NW	650g/250g

Table 1-1: PM-945GSE-N270 Specifications

Chapter

2

Unpacking

2.1 Anti-static Precautions

![WARNING icon] **WARNING:**

Failure to take ESD precautions during the installation of the PM-945GSE-N270 may result in permanent damage to the PM-945GSE-N270 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PM-945GSE-N270. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PM-945GSE-N270 or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- **Wear an anti-static wristband**: Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- **Self-grounding**: Before handling the board, touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- **Use an anti-static pad**: When configuring the PM-945GSE-N270, place it on an antic-static pad. This reduces the possibility of ESD damaging the PM-945GSE-N270.
- **Only handle the edges of the PCB**: When handling the PCB, hold the PCB by the edges.

2.2 Unpacking Precautions

When the PM-945GSE-N270 is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 2.1**.
- Make sure the packing box is facing upwards so the PM-945GSE-N270 does not fall out of the box.
- Make sure all the components shown in **Section 2.3** are present.

2.3 Unpacking Checklist

NOTE:

If some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the PM-945GSE-N270 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

2.3.1 Package Contents

The PM-945GSE-N270 is shipped with the following components:

Quantity	Item and Part Number	Image
1	PM-945GSE-N270-R10	
1	Keyboard/Mouse cable (**P/N**:32000-023800-RS)	
1	LAN cable (**P/N**: 32000-055702-RS)	
1	Power cable (**P/N**: 32000-130300-RS)	
1	Quad port RS-232 cable (**P/N**: 32200-147900-RS)	
1	SATA cable (**P/N**: 32000-062800-RS)	

2	Dual USB cable (without bracket) (**P/N**: 32000-070301-RS)	
1	VGA cable (P/N:32000-033804-RS)	
1	Mini jumper pack	
1	Quick Installation Guide	
1	Utility CD	

Table 2-1: Package List Contents

2.4 Optional Items

ATX power cable (**P/N**: 32100-052100-RS)	
SATA power cable (**P/N**: 32100-068600-RS)	
RS-422/485 Cable (**P/N**: 32200-074800-RS)	
5.1 channel AC'97 audio kit with Realtek ALC655 codec (**P/N**: AC-KIT08R-R10)	
7.1 channel HD audio kit with Realtek ALC883 codec (**P/N**: AC-KIT883HD-R10)	

Table 2-2: Package List Contents (Optional Items)

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

The locations of the peripheral interface connectors are shown in **Section 3.1.1**. A complete list of all the peripheral interface connectors can be seen in **Section 3.1.2**.

3.1.1 PM-945GSE-N270 Motherboard Layout

Figure 3-1 shows the on-board peripheral connectors and jumpers on the front side of the board.
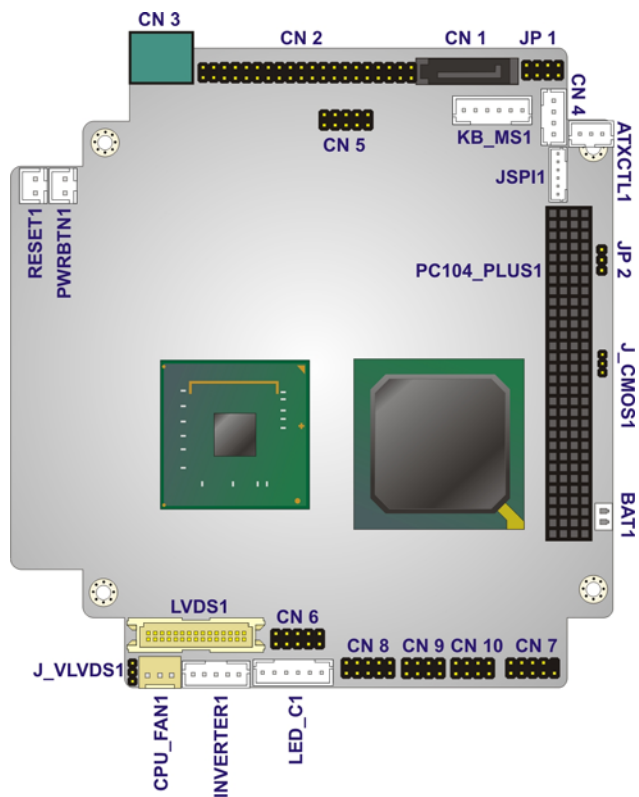
Figure 3-1: Connector and Jumper Locations (Front Side)

Figure 3-2 shows the onboard peripheral connectors on the solder side of the board.
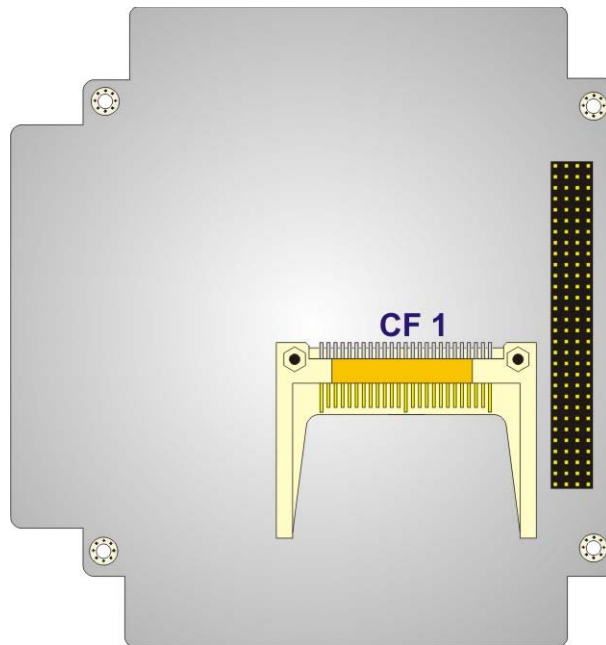
Figure 3-2: Connector and Jumper Locations (Solder Side)

3.1.2 Peripheral Interface Connectors

The table below shows a list of the peripheral interface connectors on the PM-945GSE-N270 motherboard. Detailed descriptions of these connectors can be found in the following section.

Connector	Type	Label
12V / 5V Power connector	3-pin terminal block	CN3
ATX power control connector	3-pin wafer connector	ATXCTL1
Audio connector	9-pin header	CN7
Battery connector	2-pin wafer connector	BAT1
CompactFlash® Type II connector	50-pin header	CF1
CPU fan connector	3-pin header	CPU_FAN1
Digital I/O connector	10-pin header	CN5
Keyboard/Mouse connector	6-pin wafer connector	KB_MS1
LAN connector	10-pin box header	CN8

Connector	Type	Label
LCD inverter connector	5-pin wafer connector	INVERTER1
LED and +5V output connector	6-pin wafer	LED_C1
LVDS LCD connector	30-pin crimp connector	LVDS1
PCI/104 connector	120-pin socket	PC104_PLUS1
Power button connector	2-pin wafer	PWRBTN1
Reset button connector	2-pin wafer	RESET1
RS-232 Serial ports 1-4 connector	40-pin box header	CN2
RS-422/85 Serial port connector	4-pin box header	CN4
SATA drive connector	7-pin SATA drive connector	CN1
SPI flash connector	6-pin wafer	JSPI1
USB connectors	8-pin header	CN9, CN10
VGA connector	10-pin header	CN6

Table 3-1: Peripheral Interface Connectors

3.2 Internal Peripheral Connectors

Internal peripheral connectors on the motherboard are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the PM-945GSE-N270 motherboard.

3.2.1 12V / 5V Power Connector

CN Label:	CN3
CN Type:	3-pin terminal block
CN Location:	See **Figure 3-3**
CN Pinouts:	See **Table 3-2**

The **12V / 5V Power Connector** supplies power to the motherboard.
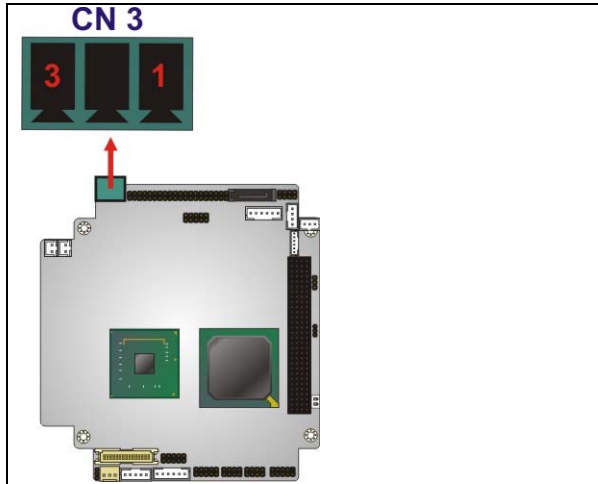
Figure 3-3: 12V / 5V Power Connector Location

PIN NO.	DESCRIPTION
1	VCC12
2	GND
3	VCC5

Table 3-2: 12V / 5V Power Connector Pinouts

3.2.2 ATX Power Supply Enable Connector

CN Label:	**ATXCTL1**
CN Type:	3-pin wafer (1x3)
CN Location:	See **Figure 3-4**
CN Pinouts:	See **Table 3-3**

The connector is for enabling an ATX power supply. When connected to the power supply, the power can be turned on and off with the front panel switch.   Use the optional ATX power cable.   Pins 2-3 are shorted by default for AT power.
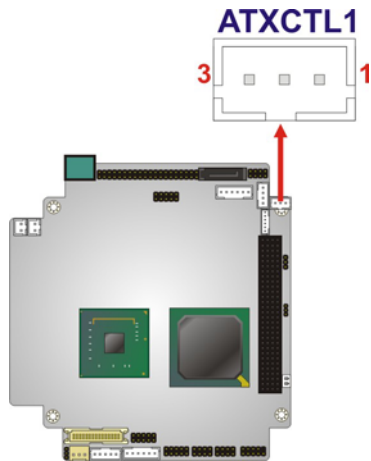
Figure 3-4: ATX Power Supply Enable Connector Location

Pin	Description
1	+5 V Standby
2	GND
3	PS-ON#

Table 3-3: ATX Power Supply Enable Connector Pinouts

3.2.3 Audio Kit Connector

CN Label: **CN7**

CN Type: 9-pin header

CN Location: See **Figure 3-5**

CN Pinouts: See **Table 3-4**

This connector connects to an external audio kit.
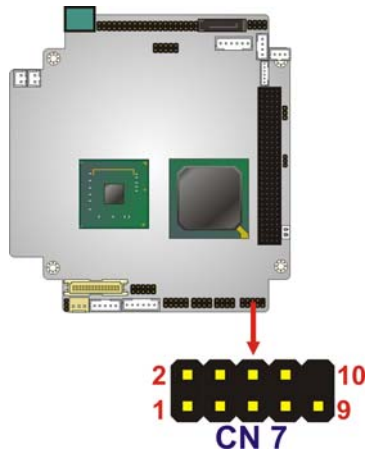
Figure 3-5: Audio Kit Connector Location

Pin	Description	Pin	Description
1	SYNC	2	BITCLK
3	SDOUT	4	PCBEEP
5	SDIN	6	RST#
7	VCC	8	GND
9	+12 V		

Table 3-4: Audio Kit Connector Pinouts

3.2.4 Battery Connector

CN Label:	**BAT1**
CN Type:	2-pin wafer connector
CN Location:	See **Figure 3-6**
CN Pinouts:	See **Table 3-5**

This battery connector connects to an externally mounted 3V, Lithium, cell coin battery (VARTA CR2032). The life expectancy of the battery is approximately seven years. Depending on the working condition, the life expectancy may be shorter.

Replacing the battery is not a user operation.

If the battery starts to weaken and lose voltage, contact a vendor or IEI for a replacement module. Dispose of the used battery properly. Contact the local waste disposal agency for

disposal instructions. Do not dispose of a used battery with normal household waste.

![WARNING icon] **WARNING!**

1. Keep batteries away from children.

2. There is a danger of explosion if the battery is incorrectly replaced.

3. Only a certified module from IEI can be used as a replacement.

4. Do not expose the battery to excessive heat or fire.

5. If the battery shows signs of leakage, contact a local vendor or IEI immediately.
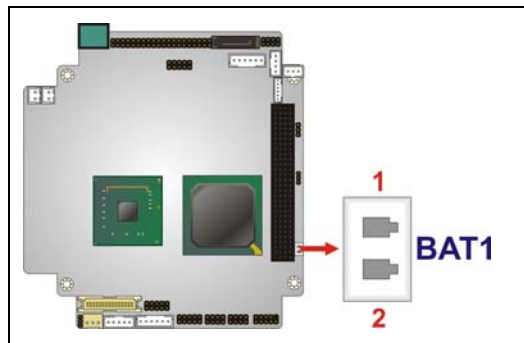
Figure 3-6: Battery Connector Location

PIN NO.	DESCRIPTION
1	BAT+
2	GND

Table 3-5: Battery Connector Pinouts

3.2.5 CompactFlash® Connector

CN Label:	**CF1** (solder side)
CN Type:	50-pin header (2x25)
CN Location:	See **Figure 3-7**
CN Pinouts:	See **Table 3-6**

A CompactFlash® memory module is inserted to the CompactFlash® connector.
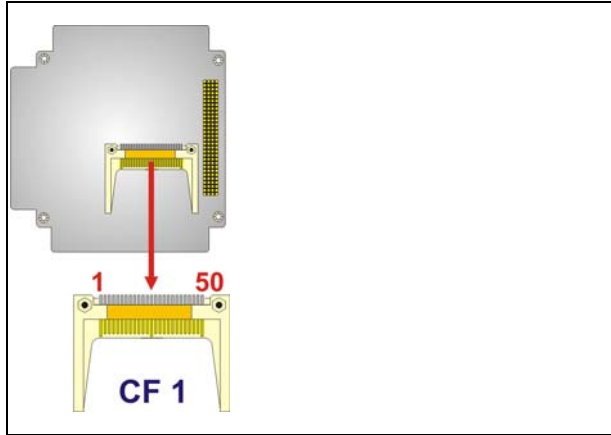
Figure 3-7: CompactFlash® Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	D3
3	D4	4	D5
5	D6	6	D7
7	CE#	8	GND
9	GND	10	GND
11	GND	12	GND
13	VCC (+5V)	14	GND
15	GND	16	GND
17	GND	18	A2
19	A1	20	A0
21	D0	22	D1
23	D2	24	NC
25	CD2#	26	CD1#
27	D11	28	D12
29	D13	30	D14
31	D15	32	CE2#
33	NC	34	IOR#
35	IOW#	36	WE#
37	IRQ	38	VCC(+5V)
39	CSEL#	40	NC
41	RESET#	42	WAIT#

43	INPACK#	44	REG#
45	BVD2	46	BVD1
47	D8	48	D9
49	D10	50	GND

Table 3-6: CompactFlash® Connector Pinouts

3.2.6 Fan Connector

CN Label:	**CPU_FAN1**
CN Type:	3-pin header
CN Location:	See **Figure 3-8**
CN Pinouts:	See **Table 3-7**

The fan connector attaches to a cooling fan.
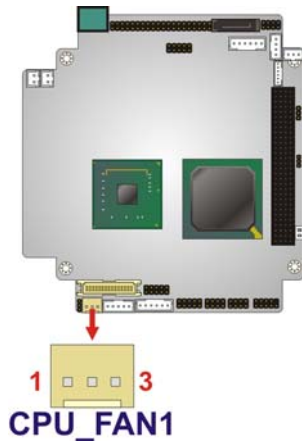
Figure 3-8: Fan Connector Location

PIN NO.	DESCRIPTION
1	Power-
2	Power+
3	Fan Speed Detect

Table 3-7: Fan Connector Pinouts

3.2.7 Digital I/O Connector

CN Label:	**CN5**
CN Type:	10-pin header
CN Location:	See **Figure 3-9**
CN Pinouts:	See **Table 3-8**

The digital I/O connector provides programmable input and output for external devices. The digital I/O provides 4-bit output and 4-bit input.
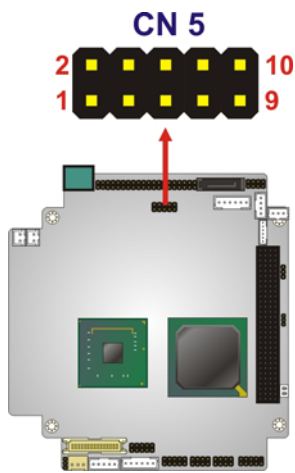
Figure 3-9: Digital I/O Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	VCC
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 3-8: Digital I/O Connector Pinouts

3.2.8 Keyboard/Mouse Connector

CN Label:	KBMS
CN Type:	6-pin wafer connector

CN Pinouts: See **Figure 3-10**

CN Location: See **Table 3-9**

The keyboard and mouse connector can be connected to a standard PS/2 cable or PS/2 Y-cable to add keyboard and mouse functionality to the system.
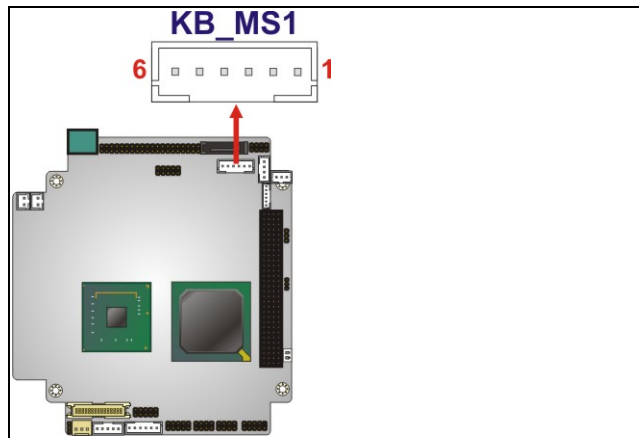
Figure 3-10: Keyboard/Mouse Connector Location

PIN NO.	DESCRIPTION
1	VCC5
2	MOUSE DATA
3	MOUSE CLOCK
4	KEYBOARD DATA
5	KEYBOARD CLOCK
6	GND

Table 3-9: Keyboard/Mouse Connector Pinouts

3.2.9 LAN Connector

CN Label: LAN1

CN Type: 10-pin box header

CN Location: See **Figure 3-11**

CN Pinouts: See **Table 3-10**

The PM-945GSE-N270 is equipped with an Ethernet controller. The Ethernet controller is interfaced to the external LAN by direct connection to the LAN connection or by connecting the LAN connector to an RJ-45 interface connector.
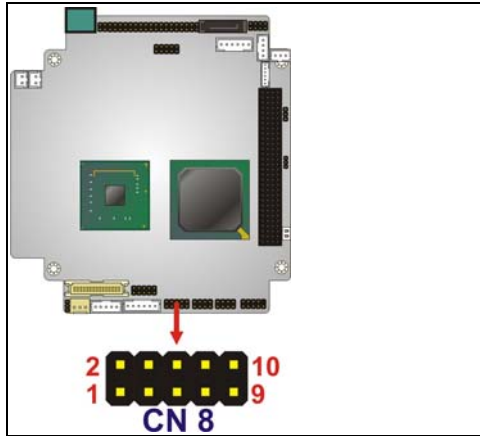
Figure 3-11: LAN Connector Location

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC3.3	6	Active
2	RX+	7	RX-
3	Link	8	GND
4	N/C	9	GND
5	TX+	10	TX-

Table 3-10: LAN Connector Pinouts

3.2.10 LCD Inverter Connector

CN Label:	INVERTER1
CN Type:	5-pin wafer connector
CN Location:	See **Figure 3-12**
CN Pinouts:	See **Table 3-11**

The Inverter connector connects to the LCD backlight.
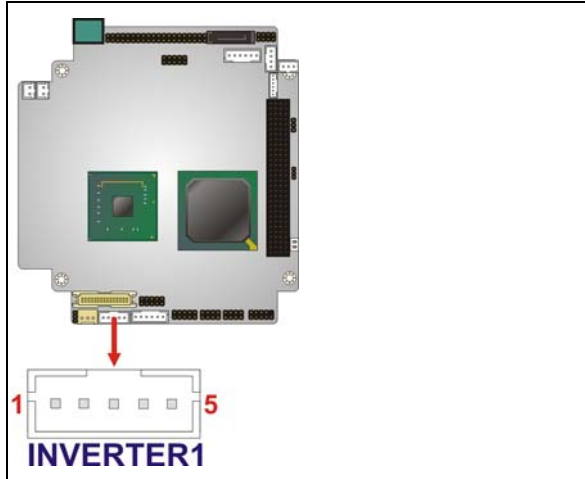
Figure 3-12: LCD Inverter Connector Location

PIN NO.	DESCRIPTION
1	LCD_BKLTCTL
2	GROUND
3	VCC12
4	GROUND
5	LCD_BKLEN

Table 3-11: LCD Inverter Connector Pinouts

3.2.11 LED and +5V Output Connector

    CN Label: **LED_C1**

    CN Type: 6-pin wafer (1x6)

    CN Location: See **Figure 3-13**

    CN Pinouts: See **Table 3-12**

The LED and +5V output connector connects to the hard drive activity LED and power LED on the system front panel and provides a +5V power output.
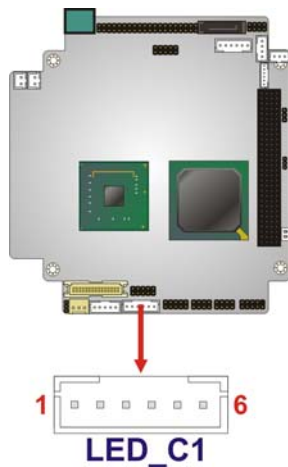
Figure 3-13: LED Connector Locations

PIN NO.	DESCRIPTION
1	+5 V
2	GND
3	Power LED+
4	Power LED-
5	HDD LED+
6	HDD LED-

Table 3-12: LED Connector Pinouts

3.2.12 PCI-104 Connector

CN Label: **PC104_PLUS1**

CN Type: 120-pin socket

CN Location: See **Figure 3-14**

CN Pinouts: See **Table 3-13**

The PCI-104 connector is for installing a PCI-104 expansion card.
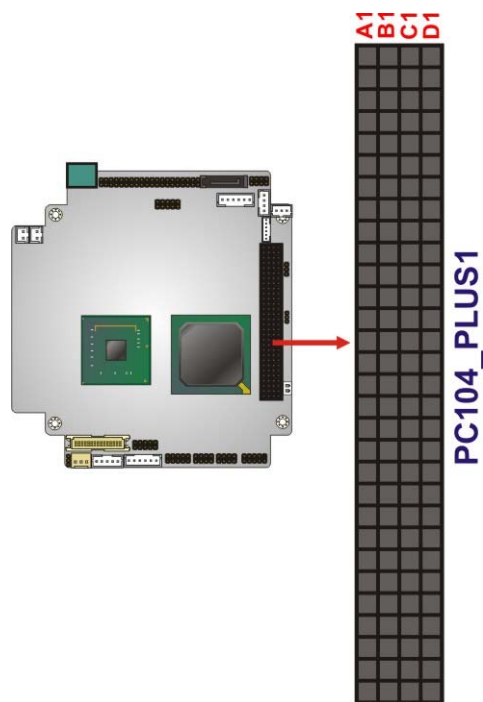
Figure 3-14: PCI-104 Connector Location

Pin No.	Column A	Column B	Column C	Column D
1	GND/5 V	TBD1	5 V	AD00
2	VI/O1	AD02	AD01	+5 V
3	AD05	GND	AD04	AD03
4	C/BE0#	AD07	GND	AD06
5	GND	AD09	AD08	GND
6	AD11	VI/O2	AD10	M66EN
7	AD14	AD13	GND	AD12
8	+3.3 V	C/BE1#	AD15	+3.3 V
9	SERR#	GND	SB0#	PAR
10	GND	PERR#	+3.3 V	SDONE
11	STOP#	+3.3 V	LOCK#	GND
12	+3.3 V	TRDY#	GND	DEVSEL#
13	FRAME#	GND	IRDY#	+3.3 V
14	GND	AD16	+3.3 V	C/BE2#
15	AD18	+3.3 V	AD17	GND
16	AD21	AD20	GND	AD19

Pin No.	Column A	Column B	Column C	Column D
17	+3.3 V	AD23	AD22	+3.3 V
18	IDSEL0	GND	IDSEL1	IDSEL2
19	AD24	C/BE3#	VI/O1	IDSEL3
20	GND	AD26	AD25	GND
21	AD29	+5 V	AD28	AD27
22	+5 V	AD30	GND	AD31
23	REQ0#	GND	REQ1#	VI/O2
24	GND	REQ2#	+5 V	GNT0#
25	GNT1#	VI/O3	GNT2#	GND
26	+5 V	CLK0	GND	CLK1
27	CLK2	+5 V	CLK3	GND
28	GND	INTD#	+5 V	RST#
29	+12 V	INTA#	INTB#	INTC#
30	-12 V	TBD2	TBD	GND/3.3 V

Table 3-13: PCI-104 Connector Pinouts

3.2.13 Power Button Connector

CN Label:	**PWRBTN1**
CN Type:	2-pin wafer (1x2)
CN Location:	See **Figure 3-15**
CN Pinouts:	See **Table 3-14**

The power button connector is connected to a power switch on the system chassis.
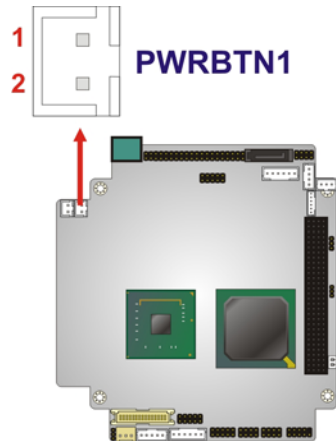
Figure 3-15: Power Button Connector Location

PIN NO.	DESCRIPTION
1	Power Switch
2	GND

Table 3-14: Power Button Connector Pinouts

3.2.14 Reset Button Connector

CN Label: **RESET1**

CN Type: 2-pin wafer (1x2)

CN Location: See **Figure 3-16**

CN Pinouts: See **Table 3-15**

The reset button connector is connected to a reset switch on the system chassis.
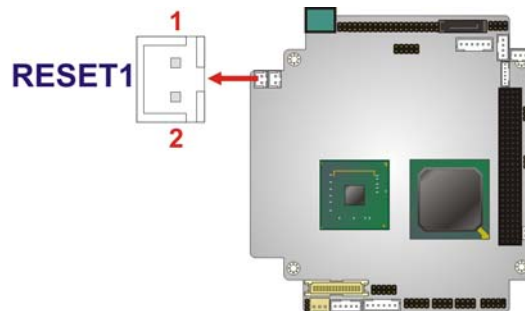
Figure 3-16: Reset Button Connector Location

PIN NO.	DESCRIPTION
1	Reset Switch
2	GND

Table 3-15: Reset Button Connector Pinouts

3.2.15 RS-232 Serial Port Connectors

CN Label: CN2

CN Type: 40-pin header

CN Location: See **Figure 3-17**

CN Pinouts: See **Table 3-16**

The serial ports connector connects to RS-232 serial port devices.
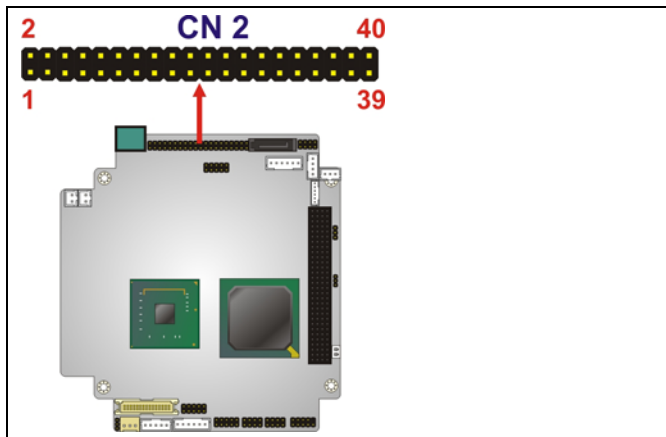
Figure 3-17: RS-232 Serial Port Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD1#	2	DSR1#
3	RX1	4	RTS1#
5	TX1	6	CTS1#
7	DTR1#	8	RI1#
9	GND	10	GND
11	DCD2#	12	DSR2#
13	RX2	14	RTS2#

15	TX2	16	CTS2#
17	DTR2#	18	RI2#
19	GND	20	GND
21	DCD3#	22	DSR3#
23	RX3	24	RTS3#
25	TX3	26	CTS3#
27	DTR3#	28	RI3#
29	GND	30	GND
31	DCD4#	32	DSR4#
33	RX4	34	RTS4#
35	TX4	36	CTS4#
37	DTR4#	38	RI4#
39	GND	40	GND

Table 3-16: RS-232 Serial Port Connector Pinouts

3.2.16 RS-422/485 Serial Port Connector

CN Label: CN4

CN Type: 4-pin wafer connector

CN Location: See **Figure 3-18**

CN Pinouts: See **Table 3-17**

The serial port connector connects to an RS-422 or RS-485 serial port device.
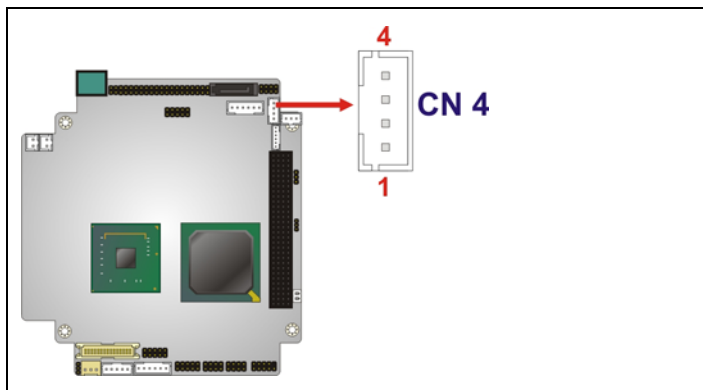
Figure 3-18: RS-422/485 Serial Port Connector Location

PIN NO.	DESCRIPTION
1	RXD485#
2	RXD485+
3	TXD485+
4	TXD485#

Table 3-17: RS-422/RS-485 Serial Port Connector Pinouts

3.2.17 LVDS LCD Connector

CN Label:	LVDS1
CN Type:	30-pin crimp connector
CN Location:	See **Figure 3-19**
CN Pinouts:	See **Table 3-18**

The LVDS connector is connected to a LVDS LCD display device.
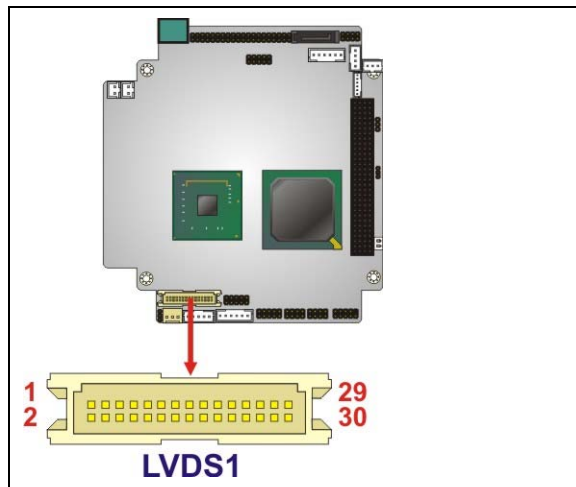
Figure 3-19: LVDS LCD Connector Locations

Pin	Description	Pin	Description
1	GROUND	2	GROUND
3	LVDSA_Y0+	4	LVDSA_Y0-
5	LVDSA_Y1+	6	LVDSA_Y1-
7	LVDSA_Y2+	8	LVDSA_Y2-
9	LVDSA_CLK+	10	LVDSA_CLK-

Pin	Description	Pin	Description
11	N/C	12	N/C
13	GROUND	14	GROUND
15	LVDSB_Y0+	16	LVDSB_Y0-
17	LVDSB_Y1+	18	LVDSB_Y1-
19	LVDSB_Y2+	20	LVDSB_Y2-
21	LVDSB_CLK+	22	LVDSB_CLK-
23	N/C	24	N/C
25	GROUND	26	GROUND
27	VCC_LVDS	28	VCC_LVDS
29	VCC_LVDS	30	VCC_LVDS

Table 3-18: LVDS Connector Pinouts

3.2.18 SATA Drive Connector

CN Label: CN1

CN Type: 7-pin SATA drive connector

CN Location: See **Figure 3-20**

CN Pinouts: See **Table 3-19**

The SATA connectors connect to SATA hard drives or optical drives.
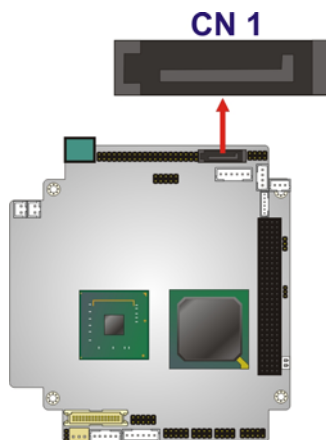
Figure 3-20: SATA Drive Connector Location

PIN NO.	DESCRIPTION
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Table 3-19: SATA Drive Connector Pinouts

3.2.19 SPI Flash Connector

CN Label:	**JSPI1**
CN Type:	6-pin header (1x6)
CN Location:	See **Figure 3-21**
CN Pinouts:	See **Table 3-20**

The 6-pin SPI Flash connector is used to flash the BIOS.
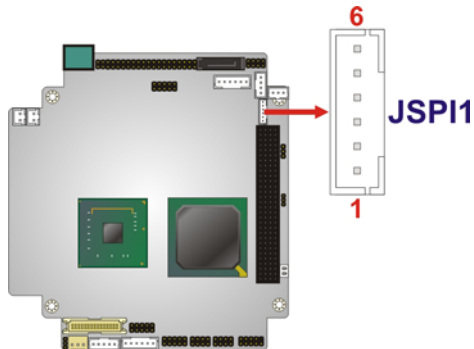
Figure 3-21: SPI Flash Connector

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	2	GND
3	CS#	4	CLOCK
5	SO	6	SI

PIN	DESCRIPTION	PIN	DESCRIPTION

Table 3-20: SPI Flash Connector

3.2.20 USB Connector

CN Label:	CN9 and CN10
CN Type:	8-pin header (2x4)
CN Location:	See **Figure 3-22**
CN Pinouts:	See **Table 3-21**

The 2x4 USB pin connectors provide connectivity to USB 2.0 ports. Each USB connector can support two USB devices. The USB port is used for I/O bus expansion.
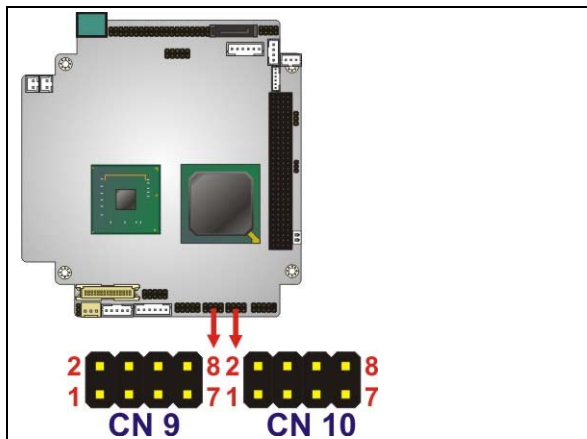
Figure 3-22: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	USBVCC1	2	GND
3	D1F-	4	D2F+
5	D1F+	6	D2F-
7	GND	8	USBVCC1

Table 3-21: USB Port Connector Pinouts

3.2.21 VGA Connector

CN Label:	CN6

CN Type:　　　　10-pin box header

CN Location:　　See **Figure 3-23**

CN Pinouts:　　See **Table 3-22**

The VGA connector connects to a monitor.
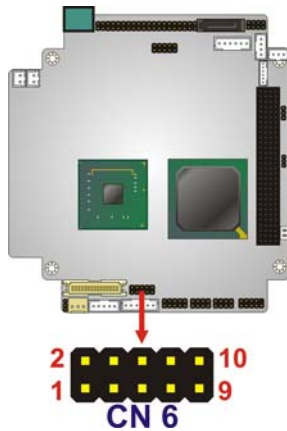
Figure 3-23: VGA Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	L_RED	2	5 V_DDCLK
3	L_GREEN	4	5 V_DDCDA
5	L_BLUE	6	GND
7	5 VHSYNC	8	GND
9	5 VVSYNC	10	CRT_PLUG#
9	5 VVSYNC	8	GND

Table 3-22: VGA Connector Pinouts

Chapter

4

Installation

4.1 Anti-static Precautions

![WARNING icon] **WARNING:**

Failure to take ESD precautions during the installation of the PM-945GSE-N270 may result in permanent damage to the PM-945GSE-N270 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the PM-945GSE-N270. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the PM-945GSE-N270 or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- **Wear an anti-static wristband**:   Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- **Self-grounding**:   Before handling the board, touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- **Use an anti-static pad**:   When configuring the PM-945GSE-N270, place it on an antic-static pad. This reduces the possibility of ESD damaging the PM-945GSE-N270.
- **Only handle the edges of the PCB**:   When handling the PCB, hold the PCB by the edges.

4.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before the PM-945GSE-N270 is installed. All installation notices should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the PM-945GSE-N270 and injury to the person installing the motherboard.

4.2.1 Installation Notices

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the PM-945GSE-N270, PM-945GSE-N270 components and injury to the user.

Before and during the installation please **DO** the following:

- Read the user manual:
  - o The user manual provides a complete description of the PM-945GSE-N270 installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - o Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the PM-945GSE-N270 on an antistatic pad:
  - o When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- Turn all power to the PM-945GSE-N270 off:

o   When working with the PM-945GSE-N270, make sure that it is
disconnected from all power supplies and that no electricity is being fed
into the system.

Before and during the installation of the PM-945GSE-N270 **DO NOT:**

▪   Remove any of the stickers on the PCB board. These stickers are required for
warranty validation.
▪   Use the product before verifying all the cables and power connectors are
properly connected.
▪   Allow screws to come in contact with the PCB circuit, connector pins, or its
components.

4.2.2 Installation Checklist

The following checklist is provided to ensure the PM-945GSE-N270 is properly installed.

▪   All the items in the packing list are present
▪   A compatible memory module is properly inserted into the slot
▪   The CF Type I or CF Type II card is properly installed into the CF socket
▪   The jumpers have been properly configured
▪   The PM-945GSE-N270 is inserted into a chassis with adequate ventilation
▪   The correct power supply is being used
▪   The following devices are properly connected
    o   SATA drive
    o   RS-232 devices
    o   RS-422/485 devices
    o   Keyboard and mouse
    o   LAN
    o   LCD backlight
    o   Power
    o   LVDS LCD screen
    o   VGA display
    o   USB port

WARNING:

A CPU should never be turned on without its heat sink being installed. If the heat sink is removed and the system turned on, permanent damage to the CPU, PM-945GSE-N270 and other electronic components attached to the system may be incurred. Running a CPU without a heat sink may also result in injury to the user.

4.3 Unpacking

When the PM-945GSE-N270 is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 4.1**.
- Make sure the packing box is facing upwards so the PM-945GSE-N270 does not fall out of the box.
- Make sure all the components in the checklist shown in **Chapter 2.3.1** are present.

NOTE:

If some of the components listed in the checklist in **Chapter 2.3.1** are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the PM-945GSE-N270 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

4.4 CompactFlash® Card Installation

A CompactFlash® Type II (CF Type II) card slot is located on the solder side of the CPU board. When appropriately formatted, a CF Type II card can serve as a bootable hard drive in applications where installation space is limited. The CF Type II card occupies a secondary IDE channel. Configuration options can be found through the BIOS configuration utility.

To install a CF Type II card, follow the instructions below.

Step 1: Turn the CPU board over so that the CF Type II card socket is facing up.

Step 2: Gently push the CF Type II card into the socket until it clicks into place. (See **Figure 4-1**)
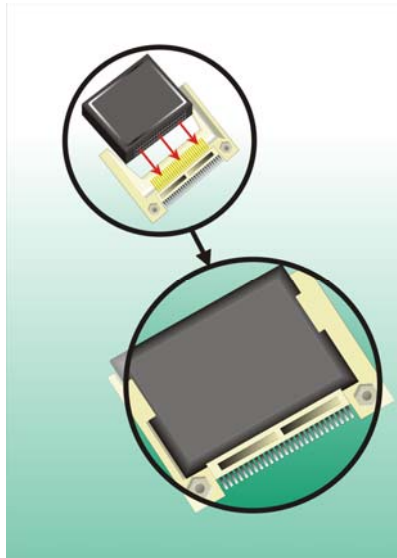
Figure 4-1: CompactFlash® Card Installation

4.5 Jumper Settings

NOTE:

A jumper is a metal bridge that is used to close an electrical circuit. It consists of two metal pins and a small metal clip (protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.
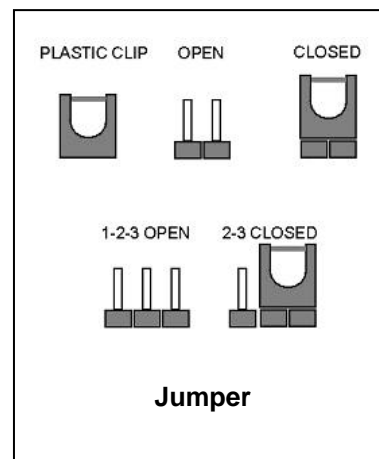
Jumper

Before the PM-945GSE-N270 is installed in the system, the jumpers must be set in accordance with the desired configuration. There are three jumpers on the PM-945GSE-N270. These three jumpers are listed in the table below.

Description	Label	Type
Clear CMOS	J_CMOS1	3-pin header
COM3 RS-232/422/485 select	JP1	8-pin header
LCD voltage select	J_LVDS1	3-pin header
PCI-104 I/O voltage select	JP2	3-pin header

The PM-945GSE-N270 CPU board has four onboard jumpers (**Figure 4-2**).
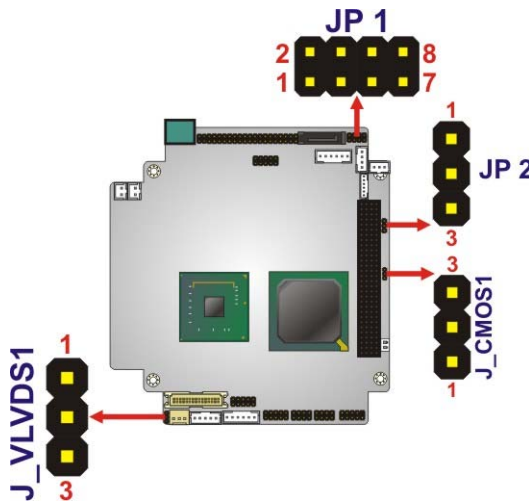
Figure 4-2: Jumper Locations

![NOTE icon] **NOTE:**

The PM-945GSE-N270 does not provide a "Clear CMOS" configuration jumper. If the system fails to boot due to improper BIOS settings, reset the CMOS contents by disconnecting and reconnecting the BT1 battery connector. Use small-sized needle nose pliers to carefully disconnect and reconnect the BT1 battery connector.

4.5.1 Clear CMOS Jumper

Jumper Label:	**J_CMOS1**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 4-1**
Jumper Location:	See **Figure 4-3**

To reset the BIOS, move the jumper to the "Clear BIOS" position for 3 seconds or more, then move back to the default position.

Setting	Description
1-2	Keep current BIOS setup
2-3	Clear BIOS

Table 4-1: Clear BIOS Jumper Settings
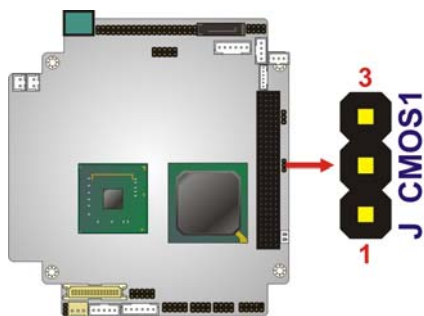
Figure 4-3: Clear BIOS Jumper Location

4.5.2 COM3 RS-232/422/RS485 Select Jumper

Jumper Label:	JP1
Jumper Type:	6-pin (2x3) header
Jumper Location:	See **Figure 4-4**
Jumper Settings:	See **Table 4-2**

The **COM3 RS-232/422/RS485 Select** jumper sets the COM3 connector type to RS-232, RS-422 or RS-485.

Setting	DESCRIPTION
1-2	RS-232 (Default)
3-4	RS-422
5-6	RS-485
7-8	RS-485 with RTS# control

Table 4-2: COM3 RS-232/422/RS485 Select Jumper Settings
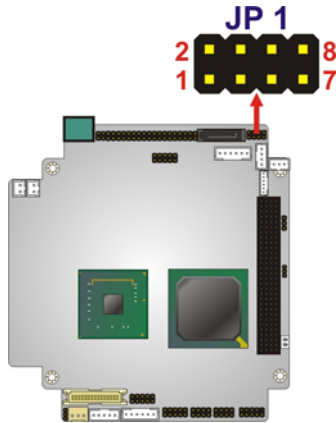
Figure 4-4: COM3 RS-232/422/RS485 Select Jumper Location

4.5.3 LVDS Voltage Select Jumper

Jumper Label: J_LVDS1

Jumper Type: 3-pin header

Jumper Location: See **Figure 4-2**

Jumper Settings: See **Table 4-3**

The **LVDS Voltage Select** jumper sets the LVDS voltage to +3.3V or +5V.

JP1	DESCRIPTION
1-2	LCD/VCC +3.3V (Default)
2-3	LCD/VCC +5V

Table 4-3: LVDS Voltage Select Jumper Settings
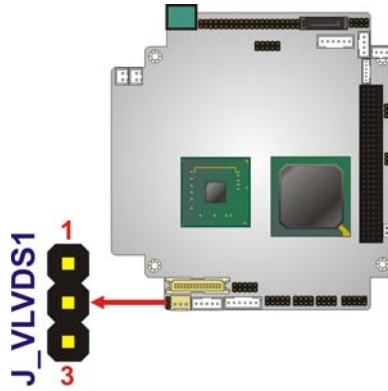
Figure 4-5: LVDS Voltage Select Jumper Location

4.5.4 PCI-104 Voltage Setup

Jumper Label:	JP2
Jumper Type:	3-pin header
Jumper Settings:	See **Table 4-4**
Jumper Location:	See **Figure 4-6**

This jumper selects the voltage supplied to the PCI-104 expansion module.

Setting	Description
1-2	+5.0 V
2-3	+3.3 V

Table 4-4: PCI-104 Voltage Jumper Settings
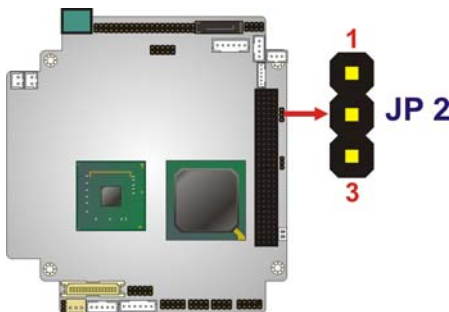
Figure 4-6: PCI-104 Voltage Jumper Location

4.6 Chassis Installation

⚡ **WARNING:**

Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the PM-945GSE-N270 must have air vents to allow cool air to move into the system and hot air to move out.

The PM-945GSE-N270 must be installed in a chassis with ventilation holes on the sides allowing air to flow through the heat sink surface. In a system with an individual power supply unit, the power supply cooling fan can help generate airflow through the board surface.

✔ **NOTE:**

IEI has a wide range of backplanes available. Please contact your vendor, reseller or an IEI sales representative at sales@iei.com.tw or visit the IEI website (http://www.ieiworld.com.tw) to find out more about the available chassis.

4.7 Internal Peripheral Device Connections

The cables listed in **Table 4-5** are shipped with the PM-945GSE-N270.

Quantity	Type
1	Quad RS-232 cable w/o bracket
1	KB/MS PS/2 Y-cable
1	Dual USB cable w/o bracket
1	LAN cable
1	Power cable
1	SATA cable
1	VGA cable

Table 4-5: IEI Provided Cables

Separately purchased optional IEI items that can be installed are listed below:

- ATX power cable
- 5.1 AC'97 Audio kit
- 7.1 HD Audio kit
- SATA power cable

For more details about the items listed above, please refer to **Chapter 2.4**. Installation of the accessories listed above is described in detail below.

4.7.1 Keyboard/Mouse Y-cable Connector

The PM-945GSE-N270-R11 is shipped with a keyboard/mouse Y-cable connector. The keyboard/mouse Y-cable connector connects to a keyboard/mouse connector on the PM-945GSE-N270-R11 and branches into two cables that are each connected to a PS/2 connector, one for a mouse and one for a keyboard. To connect the keyboard/mouse Y-cable connector, please follow the steps below.

Step 3: **Locate the connector**. The location of the keyboard/mouse Y-cable connector is shown in **Section 3.1.1**.

Step 4: **Align the connectors**. Correctly align pin 1 on the cable connector with pin 1 on the PM-945GSE-N270-R11 keyboard/mouse connector. See **Figure 4-7**.

Step 5: **Insert the cable connectors** Once the cable connector is properly aligned with the keyboard/mouse connector on the PM-945GSE-N270-R11, connect the cable connector to the onboard connectors. See **Figure 4-7**.
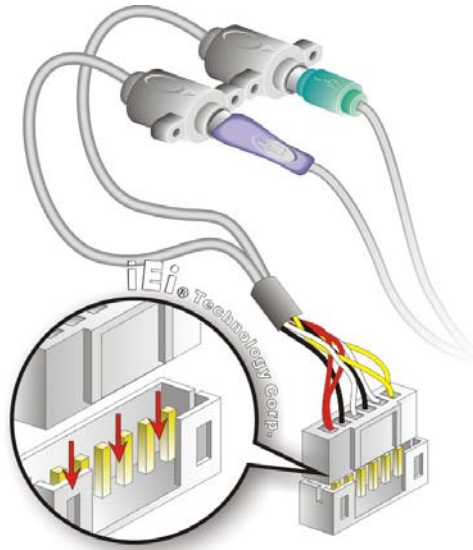
Figure 4-7: Keyboard/mouse Y-cable Connection

Step 6: **Attach PS/2 connectors to the chassis**. The keyboard/mouse Y-cable
connector is connected to two PS/2 connectors. To secure the PS/2 connectors
to the chassis please refer to the installation instructions that came with the
chassis.

Step 7: **Connect the keyboard and mouse**. Once the PS/2 connectors are connected
to the chassis, a keyboard and mouse can each be connected to one of the
PS/2 connectors. The keyboard PS/2 connector and mouse PS/2 connector are
both marked. Please make sure the keyboard and mouse are connected to the
correct PS/2 connector.

4.7.2 LVDS LCD Installation

The PM-945GSE-N270 can be connected to a TFT LCD screen through the 30-pin LVDS
crimp connector on the board. To connect a TFT LCD to the PM-945GSE-N270, please
follow the steps below.

Step 1: **Locate the connector**. The location of the LVDS connector is shown in
Chapter 3.

Step 2: **Insert the cable connector**. Insert the connector from the LVDS PCB driving board to the LVDS connector as shown in **Figure 4-8**. When connecting the connectors, make sure the pins are properly aligned.

> ⚠ **WARNING:**
>
> The diagram below is merely for illustration. The configuration and connection of the cables from the TFT LCD screen being installed may be different. Please refer to the installation manual that came with the TFT LCD screen.
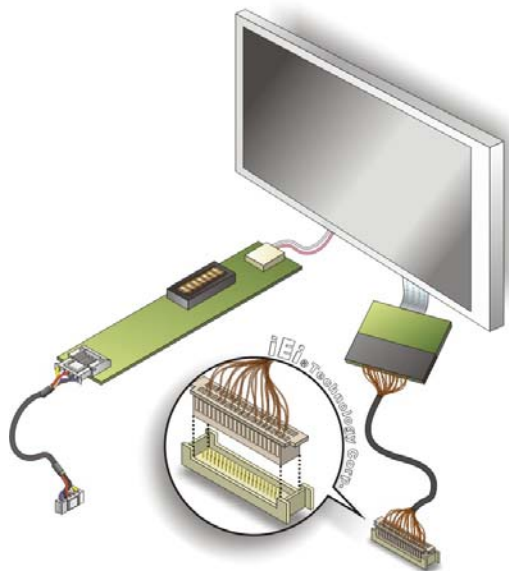
Figure 4-8: LVDS Connector

Step 3: **Locate the backlight inverter connector.** The location of the backlight inverter connector is shown in **Chapter 3**.

Step 4: **Connect backlight connector**. Connect the backlight connector to the driver TFT LCD PCB as shown in **Figure 4-9**. When inserting the cable connector, make sure the pins are properly aligned.
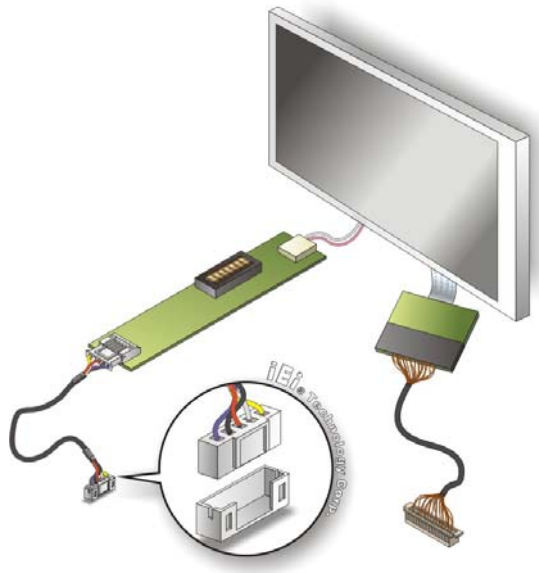
Figure 4-9: Backlight Inverter Connection

4.7.3 SATA Drive Connection

The PM-945GSE-N270 is shipped with two SATA drive cables and one SATA drive power cable. To connect the SATA drives to the connectors, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the SATA drive connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Press the clip on the connector at the end of the SATA cable and insert the cable connector into the on-board SATA drive connector. See **Figure 4-10**.
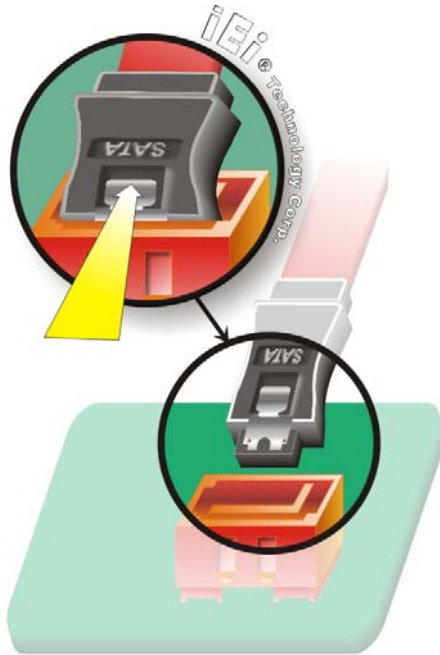
Figure 4-10: SATA Drive Cable Connection

Step 3: **Connect the cable to the SATA disk**. Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 4-11**.

Step 4: **Connect the SATA power cable**. Connect the SATA power connector to the back of the SATA drive. See **Figure 4-11**.

Figure 4-11: SATA Power Drive Connection

4.7.4 Four Serial Port Connector

The 40-pin serial port connector connects the board connector to four DB-9 connectors. To install, please follow the steps below.

Step 1: **Locate the COM connector**. The locations of the COM port connectors are shown in Chapter 4.

Step 2: **Insert the cable connector.** Align the cable connector with the onboard connector. Make sure pin 1 on the board and connector line up **Figure 4-12**.
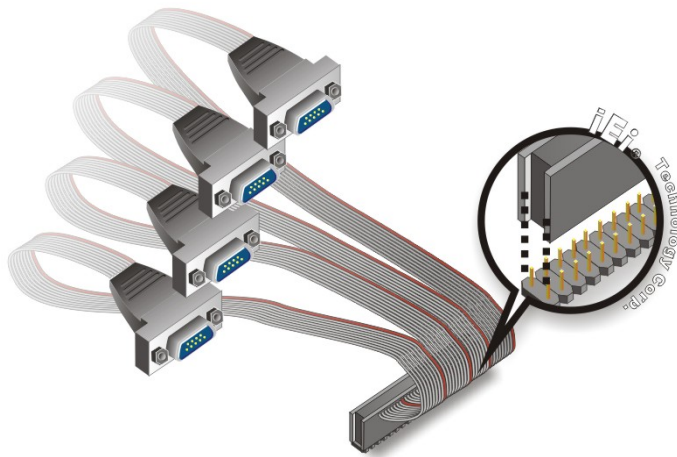
Figure 4-12: Four Serial Port Connector

Step 3: **Secure the serial ports to the chassis**. Tighten the screws on the DB-9

connectors to secure them to the chassis.
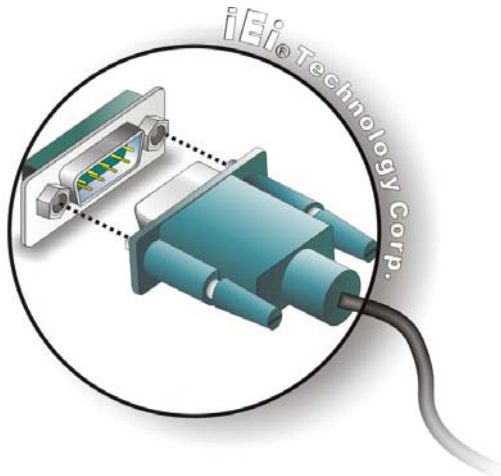
Figure 4-13: Serial Device Connector

4.7.5 USB Cable (Dual Port without Bracket)

The PM-945GSE-N270 is shipped with a dual port USB 2.0 cable. To connect the USB
cable connector, please follow the steps below.

Step 1: **Locate the connectors**. The locations of the USB connectors are shown in

Chapter 3.

⚠️ **WARNING:**

> If the USB pins are not properly aligned, the USB device can burn out.

Step 2: **Align the connectors**. The cable has two connectors. Correctly align pin 1on each cable connector with pin 1 on the PM-945GSE-N270 USB connector.

Step 3: **Insert the cable connectors**. Once the cable connectors are properly aligned with the USB connectors on the PM-945GSE-N270, connect the cable connectors to the on-board connectors. See **Figure 4-14**.
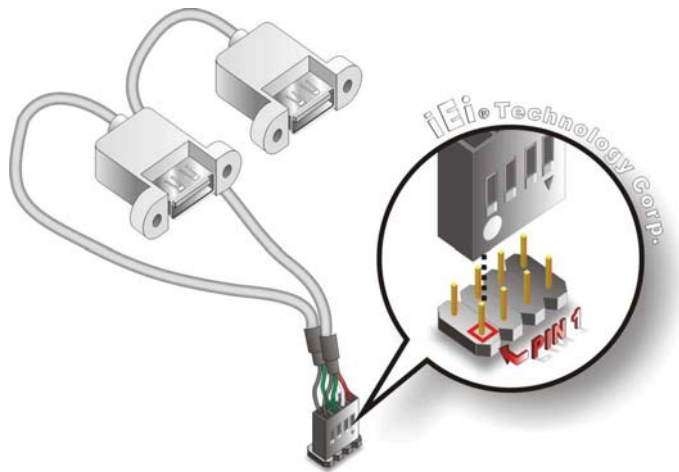
Figure 4-14: Dual USB Cable Connection

Step 4: **Attach the USB connectors to the chassis**. The USB 2.0 connectors each of two retention screw holes. To secure the connectors to the chassis please refer to the installation instructions that came with the chassis.

4.8 Software Installation

All the drivers for the PM-945GSE-N270 are on the CD that came with the system. To install the drivers, please follow the steps below.

Step 1: Insert the CD into a CD drive connected to the system.

NOTE:

> If the installation program doesn't start automatically:
>
> Click "Start->My Computer->CD Drive->autorun.exe"

Step 2: The driver main menu appears (**Figure 4-15**).
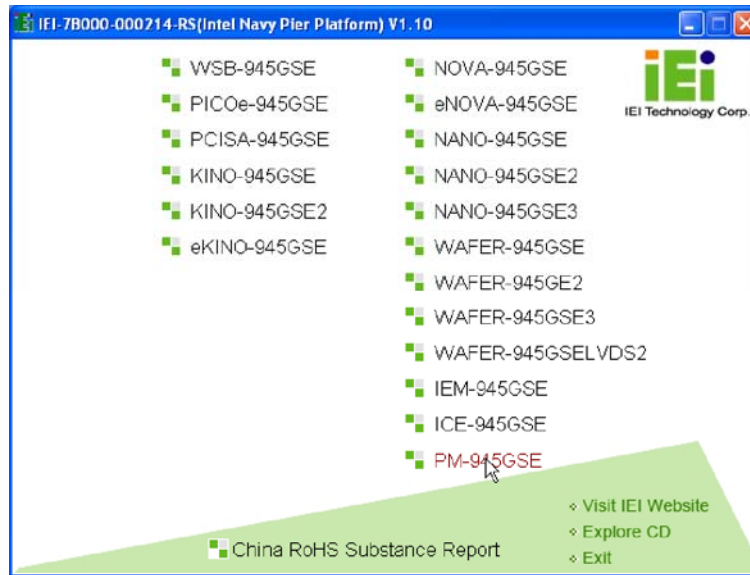
Figure 4-15: Introduction Screen

Step 3: Click PM-945GSE-N270.

Step 4: Select OS.

Step 5: A new screen with a list of available drivers appears (**Figure 4-16**).
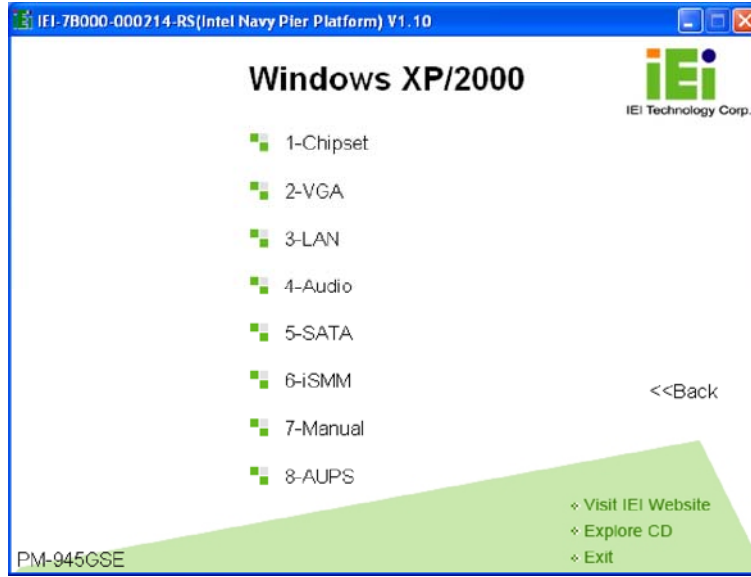
Figure 4-16: Available Drivers

Step 6: Install all of the necessary drivers in this menu.

Chapter

5

BIOS

5.1 Introduction

The BIOS is programmed onto the BIOS chip. The BIOS setup program allows changes to certain system settings. This chapter outlines the options that can be changed.

5.1.1 Starting Setup

The AMI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the DELETE key as soon as the system is turned on or
2. Press the DELETE key when the "**Press Del to enter SETUP**" message appears on the screen.

If the message disappears before the DELETE key is pressed, restart the computer and try again.

5.1.2 Using Setup

Use the arrow keys to highlight items, press ENTER to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press ESC to quit. Navigation keys are shown in.

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
Page Up key	Increase the numeric value or make changes
Page Dn key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu

Key	Function
F2 /F3 key	Change color from total 16 colors.　F2 to select color forward.
F10 key	Save all the CMOS changes, only for Main Menu

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

5.1.4 Unable to Reboot After Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in Chapter **5**.

5.1.5 BIOS Menu Bar

The **menu bar** on top of the BIOS screen has the following main items:

- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- PCIPnP – Changes the advanced PCI/PnP Settings
- Boot – Changes the system boot configuration.
- Security – Sets User and Supervisor Passwords.
- Chipset – Changes the chipset settings.
- Exit – Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

5.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered.
The **Main** menu gives an overview of the basic system information.

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

System Overview                               Use [ENTER], [TAB] or
_____       [SHIFT-TAB] to select a
AMIBIOS                                       field.
Version    :08.00.15
Build Date :05/26/09                          Use [+] or [-] to
ID:        :B162MR12                          configure system time.

Processor
Genuine Intel® CPU N270 @ 1.60GHz
Speed      :1600MHz
Count      :1
                                              ←→   Select Screen
System Memory                                 ↑↓   Select Item
Size       :1016MB                            Enter Go to SubScreen
                                              F1   General Help
System Time                [14:20:27]         F10  Save and Exit
System Time                [Tue 04/27/2009]   ESC  Exit

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```

   BIOS Menu 1: Main

➔   **System Overview**

The **System Overview** lists a brief summary of different system components. The fields in **System Overview** cannot be changed. The items shown in the system overview include:

- ▪ AMI BIOS: Displays auto-detected BIOS information
  - ○ **Version:** Current BIOS version
  - ○ **Build Date:** Date the current BIOS version was made
  - ○ **ID:** Installed BIOS ID
- ▪ Processor: Displays auto-detected CPU specifications
  - ○ **Type:** Names the currently installed processor
  - ○ **Speed:** Lists the processor speed
  - ○ **Count:** The number of CPUs on the motherboard
- ▪ System Memory: Displays the auto-detected system memory.
  - ○ **Size:** Lists memory size

The System Overview field also has two user configurable fields:

➔ **System Time [xx:xx:xx]**

Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

➔ **System Date [xx/xx/xx]**

Use the **System Date** option to set the system date. Manually enter the day, month and year.

5.3 Advanced

Use the **Advanced** menu (**BIOS Menu 2**) to configure the CPU and peripheral devices through the following sub-menus:

 WARNING!

Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.

- CPU Configuration (see **Section 5.3.1**)
- IDE Configuration (see **Section 5.3.2**)
- Floppy Configuration (see **Section 5.3.3**)
- Super I/O Configuration (see **Section 5.3.3**)
- Hardware Health Configuration (see **Section 5.3.4**)
- Remote Access Configuration (see **Section 5.3.5**)
- USB Configuration (see **Section 5.3.7**)

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

 Advanced Settings                                 Configure CPU
 _____
 WARNING: Setting wrong values in below sections may cause
 system to malfunction

 > CPU Configuration
 > IDE Configuration
 > SuperIO Configuration
 > Hardware Health Configuration                    ←→    Select Screen
 > Power Configuration                              ↑ ↓   Select Item
 > Remote Access Configuration                      Enter Go to SubScreen
 > USB Configuration                                F1    General Help
                                                    F10   Save and Exit
                                                    ESC   Exit
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```
BIOS Menu 2: Advanced

5.3.1 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 3**) to view detailed CPU specifications and configure the CPU.

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

 Configure Advanced CPU Settings
 Module Version:3F.10
 _____
 Manufacturer  : Intel®
 Brand String  : Intel® CPU N270 @ 1.60GHz
 Frequency     : 1.60GHz
 FSB Speed     : 532MHz
                                                    ←→    Select Screen
 Cache L1      : 24 KB                              ↑ ↓   Select Item
 Cache L2      : 512 KB                             Enter Go to SubScreen
                                                    F1    General Help
 Ratio Actual Value:12                              F10   Save and Exit
                                                    ESC   Exit
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```
BIOS Menu 3: CPU Configuration

The CPU Configuration menu (**BIOS Menu 3**) lists the following CPU details:

- Manufacturer: Lists the name of the CPU manufacturer

- ▪ Brand String: Lists the brand name of the CPU being used
- ▪ Frequency: Lists the CPU processing speed
- ▪ Cache L1: Lists the CPU L1 cache size
- ▪ Cache L2: Lists the CPU L2 cache size

5.3.2 IDE Configuration

Use the **IDE Configuration** menu (**BIOS Menu 4**) to change and/or set the configuration of the IDE devices installed in the system.

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

 IDE Configuration                                       DISABLED: disable the
─────────────────────────────────────────────           integrated IDE
                                                         controller.
 ATA/IDE Configuration        [Compatible]               PRIMARY: enables only
   Legacy IDE Channels        [SATA Pri, PATA Sec]       the Primary IDE
                                                         controller
 > Primary IDE Master          : [Not Detected]          SECONDARY: enables only
 > Primary IDE Slave           : [Not Detected]          the Secondary IDE
 > Secondary IDE Master        : [Not Detected]          controller.
 > Secondary IDE Slave         : [Not Detected]          BOTH: enables both IDE
                                                         controllers


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

BIOS Menu 4: IDE Configuration

➔ **ATA/IDE Configurations [Compatible]**

Use the **ATA/IDE Configurations** option to configure the ATA/IDE controller.

➔ **Disabled**   Disables the on-board ATA/IDE controller.

➔ **Compatible**   Configures the on-board ATA/IDE controller to be in compatible mode. In this mode, a SATA channel will replace one of the IDE channels. This mode supports up to 4 storage devices.

➔ **Enhanced** DEFAULT Configures the on-board ATA/IDE controller to be in Enhanced mode. In this mode, IDE channels and SATA channels are separated. This mode supports up to 6 storage devices. Some legacy OS do not support this mode.

➔ **Legacy IDE Channels [PATA Pri, SATA Sec]**

➔ **SATA Only** Only the SATA drives are enabled.

➔ **PATA Pri, SATA Sec** DEFAULT The IDE drives are enabled on the Primary IDE channel. The SATA drives are enabled on the Secondary IDE channel.

➔ **PATA Only** The IDE drives are enabled on the primary and secondary IDE channels. SATA drives are disabled.

➔ **IDE Master and IDE Slave**

When entering setup, BIOS automatically detects the presence of IDE devices. BIOS displays the status of the auto detected IDE devices. The following IDE devices are detected and are shown in the **IDE Configuration** menu:

- Primary IDE Master
- Primary IDE Slave
- Secondary IDE Master
- Secondary IDE Slave

The **IDE Configuration** menu (**BIOS Menu 4**) allows changes to the configurations for the IDE devices installed in the system. If an IDE device is detected and one of the above listed four BIOS configuration options are selected, the IDE configuration options shown in **Section 5.3.2.1** appear.

➔ **Hard Disk Write Protect [Disabled]**

Use the **Hard Disk Write Protect** BIOS option to protect the hard disks from being overwritten. This menu item is only effective if the device is accessed through the BIOS.

➔ **Disabled** DEFAULT Allows hard disks to be overwritten

➔ **Enabled** Prevents hard disks from being overwritten

5.3.2.1 IDE Master, IDE Slave

Use the **IDE Master** and **IDE Slave** configuration menu to view both primary and secondary IDE device details and configure the IDE devices connected to the system.

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

 Primary IDE Master                              Select the type of device
 _____    connected to the system
 Device       :Not Detected

 Type                          [Auto]
 LBA/Large Mode                [Auto]
 Block (Multi-Sector Transfer)  [Auto]
 PIO Mode                      [Auto]           ←→   Select Screen
 DMA Mode                      [Auto]           ↑ ↓  Select Item
 S.M.A.R.T.                    [Auto]           Enter Go to SubScreen
 32Bit Data Transfer           [Enabled]        F1   General Help
                                                F10  Save and Exit
                                                ESC  Exit

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```

BIOS Menu 5: IDE Master and IDE Slave Configuration

➔ **Auto-Detected Drive Parameters**

The "grayed-out" items in the left frame are IDE disk drive parameters automatically detected from the firmware of the selected IDE disk drive. The drive parameters are listed as follows:

▪ Device: Lists the device type (e.g. hard disk, CD-ROM etc.)
▪ Type: Indicates the type of devices a user can manually select
▪ Vendor: Lists the device manufacturer
▪ Size: List the storage capacity of the device.
▪ LBA Mode: Indicates whether the LBA (Logical Block Addressing) is a method of addressing data on a disk drive is supported or not.
▪ Block Mode: Block mode boosts IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per

interrupt if block mode is not used. Block mode allows transfers of up to 64 KB per interrupt.

- PIO Mode: Indicates the PIO mode of the installed device.
- Async DMA: Indicates the highest Asynchronous DMA Mode that is supported.
- Ultra DMA: Indicates the highest Synchronous DMA Mode that is supported.
- S.M.A.R.T.: Indicates whether or not the Self-Monitoring Analysis and Reporting Technology protocol is supported.
- 32Bit Data Transfer: Enables 32-bit data transfer.

➔ **Type [Auto]**

Use the **Type** BIOS option select the type of device the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) is complete.

➔ **Not Installed**   BIOS is prevented from searching for an IDE disk drive on the specified channel.

➔ **Auto**   **DEFAULT**   The BIOS auto detects the IDE disk drive type attached to the specified channel. This setting should be used if an IDE hard disk drive is attached to the specified channel.

➔ **CD/DVD**   The CD/DVD option specifies that an IDE CD-ROM drive is attached to the specified IDE channel. The BIOS does not attempt to search for other types of IDE disk drives on the specified channel.

➔ **ARMD**   This option specifies an ATAPI Removable Media Device. These include, but are not limited to:
ZIP
LS-120

➔ **LBA/Large Mode [Auto]**

Use the **LBA/Large Mode** option to disable or enable BIOS to auto detects LBA (Logical Block Addressing). LBA is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB.

➔ **Disabled** BIOS is prevented from using the LBA mode control on the specified channel.

➔ **Auto** DEFAULT BIOS auto detects the LBA mode control on the specified channel.

➔ **Block (Multi Sector Transfer) [Auto]**

Use the **Block (Multi Sector Transfer)** to disable or enable BIOS to auto detect if the device supports multi-sector transfers.

➔ **Disabled** BIOS is prevented from using Multi-Sector Transfer on the specified channel. The data to and from the device occurs one sector at a time.

➔ **Auto** DEFAULT BIOS auto detects Multi-Sector Transfer support on the drive on the specified channel. If supported the data transfer to and from the device occurs multiple sectors at a time.

➔ **PIO Mode [Auto]**

Use the **PIO Mode** option to select the IDE PIO (Programmable I/O) mode program timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases.

➔ **Auto** DEFAULT BIOS auto detects the PIO mode. Use this value if the IDE disk drive support cannot be determined.

➔ **0** PIO mode 0 selected with a maximum transfer rate of 3.3 MB/s

➔ **1** PIO mode 1 selected with a maximum transfer rate of 5.2 MB/s

➔ **2** PIO mode 2 selected with a maximum transfer rate of 8.3 MB/s

➔ **3** PIO mode 3 selected with a maximum transfer rate of 11.1 MB/s

➔ **4** PIO mode 4 selected with a maximum transfer rate of 16.6 MB/s

(This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.)

➔ **DMA Mode [Auto]**

Use the **DMA Mode** BIOS selection to adjust the DMA mode options.

➔ **Auto** DEFAULT BIOS auto detects the DMA mode. Use this value if the IDE disk drive support cannot be determined.

➔ **SWDMA0** Single Word DMA mode 0 selected with a maximum data transfer rate of 2.1 MB/s

➔ **SWDMA1** Single Word DMA mode 1 selected with a maximum data transfer rate of 4.2 MB/s

➔ **SWDMA2** Single Word DMA mode 2 selected with a maximum data transfer rate of 8.3 MB/s

➔ **MWDMA0** Multi Word DMA mode 0 selected with a maximum data transfer rate of 4.2 MB/s

➔ **MWDMA1** Multi Word DMA mode 1 selected with a maximum data transfer rate of 13.3 MB/s

➔ **MWDMA2** Multi Word DMA mode 2 selected with a maximum data transfer rate of 16.6 MB/s

➔ **UDMA0** Ultra DMA mode 0 selected with a maximum data transfer rate of 16.6 MB/s

➔ **UDMA1** Ultra DMA mode 1 selected with a maximum data transfer rate of 25 MB/s

➔ **UDMA2** Ultra DMA mode 2 selected with a maximum data transfer rate of 33.3 MB/s

➔ **UDMA3** Ultra DMA mode 3 selected with a maximum data transfer rate of 44 MB/s (To use this mode, it is required that an 80-conductor ATA cable is used.)

➔ **UDMA4** Ultra DMA mode 4 selected with a maximum data transfer rate of 66.6 MB/s (To use this mode, it is required that an 80-conductor ATA cable is used.)

➔ **UDMA5** Ultra DMA mode 5 selected with a maximum data transfer rate of 99.9 MB/s (To use this mode, it is required that an 80-conductor ATA cable is used.)

➔ **S.M.A.R.T [Auto]**

Use the **S.M.A.R.T** option to auto-detect, disable or enable Self-Monitoring Analysis and Reporting Technology (SMART) on the drive on the specified channel. **S.M.A.R.T** predicts impending drive failures. The **S.M.A.R.T** BIOS option enables or disables this function.

➔ **Auto** DEFAULT BIOS auto detects HDD SMART support.

➔ **Disabled** Prevents BIOS from using the HDD SMART feature.

➔ **Enabled** Allows BIOS to use the HDD SMART feature

➔ **32Bit Data Transfer [Enabled]**

Use the **32Bit Data Transfer** BIOS option to enables or disable 32-bit data transfers.

➔ **Disabled** Prevents the BIOS from using 32-bit data transfers.

➔ **Enabled** DEFAULT Allows BIOS to use 32-bit data transfers on supported hard disk drives.

5.3.3 Super I/O Configuration

Use the **Super I/O Configuration** menu (**BIOS Menu 6**) to set or change the configurations for the FDD controllers, parallel ports and serial ports.

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

Configure SCH3114 Super I/O Chipset             Allows BIOS to select
_____         Serial Port Base
                                                Addresses
Serial Port1 Address          [3F8]
  Serial Port1 IRQ            [IRQ4]
Serial Port2 Address          [2F8]
  Serial Port2 IRQ            [IRQ3]
Serial Port3 Address          [3E8]
  Serial Port3 IRQ            [IRQ4]            ←→   Select Screen
  Select RS-232 or RS-422/485 [RS-232]         ↑↓   Select Item
Serial Port4 Address          [2E8]            Enter Go to SubScreen
  Serial Port4 IRQ            [IRQ3]            F1    General Help
                                               F10   Save and Exit
                                               ESC   Exit

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```

BIOS Menu 6: Super IO Configuration

➔ **Serial Port1 Address [3F8]**

Use the **Serial Port1 Address** option to select the Serial Port 1 base address.

➔ **Disabled**   No base address is assigned to Serial Port 1

➔ **3F8**   DEFAULT   Serial Port 1 I/O port address is 3F8 and the interrupt address is IRQ4

➔ **3E8**   Serial Port 1 I/O port address is 3E8 and the interrupt address is IRQ4

➔ **2E8**   Serial Port 1 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port1 IRQ [4]**

Use the **Serial Port3 IRQ** option to select the interrupt address for serial port 3.

➔ **4**   Serial port 3 IRQ address is 4

➔ **Serial Port2 Address [2F8]**

Use the **Serial Port2 Address** option to select the Serial Port 2 base address.

➔ **Disabled** No base address is assigned to Serial Port 2

➔ **2F8** DEFAULT Serial Port 2 I/O port address is 3F8 and the interrupt address is IRQ3

➔ **3E8** Serial Port 2 I/O port address is 3E8 and the interrupt address is IRQ4

➔ **2E8** Serial Port 2 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port2 IRQ [3]**

Use the **Serial Port3 IRQ** option to select the interrupt address for serial port 3.

➔ **3** Serial port 3 IRQ address is 4

➔ **Serial Port3 Address [3E8]**

Use the **Serial Port3 Address** option to select the base addresses for serial port 3.

➔ **Disabled** No base address is assigned to serial port 3

➔ **3F8** Serial port 3 I/O port address is 3F8

➔ **2F8** Serial port 3 I/O port address is 2F8

➔ **3E8** DEFAULT Serial port 3 I/O port address is 3E8

➔ **2E8** Serial port 3 I/O port address is 2E8

➔ **Select RS232 or RS485/RS422 [RS/232]**

Use the **RS232/RS485/RS422 Select** option to select the Serial Port 2 signaling mode.

➔ **RS232** DEFAULT Serial Port 2 signaling mode is RS-232

➔ **RS422/485** Serial Port 2 signaling mode is RS-422/485

➔ **Serial Port3 IRQ [4]**

Use the **Serial Port3 IRQ** option to select the interrupt address for serial port 3.

➔ **4**   Serial port 3 IRQ address is 4

➔   **Serial Port4 Address [2E8]**

Use the **Serial Port4 Address** option to select the base addresses for serial port 4.

➔ **Disabled**   No base address is assigned to serial port 3

➔ **3F8**   Serial port 3 I/O port address is 3F8

➔ **2F8**   Serial port 3 I/O port address is 2F8

➔ **3E8**   Serial port 3 I/O port address is 3E8

➔ **2E8**   DEFAULT   Serial port 3 I/O port address is 2E8

➔   **Serial Port4 IRQ [3]**

Use the **Serial Port3 IRQ** option to select the interrupt address for serial port 3.

➔ **3**   Serial port 3 IRQ address is 4

5.3.4 Hardware Health Configuration

The **Hardware Health Configuration** menu (**BIOS Menu 7**) shows the operating temperature, fan speeds and system voltages.

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

 Hardware Health Configuration
 _____

 CPU Temperature Sensor            :52ºC/125ºF
 SYS1 Temperature Sensor           :44ºC/111ºF

 CPU_Fan1                          :N/A                   ←→   Select Screen
                                                          ↑ ↓  Select Item
 VCC_CORE                          :1.184 V               Enter Go to SubScreen
 +5V                               :4.918 V               F1   General Help
 +12V                              :12.144 V              F10  Save and Exit
 +1.8V                             :1.776 V               ESC  Exit
 VCC                               :3.280 V
 VSB                               :3.408 V
 VBAT                              :3.280 V

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```

BIOS Menu 7: Hardware Health Configuration

➔ **Hardware Health Monitoring**

The following system parameters and values are shown. The system parameters that are monitored are:

- System Temperatures:
  ○ CPU Temperature
  ○ System Temperature
- Fans:
  ○ CPU Fan1
- Voltages:
  ○ VCC CORE
  ○ +5V
  ○ +12V
  ○ +1.8V
  ○ VCC
  ○ VSB
  ○ VBAT

5.3.5 Power Configuration

The **Power Configuration** menu (**BIOS Menu 8**) allows the advanced power management options to be configured.

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

  Current Jumper Setting           [AT Power]           Go into On/Off, or
                                                        Suspend when Power
                                                        button is pressed



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

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```
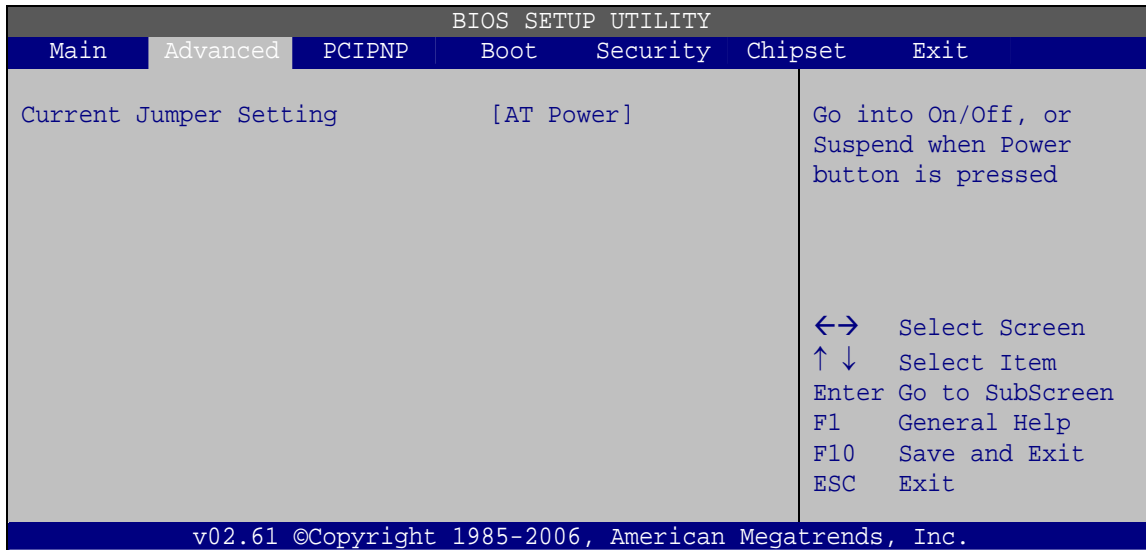
BIOS Menu 8: APM Configuration

➔ **Current Jumper Setting [AT Power]**

The **Current Jumper Setting** BIOS displays the current setting of the AT/ATX power jumper.

➔ **AT Power**   DEFAULT   The jumper is set to AT power

➔ **ATX Power**   The jumper is set to ATX power

5.3.6 Remote Access Configuration

Use the **Remote Access Configuration** menu (**BIOS Menu 9**) to configure remote access parameters. The **Remote Access Configuration** is an AMIBIOS feature and allows a remote host running a terminal program to display and configure the BIOS settings.

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

 Configure Remote Access type and parameters
 _____
 Remote Access                   [Disabled]

 Serial port number              [COM1]
     Base Address, IRQ           [3F8H, 3]
 Serial Port Mode                [115200 8,n,1]
 Redirection After BIOS POST     [Always]             ←→   Select Screen
 Terminal Type                   [ANSI]               ↑ ↓  Select Item
                                                      Enter Go to SubScreen
                                                      F1   General Help
                                                      F10  Save and Exit
                                                      ESC  Exit

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```

BIOS Menu 9: Remote Access Configuration

➔ **Remote Access [Disabled]**

Use the **Remote Access** option to enable or disable access to the remote functionalities of the system.

➔ **Disabled**   DEFAULT   Remote access is disabled.

➔ **Enabled**   Remote access configuration options shown below appear:

                        Serial Port Number

                        Serial Port Mode

                        Flow Control

                        Redirection after BIOS POST

                        Terminal Type

                        VT-UTF8 Combo Key Support

                    These configuration options are discussed below.

➔ **Serial Port r [1]**

Use the **Detected Serial Port** option to select the serial port used for remote access.

➔ **1** **DEFAULT** System is remotely accessed through COM1

➔ **2** System is remotely accessed through COM2

➔ **3** System is remotely accessed through COM3

➔ **4** System is remotely accessed through COM4

NOTE: Make sure the selected COM port is enabled through the Super I/O configuration menu.

➔ **Base Address, IRQ [3F8h,4]**

The **Base Address, IRQ** option cannot be configured and only shows the interrupt address of the serial port listed above.

➔ **Serial Port Mode [115200 8,n,1]**

Use the **Serial Port Mode** option to select baud rate through which the console redirection is made. The following configuration options are available

- 115200 8,n,1 **DEFAULT**
- 57600 8,n,1
- 38400 8,n,1
- 19200 8,n,1
- 09600 8,n,1

 NOTE:

Identical baud rate setting musts be set on the host (a management computer running a terminal software) and the slave

➔ **Redirection After BIOS POST [Always]**

Use the **Redirection After BIOS POST** option to specify when console redirection should occur.

➔ **Disabled**   The console is not redirected after POST

➔ **Boot Loader**   Redirection is active during POST and during Boot
                                  Loader

➔ **Always**   DEFAULT   Redirection is always active (Some OSes may not
                                  work if set to Always)

➔ **Terminal Type [ANSI]**

Use the **Terminal Type** BIOS option to specify the remote terminal type.

➔ **ANSI**   DEFAULT   The target terminal type is ANSI

➔ **VT100**   The target terminal type is VT100

➔ **VT-UTF8**   The target terminal type is VT-UTF8

5.3.7 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 10**) to read USB configuration
information and configure the USB settings.

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

 USB Configuration                                      Enables USB host
 _____    controllers

 Module Version - 2.24.3-13.4

 USB Devices Enabled:
            None

 USB Function                   [Enabled]            ←→    Select Screen
 Legacy USB Support             [Enabled]            ↑ ↓   Select Item
 USB 2.0 Controller             [Enabled]            Enter Go to SubScreen
 USB 2.0 Controller Mode        [HiSpeed]            F1    General Help
                                                     F10   Save and Exit
                                                     ESC   Exit

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```

BIOS Menu 10: USB Configuration

➔ **USB Configuration**

The **USB Configuration** field shows the system USB configuration. The items listed are:

▪ Module Version: x.xxxxx.xxxxx

➔ **USB Devices Enabled**

The **USB Devices Enabled** field lists the USB devices that are enabled on the system

➔ **USB 1.1 Controller [Enabled]**

Use the **USB Function** BIOS option to enable or disable USB function support.

➔ **Disabled**   USB 1.1 controller disabled

➔ **Enabled**   DEFAULT   USB 1.1 controller enabled

➔ **USB 2.0 Controller [Enabled]**

Use the **USB 2.0 Controller** BIOS option to enable or disable the USB 2.0 controller

➔ **Disabled**   USB 2.0 controller disabled

➔ **Enabled**   DEFAULT   USB 2.0 controller enabled

➔ **Legacy USB Support [Enabled]**

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support.

Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

➔ **Disabled**   Legacy USB support disabled

➔ **Enabled**   DEFAULT   Legacy USB support enabled

| ➔ | **Auto** | Legacy USB support disabled if no USB devices are connected |

5.4 PCI/PnP

Use the **PCI/PnP** menu (**BIOS Menu 11**) to configure advanced PCI and PnP settings.

⚡ WARNING!

Setting wrong values for the BIOS selections in the PCIPnP BIOS menu may cause the system to malfunction.

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

 Advanced PCI/PnP Settings                          Available: Specified IRQ
 _____        is available to be use
                                                    the PCI/PnP devices
 WARNING: Setting wrong values in below sections    Reserved: Specified IRQ
          may cause system to malfunction           is reserved for use by
 IRQ3                          [Reserved]            legacy ISA devices
 IRQ4                          [Reserved]
 IRQ5                          [Available]
 IRQ7                          [Reserved]
 IRQ9                          [Available]
 IRQ10                         [Available]
 IRQ11                         [Available]
 IRQ14                         [Available]           ←→   Select Screen
 IRQ15                         [Available]           ↑ ↓   Select Item
                                                     Enter Go to SubScreen
 DMA Channel 0                 [Available]           F1    General Help
 DMA Channel 1                 [Available]           F10   Save and Exit
 DMA Channel 3                 [Available]           ESC   Exit
 DMA Channel 5                 [Available]
 DMA Channel 6                 [Available]
 DMA Channel 7                 [Available]


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```

BIOS Menu 11: PCI/PnP Configuration

➔ **IRQ# [Available]**

Use the **IRQ#** address to specify what IRQs can be assigned to a particular peripheral device.

➔ **Available** DEFAULT The specified IRQ is available to be used by PCI/PnP devices

➔ **Reserved** The specified IRQ is reserved for use by Legacy ISA devices

Available IRQ addresses are:

- IRQ3
- IRQ4
- IRQ5
- IRQ7
- IRQ9
- IRQ10
- IRQ 11
- IRQ 14
- IRQ 15

➔ **DMA Channel# [Available]**

Use the **DMA Channel#** option to assign a specific DMA channel to a particular PCI/PnP device.

➔ **Available** DEFAULT The specified DMA is available to be used by PCI/PnP devices

➔ **Reserved** The specified DMA is reserved for use by Legacy ISA devices

Available DMA Channels are:

- DM Channel 0
- DM Channel 1
- DM Channel 3
- DM Channel 5
- DM Channel 6
- DM Channel 7

5.5 Boot Settings Configuration

Use the **Boot** menu (**BIOS Menu 12**) to configure system boot options.

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

 Boot Settings Configuration                     Configure settings
 ─────────────────────────────────              during system boot.
 > Boot Settings Configuration

 > Boot Device Priority
 > Hard Disk Drives
 > CD/DVD Drives                                 ←→   Select Screen
 > Removable Drives                              ↑↓   Select Item
                                                 Enter Go to SubScreen
                                                 F1   General Help
                                                 F10  Save and Exit
                                                 ESC  Exit

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```
BIOS Menu 12: Boot

5.5.1 Boot Settings Configuration

Use the **Boot Settings Configuration** menu (**BIOS Menu 13**) to configure advanced system boot options.

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

 Boot Settings Configuration                     Allows BIOS to skip
 ─────────────────────────────────              certain tests while
 Quick Boot                  [Enabled]           booting. This will
 Quiet Boot                  [Enabled]           decrease the time needed
 AddOn ROM Display Mode      [Force BIOS]        to boot the system.
 Bootup Num-Lock             [On]
 Boot From LAN Support       [Disabled]

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

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```
BIOS Menu 13: Boot Settings Configuration

➔ **Quick Boot [Enabled]**

Use the **Quick Boot** BIOS option to make the computer speed up the boot process.

➔ **Disabled**   No POST procedures are skipped

➔ **Enabled**   DEFAULT   Some POST procedures are skipped to decrease
the system boot time

➔ **Quiet Boot [Disabled]**

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

➔ **Disabled**   DEFAULT   Normal POST messages displayed

➔ **Enabled**   OEM Logo displayed instead of POST messages

➔ **AddOn ROM Display Mode [Force BIOS]**

Use the **AddOn ROM Display Mode** option to allow add-on ROM (read-only memory) messages to be displayed.

➔ **Force BIOS**   DEFAULT   The system forces third party BIOS to display
during system boot.

➔ **Keep Current**   The system displays normal information during
system boot.

➔ **Bootup Num-Lock [On]**

Use the **Bootup Num-Lock** BIOS option to specify if the number lock setting must be modified during boot up.

➔ **Off**   Does not enable the keyboard Number Lock automatically. To
use the 10-keys on the keyboard, press the Number Lock key
located on the upper left-hand corner of the 10-key pad. The
Number Lock LED on the keyboard lights up when the Number
Lock is engaged.

➔ **On**   DEFAULT   Allows the Number Lock on the keyboard to be enabled
automatically when the computer system boots up. This allows
the immediate use of the 10-key numeric keypad located on
the right side of the keyboard. To confirm this, the Number
Lock LED light on the keyboard is lit.

➔ **Boot From LAN Support [Disabled]**

Use the **BOOT From LAN Support** option to enable the system to be booted from a
remote system.

➔ **Disabled**   DEFAULT   Cannot be booted from a remote system through the
LAN

➔ **Enabled**   DEFAULT   Can be booted from a remote system through the
LAN

5.5.2 Boot Device Priority

Use the **Boot Device Priority** menu (**BIOS Menu 14**) to specify the boot sequence from
the available devices. The drive sequence also depends on the boot sequence in the
individual device section.

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

 Boot Device Priority                                Specifies the boot
 _____         sequence from the
 > 1st Boot Device              [1st Boot Device]    available devices.
 > 2nd Boot Device              [2nd Boot Device]
 > 3rd Boot Device              [3rd Boot Device]


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

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```

BIOS Menu 14: Boot Device Priority Settings

5.5.3 Hard Disk Drives

Use the **Hard Disk Drives** menu to specify the boot sequence of the available HDDs. Only installed hard drives are shown.

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

 Hard Disk Drives                                    Specifies the boot
 ───────────────────────────────────────────        sequence from the
                                                     available devices.
 > 1st Drive                   [Hard Drive 1]
 > 2nd Drive                   [Hard Drive 2]
 > 3rd Drive                   [Hard Drive 3]


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

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```
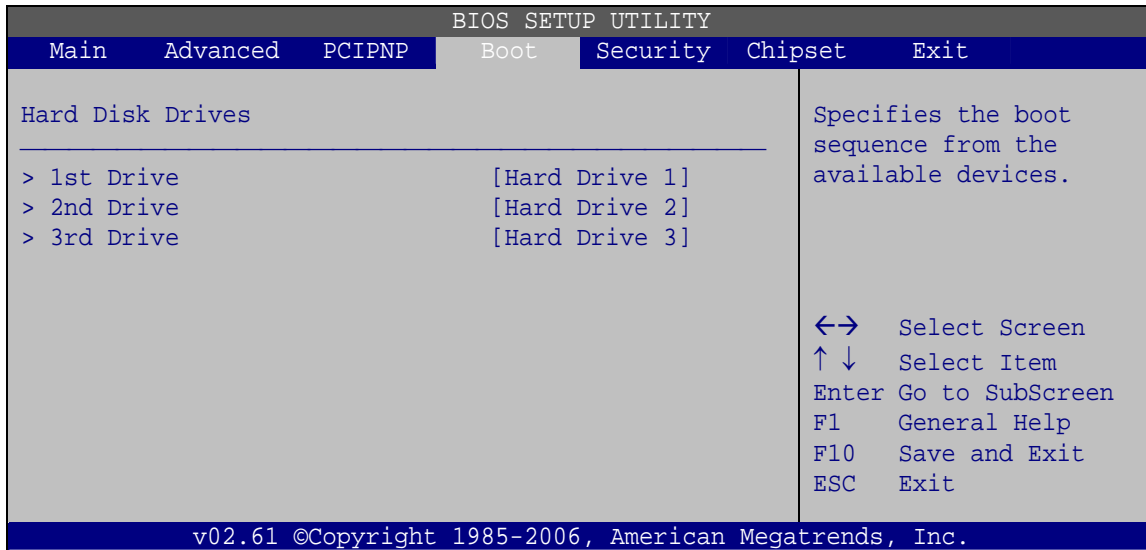
BIOS Menu 15: Hard Disk Drives

5.5.4 Removable Drives

Use the **Removable Drives** menu (**BIOS Menu 16**) to specify the boot sequence of the removable drives. Only connected drives are shown.

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

   Hard Disk Drives                                      Specifies the boot
   ─────────────────────────────────────────────        sequence from the
   > 1st Drive                    [Removable Drive 1]    available devices.
   > 2nd Drive                    [Removable Drive 2]
   > 3rd Drive                    [Removable Drive 3]



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

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```

BIOS Menu 16: Removable Drives

5.5.5 CD/DVD Drives

Use the **CD/DVD Drives** menu to specify the boot sequence of the available CD/DVD drives. When the menu is opened, the CD drives and DVD drives connected to the system are listed as shown below:

- 1st Drive   [CD/DVD: PM-(part ID)]
- 2nd Drive   [HDD: PS-(part ID)]
- 3rd Drive   [HDD: SM-(part ID)]
- 4th Drive   [HDD: SM-(part ID)]

NOTE:

Only the drives connected to the system are shown. For example, if only two CDs or DVDs are connected only "**1st Drive**" and "**2nd Drive**" are listed.

The boot sequence from the available devices is selected. If the "**1st Drive**" option is selected a list of available CD/DVD drives is shown. Select the first CD/DVD drive the system boots from. If the "**1st Drive**" is not used for booting this option may be disabled.

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

  Hard Disk Drives                                        Specifies the boot
 _____        sequence from the
                                                         available devices.
 > 1st Drive                        [CD/DVD 1]
 > 2nd Drive                        [CD/DVD 2]
 > 3rd Drive                        [CD/DVD 3]


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

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```
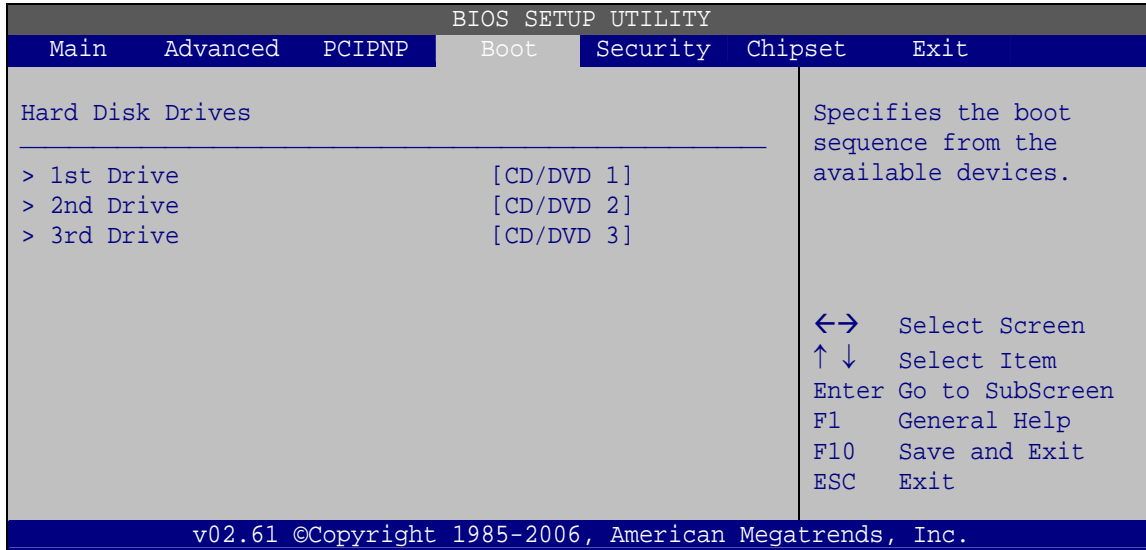
　　　　BIOS Menu 17: CD/DVD Drives

5.6 Security

Use the **Security** menu (**BIOS Menu 18**) to set system and user passwords.

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

  Security Settings
 _____

  Supervisor Password      :Not Installed
  User Password            :Not Installed

  Change Supervisor Password
  Change User Password
                                                        ←→    Select Screen
                                                        ↑ ↓   Select Item
                                                        Enter Go to SubScreen
                                                        F1    General Help
                                                        F10   Save and Exit
                                                        ESC   Exit

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```
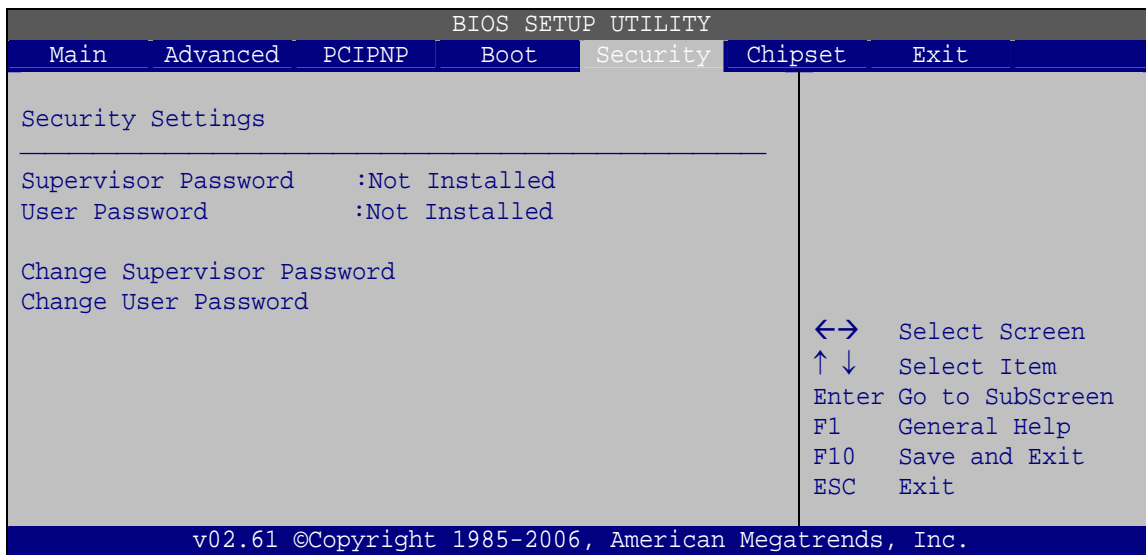
　　　　BIOS Menu 18: Security

➔　**Change Supervisor Password**

Use the **Change Supervisor Password** to set or change a supervisor password. The default for this option is **Not Installed**. If a supervisor password must be installed, select

this field and enter the password. After the password has been added, **Install** appears next to **Change Supervisor Password**.

➔ **Change User Password**

Use the **Change User Password** to set or change a user password. The default for this option is **Not Installed**. If a user password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change User Password**.

➔ **Clear User Password**

Use the **Clear User Password** to clear a user's password. The default for this option is **Not Installed**. If a user password must be cleared, use this option.

➔ **Boot Sector Virus Protection [Disabled]**

Use the **Boot Sector Virus Protection** to enable or disable boot sector protection.

➔ **Disabled**   DEFAULT   Disables the boot sector virus protection

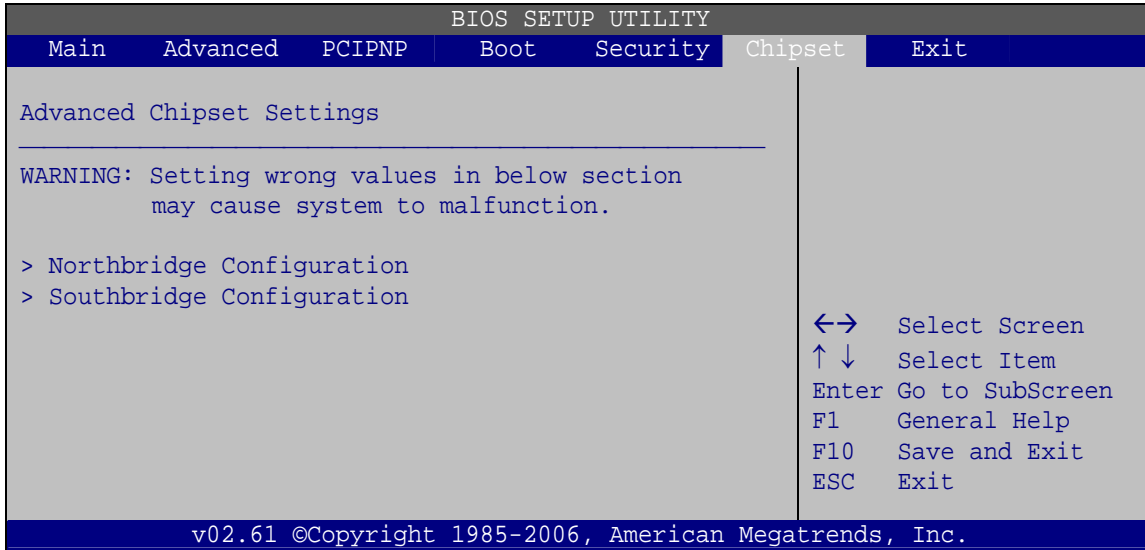➔ **Enabled**   Enables the boot sector virus protection

5.7 Chipset

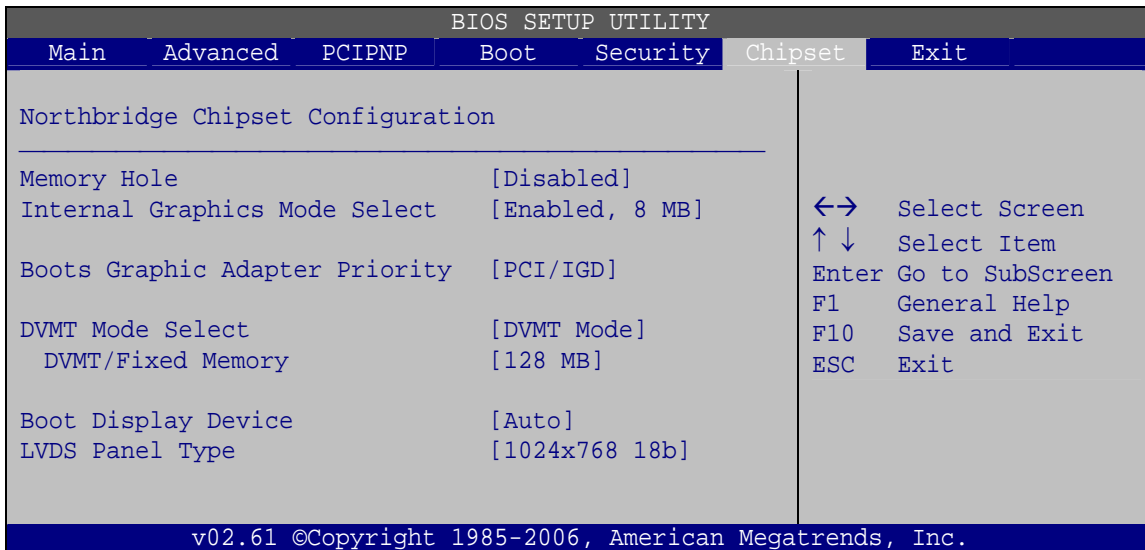Use the **Chipset** menu (**BIOS Menu 19**) to access the Video configuration menu.

> **WARNING!**
>
> Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.

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

 Advanced Chipset Settings
 _____
 WARNING: Setting wrong values in below section
          may cause system to malfunction.

 > Northbridge Configuration
 > Southbridge Configuration
                                                 ←→    Select Screen
                                                 ↑↓    Select Item
                                                 Enter Go to SubScreen
                                                 F1    General Help
                                                 F10   Save and Exit
                                                 ESC   Exit

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```

BIOS Menu 19: Chipset

5.7.1 Northbridge Chipset Configuration

Use the **Northbridge Chipset Configuration** menu (**BIOS Menu 20**) to set the configuration settings for the flat panel screen connected to the system.

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

 Northbridge Chipset Configuration
 _____
 Memory Hole                      [Disabled]
 Internal Graphics Mode Select    [Enabled, 8 MB]     ←→    Select Screen
                                                      ↑↓    Select Item
 Boots Graphic Adapter Priority   [PCI/IGD]           Enter Go to SubScreen
                                                      F1    General Help
 DVMT Mode Select                 [DVMT Mode]         F10   Save and Exit
   DVMT/Fixed Memory              [128 MB]            ESC   Exit

 Boot Display Device              [Auto]
 LVDS Panel Type                  [1024x768 18b]


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```

BIOS Menu 20: Video Configuration

➔ **Memory Hole [Disabled]**

Use the **Memory Hole** option to reserve memory space between 15 MB and 16 MB for ISA expansion cards that require a specified area of memory to work properly. If an older ISA expansion card is used, please refer to the documentation that came with the card to see if it is necessary to reserve the space.

➔ **Disabled**   DEFAULT   Memory is not reserved for ISA expansion cards

➔ **15 MB–16 MB**   Between 15 MB and 16 MB of memory is reserved for ISA expansion cards

➔ **Internal Graphics Mode Select [8 MB]**

Use the **Internal Graphics Mode Select** option to set the amount of system memory allocated to the integrated graphics processor when the system boots. The system memory allocated can then only be used as graphics memory, and is no longer available to applications or the operating system. Configuration options are listed below:

- Disabled
- Enabled, 1 MB
- Enabled, 8 MB **Default**

➔ **Boots Graphics Adapter Priority [PCI/IDG]**

Use the **Boots Graphics Adapter Priority** option to select the graphics controller used as the primary boot device. Select either an integrated graphics controller (IGD) or a combination of PCI graphics controller or an IGD. Configuration options are listed below:

- IGD
- PCI/IGD   DEFAULT

➔ **DVMT Mode Select [DVMT Mode]**

Use the **DVMT Mode Select** option to select the Intel Dynamic Video Memory Technology (DVMT) operating mode.

➔ **Fixed Mode**   A fixed portion of graphics memory is reserved as graphics memory.

→ **DVMT Mode** DEFAULT Graphics memory is dynamically allocated according to the system and graphics needs.

→ **Combo Mode** A fixed portion of graphics memory is reserved as graphics memory. If more memory is needed, graphics memory is dynamically allocated according to the system and graphics needs.

→ **DVMT/FIXED Memory [128 MB]**

Use the **DVMT/FIXED Memory** option to specify the maximum amount of memory that can be allocated as graphics memory. This option can only be configured for if **DVMT Mode** or **Fixed Mode** is selected in the **DVMT Mode Selec**t option. If **Combo Mode** is selected, the maximum amount of graphics memory is 128 MB. Configuration options are listed below.

- 64 MB
- 128 MB   Default
- Maximum DVMT

→ **Boot Display Device**

Use the **Boot Display Device** option to select the display device used by the system when it boots. Configuration options are listed below.

- Auto
- CRT
- LVDS

→ **Flat Panel Type [1024 x 768 18b]**

Use the **Flat Panel Type** option to set the resolution of the flat panel screen connected to the system. The **Flat Panel Type** options are:
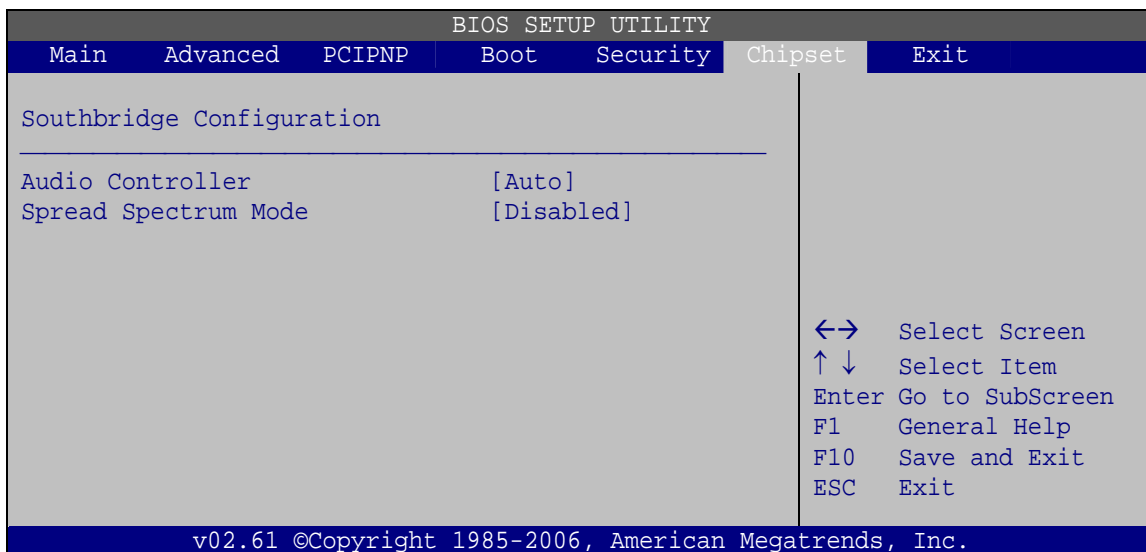
- 640 x 480 18b
- 800 x 480 18b
- 800 x 600 18b
- 1024 x 768 18b (Default)

- 1280 x 1024 36b
- 1400 x 1050 36b
- 1440 x 900 36b
- 1600 x 1200 36b

5.7.2 Southbridge Configuration

Use the **Southbridge Configuration** menu (**BIOS Menu 21**) to configure the audio controller and spread spectrum function of the Southbridge chipset.

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

 Southbridge Configuration
 _____

 Audio Controller              [Auto]
 Spread Spectrum Mode          [Disabled]


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

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```

BIOS Menu 21:Southbridge Chipset Configuration

➔ **Audio Controller Codec [Auto]**

Use the **Audio Controller Codec** option to enable or disable the audio controller codec.

➔ **All**   The audio controller codec is disabled
   Disabled

➔ **Auto**   **DEFAULT**   The audio controller codec is automatically detected and
                 enabled

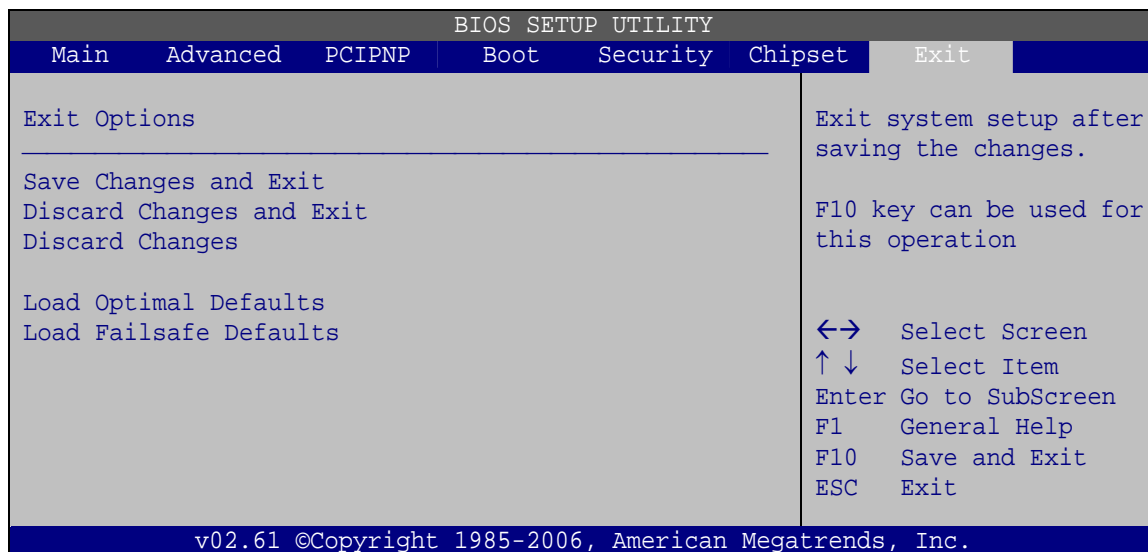➔ **Spread Spectrum [Disabled]**

Use the **Spread Spectrum** option to reduce the EMI. Excess EMI is generated when the system clock generator pulses have extreme values. Spreading the pulse spectrum

modulates changes in the extreme values from spikes to flat curves, thus reducing the EMI. This benefit may in some cases be outweighed by problems with timing-critical devices, such as a clock-sensitive SCSI device.

➔ **Disabled**   DEFAULT   EMI not reduced

➔ **Enabled**   EMI reduced

5.8 Exit

Use the **Exit** menu (**BIOS Menu 22**) to load default BIOS values, optimal failsafe values and to save configuration changes.

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

 Exit Options                                     Exit system setup after
_____  saving the changes.

 Save Changes and Exit                            F10 key can be used for
 Discard Changes and Exit                         this operation
 Discard Changes

 Load Optimal Defaults
 Load Failsafe Defaults                           ←→   Select Screen
                                                  ↑↓   Select Item
                                                  Enter Go to SubScreen
                                                  F1    General Help
                                                  F10   Save and Exit
                                                  ESC   Exit

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```

BIOS Menu 22: Exit

➔ **Save Changes and Exit**

Use the **Save Changes and Exit** option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.

➔ **Discard Changes and Exit**

Use the **Discard Changes and Exit** option to exit the BIOS configuration setup program without saving the changes made to the system.

➔ **Discard Changes**

Use the **Discard Changes** option to discard the changes and remain in the BIOS configuration setup program.

➔ **Load Optimal Defaults**

Use the **Load Optimal Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F9 key can be used for this operation.**

➔ **Load Failsafe Defaults**

Use the **Load Failsafe Defaults** option to load failsafe default values for each of the parameters on the Setup menus. **F8 key can be used for this operation.**

Appendix

A

BIOS Options

Below is a list of BIOS configuration options in the BIOS chapter.

Appendix

B

Terminology

ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
ATA	The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CompactFlash®	CompactFlash® is a solid-state storage device. CompactFlash® devices use flash memory in a standard size enclosure. Type II is thicker than Type I, but a Type II slot can support both types.
CMOS	Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.
COM	COM refers to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male DB-9 connector.
DDR	Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.
DMA	Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.
DIMM	Dual Inline Memory Modules are a type of RAM that offer a 64-bit data bus and have separate electrical contacts on each side of the module.
DIO	The digital inputs and digital outputs are general control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.
EIDE	Enhanced IDE (EIDE) is a newer IDE interface standard that has data transfer rates between 4.0 MBps and 16.6 MBps.
FSB	The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Southbridge chipset.
GPIO	General purpose input

HDD	Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.
LCD	Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.
LVDS	Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.
POST	The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.
RAM	Random Access Memory (RAM) is volatile memory that loses data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.
SATA	Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps.
USB	The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates and USB 2.0 supports 480Mbps data transfer rates.
VGA	The Video Graphics Array (VGA) is a graphics display system developed by IBM.

Appendix

C

Watchdog Timer

NOTE:

> The following discussion applies to DOS environment. IEI support is contacted or the IEI website visited for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMIs or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer.

INT 15H:

AH – 6FH Sub-function:	
AL – 2:	Sets the Watchdog Timer's period.
BL:	Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table C-1: AH-6FH Sub-function

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. When the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

NOTE:

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

EXAMPLE PROGRAM:

; INITIAL TIMER PERIOD COUNTER

;
W_LOOP:
;

```
        MOV        AX, 6F02H        ;setting the time-out value
        MOV        BL, 30           ;time-out value is 48 seconds
        INT    15H
```

;
; ADD THE APPLICATION PROGRAM HERE
;

```
        CMP        EXIT_AP, 1       ;is the application over?
        JNE    W_LOOP              ;No, restart the application

        MOV        AX, 6F02H        ;disable Watchdog Timer
        MOV        BL, 0            ;
        INT    15H
```

;
; EXIT ;

Appendix

D

Hazardous Materials Disclosure

D.1 Hazardous Materials Disclosure Table for IPB Products Certified as RoHS Compliant Under 2002/95/EC Without Mercury

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate the estimated "Environmentally Friendly Use Period" (EFUP). This is an estimate of the number of years that these substances would "not leak out or undergo abrupt change." This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Please refer to the table on the next page.

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	X	O	O	O	O	X
Display	X	O	O	O	O	X
Printed Circuit Board	X	O	O	O	O	X
Metal Fasteners	X	O	O	O	O	O
Cable Assembly	X	O	O	O	O	X
Fan Assembly	X	O	O	O	O	X
Power Supply Assemblies	X	O	O	O	O	X
Battery	O	O	O	O	O	O
O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006 X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006						

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有"环境友好使用期限"的标签，此期限是估算这些物质"不会有泄漏或突变"的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	X	O	O	O	O	X
显示	X	O	O	O	O	X
印刷电路板	X	O	O	O	O	X
金属螺帽	X	O	O	O	O	O
电缆组装	X	O	O	O	O	X
风扇组装	X	O	O	O	O	X
电力供应组装	X	O	O	O	O	X
电池	O	O	O	O	O	O
O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。 X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。						