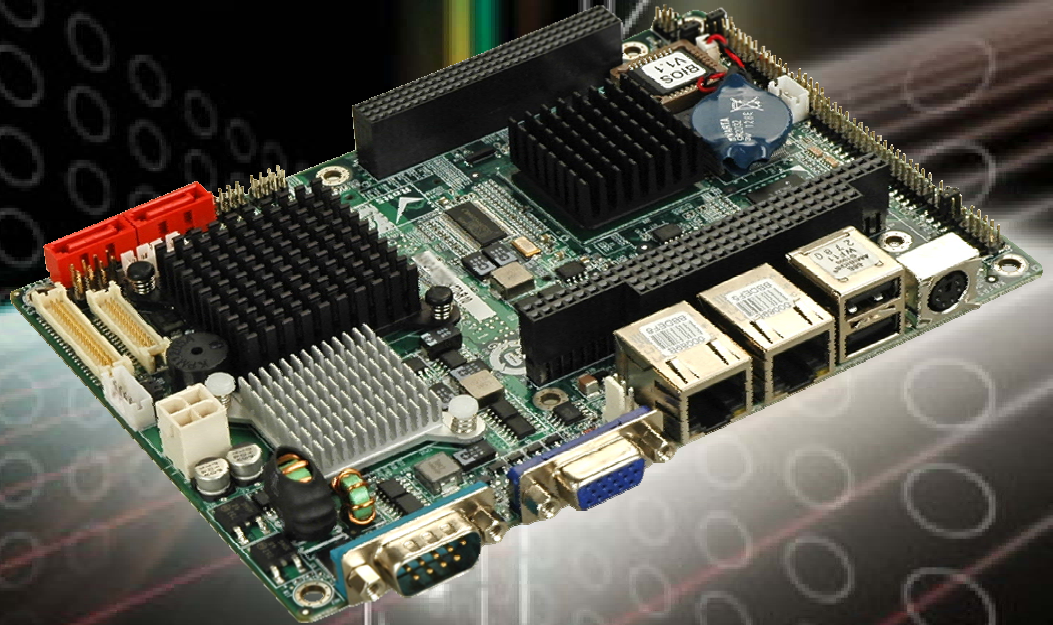**IEI Technology Corp.**

MODEL:

NANO-945GSE2

EPIC Single Board Computer with Intel® Atom™ Processor, VGA/LCD, Dual PCIe GbE, CF type II, SATA, PC/104 Plus

User Manual

Rev. 1.00 – 17 April, 2009

RoHS Lead Free

Revision

Date	Version	Changes
17 April, 2009	1.00	Initial release

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TRADEMARKS

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Chapter

1

Introduction

1.1 Overview
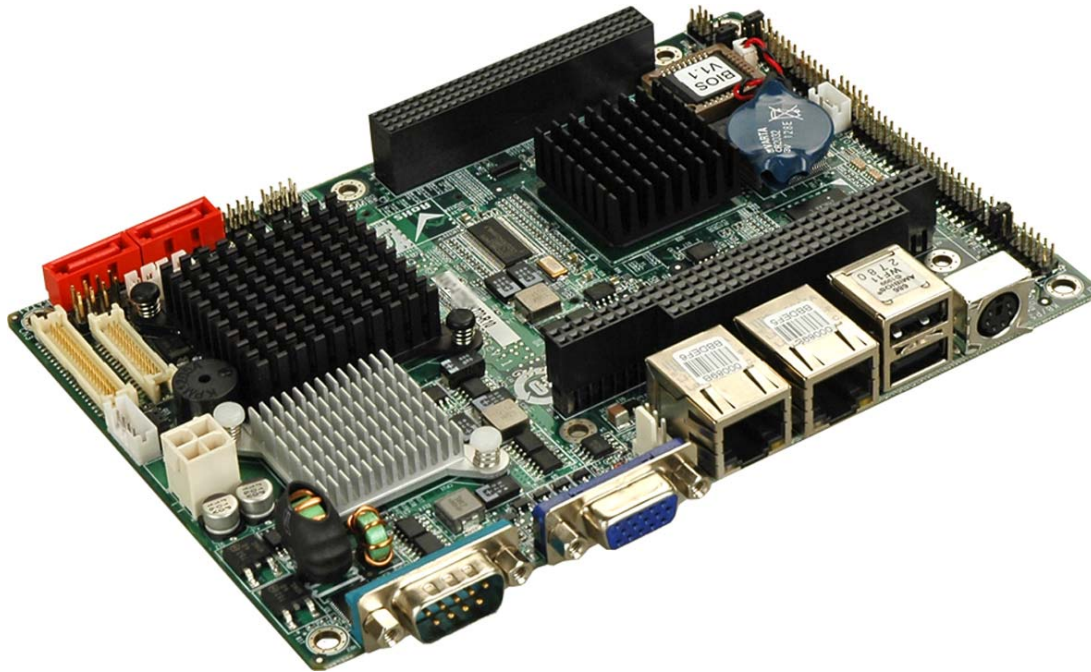
Figure 1-1: NANO-945GSE2

1.1.1 NANO-945GSE2 Introduction

The NANO-945GSE2 EPIC motherboards are embedded 45 nm Intel® Atom™ processor platforms.   The Intel® Atom™ processor N270 embedded on the NANO-945GSE2 has a 1.60 GHz clock speed, a 533 MHz FSB and a 512 KB L2 cache. The NANO-945GSE2 also supports one 200-pin 533 MHz 2.0 GB (max.) DDR2 SDRAM SO-DIMM. The NANO-945GSE2 comes with an 18-bit dual-channel LVDS connector and a 24-bit dual channel TTL connector. Dual display, VGA and LVDS or VGA and TTL, is supported. The NANO-945GSE2 also comes with two PCI Express (PCIe) Gigabit Ethernet (GbE) connectors, and a PC/104 Plus expansion slot.

1.2 NANO-945GSE2 Overview

The NANO-945GSE2 has a wide variety of peripheral interface connectors. **Figure 1-2** is a labeled photo of the peripheral interface connectors on the NANO-945GSE2.
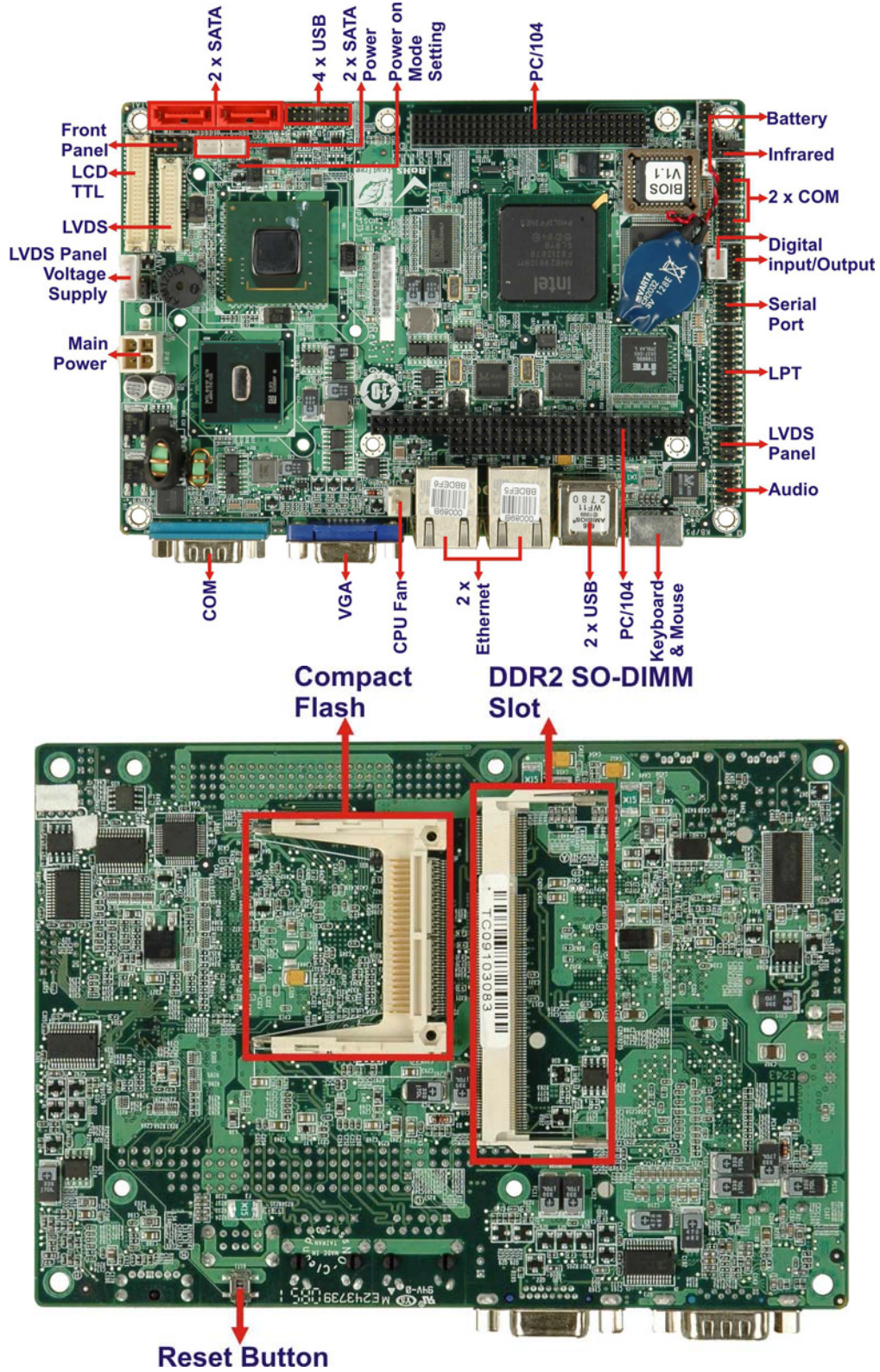
Figure 1-2: NANO-945GSE2 Overview

1.2.1 Dimensions

The dimensions of the board are listed below:

- **Length**:   165 mm
- **Width**:   115 mm
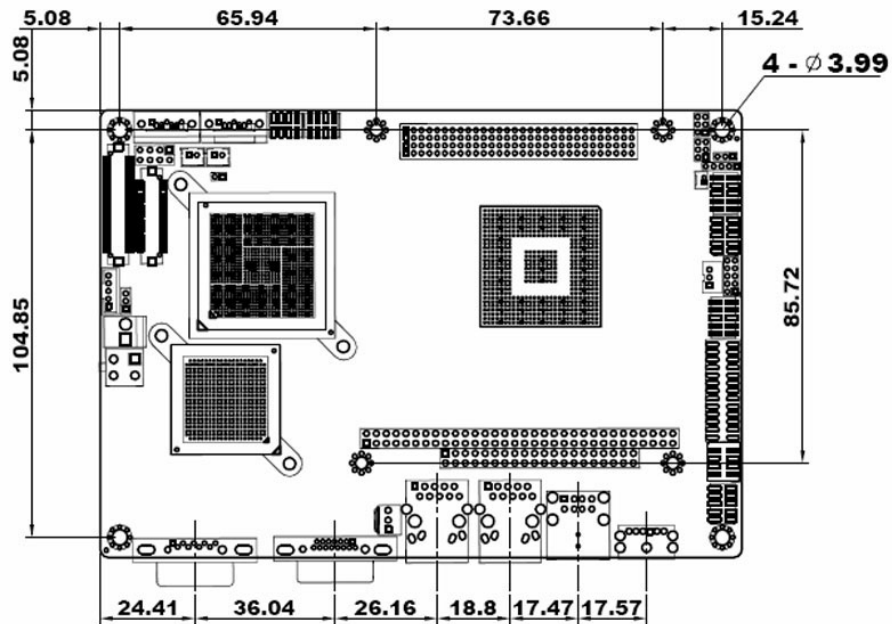
Figure 1-3: NANO-945GSE2 Dimensions (mm)

1.2.2 External Interface Panel Dimensions

External peripheral interface connector panel dimensions are shown in **Figure 1-4**.
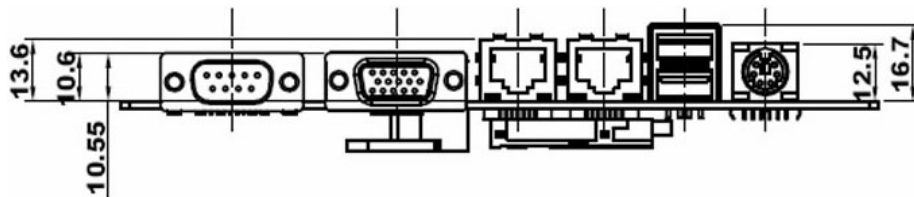
Figure 1-4: External Interface Panel Dimensions (mm)

1.2.3 Data Flow

Figure 1-5 shows the data flow between the two on-board chipsets and other components installed on the motherboard and described in the following sections of this chapter.
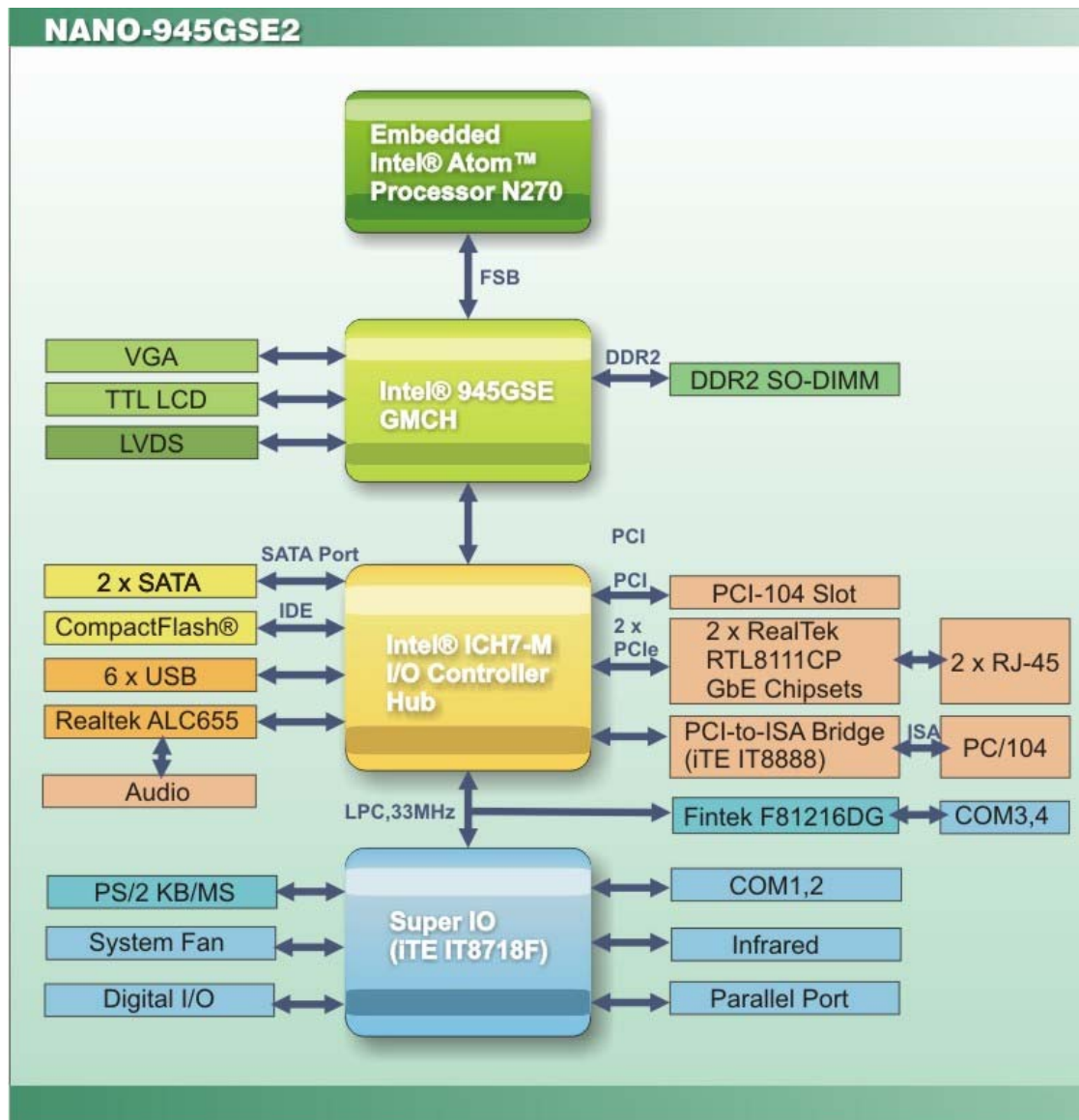
Figure 1-5: Data Flow Block Diagram

1.2.4 Technical Specifications

NANO-945GSE2 technical specifications are listed below.

Specification/Model	NANO-945GSE2
Form Factor	EPIC
CPU Supported	45 nm 1.6 GHz Intel® Atom™ N270
Front Side Bus (FSB)	533 MHz
Northbridge Chipset	Intel® 945GSE
Integrated Graphics	Intel® 945GSE, Intel® Generation 3.5 integrated GFX Core (133Mhz)
Memory	One dual-channel 2.0 GB (max.) 533 MHz DDR2 SDRAM SO-DIMMs (system max. 2.0 GB) supported
Southbridge Chipset	Intel® ICH7M
Audio	Realtek ALC655 AC'97 codec
BIOS	AMI BIOS
Digital I/O	8-bit, 4-bit input/4-bit output
Ethernet Controllers	Two Realtek RTL8111CP GbE controllers
Super I/O Controller	ITE IT8718
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Infrared	One infrared connector through the ITE IT8718
Expansion	
PCI	One PC/104 Plus (PCI-104 and PC/104) slot
I/O Interface Connectors	
Audio Connectors	One audio connector by internal pin header
Display	One VGA One LVDS (internal) One TTL (internal)
Ethernet	Two RJ-45 port

Specification/Model	NANO-945GSE2
Keyboard/Mouse	One PS/2 port
LPT	One internal parallel port connector
Serial Ports	Three RS-232 port (one external, two internal connectors) One RS-232/422/485 (internal)
USB 2.0/1.1 ports	Two external USB ports Four via internal pin headers
Storage	
CompactFlash®	One CompactFlash® Type II socket
Serial ATA	Two independent serial ATA (SATA) channels with 1.5 Gb/s data transfer rates
Environmental and Power Specifications	
Power Supply	AT/ATX supported
Power Consumption	12V @ 1.45 A (1.6 GHz Intel® Atom™ one 1.0 GB DDR2 SO-DIMM)
Temperature (operating)	0ºC ~ 60ºC (32ºF - 140ºF)
Humidity (operating)	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	115mm x 165mm
Weight GW/NW	700g/350g
Table 1-1: Technical Specifications	

Chapter

2

Unpacking

2.1 Anti-static Precautions

⚠️ **WARNING!**

Failure to take ESD precautions during the installation of the NANO-945GSE2 may result in permanent damage to the NANO-945GSE2 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the NANO-945GSE2. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the NANO-945GSE2 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 NANO-945GSE2, place it on an antic-static pad. This reduces the possibility of ESD damaging the NANO-945GSE2.
- **Only handle the edges of the PCB**: When handling the PCB, hold the PCB by the edges.

2.2 Unpacking Precautions

When the NANO-945GSE2 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 NANO-945GSE2 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 any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the NANO-945GSE2 was purchased from or contact an IEI sales representative directly by sending an email to sales@iei.com.tw.

2.3.1 Package Contents

The NANO-945GSE2 is shipped with the following components:

Quantity	Item and Part Number	Image
1	NANO-945GSE2	
2	SATA cable (**P/N**: 32000-062800-RS)	
1	KB/MS PS/2 Y-cable (**P/N**: 32000-000138-RS)	
1	AT 12V Cable (**P/N**: 32100-087100-RS)	
2	RS-232 cable (without bracket) (**P/N**: 32200-000049-RS)	
1	Mini jumper pack (2.0mm) (**P/N**:33100-000033-RS)	

1	Utility CD	
1	Quick Installation Guide	

2.3.2 Optional Items

The following components are optional:

Item and Part Number	Image
Dual USB cable (without bracket) (**P/N**: 32000-070301-RS)	
LPT cable (without bracket) (**P/N**: 32200-015100-RS)	
RS-232 cable (**P/N**: 32200-000049-RS)	
RS-422/485 cable (**P/N**: 32200-833600-RS)	
ATX cable (**P/N**: 32100-043403-RS)	
SATA power cable (**P/N**: 32100-088600-RS)	
SATA 5V power output cable kit for NANO series (**P/N**: 32100-114000-RS)	

Chapter

3

Connector Pinouts

3.1 Peripheral Interface Connectors

Figure 3-1 shows the on-board peripheral connectors, rear panel peripheral connectors and on-board jumpers.
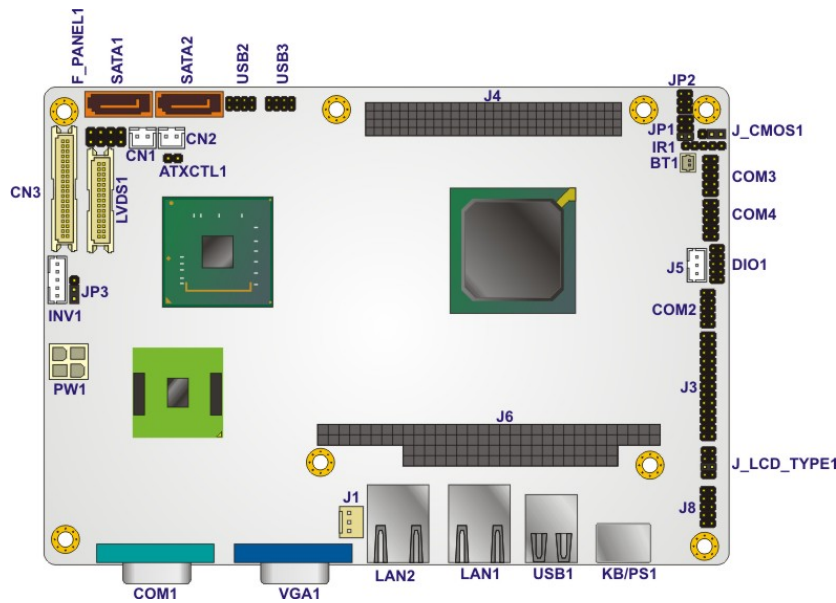
Figure 3-1: Connector and Jumper Locations [Front Side]

Figure 3-2 shows the solder side of the NANO-945GSE2.
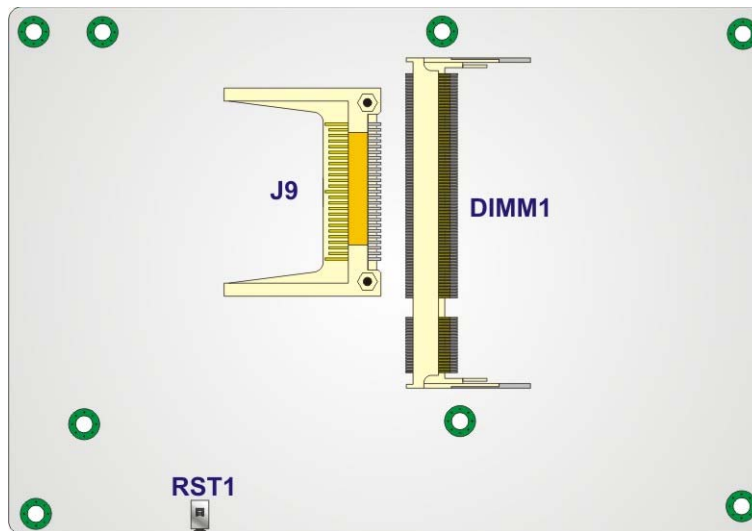
Figure 3-2: Connector and Jumper Locations [Solder Side]

3.2 Peripheral Interface Connectors

Table 3-1 shows a list of the peripheral interface connectors on the NANO-945GSE2. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
+12V power source connector (option)	2-pin?	CN5
5V power connector	3-pin wafer	J5
AT/ATX power input connector	4-pin (2x2)	PW1
Audio connector	9-pin header	J8
Backlight inverter connectors	5-pin wafer	INV1
Battery connector	2-pin wafer	BT1
CompactFlash® socket	50-pin CF socket	J9
DD2 SO-DIMM slot	SO-DIMM socket	DIMM1
Digital input/output (DIO) connector	10-pin header	DIO1
Fan connector	3-pin wafer	J1
Front panel connector	8-pin header	F_PANEL1
Infrared interface (IrDA) connector	5-pin header	IR1
LVDS connector	30-pin crimp	LVDS1
Parallel port connector	26-pin header	J3
PC/104	104-pin ISA bus	J6
PCI-104 slot	120-pin socket	J4
Reset button	2-pin wafer	RST1
Serial ATA (SATA) drive connector	7-pin SATA	SATA1
Serial ATA (SATA) drive connector	7-pin SATA	SATA2
Serial ATA (SATA) power connector	4-pin wafer	CN1
Serial ATA (SATA) power connector	4-pin wafer	CN2
Serial port connector (RS-232)	10-pin header	COM2
Serial port connector (RS-232)	10-pin header	COM4

Serial port connector (RS-232/422/485)	14-pin header	COM3
TTL LCD interface connector	40-pin crimp	CN3
USB 2.0 connector	8-pin header	USB2
USB 2.0 connector	8-pin header	USB3

Table 3-1: Peripheral Interface Connectors

3.2.1 External Interface Panel Connectors

Table 3-2 lists the rear panel connectors on the NANO-945GSE2. Detailed descriptions of these connectors can be found in **Section 3.4** on **page 37**.

Connector	Type	Label
Ethernet connector	RJ-45	LAN1
Ethernet connector	RJ-45	LAN2
Keyboard/mouse	PS/2	KB_MS1
RS-232 serial port connector	Male DB-9	COM1
Dual USB port	USB port	USB1
VGA port connector	15-pin female	VGA1

Table 3-2: Rear Panel Connectors

3.3 Internal Peripheral Connectors

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the NANO-945GSE2.

3.3.1 PS ON and +5V Standby Power Connector

    CN Label: **J5**

    CN Type: 3-pin wafer (1x3)

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

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

The 5V Power Connector provides +5V power output.
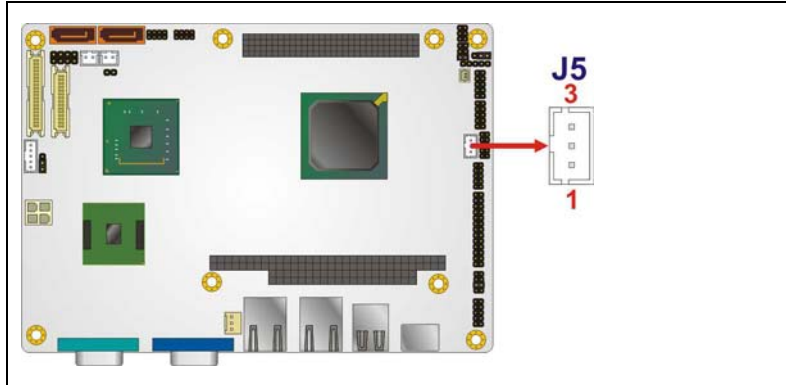
Figure 3-3: PS ON and +5V Standby Power Connector Pinouts

PIN NO.	DESCRIPTION
1	VCC5SBY
2	GND
3	-PS_ON

Table 3-3: PS ON and +5V Standby Power Connector Pinouts

3.3.2 AT/ATX Power Connector

CN Label: PW1

CN Type: 4-pin (2x2) power connector

CN Location: See **Figure 3-4**

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

The 4-pin +12V power connector is connected directly to an AT/ATX power supply.
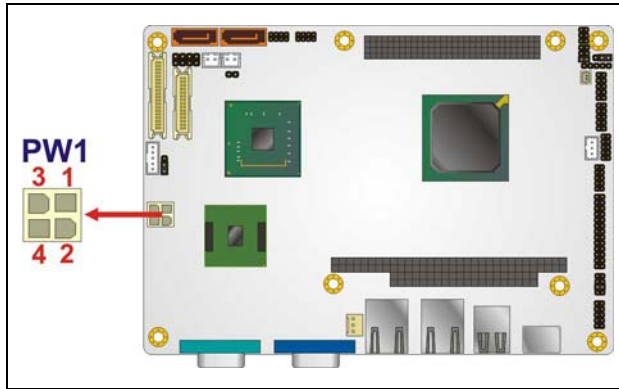
Figure 3-4: AT Power Connector Location

PIN NO.	DESCRIPTION
1	GND
2	GND
3	+12V
4	+12V

Table 3-4: AT Power Connector Pinouts

3.3.3 Audio Connector (9-pin)

CN Label:	**J8**
CN Type:	9-pin header (2x5)
CN Location:	See **Figure 3-5**
CN Pinouts:	See **Table 3-5**

The 9-pin audio connector is connected to external audio devices including speakers and microphones for the input and output of audio signals to and from the system.
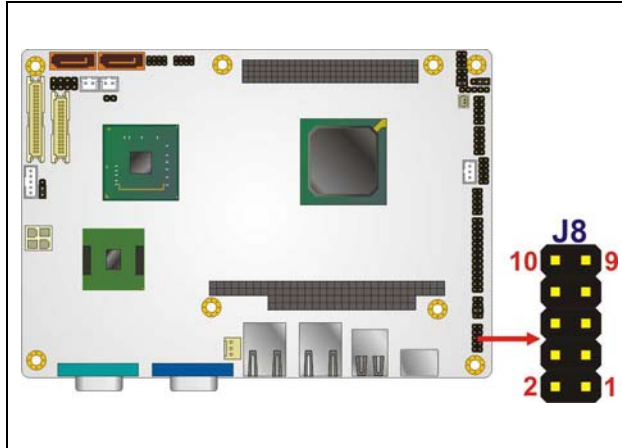
Figure 3-5: Audio Connector Location (9-pin)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LINEOUTR	2	LIR
3	GND	4	GND
5	LINEOUTL	6	LIL
7	GND	8	GND
9	MICIN		

Table 3-5: Audio Connector Pinouts (9-pin)

3.3.4 Backlight Inverter Connector

CN Label:	**INV1**
CN Type:	5-pin wafer (1x5)
CN Location:	See **Figure 3-6**
CN Pinouts:	See **Table 3-6**

The backlight inverter connectors provide the backlights on the LCD display connected to the NANO-945GSE2 with +12V of power.
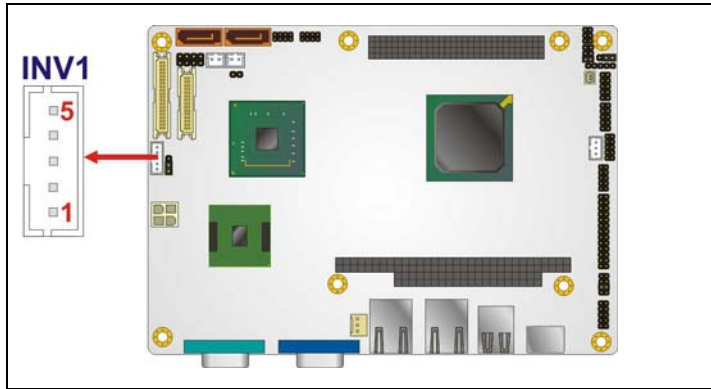
Figure 3-6: Panel Backlight Connector Pinout Locations

PIN NO.	DESCRIPTION
1	LCD Backlight Control
2	GROUND
3	+12V
4	GROUND
5	BACKLIGHT Enable

Table 3-6: Panel Backlight Connector Pinouts

3.3.5 Battery Connector

CN Label:	**BT1**
CN Type:	2-pin wafer (1x2)
CN Location:	See **Figure 3-7**
CN Pinouts:	See **Table 3-7**

The battery connector is connected to a backup battery. The battery connector is also used to reset the CMOS memory if the incorrect BIOS settings have been made and the system cannot boot up.
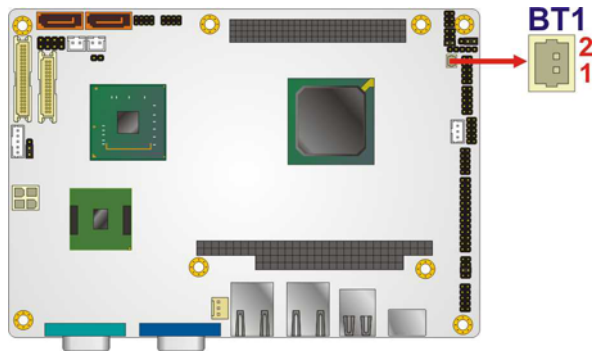
Figure 3-7: Battery Connector Location

PIN NO.	DESCRIPTION
1	Battery+
2	Ground

Table 3-7: Battery Connector Pinouts

3.3.6 CompactFlash® Socket

CN Label: **J9** (solder side)

CN Type: 50-pin header (2x25)

CN Location: See **Figure 3-8**

CN Pinouts: See **Table 3-8**

A CF Type I or Type II memory card is inserted to the CF socket on the solder side of the NANO-945GSE2.
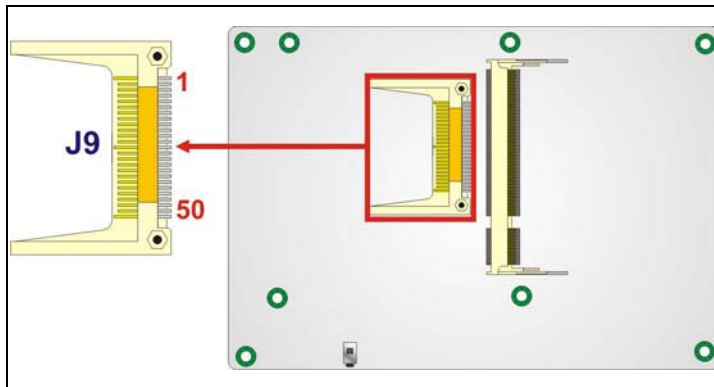
Figure 3-8: CF Card Socket Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	26	VCC-IN CHECK1
2	DATA 3	27	DATA 11
3	DATA 4	28	DATA 12
4	DATA 5	29	DATA 13
5	DATA 6	30	DATA 14
6	DATA 7	31	DATA 15
7	HDC_CS0#	32	HDC_CS1
8	N/C	33	N/C
9	GROUND	34	IOR#
10	N/C	35	IOW#
11	N/C	36	VCC_COM
12	N/C	37	IRQ15
13	VCC_COM	38	VCC_COM
14	N/C	39	CSEL
15	N/C	40	N/C
16	N/C	41	HDD_RESET
17	N/C	42	IORDY
18	SA2	43	SDREQ
19	SA1	44	SDACK#
20	SA0	45	HDD_ACTIVE#
21	DATA 0	46	66DET
22	DATA 1	47	DATA 8
23	DATA 2	48	DATA 9
24	N/C	49	DATA 10
25	VCC-IN CHECK2	50	GROUND

Table 3-8: CF Card Socket Pinouts

3.3.7 Digital Input/Output (DIO) Connector

CN Label:	**DIO1**
CN Type:	10-pin header (2x5)
CN Location:	See **Figure 3-9**
CN Pinouts:	See **Table 3-9**

The digital input/output connector is managed through a Super I/O chip. The DIO connector pins are user programmable.
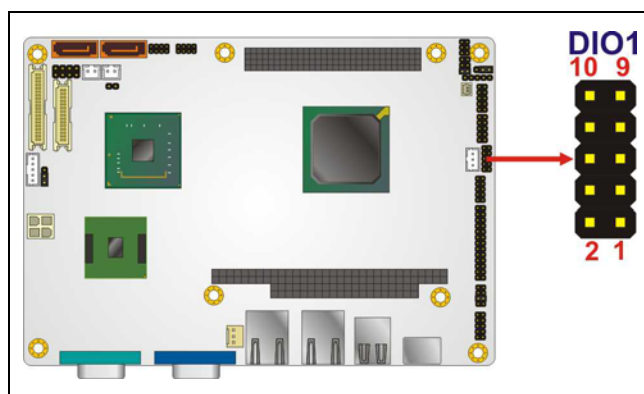
Figure 3-9: DIO Connector Locations

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 3-9: DIO Connector Pinouts

3.3.8 Fan Connector (+12V, 3-pin)

CN Label:	**J1**
CN Type:	3-pin header
CN Location:	See **Figure 3-10**
CN Pinouts:	See **Table 3-10**

The cooling fan connector provides a 12V, 500mA current to the cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.
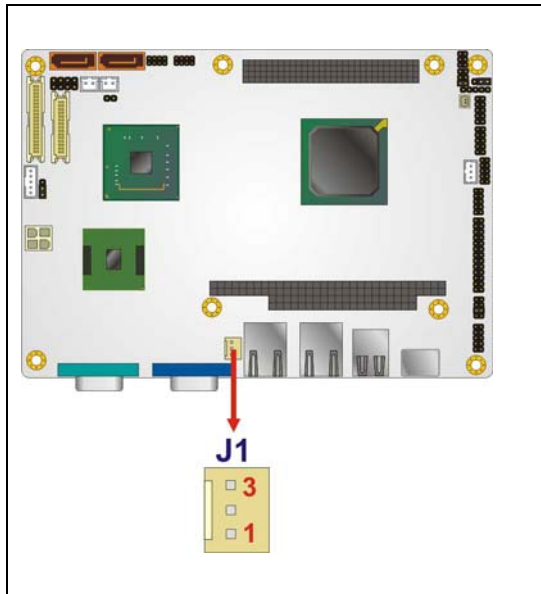
Figure 3-10: +12V Fan Connector Location

PIN NO.	DESCRIPTION
1	Fan Speed Detect
2	+12V
3	GND

Table 3-10: +12V Fan Connector Pinouts

3.3.9 Front Panel Connector (8-pin)

CN Label:	**F_PANEL1**
CN Type:	8-pin header (2x4)
CN Location:	See **Figure 3-11**
CN Pinouts:	See **Table 3-11**

The front panel connector connects to external switches and indicators to monitor and controls the motherboard. These indicators and switches include:

- ▪ Power button
- ▪ Reset
- ▪ Power LED
- ▪ HDD LED
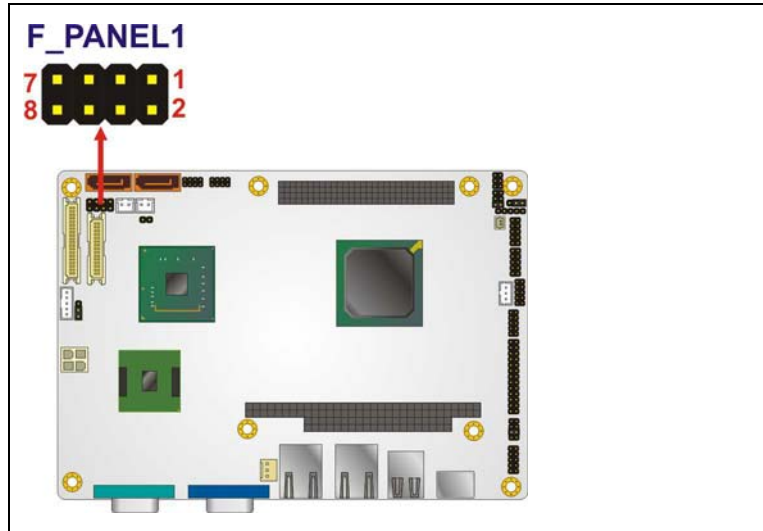
Figure 3-11: Front Panel Connector Pinout Locations (8-pin)

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power Button	1	PWR_BTN	Power LED	2	VCC5
	3	GND		4	GND
HDD LED	5	HDD_LED+	Reset	6	SYSRST-
	7	HDD_LED-		8	GND

Table 3-11: Front Panel Connector Pinouts (8-pin)

3.3.10 Infrared Interface Connector (5-pin)

CN Label: **IR1**

CN Type: 5-pin header (1x5)

CN Location: See **Figure 3-12**

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

The infrared interface connector supports both Serial Infrared (SIR) and Amplitude Shift Key Infrared (ASKIR) interfaces.
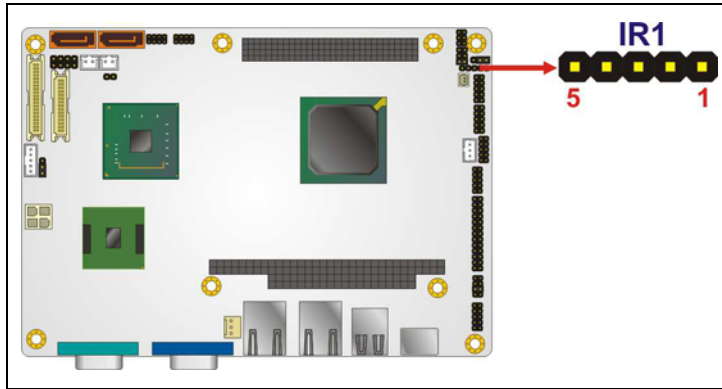
Figure 3-12: Infrared Connector Pinout Locations

PIN NO.	DESCRIPTION
1	VCC
2	NC
3	IR-RX
4	GND
5	IR-TX

Table 3-12: Infrared Connector Pinouts

3.3.11 LVDS LCD Connector

CN Label: **LVDS1**

CN Type: 30-pin crimp (2x15)

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

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

The 30-pin LVDS LCD connectors can be connected to single channel or dual channel, 24-bit or 36-bit LVDS panel.
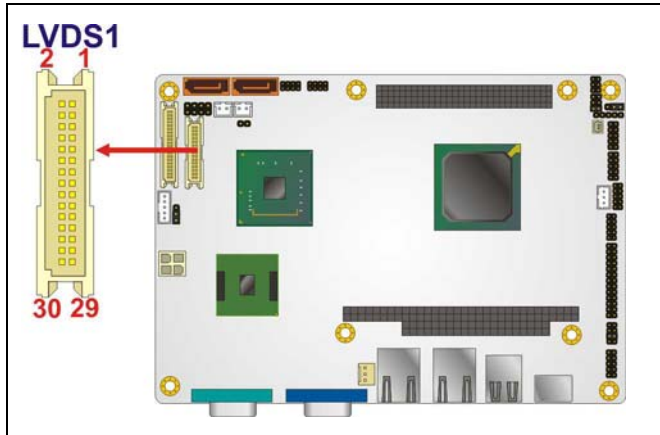
Figure 3-13: LVDS LCD Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND1	2	GND2
3	A_Y0	4	A_Y0#
5	A_Y1	6	A_Y1#
7	A_Y2	8	A_Y2#
9	A_CK	10	A_CK#
11	NC	12	NC
13	GND3	14	GND4
15	B_Y0	16	B_Y0#
17	B_Y1	18	B_Y1#
19	B_Y2	20	B_Y2#
21	B_CK	22	B_CK#
23	NC	24	NC
25	GND5	26	GND6
27	VCC_LCD	28	VCC_LCD
29	VCC_LCD	30	VCC_LCD

Table 3-13: LVDS LCD Port Connector Pinouts

3.3.12 Parallel Port Connector

CN Label:	J3
CN Type:	26-pin header
CN Location:	See **Figure 3-14**
CN Pinouts:	See **Table 3-14**

The 26-pin parallel port connector connects to a parallel port connector interface or some other parallel port device such as a printer.
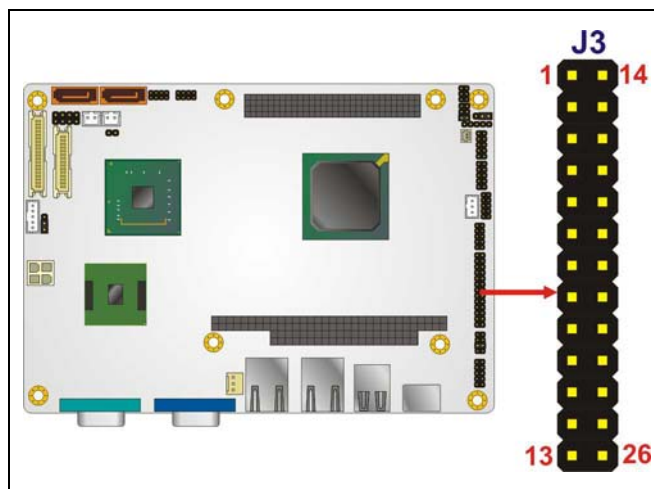
Figure 3-14: Parallel Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	STROBE#	14	AUTO FORM FEED #
2	DATA 0	15	ERROR#
3	DATA 1	16	INITIALIZE
4	DATA 2	17	PRINTER SELECT LN#
5	DATA 3	18	GROUND
6	DATA 4	19	GROUND
7	DATA 5	20	GROUND
8	DATA 6	21	GROUND
9	DATA 7	22	GROUND
10	ACKNOWLEDGE	23	GROUND
11	BUSY	24	GROUND

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
12	PAPER EMPTY	25	GROUND
13	PRINTER SELECT	26	NC

Table 3-14: Parallel Port Connector Pinouts

3.3.13 PCI-104 Slot

CN Label:	**J4**
CN Type:	120-pin PCI-104 slot
CN Location:	See **Figure 3-15**
CN Pinouts:	See **Table 3-15**

The PCI-104 slot enables a PCI-104 compatible expansion module to be connected to the board.   The PCI-104 slot together with the PC/104 slot form a PC/104 Plus slot which enable a PC/104 Plus compatible expansion module to be connected to the board.
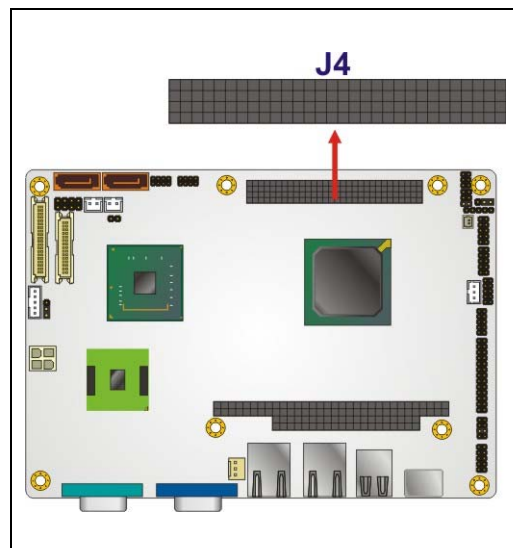
Figure 3-15: PCI-104 Slot Location

Pin No.	Column A	Column B	Column C	Column D
1	GND/5V	TBD1	5V	AD00
2	VI/O1	AD02	AD01	+5V
3	AD05	GND	AD04	AD03

Pin No.	Column A	Column B	Column C	Column D
4	C/BE0#	AD07	GND	AD06
5	GND	AD09	AD08	GND
6	AD11	VI/O2	AD10	M66EN
7	AD14	AD13	GND	AD12
8	+3.3V	C/BE1#	AD15	+3.3V
9	SERR#	GND	SB0#	PAR
10	GND	PERR#	+3.3V	SDONE
11	STOP#	+3.3V	LOCK#	GND
12	+3.3V	TRDY#	GND	DEVSEL#
13	FRAME#	GND	IRDY#	+3.3V
14	GND	AD16	+3.3V	C/BE2#
15	AD18	+3.3V	AD17	GND
16	AD21	AD20	GND	AD19
17	+3.3V	AD23	AD22	+3.3V
18	IDSEL0	GND	IDSEL1	IDSEL2
19	AD24	C/BE3#	VI/O1	IDSEL3
20	GND	AD26	AD25	GND
21	AD29	+5V	AD28	AD27
22	+5V	AD30	GND	AD31
23	REQ0#	GND	REQ1#	VI/O2
24	GND	REQ2#	+5V	GNT0#
25	GNT1#	VI/O3	GNT2#	GND
26	+5V	CLK0	GND	CLK1
27	CLK2	+5V	CLK3	GND
28	GND	INTD#	+5V	RST#
29	+12V	INTA#	INTB#	INTC#
30	-12V	TBD2	TBD	GND/3.3V

Table 3-15: PCI-104 Slot Connector Pinouts

3.3.14 PC/104 Connector

CN Label:	J6
CN Type:	104-pin PC/104 slot
CN Location:	See **Figure 3-16**
CN Pinouts:	See **Table 3-16** and **Table 3-17**

The PC/104 slot enables a PC/104 compatible expansion module to be connected to the board. The PC/104 slot together with the PCI-104 slot form a PC/104 Plus slot which enable a PC/104 Plus compatible expansion module to be connected to the board.
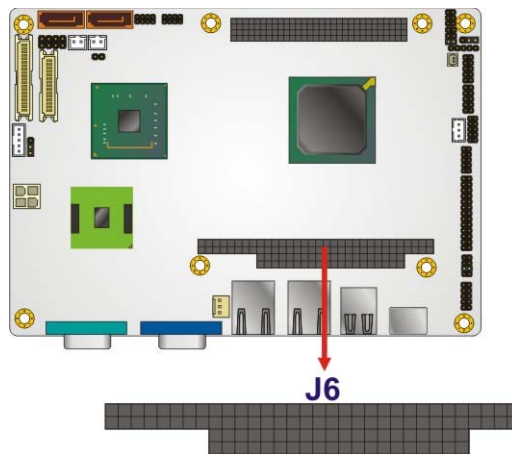
Figure 3-16: PC/104 Connector

PIN	Description	PIN	Description	PIN	Description	PIN	Description
A1	-IOCHK	A17	SA14	B1	GND	B17	-DACK1
A2	SD7	A18	SA13	B2	RSTDRV	B18	DRQ1
A3	SD6	A19	SA12	B3	VCC	B19	-REFRESH
A4	SD5	A20	SA11	B4	IRQ9	B20	BCLK
A5	SD4	A21	SA10	B5	NC	B21	IRQ7
A6	SD3	A22	SA9	B6	DRQ2	B22	IRQ6
A7	SD2	A23	SA8	B7	NC	B23	IRQ5
A8	SD1	A24	SA7	B8	-NOWS	B24	IRQ4
A9	SD0	A25	SA6	B9	+12V	B25	IRQ3
A10	IOCHRDY	A26	SA5	B10	GND	B26	-DACK2

PIN	Description	PIN	Description	PIN	Description	PIN	Description
A11	AEN	A27	SA4	B11	-SMEMW	B27	TC
A12	SA19	A28	SA3	B12	-SMEMR	B28	BALE
A13	SA18	A29	SA2	B13	-IOW	B29	VCC
A14	SA17	A30	SA1	B14	-IOR	B30	ISAOSC
A15	SA16	A31	SA0	B15	-DACK3	B31	GND
A16	SA15	A32	GND	B16	DRQ3	B32	GND

Table 3-16: PC/104 Connector Pinouts (1 of 2)

PIN	Description	PIN	Description	PIN	Description	PIN	Description
C1	GND	C11	-MEMW	D1	GND	D11	-DACK5
C2	-SBHE	C12	SD8	D2	-MEMCS16	D12	DRQ5
C3	SA23	C13	SD9	D3	-IOCS16	D13	-DACK6
C4	SA22	C14	SD10	D4	IRQ10	D14	DRQ6
C5	SA21	C15	SD11	D5	IRQ11	D15	-DACK7
C6	SA20	C16	SD12	D6	IRQ12	D16	DRQ7
C7	SA19	C17	SD13	D7	IRQ15	D17	VCC
C8	SA18	C18	SD14	D8	IRQ14	D18	-MASTER
C9	SA17	C19	SD15	D9	-DACK0	D19	GND
C10	-MEMR	C20	NC	D10	DRQ0	D20	GND

Table 3-17: PC/104 Connector Pinouts (2 of 2)

3.3.15 SATA Drive Connectors

CN Label:	**SATA1**, **SATA2**	
CN Type:	7-pin SATA drive connectors	
CN Location:	See **Figure 3-17**	
CN Pinouts:	See **Table 3-18**	

The four SATA drive connectors are each connected to a first generation SATA drive. First generation SATA drives transfer data at speeds as high as 150Mb/s. The SATA drives can be configured in a RAID configuration.
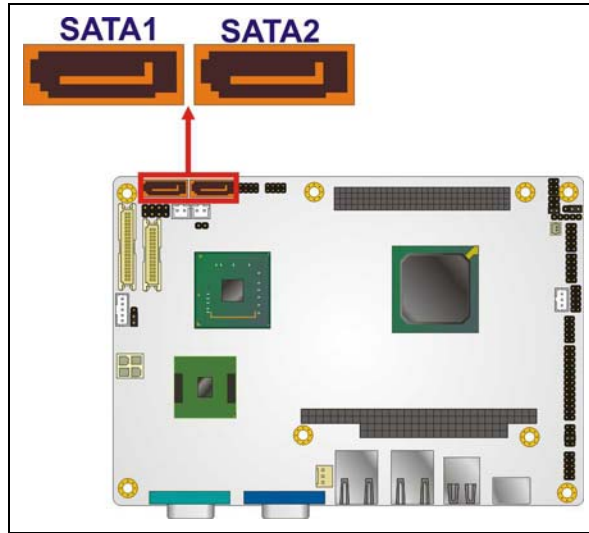
Figure 3-17: SATA Drive Connector Locations

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

Table 3-18: SATA Drive Connector Pinouts

3.3.16 SATA Power Connectors

CN Label:	**CN1 and CN2**
CN Type:	2-pin SATA power connector
CN Location:	See **Figure 3-18**
CN Pinouts:	See **Table 3-19**

Use the SATA Power Connectors to connect to SATA device power connections.
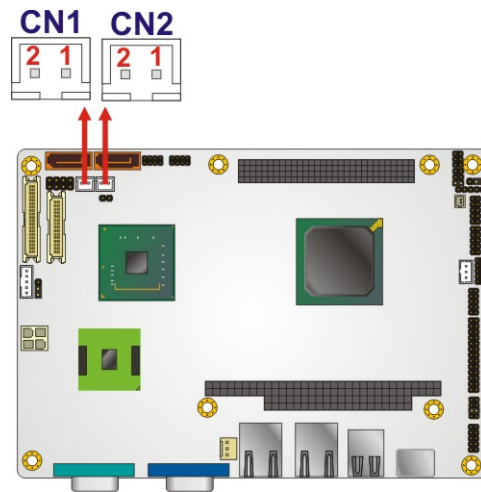
Figure 3-18: SATA Power Connector Locations

Pin No.	Description
1	+5V
2	GND

Table 3-19: SATA Power Connector Pinouts

3.3.17 Serial Port Connectors (RS-232)

CN Label:	**COM2** and **COM4**
CN Type:	10-pin header (2x5)
CN Location:	See **Figure 3-19**
CN Pinouts:	See **Table 3-20**

Two 10-pin serial port connectors provide two RS-232 serial communications channels. The COM serial port connectors can be connected to external RS-232 serial port devices.
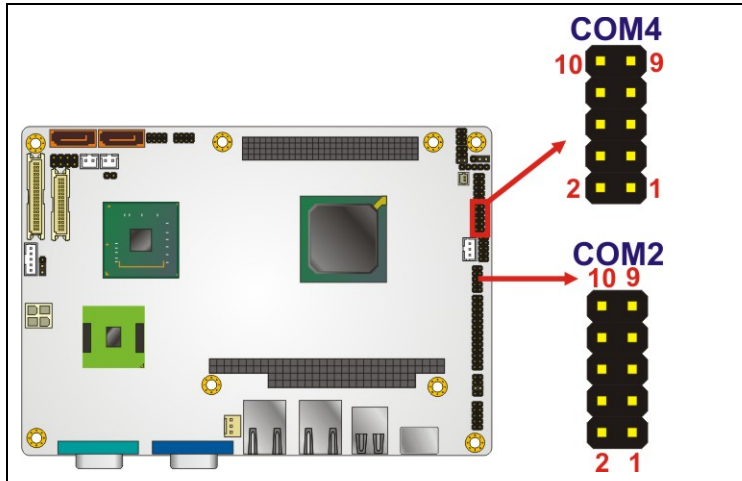
Figure 3-19: COM2 and COM4 Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Data Carrier Direct (DCD)	2	Data Set Ready (DSR)
3	Receive Data (RXD)	4	Request To Send (RTS)
5	Transmit Data (TXD)	6	Clear To Send (CTS)
7	Data Terminal Ready (DTR)	8	Ring Indicator (RI)
9	Ground (GND)	10	N/C

Table 3-20: COM Connector Pinouts

3.3.18 Serial Port Connector (COM3) (RS-232, RS-422 or RS-485)

CN Label:	**COM3**
CN Type:	10-pin header (2x5)
CN Location:	See **Figure 3-20**
CN Pinouts:	See **Table 3-21**

The 10-pin serial port connector connects to a COM3 serial communications channel. COM3 is a multifunction channel. In default mode COM3 is an RS-232 serial communication channel, but can be configured as either an RS-422 or RS-485 serial communications channel with the COM3 function select jumper.
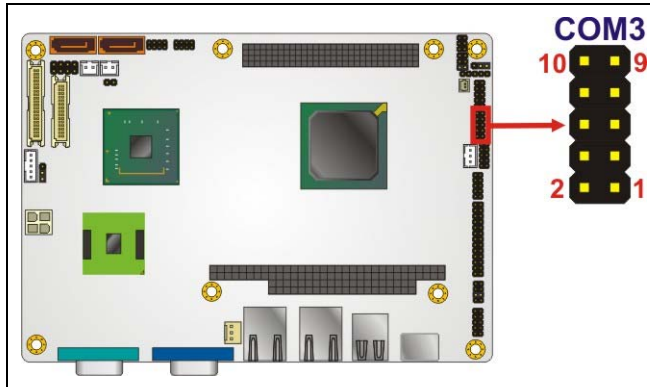
Figure 3-20: COM3 Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DATA CARRIER DETECT (DCD)	2	DATA SET READY (DSR)
3	RECEIVE DATA (RXD)	4	REQUEST TO SEND (RTS)
5	TRANSMIT DATA (TXD)	6	CLEAR TO SEND (CTS)
7	DATA TERMINAL READY (DTR)	8	RING INDICATOR (RI)
9	GND	10	N/C

Table 3-21: COM3 Connector Pinouts

3.3.19 TTL LCD Connector

CN Label:	**CN3**
CN Type:	40-pin crimp (2x20)
CN Location:	See **Figure 3-21**
CN Pinouts:	See **Table 3-22**

The TTL LCD connector can be connected to a LCD screen directly.
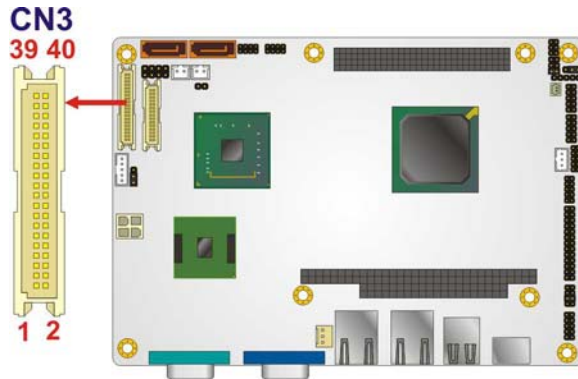
Figure 3-21: LCD TTL Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC_LCD	2	VCC_LCD
3	GND	4	GND
5	VCC_LCD	6	VCC_LCD
7	N/C	8	GND
9	TFT_B0	10	TFT_B1
11	TFT_B2	12	TFT_B3
13	TFT_B4	14	TFT_B5
15	TFT_B6	16	TFT_B7
17	TFT_G0	18	TFT_G1
19	TFT_G2	20	TFT_G3
21	TFT_G4	22	TFT_G5
23	TFT_G6	24	TFT_G7
25	TFT_R0	26	TFT_R1
26	TFT_R2	28	TFT_R3
29	TFT_R4	30	TFT_R5
31	TFT_R6	32	TFT_R7
33	GND	34	GND
35	FPCLK	36	T_VSYNC
37	TFT_EN	38	T_HSYNC
39	N/C	40	L_VDDEN

Table 3-22: TTL LCD Port Connector Pinouts

3.3.20 USB Connectors (Internal)

CN Label:	**USB2** and **USB3**
CN Type:	8-pin header (2x4)
CN Location:	See **Figure 3-22**
CN Pinouts:	See **Table 3-23**

The 2x4 USB pin connectors each provide connectivity to two USB 1.1 or two USB 2.0 ports. Each USB connector can support two USB devices. Additional external USB ports are found on the rear panel. The USB ports are used for I/O bus expansion.
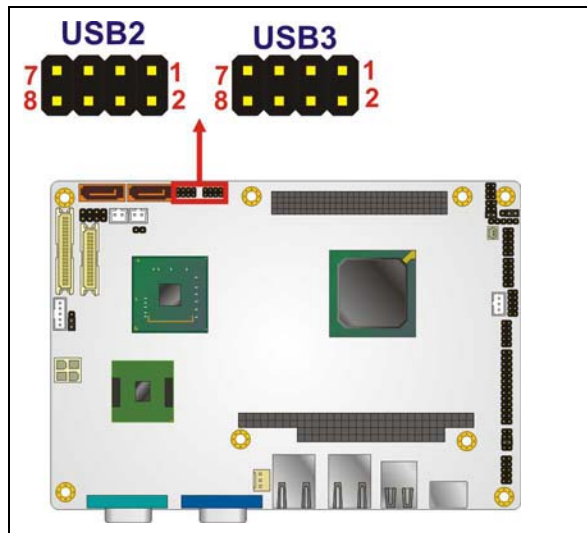
Figure 3-22: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	2	GND
3	DATA-	4	DATA+
5	DATA+	6	DATA-
7	GND	8	VCC

Table 3-23: USB Port Connector Pinouts

3.4 External Peripheral Interface Connector Panel

Figure 3-23 shows the NANO-945GSE2 external peripheral interface connector (EPIC) panel. The NANO-945GSE2 EPIC panel consists of the following:

- ▪ 1 x Keyboard/mouse connector

- ▪ 2 x LAN connectors

- ▪ 1 x Serial port connector

- ▪ 1 x VGA connector

- ▪ 2 x USB connectors
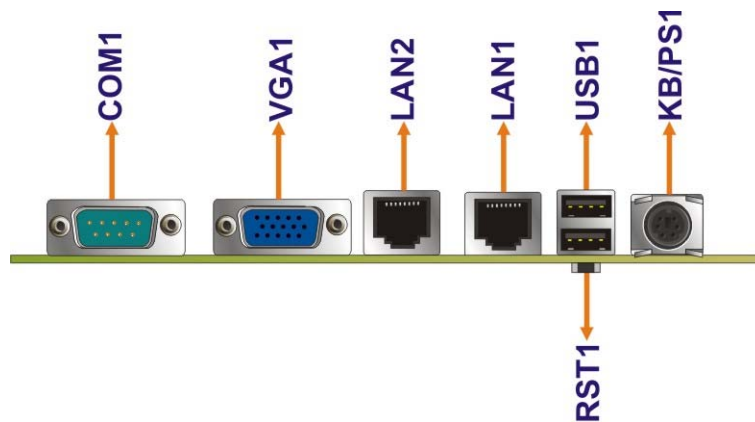
Figure 3-23: NANO-945GSE2 External Peripheral Interface Connector

3.4.1 Keyboard/Mouse Connector

CN Label: **KB/PS1**

CN Type: PS/2

CN Location: See **Figure 3-23** (labeled 1)

CN Pinouts: See **Figure 3-24, Table 3-24**

The NANO-945GSE2 keyboard and mouse connector is a standard PS/2 connector.
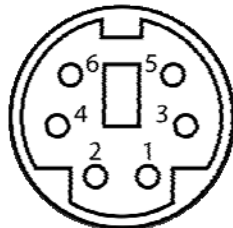
Figure 3-24: PS/2 Pinout and Configuration

PIN	DESCRIPTION
1	KB DATA
2	MS DATA
3	GND
4	VCC
5	KB CLOCK
6	MS CLOCK

Table 3-24: Keyboard Connector Pinouts

3.4.2 LAN Connectors

CN Label: **LAN1** and **LAN2**

CN Type: RJ-45

CN Location: See **Figure 3-23**

CN Pinouts: See **Table 3-25**

The NANO-945GSE2 is equipped with two RJ-45 Ethernet controllers. The controllers connect to the LAN through two RJ-45 LAN connectors. The pin assignments are listed below.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	MDIA3-	5	MDIA1+
2	MDIA3+	6	MDIA2+
3	MDIA2-	7	MDIA0-
4	MDIA1-	8	MDIA0+

Table 3-25: LAN Pinouts
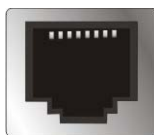
Figure 3-25: RJ-45 Ethernet Connector

3.4.3 Reset Button

The reset button enables users to reboot the system when the system is turned on.
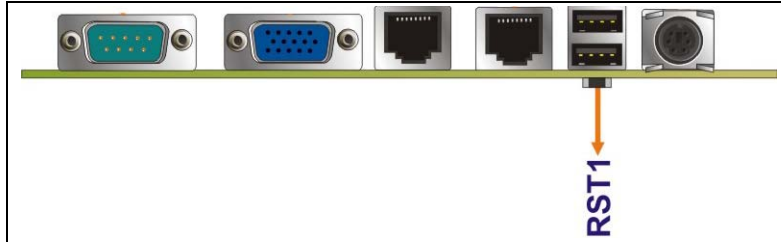
Figure 3-26: Reset Button Location

3.4.4 Serial Port Connector (COM1)

CN Label: **COM1**

CN Type: DB-9 connectors

CN Location: See **Figure 3-23** (see 2)

CN Pinouts: See **Table 3-26** and **Figure 3-27**

The 9-pin DB-9 serial port connectors are connected to RS-232 serial communications devices.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	6	DSR
2	RX	7	RTS
3	TX	8	CTS
4	DTR	9	RI
5	GND		

Table 3-26: RS-232 Serial Port (COM 1) Pinouts
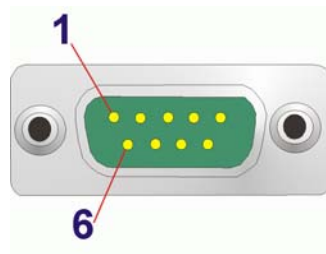
Figure 3-27: COM1 Pinout Locations

3.4.5 USB Connectors

CN Label:	**USB1**
CN Type:	Dual USB port
CN Location:	See **Figure 3-23**
CN Pinouts:	See **Table 3-27**

The NANO-945GSE2 has two external USB 2.0 ports. The ports connect to both USB 2.0 and USB 1.1 devices.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VCC	5	VCC
2	DATA-	6	DATA-
3	DATA+	7	DATA+
4	GND	8	GND

Table 3-27: USB Port Pinouts

3.4.6 VGA Connector

CN Label:	**VGA1**
CN Type:	15-pin Female
CN Location:	See **Figure 3-23**
CN Pinouts:	See **Figure 3-28** and **Table 3-28**

The NANO-945GSE2 has a single 15-pin female connector for connectivity to standard display devices.
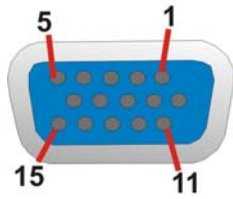
Figure 3-28: VGA Connector

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RED	2	GREEN
3	BLUE	4	NC
5	GND	6	CRT_PLUG-
7	GND	8	GND
9	VCC	10	GND
11	NC	12	DDC DAT
13	HSYNC	14	VSYNC
15	DDCCLK		

Table 3-28: VGA Connector Pinouts

Chapter

4

Installation

4.1 Anti-static Precautions

 WARNING:

Failure to take ESD precautions during the installation of the NANO-945GSE2 may result in permanent damage to the NANO-945GSE2 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the NANO-945GSE2. Dry climates are especially susceptible to ESD. It is therefore critical to strictly adhere to the following anti-static precautions whenever the NANO-945GSE2, or any other electrical component, is handled.

- § *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 NANO-945GSE2, place it on an antic-static pad. This reduces the possibility of ESD damaging the NANO-945GSE2.
- § *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 NANO-945GSE2 is installed. All installation notices pertaining to its installation should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the NANO-945GSE2 and injury to the person installing it.

4.2.1 Installation Notices

 WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the NANO-945GSE2, NANO-945GSE2 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 NANO-945GSE2 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 NANO-945GSE2 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 NANO-945GSE2 off:

o When working with the NANO-945GSE2, 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 NANO-945GSE2 **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.

4.3 SO-DIMM Installation

> **WARNING:**
>
> Using incorrectly specified SO-DIMM may cause permanently damage the NANO-945GSE2. Please make sure the purchased SO-DIMM complies with the memory specifications of the NANO-945GSE2. SO-DIMM specifications compliant with the NANO-945GSE2 are listed in **Chapter 2**.

To install a SO-DIMM into a SO-DIMM socket, please follow the steps below and refer to **Figure 4-1**.
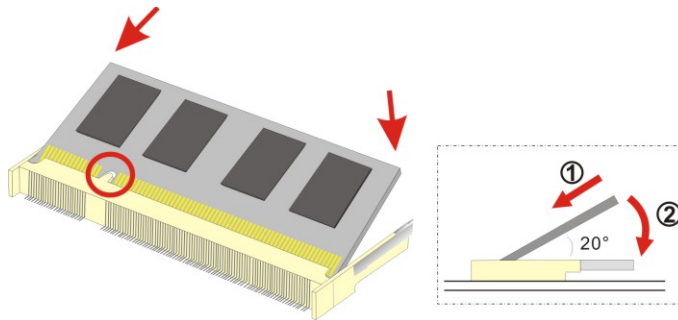
Figure 4-1: SO-DIMM Installation

Step 1: **Locate the SO-DIMM socket**. Place the NANO-945GSE2 on an anti-static pad with the solder side facing up.

Step 2: **Align the SO-DIMM with the socket**. The SO-DIMM must be oriented in such a way that the notch in the middle of the SO-DIMM must be aligned with the plastic bridge in the socket.

Step 3: **Insert the SO-DIMM**. Push the SO-DIMM chip into the socket at an angle. (See **Figure 4-1**)

Step 4: **Open the SO-DIMM socket arms**. Gently pull the arms of the SO-DIMM socket out and push the rear of the SO-DIMM down. (See **Figure 4-1**)

Step 5: **Secure the SO-DIMM**. Release the arms on the SO-DIMM socket. They clip into place and secure the SO-DIMM in the socket.

4.4 CF Card Installation

![NOTE icon] **NOTE:**

The NANO-945GSE2 can support both CF Type I and II cards.

To install a CF card onto the NANO-945GSE2, please follow the steps below:

Step 1: **Locate the CF card socket**. Place the NANO-945GSE2 on an anti-static pad with the solder side facing up. Locate the CF card socket.

Step 2: **Align the CF card**. Make sure the CF card is properly aligned with the CF socket.

Step 3: **Insert the CF card**. Gently insert the CF card into the socket making sure the socket pins are properly inserted into the socket. See **Figure 4-2**.
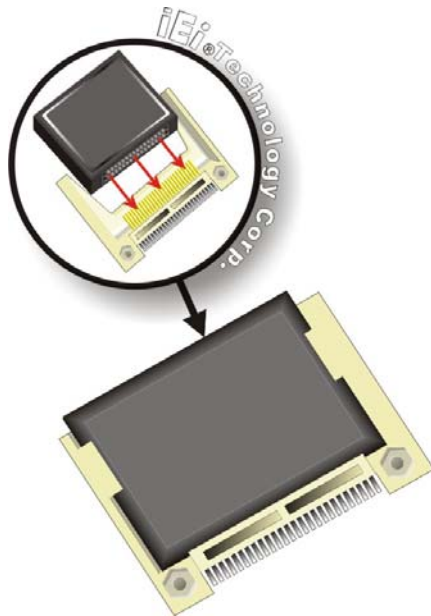
Figure 4-2: CF Card Installation

4.5 Jumper Settings

NOTE:

A jumper is a metal bridge used to close an electrical circuit. It consists of two or three metal pins and a small metal clip (often 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.
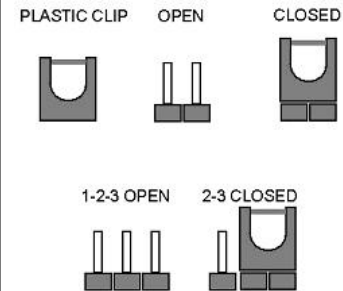
Before the NANO-945GSE2 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the NANO-945GSE2 are listed in **Table 4-1**.

Description	Label	Type
AT power mode setting	ATXCTL1	2-pin header
Clear CMOS	J_CMOS1	3-pin header
COM3 RS-232/422/485 mode setting	JP1	6-pin header
COM3 RS-422/485 mode setting	JP2	6-pin header
LVDS1 panel resolution	J_LCD_TYPE1	8-pin header
LVDS1 voltage select	JP3	3-pin header

Table 4-1: Jumpers

4.5.1 AT Power Select Jumper Settings

NOTE:

The AT Power Select Jumper is the same as the ATX Enable connector.

Jumper Label:	ATXCTL1
Jumper Type:	2-pin header
Jumper Settings:	See **Table 4-2**
Jumper Location:	See **Figure 4-3**

The AT Power Select jumper specifies the system's power mode as AT or ATX. Use a jumper cap to short pins 1 and 2 to enable the AT Power mode. In the ATX mode use the PS_ON- and 5VSB cable. AT Power Select jumper settings are shown in **Table 4-2**.

AT Power Select	Description	
Short 1 – 2	Use AT power	Default
Open	Use ATX power	

Table 4-2: AT Power Select Jumper Settings

The location of the AT Power Select jumper is shown in **Figure 4-3** below.
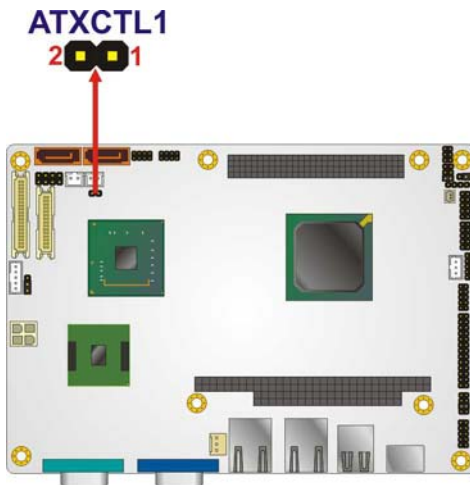
Figure 4-3: AT Power Select Jumper Location

4.5.2 Clear CMOS Jumper

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

If the NANO-945GSE2 fails to boot due to improper BIOS settings, the clear CMOS jumper clears the CMOS data and resets the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

If the "CMOS Settings Wrong" message is displayed during the boot up process, the fault may be corrected by pressing the F1 to enter the CMOS Setup menu. Do one of the following:

- Enter the correct CMOS setting
- Load Optimal Defaults
- Load Failsafe Defaults.

After having done one of the above, save the changes and exit the CMOS Setup menu. The clear CMOS jumper settings are shown in **Table 4-3**.

AT Power Select	Description	
Short 1 - 2	Keep CMOS Setup	Default
Short 2 - 3	Clear CMOS Setup	

Table 4-3: Clear CMOS Jumper Settings

The location of the clear CMOS jumper is shown in **Figure 4-4** below.
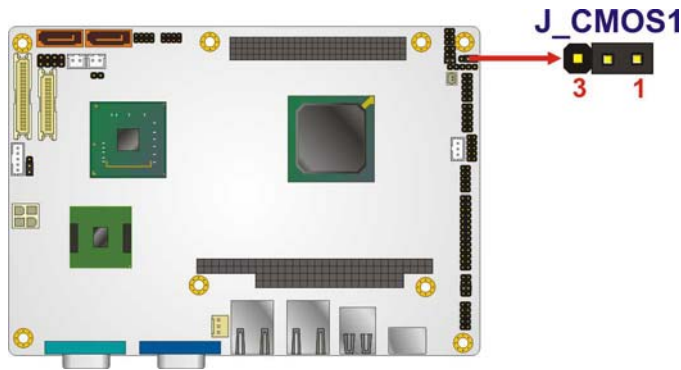
Figure 4-4: Clear CMOS Jumper

4.5.3 COM3 Function Select Jumper

Jumper Label:	**JP1**
Jumper Type:	6-pin header
Jumper Settings:	See **Table 4-4**
Jumper Location:	See **Figure 4-5**

The COM2 Function Select jumper sets the communication protocol used by the second serial communications port (COM3) as RS-232, RS-422 or RS-485. The COM 2 Function Select settings are shown in **Table 4-4**.

COM 2 Function Select	Description	
Short 1-2	RS-232	Default
Short 3-4	RS-422	
Short 5-6	RS-485	

Table 4-4: COM 2 Function Select Jumper Settings

The COM 2 Function Select jumper location is shown in **Figure 4-5**.
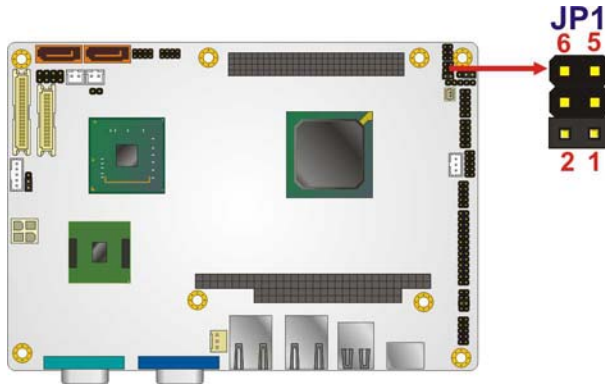
Figure 4-5: COM 2 Function Select Jumper Location

4.5.4 LVDS1 Panel Resolution Jumper

Jumper Label:	**J_LCD_TYPE1**
Jumper Type:	8-pin header
Jumper Settings:	See **Table 4-5**
Jumper Location:	See **Figure 4-6**

The LVDS1 Panel Resolution jumper allows the resolution of the LVDS screens connected to the LVDS1 connector to be configured. The LVDS1 Panel Resolution jumper settings are shown in **Table 4-5**.

DESCRIPTION (LVDS1)				
Pin 1-2	Pin 3-4	Pin 5-6	Pin 7-8	Resolution
OPEN	OPEN	OPEN	OPEN	640 x 480 (18-bit)
SHORT	OPEN	OPEN	OPEN	800 x 480 (18-bit)
OPEN	SHORT	OPEN	OPEN	800 x 600 (18-bit) Default
SHORT	SHORT	OPEN	OPEN	1024 x 768 (18-bit)
OPEN	OPEN	SHORT	OPEN	1280 x 1024 (36-bit)
SHORT	OPEN	SHORT	OPEN	1400 x 1050 (36-bit)
OPEN	SHORT	SHORT	OPEN	1400 x 900 (36-bit)
SHORT	SHORT	SHORT	OPEN	1400 x 1200 (36-bit)

Table 4-5: LVDS Panel Resolution Jumper Settings

The LVDS Panel Resolution jumper location is shown in **Figure 4-6**.
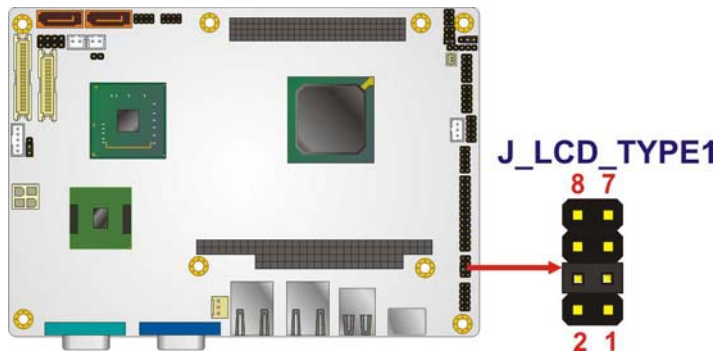
Figure 4-6:LVDS Panel Resolution Jumper Pinout Locations

4.5.5 LVDS Voltage Selection

⚠ **WARNING:**

Permanent damage to the screen and NANO-945GSE2 may occur if the wrong voltage is selected with this jumper. Please refer to the user guide that cam with the monitor to select the correct voltage.

Jumper Label:	**JP3**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 4-6**
Jumper Location:	See **Figure 4-7**

The **LVDS Voltage Selection** jumpers allow the LVDS screen voltages to be set. J_VLVDS1 sets the voltage connected to LVDS1. The **LVDS Voltage Selection** jumper settings are shown in **Table 4-6**.

LCD Voltage Select	Description	
Short 1-2	+3.3V LVDS	
Short 2-3	+5V LVDS	Default

Table 4-6: LVDS Voltage Selection Jumper Settings

The LVDS Voltage Selection jumper location is shown in **Figure 4-7**.
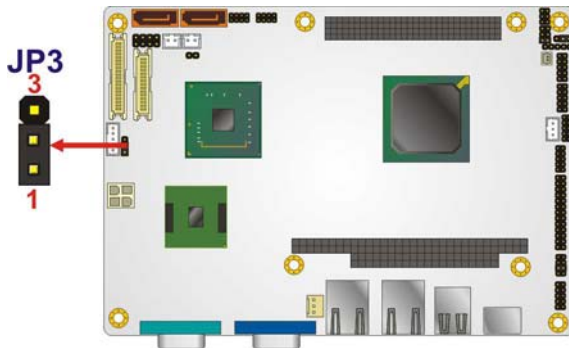
Figure 4-7: LVDS Voltage Selection Jumper Pinout Locations

4.5.6 COM3 RS-422/485 mode selection

Jumper Label:	JP2
Jumper Type:	6-pin header
Jumper Settings:	See **Table 4-7**
Jumper Location:	See **Figure 4-8**

The **COM3 RS-422/485** mode selection jumper allows the COM3 RS-422/485 mode to be set. The **COM3 RS-422/485** jumper settings are shown in **Table 4-7**.

Pin No.	Description	Pin No.	
1	TX_422-	2	RX_422-
3	TX_422+	4	RX_422+
5	D_485+	6	D_485-

Table 4-7: COM3 RS-422/485

The COM3 RS-422/485 mode select jumper location is shown in **Figure 4-8**.
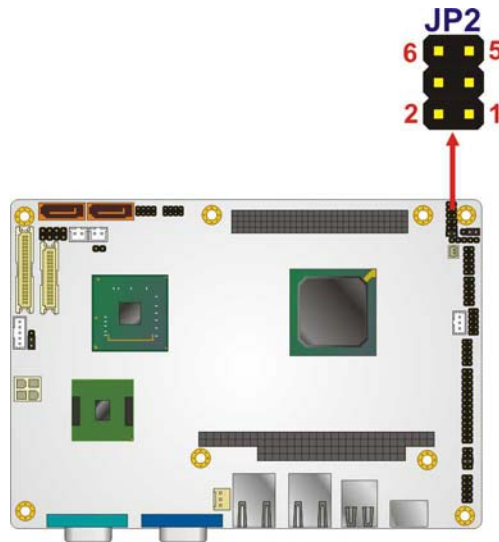
Figure 4-8:COM2 Function Select Jumper Location

4.6 Chassis Installation

4.6.1 Airflow

![warning] **WARNING:**

Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the NANO-945GSE2 must have air vents to allow cool air to move into the system and hot air to move out.

The NANO-945GSE2 must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

![note] **NOTE:**

IEI has a wide range of backplanes available. Please contact your NANO-945GSE2 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.

4.6.2 Motherboard Installation

To install the NANO-945GSE2 motherboard into the chassis please refer to the reference material that came with the chassis.

4.7 Internal Peripheral Device Connections

The cables listed in are shipped with the NANO-945GSE2.

Quantity	Type
1	AT Power cable
1	Keyboard and Mouse cable
1	RS-232 cable
2	SATA drive cable

Table 4-8: IEI Provided Cables

Some optional items that can be purchased separately and installed on the NANO-945GSE2 include:

- ATX power cable
- Dual port USB cable
- Parallel port cable
- RS-232 cable
- RS-422/485 cable
- SATA 5V power output cable kit for NANO series
- SATA power cable

4.7.1 AT Power Connection

Follow the instructions below to connect the NANO-945GSE2 to an AT power supply.

⚡ **WARNING:**

Disconnect the power supply power cord from its AC power source to prevent a sudden power surge to the NANO-945GSE2.

Step 1: **Locate the power cable**. The power cable is shown in the packing list in **Chapter 3**.

Step 2: **Connect the Power Cable to the Motherboard**. Connect the 4-pin (2x2) Molex type power cable connector to the AT power connector on the motherboard. See **Figure 4-9**.
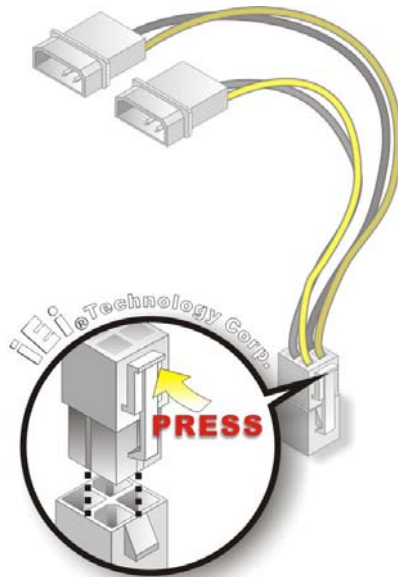
Figure 4-9: Power Cable to Motherboard Connection

Step 3: **Connect Power Cable to Power Supply**. Connect one of the 4-pin (1x4) Molex type power cable connectors to an AT power supply. See **Figure 4-10**.
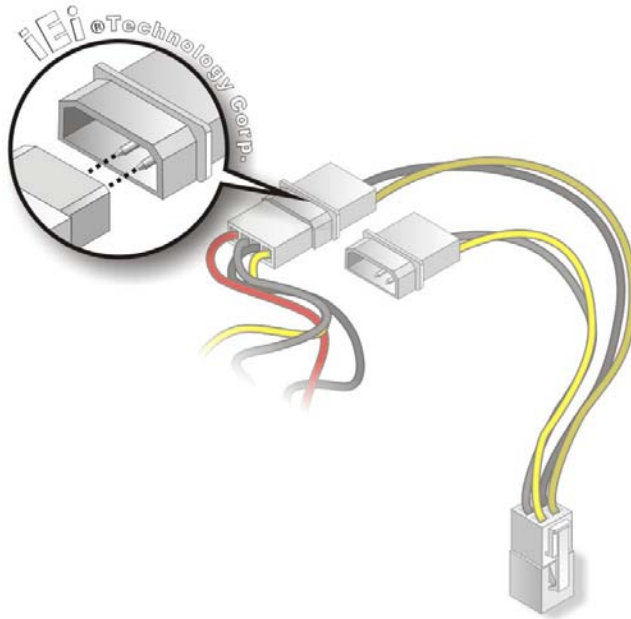
Figure 4-10: Connect Power Cable to Power Supply

4.7.2 PC/104-Plus Card Installation

To install a PC/104-Plus card, please refer to the diagram and instructions below.
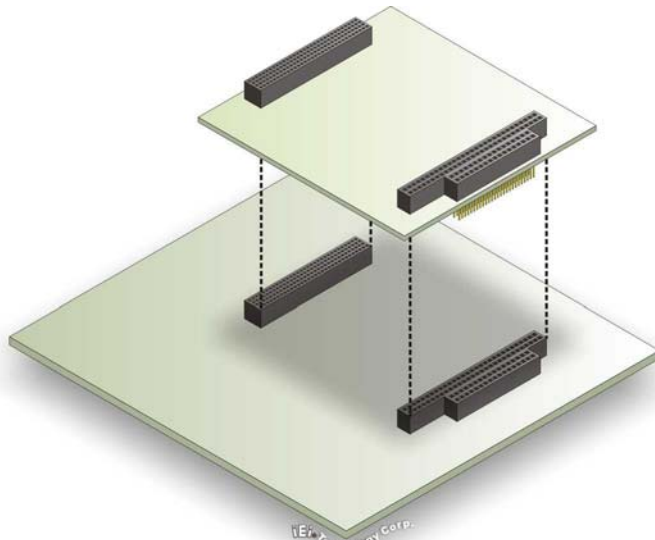
Figure 4-11: PC/104-Plus Card Installation

Step 1: **Align the connectors**. Make sure that the connectors are lined up correctly.

The connectors should match up with the slot of the same shape.

Step 2: **Push straight down until the card is properly seated.** Push the card straight

downwards to connect. Use a firm pushing action to connect. When the cards

are connected properly there will be no gaps between the baseboard connectors

and the card connectors.

4.7.3 SATA Drive Connection

The NANO-945GSE2 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 onboard SATA drive

connector. See **Figure 4-12**.
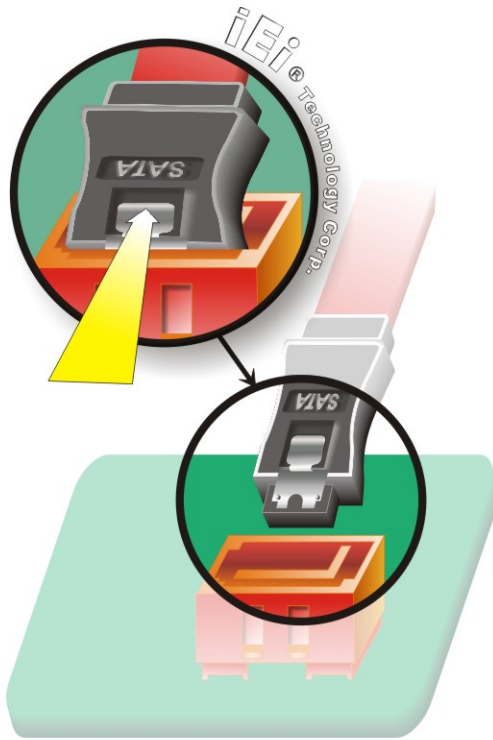
Figure 4-12: SATA Drive Cable Connection

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 4-13**.

Step 4: **Connect the SATA power cable**. Connect the SATA power connector to the
back of the SATA drive. See **Figure 4-13**.

Figure 4-13: SATA Power Drive Connection

4.7.4 Single RS-232 Cable (w/o Bracket)

The single RS-232 cable consists of one serial port connector attached to a serial communications cable that is then attached to a D-sub 9 male connector. To install the single RS-232 cable, please follow the steps below.

Step 1: Locate the connector. The location of the RS-232 connector is shown in **Chapter 4**.

Step 2: Align the connectors. Correctly align pin 1 on the cable connector with pin 1 on the NANO-945GSE2 serial port connector.

Step 3: Insert the cable connectors Once the cable connector is properly aligned with the serial port connector on the NANO-945GSE2, connect the cable connector to the on-board connector. See **Figure 4-14**.
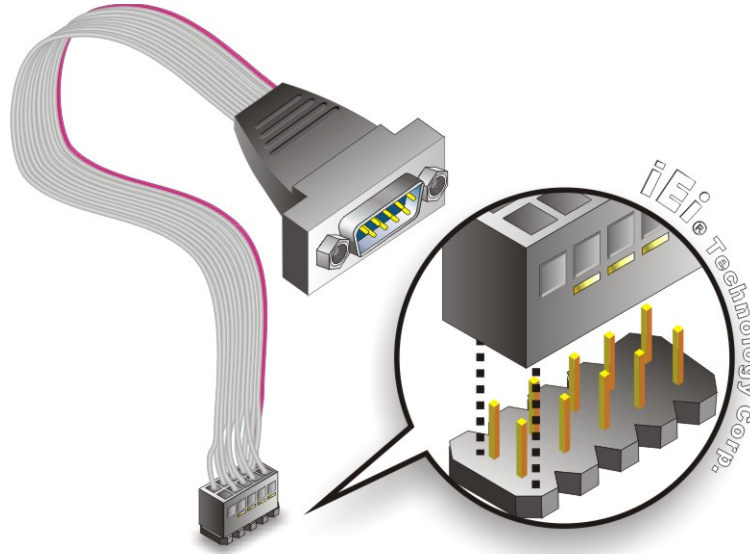
Figure 4-14: Single RS-232 Cable Installation

Step 4: **Secure the bracket**. The single RS-232 connector has two retention screws that must be secured to a chassis or bracket.

Step 5: **Connect the serial device**. Once the single RS-232 connector is connected to a chassis or bracket, a serial communications device can be connected to the system.

4.7.5 USB Cable (Dual Port without Bracket)

The NANO-945GSE2 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 NANO-945GSE2 USB connector.

Step 3: **Insert the cable connectors**. Once the cable connectors are properly aligned with the USB connectors on the NANO-945GSE2, connect the cable connectors to the on-board connectors. See **Figure 4-15**.
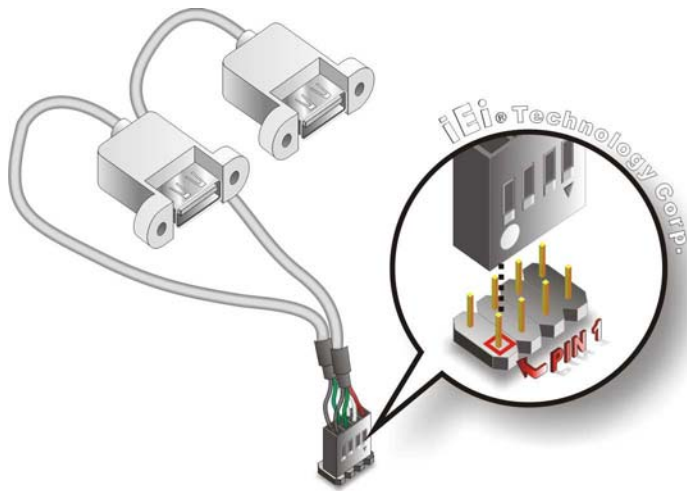
Figure 4-15: Dual USB Cable Connection

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.

4.7.6 Parallel Port Cable without Bracket

The optional parallel port (LPT) cable respectively connects the on-board LPT 26-pin box header to an external LPT device (like a printer). The cable comprises a 26-pin female header, to be connected to the on-board LPT box-header, on one side and on the other side a standard external LPT connector. To connect the LPT cable, please follow the steps below.

Step 1: **Locate the connector**. The LPT connector location is shown in **Chapter 4**.

Step 2: **Align the connectors**. Correctly align pin 1 on the cable connector with pin 1 on the NANO-945GSE2 LPT box-header connector. See **Figure 4-16**.

Step 3: **Insert the cable connectors** Once the cable connector is properly aligned with the 26-pin box-header connector on the NANO-945GSE2, connect the cable connector to the on-board connector. See **Figure 4-16.**
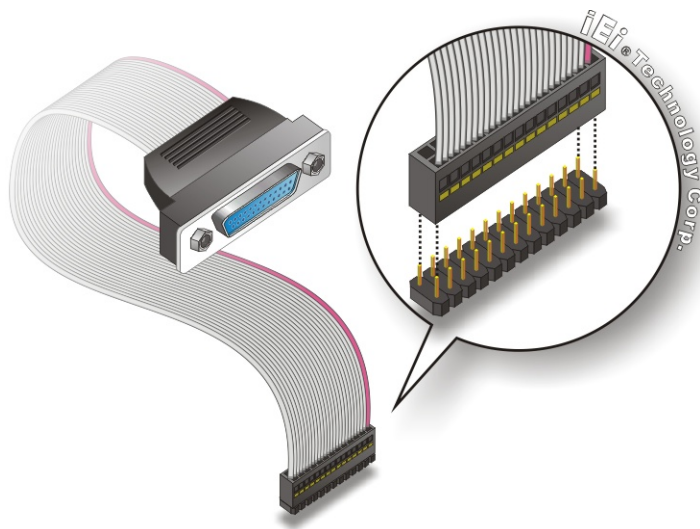
Figure 4-16: LPT Cable Connection

Step 4: **Attach the LPT connector to the chassis**. To secure the LPT interface connector to the chassis please refer to the installation instructions that came with the chassis.

Step 5: **Connect LPT device**. Once the LPT interface connector is connected to the chassis, the LPT device can be connected to the LPT interface connector. See **Figure 4-17**
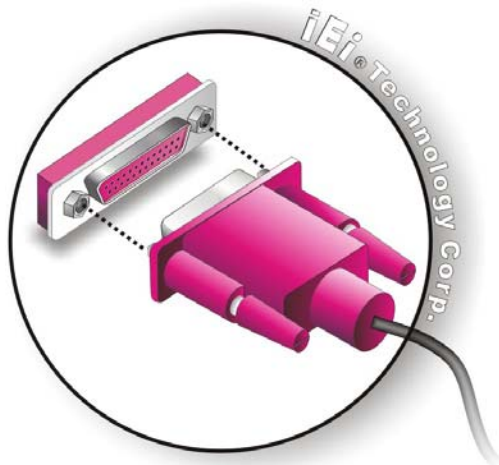
Figure 4-17: Connect the LPT Device

4.7.7 Dual RS-422/485 Cable

An optional RS-422/485 dual serial port connector cable is available for the NANO-945GSE2. The dual serial port connector cable connects the serial port connectors on the cable to the RS-422/485 serial port connectors on the NANO-945GSE2. Follow the steps below to connect the dual serial port connector cable.

Step 1: **Locate the serial port connector**. The location of the RS-422/485 serial port connector is shown in **Chapter 3**.

Step 2: **Align the connectors**. Correctly align pin 1 on the cable connector with pin 1 on the NANO-945GSE2 COM2 serial port connector.

Step 3: **Insert the cable connectors** Once the cable connector is properly aligned with the COM2 serial port connector on the NANO-945GSE2, connect the cable connector to the on-board connectors. See **Figure 4-18**.
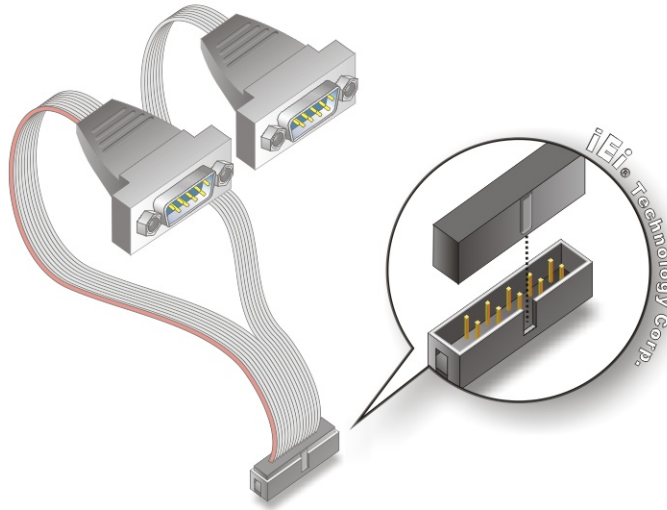
Figure 4-18: Dual Serial Port Connector Cable Connection

Step 4: **Attach DB-9 serial port connectors to the chassis**. The dual DB-9 serial port connectors can be inserted into dual preformed holes in the chassis. Once, inserted the DB-9 connectors should be secured to the chassis with retention screws.

4.8 External Peripheral Interface Connection

The following external peripheral devices can be connected to the external peripheral interface connectors.

- RJ-45 Ethernet cable connectors
- PS/2 devices
- Serial port devices
- USB devices
- VGA monitors

To install these devices, connect the corresponding cable connector from the actual device to the corresponding NANO-945GSE2 external peripheral interface connector making sure the pins are properly aligned.

4.8.1 LAN Connection (Single Connector)

There are two external RJ-45 LAN connectors. The RJ-45 connectors enable connection to an external network. To connect a LAN cable with an RJ-45 connector, please follow the instructions below.

Step 1: **Locate the RJ-45 connectors**. The locations of the USB connectors are shown in **Chapter 4**.

Step 2: **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the NANO-945GSE2. See **Figure 4-19**.
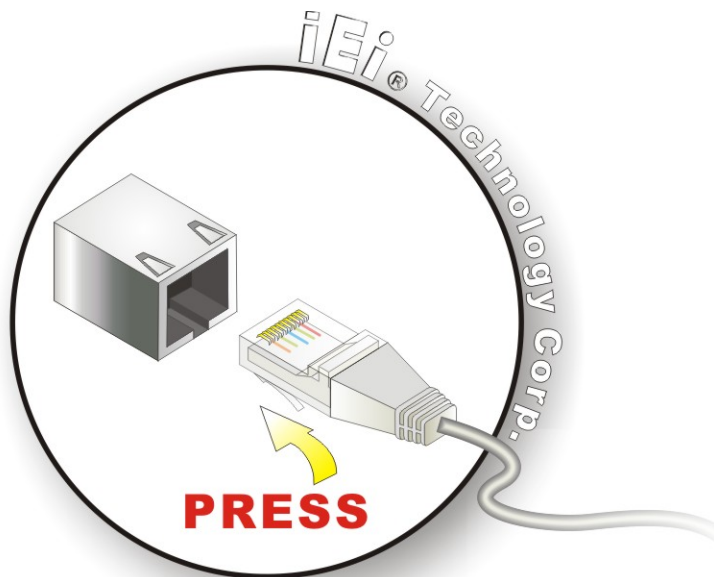
Figure 4-19: LAN Connection

Step 3: **Insert the LAN cable RJ-45 connector.** Once aligned, gently insert the LAN cable RJ-45 connector into the onboard RJ-45 connector.

4.8.2 PS/2 Y-Cable Connection

The NANO-945GSE2 has a PS/2 connector on the external peripheral interface panel. The dual PS/2 connector is connected to the PS/2 Y-cable that came with the NANO-945GSE2. One of the PS/2 cables is connected to a keyboard and the other to a

mouse to the system. Follow the steps below to connect a keyboard and mouse to the NANO-945GSE2.

Step 1: **Locate the dual PS/2 connector**. The location of the PS/2 connector is shown in **Chapter 3**.

Step 2: **Insert the keyboard/mouse connector**. Insert the PS/2 connector on the end of the PS/2 y-cable into the external PS/2 connector. See **Figure 4-20**.
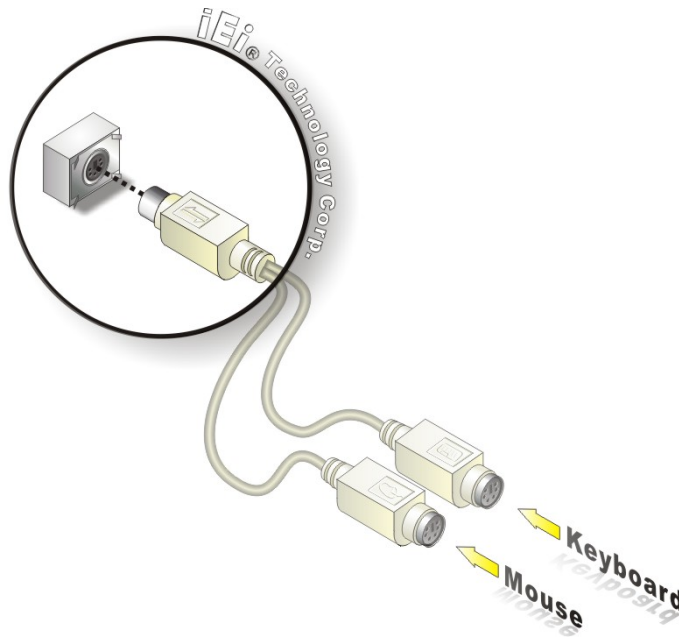
Figure 4-20: PS/2 Keyboard/Mouse Connector

Step 3: **Connect the keyboard and mouse**. Connect the keyboard and mouse to the appropriate connector. The keyboard and mouse connectors can be distinguished from each other by looking at the small graphic at the top of the connector.

4.8.3 Serial Device Connection

The NANO-945GSE2 has a single female DB-9 connector on the external peripheral interface panel for a serial device. Follow the steps below to connect a serial device to the NANO-945GSE2.

Step 1: **Locate the DB-9 connector**. The location of the DB-9 connector is shown in **Chapter 3**.

Step 2: **Insert the serial connector**. Insert the DB-9 connector of a serial device into the DB-9 connector on the external peripheral interface. See **Figure 4-21**.
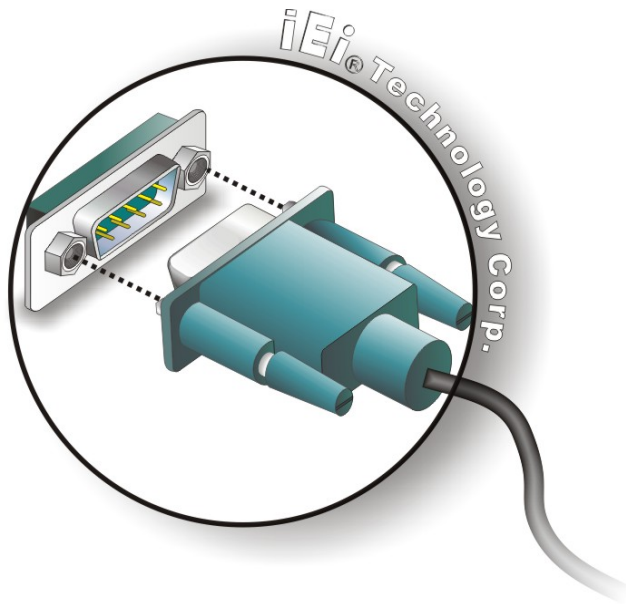
Figure 4-21: Serial Device Connector

Step 3: **Secure the connector**. Secure the serial device connector to the external interface by tightening the two retention screws on either side of the connector.Step 3:

4.8.4 USB Connection (Dual Connector)

The external USB connectors provide easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the NANO-945GSE2.

Step 1: **Locate the USB connectors**. The location of the USB connectors is shown in **Chapter 3**.

Step 2: **Insert a USB plug**. Insert the USB plug of a device into the USB receptacle on the external peripheral interface. See **Figure 4-22**.
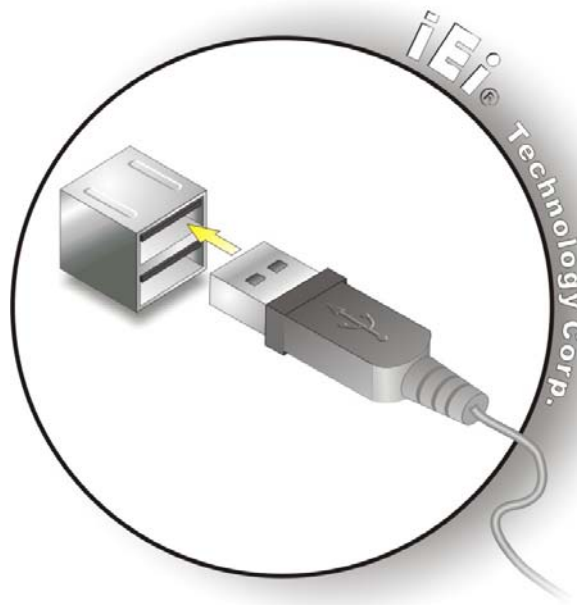
Figure 4-22: USB Connector

4.8.5 VGA Monitor Connection

The NANO-945GSE2 has a single female DB-15 connector on the external peripheral interface panel. The DB-15 connector is connected to a CRT or VGA monitor. To connect a monitor to the NANO-945GSE2, please follow the instructions below.

Step 1: **Locate the female DB-15 connector**. The location of the female DB-15 connector is shown in **Chapter 3**.

Step 2: **Align the VGA connector**. Align the male DB-15 connector on the VGA screen cable with the female DB-15 connector on the external peripheral interface.

Step 3: **Insert the VGA connector**. Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the NANO-945GSE2. See **Figure 4-23**.
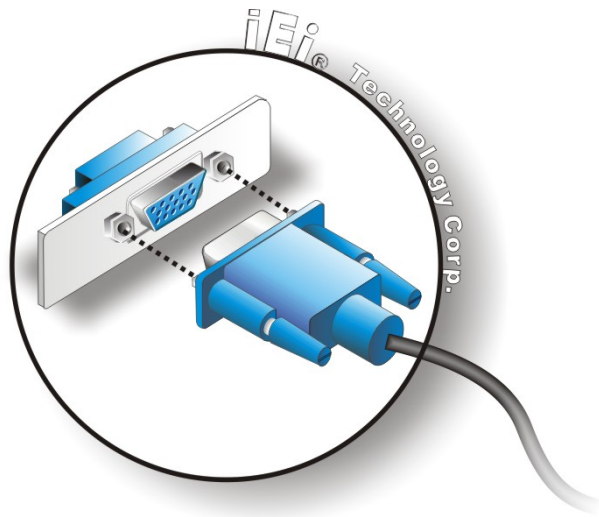
Figure 4-23: VGA Connector

Step 4: **Secure the connector**. Secure the DB-15 VGA connector from the VGA

monitor to the external interface by tightening the two retention screws on either

side of the connector.

Chapter

5

BIOS Screens

5.1 Introduction

A licensed copy of AMI BIOS is preprogrammed into the ROM BIOS. The BIOS setup program allows users to modify the basic system configuration.   This chapter describes how to access the BIOS setup program and the configuration options that may 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 below.

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
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.
- **Power** Changes power management 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
  AMIBIOS                                    a field.
  Version   :08.00.15
  Build Date:11/20/08                        Use [+] or [-] to
  ID        :E243MR11                        configure system
  0                                          Time.

  Processor
  Genuine Intel® CPU N70 @ 1.60GHz
  Speed     :1600MHz
  Count     :1
                                             ←→    Select Screen
  System Memory                              ↑↓    Select Item
  Size      :1016MB                          +-    Change Field
                                             Tab   Select Field
  System Time              [14:20:27]        F1    General Help
  System Date             [Tue 12/23/2008]   F10   Save and Exit
                                             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**)
- Super I/O Configuration (see **Section 5.3.3**)
- Hardware Health Configuration (see **Section 5.3.4**)
- Power Configuration (see **Section 5.3.5**)
- Remote Access Configuration (see **Section 5.3.5.1**)
- USB Configuration (see **Section 5.3.7**)
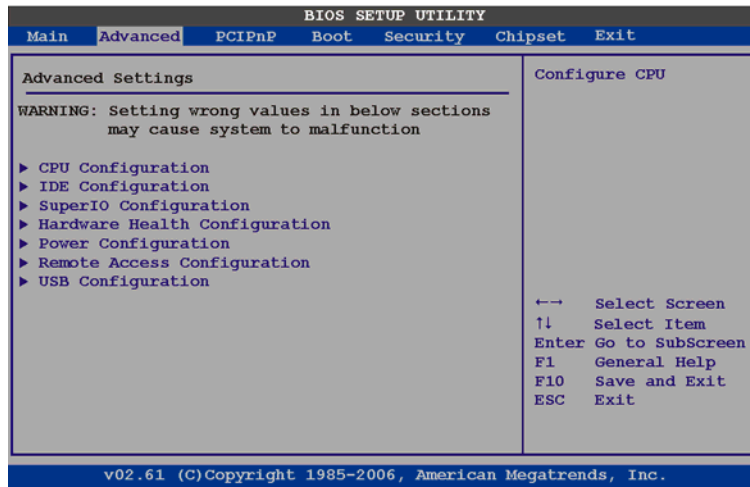
BIOS Menu 2: Advanced

5.3.1 CPU Configuration

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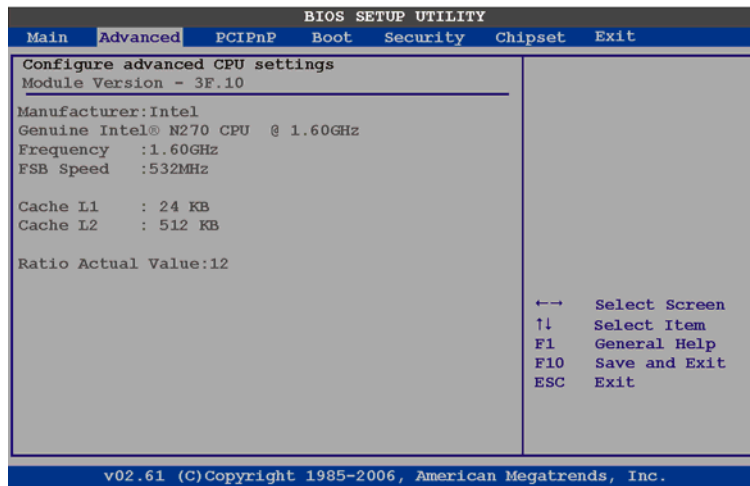
BIOS Menu 3: CPU Configuration

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
- **FSB Speed**: Lists the FSB 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                                      Options

  ATA/IDE Configuration         [Compatible]        Disabled
    Legacy IDE Channels         [SATA Pri, SATA Sec] Compatible
                                                    Enhanced
  ▶ Primary IDE Master             : [Not Detected]
  ▶ Primary IDE Slave              : [Not Detected]
  ▶ Secondary IDE Master           : [Not Detected]
  ▶ Secondary IDE Slave            : [Not Detected]



                                                    ←→    Select Screen
                                                    ↑↓    Select Item
                                                    +-    Change Option
                                                    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.

    ➔ **SATA Pri, PATA 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 four BIOS configuration options listed above is selected, the IDE configuration options shown in **Section 5.3.2.1** will appear.

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
   Device     :Not Detected                     the system.

   Type                        [Auto]
   LBA/Large Mode              [Auto]
   Block (Multi-Sector Transfer)  [Auto]
   PIO Mode                    [Auto]
   DMA Mode                    [Auto]
   S.M.A.R.T.                  [Auto]
   32Bit Data Transfer         [Enabled]

                                                ←→     Select Screen
                                                ↑↓     Select Item
                                                +-     Change Option
                                                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 3.3MBps

➔ **1** — PIO mode 1 selected with a maximum transfer rate of 5.2MBps

➔ **2** — PIO mode 2 selected with a maximum transfer rate of 8.3MBps

➔ **3** — PIO mode 3 selected with a maximum transfer rate of 11.1MBps

➔ **4** — PIO mode 4 selected with a maximum transfer rate of 16.6MBps (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 2.1MBps

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

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

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

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

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

➔ **UDMA1** Ultra DMA mode 0 selected with a maximum data transfer rate of 16.6MBps

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

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

➔ **UDMA3** Ultra DMA mode 3 selected with a maximum data transfer rate of 44MBps (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 66.6MBps (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 99.9MBps (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.
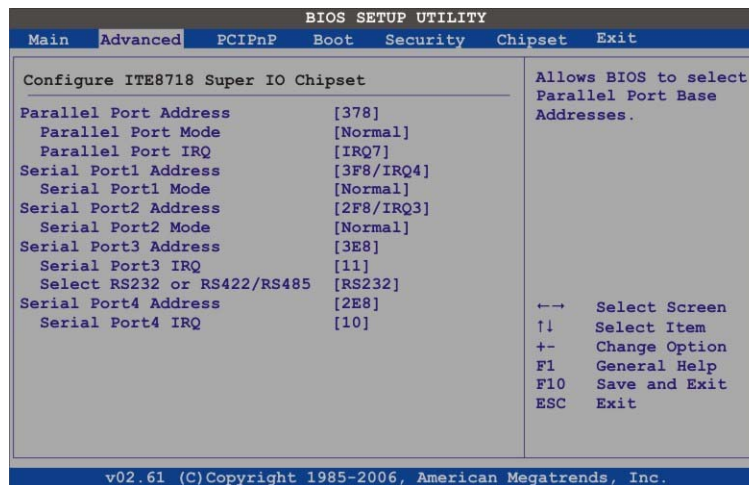
BIOS Menu 6: Super I/O Configuration

➔ **Serial Port1 Address [3F8/IRQ4]**

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

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

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

➔ **Serial Port2 Address [2F8/IRQ3]**

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

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

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

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                Fan configuration
                                              mode setting
 CPU FAN Mode Setting           [Full On mode]

 CPU Temperature                :52°C/122°F
 System Temperature             :47°C/116°F

 CPU Fan Speed                  :4800 RPM

 CPU Core                       :1.184 V
 +1.05V                         :1.024 V
 +3.30V                         :3.264 V
 +5.00V                         :5.080 V
 +12.0V                         :12.608 V      ←→    Select Screen
 +1.5V                          :1.488 V       ↑↓    Select Item
 +1.8V                          :1.792 V       F1    General Help
 5VSB                           :5.080 V       F10   Save and Exit
 VBAT                           :3.232 V       ESC   Exit


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```

BIOS Menu 7: Hardware Health Configuration

➔ **CPU FAN Mode Setting [Full On Mode]**

Use the **CPU FAN Mode Setting** option to configure the second fan.

➔ **Full On Mode**   DEFAULT   Fan is on all the time

➔ **Automatic mode**   Fan is off when the temperature is low enough. Parameters must be set by the user.

➔ **PWM Manual mode**   Pulse width modulation set manually

When the **CPU FAN Mode Setting** option is in the **Automatic Mode**, the following parameters can be set.

▪ CPU Temp. Limit of OFF
▪ CPU Temp. Limit of Start
▪ CPU Fan Start PWM
▪ Slope PWM 1

When the **CPU FAN Mode Setting** option is in the **PWM Manual Mode**, the following parameters can be set.

▪ CPU Fan PWM control

→ **CPU Temp. Limit of OFF [000]**

![warning icon] **WARNING:**

Setting this value too high may cause the fan to stop when the CPU is at a high temperature and therefore cause the system to be damaged.

The **CPU Temp. Limit of OFF** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **CPU Temp. Limit of OFF** option to select the CPU temperature at which the cooling fan should automatically turn off. To select a value, select the **CPU Temp. Limit of OFF** option and enter a decimal number between 000 and 127. The temperature range is specified below.

- Minimum Value: 0°C
- Maximum Value: 127°C

→ **CPU Temp. Limit of Start [020]**

![warning icon] **WARNING:**

Setting this value too high may cause the fan to start only when the CPU is at a high temperature and therefore cause the system to be damaged.

The **CPU Temp. Limit of Start** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **CPU Temp. Limit of Start** option to select the CPU temperature at which the cooling fan should automatically turn on. When the fan starts, it rotates using the starting pulse width modulation (PWM) specified in the **Fan 3 Start PWM** option below. To select a value, select the **CPU Temp. Limit of Start** option and enter a decimal number between 000 and 127. The temperature range is specified below.

- Minimum Value: 0°C
- Maximum Value: 127°C

➔ **CPU Fan Start PWM [070]**

The **Fan 3 Start PWM** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **Fan 3 Start PWM** option to select the PWM mode the fan starts to rotate with after the temperature specified in the **Temperature 3 Limit of Start** is exceeded. The Super I/O chipset supports 128 PWM modes. To select a value, select the **Fan 3 Start PWM** option and enter a decimal number between 000 and 127. The temperature range is specified below.

- ▪ PWM Minimum Mode: 0
- ▪ PWM Maximum Mode: 127

➔ **Slope PWM   [0.5 PWM]**

The **Slope PWM 1** option can only be set if the **CPU FAN Mode Setting** option is set to **Automatic Mode**. Use the **Slope PWM 1** option to select the linear rate at which the PWM mode increases with respect to an increase in temperature. A list of available options is shown below:

- ▪ 0 PWM
- ▪ 1 PWM
- ▪ 2 PWM
- ▪ 4 PWM
- ▪ 8 PWM
- ▪ 16 PWM
- ▪ 32 PWM
- ▪ 64 PWM

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

- ▪ **System Temperatures**: The following system temperatures are monitored
    - ○ CPU Temperature
    - ○ System Temperature
- ▪ **Fan Speeds**: The CPU cooling fan speed is monitored.
    - ○ CPU Fan Speed
- ▪ **Voltages**: The following system voltages are monitored

○ CPU Core

○ +1.05V

○ +3.30V

○ +12.0 V

○ +1.5V

○ +1.8V

○ 5VSB

○ VBAT

5.3.5 Power Configuration

Use the Power Configuration Menu to set select AT or ATX power modes.   This menu also displays the current AT/ATX jumper setting.

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

                                              Default set
                                              AUTO is detect
                                              power supply status
  Select AT/ATX Power         [BY HARDWARE]
  Current Jumper Setting      [AT Power]
                                              If set AT Power
                                              Power State will
                                              Auto set Power On




                                              ←→    Select Screen
                                              ↑↓    Select Item
                                              +-    Change Option
                                              F1    General Help
                                              F10   Save and Exit
                                              ESC   Exit

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```

BIOS Menu 8: Power Configuration

When ATX power is selected the following menu appears (BIOS Menu 9).   The Advanced **Power Configuration** menu (BIOS Menu 9) configures the Advanced Configuration and Power Interface (ACPI) and Power Management (APM) options.
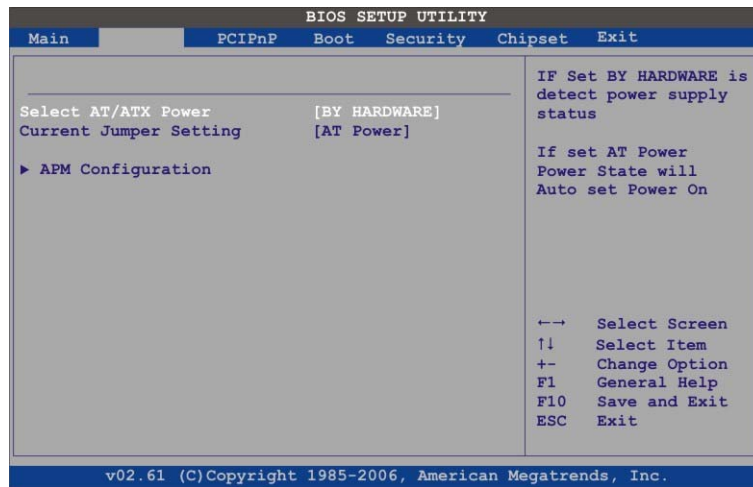
BIOS Menu 9: Advanced Power Configuration

5.3.5.1 APM Configuration

The **APM Configuration** menu (**BIOS Menu 10**) allows the advanced power management options to be configured.
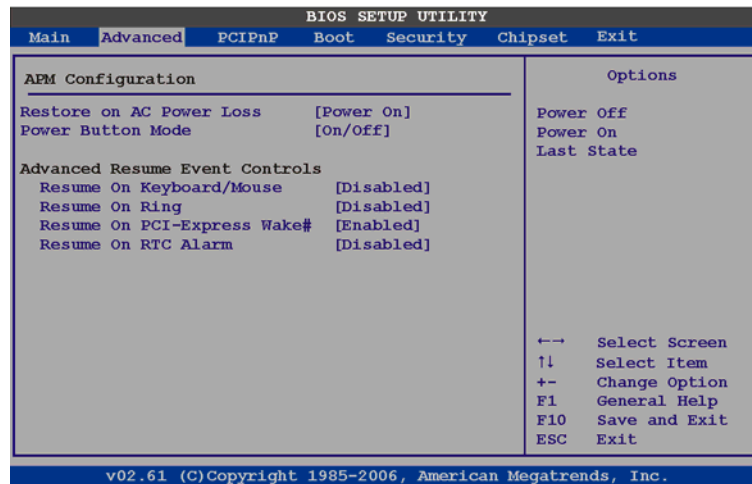
BIOS Menu 10: Advanced Power Management Configuration

➔ **Restore on AC Power Loss [Last State]**

Use the **Restore on AC Power Loss** BIOS option to specify what state the system returns to if there is a sudden loss of power to the system.

➔   **Power Off**   The system remains turned off

➔   **Power On**   The system turns on

➔   **Last State**   DEFAULT   The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off.

➔ **Power Button Mode [On/Off]**

Use the **Power Button Mode** BIOS to specify how the power button functions.

➔   **On/Off**   DEFAULT   When the power button is pressed the system is either turned on or off

➔   **Suspend**   When the power button is pressed the system goes into suspend mode

➔ **Resume on Keyboard/Mouse [Disabled]**

Use the **Resume on Keyboard/Mouse** BIOS option to enable activity on either the keyboard or mouse to rouse the system from a suspend or standby state. That is, the system is roused when the mouse is moved or a button on the keyboard is pressed.

➔   **Disabled**   (Default)   Wake event not generated by activity on the keyboard or mouse

➔   **Enabled**   Wake event generated by activity on the keyboard or mouse

➔ **Resume on Ring [Disabled]**

Use the **Resume on Ring** BIOS option to enable activity on the RI (ring in) modem line to rouse the system from a suspend or standby state. That is, the system will be roused by an incoming call on a modem.

➔   **Disabled**   DEFAULT   Wake event not generated by an incoming call

➔   **Enabled**   Wake event generated by an incoming call

➔ **Resume on PCI-Express WAKE# [Enabled]**

Use the **Resume PCI-Express WAKE#** BIOS option to enable activity on the PCI-Express WAKE# signal to rouse the system from a suspend or standby state.

➔ **Disabled**   Wake event not generated by PCI-Express WAKE# signal activity

➔ **Enabled**   DEFAULT   Wake event generated by PCI-Express WAKE# signal activity

➔ **Resume On RTC Alarm [Disabled]**

Use the **Resume On RTC Alarm** option to specify the time the system should be roused from a suspended state.

➔ **Disabled**   DEFAULT   The real time clock (RTC) cannot generate a wake event

➔ **Enabled**   If selected, the following appears with values that can be selected:

➔ **RTC Alarm Date (Days)**

➔ **System Time**

After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

5.3.6 Remote Configuration

Use the **Remote Access Configuration** menu (**BIOS Menu 11**) 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.
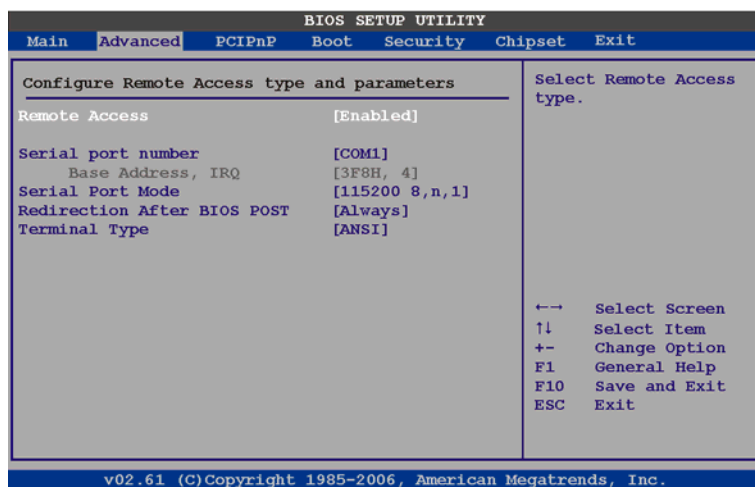
BIOS Menu 11: Remote Access Configuration [Advanced]

➔ **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 Number [COM1]**

Use the **Serial Port Number** option to select the serial port to use for remote access.

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

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

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

➔ **Base Address, IRQ [2F8h,3]**

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

➔ **Flow Control [None]**

Use the **Flow Control** option to report the flow control method for the console redirection application.

➔ **None** **DEFAULT** No control flow,

➔ **Hardware** Hardware is set as the console redirection

➔ **Software** Software is set as the console redirection

➔ **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

➔ **VT-UTF8 Combo Key Support [Disabled]**

Use the **VT-UFT8 Combo Key Support** option to enable additional keys that are not provided by VT100 for the PC 101 keyboard.

The VT100 Terminal Definition is the standard convention used to configure and conduct emergency management tasks with UNIX-based servers. VT100 does not support all keys on the standard PC 101-key layout, however. The VT-UTF8 convention makes available additional keys that are not provided by VT100 for the PC 101 keyboard.

➔ **Disabled**   DEFAULT   Disables the VT-UTF8 terminal keys

➔ **Enabled**   Enables the VT-UTF8 combination key. Support for ANSI/VT100 terminals

➔ **Sredir Memory Display Delay [Disabled]**

Use the **Sredir Memory Display Delay** option to select the delay before memory information is displayed. Configuration options are listed below

- No Delay   DEFAULT
- Delay 1 sec
- Delay 2 sec
- Delay 4 sec

5.3.7 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 12**) to read USB configuration information and configure the USB settings.

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

   USB Configuration                                     Options

   Module Version - 2.24.3-13.4                     Disabled
                                                    Enabled
   USB Devices Enabled :
              None

   USB Functions              [Enabled]
   USB 2.0 Controller         [Enabled]
   Legacy USB Support         [Enabled]
   USB 2.0 Controller Mode    [HiSpeed]

                                               ←→    Select Screen
                                               ↑↓    Select Item
                                               +-    Change Option
                                               F1    General Help
                                               F10   Save and Exit
                                               ESC   Exit

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```

BIOS Menu 12: USB Configuration

➔ **USB Functions [Enabled]**

Use the **USB Function** option to enable or disable the USB controllers.

➔ **Disabled**   USB controllers are enabled

➔ **Enabled**   DEFAULT   USB controllers are disabled

➔ **USB 2.0 Controller [Enabled]**

The **USB 2.0 Controller** BIOS option enables or disables the USB 2.0 controller

 è   **Disabled**   USB function disabled

 è   **Enabled**   DEFAULT   USB function enabled

è   **USB2.0 Controller Mode [HiSpeed]**

The **USB2.0 Controller Mode** BIOS option sets the speed of the USB2.0 controller.

 è   **FullSpeed**   The controller is capable of operating at full speed 12 Mb/s

 è   **HiSpeed**   DEFAULT   The controller is capable of operating at high speed 480 Mb/s

è   **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.

 è   **Disabled**   Legacy USB support disabled

 è   **Enabled**   DEFAULT   Legacy USB support enabled

 è   **Auto**   Legacy USB support disabled if no USB devices are connected
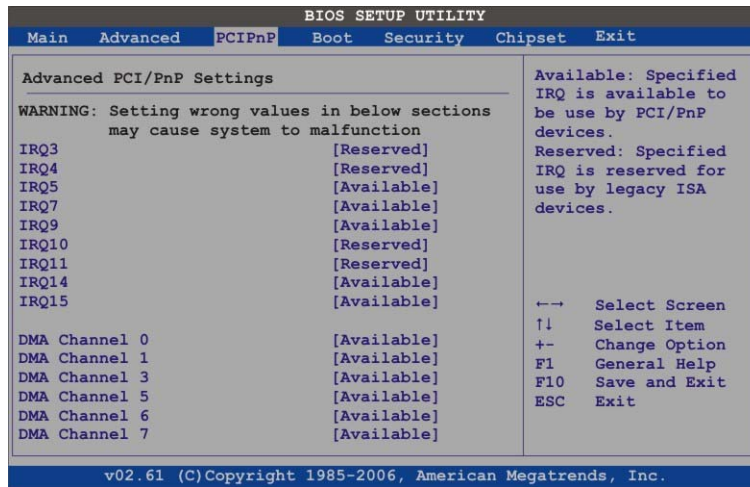
5.4 PCI/PnP

Use the PCI/PnP menu (BIOS Menu 13) 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
 WARNING: Setting wrong values in below sections  be use by PCI/PnP
         may cause system to malfunction      devices.
 IRQ3                          [Reserved]     Reserved: Specified
 IRQ4                          [Reserved]     IRQ is reserved for
 IRQ5                          [Available]    use by legacy ISA
 IRQ7                          [Available]    devices.
 IRQ9                          [Available]
 IRQ10                         [Reserved]
 IRQ11                         [Reserved]
 IRQ14                         [Available]
 IRQ15                         [Available]    ←→    Select Screen
                                              ↑↓    Select Item
 DMA Channel 0                 [Available]    +-    Change Option
 DMA Channel 1                 [Available]    F1    General Help
 DMA Channel 3                 [Available]    F10   Save and Exit
 DMA Channel 5                 [Available]    ESC   Exit
 DMA Channel 6                 [Available]
 DMA Channel 7                 [Available]

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```

BIOS Menu 13: 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

➔ **Reserved Memory Size [Disabled]**

Use the **Reserved Memory Size** BIOS option to specify the amount of memory that should be reserved for legacy ISA devices.

➔ **Disabled**   **DEFAULT**   No memory block reserved for legacy ISA devices

➔ **16K**   16KB reserved for legacy ISA devices

➔ **32K**   32KB reserved for legacy ISA devices

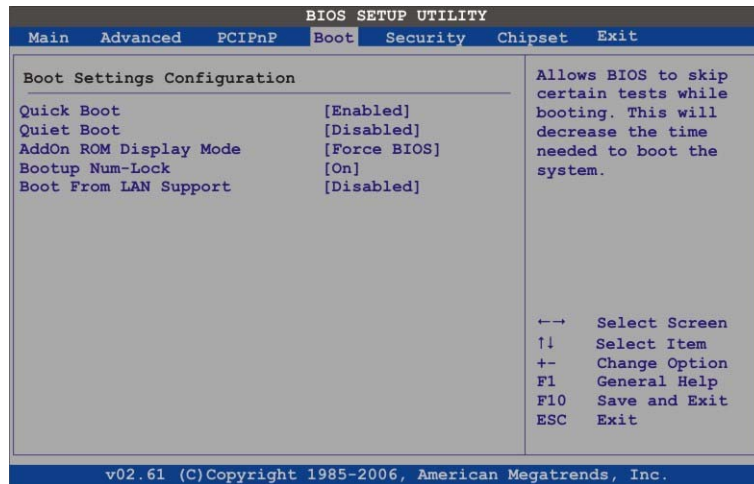➔ **64K**   54KB reserved for legacy ISA devices

5.5 Boot

Use the Boot menu (BIOS Menu 14) to configure system boot options.
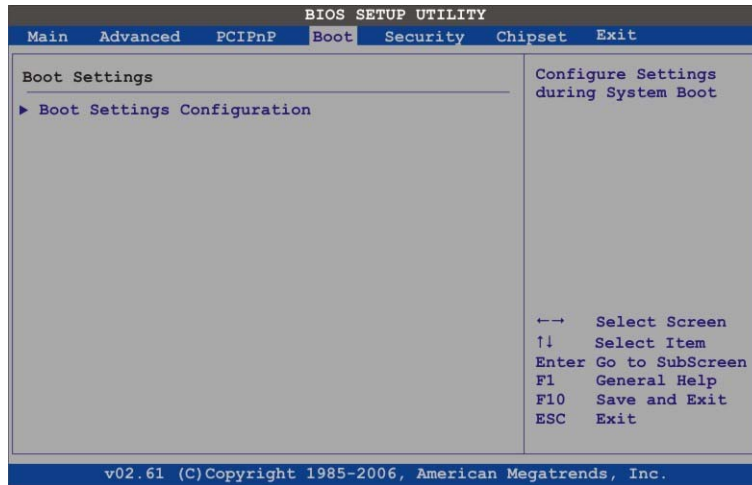
BIOS Menu 14: Boot

5.5.1 Boot Settings Configuration

Use the Boot Settings Configuration menu (BIOS Menu 14) to configure advanced system boot options.

BIOS Menu 15: 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]**

The **AddOn ROM Display Mode** option allows add-on ROM (read-only memory) messages to be displayed.

➔ **Force BIOS** DEFAULT Allows the computer system to force a third party BIOS to display during system boot.

➔ **Keep Current** Allows the computer system to display the information during system boot.

➔ **Bootup Num-Lock [Off]**

The **Bootup Num-Lock** BIOS option allows the Number Lock setting to be modified during boot up.

➔ **Off** DEFAULT 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** 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.

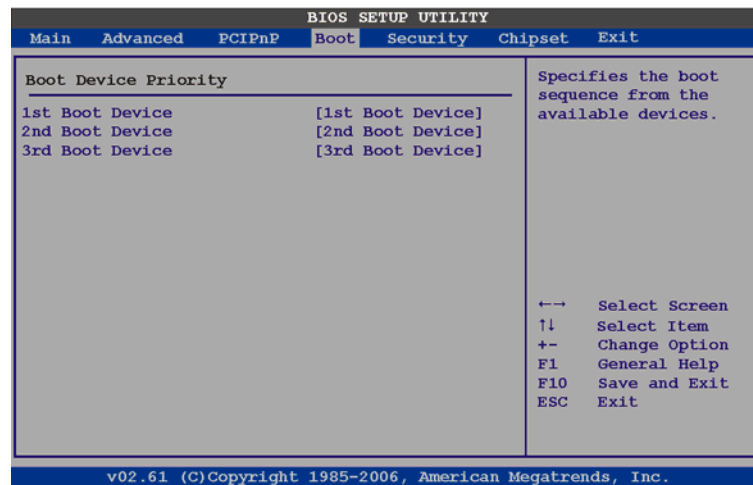➔ **Boot From LAN Support [Disabled]**

The **BOOT From LAN Support** option enables 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 16**) to specify the boot sequence from the available devices. The following options are available:

- 1st Boot Device
- 2nd Boot Device
- 3rd Boot Device

```
                        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
                                                 +-    Change Option
                                                 F1    General Help
                                                 F10   Save and Exit
                                                 ESC   Exit

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```

BIOS Menu 16: Boot Device Priority Settings

5.6 Security

Use the Security menu (BIOS Menu 17) to set system and user passwords.
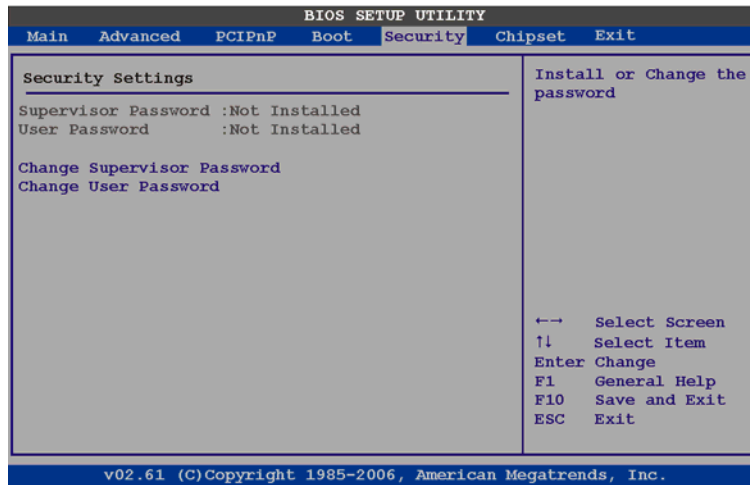
BIOS Menu 17: Security

➔ **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**.
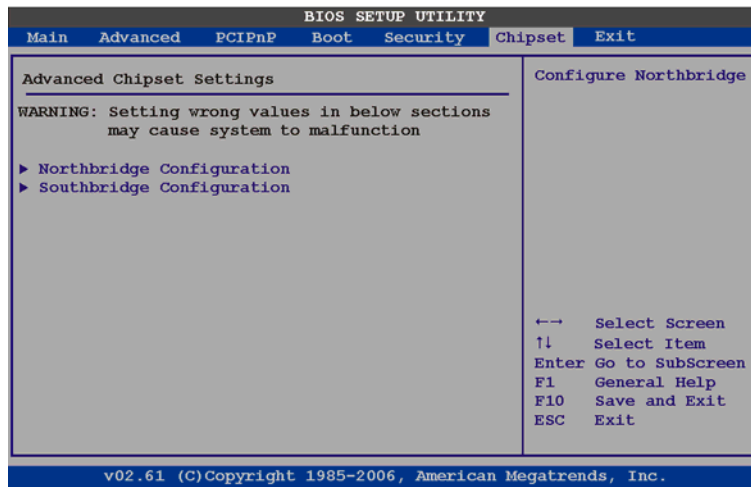
5.7 Chipset

Use the **Chipset** menu (**BIOS Menu 18**) to access the Northbridge and Southbridge configuration menus

⚠ **WARNING!**

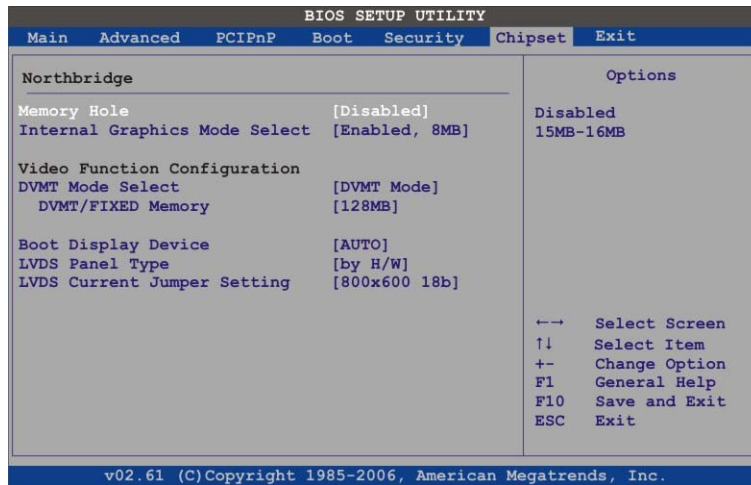Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS

menu may cause the system to malfunction.

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

  Advanced Chipset Settings                    Configure Northbridge

  WARNING: Setting wrong values in below sections
           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

        v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.
```

BIOS Menu 18: Chipset

5.7.1 Northbridge Chipset Configuration

Use the **Northbridge Chipset Configuration** menu (BIOS Menu 18) to configure the Northbridge chipset settings.

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

  Northbridge                                  Options

  Memory Hole                   [Disabled]     Disabled
  Internal Graphics Mode Select [Enabled, 8MB] 15MB-16MB

  Video Function Configuration
  DVMT Mode Select              [DVMT Mode]
    DVMT/FIXED Memory           [128MB]

  Boot Display Device           [AUTO]
  LVDS Panel Type               [by H/W]
  LVDS Current Jumper Setting   [800x600 18b]

                                               ←→    Select Screen
                                               ↑↓    Select Item
                                               +-    Change Option
                                               F1    General Help
                                               F10   Save and Exit
                                               ESC   Exit

        v02.61 (C)Copyright 1985-2006, American Megatrends, Inc.
```

BIOS Menu 19:Northbridge Chipset Configuration

➔ **Memory Hole [Disabled]**

The **Memory Hole** reserves the memory space between 15MB and 16MB 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

➔ **Enabled**   Memory is reserved for ISA expansion cards

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

The **Internal Graphic Mode Select** option determines the amount of system memory that can be used by the Internal graphics device.

➔ **Disable**

➔ **Enable, 1MB**   1MB of memory used by internal graphics device

➔ **Enable, 8MB**   DEFAULT   8MB of memory used by internal graphics device

➔ **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**

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 128MB. Configuration options are listed below.

- 64MB
- 128MB **DEFAULT**
- Maximum DVMT

➔ **Boot Display Device [Auto]**

The **Boot Display Device** BIOS option selects the display device the system uses when it boots. The available options are listed below:

- Auto **DEFAULT**
- CRT
- LFP

➔ **LVDS1 Panel Type**

Use the **LVDS Panel Type** to determine the LCD panel resolution. Configuration options are listed below:

- 640 x 480 18b
- 800 x 480 18b
- 800 x 600 18b
- 1024 x 768 18b
- 1280 x 1024 36b
- 1400 x 1050 36b
- 1440 x 900 36b
- 1600 x 1200 36b
- 1280 x 800 18b

5.7.2 Southbridge Configuration

The **Southbridge Configuration** menu (BIOS Menu 20) configures the Southbridge chipset.

BIOS SETUP UTILITY
Main   Advanced   PCIPnP   Boot   Security   Chipset   Exit

Southbridge Chipset Configuration   Options

Audio Controller   [Enabled]   Enabled
Spread Spectrum Mode   [Disabled]   Disabled

                                                 ←→   Select Screen
                                                 ↑↓   Select Item
                                                 +-   Change Option
                                                 F1   General Help
                                                 F10   Save and Exit
                                                 ESC   Exit

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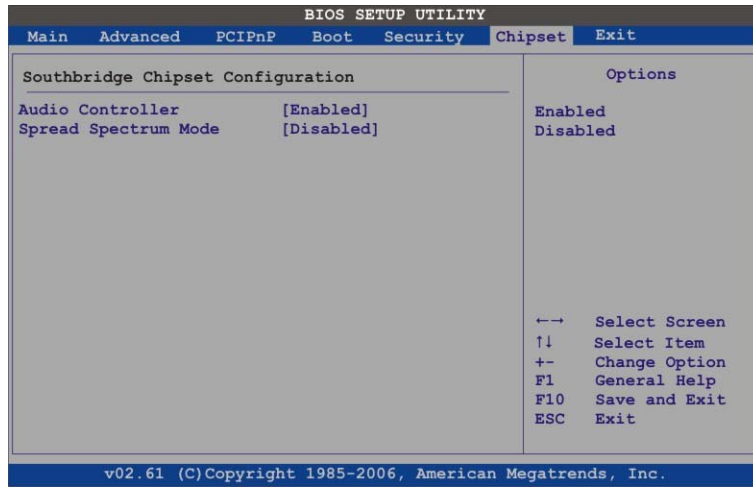
BIOS Menu 20:Southbridge Chipset Configuration

➔ **Audio Controller [All Disabled]**

The **Audio Controller** option enables or disables the audio controller.

➔ **Enabled**   The on-board AC'97 audio controller is enabled.

➔ **Disabled**   DEFAULT   The on-board audio controller is disabled.

➔ **Spread Spectrum**

5.8 Exit

Use the **Exit** menu (**BIOS Menu 21**) to load default BIOS values, optimal failsafe values and to save configuration changes.
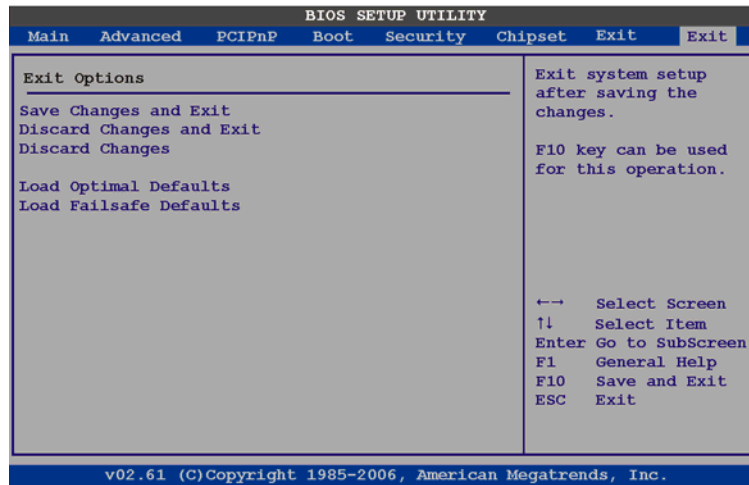
BIOS Menu 21:Exit

➔ **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.**

Chapter

6

Software Drivers

6.1 Available Software Drivers

> ![NOTE icon] **NOTE:**
>
> The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. Visit the IEI website or contact technical support for the latest updates.

The following drivers can be installed on the system:

Installation instructions are given below.

6.2 Starting the Driver Program

To access the driver installation programs, please do the following.

Step 1:   Insert the CD-ROM that came with the system into a CD-ROM drive attached to the system.

Step 2: The screen in **Figure 6-1** appears.

Figure 6-1: Start Up Screen

Step 3: Click **NANO-945GSE2**.

Step 4: The screen in **Figure 6-2** appears.

Figure 6-2: Select Operating System

Step 5: Select the operating system installed on the NANO-945GSE2 system. This manual describes the installation for a **Windows XP** operating system.

Step 6: The list of drivers in **Figure 6-3** appears.
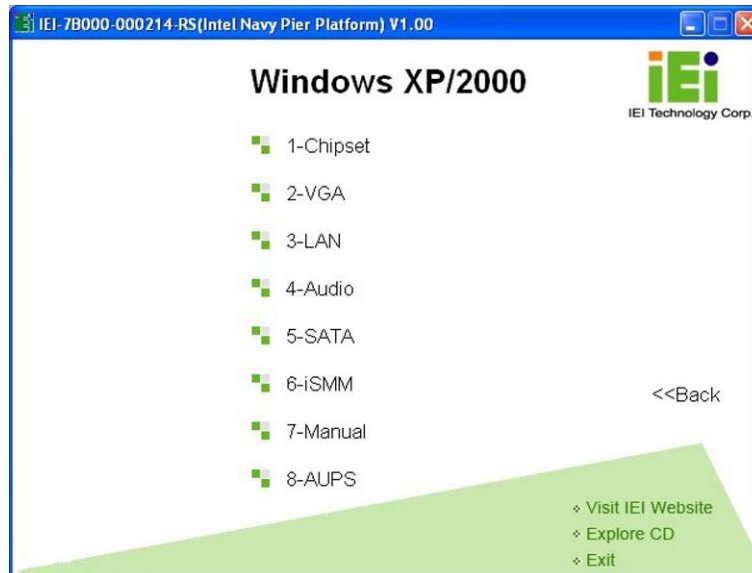
Figure 6-3: Drivers

6.3 Chipset Driver Installation

To install the chipset driver, please do the following.

Step 1: Access the driver list shown in **Figure 6-3**. (See **Section 6.2**)

Step 2: Click "**1-Chipset Driver**"

Step 3: When the setup files are completely extracted the **Welcome Screen** in

Figure 6-4 appears.

Figure 6-4: Chipset Driver Welcome Screen

Step 4:   Click **Next** to continue.

Step 5:   The license agreement in **Figure 6-5** appears.

Figure 6-5: Chipset Driver License Agreement

Step 6:   Read the **License Agreement**.

Step 7: Click the Y<small>ES</small> button to accept the license agreement and continue.

Step 8: The Read Me file in **Figure 6-6** appears.

Figure 6-6: Chipset Driver Read Me File

Step 9: Click N<small>EXT</small> to continue.

Step 10: Setup Operations are performed as shown in **Figure 6-7**.

Figure 6-7: Chipset Driver Setup Operations

Step 11: Once the **Setup Operations** are complete, click the NEXT icon to continue.

Step 12: The **Finish** screen appears.

Figure 6-8: Chipset Driver Installation Finish Screen

Step 13: Select "**Yes, I want to restart the computer now**" and click the **Finish** icon.

See **Figure 6-8**.

6.4 VGA Driver Installation

To install the VGA driver, please do the following.

Step 1: Access the driver list shown in **Figure 6-3**. (See **Section 6.2**)

Step 2: Click "**2-VGA**"

Step 3: The VGA Read Me file in **Figure 6-9** appears.
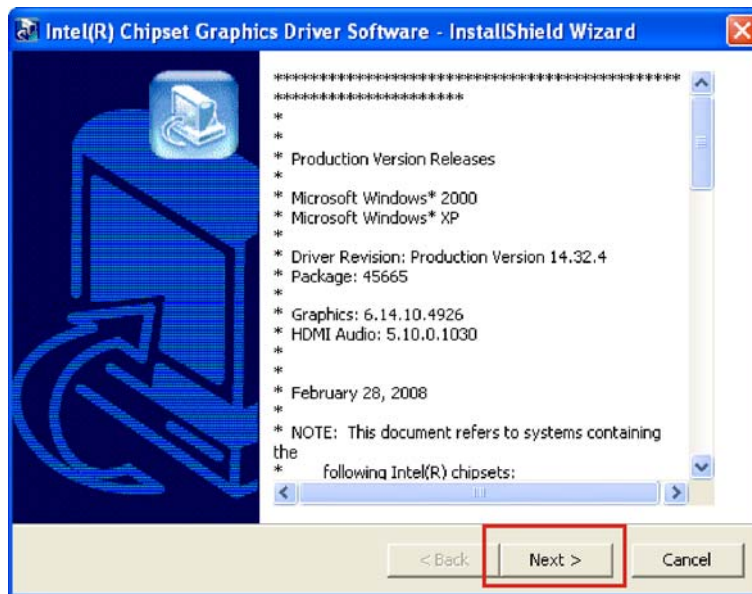
Figure 6-9: VGA Driver Read Me File

Step 4: Click NEXT to continue.

Step 5: The installation files are extracted. See **Figure 6-10**.
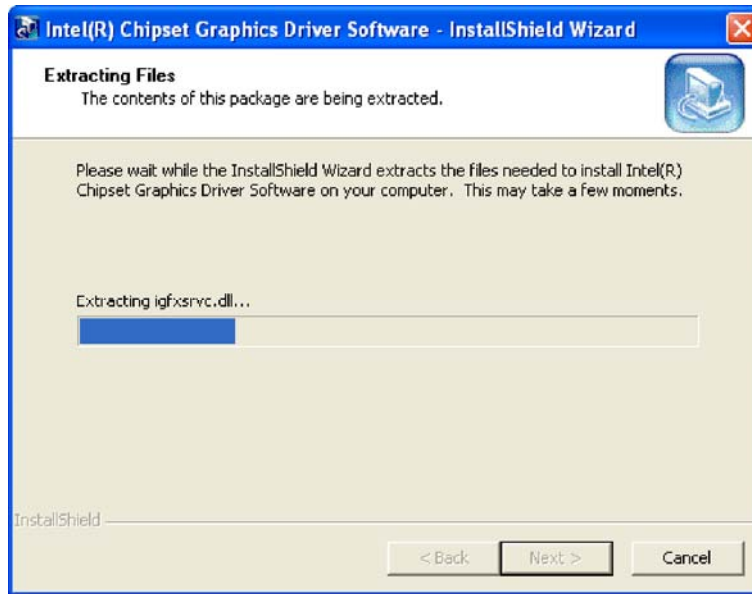
Figure 6-10: VGA Driver Setup Files Extracted

Step 6: The **Welcome Screen** in **Figure 6-11** appears.

Figure 6-11: VGA Driver Welcome Screen

Step 7: Click NEXT to continue.

Step 8: The license agreement in **Figure 6-12** appears.
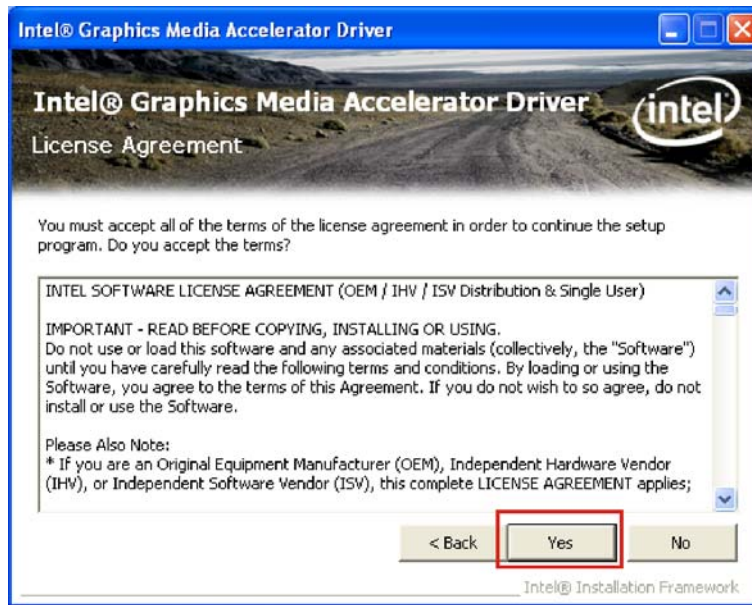
Figure 6-12: VGA Driver License Agreement

Step 9: Read the **License Agreement**.

Step 10: Click **YES** to accept the license agreement and continue.

Step 11: The Readme file in **Figure 6-13** appears.
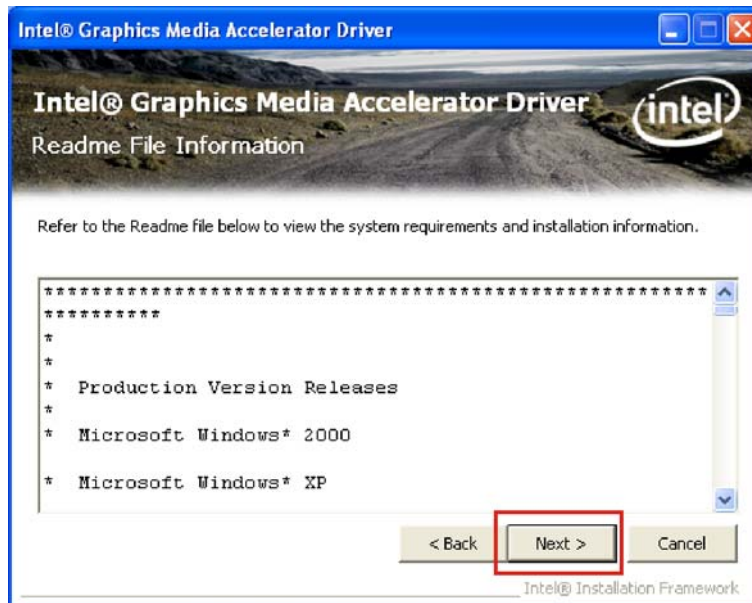
Figure 6-13: VGA Driver Read Me File

Step 12: Click NEXT to continue.

Step 13: **Setup Operations** are performed as shown in **Figure 6-14**.

  NOTE:

The "Found New Hardware Wizard" will appear and then disappear
during this step. Do not adjust any settings in the "Found New
Hardware Wizard" window.
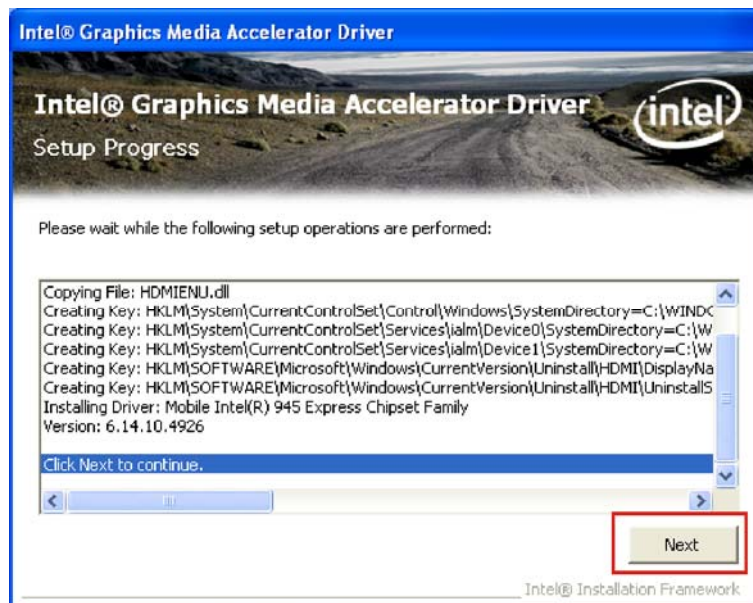
Figure 6-14: VGA Driver Setup Operations

Step 14: Once the **Setup Operations** are complete, click NEXT to continue.

Step 15: The **Finish** screen appears.
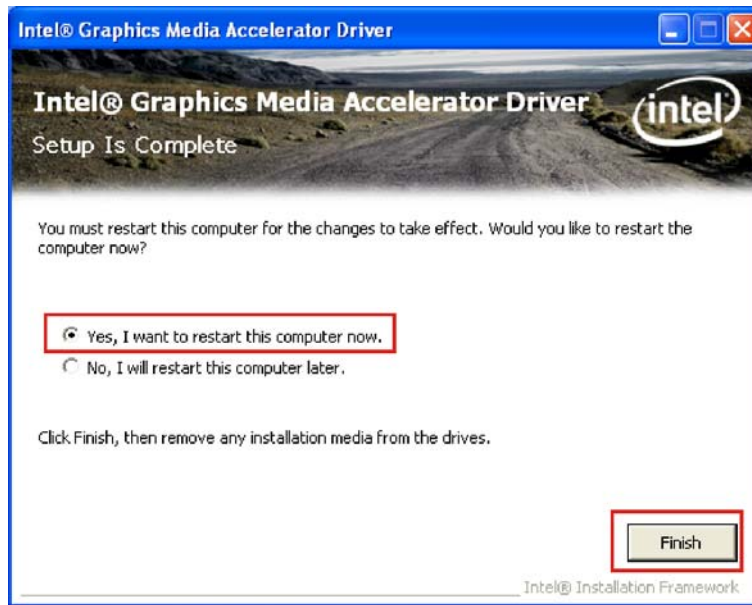
Figure 6-15: VGA Driver Installation Finish Screen

Step 16: Select "**Yes, I want to restart the computer now**" and click FINISH. See

Figure 6-15.

6.5 LAN Driver Installation

To install the chipset driver, please do the following.

Step 1: Access the driver list shown in **Figure 6-3**. (See **Section 6.2**)

Step 2: Click "**3-LAN**"

Step 3: The **Welcome** screen in **Figure 6-16** appears.
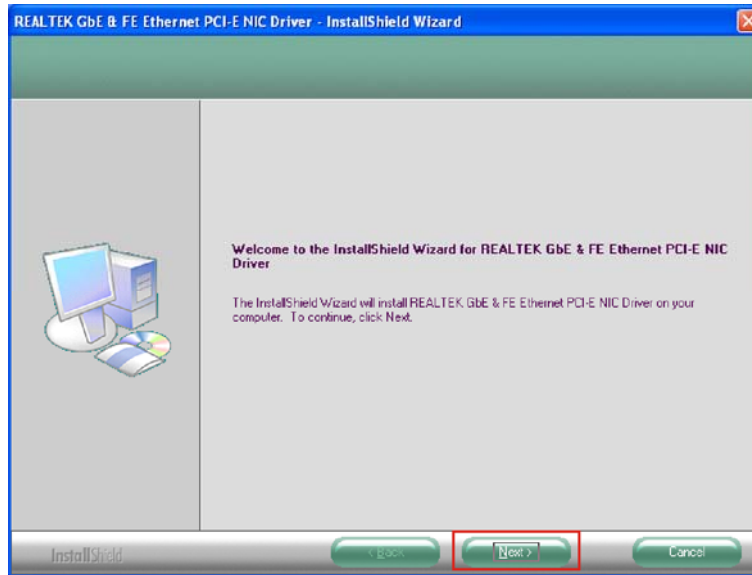
Figure 6-16: LAN Driver Welcome Screen

Step 4: Click NEXT to continue.

Step 5: The **Ready to Install** screen in **Figure 6-17** appears.
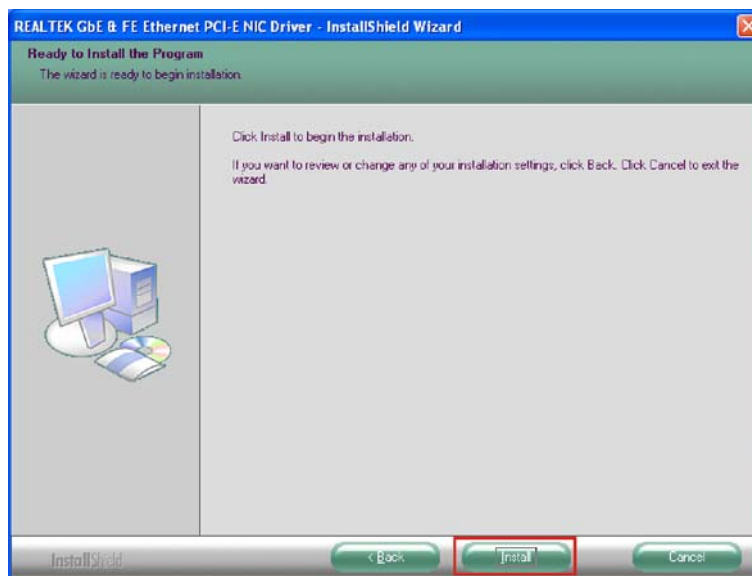
Figure 6-17: LAN Driver Welcome Screen

Step 6: Click NEXT to proceed with the installation.

Step 7: The program begins to install.

Step 8: The installation progress can be monitored in the progress bar shown in

Figure 6-18.
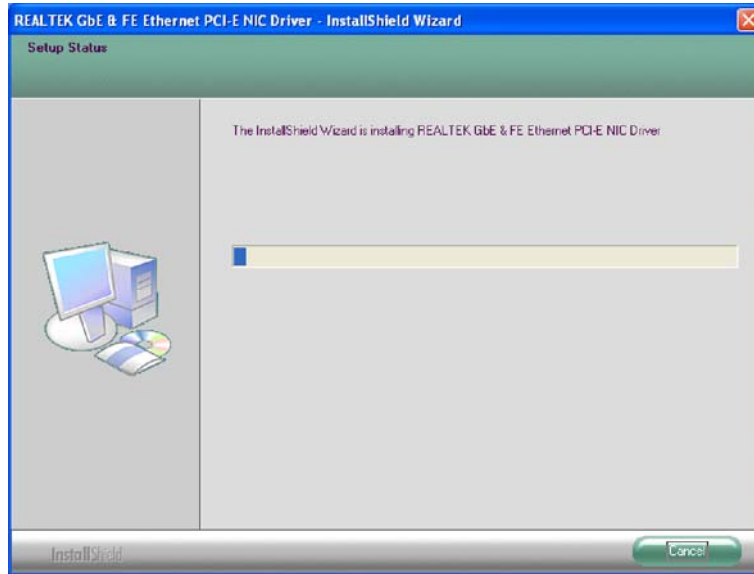
Figure 6-18: LAN Driver Installation

Step 9: When the driver installation is complete, the screen in **Figure 6-19** appears.
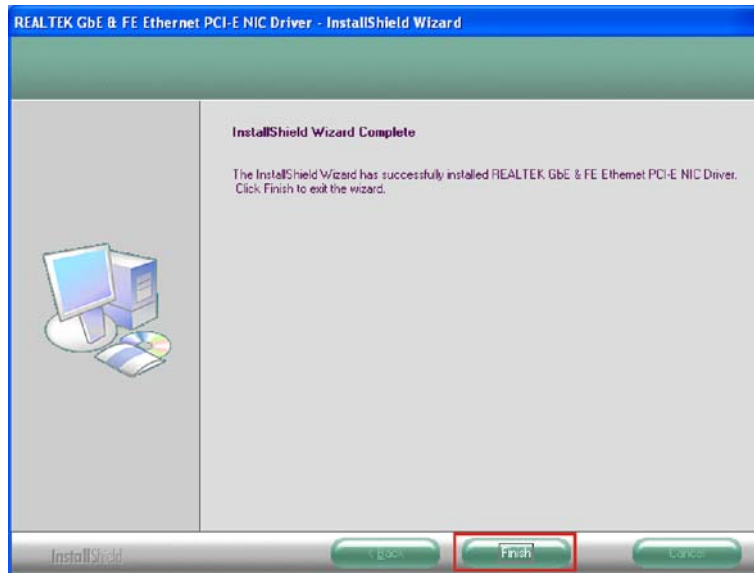
Figure 6-19: LAN Driver Installation Complete

Step 10: Click **FINISH** to exit the InstallShield Wizard (**Figure 6-19**).

6.6 Audio Driver Installation

There is no audio driver on the NANO-945GSE2. To add audio capabilities to the NANO-945GSE2, connect a HD Audio kit or AC'97 audio kit available from IEI. Follow the installation applicable to the installed audio kit.

6.6.1 AC'97 Driver Installation

To install the chipset driver, please do the following.

Step 1:   Access the driver list shown in **Figure 6-3**. (See **Section 6.2**)

Step 2:   Click "**4-Audio**"
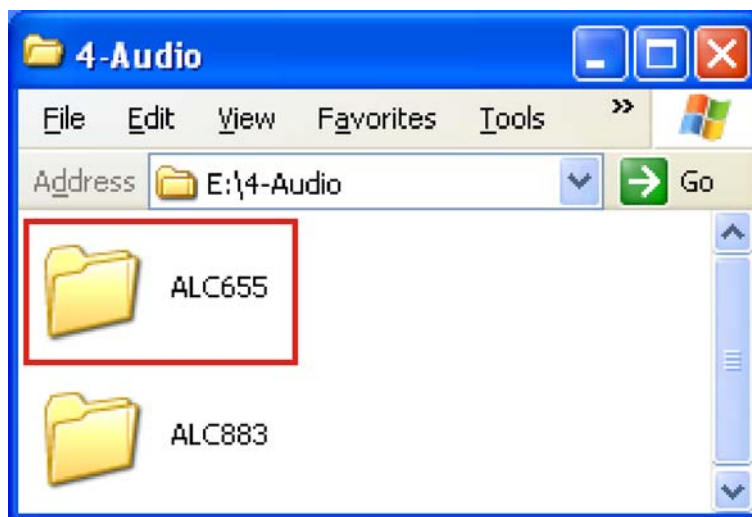
Figure 6-20: AC'97 Audio

Step 3: Browse to "**E:\4-Audio\ALC665\Windows\Windows 98Gold, 98se, Me, 2000,**

XP, 2003(32,64 bits)\A3.84" **Figure 6-21**
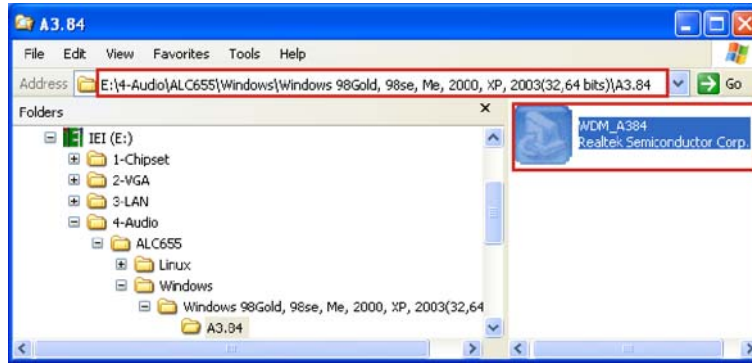
Figure 6-21: AC'97 Audio Driver Options

Step 4: Double-click the installation file in **Figure 6-21**.

Step 5: The AC'97 Driver Installation screen in **Figure 6-22** appears.
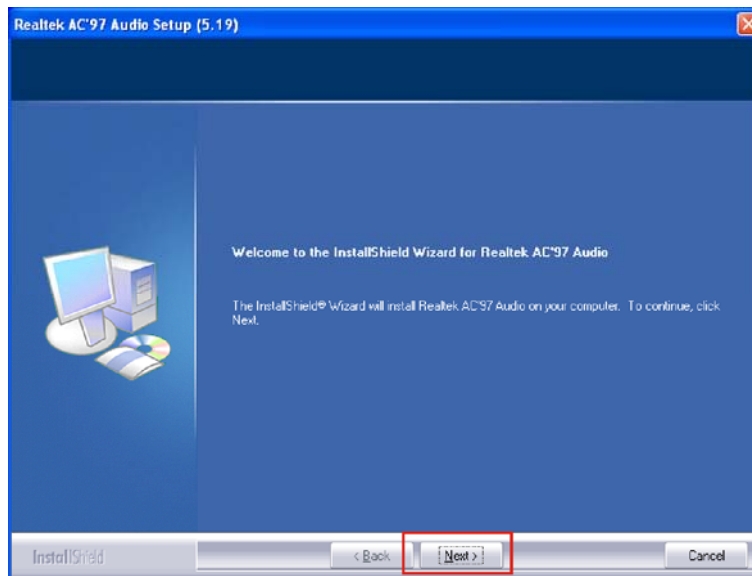
Figure 6-22: AC'97 Driver Installation Welcome Screen

Step 6: Click NEXT to continue.

Step 7: The Verification window in **Figure 6-23** may appear.

Figure 6-23: AC'97 Driver Installation Verification

Step 8: Click CONTINUE ANYWAY.

Step 9: When the driver is installed, the driver installation finish screen in **Figure 6-24**

appears.
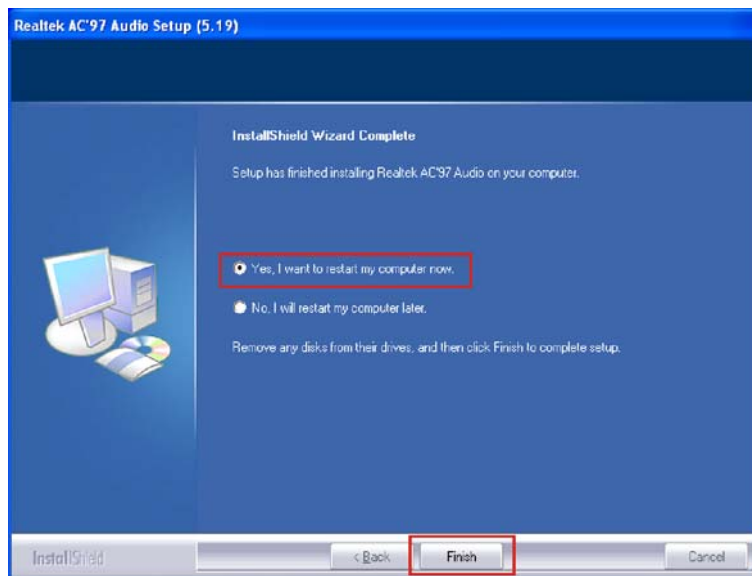
Figure 6-24: AC'97 Driver Installation Complete

Step 10: Select "**Yes, I wish to restart my computer now**" And click FINISH to exit the

InstallShield Wizard and restart the computer.

6.7 Intel® Matrix Storage Manager Driver Installation

To install the Intel® Matrix Storage Manager driver, please follow the steps below:

Step 1: Select **5-SATA** from the list in **Figure 6-1**.

Step 2: A new window opens (**Figure 6-25**).
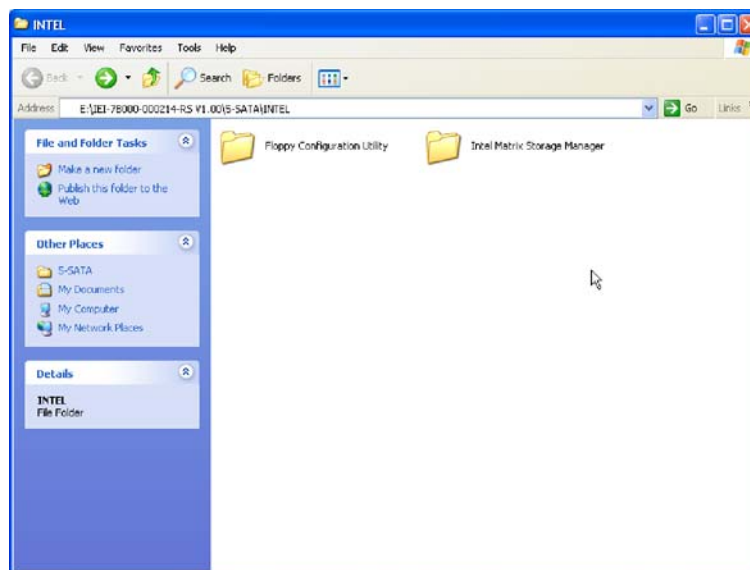
Figure 6-25: SATA RAID Driver Installation Program

Step 3: Double-click the **Intel® Matrix Storage Manager** folder.

Step 4: Double-click the **8.5.0.1032** folder in **Figure 6-26**
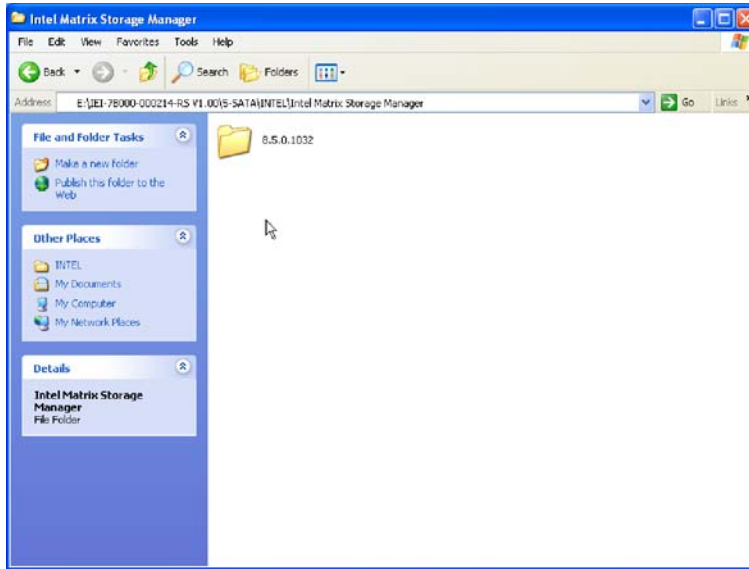
Figure 6-26: SATA RAID Driver Installation Program

Step 5: Double-click the IATA85CD.exe program icon in **Figure 6-27**.
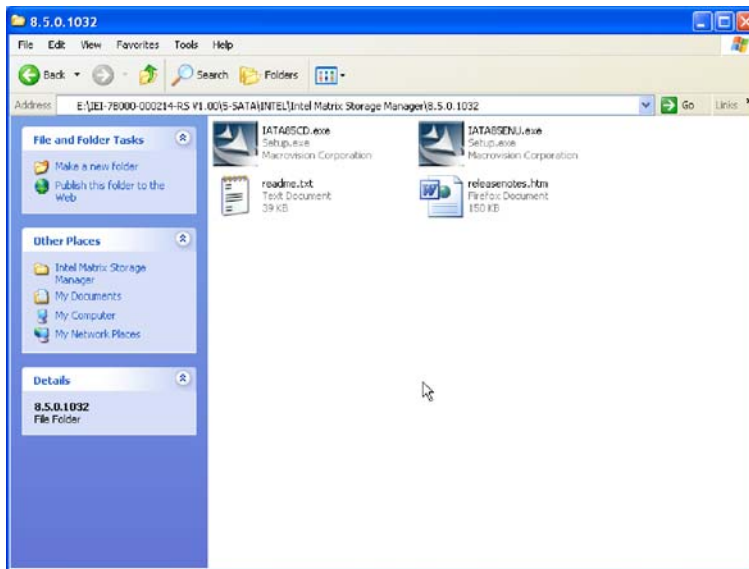
Figure 6-27: SATA RAID Setup Program Icon

Step 6: **Figure 6-28** shows the **InstallShield Wizard** preparing to guide the user

through the rest of the process.
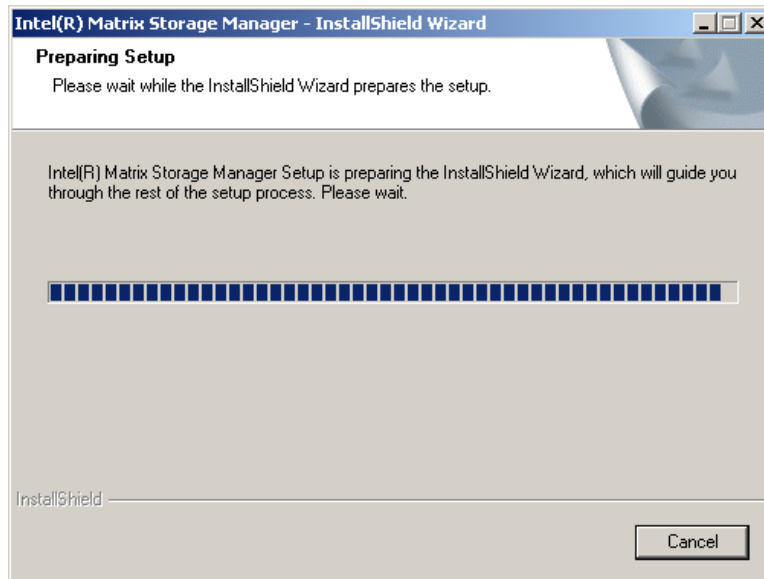
Figure 6-28: InstallShield Wizard Setup Screen

Step 7: **Figure 6-29** shows the **Matrix Storage Manager** software configuring the

installation process.
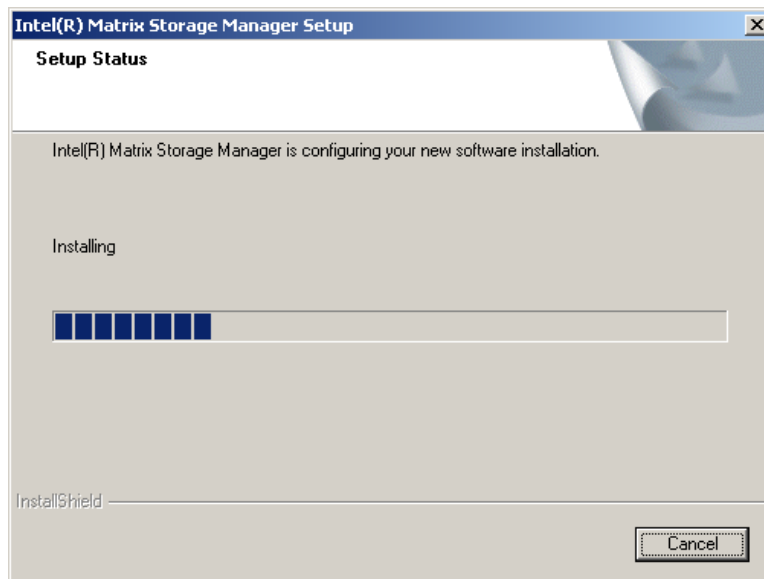
Figure 6-29: Matrix Storage Manager Setup Screen

Step 8: **Figure 6-30** shows the **Matrix Storage Manager** welcome screen.
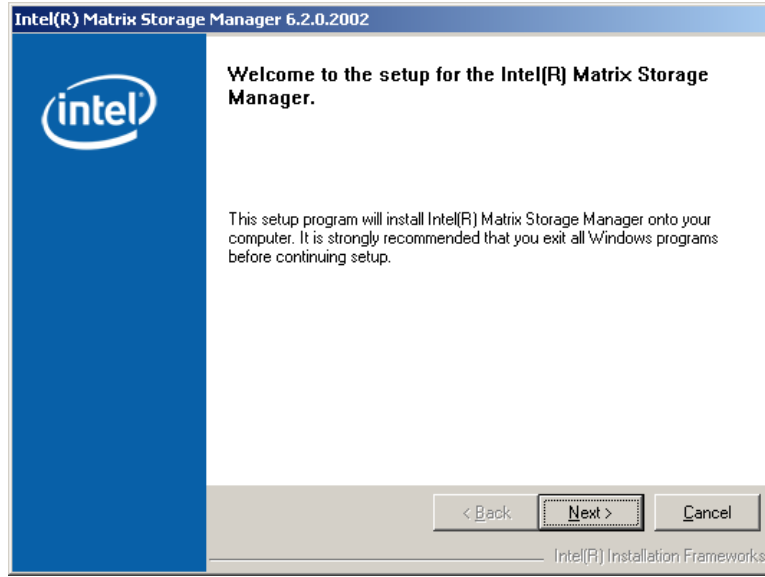
Figure 6-30: Matrix Storage Manager Welcome Screen

Step 9: Click **NEXT** and a warning appears (**Figure 6-31**). Read the warning carefully

and decide whether or not to continue the installation process.
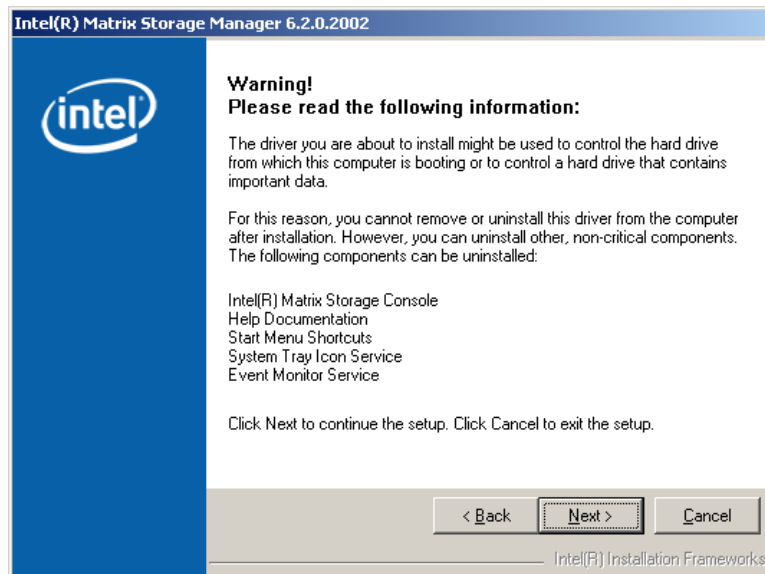
Figure 6-31: Matrix Storage Manager Warning Screen

Step 10: Click **NEXT** and a license agreement appears (**Figure 6-32**).
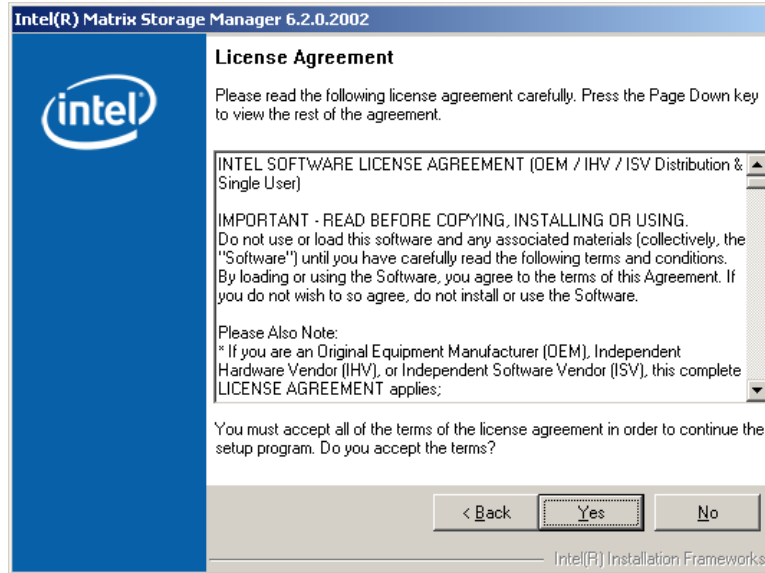
Figure 6-32: Matrix Storage Manager License Agreement

Step 11: Read the license agreement. To accept the terms and conditions stipulated in

the license agreement shown, click **YES** and the Readme information file shown
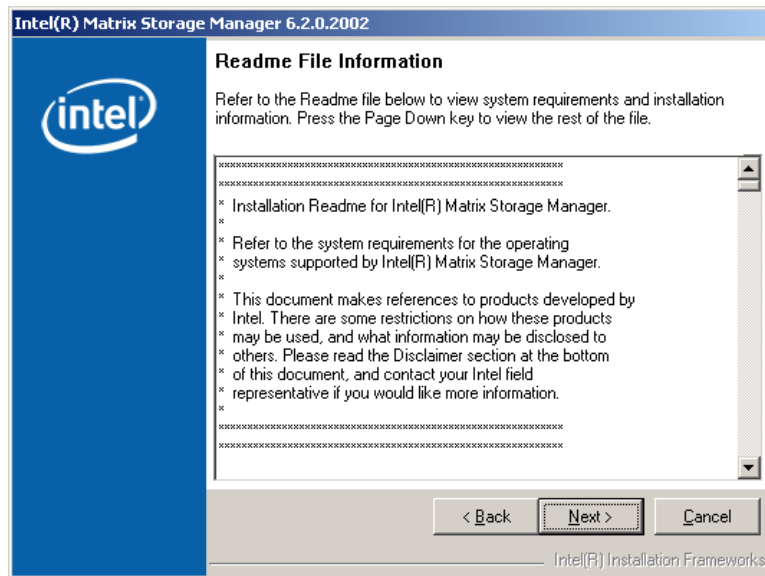
in **Figure 6-33** appears.

Figure 6-33: Matrix Storage Manager Readme File

Step 12: Read the Readme file information and click **NEXT**.

Step 13: After the driver installation process is complete, a confirmation screen appears (**Figure 6-34**).
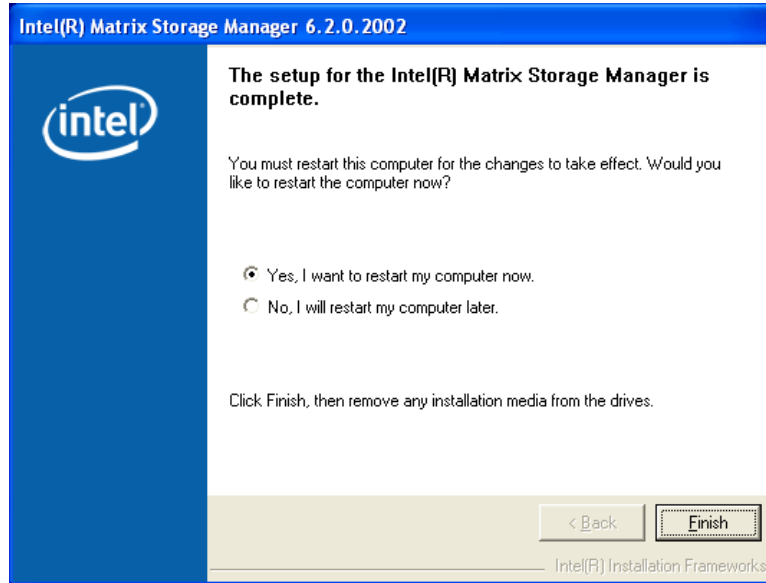

Figure 6-34: Matrix Storage Manager Setup Complete

Step 14: The confirmation screen offers the option of restarting the computer now or later. For the settings to take effect, the computer must be restarted. Click FINISH to restart the computer.

6.8 iSMM Installation

The iSMM (Intelligent System Management Module) allows hardware functions to be monitored from within the operating system. The iSMM can be set to sound an alarm when voltages, temperatures or fan speeds rise above or fall below the set limits.

Step 1: Access the driver list shown in **Figure 6-3**. (See **Section 6.2**)

Step 2: Click "**6-iSMM**"

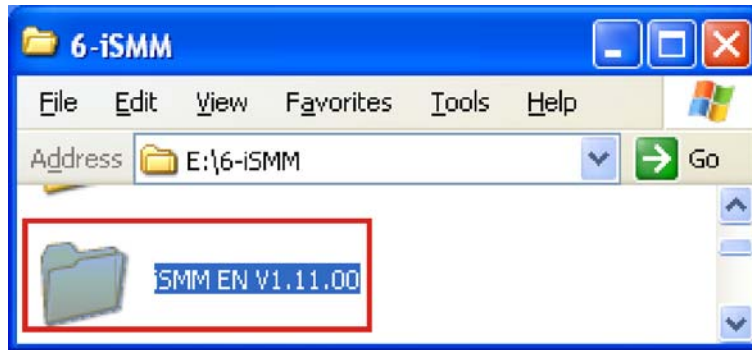**Step 3:** The iSMM directory appears. (**Figure 6-35**)

Figure 6-35: iSMM Directory

Step 4: Double click the **iSMM EN V1.11.00** directory icon. (**Figure 6-35**)

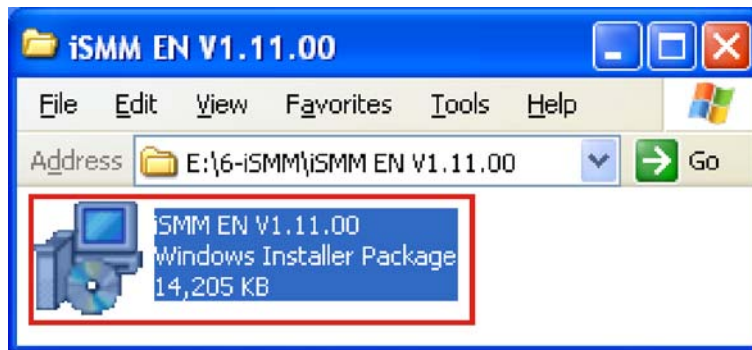**Step 5:** The contents of the directory are displayed. (**Figure 6-36**)

Figure 6-36: iSMM Installation File

Step 6: Double click the **iSMM EN V1.11.00** setup file. (**Figure 6-36**)

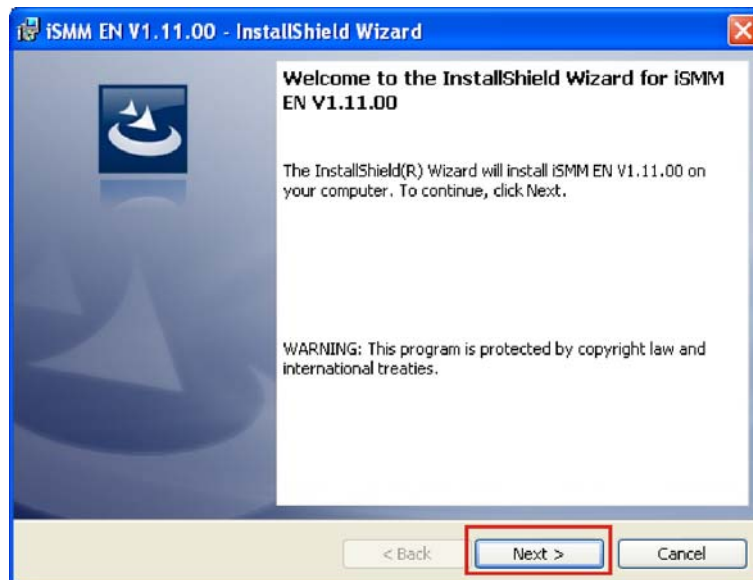**Step 7:** The **iSMM InstallShield Welcome Screen** appears. (**Figure 6-37**)

Figure 6-37: iSMM InstallShield Welcome Screen

Step 8: Click NEXT to continue.

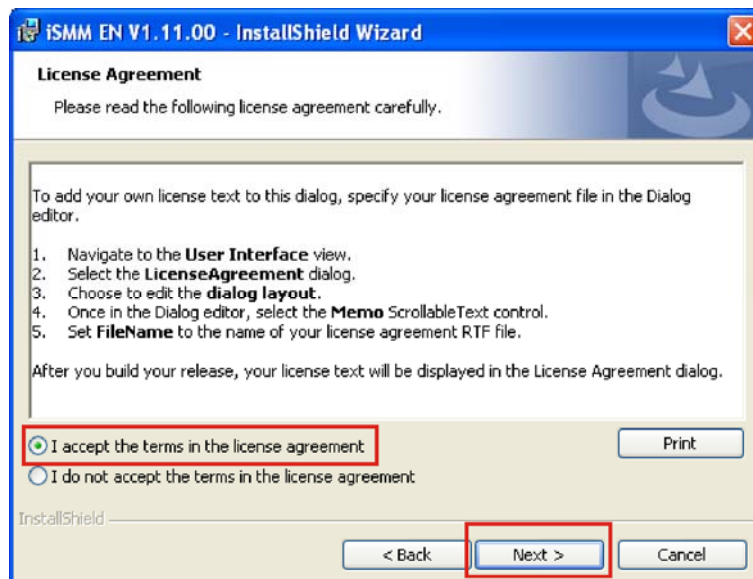**Step 9:** The **License Agreement** screen appears. (**Figure 6-38**)

Figure 6-38: iSMM License Agreement

Step 10: Select "**I accept the terms of the license agreement.**" (**Figure 6-38**)

Step 11: Click NEXT to continue.(**Figure 6-38**)

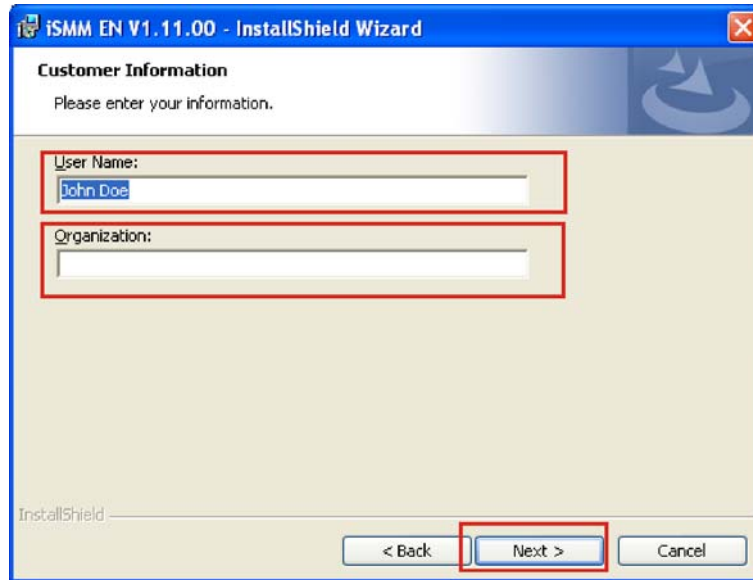**Step 12:** The **Customer Information** screen appears.(**Figure 6-39**)

Figure 6-39: iSMM Customer Information

Step 13: Fill in the "User Name" and "Organization" fields, which will be automatically

filled with the settings for the current user.(**Figure 6-39**)

Step 14: Click **Next** to continue.(**Figure 6-39**)

Step 15: The **Setup Type** screen appears. (**Figure 6-40**)
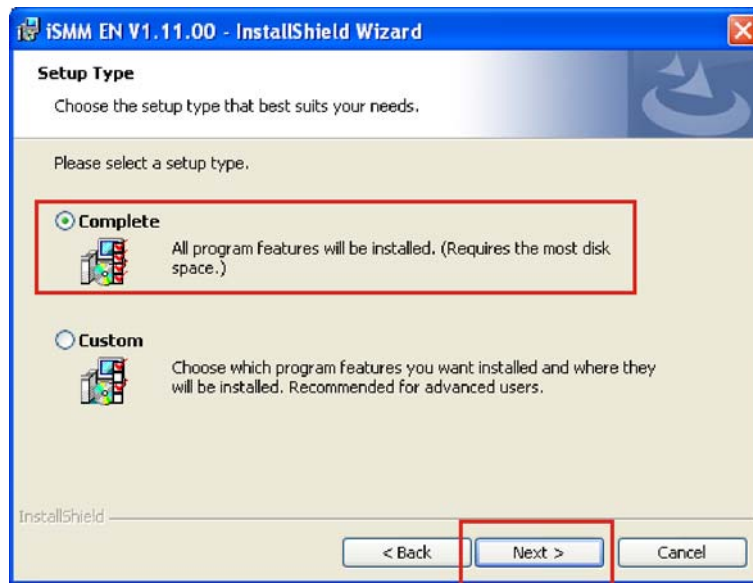

Figure 6-40: iSMM Setup Type

Step 16: Select "**Complete**" (**Figure 6-40**)

Step 17: Click NEXT to continue. (**Figure 6-40**)

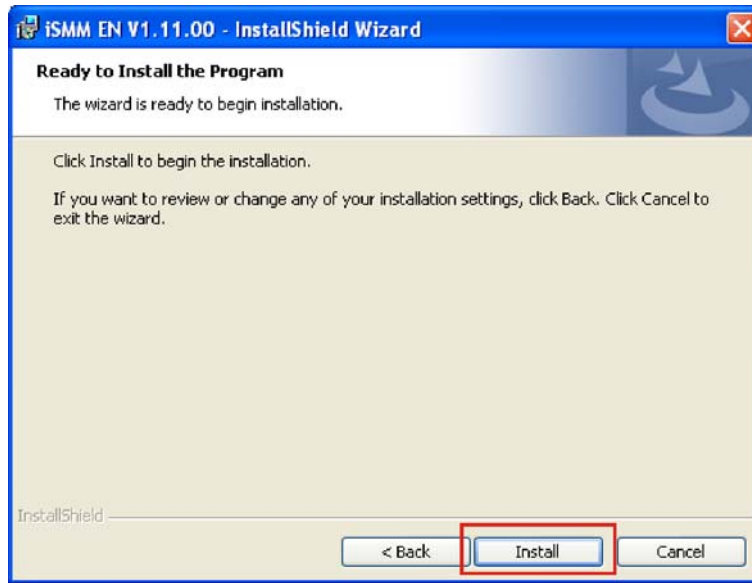Step 18: The **Installation Confirmation** screen appears. (**Figure 6-41**)

Figure 6-41: iSMM Installation Confirmation

Step 19: Click INSTALL to begin installing the drivers. (**Figure 6-41**)

Step 20: The InstallShield Wizard Completed appears when the drivers are finished

installing. (**Figure 6-42**)
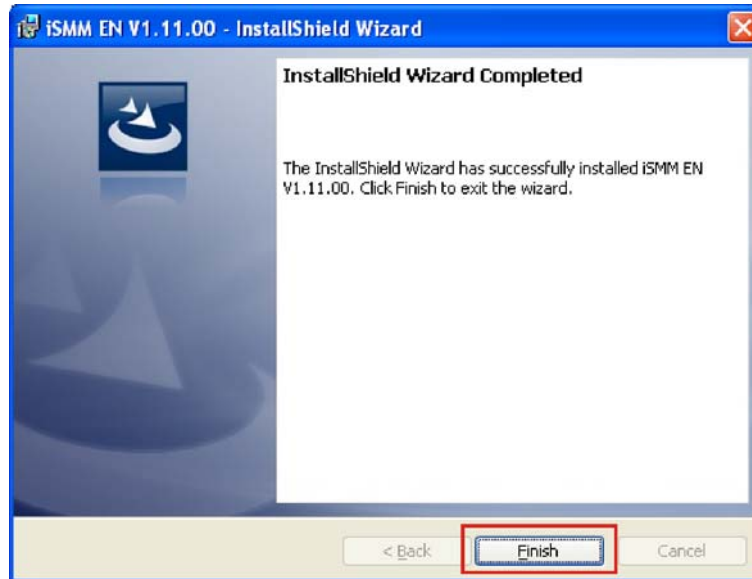

Figure 6-42: iSMM InstallShield Wizard Complete

Step 21: Click FINISH to exit the installation program.(**Figure 6-42**)

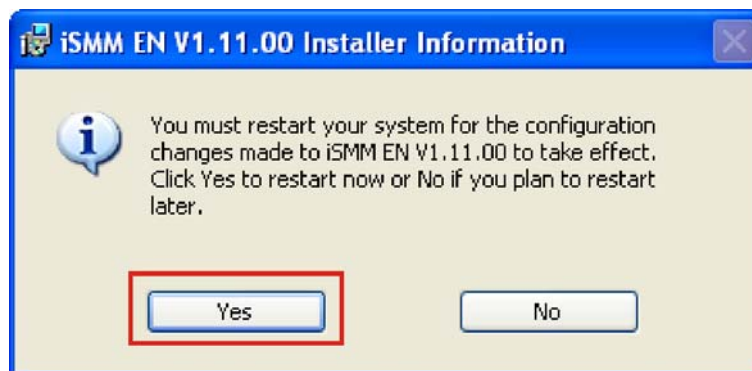**Step 22:** The **Restart Confirmation** screen appears.(**Figure 6-43**)

Figure 6-43: iSMM Restart Confirmation

Step 23: Select YES to restart the system, or NO to restart the system manually later.

Appendix

A

BIOS Options

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

Appendix

B

Terminology

AC '97	Audio Codec 97 (AC'97) refers to a codec standard developed by Intel® in 1997.
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.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
ASKIR	Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude ("volume") of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.
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
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
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.
DAC	The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.
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.
EHCI	The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.
EIDE	Enhanced IDE (EIDE) is a newer IDE interface standard that has data transfer rates between 4.0 MBps and 16.6 MBps.
EIST	Enhanced Intel® SpeedStep Technology (EIST) allows users to modify the power consumption levels and processor performance through application software. The application software changes the bus-to-core frequency ratio and the processor core voltage.
FSB	The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Northbridge chipset.
GbE	Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gbps and complies with the IEEE 802.3-2005 standard.
GPIO	General purpose input
HDD	Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.
ICH	The Input/Ouput Control Hub (ICH) is an Intel® Southbridge chipset.
IrDA	Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.
L1 Cache	The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.
L2 Cache	The Level 2 Cache (L2 Cache) is an external processor memory cache.

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.
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.
UART	Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.
UHCI	The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.
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

Digital I/O Interface

C.1 Introduction

The DIO connector on the NANO-945GSE2 is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally 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.

 NOTE:

For further information, please refer to the datasheet for the Super I/O chipset.

C.2 DIO Connector Pinouts

The following table describes how the DIO connector pins are connected to the Super I/O GPIO port 1.

Pin	Description	Super I/O Pin	Super I/O Pin Description
1	Ground	N/A	N/A
2	VCC	N/A	N/A
3	Output 3	GP27	General purpose I/O port 2 bit 7.
4	Output 2	GP26	General purpose I/O port 2 bit 6.
5	Output 1	GP25	General purpose I/O port 2 bit 5.
6	Output 0	GP24	General purpose I/O port 2 bit 4.
7	Input 3	GP23	General purpose I/O port 2 bit 3.
8	Input 2	GP22	General purpose I/O port 2 bit 2
9	Input 1	GP21	General purpose I/O port 2 bit 1
10	Input 0	GP20	General purpose I/O port 2 bit 0

Table C-1: Digital I/O Connector Pinouts

C.3 Assembly Language Samples

C.3.1 Enable the DIO Input Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O input functions is listed below.

MOV	**AX, 6F08H**	Sets the digital port as input
INT	**15H**	Initiates the INT 15H BIOS call

C.3.2 Enable the DIO Output Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O output functions is listed below.

MOV	**AX, 6F09H**	Sets the digital port as output
MOV	**BL, 09H**	
INT	**15H**	Initiates the INT 15H BIOS call

Appendix

D

Watchdog Timer

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 D-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, the call 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

E

Compatibility

> **NOTE:**
>
> The compatible items described here have been tested by the IEI R&D
> team and found to be compatible with the NANO-945GSE2

E.1 Compatible Operating Systems

The following operating systems have been successfully run on the NANO-945GSE2.

- MS-DOS 6.22
- Microsoft Windows XP (32-bit)
- Microsoft Windows XPE-POS (32-bit)
- Microsoft Windows 2000/SP4
- Microsoft Vista Ultimate (32-bit)
- Mardriva 2008/Mardriva 2006
- Ubuntu 8.04
- openSuSE 11.0
- Fedora 9
- QNX 6.2.1

E.2 Compatible Processors

The following Intel® Socket 478 processors have been successfully tested on the
NANO-945GSE2

CPU	FSB	Frequency	L2 Cache
Intel® Atom™ CPU N270	533 MHz	1.6 GHz	512 KB

Table E-1: Compatible Processors

E.3 Compatible Memory Modules

> **NOTE:**
>
> The memory modules listed below have been tested on the NANO-945GSE2 other memory modules that comply with the specifications may also work on the NANO-945GSE2 but have not been tested.

The following memory modules have been successfully tested on the NANO-945GSE2.

Manufacturer	Model No.	Capacity	Speed	Type
A-DATA	AD29608A8A-3EG	512MB	667 MHz	DDR2
A-DATA	AD20908A8A-25EG	2GB	800 MHz	DDR2
Apacer	ELPIDA E5108AB-5C-E	512MB	533 MHz	DDR2
CORSAIR	VS512SDS667D2	512MB	667 MHz	DDR2
Infinity	64M8PC6400	1GB	800 MHz	DDR2
Kingston	hynix Hy5PS12821C FP-Y5	1GB	667 MHz	DDR2
Kingston	Micron 7JE11D9HNL	2GB	667 MHz	DDR2
KINGMAX	KINGMAX KKA8FFBXF	512MB	667 MHz	DDR2
KINGMAX	KINGMAX KKA8FFBXF	1GB	667 MHz	DDR2
KINGMAX	KINGMAX KKB8FFBXF	1GB	800 MHz	DDR2
Transcend	MICRON 6AB32D9DCN	512MB	533 MHz	DDR2
Transcend	ELPIDA E5108AJBG-6E-E	1GB	667 MHz	DDR2
UMAX	UMAX (U2S12D30TP-6E)	1GB	667 MHz	DDR2
WinChip	WinChip AEP128EGG-25	2GB	800 MHz	DDR2

Table E-2: Compatible Memory Modules

Hazardous Materials Disclosure

F.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。						