**IEi**®

IEI Technology Corp.

MODEL:

NANO-PV-D4252/N4552/D5252

EPIC Motherboard with Intel® Atom™ processor D425/N455/D525, VGA, Dual LVDS, GbE LAN, Eight USB 2.0, Two SATA 3Gb/s, Four RS-232, RS-232/422/485, PCIe mini, PCI-104, RoHS

User Manual

Rev. 1.05 – 31 December, 2011

RoHS Lead Free

Revision

Date	Version	Changes
31 December, 2011	1.05	Added note to Section 3.1.3 and Section 4.8
24 August, 2011	1.04	Minor revision to pin definitions in the following sections: 4.5.9 LVDS1 Screen Resolution Selection 4.5.10 LVDS2 Screen Resolution Selection
17 June, 2011	1.03	Minor revision to pin definitions in section 3.2.16 Power Connector
18 April, 2011	1.02	Updated Table 4-7, 4-8, and 4-10 jumper settings. Updated KEY1 connector to LVDS2 Backlight Adjustment.
6 January, 2011	1.01	Revised Pins 11, 12, 23, 24 in Table 3-14 LVDS2 Connector Pinouts
24 November, 2010	1.00	Initial release

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Introduction

1.1 Introduction

Figure 1-1: NANO-PV-D4252/N4552/D5252

The NANO-PV-D4252/N4552/D5252 EPIC motherboard is a Intel® Atom™ processor D525, D425 or N455 platform. Up to one 2.0 GB 800 MHz or 667 MHz DDR3 SDRAM SO-DIMM is supported by the NANO-PV-D4252/N4552/D5252.

The integrated Intel® ICH8M Chipset supports a GbE LAN port through the Realtek RTL8111E Ethernet controller (with ASF 2.0 support). The NANO-PV-D4252/N4552/D5252 also supports two SATA 3Gb/s drives and provides 5 V SATA power.

The NANO-PV-D4252/N4552/D5252 supports dual display via VGA and two internal LVDS LCD connectors. Eight USB 2.0 channels, one PCIe mini socket, one PCI-104 slot and internal one parallel port connector provide flexible expansion options. High Definition Audio (HDA) support ensures HDA devices can be easily implemented on the NANO-PV-D4252/N4552/D5252. Serial device connectivity is provided by a RS-232 serial port, three internal RS-232 and one internal RS-232/422/485 connectors.

1.2 Connectors

The connectors on the NANO-PV-D4252/N4552/D5252 are shown in the figure below.
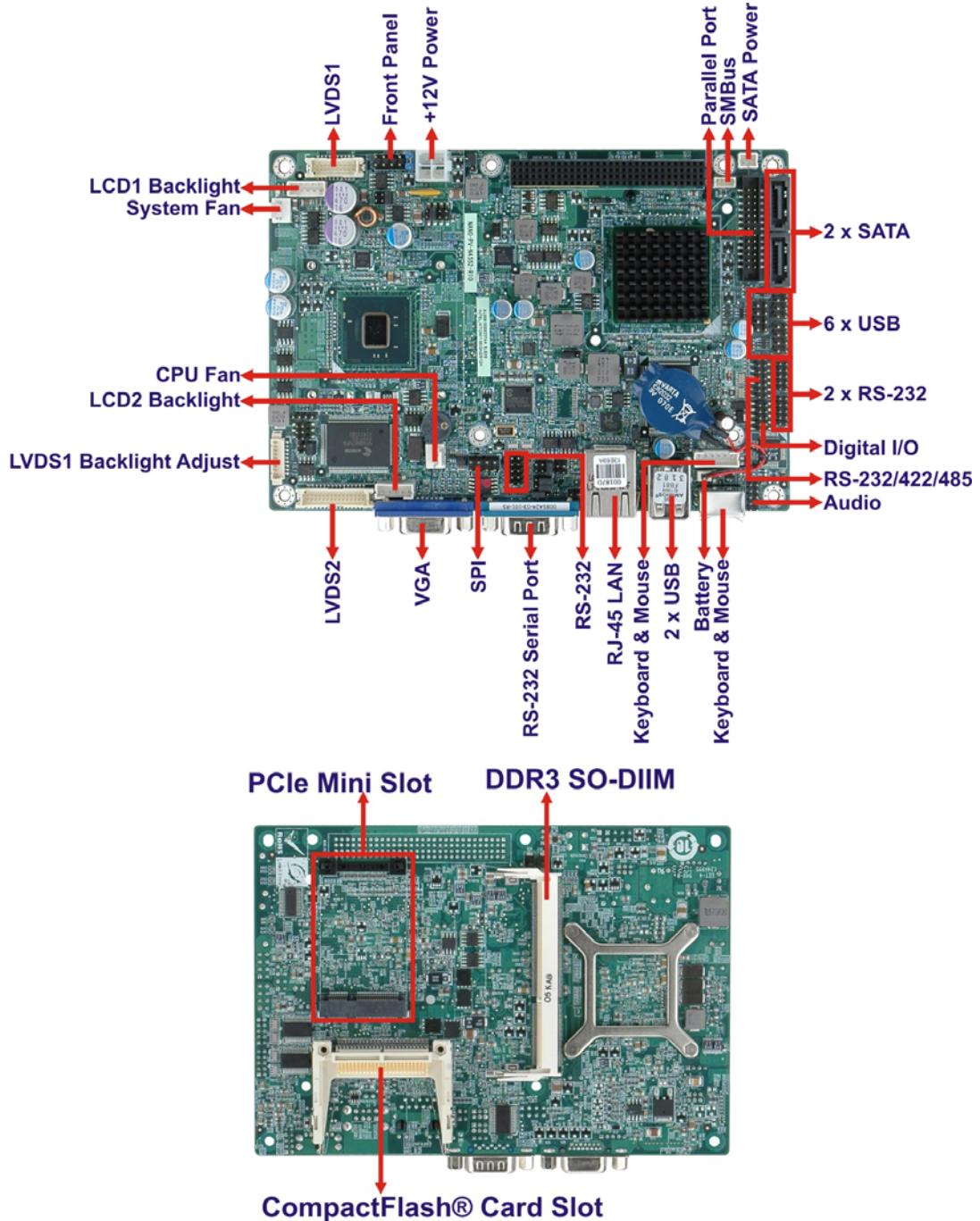
Figure 1-2: Connectors

1.3 Dimensions

The dimensions of the board are listed below:

- ▪ **Length**: 165 mm
- ▪ **Width**: 115 mm
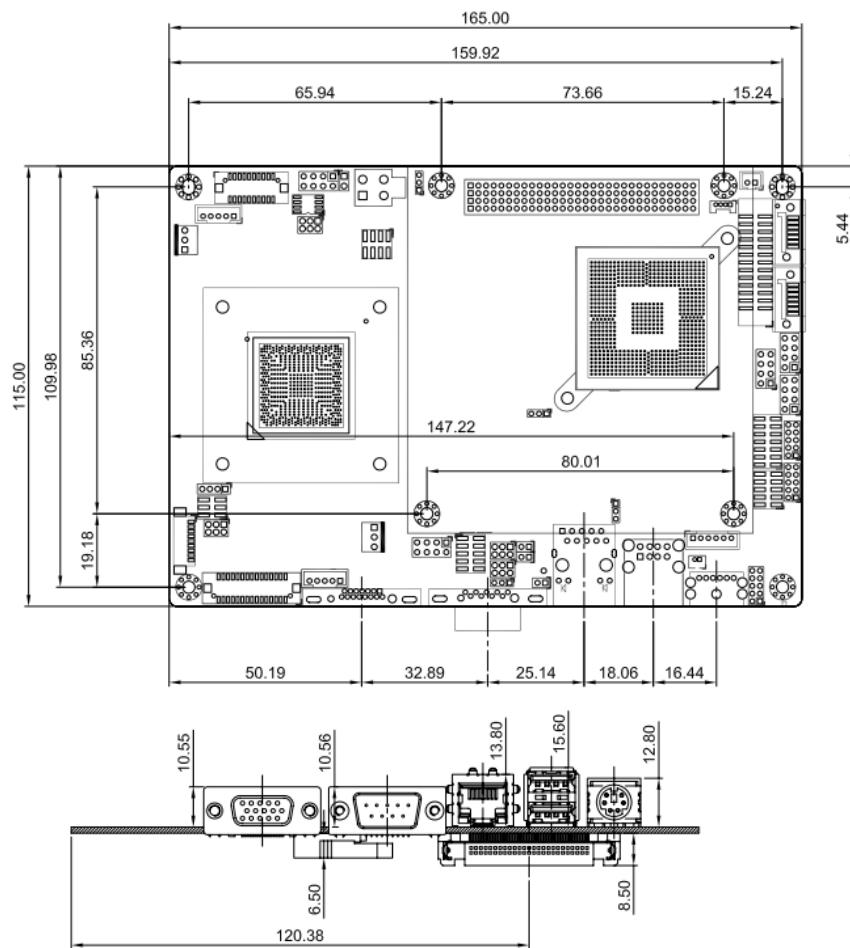
Figure 1-3: NANO-PV-D4252/N4552/D5252 Dimensions (mm)

1.4 Data Flow

Figure 1-4 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.
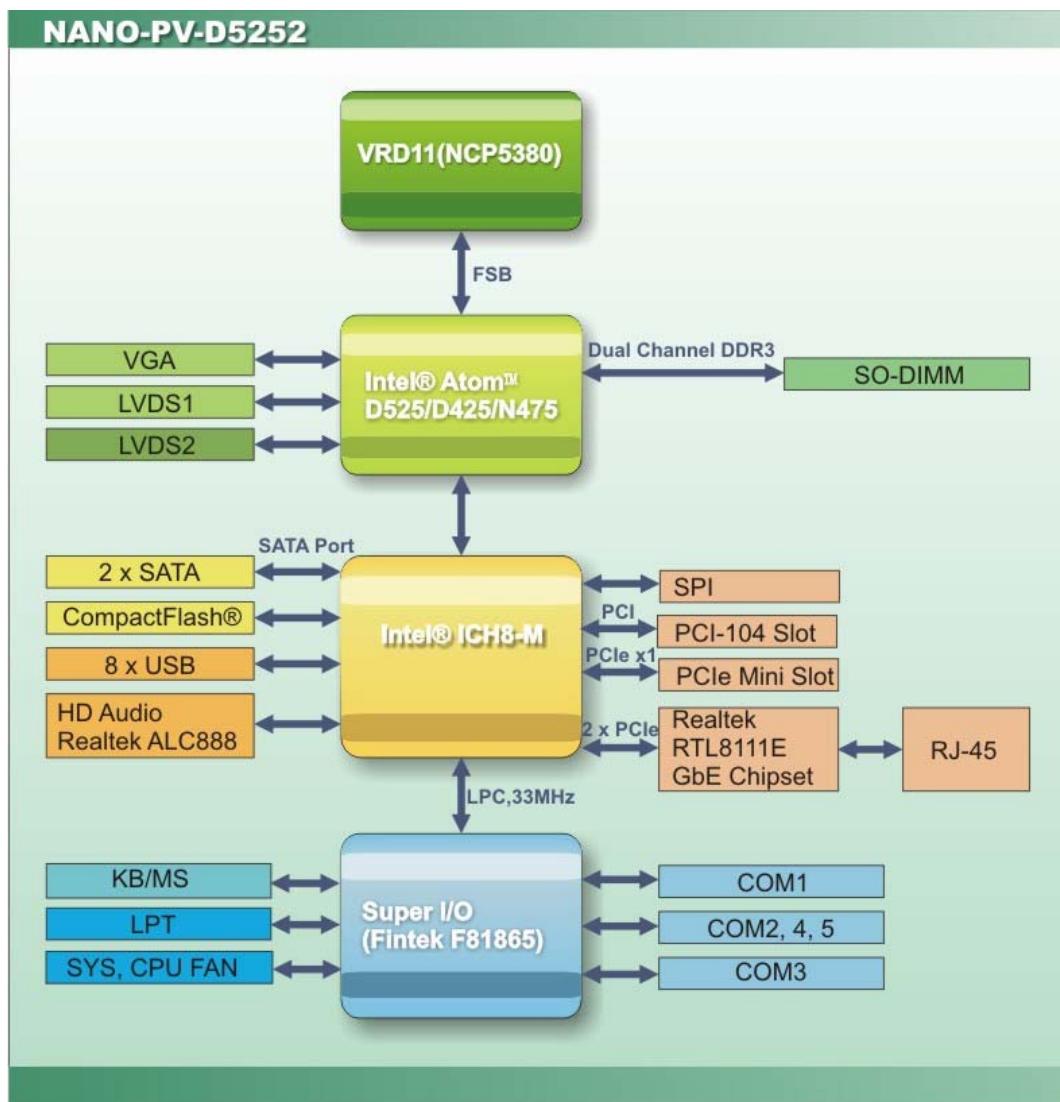
Figure 1-4: Data Flow Block Diagram

1.5 Technical Specifications

NANO-PV-D4252/N4552/D5252 technical specifications are listed in table below.

Specification	NANO-PV-D4252/N4552/D5252
Form Factor	EPIC
CPU options	Intel® Atom™ processor D525, 1.8 GHz/1 MB L2 cache Intel® Atom™ processor D425, 1.8 GHz/512 KB L2 cache Intel® Atom™ processor N455, 1.66 GHz/512 KB L2 cache
Express Chipset	Intel® ICH8M
Memory	One 204-pin SO-DIMM sockets support one 800/667 MHz 2.0 GB (max.) DDR3 SDRAM SO-DIMM (system max. 2 GB)
Audio	Realtek ALC888 HD 7.1 channel audio codec
LAN	One Realtek RTL8111E PCIe GbE controller with ASF 2.0 support
Super I/O	Fintek F81865
Digital I/O	8-bit, 4-bit input/4-bit output
BIOS	AMI BIOS label
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansion	
PCIe	One PCIe Mini slot
PCI	One PCI-104 slot
I/O Interface Connectors	
Audio Connector	One internal audio connector (10-pin header)
Display Ports	One VGA port (2048x1536) One internal 18/24bit single/dual-channel LVDS connector (up to 1920 x 1080) One internal 18-bit single-channel LVDS connector (up to 1024 x 768 or 1366 x 768)
Ethernet	One RJ-45 GbE ports

Specification	NANO-PV-D4252/N4552/D5252
Serial Ports	One RS-232 serial port Three RS-232 via four 10-pin headers One RS-232/422/485 via 14–pin header
USB 2.0/1.1 Ports	Two external USB ports Six internal USB ports via three 8-pin headers
Parallel Ports	One LPT connector via 26-pin header
Storage	
Serial ATA	Two SATA 3.0 Gb/s connectors with RAID 0,1 support One 5 V SATA power connector
CompactFlash®	One CompactFlash® Type II socket
Environmental and Power Specifications	
Power Supply	12 V only ATX and AT power supported
Power Connector	One internal 4-pin Molex power connector for power supply
Power Consumption	12V@2.21A(Intel® Atom™ D525 with 1GB 667Mhz DDR3)
Operating Temperature	-10ºC ~ 60ºC (requires cooler and silicone heat sink paste)
Humidity	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	165 mm x 115 mm
Weight GW/NW	850 g / 350 g

Table 1-1: Technical Specifications

Chapter

2

Unpacking

2.1 Anti-static Precautions

 ⚠️ **WARNING!**

Static electricity can destroy certain electronics. Make sure to follow the ESD precautions to prevent damage to the product, and injury to the user.

Make sure to adhere to the following guidelines:

- *Wear an anti-static wristband*: Wearing an anti-static wristband can prevent electrostatic discharge.
- *Self-grounding*: Touch a grounded conductor every few minutes to discharge any excess static buildup.
- *Use an anti-static pad*: When configuring any circuit board, place it on an anti-static mat.
- *Only handle the edges of the PCB*: Don't touch the surface of the motherboard. Hold the motherboard by the edges when handling.

2.2 Unpacking Precautions

When the NANO-PV-D4252/N4552/D5252 is unpacked, please do the following:

- Follow the antistatic guidelines above.
- Make sure the packing box is facing upwards when opening.
- Make sure all the packing list items are present.

2.3 Packing List

![NOTE icon] **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-PV-D4252/N4552/D5252 was purchased from or contact an IEI sales representative directly by sending an email to sales@iei.com.tw.

The NANO-PV-D4252/N4552/D5252 is shipped with the following components:

Quantity	Item and Part Number	Image
1	NANO-PV-D4252/N4552/D5252-R10, or NANO-PV-D4252-R10, or NANO-PV-N4552-R10 motherboard	
1	SATA and 5 V power cable (**P/N:** 32000-114000-RS)	
1	KB/MS PS/2 Y-cable (**P/N**: 32000-000138-RS)	
2	RS-232 serial port cable (**P/N**: 32200-000049-RS)	
1	AT 12 V Cable (**P/N**: 32100-087100-RS)	
1	Audio cable (**P/N:** 32000-072100-RS)	

1	Dual USB cable (w bracket) (**P/N**:CB-USB02A-RS)	
1	Mini jumper pack (2.0mm) (**P/N**: 33100-000033-RS)	
1	Utility CD	
1	Quick Installation Guide	

2.3.1 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
LPT cable (wo bracket) (**P/N**: 32200-015100-RS)	
Dual USB cable (wo bracket) (**P/N**: 32000-044300-RS)	
RS-232/422/485 cable (**P/N**: 32200-026500-RS)	
SATA power cable (**P/N**: 32100-000100-100-RS) (**P/N**: 32100-000100-200-RS)	
SATA cable (**P/N**: 32000-062800-RS)	

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the jumpers and connectors.

3.1.1 NANO-PV-D4252/N4552/D5252 Layout

The figures below show all the connectors and jumpers.
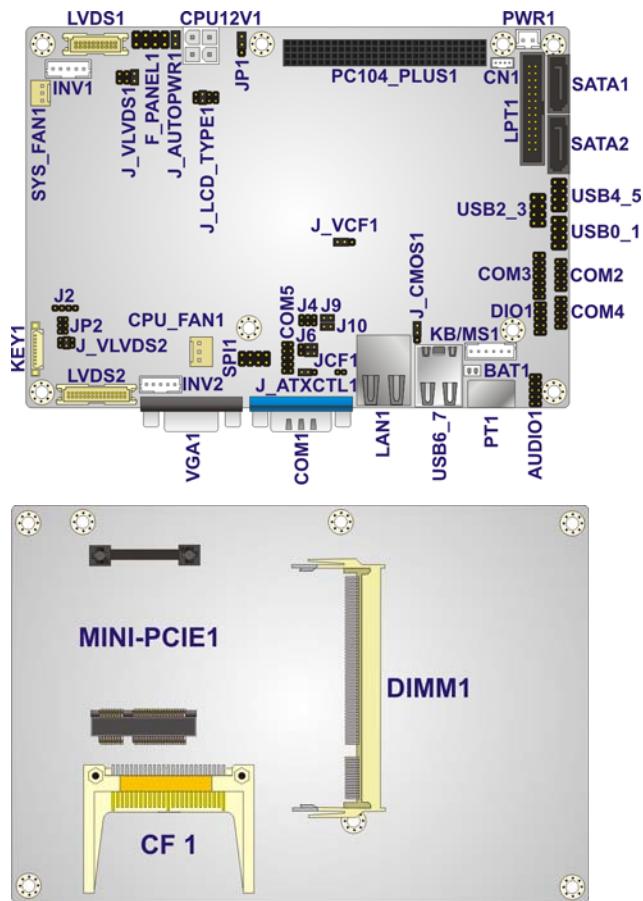
Figure 3-1: Connector and Jumper Locations

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
Audio connector	10-pin header	AUDIO1
Battery connector	2-pin wafer	BAT1
BIOS update connector	6-pin wafer	SPI1
CompactFlash® slot	50-pin header	CF1
DDR3 SO-DIMM socket	204-pin socket	DIMM1
Digital I/O connector	10-pin header	DIO1
Fan connector (CPU)	3-pin wafer	CPU_FAN1
Fan connector (system)	3-pin wafer	SYS_FAN1
Front panel connector	8-pin header	F_PANEL1
Keyboard and mouse connector	6-pin wafer	KB/MS1
LVDS1 backlight inverter connector	5-pin wafer	INV1
LVDS2 backlight inverter connector	5-pin wafer	INV2
LVDS2 backlight adjust connector	9-pin wafer	KEY1
LVDS1 LCD connector	30-pin crimp	LVDS1
LVDS2 LCD connector	20-pin crimp	LVDS2
Parallel port connector	26-pin header	LPT1
PCI-104 connector	PCI-104 connector	PC104_PLUS1
PCIe Mini card slot	PCIe Mini card slot	MINI_PCIE1
Power connector (+12V, power supply)	4-pin connector	CPU12V1
RS-232 serial port connector	10-pin header	COM2
RS-232 serial port connector	10-pin header	COM4
RS-232 serial port connector	10-pin header	COM5
RS-232/422/485 serial port connector	14-pin header	COM3

Serial ATA (SATA) drive connector	7-pin SATA	SATA1
Serial ATA (SATA) drive connector	7-pin SATA	SATA2
SATA power connector	2-pin wafer	PWR1
SMBus connector	4-pin wafer	CN1
USB connector	8-pin header	USB0_1
USB connector	8-pin header	USB2_3
USB connector	8-pin header	USB4_5

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

NOTE:

Due to limited space on the mainboard, the VGA and COM port on the I/O panel cannot be used simultaneously. To utilize both the VGA and COM port at the same time, please connect the RS-232 COM port cable to the mainboard pin-header. For convenience, the mainboard provides support for a maximum of four COM ports plus one VGA port or five COM ports without VGA setup.

The table below lists the connectors on the external I/O panel.

Connector	Type	Label
Ethernet connector	RJ-45	LAN1
Keyboard/Mouse connector	PS/2	PT1
VGA port connector	15-pin Female	VGA1
Serial port (RS-232) connector	9-pin male	COM1
USB ports (dual)	USB port	USB6_7

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the NANO-PV-D4252/N4552/D5252.

3.2.1 Audio Connector

CN Label:	**AUDIO1**
CN Type:	10-pin header (2x5)
CN Location:	See **Figure 3-2**
CN Pinouts:	See **Table 3-3**

The 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.
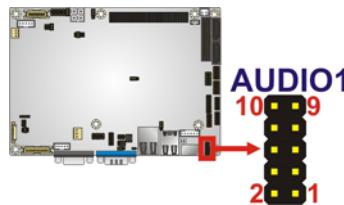
Figure 3-2: Audio Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LFRONT-R	2	LLINE-R
3	GND	4	GND
5	LFRONT-L	6	LLINE-L
7	GND	8	GND
9	LMIC1-CONN-R	10	LMIC1-CONN-L

Table 3-3: Audio Connector Pinouts

3.2.2 Battery Connector

CN Label:	**BAT1**
CN Type:	2-pin wafer (1x2)
CN Location:	See **Figure 3-3**
CN Pinouts:	See **Table 3-4**

This is connected to the system battery. The battery provides power to the system clock to retain the time when power is turned off.
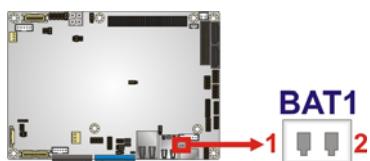
Figure 3-3: Battery Connector Location

Pin	Description
1	Battery+
2	Ground

Table 3-4: Battery Connector Pinouts

3.2.3 CompactFlash® Slot

CN Label: **CF1**

CN Type: CompactFlash® card slot

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

CN Pinouts: See **Table 3-5**

A CompactFlash® Type I/II card can be used in this slot.
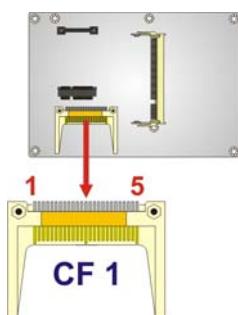
Figure 3-4: CompactFlash® Slot Location

Pin	Description	Pin	Description
1	GROUND	26	VCC-IN CHECK1

Pin	Description	Pin	Description
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	GROUND	33	N/C
9	GROUND	34	IOR#
10	GROUND	35	IOW#
11	GROUND	36	VCC_CF
12	GROUND	37	IRQ14
13	VCC_CF	38	VCC_CF
14	GROUND	39	CSEL
15	GROUND	40	N/C
16	GROUND	41	HDD_RESET
17	GROUND	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 3-5: CompactFlash® Slot Pinouts

3.2.4 Digital I/O Connector

CN Label: **DIO1**

CN Type: 10-pin header

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

CN Pinouts: See **Table 3-6**

The digital I/O connector provides programmable input and output for external devices. The digital I/O provides 4-bit output and 4-bit input.
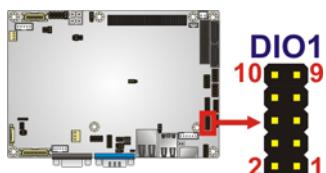
Figure 3-5: Digital I/O Connector Locations

Pin	Description	Pin	Description
1	GND	2	+5V
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 3-6: Digital I/O Connector Pinouts

3.2.5 Fan Connector (CPU)

CN Label:	**CPU_FAN1**
CN Type:	3-pin wafer (1x3)
CN Location:	See **Figure 3-6**
CN Pinouts:	See **Table 3-7**

The fan connector attaches to a CPU cooling fan.
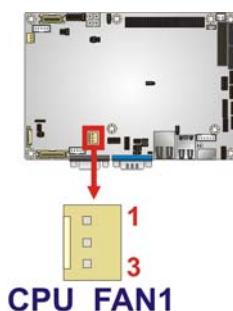
Figure 3-6: CPU Fan Connector Location

Pin	Description
1	FANIO1
2	POWER
3	GND

Table 3-7: CPU Fan Connector Pinouts

3.2.6 Fan Connector (System)

CN Label: **SYS_FAN1**

CN Type: 3-pin wafer (1x3)

CN Location: See **Figure 3-7**

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

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.
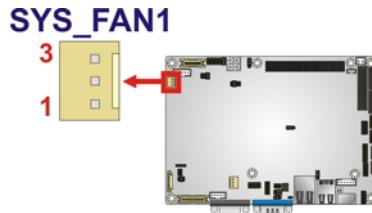
Figure 3-7: +12V Fan Connector Locations

PIN NO.	DESCRIPTION
1	FANIO2
2	+12V
3	GND

Table 3-8: +12V Fan Connector Pinouts

3.2.7 Front Panel Connector

CN Label: **F_PANEL1**

CN Type:	8-pin header (2x4)
CN Location:	See **Figure 3-8**
CN Pinouts:	See **Table 3-9**

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
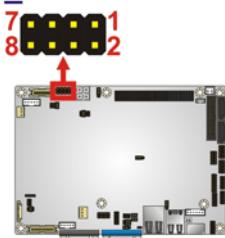
Figure 3-8: Front Panel Connector Location

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power Button	1	PWR_BTN+	Power LED	2	PWR LED
	3	GND		4	GND
SATA LED	5	SATA LED PWT	Reset	6	RESET
	7	SATA_LED#		8	GND

Table 3-9: Front Panel Connector Pinouts

3.2.8 Keyboard/Mouse Connector

CN Label:	**KB/MS1**
CN Type:	6-pin wafer (1x6)
CN Location:	See **Figure 3-9**
CN Pinouts:	See **Table 3-10**

The keyboard/mouse connector connects to a PS/2 Y-cable that can be connected to a PS/2 keyboard and mouse.
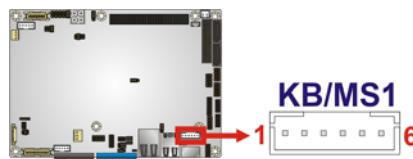
Figure 3-9: Keyboard/Mouse Connector Location

Pin	Description
1	+5 VCC
2	MS DATA
3	MS CLK
4	KB DATA
5	KB CLK
6	GROUND

Table 3-10: Keyboard/Mouse Connector Pinouts

3.2.9 Backlight Inverter Connector

CN Label: **INV1, INV2**

CN Type: 5-pin wafer (1x5)

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

CN Pinouts: See **Table 3-11**

The backlight inverter connector provides power to an LCD panel.
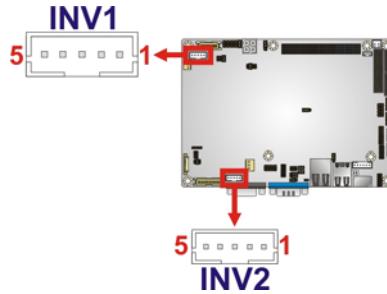
Figure 3-10: Backlight Inverter Connector Location

Pin	Description
1	BL_ADJ
2	GROUND
3	+12 V
4	GROUND
5	BACKLIGHT ENABLE

Table 3-11: Backlight Inverter Connector Pinouts

3.2.10 LVDS Backlight Adjustment (LVDS2)

CN Label: **KEY1**

CN Type: 9-pin header

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

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

Interfaces to the LPC interface on the Southbridge.
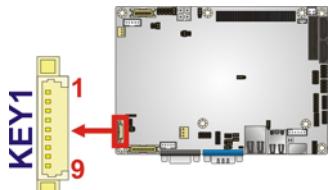
Figure 3-11: LPC Connector Location

Pin	Description	Pin	Description
1	LED-BL	2	N/A
3	LED-AM	4	menu/enter
5	DOWN	6	UP
7	auto/exit	8	POWER
9	GND		

Table 3-12: LPC Connector Pinouts

3.2.11 LVDS1 LCD Connector

CN Label: **LVDS1**

CN Type: 20-pin crimp (2x10)

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

CN Pinouts: See **Table 3-14**

The LVDS1 connector is for an LCD panel connected to the board.

Figure 3-12: LVDS1 Connector Locations

Pin	Description	Pin	Description
1	GROUND	2	GROUND
3	LVDSA_DATA0+	4	LVDSA_DATA0-
5	LVDSA_DATA1+	6	LVDSA_DATA1-
7	LVDSA_DATA2+	8	LVDSA_DATA2-
9	LVDSA_CLK+	10	LVDSA_CLK-
11	N/C	12	N/C
13	GROUND	14	GROUND
15	LDDC_DATA	16	LDDC_CLK
17	VCC_LCD	18	VCC_LCD
19	VCC_LCD	20	VCC_LCD

Table 3-13: LVDS1 Connector Pinouts

3.2.12 LVDS2 LCD Connector

CN Label: **LVDS2**

CN Type: 30-pin crimp (2x15)

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

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

The LVDS2 connector is for an LCD panel connected to the board.
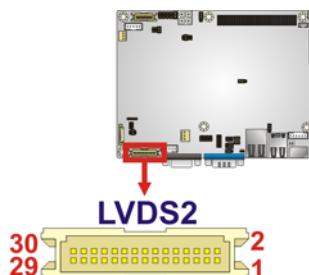
Figure 3-13: LVDS2 Connector Location

Pin	Description	Pin	Description
1	GROUND	2	GROUND
3	LVDSA_Y0+	4	LVDSA_Y0-
5	LVDSA_Y1+	6	LVDSA_Y1-
7	LVDSA_Y2+	8	LVDSA_Y2-
9	LVDSA_CLK+	10	LVDSA_CLK-
11	LVDSA_Y3+	12	LVDSA_Y3-
13	GROUND	14	GROUND
15	LVDSB_Y0+	16	LVDSB_Y0-
17	LVDSB_Y1+	18	LVDSB_Y1-
19	LVDSB_Y2+	20	LVDSB_Y2-
21	LVDSB_CLK+	22	LVDSB_CLK-
23	LVDSB_Y3+	24	LVDSB_Y3-
25	GROUND	26	GROUND
27	VCC_LVDS	28	VCC_LVDS
29	VCC_LVDS	30	VCC_LVDS

Table 3-14: LVDS2 Connector Pinouts

3.2.13 Parallel Port Connector

CN Label: LPT1

CN Type: 26-pin box header

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

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

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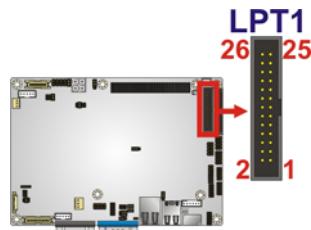
Figure 3-14: Parallel Port Connector Location

Pin	Description	Pin	Description
1	STROBE#	2	AFD
3	PTD0	4	ERROR#
5	PTD1	6	INITIALIZE
7	PTD 2	8	SLIN
9	PTD3	10	GROUND
11	PTD 4	12	GROUND
13	PTD 5	14	GROUND
15	PTD 6	16	GROUND
17	PTD7	18	GROUND
19	ACK	20	GROUND
21	BUSY	22	GROUND
23	PE	24	GROUND
25	SLCT	26	NC

Table 3-15: Parallel Port Connector Pinouts

3.2.14 PCI-104 Connector

CN Label: **PCI-104_PLUS1**

CN Type: PCI-104 connector

CN Location: See **Figure 3-15**

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

The PCI-104 connector is for installing a PCI-104 expansion card.
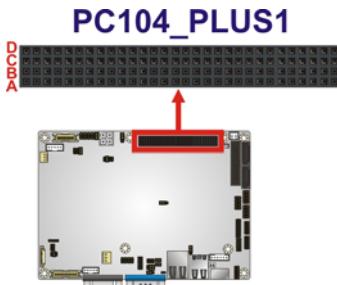
Figure 3-15: PCI-104 Connector Location

Pin	Row A	Row B	Row C	Row D
1	GND/5 V	TBD1	5 V	AD00
2	VI/O1	AD02	AD01	+5 V
3	AD05	GND	AD04	AD03
4	C/BE0#	AD07	GND	AD06
5	GND	AD09	AD08	GND
6	AD11	VI/O2	AD10	M66EN
7	AD14	AD13	GND	AD12
8	+3.3 V	C/BE1#	AD15	+3.3 V
9	SERR#	GND	SB0#	PAR
10	GND	PERR#	+3.3 V	SDONE
11	STOP#	+3.3 V	LOCK#	GND
12	+3.3 V	TRDY#	GND	DEVSEL#
13	FRAME#	GND	IRDY#	+3.3 V
14	GND	AD16	+3.3 V	C/BE2#
15	AD18	+3.3 V	AD17	GND
16	AD21	AD20	GND	AD19
17	+3.3 V	AD23	AD22	+3.3 V
18	IDSEL0	GND	IDSEL1	IDSEL2
19	AD24	C/BE3#	VI/O1	IDSEL3
20	GND	AD26	AD25	GND
21	AD29	+5 V	AD28	AD27
22	+5 V	AD30	GND	AD31
23	REQ0#	GND	REQ1#	VI/O2
24	GND	REQ2#	+5 V	GNT0#
25	GNT1#	VI/O3	GNT2#	GND

Pin	Row A	Row B	Row C	Row D
26	+5 V	CLK0	GND	CLK1
27	CLK2	+5 V	CLK3	GND
28	GND	INTD#	+5 V	RST#
29	+12 V	INTA#	INTB#	INTC#
30	-12 V	TBD2	TBD	GND/3.3 V

Table 3-16: PCI-104 Connector Pinouts

3.2.15 PCIe Mini Card Slot

CN Label: **MINI-PCIE1**

CN Type: PCIe Mini card slot

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

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

The PCIe Mini card slot is for installing PCIe Mini expansion cards.
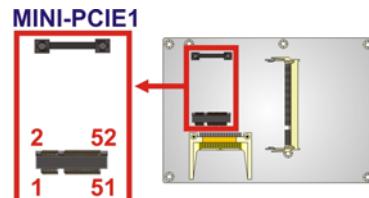
Figure 3-16: PCIe Mini Card Slot Location

Pin	Description	Pin	Description
1	PCIE_WAKE#	2	VCC3
3	N/C	4	GND
5	N/C	6	1.5 V
7	CLKREQ#	8	LFRAME#
9	GND	10	LAD3
11	CLK-	12	LAD2
13	CLK+	14	LAD1
15	GND	16	LAD0
17	PCIRST#	18	GND

Pin	Description	Pin	Description
19	LPC	20	VCC3
21	GND	22	PCIRST#
23	PERN2	24	3VDual
25	PERP2	26	GND
27	GND	28	1.5 V
29	GND	30	SMBCLK
31	PETN2	32	SMBDATA
33	PETP2	34	GND
35	GND	36	USBD-
37	GND	38	USBD+
39	VCC3	40	GND
41	VCC3	42	N/C
43	GND	44	RF_LINK#
45	SATATXP1	46	BLUELED#
47	SATATXN1	48	1.5 V
49	SATARXN1	50	GND
51	SATARXP1	52	VCC3

Table 3-17: PCIe Mini Card Slot Pinouts

3.2.16 Power Connector (+12 V, power supply)

CN Label: CPU12V1

CN Type: 4-pin Molex power connector (1x4)

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

CN Pinouts: See **Table 3-18**

The connector supports the 12 V power supply.
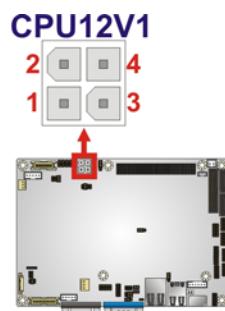
Figure 3-17: CPU 12V Power Connector Location

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

Table 3-18: CPU 12V Power Connector Pinouts

3.2.17 SATA Drive Connectors

CN Label:	**SATA1, SATA2**
CN Type:	7-pin SATA drive connectors
CN Location:	See **Figure 3-18**
CN Pinouts:	See **Table 3-19**

The two SATA 3Gb/s drive connectors are each connected to a SATA 3Gb/s drive. The SATA 3Gb/s drives transfer data at speeds as high as 3.0 Gb/s.
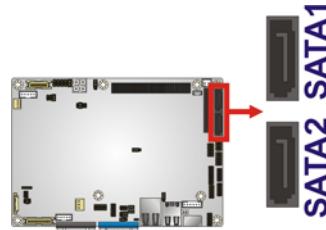
Figure 3-18: SATA Drive Connector Locations

PIN NO.	DESCRIPTION
1	GND
2	TX+
3	TX-

4	GND
5	RX-
6	RX+
7	GND

Table 3-19: SATA Drive Connector Pinouts

3.2.18 SATA Power Connector

CN Label: **PWR1**

CN Type: 2-pin wafer (1x2)

CN Location: See **Figure 3-19**

CN Pinouts: See **Table 3-20**

The SATA Power Connector provides +5V power output to the SATA connectors.
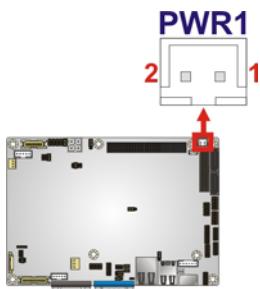
Figure 3-19: SATA Power Connector Locations

PIN NO.	DESCRIPTION
1	+5V
2	GND

Table 3-20: SATA Power Connector Pinouts

3.2.19 Serial Port Connectors (RS-232)

CN Label: **COM2, COM4, COM5**

CN Type: 10-pin header (2x5)

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

CN Pinouts: See **Table 3-21**

These connectors provide RS-232 communications.
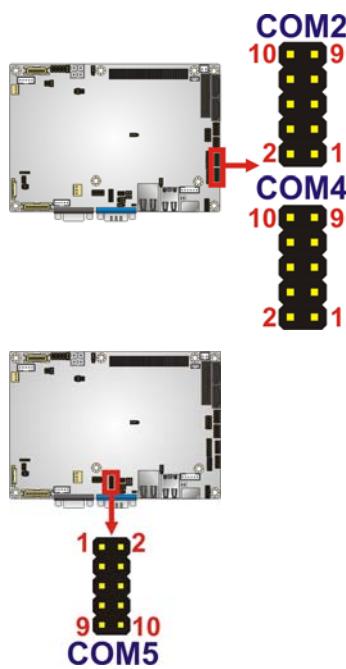
Figure 3-20: COM Connector Pinout Locations

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	GND

Table 3-21: COM Connector Pinouts

3.2.20 Serial Port Connector (RS-232/422/485)

CN Label: COM3

CN Type: 14-pin header (2x7)

CN Location: See **Figure 3-21**

CN Pinouts: See **Table 3-22**

Used for RS-232/422/485 communications.
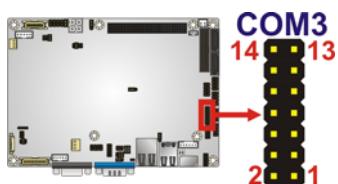
Figure 3-21: Serial Port Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	DSR2
3	RXD	4	RTS2
5	TXD	6	CTS2
7	DTR	8	RI2
9	GND	10	N/A
11	RS422 TX2/485+	12	RS422 TX2/485-
13	RS422 RX2+	14	RS422 RX2-

Table 3-22: Serial Port Connector Pinouts

3.2.21 SMBus Connector

CN Label: CN1

CN Type: 4-pin wafer (1x4)

CN Location: See **Figure 3-19**

CN Pinouts: See **Table 3-20**

The SMBus Connector provides a connection to a SMBus (System Management Bus) device.

Figure 3-22: SMBus Connector Locations

PIN NO.	DESCRIPTION
1	GND
2	SMBDATA
3	SMBCLK
4	VCC5S

Table 3-23: SMBus Connector Pinouts

3.2.22 SPI Flash Connector

CN Label:	**SPI1**
CN Type:	8-pin header (2x4)
CN Location:	See **Figure 3-23**
CN Pinouts:	See **Table 3-24**

The 8-pin SPI Flash connector is used to flash the BIOS.
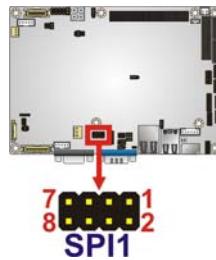
Figure 3-23: SPI Flash Connector

Pin	Description	Pin	Description
1	VCC	2	GND
3	CS#	4	CLOCK

Pin	Description	Pin	Description
5	SO	6	SI
7	NC	8	NC

Table 3-24: SPI Flash Connector Pinouts

3.2.23 USB Connectors

CN Label:	**USB0_1, USB2_3, USB4_5**
CN Type:	8-pin header (2x4)
CN Location:	See **Figure 3-24**
CN Pinouts:	See **Table 3-25**

The USB connectors connect to USB devices. Each pin header provides two USB ports.
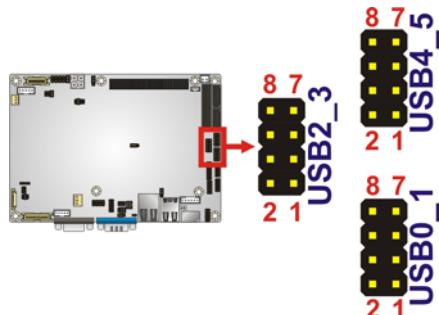
Figure 3-24: USB Connector Pinout Locations

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

Table 3-25: USB Port Connector Pinouts

3.3 External Peripheral Interface Connector Panel

Figure 3-25 shows the NANO-PV-D4252/N4552/D5252 external peripheral interface connector (EPIC) panel. The NANO-PV-D4252/N4552/D5252 EPIC panel consists of the following:

- 1 x Ethernet connector
- 1 x Keyboard/Mouse
- 1 x Serial port (RS-232)
- 2 x USB connectors
- 1 x VGA connector
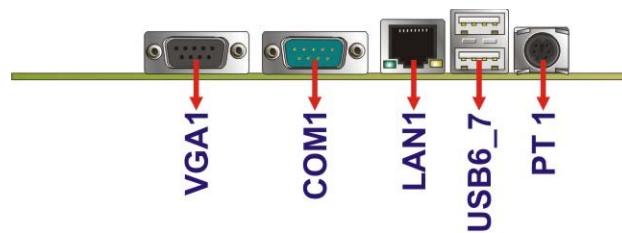
Figure 3-25: NANO-PV-D4252/N4552/D5252 External Peripheral Interface Connector

3.3.1 Ethernet Connector

CN Label: **LAN1**

CN Type: RJ-45

CN Location: See **Figure 3-25**

CN Pinouts: See **Table 3-26**

The NANO-PV-D4252/N4552/D5252 is equipped with one built-in RJ-45 Ethernet controller. The controller can connect to the LAN through the RJ-45 LAN connector.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	LAN1_MDI0P	2	LAN1_MDI0N
3	LAN1_MDI1P	4	LAN1_MDI1N
5	+VCT_LAN1	6	GND
7	LAN1_MDI2P	8	LAN1_MDI2N
9	LAN1_MDI3P	10	LAN1_MDI3N

Table 3-26: LAN Pinouts

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the speed. See **Table 3-27**.

Speed LED		Activity/Link LED	
STATUS	**DESCRIPTION**	**STATUS**	**DESCRIPTION**
Off	10 Mbps connection	Off	No link
Green	100 Mbps connection	Yellow	Linked
Orange	Gbps connection	Blinking	TX/RX activity 1

Table 3-27: RJ-45 Ethernet Connector LEDs

Figure 3-26: RJ-45 Ethernet Connector

3.3.2 Keyboard/Mouse Connector

CN Label:	**PT1**
CN Type:	PS/2
CN Location:	See **Figure 3-25**
CN Pinouts:	See **Figure 3-27** and **Table 3-28**

The keyboard and mouse connector is a standard PS/2 connector.
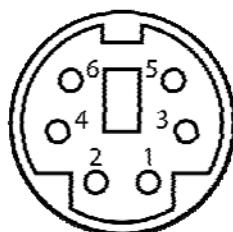
Figure 3-27: PS/2 Pinout and Configuration

Pin	Description
1	KB DATA
2	MS DATA
3	GND
4	VCC
5	KB CLOCK
6	MS CLOCK

Table 3-28: Keyboard Connector Pinouts

3.3.3 USB Connectors

    CN Label: **USB6_7**

    CN Type: USB port

    CN Location: See **Figure 3-25**

    CN Pinouts: See **Table 3-29**

The NANO-PV-D4252/N4552/D5252 has four 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	GROUND	8	GROUND

Table 3-29: USB Port Connector Pinouts

3.3.4 VGA Connector

    CN Label: **VGA1**

    CN Type: 15-pin Female

    CN Location: See **Figure 3-25**

    CN Pinouts: See **Figure 3-28** and **Table 3-30**

Connects to a monitor that accepts a standard VGA input.
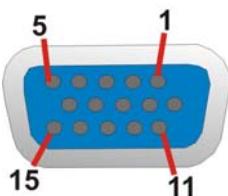
Figure 3-28: VGA Connector

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

Table 3-30: VGA Connector Pinouts

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the NANO-PV-D4252/N4552/D5252 may result in permanent damage to the NANO-PV-D4252/N4552/D5252 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the NANO-PV-D4252/N4552/D5252. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the NANO-PV-D4252/N4552/D5252 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-PV-D4252/N4552/D5252, place it on an antic-static pad. This reduces the possibility of ESD damaging the NANO-PV-D4252/N4552/D5252.
- **Only handle the edges of the PCB**: When handling the PCB, hold the PCB by the edges.

4.2 Installation Considerations

![NOTE icon] **NOTE:**

The following installation notices and installation considerations should be read and understood before the NANO-PV-D4252/N4552/D5252 is installed. All installation notices pertaining to the installation of the NANO-PV-D4252/N4552/D5252 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the NANO-PV-D4252/N4552/D5252 and injury to the person installing the motherboard.

4.2.1 Installation Notices

![WARNING icon] **WARNING:**

The installation instructions described in this manual should be carefully followed in order to prevent damage to the NANO-PV-D4252/N4552/D5252, NANO-PV-D4252/N4552/D5252 components and injury to the user.

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

- Read the user manual:
  - The user manual provides a complete description of the NANO-PV-D4252/N4552/D5252 installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the NANO-PV-D4252/N4552/D5252 on an antistatic pad:
  - 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-PV-D4252/N4552/D5252 off:

o When working with the NANO-PV-D4252/N4552/D5252, 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-PV-D4252/N4552/D5252 **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 Unpacking

When the NANO-PV-D4252/N4552/D5252 is unpacked, please check all the unpacking list items listed in Chapter 3 are indeed present. If any of the unpacking list items are not available please contact the NANO-PV-D4252/N4552/D5252 vendor reseller/vendor where the NANO-PV-D4252/N4552/D5252 was purchased or contact an IEI sales representative.

4.4 SO-DIMM Installation

SO-DIMM is a critical component of the NANO-PV-D4252/N4552/D5252. If it is not installed the NANO-PV-D4252/N4552/D5252 cannot run.

4.4.1 SO-DIMM Installation

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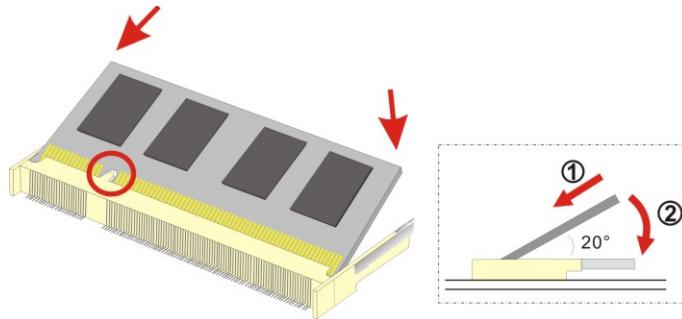
Figure 4-1: SO-DIMM Installation

Step 1:   **Locate the SO-DIMM socket**. Place the board on an anti-static mat.

Step 2:   **Align the SO-DIMM with the socket**. Align the notch on the memory with the notch on the memory socket.

Step 3:   **Insert the SO-DIMM**. Push the memory in at a 20⁰ angle. (See **Figure 4-1**)

Step 4:   **Seat the SO-DIMM**. Gently push downwards and the arms clip into place. (See **Figure 4-1**)

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.
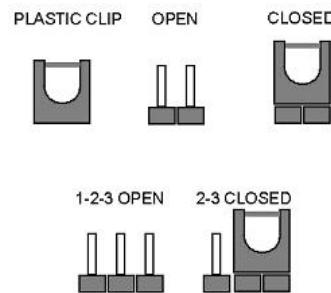
Before the NANO-PV-D4252/N4552/D5252 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the NANO-PV-D4252/N4552/D5252 are listed in **Table 4-1**.

Description	Type	Label
AT Auto Button	2-pin header	J_AUTOPWR1
Clear CMOS	3-pin header	J_CMOS1
CompactFlash® Master/Slave function setting	2-pin header	JCF1
CompactFlash® voltage select	2-pin header	J_VCF1
COM3 RS-232/422/485 select	6-pin header	J4
COM3 RS-422/485 select	6-pin header	J6
COM3 RS-422 Termination select	2-pin header	J10
COM3 RS-485 Termination select	2-pin header	J9
LVDS1 LCD Voltage select	6-pin header	J_VLVDS1
LVDS2 LCD Voltage select	6-pin header	J_VLVDS2
LVDS1 LCD panel type	8-pin header	J_LCD_TYPE1
LVDS2 LCD panel type	6-pin header	JP2

Table 4-1: Jumpers

4.5.1 AT Auto Button Power Select Jumper Settings

Jumper Label:	**J_AUTOPWR1**
Jumper Type:	2-pin header
Jumper Settings:	See **Table 4-2**
Jumper Location:	See **Figure 4-2**

The AT Auto Button Power Select jumper specifies the systems auto button power mode as AT or ATX.

Setting	Description
Short	Use AT power

Setting	Description
Open	Use ATX power

Table 4-2: AT Auto Button Power Select Jumper Settings
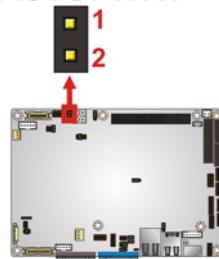
Figure 4-2: AT Auto Button Select Jumper Settings

4.5.2 AT/ATX Power Select Jumper Settings

Jumper Label:	**J_ATXCTL1**
Jumper Type:	3-pin header (1x3)
Jumper Settings:	See **Table 4-3**
Jumper Location:	See **Figure 4-3**

The AT/ATX Power Select jumper specifies the systems power mode as AT or ATX. AT/ATX Power Select jumper settings are shown in **Table 4-3**.

AT Power Select	Description	
Short 1 - 2	Use ATX power	
Short 2 − 3	Use AT power	Default

Table 4-3: AT/ATX Power Select Jumper Settings

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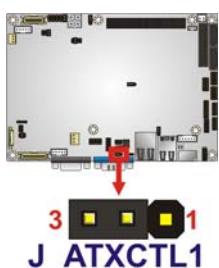
Figure 4-3: AT/ATX Power Select Jumper Location

4.5.3 Clear CMOS Jumper

Jumper Label:	**J_CMOS1**
Jumper Type:	3-pin header (1x3)
Jumper Settings:	See **Table 4-4**
Jumper Location:	See **Figure 4-4**

If the NANO-PV-D4252/N4552/D5252 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 4-4**.

Clear CMOS	Description	
Short 1 - 2	Keep CMOS Setup	Default
Short 2 - 3	Clear CMOS Setup	

Table 4-4: Clear CMOS Jumper Settings

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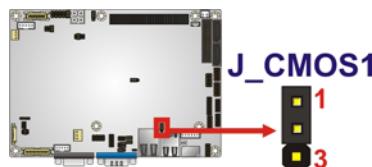
Figure 4-4: Clear CMOS Jumper

4.5.4 COM 3 Function Select Jumper

Jumper Label:	J4
Jumper Type:	6-pin header
Jumper Settings:	See Table 4-5
Jumper Location:	See Figure 4-5

The COM 3 Function Select jumper sets the communication protocol used by the second serial communications port (COM 3) as RS-232, RS-422 or RS-485. The COM 3 Function Select settings are shown below.

Setting	Description
1-2	RS-232
3-4	RS-422
5-6	RS-485

Table 4-5: COM 3 Function Select Jumper Settings
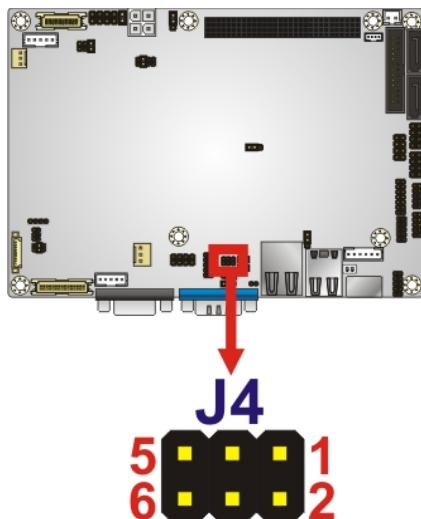
Figure 4-5: COM 3 Function Select Jumper Location

4.5.5 COM 3 RS-422/485 Function Select Jumper

Jumper Label:	J6
Jumper Type:	6-pin header
Jumper Settings:	See Table 4-5
Jumper Location:	See Figure 4-5

The COM 3 Function Select jumper sets the communication protocol used by the second serial communications port (COM 3) as RS-422 or RS-485. The COM 3 Function Select settings are shown below.

Setting	Description
1-3, 2-4	RS-422
3-5, 4-6	RS-485

Table 4-6: COM 3 RS-422/485 Function Select Jumper Settings
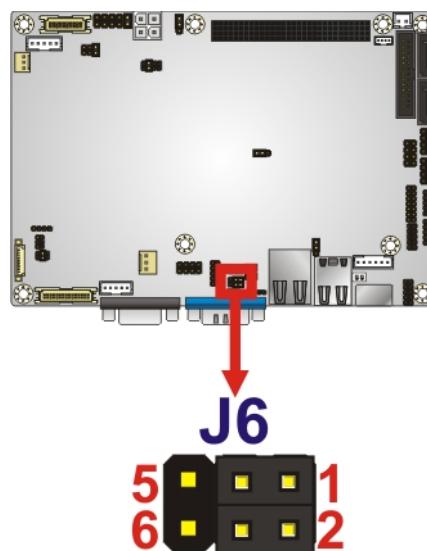
Figure 4-6: COM 3 RS-422/485 Function Select Jumper Location

4.5.6 COM 3 RS-422/485 Termination Select Jumpers

Jumper Label:	**J9 and J10**
Jumper Type:	2-pin header
Jumper Settings:	See **Table 4-5** and **Table 4-7**
Jumper Location:	See **Figure 4-7**

The COM 3 RS-422 and RS-485 Termination Select jumpers enable or disable the termination used by the serial COM 3 communications port as 120 ohm. The COM 3 RS-422 and RS-485 Termination Select settings are shown in **Table 4-5 and Table 4-7**.

RS-422 (J9) Setting	Description
Short	120 ohm termination Resistance
Open	NC (Default)

Table 4-7: COM 3 RS-422 Termination Select Jumper Settings

RS-485 (J10) Setting	Description
Short	120 ohm termination Resistance
Open	NC (Default)

Table 4-8: COM 3 RS-485 Termination Select Jumper Settings
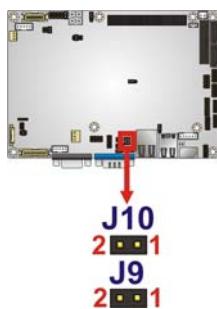
Figure 4-7: COM 3 RS-422 and RS-485 Termination Select Jumper Location

4.5.7 CompactFlash® Card Setup

Jumper Label:	JCF1
Jumper Type:	2-pin header
Jumper Settings:	See **Table 4-9**
Jumper Location:	See **Figure 4-4**

The CompactFlash® slot is connected through an IDE connection. This jumper sets the CompactFlash® card as the master or slave IDE device.

Setting	Description
Open	Slave
Closed	Master

Table 4-9: CompactFlash® Setup Jumper Settings
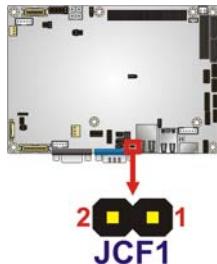
Figure 4-8: CompactFlash® Setup Jumper Location

4.5.8 CompactFlash® Voltage Selection

![WARNING icon] **WARNING:**

Incorrect voltages can destroy the CF card. Make sure to select a voltage that matches the voltage required by the CF card.

Jumper Label:	**J_VCF1**
Jumper Type:	2-pin header
Jumper Settings:	See **Table 4-10**
Jumper Location:	See **Figure 4-9**

The CompactFlash® voltage selection jumper sets the voltage of the power supplied to the CF card.

Setting	Description
Short 1-2	+5 V
Short 2-3	+3.3 V

Table 4-10: CompactFlash® Voltage Selection Jumper Settings
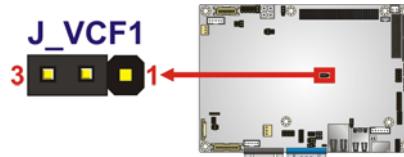
Figure 4-9: CompactFlash® Voltage Selection Jumper Location

4.5.9 LVDS1 Screen Resolution Selection

Jumper Label:	**J_LCD_TYPE**
Jumper Type:	8-pin header
Jumper Settings:	See **Table 4-11**
Jumper Location:	See **Figure 4-10**

The **LVDS1 Screen Resolution Selection** jumper allows the LVDS screen voltage to be set. The **LVDS1 Screen Resolution Selection** jumper settings are shown in Table 4-13.

Pin	Description
Open	640 x 480
1-2	800 x 600
3-4	1024 x 768
1-2 and 3-4	1280 x 1024
5-6	1366 x 768
1-2 and 5-6	1920 x 1080

Table 4-11: LVDS1 Screen Resolution Jumper Settings
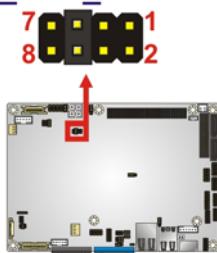
Figure 4-10: LVDS1 Screen Resolution Jumper Location

4.5.10 LVDS2 Screen Resolution Selection

Jumper Label:	**JP2**
Jumper Type:	6-pin header
Jumper Settings:	See **Table 4-13**
Jumper Location:	See **Figure 4-12**

The **LVDS2 Screen Resolution Selection** jumper allows the LVDS2 screen voltage to be set. The **LVDS2 Screen Resolution Selection** jumper settings are shown in Table 4-13.

Pin	Description
Open	640 x 480
1-2	800 x 600
3-4	1024 x 768
1-2 and 3-4	1280 x 1024

Pin	Description
5-6	1366 x 768
1-2 and 5-6	1920 x 1080

Table 4-12: LVDS2 Screen Resolution Jumper Settings
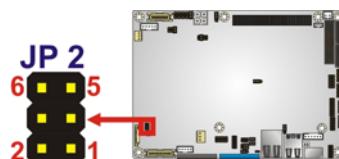
Figure 4-11: LVDS2 Screen Resolution Jumper Location

4.5.11 LVDS Voltage Selection

 WARNING:

Incorrect voltages can destroy the LCD panel. Make sure to select a voltage that matches the voltage required by the LCD panel.

Jumper Label: **J_VLVDS1, J_VLVDS2**

Jumper Type: 6-pin header

Jumper Settings: See **Table 4-13**

Jumper Location: See **Figure 4-12**

The LCD voltage selection jumper sets the voltage of the power supplied to the LCD panel.

Setting	Description
1-2	+3.3 V (Default)
3-4	+5.0 V
5-6	+12 V

Table 4-13: LVDS Voltage Selection Jumper Settings
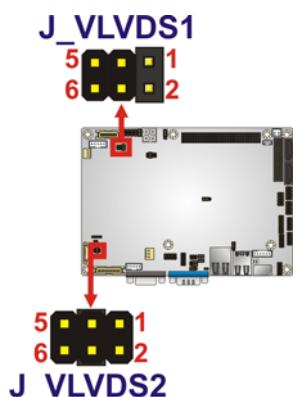
Figure 4-12: LVDS Voltage Selection Jumper Locations

4.5.12 PCI-104 Voltage Setup

Jumper Label:	**JP1**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 4-14**
Jumper Location:	See **Figure 4-13**

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

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

Table 4-14: PCI-104 Voltage Jumper Settings
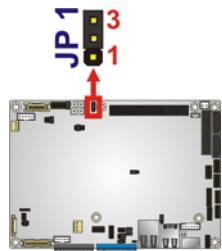
Figure 4-13: PCI-104 Voltage Jumper Location

4.6 Chassis Installation

4.6.1 Airflow

WARNING:

Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the NANO-PV-D4252/N4552/D5252 must have air vents to allow cool air to move into the system and hot air to move out.

The NANO-PV-D4252/N4552/D5252 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.

4.6.2 Motherboard Installation

To install the NANO-PV-D4252/N4552/D5252 motherboard into the chassis please refer to the reference material that came with the chassis.

4.7 Internal Peripheral Device Connections

This section outlines the installation of peripheral devices to the onboard connectors

4.7.1 AT/ATX Power Connection

Follow the instructions below to connect the NANO-PV-D4252/N4552/D5252 to an AT or ATX power supply.

WARNING:

Disconnect the power supply power cord from its AC power source to prevent a sudden power surge to the NANO-PV-D4252/N4552/D5252.

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/ATX power connector on the motherboard.

See Figure 4-14.
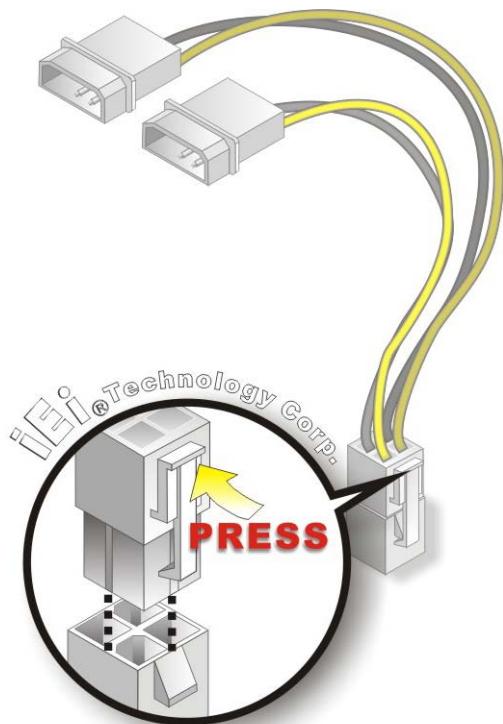
Figure 4-14: Power Cable to Motherboard Connection

Step 3: **Connect Power Cable to Power Supply**. Connect one of the 4-pin (1x4) Molex

type power cable connectors to an AT/ATX power supply. See Figure 4-15.
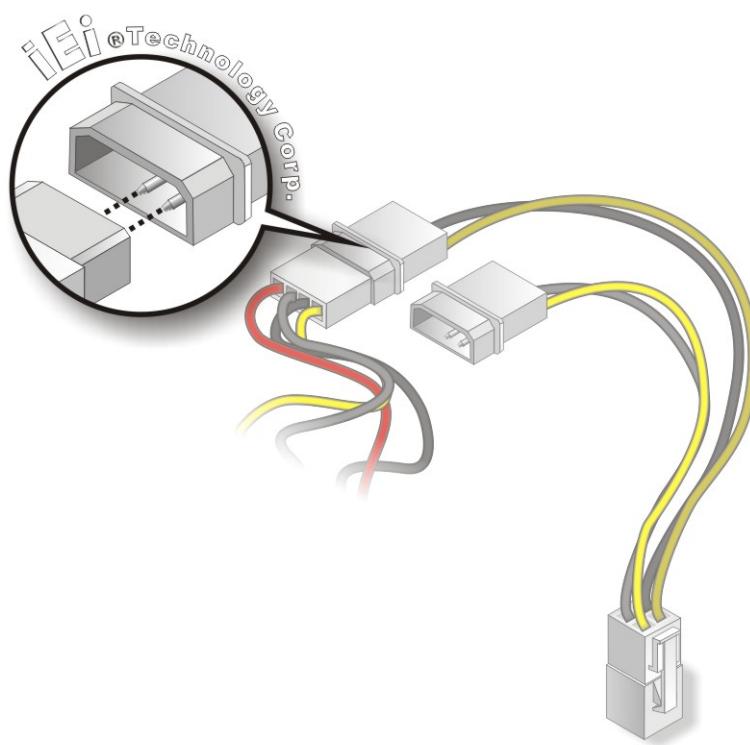
Figure 4-15: Connect Power Cable to Power Supply

4.7.2 Audio Kit Installation

The Audio Kit that came with the NANO-PV-D4252/N4552/D5252 connects to the audio connector on the NANO-PV-D4252/N4552/D5252. The audio kit consists of three audio jacks. Mic-in connects to a microphone. Line-in provides a stereo line-level input to connect to the output of an audio device. Line-out, a stereo line-level output, connects to two amplified speakers. To install the audio kit, please refer to the steps below:

Step 1: **Locate the audio connector**. The location of the 10-pin audio connector is shown in **Chapter 3**.

Step 2: **Align pin 1**. Align pin 1 on the on-board connector with pin 1 on the audio kit connector. Pin 1 on the audio kit connector is indicated with a white dot. See Figure 4-16.
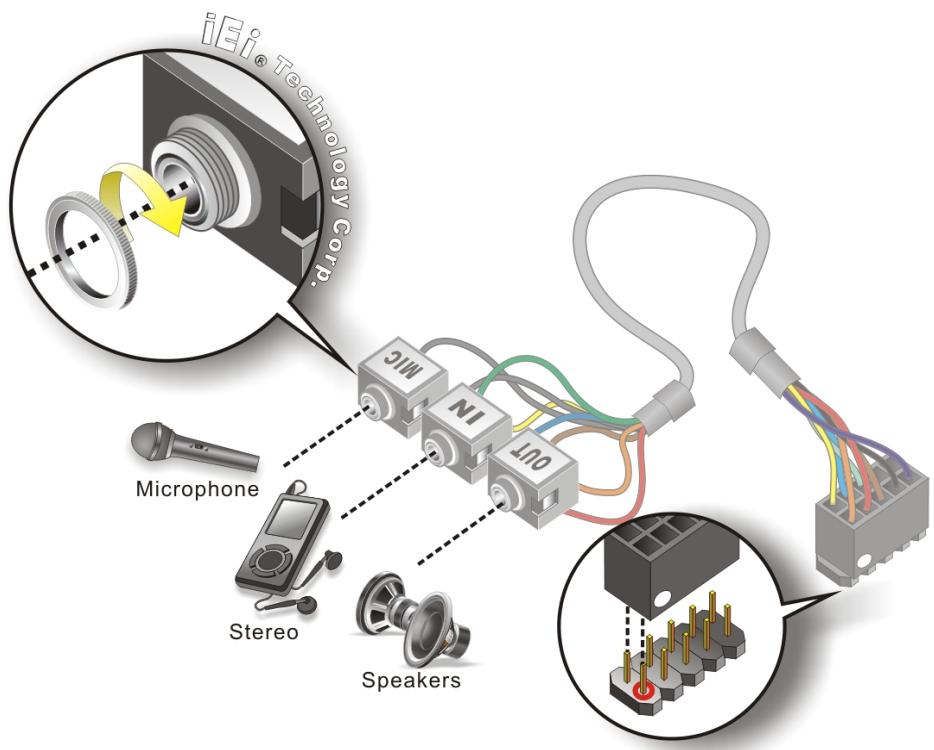
Figure 4-16: Audio Kit Cable Connection

Step 3: **Connect the audio devices**. Connect speakers to the line-out audio jack. Connect the output of an audio device to the line-in audio jack. Connect a microphone to the mic-in audio jack.

4.7.3 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 3**.

Step 2: **Insert the cable connector**. Insert the connector into the serial port box header. See Figure 4-17. A key on the front of the cable connectors ensures the connector can only be installed in one direction.
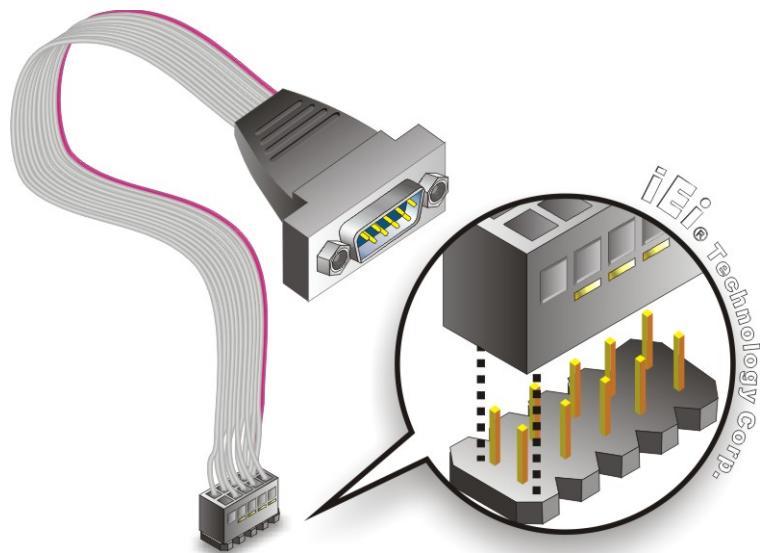
Figure 4-17: Single RS-232 Cable Installation

Step 3: **Secure the bracket**. The single RS-232 connector has two retention screws that must be secured to a chassis or bracket.

Step 4: **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.

4.8 External Peripheral Interface Connection

![NOTE icon] **NOTE:**

Due to limited space on the mainboard, the VGA and COM port on the I/O panel cannot be used simultaneously. To utilize both the VGA and COM port at the same time, please connect the RS-232 COM port cable to the mainboard pin-header. For convenience, the mainboard provides support for a maximum of four COM ports plus one VGA port or five COM ports without VGA setup.

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

- Keyboard and mouse
- RJ-45 Ethernet cable connector
- Serial devices
- USB devices
- VGA monitor

To install these devices, connect the corresponding cable connector from the actual device to the corresponding NANO-PV-D4252/N4552/D5252 external peripheral interface connector making sure the pins are properly aligned.

4.8.1 LAN Connection (Single Connector)

There is one external RJ-45 LAN connector. The RJ-45 connector enables 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 location of the LAN connector is 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-PV-D4252/N4552/D5252. See Figure 4-18.
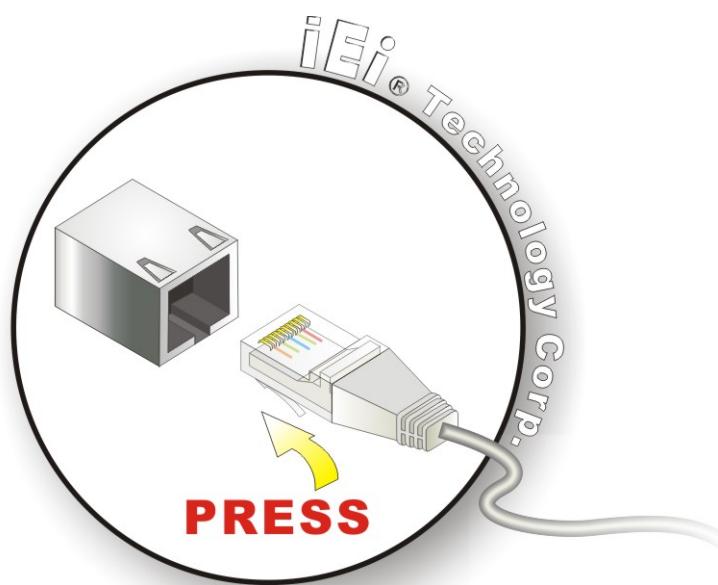
Figure 4-18: LAN Connection

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

4.8.2 PS/2 Y-Cable Connection

The NANO-PV-D4252/N4552/D5252 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-PV-D4252/N4552/D5252. 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-PV-D4252/N4552/D5252.

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 4-19.
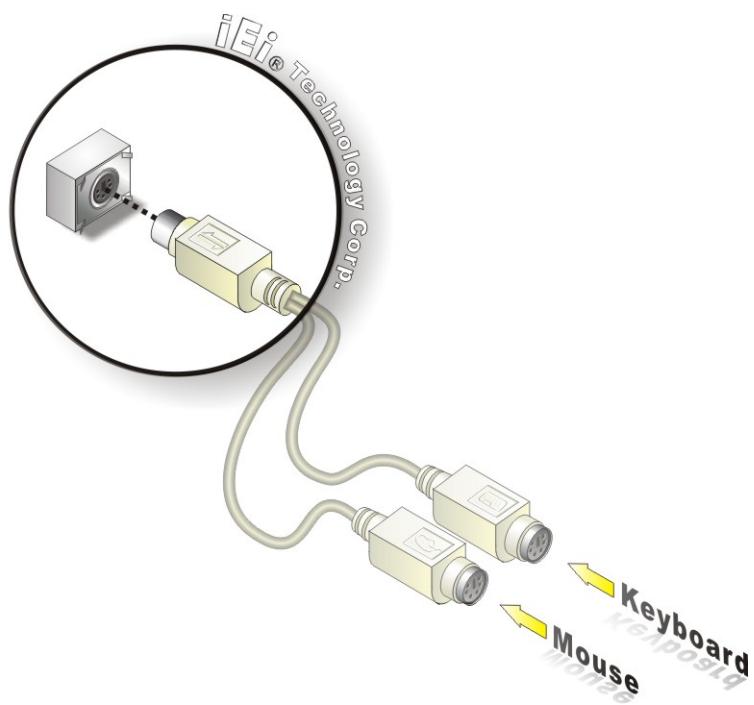
Figure 4-19: PS/2 Keyboard/Mouse Connector

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-PV-D4252/N4552/D5252 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-PV-D4252/N4552/D5252.

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 4-20.
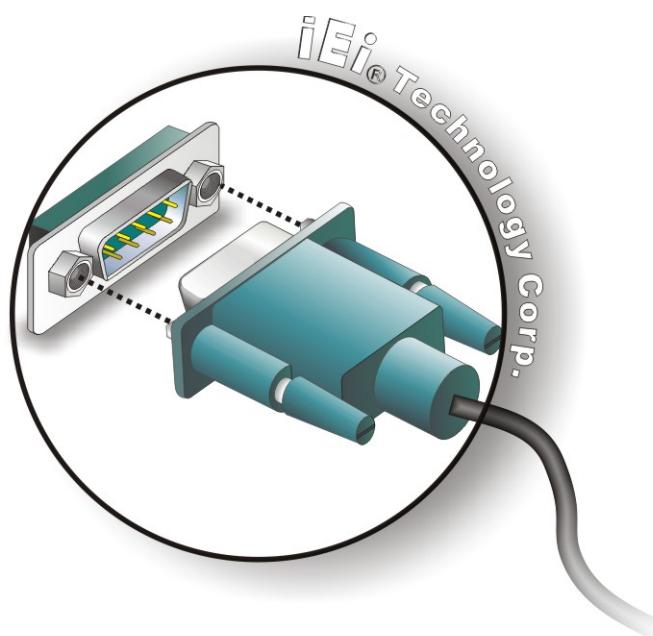
Figure 4-20: Serial Device Connector

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.

4.8.4 USB Connection (Dual Connector)

The external USB Series "A" receptacle connectors provide easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the NANO-PV-D4252/N4552/D5252.

Step 1: **Locate the USB Series "A" receptacle connectors**. The location of the USB

Series "A" receptacle connectors are shown in **Chapter 3**.

Step 2: **Insert a USB Series "A" plug**. Insert the USB Series "A" plug of a device into

the USB Series "A" receptacle on the external peripheral interface. See

Figure 4-21.
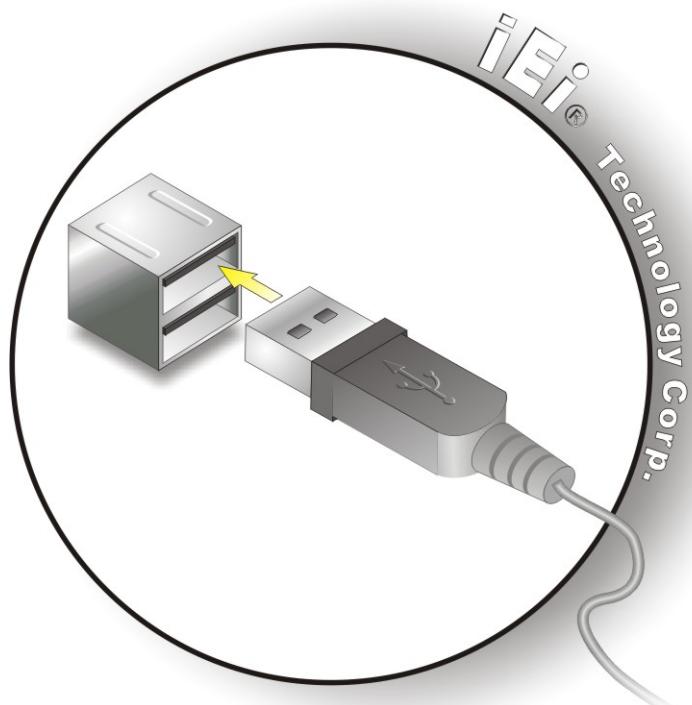
Figure 4-21: USB Connector

4.8.5 VGA Monitor Connection

The NANO-PV-D4252/N4552/D5252 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-PV-D4252/N4552/D5252, 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-PV-D4252/N4552/D5252. See Figure 4-22.
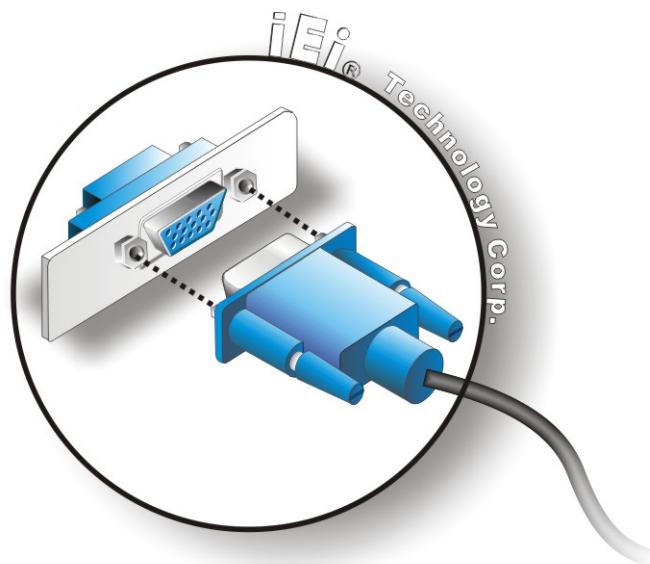
Figure 4-22: VGA Connector

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.

4.9 Software Installation

All the drivers for the NANO-PV-D4252/N4552/D5252 are on the CD that came with the system. To install the drivers, please follow the steps below.

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

![NOTE icon] **NOTE:**

If the installation program doesn't start automatically:

Click "Start->My Computer->CD Drive->autorun.exe"

Step 2: The driver main menu appears (**Figure 4-23**).
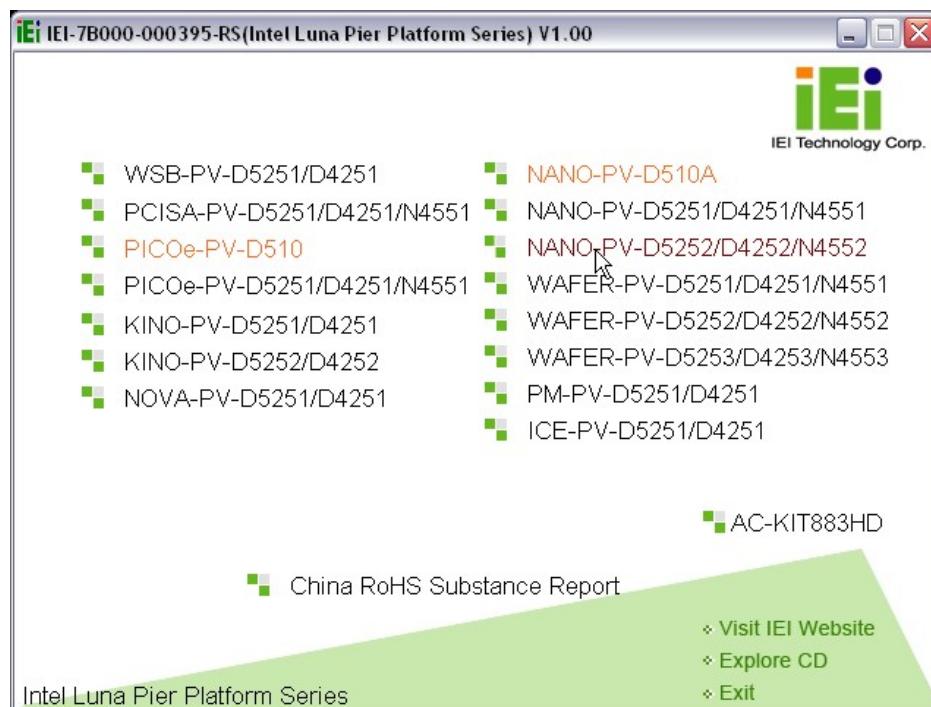
Figure 4-23: Introduction Screen

Step 3: Click **NANO-PV-D4252/N4552/D5252**.

Step 4: A new screen with a list of available drivers appears (**Figure 4-24**).
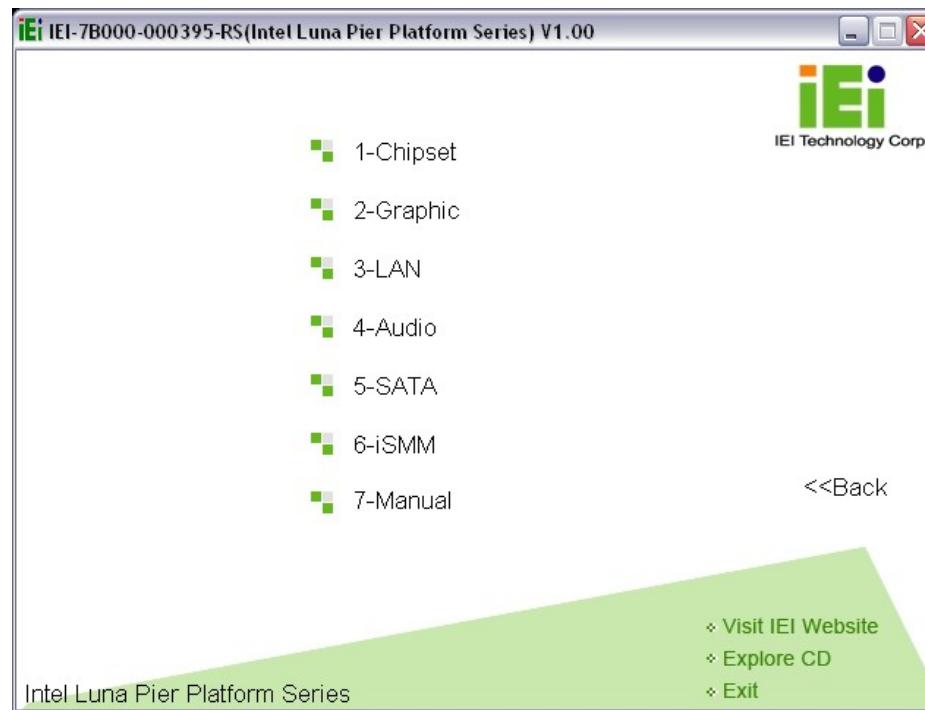
Figure 4-24: Available Drivers

Step 5: Install all of the necessary drivers in this menu.

Chapter

5

BIOS Screens

5.1 Introduction

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

5.1.1 Starting Setup

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

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

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

5.1.2 Using Setup

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

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Load previous values.
F3 key	Load optimized defaults

Key	Function
F4 key	Save all the CMOS changes
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

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 **4**.

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.
- ▪ Chipset – Changes the chipset settings.
- ▪ Boot – Changes the system boot configuration.
- ▪ Security – Sets User and Supervisor Passwords.
- ▪ Save & 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.

```
         Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
    Main    Advanced   Chipset    Boot    Security  Save & Exit

 BIOS Information                                            Set the Time. Use Tab to
 BIOS Vendor                    American Megatrends          switch between Time
 Core Version                   4.6.4.0 0.20                 elements.
 Compliency                     UEFI 2.0
 Project Version                SA24AR11.ROM
 Build Date                     09/13/2010 20:29:21          ---------------------


 System Date                    [Tue 09/23/2010]            ←→: Select Screen
 System Time                    [14:20:27]                  ↑ ↓: Select Item
                                                            EnterSelect
 Access Level                   Administrator               F1   General Help
                                                            F2   Previous Values
                                                            F3   Optimized Defaults
                                                            F4   Save
                                                            ESC  Exit
         Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 1: Main

➔ **BIOS Information**

The **BIOS Information** lists a brief summary of the BIOS. The fields in **BIOS Information** cannot be changed. The items shown in the system overview include:

- **BIOS Vendor:** Installed BIOS vendor
- **Core Version:** Current BIOS version
- **Project Version:** the board version
- **Build Date:** Date the current BIOS version was made

The System Overview field also has two user configurable fields:

➔ **System Date [xx/xx/xx]**

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

➔ **System Time [xx:xx:xx]**

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

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.

```
       Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
   Main   Advanced   Chipset     Boot     Security  Save & Exit

 > ACPI Settings                               System ACPI Parameters
 > Trusted Computing
 > CPU Configuration
 > IDE Configuration
 > USB Configuration                           ---------------------
 > Super IO Configuration
 > H/M Monitor                                 ←→: Select Screen
 > Serial Port Console Redirection             ↑ ↓: Select Item
                                               Enter Select
                                               F1    General Help
                                               F2    Previous Values
                                               F3    Optimized
                                               Defaults
                                               F4    Save
                                               ESC   Exit
         Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 2: Advanced

5.3.1 ACPI Settings

The **ACPI Settings** menu (**BIOS Menu 3**) configures the Advanced Configuration and Power Interface (ACPI) options.

```
Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
      Advanced

ACPI Sleep State                 [S3 (Suspend to R…)]   Set the ACPI state used
                                                        for System suspend


                                                        ----------------------

                                                        ←→: Select Screen
                                                        ↑ ↓: Select Item
                                                        Enter Select
                                                        F1    General Help
                                                        F2    Previous Values
                                                        F3    Optimized
                                                        Defaults
                                                        F4    Save
                                                        ESC   Exit
      Version 2.01.1204. Copyright (C) 2010 American Megatrends, Inc.
```
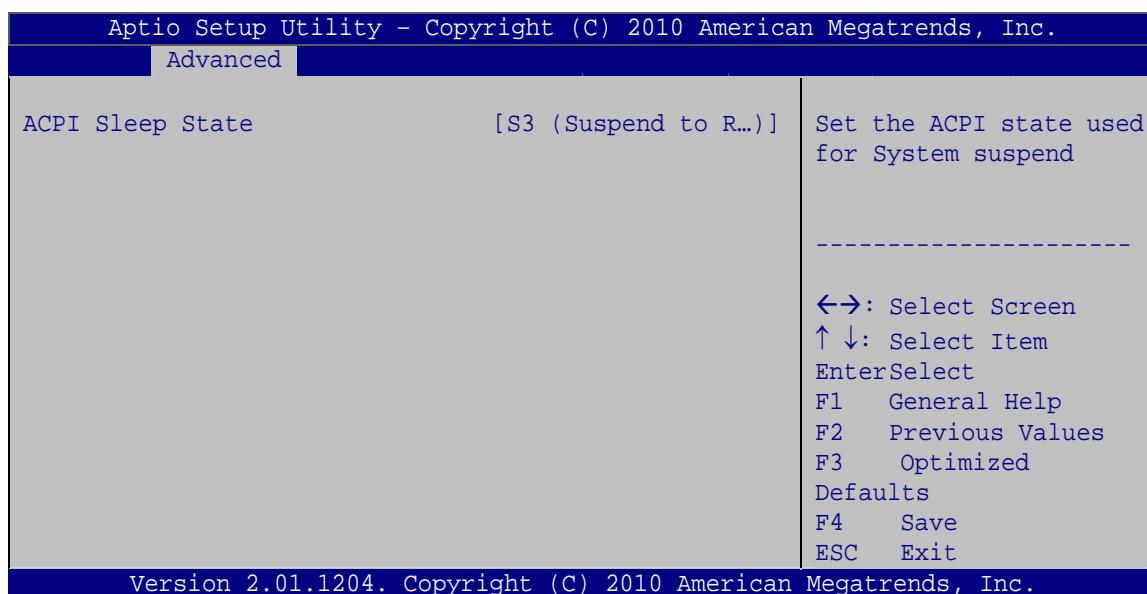
BIOS Menu 3: ACPI Settings

➔ **ACPI Sleep State [S3 (Suspend to RAM)]**

Use the **ACPI Sleep State** option to specify the sleep state the system enters when it is not being used.

➔ **Suspend Disabled**

➔	**S1 (CPU Stop Clock)**	The system enters S1(POS) sleep state. The system appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.
➔	**S3 (Suspend to** DEFAULT **RAM)**	The caches are flushed and the CPU is powered off. Power to the RAM is maintained. The computer returns slower to a working state, but more power is saved.

5.3.2 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 4**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).
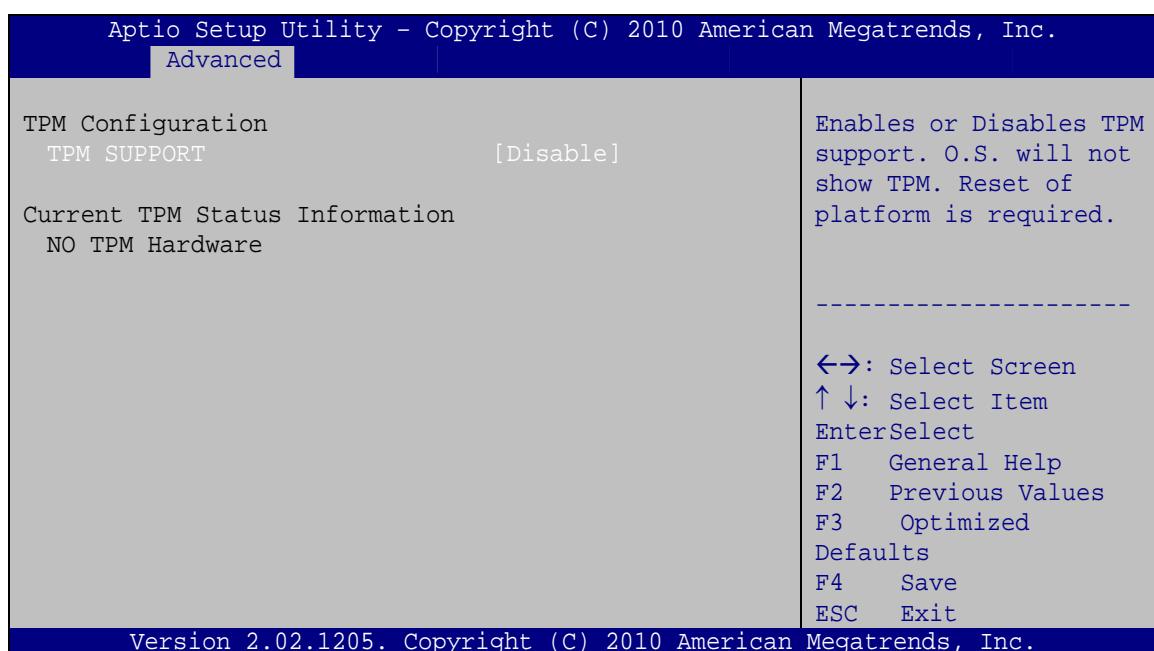
```
Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
    Advanced

TPM Configuration                                        Enables or Disables TPM
  TPM SUPPORT                     [Disable]              support. O.S. will not
                                                         show TPM. Reset of
Current TPM Status Information                           platform is required.
  NO TPM Hardware

                                                         ----------------------

                                                         ←→: Select Screen
                                                         ↑ ↓: Select Item
                                                         Enter Select
                                                         F1   General Help
                                                         F2   Previous Values
                                                         F3    Optimized
                                                         Defaults
                                                         F4    Save
                                                         ESC   Exit
        Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```
BIOS Menu 4: TPM Configuration

➔ **TPM Support [Disable]**

Use the **TPM Support** option to configure support for the TPM.

➔ **Disable** DEFAULT TPM support is disabled.

➔ **Enable**   TPM support is enabled.

5.3.3 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 5**) to view detailed CPU specifications and configure the CPU.

```
            Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
              Advanced

CPU Configuration

Processor Type                    Intel(R) Atom(TM) CPU
                                  CPU N475     @ 1.83GHz    ----------------------
EMT64                             Supported
Processor Speed                   1834 MHz                  ←→: Select Screen
System Bus Speed                  667 MHz                   ↑↓: Select Item
Ratio Status                      11                        Enter Select
Actual Ratio                      11                        F1   General Help
Processor Stepping                106ca                     F2   Previous Values
Microcode Revision                263                       F3    Optimized
L1 Cache RAM                      56 k                      Defaults
L2 Cache RAM                      512 k                     F4    Save
Processor Core                    Single                    ESC   Exit
Hyper-Threading                   Supported


            Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 5: CPU Configuration

The CPU Configuration menu (**BIOS Menu 5**) lists the following CPU details:

- Processor Type: Lists the brand name of the CPU being used
- EMT64: Indicates if the EM64T is supported by the CPU.
- Processor Speed: Lists the CPU processing speed
- System Bus: Lists the system bus
- Ratio Status: List the maximum FSB divisor
- Actual Ratio: Lists current FSB divisor
- Processor Stepping: Lists the CPU processing stepping
- Microcode Revision: Lists the microcode revision
- L1 Cache RAM: Lists the CPU L1 cache size
- L2 Cache RAM: Lists the CPU L2 cache size
- Processor Core: Lists the number of the processor core
- Hyper-Threading: Indicates if the Intel Hyper-Threading Technology is supported by the CPU.

5.3.4 SATA Configuration

Use the **SATA Configuration** menu (**BIOS Menu 6**) to change and/or set the configuration of the SATA devices installed in the system.

```
         Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
            Advanced

PATA Master                       Not Present          Select ATA/IDE
PATA Slave                        Not Present          Configuration.

SATA Port0                        Not Present
SATA Port1                        Not Present          --------------------
SATA Port2                        Not Present
SATA Port3                        Not Present          ←→: Select Screen
                                                       ↑ ↓: Select Item
ATA/IDE Configuration             [Enhanced]           EnterSelect
  Configure SATA as               [IDE]                F1   General Help
                                                       F2   Previous Values
                                                       F3    Optimized
                                                       Defaults
                                                       F4    Save
                                                       ESC   Exit
         Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```

 BIOS Menu 6: IDE Configuration

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

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.

➔ **Configure SATA as [IDE]**

Use the **Configure SATA as** option to configure SATA devices as normal IDE devices.

➔ **IDE** **DEFAULT** Configures SATA devices as normal IDE device.

➔ **AHCI** Configures SATA devices as AHCI device.

5.3.5 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 7**) to read USB configuration information and configure the USB settings.

```
        Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
          Advanced

USB Configuration                                          Enables Legacy USB
                                                           support. AUTO option
USB Devices:                                               disables legacy support
        1 Keyboard                                         if no USB devices are
                                                           connected. DISABLE
Legacy USB Support               [Enabled]                 option will keep USB
                                                           devices available only
                                                           for EFI applications.

                                                           --------------------
                                                           ←→: Select Screen
                                                           ↑↓: Select Item
                                                           Enter Select
                                                           F1   General Help
                                                           F2   Previous Values
                                                           F3    Optimized
                                                           Defaults
                                                           F4    Save
                                                           ESC   Exit
        Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 7: USB Configuration

➔ **USB Devices**

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

➔ **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.

➔ **Enabled**   DEFAULT   Legacy USB support enabled

➔ **Disabled**   Legacy USB support disabled

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

5.3.6 Super IO Configuration

Use the **Super IO Configuration** menu (**BIOS Menu 8**) to set or change the configurations for the FDD controllers, parallel ports and serial ports.

```
        Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
          Advanced

Super IO Configuration                                Set Parameters of Serial
                                                      Port 0 (COMA)
Super IO Chip                     Finteck F81865
> Serial Port 0 Configuration
> Serial Port 1 Configuration                         ---------------------
> Serial Port 2 Configuration                         ←→: Select Screen
> Serial Port 3 Configuration                         ↑ ↓: Select Item
> IrDA Configuration                                  Enter Select
> Parallel Port Configuration                         F1   General Help
                                                      F2   Previous Values
                                                      F3    Optimized
                                                      Defaults
                                                      F4    Save
                                                      ESC   Exit
        Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 8: Super IO Configuration

5.3.6.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 9**) to configure the serial port n.

```
         Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
           Advanced

Serial Port 0 Configuration                                 Enable or Disable Serial
                                                            Port (COM)
Serial Port                         [Enabled]
Device Settings                     IO=3F8h; IRQ=4
                                                            ---------------------
Change Settings                     [Auto]                  ←→: Select Screen
                                                            ↑ ↓: Select Item
                                                            Enter Select
                                                            F1   General Help
                                                            F2   Previous Values
                                                            F3    Optimized
                                                            Defaults
                                                            F4    Save
                                                            ESC   Exit
         Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```
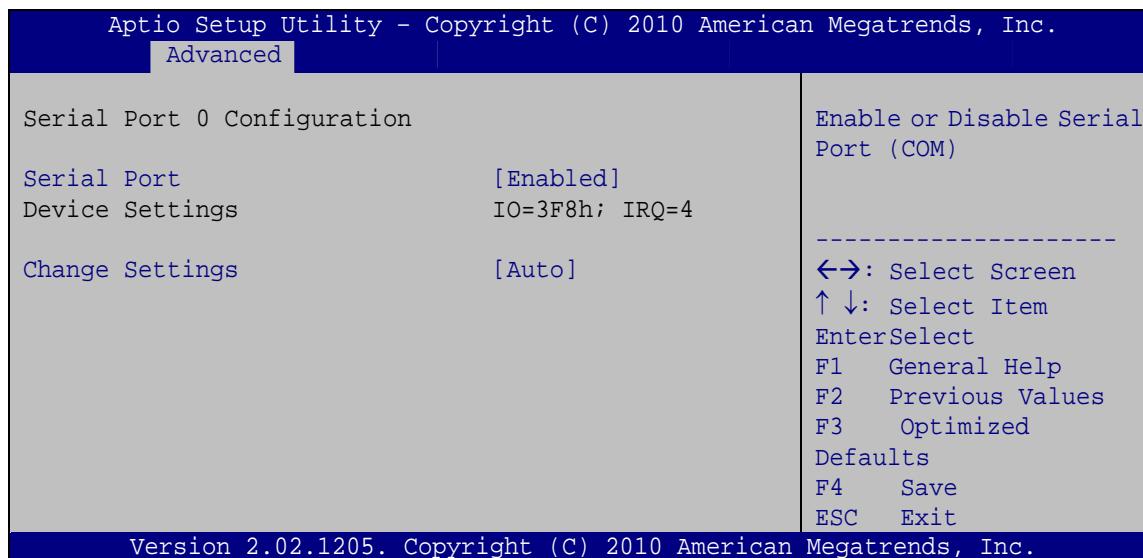
BIOS Menu 9: Serial Port n Configuration Menu

5.3.6.1.1 Serial Port 0 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled**　　　　　　Disable the serial port

➔ **Enabled**　**DEFAULT**　Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto**　　**DEFAULT**　The serial port IO port address and interrupt address are automatically detected.

➔ **IO=3F8h;**　　　　　Serial Port I/O port address is 3F8h and the interrupt
IRQ=4　　　　　　address is IRQ4

➔ **IO=3F8h;**   Serial Port I/O port address is 3F8h and the interrupt
   IRQ=3, 4   address is IRQ3 and IRQ4

➔ **IO=2F8h;**   Serial Port I/O port address is 2F8h and the interrupt
   IRQ=3, 4   address is IRQ3 and IRQ4

5.3.6.1.2 Serial Port 1 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled**   Disable the serial port

➔ **Enabled** DEFAULT   Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

➔ **Auto** DEFAULT   The serial port IO port address and interrupt address are automatically detected.

➔ **IO=2F8h;**   Serial Port I/O port address is 2F8h and the interrupt
   IRQ=3   address is IRQ3

➔ **IO=3F8h;**   Serial Port I/O port address is 3F8h and the interrupt
   IRQ=3, 4   address is IRQ3 and IRQ4

➔ **IO=2F8h;**   Serial Port I/O port address is 2F8h and the interrupt
   IRQ=3, 4   address is IRQ3 and IRQ4

5.3.6.1.3 Serial Port 2 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

➔ **Disabled**   Disable the serial port

→ **Enabled** D<small>EFAULT</small> Enable the serial port

→ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

→ **Auto** D<small>EFAULT</small> The serial port IO port address and interrupt address are automatically detected.

→ **IO=3E8h; IRQ=11** Serial Port I/O port address is 3E8h and the interrupt address is IRQ11

→ **IO=3E8h; IRQ=10, 11** Serial Port I/O port address is 3E8h and the interrupt address is IRQ10, 11

→ **IO=2E8h; IRQ=10, 11** Serial Port I/O port address is 2E8h and the interrupt address is IRQ10, 11

5.3.6.1.4 Serial Port 3 Configuration

→ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

→ **Disabled** Disable the serial port

→ **Enabled** D<small>EFAULT</small> Enable the serial port

→ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

→ **Auto** D<small>EFAULT</small> The serial port IO port address and interrupt address are automatically detected.

➔ **IO=2E8h;**   Serial Port I/O port address is 2E8h and the interrupt
  IRQ=10   address is IRQ10

➔ **IO=3E8h;**   Serial Port I/O port address is 3E8h and the interrupt
  IRQ=10, 11   address is IRQ10, 11

➔ **IO=2E8h;**   Serial Port I/O port address is 2E8h and the interrupt
  IRQ=10, 11   address is IRQ10, 11

5.3.6.2 IrDA Configuration

Use the **IrDA Configuration** menu (**BIOS Menu 9**) to configure the serial port n.

```
     Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
        Advanced

IrDA Configuration                                 Enable or Disable IrDA

IrDA  [Enabled]
Device Settings              Reset Required         --------------------
                                                   ←→: Select Screen
                                                   ↑ ↓: Select Item
                                                   EnterSelect
                                                   F1   General Help
                                                   F2   Previous Values
                                                   F3    Optimized
                                                   Defaults
                                                   F4   Save
                                                   ESC  Exit

        Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 10: IrDA Configuration Menu

➔ **IrDA [Enabled]**

Use the **IrDA** option to enable or disable the infrared function.

➔ **Disabled**   Disable the infrared function
➔ **Enabled**   **DEFAULT**   Enable the infrared function

5.3.6.3 Parallel Port Configuration

Use the **Parallel Port Configuration** menu (**BIOS Menu 9**) to configure the serial port n.

```
          Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
             Advanced

Parallel Port Configuration                                          Change the Printer Port
                                                                     mode
Parallel Port                        [Enabled]
Device Settings                      IO=378h; IRQ=7
                                                                     --------------------
Change Settings                      [Auto]                          ←→: Select Screen
Device Mode                          [Printer Mode]                  ↑ ↓: Select Item
                                                                     Enter Select
                                                                     F1   General Help
                                                                     F2   Previous Values
                                                                     F3    Optimized
                                                                     Defaults
                                                                     F4    Save
                                                                     ESC   Exit
          Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```
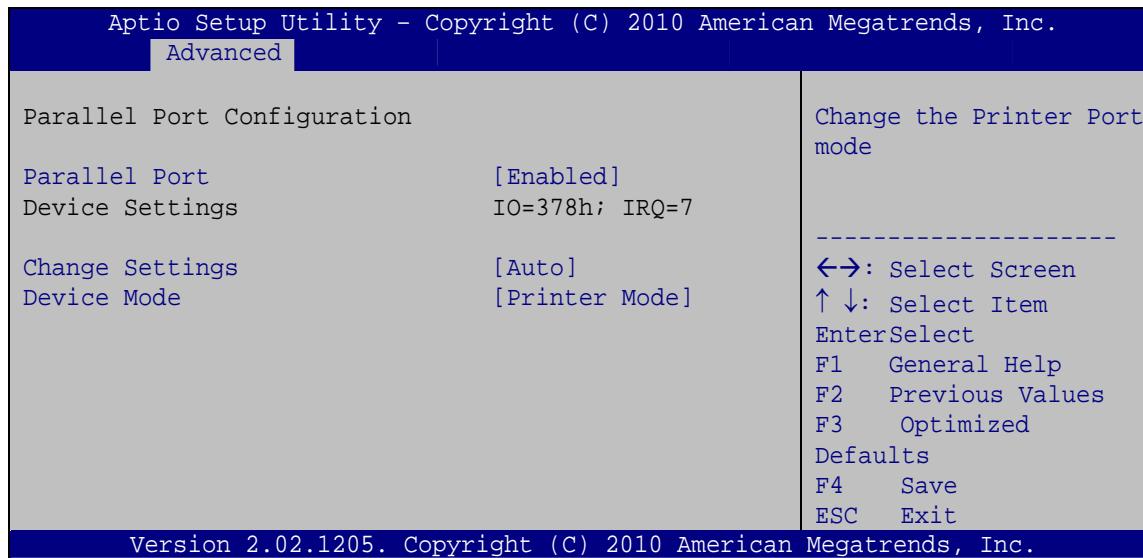
BIOS Menu 11: Parallel Port Configuration Menu

➔ **Parallel Port [Enabled]**

Use the **Parallel Port** option to enable or disable the parallel port.

➔ **Disabled**   Disable the parallel port

➔ **Enabled**   DEFAULT   Enable the parallel port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the parallel port IO port address and interrupt address.

➔ **Auto**   DEFAULT   The parallel port IO port address and interrupt address are automatically detected.

➔ **IO=378h; IRQ=7**   Parallel Port I/O port address is 378h and the interrupt address is IRQ7

➔ **IO=278h; IRQ=7**   Parallel Port I/O port address is 278h and the interrupt address is IRQ7

➔	**IO=3BCh;**	Parallel Port I/O port address is 3BCh and the
	IRQ=7	interrupt address is IRQ7
➔	**IO=378h**	Parallel Port I/O port address is 378h
➔	**IO=278h**	Parallel Port I/O port address is 278h
➔	**IO=3BCh**	Parallel Port I/O port address is 3BCh

➔ **Device Mode [Printer Mode]**

Use the **Device Mode** option to select the mode the parallel port operates in. Configuration options are listed below.

- Printer Mode   **Default**
- SPP Mode
- EPP-1.9 and SPP Mode
- EPP-1.7 and SPP Mode
- ECP Mode
- ECP and EPP 1.9 Mode
- ECP and EPP 1.7 Mode

5.3.7 H/W Monitor

The H/W Monitor menu (**BIOS Menu 12**) shows the operating temperature, fan speeds and system voltages.

```
Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
      Advanced

PC Health Status

CPU Temperature                     :+39 C
SYS Temperature                     :+40 C
CPU FAN Speed                       :4950 RPM
VCC3V                               :+3.344 V
V_core                              :+1.136 V
Vcc                                 :+5.087 V              --------------------
Vcc12                               :+11.352 V
V1_5VDDR                            :+1.504 V           ←→: Select Screen
VSB3V                               :+3.360 V           ↑↓: Select Item
VBAT                                :+3.316 V           Enter Select
CPU Smart Fan control               [Auto Mode]          F1   General Help
Temperature Bound1                  60                   F2   Previous Values
Temperature Bound2                  50                   F3    Optimized
Temperature Bound3                  40                   Defaults
Temperature Bound4                  30                   F4    Save
                                                         ESC   Exit

            Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 12: Hardware Health Configuration

➔   **PC Health Status**

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

- System Temperatures:
  - ○ CPU Temperature
  - ○ System Temperature
- Fan Speeds:
  - ○ CPU Fan Speed
- Voltages:
  - ○ V_core
  - ○ Vcc
  - ○ Vcc12
  - ○ V1_5VDDR
  - ○ VSB3V
  - ○ VBAT

➔ **CPU Smart Fan control [Auto Mode]**

Use the **CPU Smart Fan control** option to configure the CPU fan.

➔ **Auto Mode**   The fan adjusts its speed using these settings:

Temperature Bound 1

Temperature Bound 2

Temperature Bound 3

Temperature Bound 4

➔ **Manual Mode**   The fan spins at the speed set in:

Manual Duty Cycle Setting

5.3.8 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 13**) allows the console redirection options to be configured. Console redirection allows users to maintain a system remotely by re-directing keyboard input and text output through the serial port.

```
Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
     Advanced

 COM0                                           Console Redirection
 Console Redirection          [Disabled]        Enable/Disable
> Console Redirection Settings

 COM1                                           --------------------
 Console Redirection          [Disabled]        ←→: Select Screen
> Console Redirection Settings                  ↑ ↓: Select Item
                                                EnterSelect
 COM2                                           F1    General Help
 Console Redirection          [Disabled]        F2    Previous Values
> Console Redirection Settings                  F3    Optimized
                                                Defaults
 COM3                                           F4    Save
 Console Redirection          [Disabled]        ESC   Exit
> Console Redirection Settings
     Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 13: Serial Port Console Redirection

➔ **Console Redirection [Disabled]**

Use **Console Redirection** option to enable or disable the console redirection function.

 ➔ **Disabled**   DEFAULT   Disabled the console redirection function

 ➔ **Enabled**   Enabled the console redirection function

5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 14**) 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.
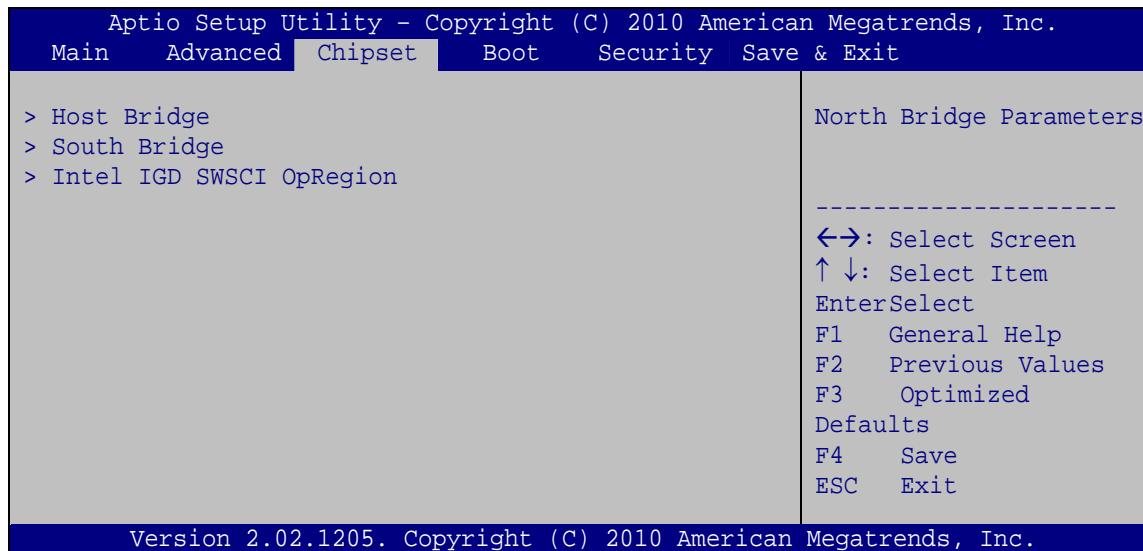
```
     Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
   Main    Advanced   Chipset    Boot    Security  Save & Exit

 > Host Bridge                                       North Bridge Parameters
 > South Bridge
 > Intel IGD SWSCI OpRegion
                                                     --------------------
                                                     ←→: Select Screen
                                                     ↑ ↓: Select Item
                                                     EnterSelect
                                                     F1   General Help
                                                     F2   Previous Values
                                                     F3    Optimized
                                                     Defaults
                                                     F4    Save
                                                     ESC   Exit
        Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```
BIOS Menu 14: Chipset

5.4.1 Host Bridge Configuration

Use the **Host Bridge Configuration** menu (**BIOS Menu 15**) to configure the Northbridge chipset.

```
        Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
                      Chipset

> OnChip VGA Configuration                              Select which graphics
  Initate Graphic Adapter          [IGD]               controller to use as the
                                                       primary boot device.
******* Memory Information *******
Memory Frequency                   667 Mhz

Total Memory                       1024 MB

DIMM#0                             1024 MB
DIMM#1                             Not Present
                                                       --------------------
                                                       ←→: Select Screen
                                                       ↑ ↓: Select Item
                                                       Enter Select
                                                       F1   General Help
                                                       F2   Previous Values
                                                       F3    Optimized
                                                       Defaults
                                                       F4    Save
                                                       ESC   Exit
        Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 15: Host Bridge Chipset Configuration

5.4.1.1 OnChip VGA Configuration

Use the **OnChip VGA Configuration** menu (**BIOS Menu 15**) to configure the OnChip VGA.

```
         Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
                   Chipset

OnChip VGA Configuration                                  Select Share Memory
                                                          Size.
Share Memory Size                   [8 MB]
Multi-Monitor Support               [Enabled]




                                                          ---------------------
                                                          ←→: Select Screen
                                                          ↑↓: Select Item
                                                          Enter Select
                                                          F1   General Help
                                                          F2   Previous Values
                                                          F3   Optimized
                                                          Defaults
                                                          F4   Save
                                                          ESC  Exit
         Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```
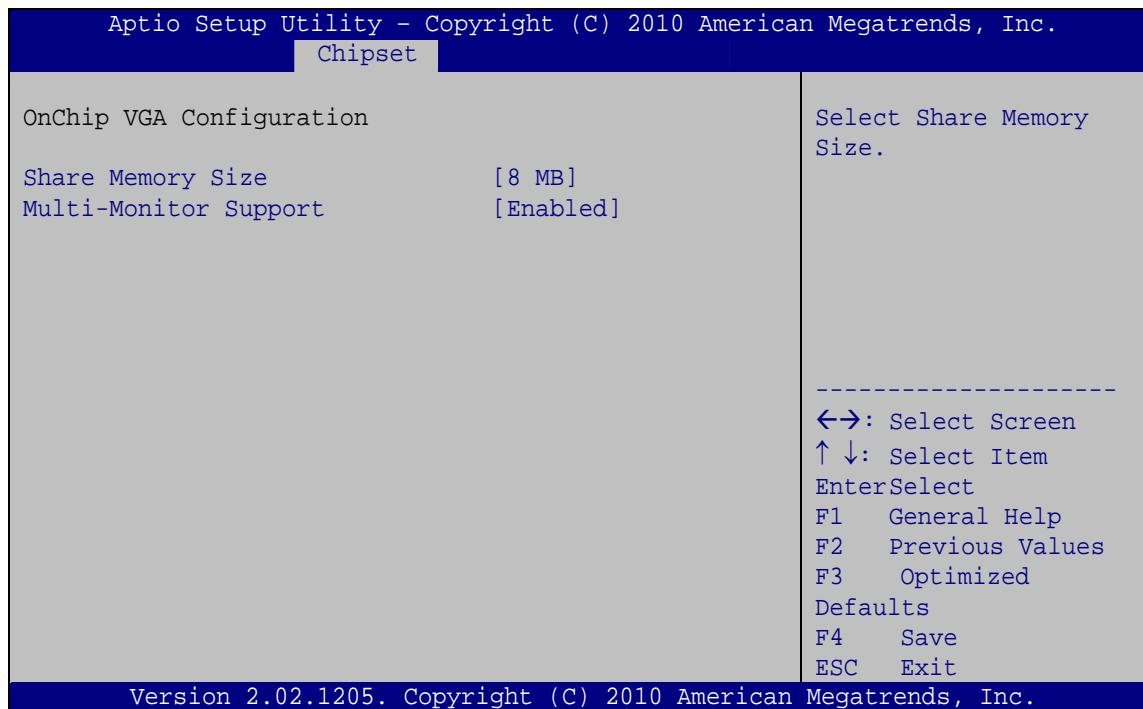
BIOS Menu 16: OnChip VGA Configuration

➔ **Share Memory Size [8 MB]**

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

- Disabled
- 1 MB
- 8 MB   **Default**

➔ **Multi-Monitor Support [Enabled]**

Use **Multi-Monitor Support** option to enable or disable the multi-monitor function.

➔ **Disabled**　　　　　　　Disabled the multi-monitor function

➔ **Enabled**　**DEFAULT**　Enabled the multi-monitor function

5.4.2 South Bridge Configuration

Use the **South Bridge Configuration** menu (**BIOS Menu 17**) to configure the Southbridge chipset.

```
        Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
                        Chipset

Auto Power Button Function       [Enabled]           HD Audio Controller
HD Audio Controller              [Enabled]
USB Function                     [Enabled]
USB 2.0(EHCI) Support            [Enabled]           ---------------------
Set Spread Spectrum function     [Disabled]          ←→: Select Screen
                                                     ↑ ↓: Select Item
                                                     Enter Select
                                                     F1   General Help
                                                     F2   Previous Values
                                                     F3    Optimized
                                                     Defaults
                                                     F4    Save
                                                     ESC   Exit

        Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```
BIOS Menu 17:South Bridge Chipset Configuration

➔ **HD Audio Controller [Enabled]**

Use the **HD Audio Controller** option to enable or disable the High Definition Audio controller.

➔ **Enabled**　**DEFAULT**　The onboard High Definition Audio controller automatically detected and enabled

➔ **Disabled**　　　　　　　The onboard High Definition Audio controller is disabled

➔ **USB Function [Enabled]**

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

➔ **Disabled**　　　　　　　USB function support disabled

➔ **Enabled** DEFAULT USB function support enabled

➔ **USB 2.0 (EHCI) Support [Enabled]**

Use the **USB 2.0 (EHCI) Support** BIOS option to enable or disable USB 2.0 support.

➔ **Enabled** DEFAULT USB 2.0 (EHCI) support enabled

➔ **Disabled** USB 2.0 (EHCI) support disabled

➔ **Set Spread Spectrum Function [Disabled]**

The **Set Spread Spectrum Function** option can help to improve CPU EMI issues.

➔ **Disabled** DEFAULT The spread spectrum mode is disabled

➔ **Enabled** The spread spectrum mode is enabled

5.4.3 Intel IGD SWSCI OpRegion

Use the **Intel IGD SWSCI OpRegion** menu to configure the video device connected to the system.

```
       Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
                Chipset

Intel IGD SWSCI OpRegion Configuration            Select DVMT Mode/Fixed
                                                  Mode
DVMT Mode Select              [DVMT Mode]
DVMT/Fixed Memory             [256 MB]
IGD - Boot Type               [VBIOS Default]     ---------------------
LCD Panel Type                [Select by Panel ID] ←→: Select Screen
                                                  ↑ ↓: Select Item
                                                  Enter Select
                                                  F1   General Help
                                                  F2   Previous Values
                                                  F3    Optimized
                                                  Defaults
                                                  F4    Save
                                                  ESC   Exit
       Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 18:South Bridge Chipset Configuration

➔ **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.

➔ **DVMT/FIXED Memory [256 MB]**

Use the **DVMT/FIXED Memory** option to specify the maximum amount of memory that can be allocated as graphics memory. Configuration options are listed below.

- 128 MB
- 256 MB   **Default**
- Maximum

➔ **IGD - Boot Type [VBIOS Default]**

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

- VBIOS Default   DEFAULT
- CRT
- LFP
- CRT + LFP

➔ **LCD Panel Type [Select by Panel ID]**

Use the **LCD Panel Type** option to select the type of flat panel connected to the system. Configuration options are listed below.

- Select by Panel ID   DEFAULT
- 640x480 18bit
- 800x480 18bit
- 800x600 18bit

- 1024x768 18bit

- 1280x1024 18bit

- 1366x768 18bit

- 1280x800 18bit

- 1280x600 18bit

5.5 Boot

Use the **Boot** menu (**BIOS Menu 19**) to configure system boot options.

```
       Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
   Main    Advanced   Chipset    Boot     Security  Save & Exit

 Boot Configuration                                    Select the keyboard
 Boot NumLock State              [On]                  NumLock state

 Quiet Boot                      [Enabled]
 Launch PXE OpROM                [Disabled]            --------------------
                                                       ←→: Select Screen
 Boot Option Priorities                                ↑ ↓: Select Item
                                                       EnterSelect
                                                       F1   General Help
                                                       F2   Previous Values
                                                       F3    Optimized
                                                       Defaults
                                                       F4    Save
                                                       ESC   Exit
        Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 19: Boot

➔ **Bootup NumLock State [On]**

Use the **Bootup NumLock State** BIOS option to specify if the number lock setting must be modified during boot up.

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

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

➔ **Quiet Boot [Enabled]**

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

➔ **Disabled**
Normal POST messages displayed

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

➔ **Launch PXE OpROM [Disabled]**

Use the **Launch PXE OpROM** option to enable or disable boot option for legacy network devices.

➔ **Disabled** DEFAULT
Ignore all PXE Option ROMs

➔ **Enabled**
Load PXE Option ROMs.

5.6 Security

Use the **Security** menu (**BIOS Menu 20**) to set system and user passwords.

```
      Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.
   Main    Advanced   Chipset    Boot    Security  Save & Exit

 Password Description                           Set Setup Administrator
                                                Password
 If ONLY the Administrator's password is set,
 then this only limits access to Setup and is
 only asked for when entering Setup             --------------------
 If ONLY the User's password is set, then this  ←→: Select Screen
 is a power on password and must be entered to  ↑↓: Select Item
 boot or enter Setup. In Setup the User will    Enter Select
 have Administrator rights.                     F1   General Help
                                                F2   Previous Values
 Administrator Password                         F3    Optimized
 User Password                                  Defaults
                                                F4    Save
                                                ESC   Exit
      Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```
BIOS Menu 20: Security

➔ **Administrator Password**

Use the **Administrator Password** to set or change a administrator password.

➔ **User Password**

Use the **User Password** to set or change a user password.

5.7 Exit

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

```
     Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
  Main    Advanced   Chipset     Boot    Security  Save & Exit

 Save Changes and Reset                          Exit system setup after
 Discard Changes and Reset                       saving the changes.

 Restore Defaults
 Save as User Defaults
 Restore User Defaults
                                                 ----------------------
                                                 ←→: Select Screen
                                                 ↑ ↓: Select Item
                                                 Enter Select
                                                 F1   General Help
                                                 F2   Previous Values
                                                 F3    Optimized
                                                 Defaults
                                                 F4    Save
                                                 ESC   Exit
        Version 2.02.1205. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 21:Exit

➔ **Save Changes and Reset**

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

➔ **Discard Changes and Reset**

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

➔ **Restore Defaults**

Use the **Restore Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F3 key can be used for this operation.**

➔ **Save as User Defaults**

Use the **Save as User Defaults** option to save the changes done so far as user defaults.

➔ **Restore User Defaults**

Use the **Restore User Defaults** option to restore the user defaults to all the setup options.

Appendix

A

BIOS Menu Options

Appendix

B

One Key Recovery

B.1 One Key Recovery Introduction

The IEI one key recovery is an easy-to-use front end for the Norton Ghost system backup and recovery tool. The one key recovery provides quick and easy shortcuts for creating a backup and reverting to that backup or for reverting to the factory default settings.

To create the system backup the main storage device must be split into two partitions (three partitions for Linux). The first partition will be for the operating system, while the second partition will be invisible to the operating system and contain the backup made by the one key recovery software.

B.1.1 System Requirement

The partition created for recovery images must be big enough to contain both the factory default image and the user backup image. The size must be calculated before creating the partitions. Please take the following table as a reference when calculating the size of the partition.

	OS	OS Image after Ghost	Compression Ratio
Windows® 7	7 GB	5 GB	70%
Windows® XPE	776 MB	560 MB	70%
Windows® CE 6.0	36 MB	28 MB	77%

NOTE:

Specialized tools are required to change the partition size if the operating system is already installed.

B.1.2 Supported Operating System

The recovery CD is compatible with both Microsoft Windows and Linux operating system (OS). The supported OS versions are listed below.

- Microsoft Windows
  - Windows XP (Service Pack 2 or 3 required)
  - Windows Vista

- o Windows 7
- o Windows CE 5.0
- o Windows CE 6.0
- o Windows XP Embedded
- Linux
  - o Fedora Core 12 (Constantine)
  - o Fedora Core 11 (Leonidas)
  - o Fedora Core 10 (Cambridge)
  - o Fedora Core 8 (Werewolf)
  - o Fedora Core 7 (Moonshine)
  - o RedHat RHEL-5.4
  - o RedHat 9 (Ghirke)
  - o Ubuntu 8.10 (Intrepid)
  - o Ubuntu 7.10 (Gutsy)
  - o Ubuntu 6.10 (Edgy)
  - o Debian 5.0 (Lenny)
  - o Debian 4.0 (Etch)
  - o SuSe 11.2
  - o SuSe 11.3

NOTE:

Installing unsupported OS versions may cause the recovery tool to fail.

> **NOTE:**
>
> The recovery CD can only be used with IEI products. The software will fail to run and a warning message will appear when used on non-IEI hardware.

```
X:\I386\system32\cmd.exe - startnet.cmd

X:\I386\system32>call start.exe



        Project1                    X
        This software only runs on IEI hardware!
                    OK
```
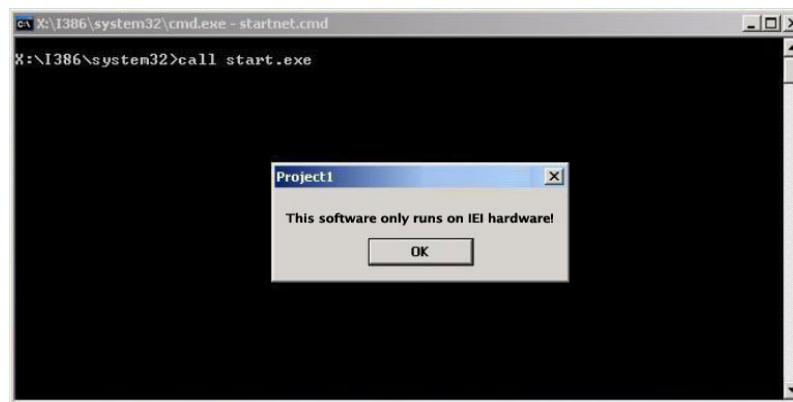
B.2 Setup Procedure for Windows

Prior to using the recovery tool to backup or restore system, a few setup procedures are required.

Step 1: Hardware and BIOS setup

Step 2: Create partitions

Step 3: Install operating system, drivers and system applications.

Step 4: Build-up recovery partition

Step 5: Create factory default image

The detailed descriptions are described in the following sections.

![NOTE icon] **NOTE:**

The setup procedures described below are for Microsoft Windows operating system users. For Linux system, most setup procedures are the same with Microsoft Windows except for several steps which is described in **Section B.3**.

B.2.1 Hardware and BIOS Setup

Step 1: Make sure the system is powered off and unplugged.

Step 2: Install a hard driver or SSD in the NANO-PV-D4252/N4552/D5252. An unformatted and unpartitioned disk is recommended.

Step 3: Connect an optical disk drive to the NANO-PV-D4252/N4552/D5252 and insert the recovery CD.

Step 4: Turn on the system.

Step 5: Press the <**DELETE**> key as soon as the system is turned on to enter the BIOS.

Step 6: Select the connected optical disk drive as the 1st boot device. (**Boot → Boot Device Priority → 1st Boot Device**).

Step 7: Save changes and restart the computer. Continue to the next section for instructions on partitioning the internal storage.

B.2.2 Create Partitions

Step 1: Put the recovery CD in the optical drive.

Step 2: Turn on the system.

Step 3: When prompted, press any key to boot from the recovery CD. It will take a while to launch the recovery tool. Please be patient.

Step 4: The recovery tool setup menu is shown as below.
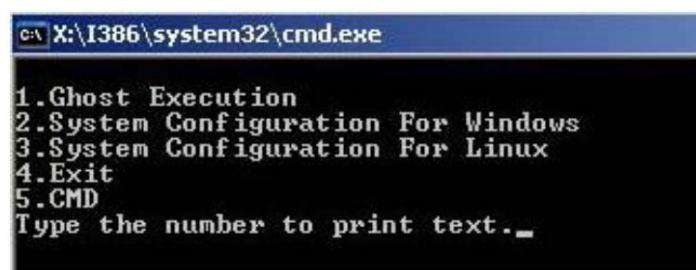
**Figure B-1: Recovery Tool Setup Menu**

Step 5: Press <**5**> then <Enter>.
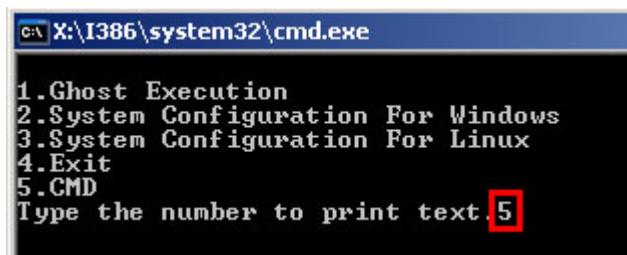
Figure B-2: Command Mode

Step 6: The command prompt window appears. Type the following commands (marked

in red) to create two partitions. One is for the OS installation; the other is for

saving recovery files and images which will be an invisible partition.

(Press <Enter> after entering each line below)

system32>diskpart

DISKPART>list vol

DISKPART>sel disk 0

DISKPART>create part pri size= ___

DISKPART>assign letter=N

DISKPART>create part pri size= ___

DISKPART>assign letter=F

DISKPART>exit

system32>format N: /fs:ntfs /q /y

system32>format F: /fs:ntfs /q /v:Recovery /y

system32>exit

Figure B-3: Partition Creation Commands

![IEI Technology Corp.]

NOTE:

Use the following commands to check if the partitions were created successfully.

Step 7: Press any key to exit the recovery tool and automatically reboot the system.

Please continue to the following procedure: Build-up Recovery Partition.

B.2.3 Install Operating System, Drivers and Applications

Install the operating system onto the unlabelled partition. The partition labeled as "Recovery" is for use by the system recovery tool and should not be used for installing the operating system or any applications.

NOTE:

The operating system installation program may offer to reformat the chosen partition. DO NOT format the partition again. The partition has already been formatted and is ready for installing the new operating system.

To install the operating system, insert the operating system installation CD into the optical drive. Restart the computer and follow the installation instructions.

B.2.4 Build-up Recovery Partition

Step 1: Put the recover CD in the optical drive.

Step 2: Start the system.

Step 3: Press any key to boot from the recovery CD. It will take a while to launch the recovery tool. Please be patient.

Step 4: When the recovery tool setup menu appears, press <**2**> then <Enter>.


```
X:\I386\system32\cmd.exe

1.Ghost Execution
2.System Configuration For Windows
3.System Configuration For Linux
4.Exit
5.CMD
Type the number to print text.2
```
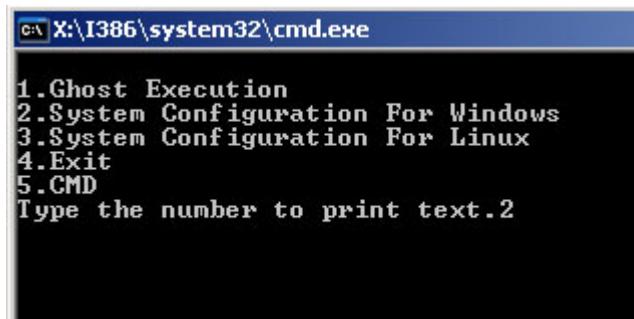
Figure B-4: System Configuration for Windows

Step 5: The Symantec Ghost window appears and starts configuring the system to build-up a recovery partition. In this process, the partition which is created for recovery files in **Section B.2.2** is hidden and the recovery tool is saved in this partition.
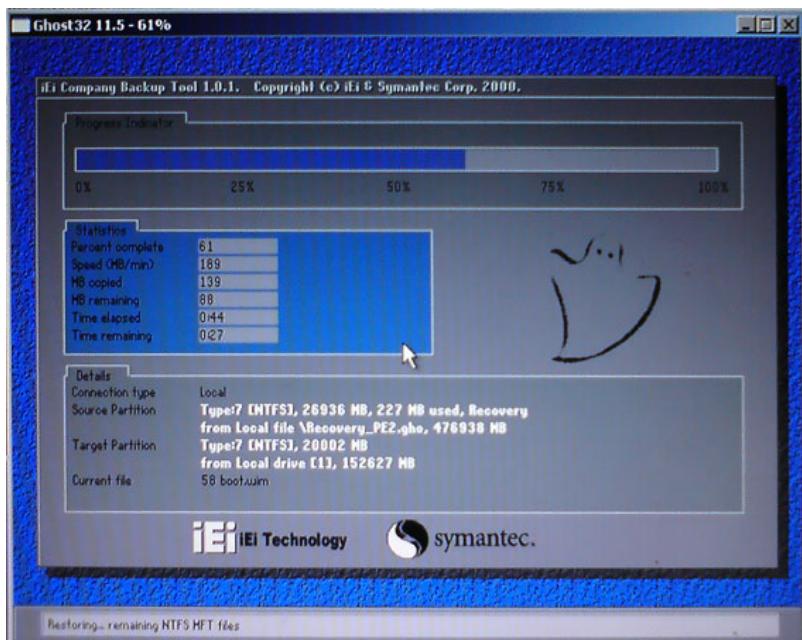
Figure B-5: Build-up Recovery Partition

Step 6: After completing the system configuration, press any key in the following window to reboot the system.
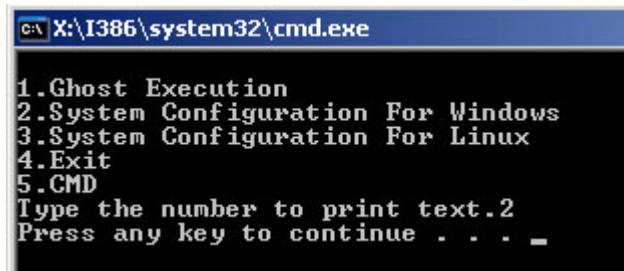
Figure B-6: Press any key to continue

Step 7: Eject the recovery CD.

B.2.5 Create Factory Default Image

NOTE:

Before creating the factory default image, please configure the system to a factory default environment, including driver and application installations.

To create a factory default image, please follow the steps below.

Step 1: Turn on the system. When the following screen displays (**Figure B-7**), press the <**F3**> key to access the recovery tool. The message will display for 10 seconds, please press F3 before the system boots into the operating system.
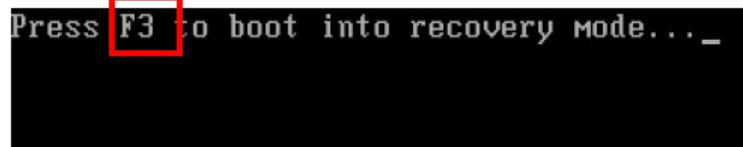
Figure B-7: Press F3 to Boot into Recovery Mode

Step 2: The recovery tool menu appears. Type <**4**> and press <**Enter**>. (**Figure B-8**)
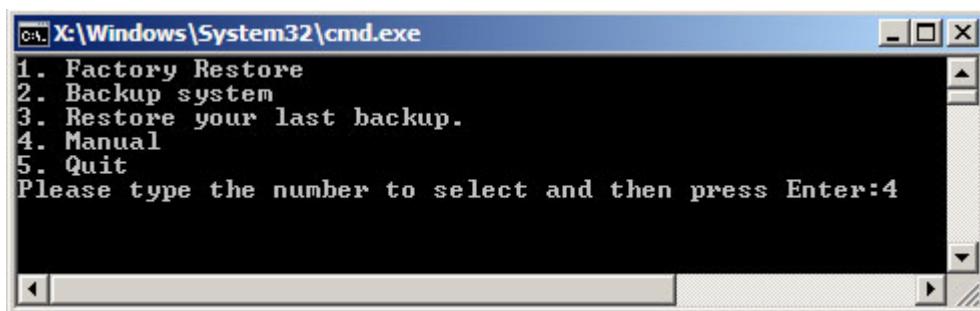
Figure B-8: Recovery Tool Menu

Step 3:   The About Symantec Ghost window appears. Click **OK** button to continue.
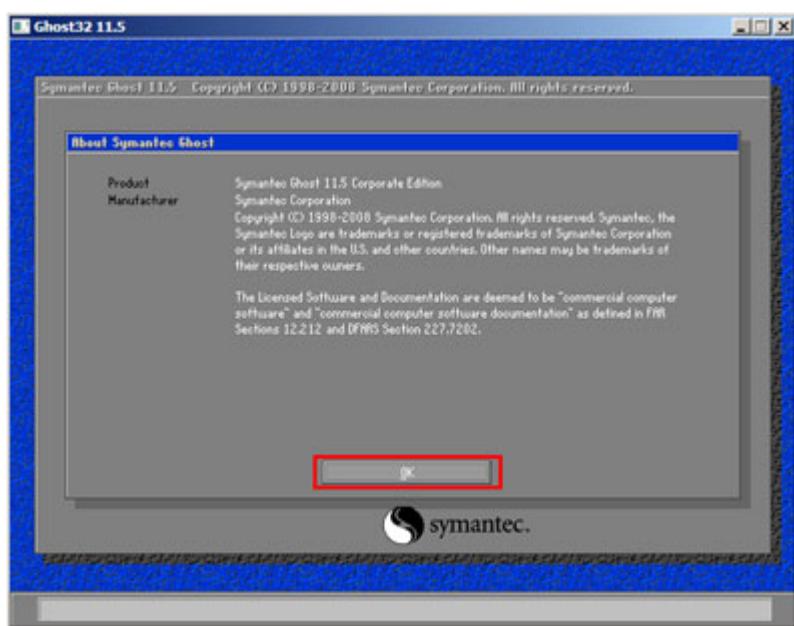
Figure B-9: About Symantec Ghost Window

Step 4:   Use mouse to navigate to the option shown below (**Figure B-10**).
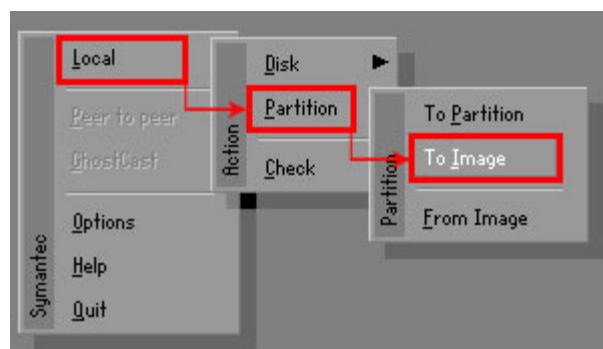
Figure B-10: Symantec Ghost Path

Step 5: Select the local source drive as shown in **Figure B-11**. Then click OK.
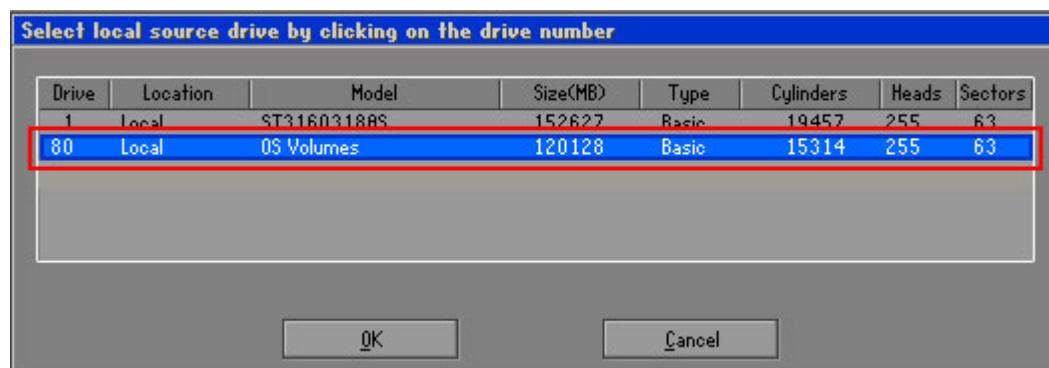
Figure B-11: Select a Local Source Drive

Step 6: Select a source partition from basic drive as shown in **Figure B-12**. Then click

OK.
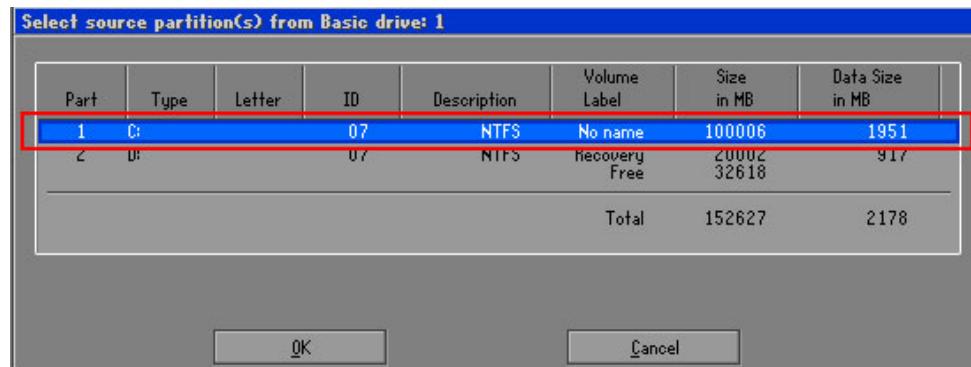
Figure B-12: Select a Source Partition from Basic Drive

Step 7: Select **1.2: [Recovery] NTFS drive** and enter a file name called **iei**

(**Figure B-13**). Click **Save**. The factory default image will then be saved in the

selected recovery drive and named IEI.GHO.

WARNING:

The file name of the factory default image must be **iei.GHO**.
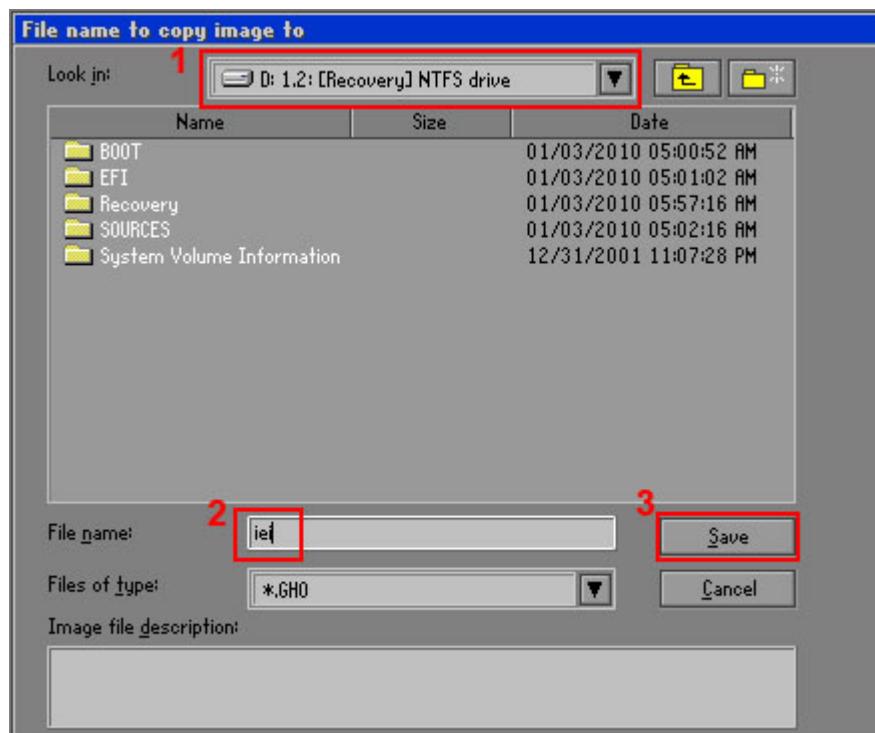
Figure B-13: File Name to Copy Image to

Step 8: When the Compress Image screen in **Figure B-14** prompts, click **High** to make

the image file smaller.
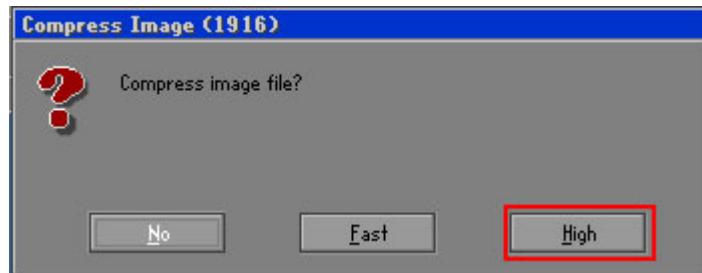
Figure B-14: Compress Image

Step 9: The Proceed with partition image creation window appears, click **Yes** to

continue.
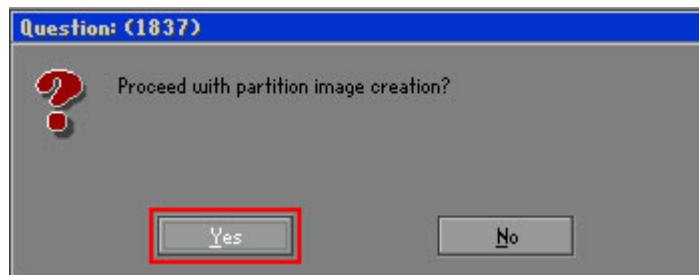
Figure B-15: Image Creation Confirmation

Step 10: The Symantec Ghost starts to create the factory default image (**Figure B-16**).
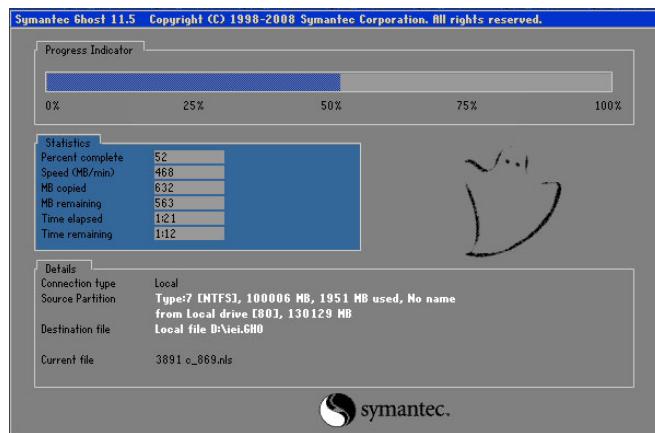
Figure B-16: Image Creation Complete

Step 11: When the image creation completes, a screen prompts as shown in **Figure B-17**.

Click **Continue** and close the Ghost window to exit the program.
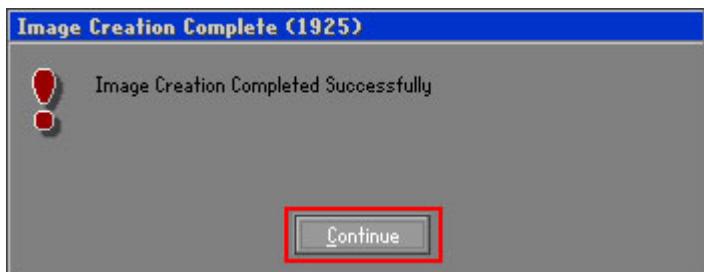
Figure B-17: Image Creation Complete

Step 12: The recovery tool main menu window is shown as below. Press any key to

reboot the system.
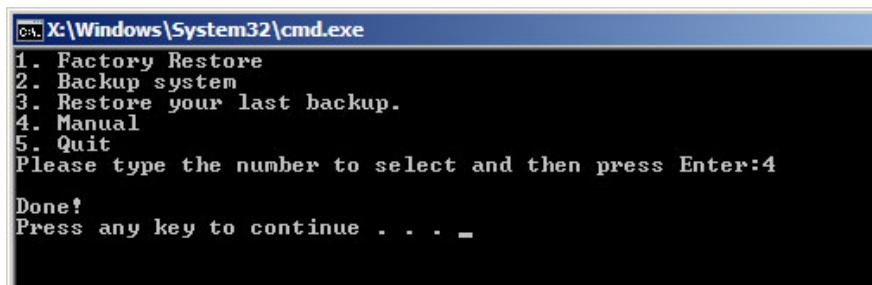
Figure B-18: Press Any Key to Continue

B.3 Setup Procedure for Linux

The initial setup procedures for Linux system are mostly the same with the procedure for Microsoft Windows. Please follow the steps below to setup recovery tool for Linux OS.

Step 1: **Hardware and BIOS setup**. Refer to **Section B.2.1**.

Step 2: **Install Linux operating system**. Make sure to install GRUB (v0.97 or earlier) MBR type and Ext3 partition type. Leave enough space on the hard drive to create the recover partition later.

> **NOTE:**
>
> If the Linux OS is not installed with GRUB (v0.97 or earlier) and Ext3, the Symantec Ghost may not function properly.

While installing Linux OS, please create two partitions:

- Partition 1: **/**
- Partition 2: **SWAP**

> **NOTE:**
>
> Please reserve enough space for partition 3 for saving recovery images.
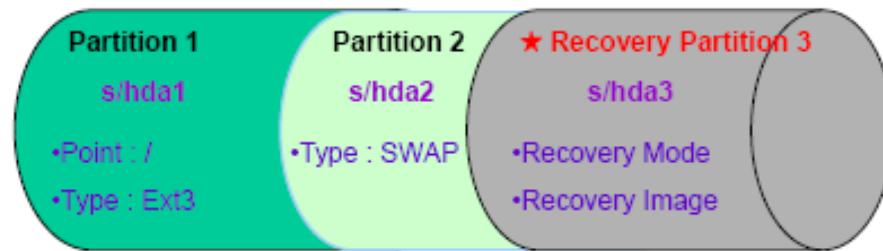
Figure B-19: Partitions for Linux

Step 3: **Create a recovery partition**. Insert the recovery CD into the optical disk drive. Follow **Step 1** ~ **Step 3** described in **Section B.2.2**. Then type the following commands (marked in red) to create a partition for recovery images.

system32>diskpart

DISKPART>list vol

DISKPART>sel disk 0

DISKPART>create part pri size= ___

DISKPART>assign letter=N

DISKPART>exit

system32>format N: /fs:ntfs /q /v:Recovery /y

system32>exit

Step 4: **Build-up recovery partition**. Press any key to boot from the recovery CD. It will take a while to launch the recovery tool. Please be patient. When the recovery tool setup menu appears, type <**3**> and press <Enter> (**Figure B-20**). The Symantec Ghost window appears and starts configuring the system to build-up a recovery partition. After completing the system configuration, press any key to reboot the system. Eject the recovery CD.
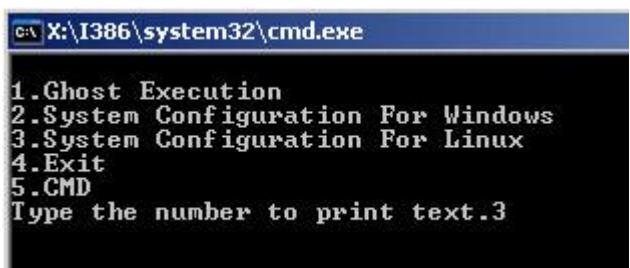

Figure B-20: System Configuration for Linux

Step 5: **Access the recovery tool main menu by modifying the "menu.lst"**. To first access the recovery tool main menu, the menu.lst must be modified. In Linux system, enter Administrator (root). When prompt appears, type:

cd /boot/grub

vi menu.lst
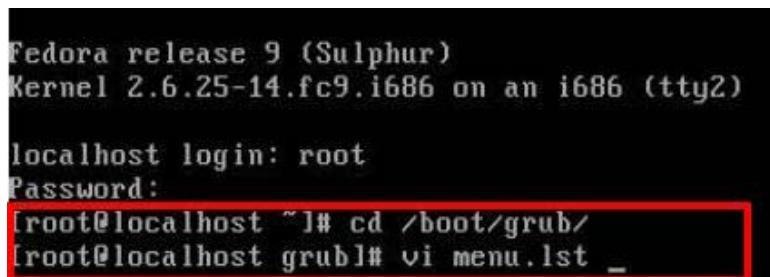
Figure B-21: Access menu.lst in Linux (Text Mode)

Step 6: Modify the menu.lst as shown below.

- **Type command:**

  title Recovery Partition

  root (hd0,2)

  makeactive

  chainloader +1

Step 7: The recovery tool menu appears. (**Figure B-22**)


```
1. Factory Restore
2. Backup system
3. Restore your last backup.
4. Manual
5. Quit
Please type the number to select and then press Enter:
```

Figure B-22: Recovery Tool Menu

Step 8: **Create a factory default image**. Follow **Step 2** ~ **Step 12** described in **Section B.2.5** to create a factory default image.

B.4 Recovery Tool Functions

After completing the initial setup procedures as described above, users can access the recovery tool by pressing <**F3**> while booting up the system. The main menu of the recovery tool is shown below.
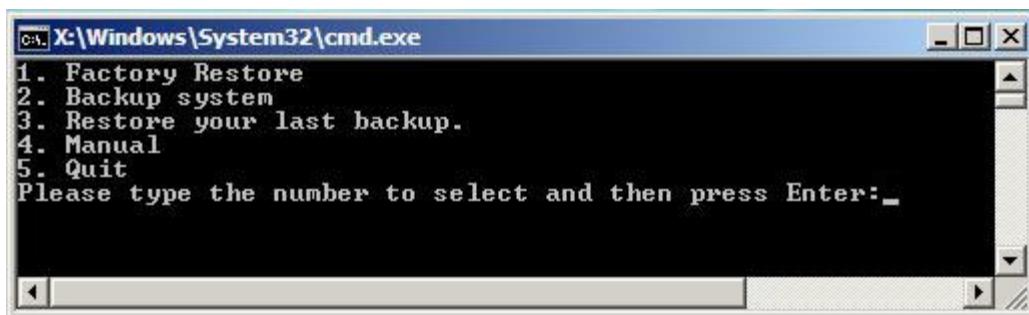
Figure B-23: Recovery Tool Main Menu

The recovery tool has several functions including:

1. **Factory Restore**: Restore the factory default image (iei.GHO) created in **Section B.2.5**.
2. **Backup system**: Create a system backup image (iei_user.GHO) which will be saved in the hidden partition.
3. **Restore your last backup**: Restore the last system backup image
4. **Manual**: Enter the Symantec Ghost window to configure manually.
5. **Quit**: Exit the recovery tool and restart the system.

WARNING:

Please do not turn off the system power during the process of system recovery or backup.

WARNING:

All data in the system will be deleted during the system recovery. Please backup the system files before restoring the system (either Factory Restore or Restore Backup).

B.4.1 Factory Restore

To restore the factory default image, please follow the steps below.

Step 1: Type <**1**> and press <**Enter**> in the main menu.

Step 2: The Symantec Ghost window appears and starts to restore the factory default. A factory default image called **iei.GHO** is created in the hidden Recovery partition.
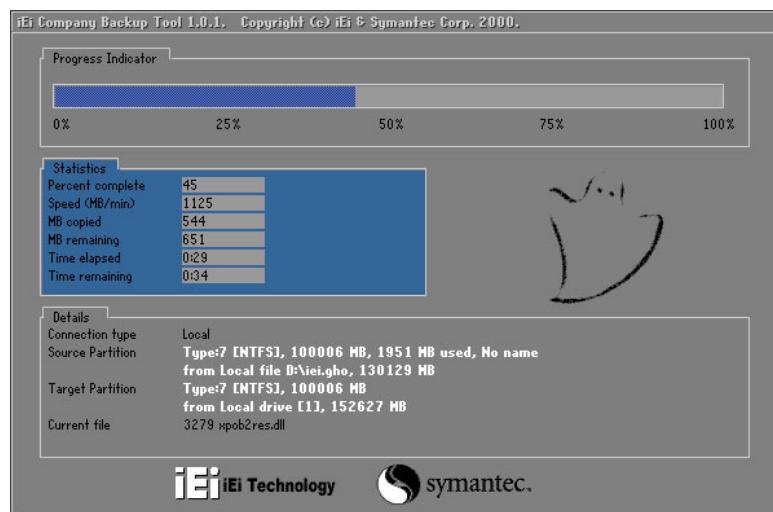

Figure B-24: Restore Factory Default

Step 3: The screen is shown as in **Figure B-25** when completed. Press any key to reboot the system.
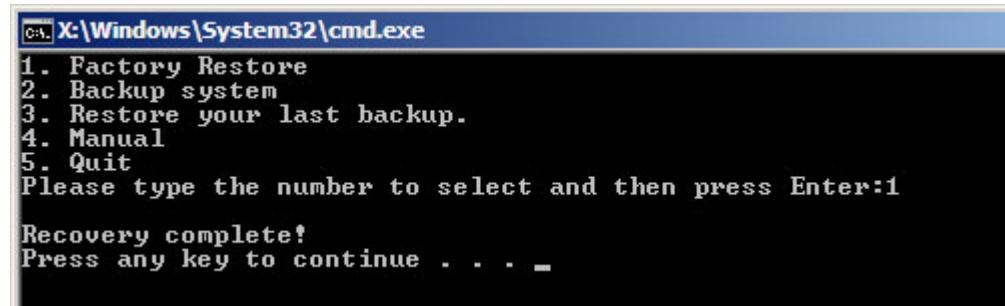

Figure B-25: Recovery Complete Window

B.4.2 Backup System

To backup the system, please follow the steps below.

Step 1: Type <**2**> and press <**Enter**> in the main menu.

Step 2: The Symantec Ghost window appears and starts to backup the system. A

backup image called **iei_user.GHO** is created in the hidden Recovery partition.
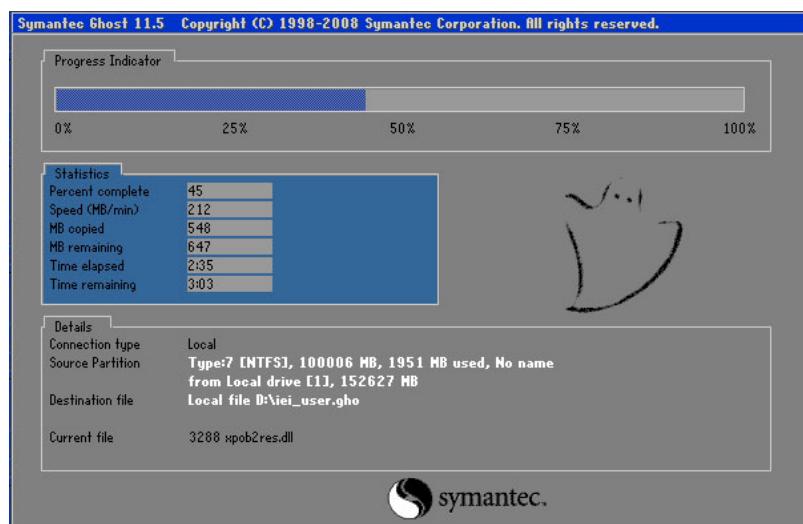

Figure B-26: Backup System

Step 3: The screen is shown as in **Figure B-27** when system backup is completed.

Press any key to reboot the system.
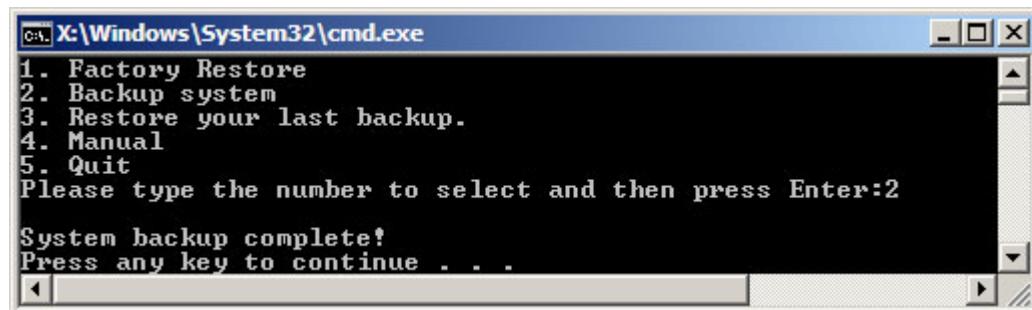
Figure B-27: System Backup Complete Window

B.4.3 Restore Your Last Backup

To restore the last system backup, please follow the steps below.

Step 1: Type <**3**> and press <**Enter**> in the main menu.

Step 2: The Symantec Ghost window appears and starts to restore the last backup image (iei_user.GHO).
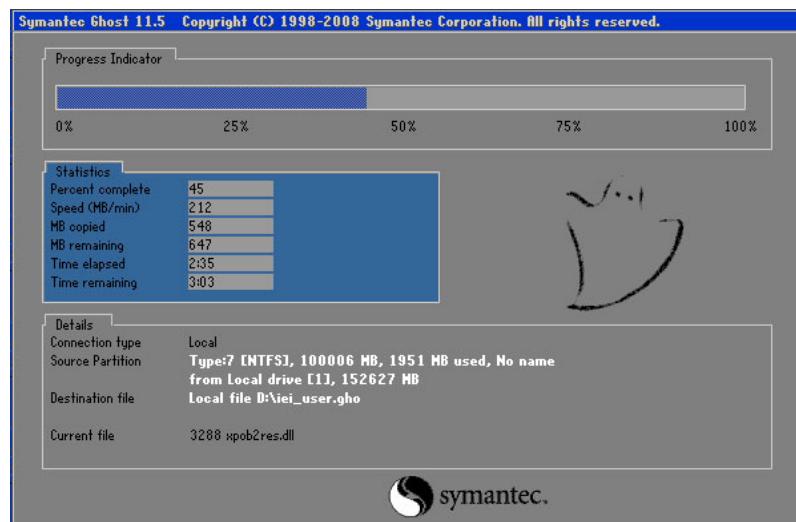
Figure B-28: Restore Backup

Step 3: The screen is shown as in **Figure B-29** when backup recovery is completed. Press any key to reboot the system.
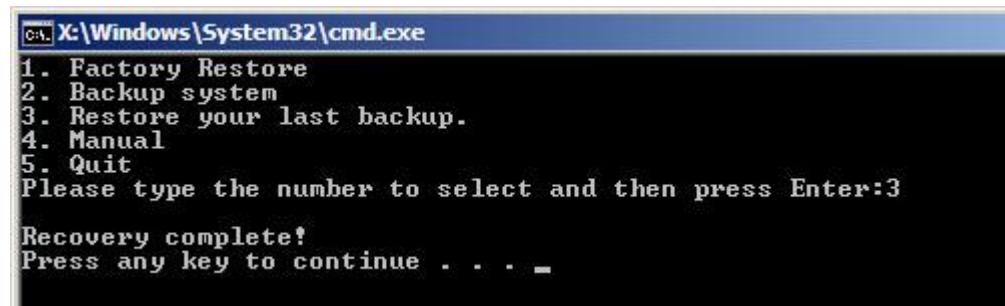
Figure B-29: Restore System Backup Complete Window

B.4.4 Manual

To restore the last system backup, please follow the steps below.

Step 1: Type **<4>** and press **<Enter>** in the main menu.

Step 2: The Symantec Ghost window appears. Use the Ghost program to backup or recover the system manually.
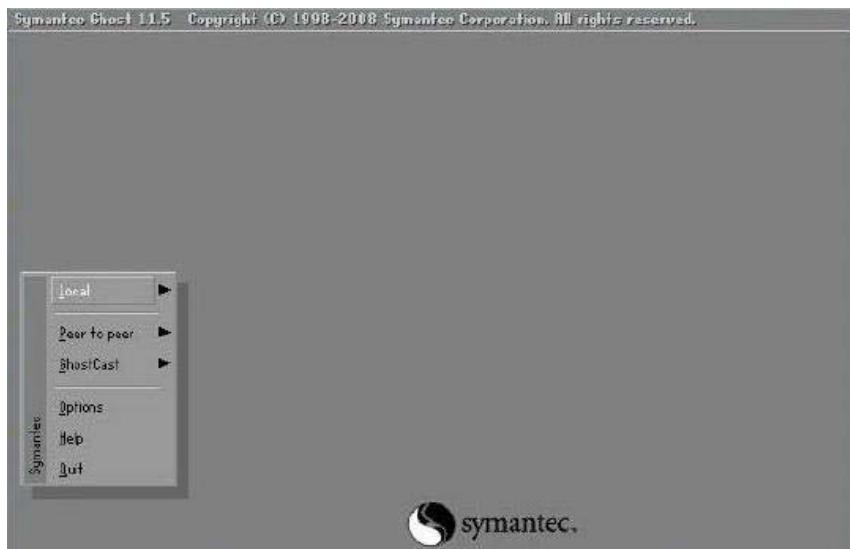
Figure B-30: Symantec Ghost Window

Step 3: When backup or recovery is completed, press any key to reboot the system.

Appendix

C

# 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.
APM	The Advanced Power Management (APM) application program interface (API) enables the inclusion of power management in the BIOS.
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.
CMOS	Complimentary metal-oxide-conductor is a type of integrated circuit used in chips like static RAM and microprocessors.
COM	COM is used to refer to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male DE-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.

EHCI   The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.

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

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.

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.

MAC   The Media Access Control (MAC) protocol enables several terminals or network nodes to communicate in a LAN, or other multipoint networks.

PCIe   PCI Express (PCIe) is a communications bus that uses dual data lines for full-duplex (two-way) serial (point-to-point) communications between the SBC components and/or expansion cards and the SBC chipsets. Each line has a 2.5 Gbps data transmission rate and a 250 MBps sustained data transfer rate.

POST   The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.

QVGA   Quarter Video Graphics Array (QVGA) refers to a display with a resolution of 320 x 240 pixels.

RAM   Random Access Memory (RAM) is a form of storage used in computer. RAM is volatile memory, so it loses its 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 3Gb/s 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, while USB 2.0 supports 480Mbps data transfer rates.

VGA   The Video Graphics Array (VGA) is a graphics display system developed by IBM.

Appendix

D

Watchdog Timer

![NOTE icon] **NOTE:**

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

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI 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. While the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the Watchdog timer is disabled if the time-out value is set to zero.

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

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

Example program:

; **INITIAL TIMER PERIOD COUNTER**

;

W_LOOP:

```
        MOV     AX, 6F02H        ;setting the time-out value
        MOV     BL, 30H              ;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

Hazardous Materials Disclosure

E.1 Hazardous Material 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。						