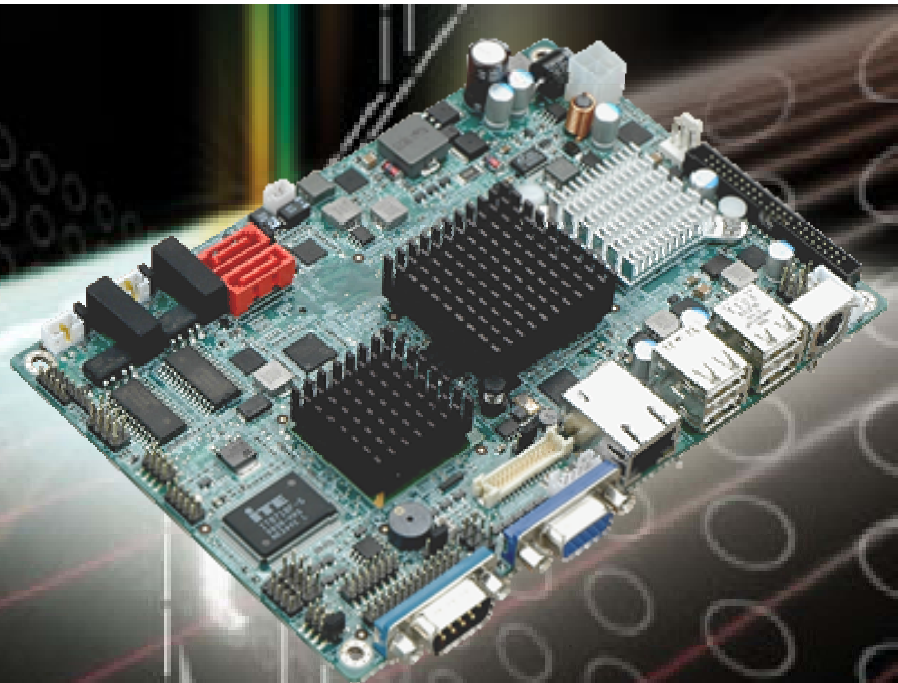




IEI Technology Corp.



MODEL: **NANO-945GSE3**

EPIC Single Board Computer with Intel® Atom™ N270 1.6 GHz Processor, Gigabit Ethernet, VGA/LVDS, Six USB, Audio, RS-232, RS-232/422/485, CAN Bus, CompactFlash® Type II, Two SATA, RoHS Compliant

User Manual

Rev. 1.00 – 24 June, 2010





Revision

Date	Version	Changes
24 June, 2010	1.00	Initial release

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Chapter

1

Introduction

1.1 Introduction

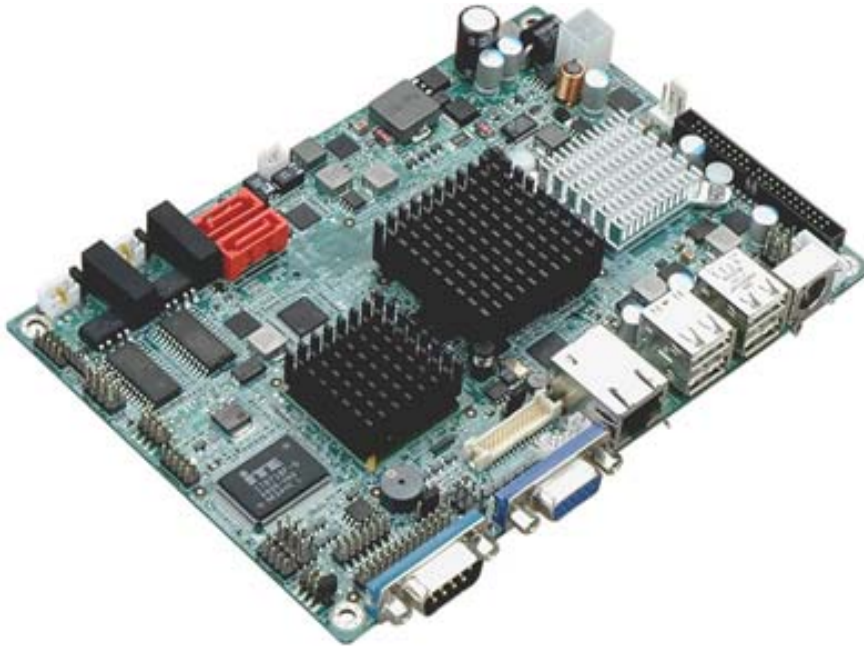


Figure 1-1: NANO-945GSE3

The NANO-945GSE3 EPIC motherboards are embedded 45 nm Intel® Atom™ processor platforms. The Intel® Atom™ processor N270 embedded on the NANO-945GSE3 has a 1.60 GHz clock speed, a 533 MHz FSB and a 512 KB L2 cache. The NANO-945GSE3 also supports one 200-pin 400/533 MHz 2.0 GB (max.) DDR2 SDRAM SO-DIMM. The NANO-945GSE3 comes with an 18-bit dual-channel LVDS connector, a VGA port, a TV-out connector, and a SDVO connector. The NANO-945GSE3 also comes with a PCI Express (PCIe) Gigabit Ethernet (GbE) connector, a RS-232 serial port and a RS-232/422/485 connector, four USB ports and two additional USB port by internal connector. Two SATA connectors, a parallel ATA (IDE), and a CompactFlash® slot provide storage options to the NANO-945GSE3. One internal parallel port (LPT) and two CAN Bus connectors are also included.

1.2 NANO-945GSE3 Overview

The NANO-945GSE3 has a wide variety of peripheral interface connectors. **Figure 1-2** is a labeled photo of the peripheral interface connectors on the NANO-945GSE3.

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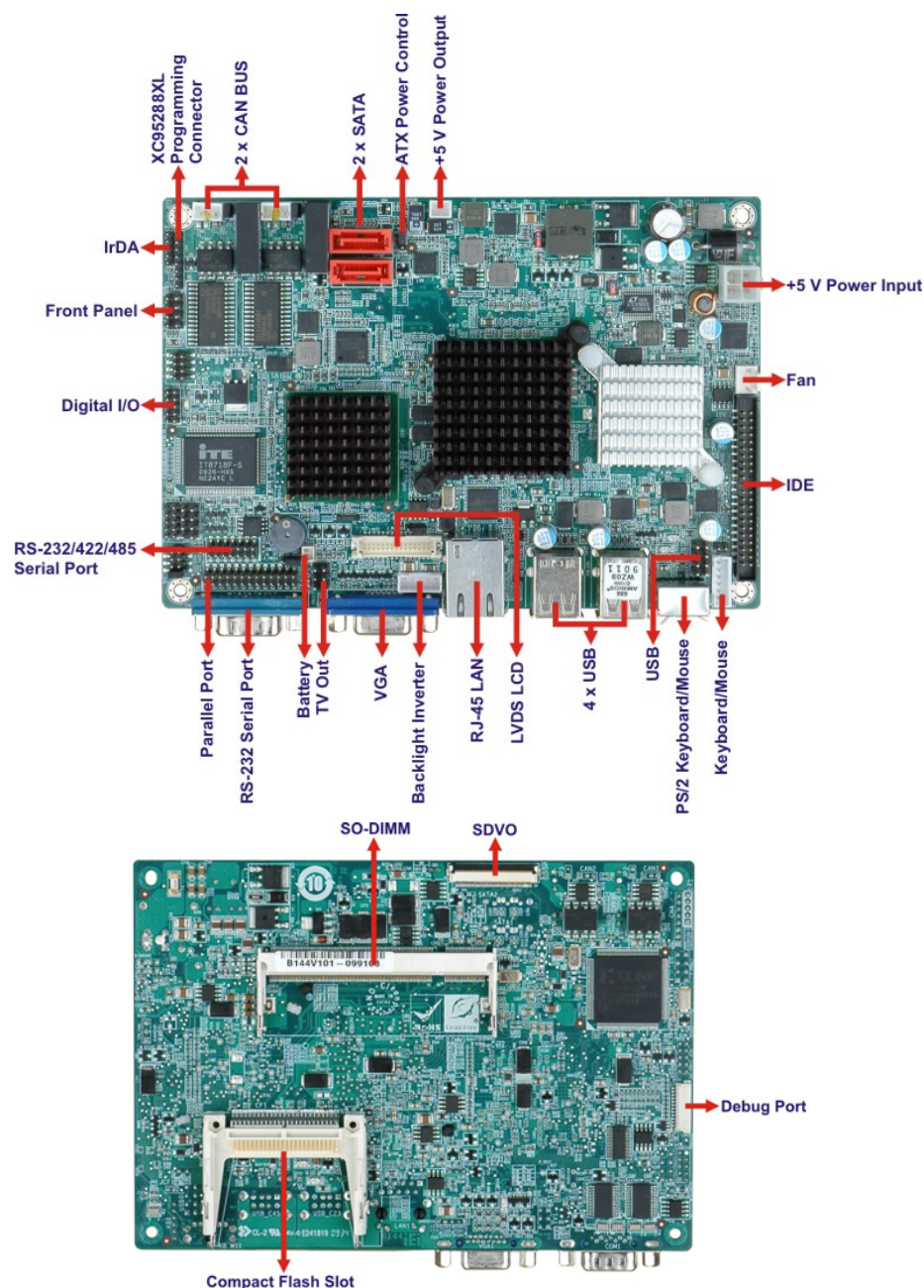


Figure 1-2: NANO-945GSE3 Overview

1.2.1 Dimensions

The dimensions of the board are listed below:

- **Length:** 165 mm
- **Width:** 115 mm

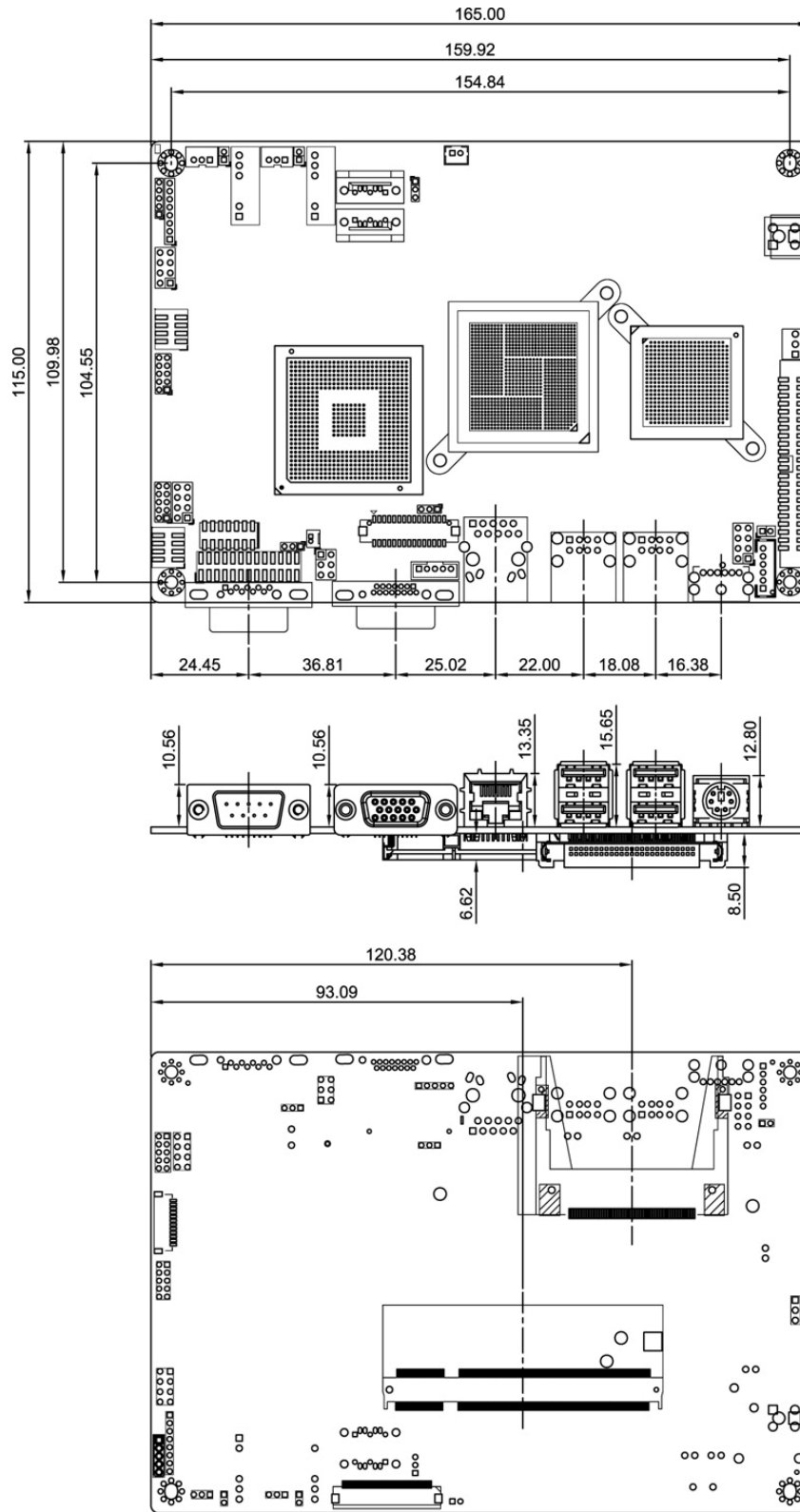


Figure 1-3: NANO-945GSE3 Dimensions (mm)

1.2.2 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.

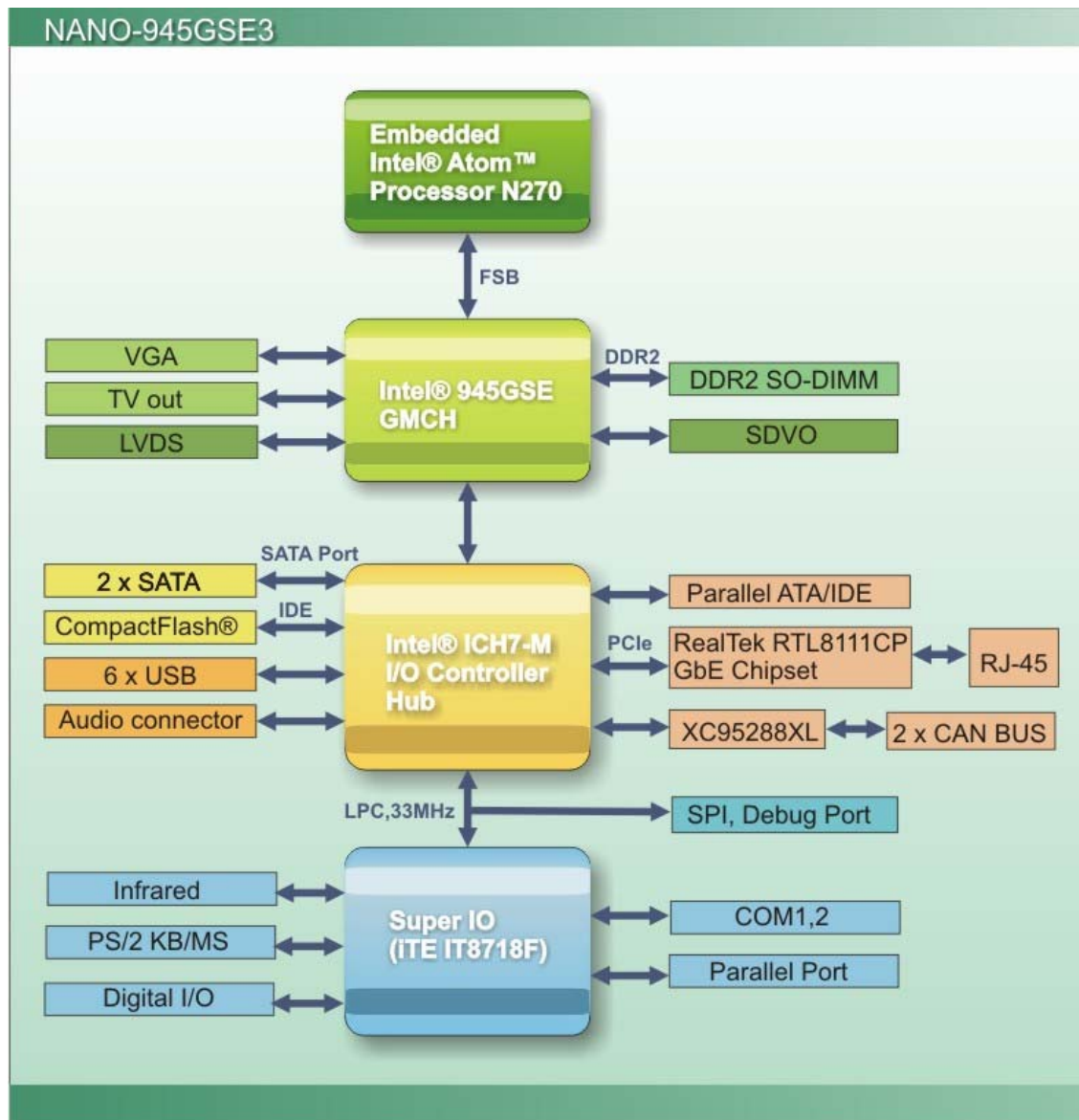


Figure 1-4: Data Flow Block Diagram

1.2.3 Technical Specifications

NANO-945GSE3 technical specifications are listed below.

Specification/Model	NANO-945GSE3
Form Factor	EPIC
CPU Supported	45 nm 1.6 GHz Intel® Atom™ N270
Front Side Bus (FSB)	533 MHz
Northbridge Chipset	Intel® 945GSE
Integrated Graphics	Intel® 945GSE, Intel® Generation 3.5 integrated GFX Core (133Mhz), Intel® Graphics Media Accelerator 950
Memory	One 200-pin 533 MHz DDR2 SDRAM SO-DIMM supported (system max. 2.0 GB)
Southbridge Chipset	Intel® ICH7M
Audio	Audio connector for optional audio kit
BIOS	AMI BIOS
Digital I/O	8-bit, 4-bit input/4-bit output
Ethernet Controllers	One Realtek RTL8111CP GbE controllers
Super I/O Controller	ITE IT8718
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Infrared	One infrared connector through the ITE IT8718
I/O Interface Connectors	
Audio Connectors	One internal pin header
Display	One VGA One LVDS (internal) One TV-out (internal) One SDVO (internal)
Ethernet	One RJ-45 port
Keyboard/Mouse	One PS/2 port One KB/MS (internal) connector

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Specification/Model	NANO-945GSE3
LPT	One internal parallel port connector
Serial Ports	One RS-232 serial port One RS-232/422/485 (internal)
USB 2.0/1.1 ports	Four external USB ports Two via internal pin headers
Storage	
CompactFlash®	One CompactFlash® Type II socket
Parallel ATA	One Parallel ATA (IDE) connector
Serial ATA	Two independent serial ATA (SATA) channels with 1.5 Gb/s data transfer rates
Environmental and Power Specifications	
Power Supply	AT/ATX supported
Power Consumption	12V @ 1.49 A (1.6 GHz Intel® Atom™ one 2.0 GB DDR2 SO-DIMM)
Temperature (operating)	0°C ~ 60°C (32°F - 140°F)
Humidity (operating)	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	165mm x 115mm
Weight GW/NW	700g/320g
Table 1-1: Technical Specifications	

Chapter

2

Unpacking

NANO-945GSE3 User Manual

2.1 Unpacking Checklist



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-945GSE3 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.

Packing List



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-945GSE3 was purchased from or contact an IEI sales representative directly by sending an email to sales@iei.com.tw.

The NANO-945GSE3 is shipped with the following components:

Quantity	Item and Part Number	Image
1	NANO-945GSE3 (P/N: NANO-945GSE3-N270-R10)	
2	CAN Bus cable (P/N: 32100-212800-RS)	
1	SATA 5V power output cable kit for NANO series (P/N: 32100-114000-RS)	
1	KB/MS PS/2 Y-cable (P/N: 32000-133200-RS)	
1	Power Cable (P/N: 32100-087100-RS)	
1	Mini jumper pack (2.0mm)	
1	Utility CD	

NANO-945GSE3 User Manual

1	Quick Installation Guide	
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2.2.1 Optional Items

The following components are optional:

Item and Part Number	Image
5.1 Channel AC'97 audio kit with Realtek ALC655 codec (P/N: AC-KIT08R-R10)	
7.1 Channel HD audio kit with Realtek ALC883 codec support (P/N: AC-KIT883HD-R10)	
Dual USB cable (without bracket) (P/N: 32000-044300-RS)	
LPT cable (without bracket) (P/N: 32200-015100-RS)	
IDE cable, 44-pin to 44-pin (P/N: 32200-000009-RS)	
RS-232/422/485 cable (P/N: 32200-026500-RS)	
HDTV out cable (P/N: 32000-083701-RS)	
4-pin (2x2) to 4-pin (1x4) DC power cable (P/N: 32200-192900-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

Figure 3-1 shows the on-board peripheral connectors, rear panel peripheral connectors and on-board jumpers.

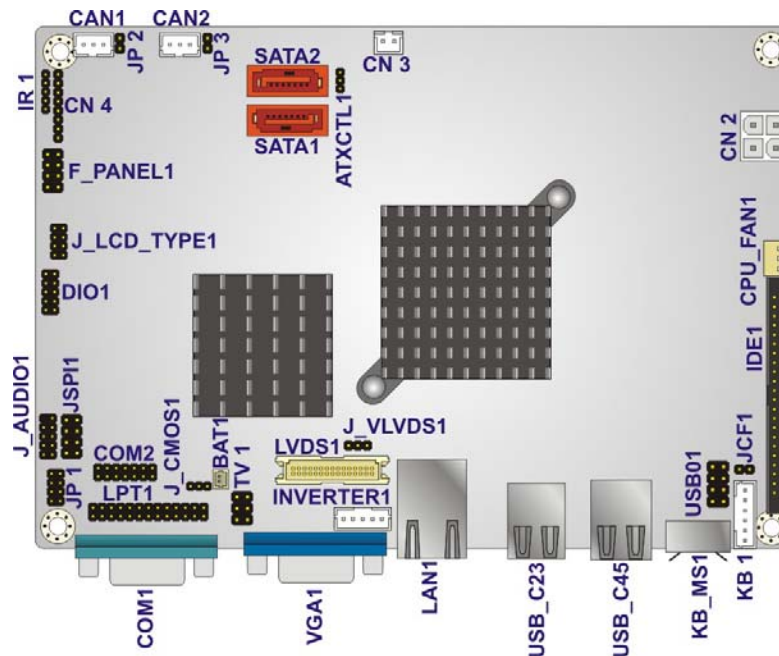


Figure 3-1: Connector and Jumper Locations [Front Side]

Figure 3-2 shows the solder side of the NANO-945GSE3.

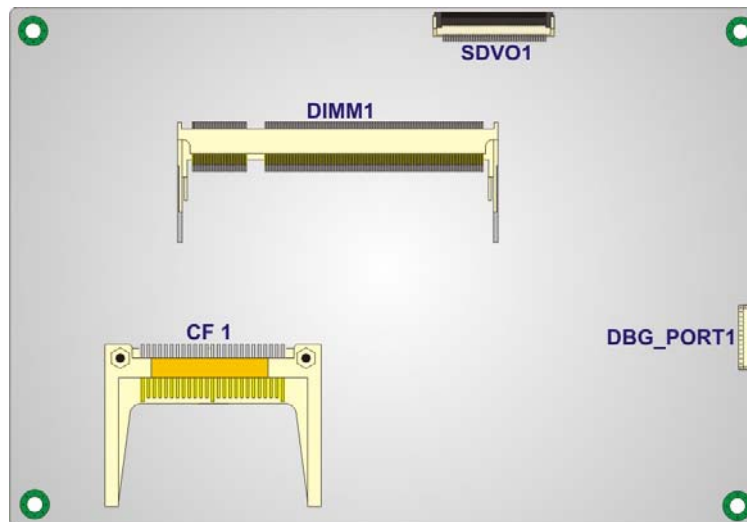


Figure 3-2: Connector and Jumper Locations [Solder Side]

3.2 Peripheral Interface Connectors

The table below lists all the connectors on the NANO-945GSE3. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
+5V power output connector	2-pin wafer	CN3
AT/ATX power input connector	4-pin (2x2)	CN1, CN2
ATX power control connector	3-pin header	ATXCTL1
Audio connector	9-pin header	J_AUDIO1
Backlight inverter connector	5-pin wafer	INVERTER1
Battery connector	2-pin wafer	BT1
CAN Bus connectors	3-pin wafer	CAN1, CAN2
CompactFlash® socket	50-pin CF socket	CF1
DD2 SO-DIMM slot	SO-DIMM socket	DIMM1
Debug Port	12-pin	DBG_PORT1
Digital input/output (DIO) connector	10-pin header	DIO1
CPU Fan connector	3-pin wafer	CPU_FAN1
Front panel connector	8-pin header	F_PANEL1
Infrared interface (IrDA) connector	5-pin header	IR1
Keyboard/Mouse connector	6-pin wafer	KB1
LVDS connector	30-pin crimp	LVDS1
Parallel ATA (IDE)	44-pin box header	IDE1
Parallel port connector	26-pin header	LPT1
SDVO connector (Reserved)	45-pin flat ribbon cable connector	SDVO1
Serial ATA (SATA) drive connector	7-pin SATA	SATA1, SATA2
Serial port connector (RS-232/422/485)	14-pin header	COM2

Connector	Type	Label
TV-out	6-pin header	TV1
USB 2.0 connector	8-pin header	USB01
XC95288XL programming connector	8-pin header	CN4

Table 3-1: Peripheral Interface Connectors

3.2.1 External Interface Panel Connectors

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

Connector	Type	Label
Ethernet connector	RJ-45	LAN1
Keyboard/mouse	PS/2	KB_MS1
RS-232 serial port connector	Male DB-9	COM1
Dual USB port	USB port	USB_C23, USB_C45
VGA port connector	15-pin female	VGA1

Table 3-2: Rear Panel Connectors

3.3 Internal Peripheral Connectors

The section describes all of the connectors on the NANO-945GSE3.

3.3.1 +5 V Power Connector

CN Label: CN3

CN Type: 2-pin wafer

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

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

The 5 V Power Connector provides +5 V power output.

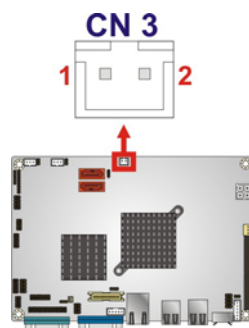


Figure 3-3: +5 V Power Connector Pinouts

Pin	Description
1	VCC
2	GND

Table 3-3: +5 V Power Connector Pinouts

3.3.2 AT Power Connector

- CN Label:** CN1, CN2
- CN Type:** 4-pin (2x2) AT power connector
- CN Location:** See **Figure 3-4**
- CN Pinouts:** See **Table 3-4**

The 4-pin AT power connector is connected to an AT power supply.

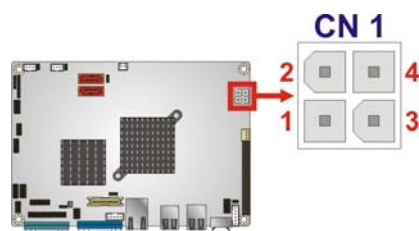


Figure 3-4: AT Power Connector Location

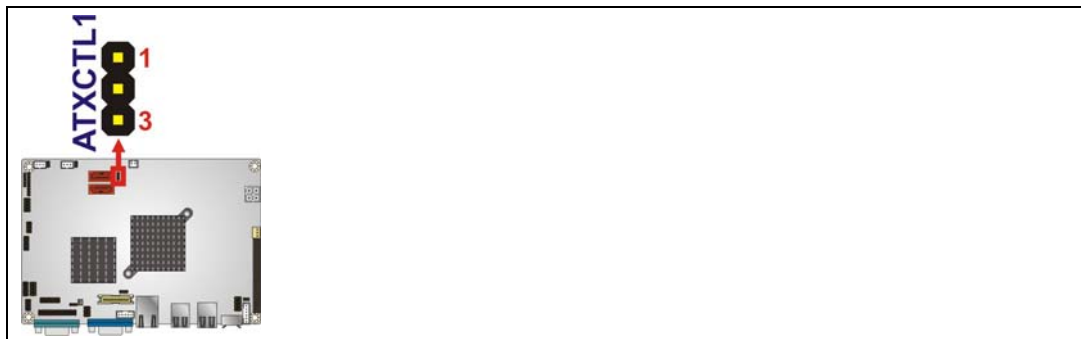
Pin	Description
1	+5 V
2	GND
3	GND
4	+12 V

Table 3-4: AT Power Connector Pinouts

3.3.3 ATX Power Supply Enable Connector

- CN Label:** ATXCTL1
- CN Type:** 3-pin header (1x3)
- CN Location:** See **Figure 3-5**
- CN Pinouts:** See **Table 3-5**

The ATX power supply enable connector enables the NANO-945GSE3 to be connected to an ATX power supply. In default mode, the NANO-945GSE3 can only use an AT power supply. To enable an ATX power supply the AT Power Select jumper must also be configured. Please refer to **Section 4.3.1** for more details.


Figure 3-5: ATX Power Supply Enable Connector Location

PIN NO.	DESCRIPTION
1	GND
2	PS-ON
3	+5V Standby

Table 3-5: ATX Power Supply Enable Connector Pinouts

3.3.4 Audio Connector

- CN Label:** J_AUDIO1
- CN Type:** 9-pin header
- CN Location:** See **Figure 3-6**
- CN Pinouts:** See **Table 3-6**

This connector connects to an external audio kit.

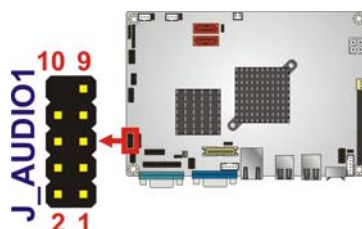


Figure 3-6: Audio Connector Pinouts

Pin	Description	Pin	Description
1	AC97_SYNC	2	AC97_BITCLK
3	AC97_SDOOUT	4	AC97_PCBEEP
5	AC97_SDIN	6	AC97_RST#
7	AC97_VCC	8	AC97_GND
9	AC97_12V	10	AC97_GND

Table 3-6: Audio Connector Pinouts

3.3.5 Backlight Inverter Connector

- CN Label:** INVERTER1
- CN Type:** 5-pin wafer (1x5)
- CN Location:** See **Figure 3-7**
- CN Pinouts:** See **Table 3-7**

The backlight inverter connector provides the backlight on the LCD display connected to the NANO-945GSE3 with +12V of power.

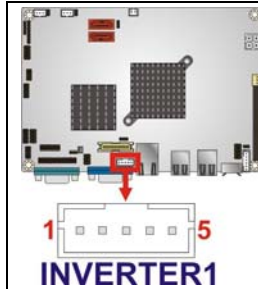


Figure 3-7: Backlight Inverter Connector Pinout Locations

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

Table 3-7: Panel Backlight Connector Pinouts

3.3.6 CAN Bus connectors

CN Label: CAN1, CAN2

CN Type: 3-pin wafer

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

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

Each CAN Bus connector connects to a CAN Bus device.

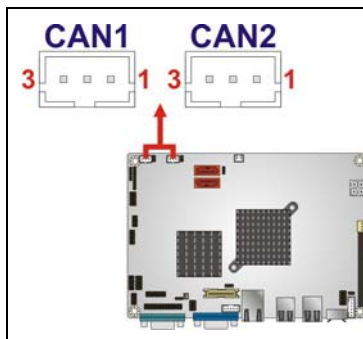


Figure 3-8: CAN Bus Connector Location

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PIN NO.	DESCRIPTION
1	CAN H
2	Isolated GND
3	CAN L

Table 3-8: CAN Bus Connector Pinouts

3.3.7 CompactFlash® Socket

- CN Label:** CF1 (solder side)
- CN Type:** 50-pin header (2x25)
- CN Location:** See **Figure 3-9**
- CN Pinouts:** See **Table 3-9**

A CF Type I or Type II memory card is inserted to the CF socket on the solder side of the NANO-945GSE3.

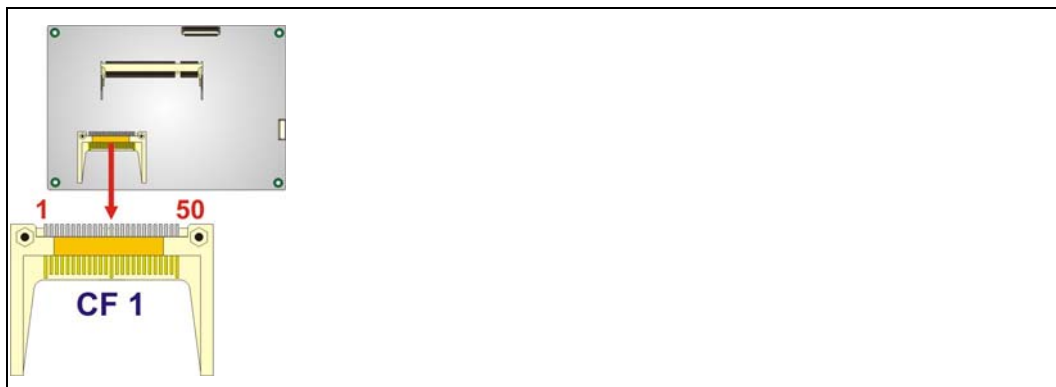


Figure 3-9: CF Card Socket Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	26	VCC-IN CHECK1
2	DATA 3	27	DATA 11
3	DATA 4	28	DATA 12
4	DATA 5	29	DATA 13
5	DATA 6	30	DATA 14
6	DATA 7	31	DATA 15
7	HDC_CS0#	32	HDC_CS1

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

Table 3-9: CF Card Socket Pinouts

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

- CN Label:** CPU_FAN1
- CN Type:** 3-pin header
- CN Location:** See **Figure 3-10**
- CN Pinouts:** See **Table 3-10**

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

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Figure 3-10: +12V Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+ 12V
3	FANIO1

Table 3-10: +12V Fan Connector Pinouts

3.3.9 Debug Port

- CN Label:** DBG_PORT1
- CN Type:** connectors
- CN Location:** See Figure 3-21
- CN Pinouts:** See Table 3-21

The Debug port connector is used to a debugging device.

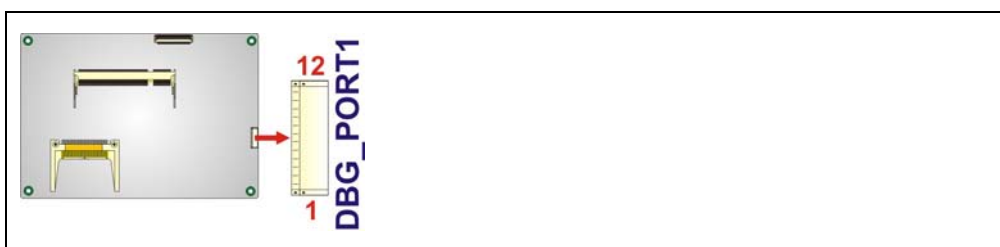


Figure 3-11: Debug Port Connector Locations

PIN NO.	DESCRIPTION
1	GND
2	FWHPCLK
3	PCIRST#3
4	-LFRAME
5	LAD0
6	LAD1

7	LAD2
8	LAD3
9	INT_SERIRQ
10	GND
11	VCC3
12	VCC (Reserved)

Table 3-11: Debug Port Connector Pinouts

3.3.10 Digital Input/Output (DIO) Connector

- CN Label:** DIO1
- CN Type:** 10-pin header (2x5)
- CN Location:** See **Figure 3-12**
- CN Pinouts:** See **Table 3-12**

The digital input/output connector is managed through a Super I/O chip. The DIO connector pins are user programmable.

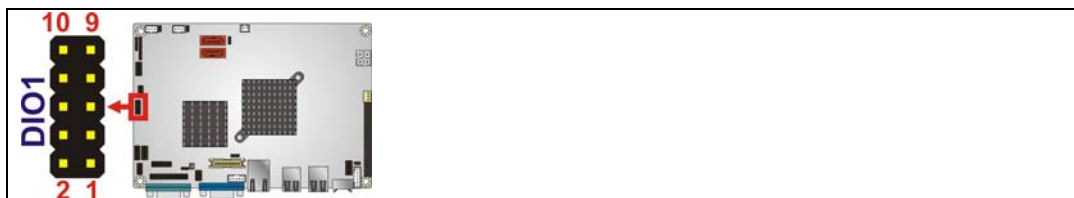


Figure 3-12: DIO Connector Locations

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

Table 3-12: DIO Connector Pinouts

3.3.11 Front Panel Connector (8-pin)

CN Label: F_PANEL1

CN Type: 8-pin header (2x4)

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

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

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

- Power button
- Reset
- Power LED
- HDD LED

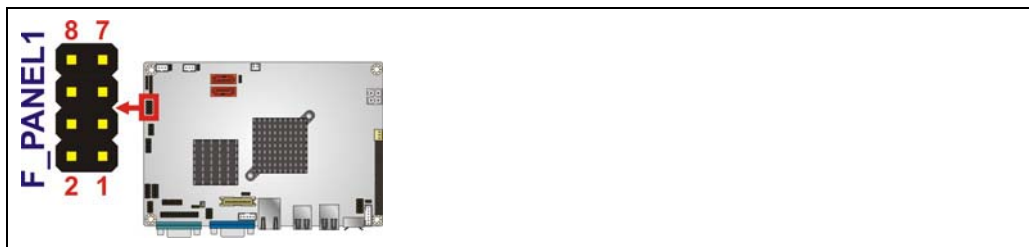


Figure 3-13: Front Panel Connector Pinout Locations (8-pin)

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

Table 3-13: Front Panel Connector Pinouts (8-pin)

3.3.12 IDE Connector

CN Label: IDE1

CN Type: 44-pin box header (2x22)

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

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

The IDE connector can connect to an IDE hard drive or optical device.

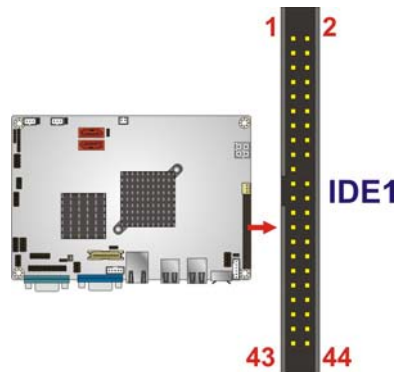


Figure 3-14: IDE Connector Location

Pin	Description	Pin	Description
1	RESET #	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	IDE DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND
29	IDE DACK	30	GROUND-DEFAULT
31	INTERRUPT	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0 #	38	HDC CS1 #
39	HDD ACTIVE #	40	GROUND

Pin	Description	Pin	Description
41	VCC	42	VCC
43	GROUND	44	N/C

Table 3-14: IDE Connector Pinouts

3.3.13 Infrared Interface Connector

- CN Label:** IR1
- CN Type:** 5-pin header (1x5)
- CN Location:** See **Figure 3-15**
- CN Pinouts:** See **Table 3-15**

The infrared interface connector supports both Serial Infrared (SIR) and Amplitude Shift Key Infrared (ASKIR) interfaces.



Figure 3-15: Infrared Connector Pinout Locations

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

Table 3-15: Infrared Connector Pinouts

3.3.14 Keyboard/Mouse

- CN Label:** KB1
- CN Type:** 6-pin header (1x6)
- CN Location:** See **Figure 3-16**
- CN Pinouts:** See **Table 3-16**

The keyboard/mouse connector connects to a PS/2 Y-cable that can be connected to a PS/2 keyboard and mouse.

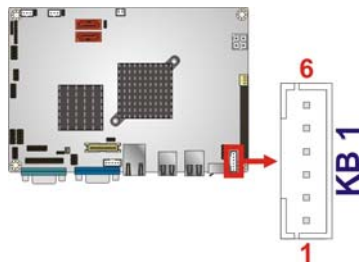


Figure 3-16: Keyboard/Mouse Connector Location

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

Table 3-16: Keyboard/Mouse Connector Pinouts

3.3.15 LVDS LCD Connector

- CN Label:** LVDS1
- CN Type:** 30-pin crimp (2x15)
- CN Location:** See **Figure 3-17**
- CN Pinouts:** See **Table 3-17**

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

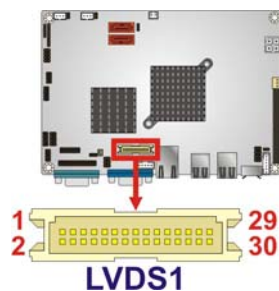


Figure 3-17: LVDS Connector Location

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

Table 3-17: LVDS Connector Pinouts

3.3.16 Parallel ATA (IDE)

CN Label: IDE1

CN Type: 44-pin box header (2x22)

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

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

The Parallel ATA (IDE) connector can connect to an IDE hard drive or optical device.

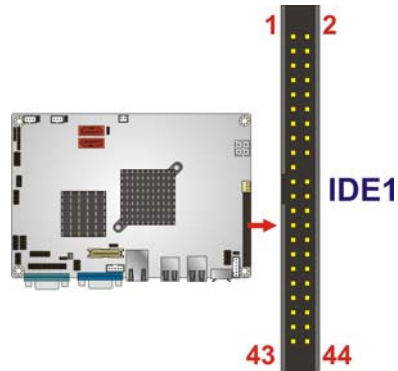


Figure 3-18: IDE Connector Location

Pin	Description	Pin	Description
1	RESET #	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GROUND	20	N/C
21	IDE DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND
29	IDE DACK	30	GROUND-DEFAULT
31	INTERRUPT	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#

Pin	Description	Pin	Description
39	HDD ACTIVE#	40	GROUND
41	VCC	42	VCC
43	GROUND	44	N/C

Table 3-18: IDE Connector Pinouts

3.3.17 Parallel Port Connector

CN Label: LPT1

CN Type: 26-pin header

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

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

The 26-pin parallel port connector connects to a parallel port connector interface or some other parallel port device such as a printer.



Figure 3-19: Parallel Port Connector Location

Pin	Description	Pin	Description
1	STB	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

Pin	Description	Pin	Description
19	ACK	20	GROUND
21	BUSY	22	GROUND
23	PE	24	GROUND
25	SLCT	26	NC

Table 3-19: Parallel Port Connector Pinouts

3.3.18 SDVO (Reserved)

CN Label: SDVO1 (Reserved)

CN Type: 45-pin flat ribbon cable connector

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

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

The SDVO port is for system expansion. Primarily designed for graphics, it is also programmable to perform other functions.

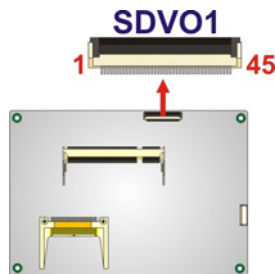


Figure 3-20: SDVO Connector Location (Reserved)

Pin	Description	Pin	Description
1	GND	25	GND
2	N/C	26	SDVOC_BLUE-
3	N/C	27	SDVOC_BLUE+
4	GND	28	GND
5	N/C	29	SDVOC_RED-
6	N/C	30	SDVOC_RED+
7	GND	31	GND

Pin	Description	Pin	Description
8	SDVOC_CLK-	32	SDVO_STALL-
9	SDVOC_CLK+	33	SDVO_STALL+
10	GND	34	GND
11	SDVOC_GREEN-	35	SDVO_TVCLKIN-
12	SDVOC_GREEN+	36	SDVO_TVCLKIN+
13	GND	37	GND
14	N/C	38	SDVO_CLK
15	N/C	39	SDVO_DATA
16	GND	40	PCIRST-
17	SDVOC_INT-	41	VCC
18	SDVOC_INT+	42	VCC
19	GND	43	VCC
20	N/C	44	N/C
21	N/C	45	N/C
22	GND		
23	N/C		
24	N/C		

Table 3-20: SDVO Connector Pinouts

3.3.19 SATA Drive Connectors

- CN Label:** SATA1, SATA2
- CN Type:** 7-pin SATA drive connectors
- CN Location:** See **Figure 3-21**
- CN Pinouts:** See **Table 3-21**

The SATA connectors connect to SATA hard drives or optical drives.

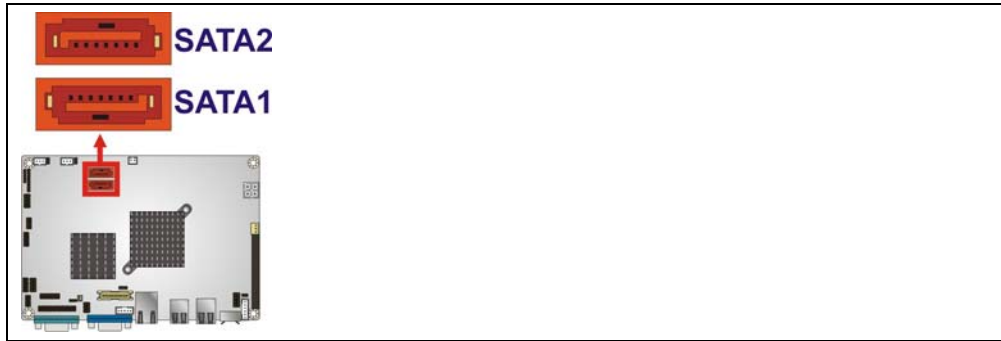


Figure 3-21: SATA Drive Connector Locations

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

Table 3-21: SATA Drive Connector Pinouts

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

CN Label: COM2

CN Type: 14-pin header (2x7)

CN Location: See **Figure 3-22**

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

Used for RS-232/422/485 communications.

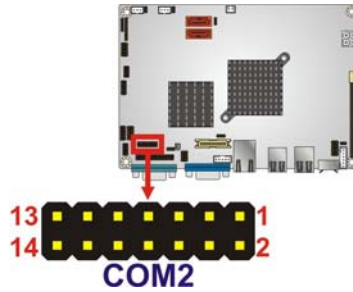


Figure 3-22: Serial Port Connector Location

Pin	Description	Pin	Description
1	DCD	2	NDSR2
3	RXD	4	NRTS2
5	TXD	6	NCTS2
7	DTR	8	NR12
9	GND	10	GND
11	TXD485+	12	TXD485-
13	RXD485+	14	RXD485-

Table 3-22: Serial Port Connector Pinouts

3.3.21 TV Out Connector

CN Label:	TV1
CN Type:	6-pin header (2x3)
CN Location:	See Figure 3-23
CN Pinouts:	See Table 3-23

The TV out connector connects to a TV by using an S-Video or RCA connector.

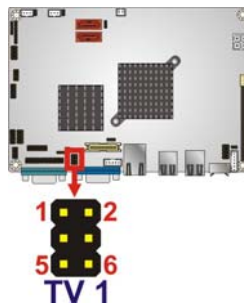


Figure 3-23: TV Connector Pinout Locations

Pin	Description	Pin	Description
S-Video Connector			
1	GND	2	AGREEN_Y
3	GND	4	ARED_C
RCA Connector (only video signal)			
5	GND	6	ABLUE_CVBS

Table 3-23: TV Port Connector Pinouts

3.3.22 USB Connectors (Internal)

- CN Label:** USB01
- CN Type:** 8-pin header (2x4)
- CN Location:** See **Figure 3-24**
- CN Pinouts:** See **Table 3-24**

The 2x4 USB pin connector provides connectivity to two USB 1.1 or two USB 2.0 ports. Each USB connector can support two USB devices. Additional external USB ports are found on the rear panel. The USB ports are used for I/O bus expansion.

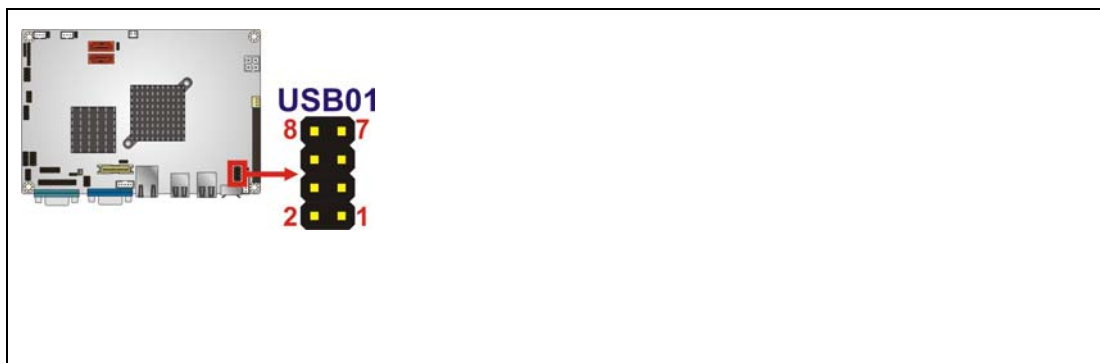


Figure 3-24: USB Connector Pinout Locations

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

Table 3-24: USB Port Connector Pinouts

3.3.23 XC95288XL Programming Connector

- CN Label:** CN4
- CN Type:** 8-pin header
- CN Location:** See **Figure 3-21**
- CN Pinouts:** See **Table 3-21**

The XC95288XL programming connector is used to program the code of the XC95288XL.

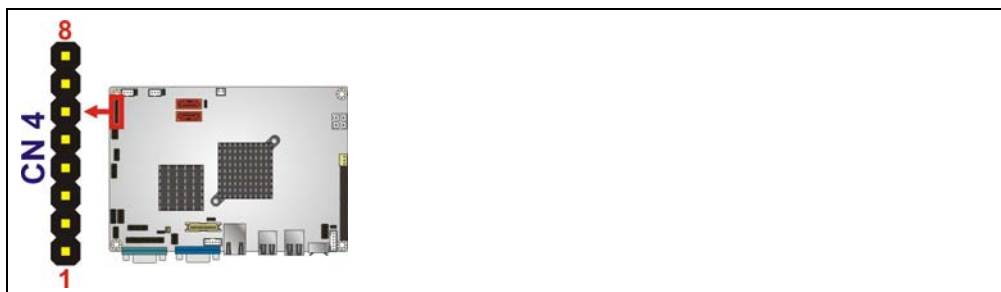


Figure 3-25: XC95288XL Programming Connector Locations

PIN NO.	DESCRIPTION
1	VCC3
2	TDO
3	TD1
4	NC
5	NC-
6	TMS
7	GND
8	TCK

Table 3-25: XC95288XL Programming Connector Pinouts

3.4 External Peripheral Interface Connector Panel

The figure below shows the external peripheral interface connector (EPIC) panel. The EPIC panel consists of the following:

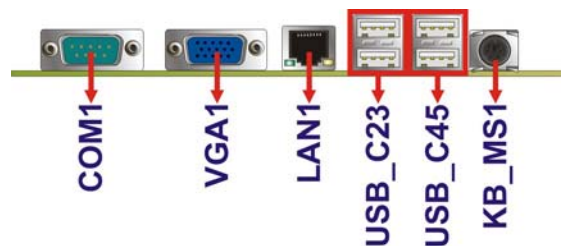


Figure 3-26: External Peripheral Interface Connector

3.4.1 Keyboard/Mouse Connector

CN Label: KB_MS1

CN Type: PS/2

CN Location: See **Figure 3-26**

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

The keyboard and mouse connector is a standard PS/2 connector.

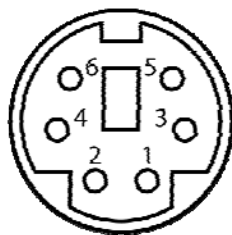


Figure 3-27: PS/2 Pinout and Configuration

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

Table 3-26: Keyboard Connector Pinouts

3.4.2 LAN Connector

- CN Label:** LAN1
- CN Type:** RJ-45
- CN Location:** See Figure 3-26
- CN Pinouts:** See Table 3-27

A 10/100/1000 Mb/s connection can be made to a Local Area Network.

Pin	Description	Pin	Description
1	MDIA3-	5	MDIA1+
2	MDIA3+	6	MDIA2+
3	MDIA2-	7	MDIA0-
4	MDIA1-	8	MDIA0+

Table 3-27: Ethernet Connector Pinouts

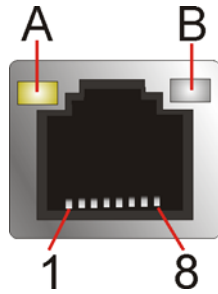


Figure 3-28: Ethernet Connector

LED	Description	LED	Description
A	on: linked blinking: data is being sent/received	B	off: 10 Mb/s green: 100 Mb/s orange: 1000 Mb/s

Table 3-28: Connector LEDs

3.4.3 Serial Port Connector (COM1)

CN Label: COM1

CN Type: DB-9 connectors

CN Location: See **Figure 3-26**

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

The serial port connects to a RS-232 serial communications device.

Pin	Description	Pin	Description
1	DCD	6	DSR
2	RX	7	RTS
3	TX	8	CTS
4	DTR	9	RI
5	GND		

Table 3-29: Serial Port Pinouts

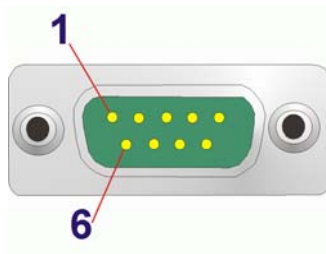


Figure 3-29: Serial Port Pinouts

3.4.4 USB Connector

- CN Label:** USB_C23, USB_C45
- CN Type:** USB port
- CN Location:** See **Figure 3-26**
- CN Pinouts:** See **Table 3-30**

The USB connector can be connected to a USB device.

Pin	Description	Pin	Description
1	USBV3L 5 V	2	GND
3	USBP4N	4	USBP5P
5	USBP4P	6	USBP5N
7	GND	8	USBV3L 5 V

Table 3-30: USB Port Pinouts

3.4.5 VGA Connector

- CN Label:** VGA1
- CN Type:** 15-pin Female
- CN Location:** See **Figure 3-26**
- CN Pinouts:** See **Figure 3-30** and **Table 3-31**

Connects to a monitor that accepts a standard VGA input.

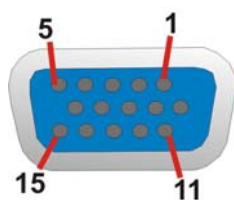


Figure 3-30: VGA Connector

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 3-31: VGA Connector Pinouts

Chapter

4

Installation

4.1 Anti-static Precautions



WARNING:

Failure to take ESD precautions during the installation of the NANO-945GSE3 may result in permanent damage to the NANO-945GSE3 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the NANO-945GSE3. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the NANO-945GSE3 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-945GSE3, place it on an anti-static pad. This reduces the possibility of ESD damaging the NANO-945GSE3.
- ***Only handle the edges of the PCB:*** When handling the PCB, hold the PCB by the edges.

4.2 Installation Considerations



NOTE:

The following installation notices and installation considerations should be read and understood before installation. All installation notices must be strictly adhered to. Failing to adhere to these precautions may lead to severe damage and injury to the person performing the installation.

NANO-945GSE3 User Manual



WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the 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-945GSE3 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-945GSE3 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-945GSE3 off:**
 - When working with the NANO-945GSE3, 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-945GSE3 **DO NOT**:

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

4.2.1 SO-DIMM Installation

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

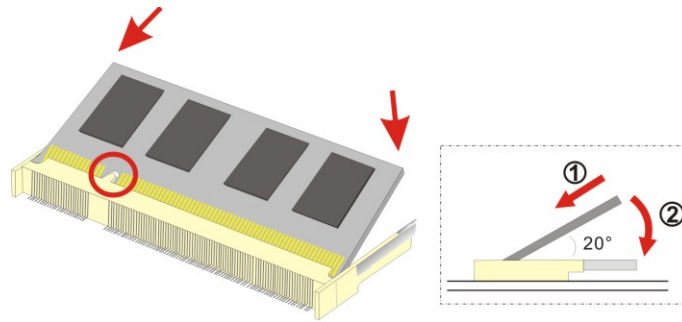


Figure 4-1: SO-DIMM Installation

- 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 20° angle. (See Figure 4-1)
- Step 4:** **Seat the SO-DIMM**. Gently push downwards and the arms clip into place. (See Figure 4-1)

4.2.2 CompactFlash® Installation



NOTE:

Both CompactFlash® Type I and Type II cards are supported.

To install the CompactFlash® card, please follow the steps below.

- Step 1:** Locate the **CF card socket**. Locate the CompactFlash® slot.
- Step 2:** Align the **CF card**. Align the CompactFlash® card. The label side should be facing away from the board. The grooves on the CompactFlash® slot ensure that the card cannot be inserted the wrong way.
- Step 3:** Insert the **CF card**. Push until the CompactFlash® card is firmly seated in the slot. See Figure 4-2.

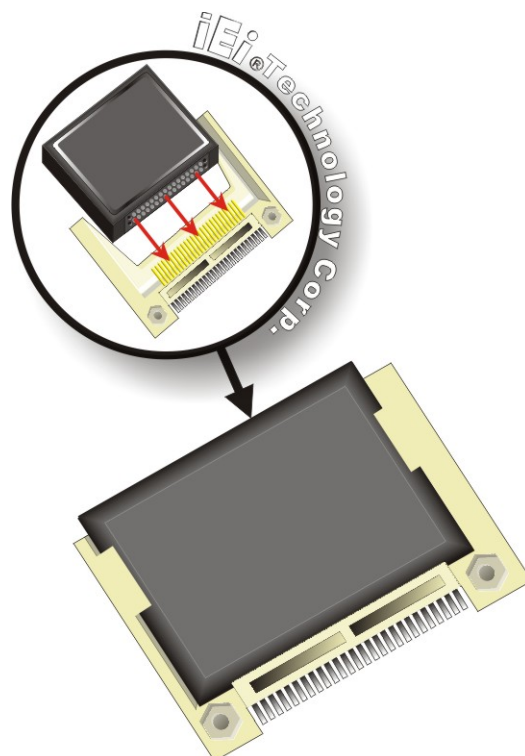


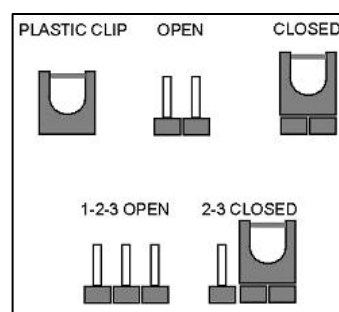
Figure 4-2: CompactFlash® Card Installation

4.3 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.



The hardware jumpers must be set before installation. Jumpers are shown in Table 4-1.

Description	Label	Type
AT power mode setting	ATXCTL1	3-pin header
CAN Bus terminal resistor (120 Ω) setting	JP2, JP3	2-pin header
CF card setup	JCF1	2-pin header
Clear CMOS	J_CMOS1	3-pin header
COM2 RS-232/4222/485 mode select	JP1	6-pin header
LVDS voltage selection	J_VLVDS1	3-pin header
LVDS1 panel resolution mode select	J_LCD_TYPE1	8-pin header

Table 4-1: Jumpers

4.3.1 AT Power Select Jumper Settings


NOTE:

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

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

The AT Power Select jumper specifies the system's power mode as AT or ATX. Use a jumper cap to short pins 1 and 2 to enable the ATX mode. To enable the AT power mode, short pins 2 and 3. AT Power Select jumper settings are shown in **Table 4-2**.

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

Table 4-2: AT Power Select Jumper Settings

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



Figure 4-3: AT Power Select Jumper Location

4.3.2 CAN Bus Terminal Resistor (120Ω) Setting

- Jumper Label: JP2, JP3
- Jumper Type: 3-pin header
- Jumper Settings: See Table 4-7
- Jumper Location: See Figure 4-8

The **CAN Bus Terminal Resistor (120Ω) Setting** jumpers turns the CAN Bus Terminal Resister (120Ω) on or off. The **CAN Bus Terminal Resistor (120Ω) Setting** jumper settings are shown in **Table 4-7**.

CAN Bus Terminal Resistor Setting	Description	
Short 1-2	ON	
Open	OFF	Default

Table 4-3: CAN Bus Terminal Resistor (120Ω) Jumper Settings

The CAN Bus Terminal Resister jumper location is shown in **Figure 4-8**.

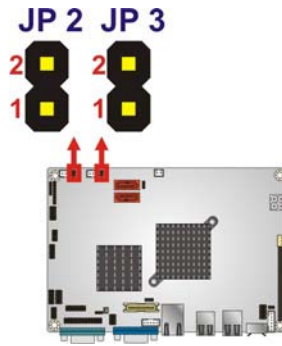


Figure 4-4: CAN Bus Terminal Resistor (120Ω) Jumper Pinout Locations

4.3.3 Clear CMOS Jumper

Jumper Label:	J_CMOS1
Jumper Type:	3-pin header
Jumper Settings:	See Table 4-4
Jumper Location:	See Figure 4-5

If the NANO-945GSE3 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**.

AT Power Select	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 4-5** below.

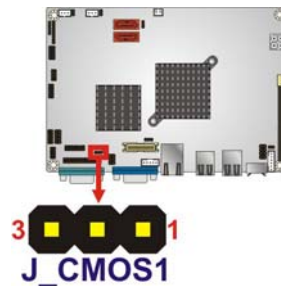


Figure 4-5: Clear CMOS Jumper

4.3.4 COM2 Function Select Jumper

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

The COM2 Function Select jumper sets the communication protocol used by the second serial communications port (COM2) as RS-232, RS-422 or RS-485. The COM2 Function Select settings are shown in **Table 4-5**.

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

Table 4-5: COM2 Function Select Jumper Settings

The COM2 Function Select jumper location is shown in **Figure 4-6**.

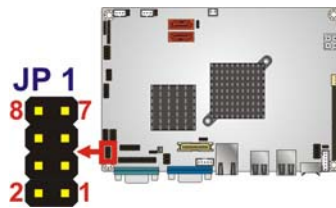


Figure 4-6: COM2 Function Select Jumper Location

4.3.5 LVDS1 Panel Resolution Jumper

Jumper Label:	J_LCD_TYPE1
Jumper Type:	8-pin header
Jumper Settings:	See Table 4-6
Jumper Location:	See Figure 4-7

The LVDS1 Panel Resolution jumper allows the resolution of the LVDS screens connected to the LVDS1 connector to be configured. The LVDS1 Panel Resolution jumper settings are shown in **Table 4-6**.

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

Table 4-6: LVDS Panel Resolution Jumper Settings

The LVDS Panel Resolution jumper location is shown in **Figure 4-7**.

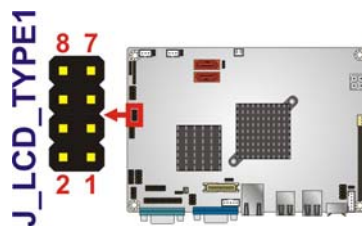


Figure 4-7: LVDS Panel Resolution Jumper Pinout Locations

4.3.6 LVDS Voltage Selection



WARNING:

Permanent damage to the screen and NANO-945GSE3 may occur if the wrong voltage is selected with this jumper. Please refer to the user guide that came with the monitor to select the correct voltage.

Jumper Label:	J_VLVDS1
Jumper Type:	3-pin header
Jumper Settings:	See Table 4-7
Jumper Location:	See Figure 4-8

The **LVDS Voltage Selection** jumpers allow the LVDS screen voltages to be set. J_VLVDS1 sets the voltage connected to LVDS1. The **LVDS Voltage Selection** jumper settings are shown in **Table 4-7**.

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

Table 4-7: LVDS Voltage Selection Jumper Settings

The LVDS Voltage Selection jumper location is shown in **Figure 4-8**.

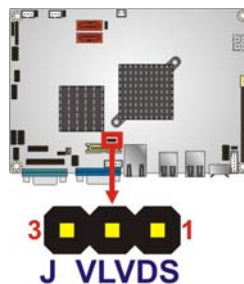


Figure 4-8: LVDS Voltage Selection Jumper Pinout Locations

4.4 Chassis Installation

4.4.1 Airflow



WARNING:

Airflow is critical for keeping components within recommended operating temperatures. The chassis should have fans and vents as necessary to keep things cool.

The NANO-945GSE3 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.

4.4.2 Motherboard Installation

To install the NANO-945GSE3 motherboard into the chassis please refer to the reference material that came with the chassis.

4.5 Internal Peripheral Device Connections

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

4.5.1 AT/ATX Power Connection

Follow the instructions below to connect the NANO-945GSE3 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-945GSE3.

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Step 4: **Locate the power cable.** The power cable is shown in the packing list in Chapter 3.

Step 5: **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 4-9.

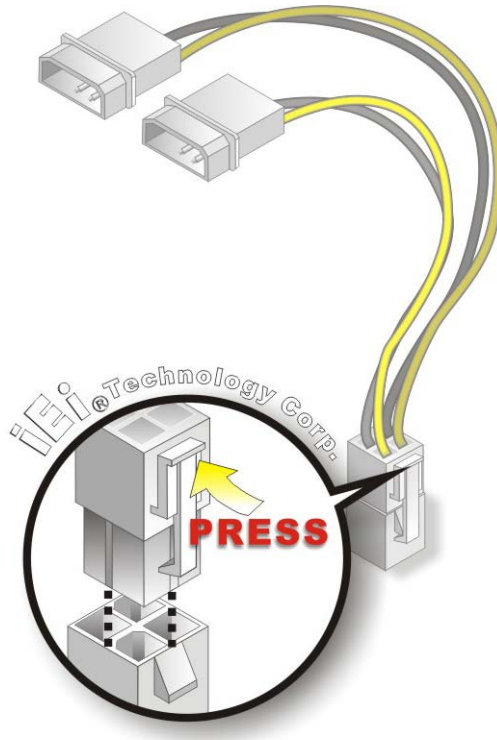


Figure 4-9: Power Cable to Motherboard Connection

Step 6: **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 4-10.

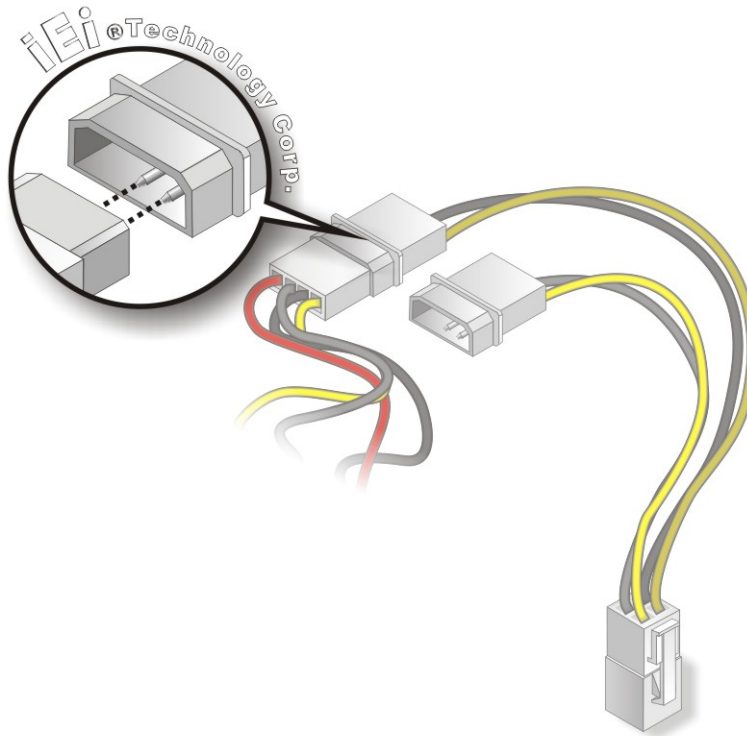


Figure 4-10: Connect Power Cable to Power Supply

4.6 External Peripheral Interface Connection

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

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

To install these devices, connect the corresponding cable connector from the actual device to the corresponding NANO-945GSE3 external peripheral interface connector making sure the pins are properly aligned.

4.6.1 LAN Connection (Single Connector)

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

Step 7: Locate the RJ-45 connectors. The locations of the USB connectors are shown in **Chapter 4**.

Step 8: Align the connectors. Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the NANO-945GSE3. See Figure 4-11.

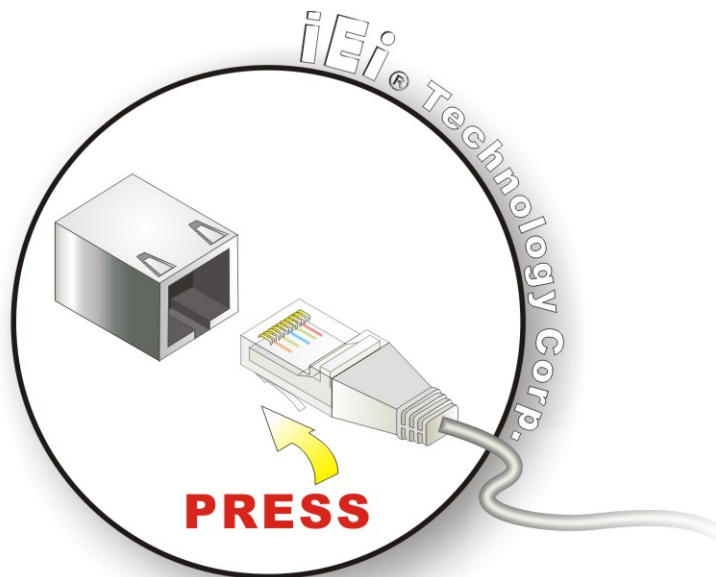


Figure 4-11: LAN Connection

Step 9: Insert the LAN cable RJ-45 connector. Once aligned, gently insert the LAN cable RJ-45 connector into the on-board RJ-45 connector.

4.6.2 PS/2 Y-Cable Connection

The NANO-945GSE3 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-945GSE3. 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-945GSE3.

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 4-12.

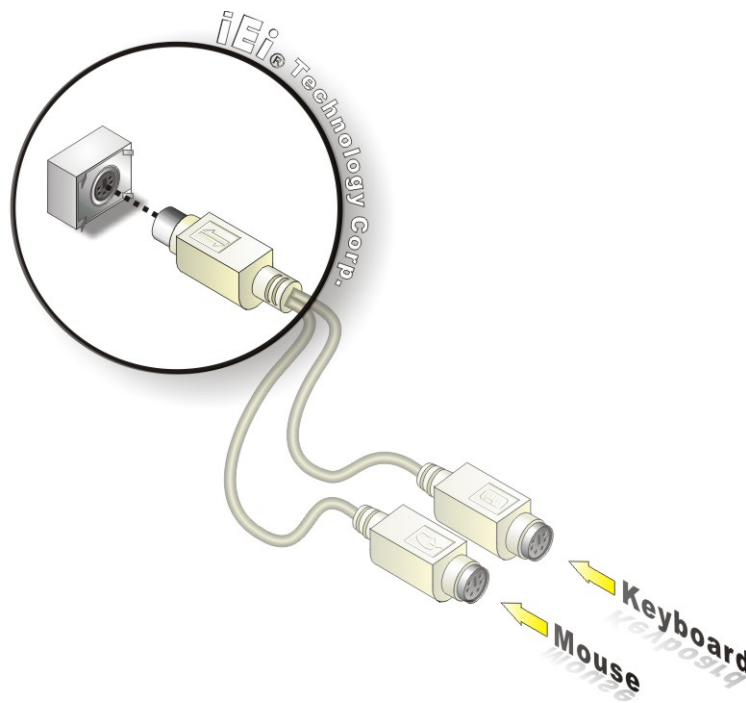


Figure 4-12: PS/2 Keyboard/Mouse Connector

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.

4.6.3 Serial Device Connection

The NANO-945GSE3 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-945GSE3.

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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 4-13.

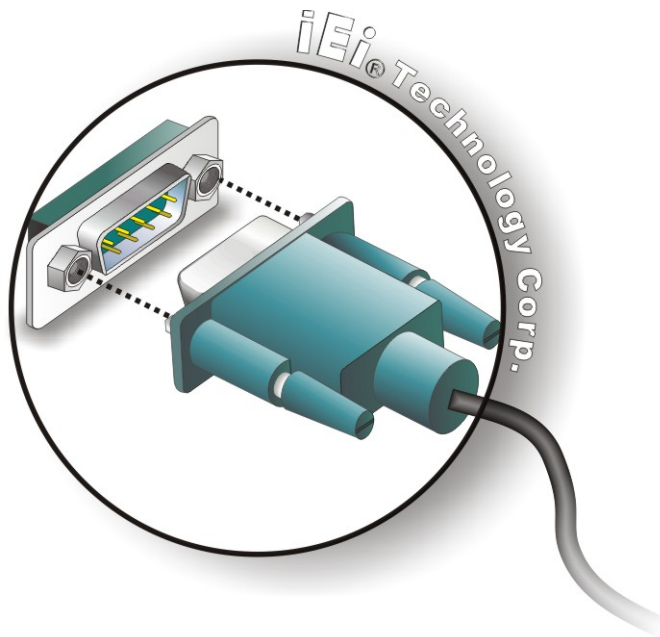


Figure 4-13: Serial Device Connector

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.

4.6.4 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-945GSE3.

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 4-14.

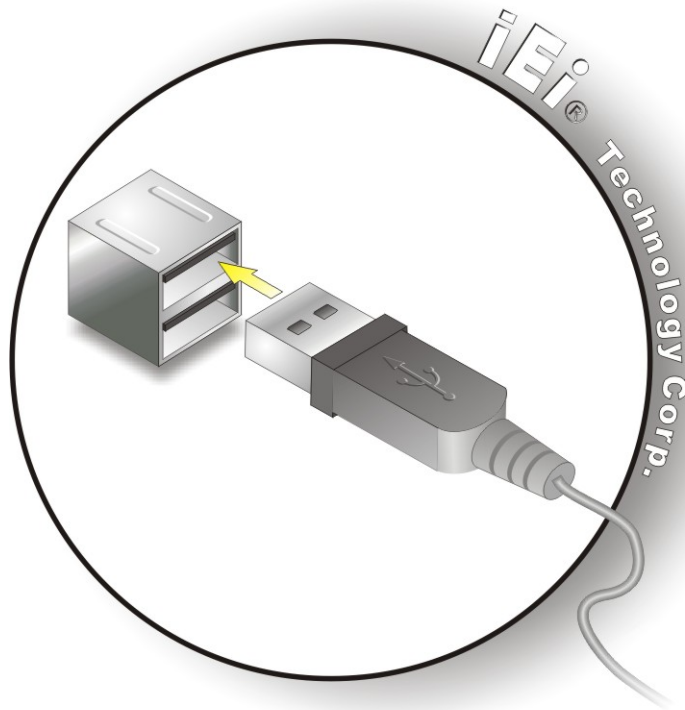


Figure 4-14: USB Connector

4.6.5 VGA Monitor Connection

The NANO-945GSE3 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-945GSE3, please follow the instructions below.

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

Step 4: **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.

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Step 5: 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-945GSE3. See Figure 4-15.

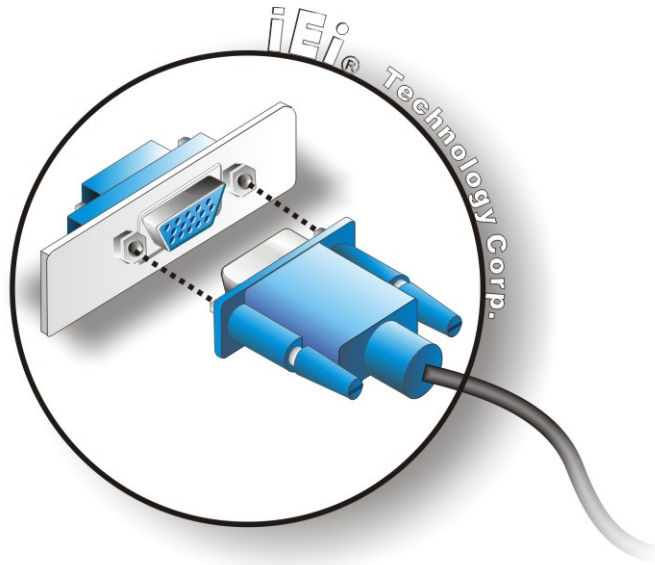


Figure 4-15: VGA Connector

Step 6: 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.

4.7 Software Installation

All the drivers for the NANO-945GSE3 are on the CD that came with the system. To install the drivers, please follow the steps below.

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



NOTE:

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

Step 2: The driver main menu appears (**Figure 4-16**).

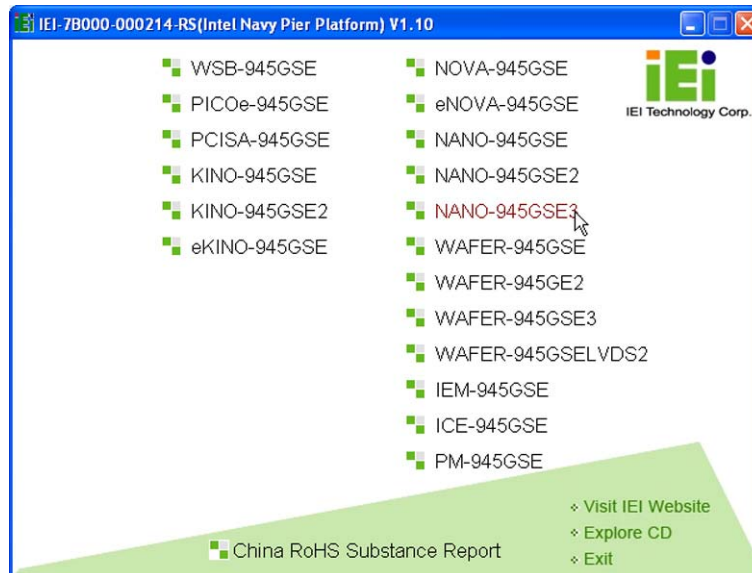


Figure 4-16: Introduction Screen

Step 3: Click **NANO-945GSE3**.

Step 4:

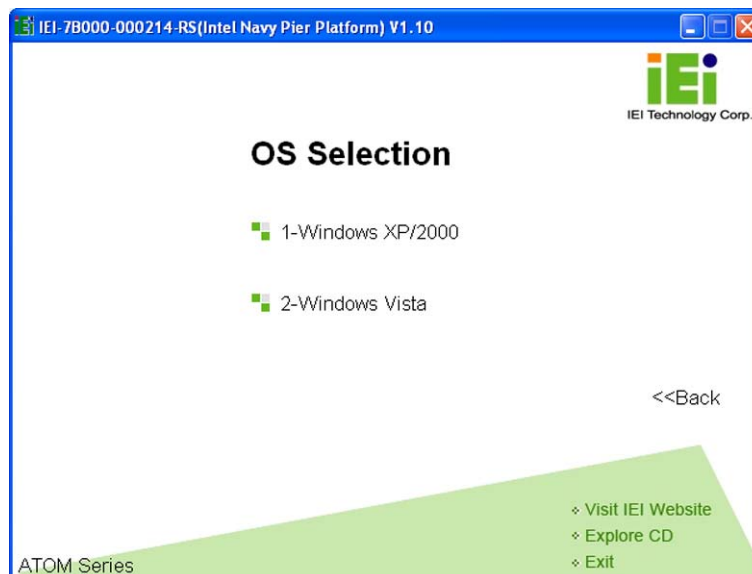


Figure 4-17: Operating Systems

Step 5: A new screen with a list of available drivers appears (**Figure 4-18**).

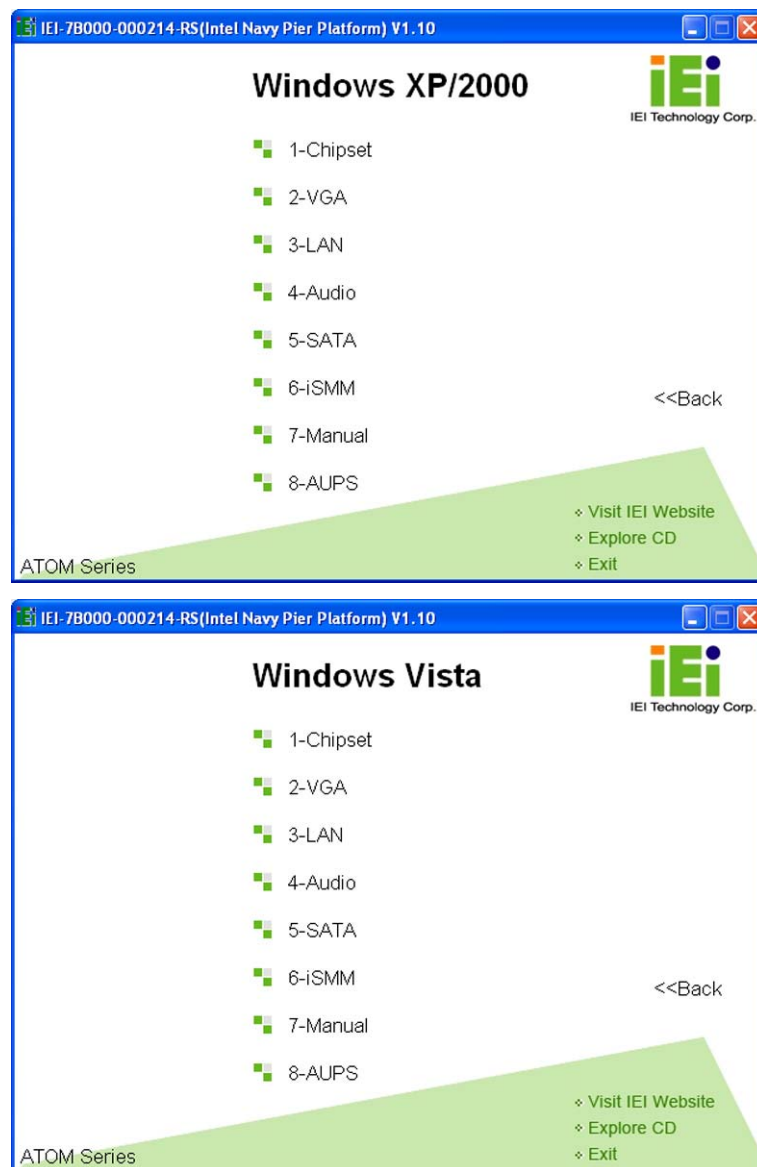


Figure 4-18: Available Drivers

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
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
Page Up key	Increase the numeric value or make changes
Page Dn key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu

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

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

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

5.1.4 Unable to Reboot After Configuration Changes

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

5.1.5 BIOS Menu Bar

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

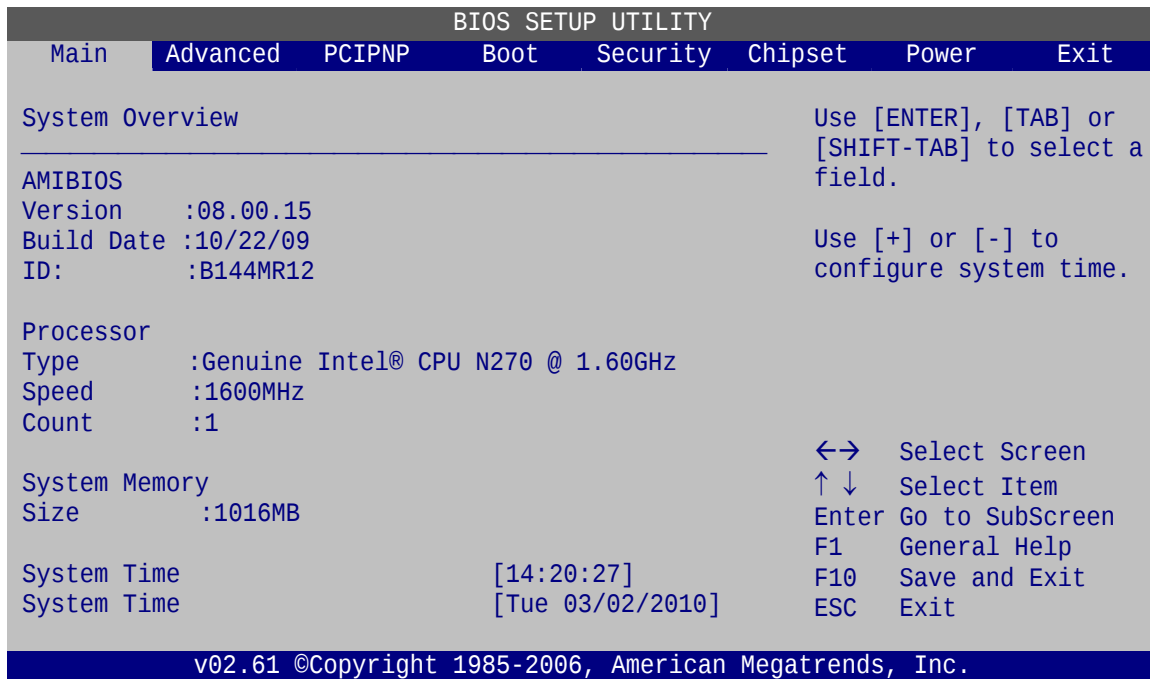
- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- PCIPnP – Changes the advanced PCI/PnP Settings
- Boot – Changes the system boot configuration.
- Security – Sets User and Supervisor Passwords.
- Chipset – Changes the chipset settings.
- Power – Changes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

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

5.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered.

The **Main** menu gives an overview of the basic system information.



BIOS Menu 1: Main

→ System Overview

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

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

The System Overview field also has two user configurable fields:

→ **System Time [xx:xx:xx]**

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

→ **System Date [xx/xx/xx]**

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

5.3 Advanced

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

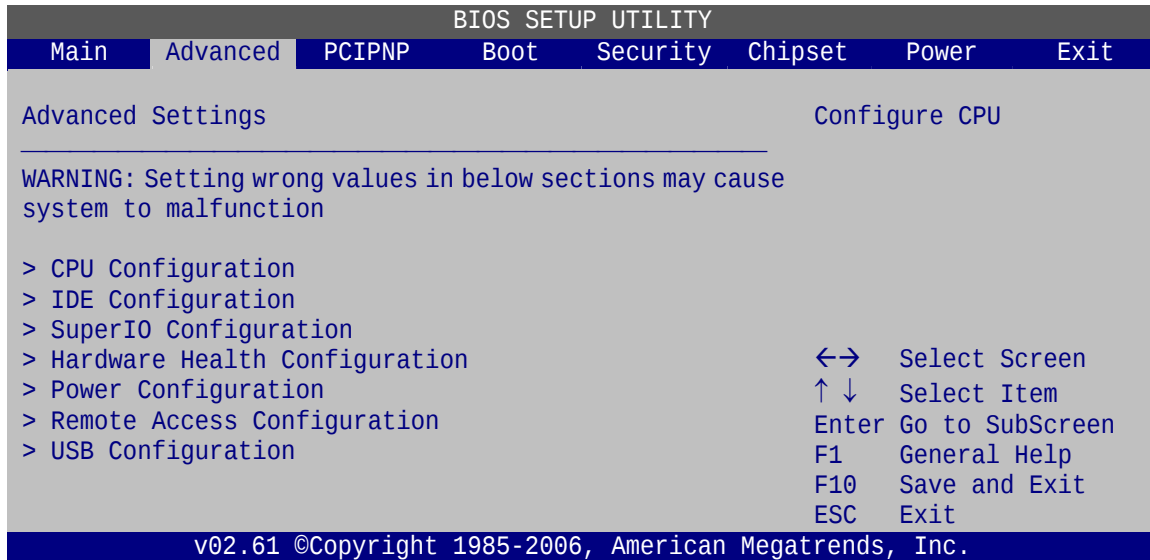


WARNING!

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

-
- CPU Configuration (see **Section 5.3.1**)
 - IDE Configuration (see **Section 5.3.2**)
 - Super IO Configuration (see **Section 5.3.3**)
 - Hardware Health Configuration (see **Section 5.3.4**)
 - Power Configuration (see **Section 5.3.5**)
 - Remote Access Configuration (see **Section 5.3.6**)
 - USB Configuration (see **Section 5.3.7**)

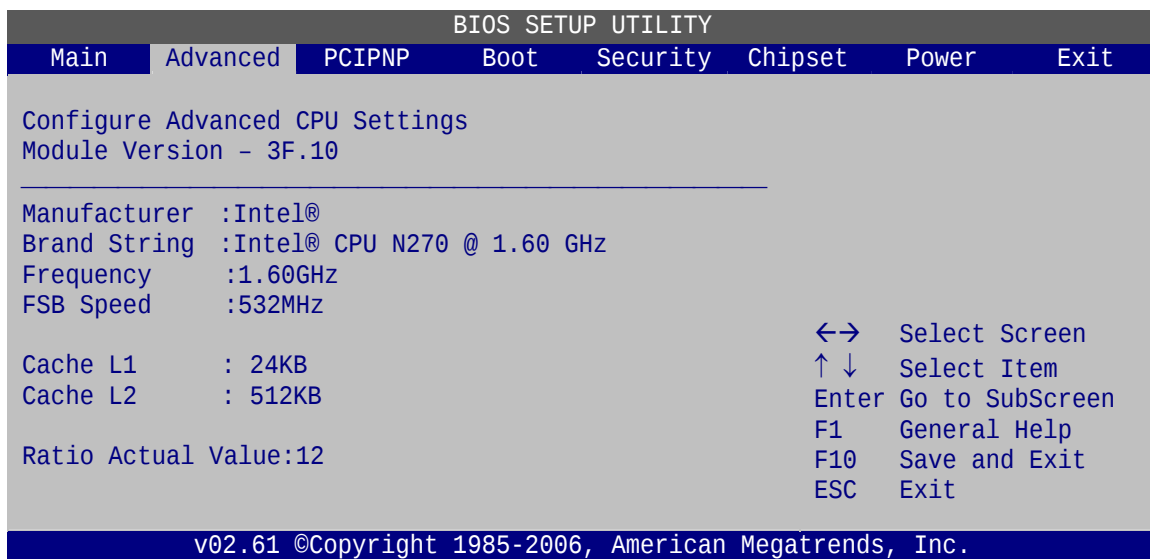
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BIOS Menu 2: Advanced

5.3.1 CPU Configuration

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



BIOS Menu 3: CPU Configuration

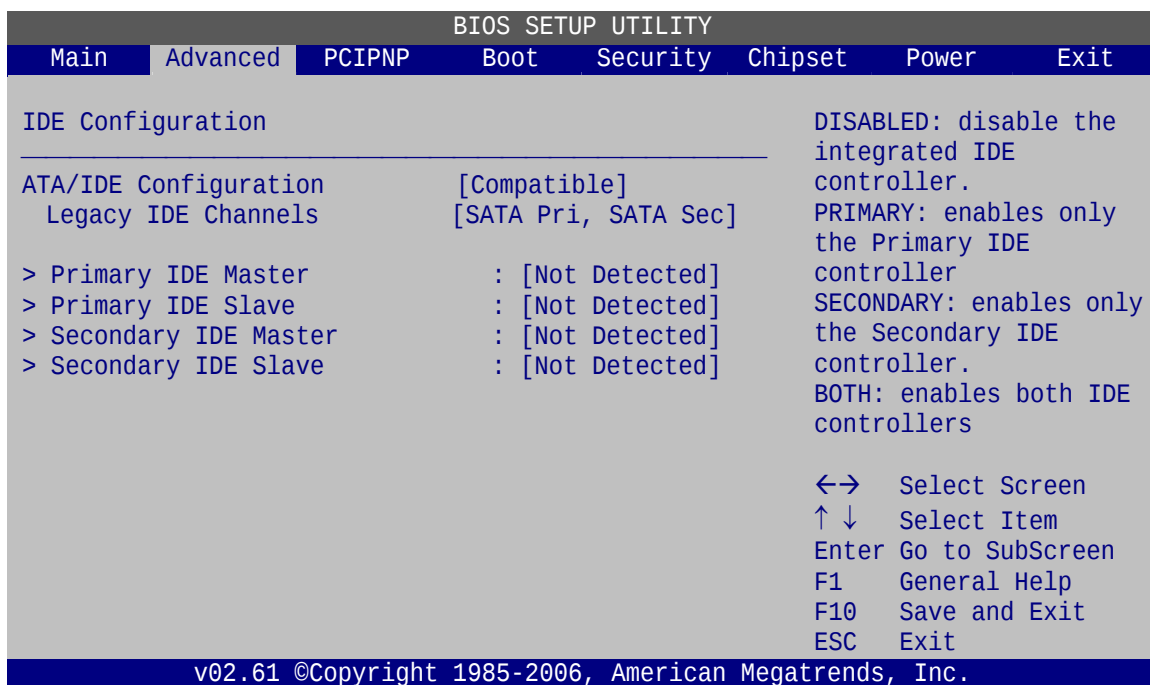
The CPU Configuration menu (**BIOS Menu 3**) lists the following CPU details:

- Manufacturer: Lists the name of the CPU manufacturer
- Brand String: Lists the brand name of the CPU being used

- Frequency: Lists the CPU processing speed
- FSB Speed: Lists the FSB speed
- Cache L1: Lists the CPU L1 cache size
- Cache L2: Lists the CPU L2 cache size

5.3.2 IDE Configuration

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



BIOS Menu 4: IDE Configuration

→ ATA/IDE Configurations [Compatible]

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

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

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

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

- ➔ **SATA Only** Only the SATA drives are enabled.
- ➔ **PATA Pri, SATA Sec** **DEFAULT** The IDE drives are enabled on the Primary IDE channel. The SATA drives are enabled on the Secondary IDE channel.
- ➔ **PATA Pri., PATA Sec** The IDE drives are enabled on the primary and secondary IDE channels. SATA drives are disabled.

➔ **IDE Master and IDE Slave**

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

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

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

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

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

- | | | | |
|---|-----------------|----------------|--|
| ➔ | Disabled | DEFAULT | Allows hard disks to be overwritten |
| ➔ | Enabled | | Prevents hard disks from being overwritten |

➔ IDE Detect Time Out (Sec) [35]

Use the **IDE Detect Time Out (Sec)** BIOS to specify the maximum time (in seconds) the AMI BIOS can search for IDE devices. This allows fine-tuning of the settings to allow for faster boot times. The following configuration options are available.

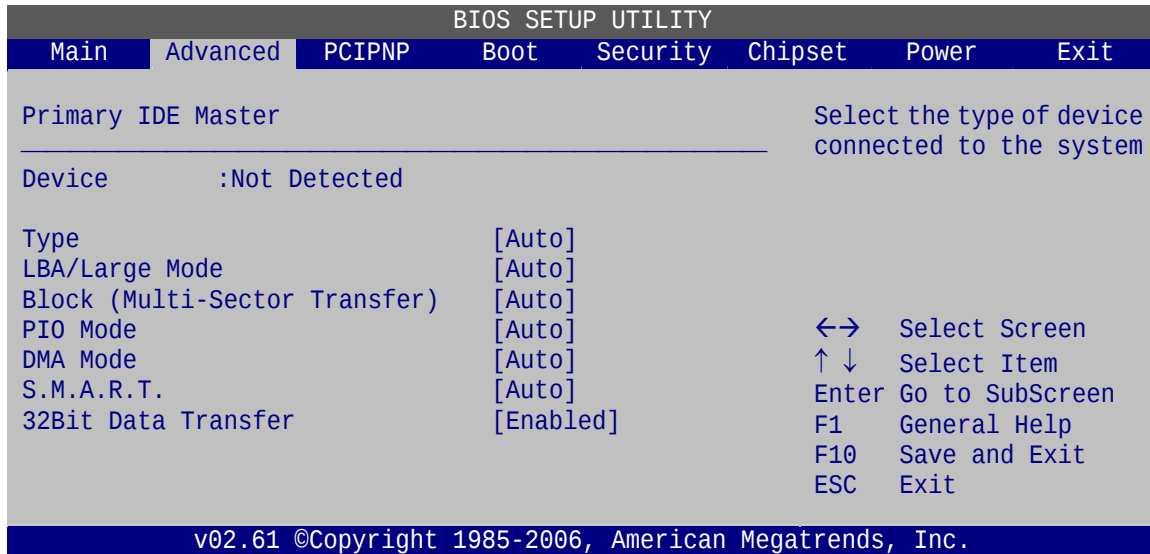
- 0 seconds
- 5 seconds **DEFAULT**
- 10 seconds
- 15 seconds
- 20 seconds
- 25 seconds
- 30 seconds
- 35 seconds

The best setting to use if the onboard IDE controllers are set to a specific IDE disk drive in the AMIBIOS is “0 seconds” and a large majority of ultra ATA hard disk drives can be detected well within “5 seconds”.

5.3.2.1 IDE Master, IDE Slave

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

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BIOS Menu 5: IDE Master and IDE Slave Configuration

→ Auto-Detected Drive Parameters

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

- Device: Lists the device type (e.g. hard disk, CD-ROM etc.)
- Type: Indicates the type of devices a user can manually select
- Vendor: Lists the device manufacturer
- Size: List the storage capacity of the device.
- LBA Mode: Indicates whether the LBA (Logical Block Addressing) is a method of addressing data on a disk drive is supported or not.
- Block Mode: Block mode boosts IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if block mode is not used. Block mode allows transfers of up to 64 KB per interrupt.
- PIO Mode: Indicates the PIO mode of the installed device.
- Async DMA: Indicates the highest Asynchronous DMA Mode that is supported.
- Ultra DMA: Indicates the highest Synchronous DMA Mode that is supported.
- S.M.A.R.T.: Indicates whether or not the Self-Monitoring Analysis and Reporting Technology protocol is supported.

- 32Bit Data Transfer: Enables 32-bit data transfer.

→ **Type [Auto]**

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

- | | | | |
|---|----------------------|----------------|---|
| → | Not Installed | | BIOS is prevented from searching for an IDE disk drive on the specified channel. |
| → | Auto | DEFAULT | The BIOS auto detects the IDE disk drive type attached to the specified channel. This setting should be used if an IDE hard disk drive is attached to the specified channel. |
| → | CD/DVD | | The CD/DVD option specifies that an IDE CD-ROM drive is attached to the specified IDE channel. The BIOS does not attempt to search for other types of IDE disk drives on the specified channel. |
| → | ARMD | | This option specifies an ATAPI Removable Media Device. These include, but are not limited to:

ZIP

LS-120 |

→ **LBA/Large Mode [Auto]**

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

- | | | | |
|---|-----------------|----------------|---|
| → | Disabled | | BIOS is prevented from using the LBA mode control on the specified channel. |
| → | Auto | DEFAULT | BIOS auto detects the LBA mode control on the specified channel. |

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→ Block (Multi Sector Transfer) [Auto]

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

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

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

→ PIO Mode [Auto]

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

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

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

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

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

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

→ **4** PIO mode 4 selected with a maximum transfer rate of 16.6 MB/s
(This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.)

→ DMA Mode [Auto]

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

➔	Auto	DEFAULT	BIOS auto detects the DMA mode. Use this value if the IDE disk drive support cannot be determined.
➔	SWDMA0		Single Word DMA mode 0 selected with a maximum data transfer rate of 2.1 MB/s
➔	SWDMA1		Single Word DMA mode 1 selected with a maximum data transfer rate of 4.2 MB/s
➔	SWDMA2		Single Word DMA mode 2 selected with a maximum data transfer rate of 8.3 MB/s
➔	MWDMA0		Multi Word DMA mode 0 selected with a maximum data transfer rate of 4.2 MB/s
➔	MWDMA1		Multi Word DMA mode 1 selected with a maximum data transfer rate of 13.3 MB/s
➔	MWDMA2		Multi Word DMA mode 2 selected with a maximum data transfer rate of 16.6 MB/s
➔	UDMA0		Ultra DMA mode 0 selected with a maximum data transfer rate of 16.6 MB/s
➔	UDMA1		Ultra DMA mode 1 selected with a maximum data transfer rate of 25 MB/s
➔	UDMA2		Ultra DMA mode 2 selected with a maximum data transfer rate of 33.3 MB/s
➔	UDMA3		Ultra DMA mode 3 selected with a maximum data transfer rate of 44 MB/s (To use this mode, it is required that an 80-conductor ATA cable is used.)
➔	UDMA4		Ultra DMA mode 4 selected with a maximum data transfer rate of 66.6 MB/s (To use this mode, it is required that an 80-conductor ATA cable is used.)
➔	UDMA5		Ultra DMA mode 5 selected with a maximum data transfer rate of 99.9 MB/s (To use this mode, it is required that an 80-conductor ATA cable is used.)

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→ S.M.A.R.T [Auto]

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

- **Auto** **DEFAULT** BIOS auto detects HDD SMART support.
- **Disabled** Prevents BIOS from using the HDD SMART feature.
- **Enabled** Allows BIOS to use the HDD SMART feature

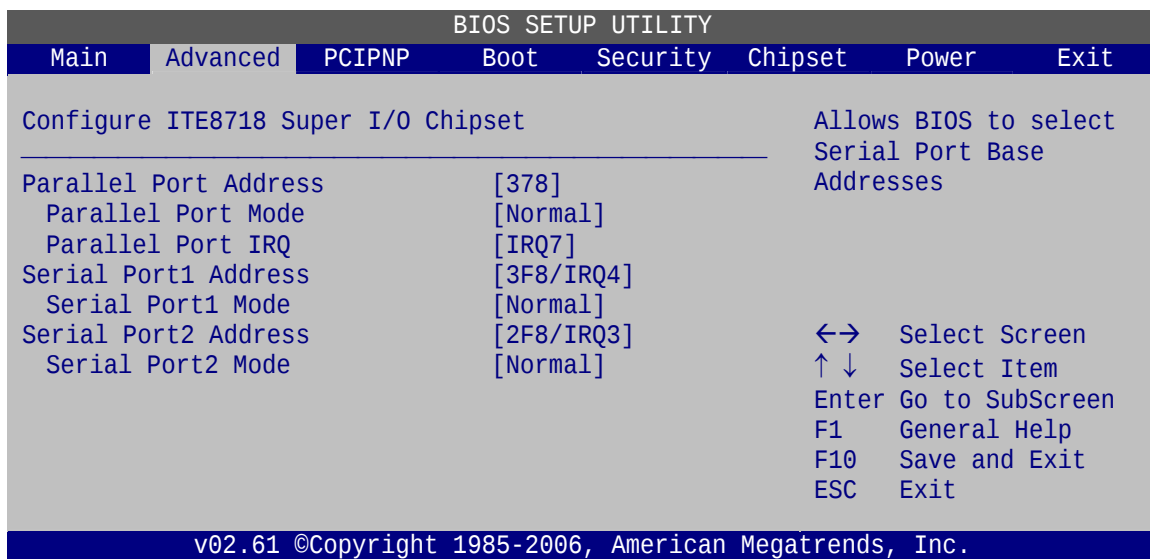
→ 32Bit Data Transfer [Enabled]

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

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

5.3.3 Super IO Configuration

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



BIOS Menu 6: Super IO Configuration

➔ **Parallel Port Address [Disabled]**

Use the **Parallel Port Address** option to select the parallel port base address.

- ➔ **Disabled** **DEFAULT** No base address is assigned to the Parallel Port
- ➔ **378** Parallel Port I/O port address is 378
- ➔ **278** Parallel Port I/O port address is 278
- ➔ **3BC** Parallel Port I/O port address is 3BC

➔ **Parallel Port Mode [Normal]**

Use the **Parallel Port Mode** option to select the mode the parallel port operates in.

- ➔ **Normal** **DEFAULT** The normal parallel port mode is the standard mode for parallel port operation.
- ➔ **Bi-directional** Parallel port outputs are 8-bits long. Inputs are accomplished by reading 4 of the 8 bits on the status register.
- ➔ **EPP** The parallel port operates in the enhanced parallel port mode (EPP). The EPP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the Normal mode.
- ➔ **ECP+EPP** The parallel port operates in the extended capabilities port (ECP) mode. The ECP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the Normal mode

The parallel port is also be compatible with EPP devices described above

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→ Parallel Port IRQ [IRQ7]

Use the **Parallel Port IRQ** selection to set the parallel port interrupt address.

- **IRQ5** IRQ5 is assigned as the parallel port interrupt address
- **IRQ7** **DEFAULT** IRQ7 is assigned as the parallel port interrupt address

→ Serial Port1 Address [3F8/IRQ4]

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

- **Disabled** No base address is assigned to Serial Port 1
- **3F8/IRQ4** **DEFAULT** Serial Port 1 I/O port address is 3F8 and the interrupt address is IRQ4
- **3E8/IRQ4** Serial Port 1 I/O port address is 3E8 and the interrupt address is IRQ4
- **2E8/IRQ3** Serial Port 1 I/O port address is 2E8 and the interrupt address is IRQ3

→ Serial Port1 Mode [Normal]

Use the **Serial Port1 Mode** option to select the transmitting and receiving mode for the first serial port.

- **Normal** **DEFAULT** Serial Port 1 mode is normal
- **IrDA** Serial Port 1 mode is IrDA
- **ASK IR** Serial Port 1 mode is ASK IR

→ Serial Port2 Address [2F8/IRQ3]

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

- **Disabled** No base address is assigned to Serial Port 2
- **2F8/IRQ3** **DEFAULT** Serial Port 2 I/O port address is 3F8 and the interrupt address is IRQ3

- ➔ **3E8/IRQ4** Serial Port 2 I/O port address is 3E8 and the interrupt address is IRQ4
- ➔ **2E8/IRQ3** Serial Port 2 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port2 Mode [Normal]**

Use the **Serial Port2 Mode** option to select the Serial Port2 operational mode.

- ➔ **Normal** **DEFAULT** Serial Port 2 mode is normal
- ➔ **IrDA** Serial Port 2 mode is IrDA
- ➔ **ASK IR** Serial Port 2 mode is ASK IR

➔ **Serial Port3 Address [3E8]**

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

- ➔ **Disabled** No base address is assigned to serial port 3
- ➔ **3E8** **DEFAULT** Serial port 3 I/O port address is 3E8
- ➔ **2E8** Serial port 3 I/O port address is 2E8
- ➔ **2E0** Serial port 3 I/O port address is 2E0

5.3.4 Hardware Health Configuration

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

BIOS SETUP UTILITY			
Main	Advanced	PCIPNP	Boot Security Chipset Power Exit
Hardware Health Event Monitoring			Fan Configuration Mode setting
CPU FAN Mode Setting		[Automatic Mode]	
CPU Temperature Limit of Off		[035]	
CPU Temperature Limit of On		[055]	
CPU FAN Start PWM		[050]	
Slope PWM		[2 PWM]	
CPU Temperature		:49°C/120°F	
System Temperature		:47°C/116°F	
CPU Fan Speed		:4821 RPM	
CPU Core		:1.200 V	
+1.05V		:1.056 V	
+3.30V		:3.344 V	
+5.00V		:5.107 V	
+12.0V		:12.160 V	
+1.5V		:1.504 V	
+1.8V		:1.824 V	
5VSB		:5.107 V	
VBAT		:3.360 V	
		↔	Select Screen
		↑↓	Select Item
		Enter	Go to SubScreen
		F1	General Help
		F10	Save and Exit
		ESC	Exit
v02.61 ©Copyright 1985-2006, American Megatrends, Inc.			

BIOS Menu 7: Hardware Health Configuration

→ CPU FAN Mode Setting [Full On Mode]

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

- **Full On Mode** **DEFAULT** Fan is on all the time
- **Automatic mode** The fan adjusts its speed using these settings:
 - Temp. Limit of OFF
 - Temp. Limit of Start
 - Fan Start PWM
 - Slope PWM 1

→ PWM Manual mode

The fan spins at the speed set in:
Fan PWM control

→ CPU Temperature Limit of Off [000]

**WARNING:**

CPU failure can result if this value is set too high

The fan will turn off if the temperature falls below this value.

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

→ CPU Temperature Limit of On [020]

**WARNING:**

CPU failure can result if this value is set too high

When the fan is off, it will only start when the temperature exceeds this setting.

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

→ CPU Fan Start PWM [070]

This is the initial speed of the fan when it first starts spinning.

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

→ Slope PWM [1 PWM]

A bigger value will increase the fan speed in big amounts. A smaller value will increase the speed more gradually.

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

→ CPU Fan PWM Control [070]

This value specifies the speed of the fan.

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

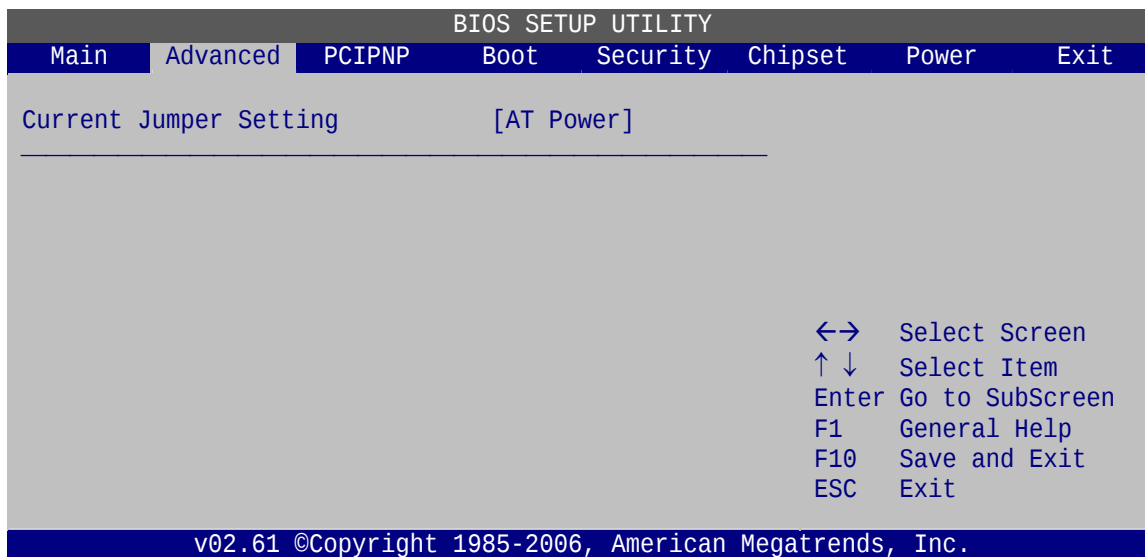
→ Hardware Health Monitoring

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:
 - CPU Core
 - +1.05 V
 - +3.30 V
 - +5.00 V
 - +12.0 V
 - +1.50 V
 - +1.80 V

5.3.5 Power Configuration

The **Power Configuration** menu (**BIOS Menu 8**) configures the Advanced Configuration and Power Interface (ACPI) and Power Management (APM) options.



BIOS Menu 8: ACPI Configuration

→ Current Jumper Setting [AT]

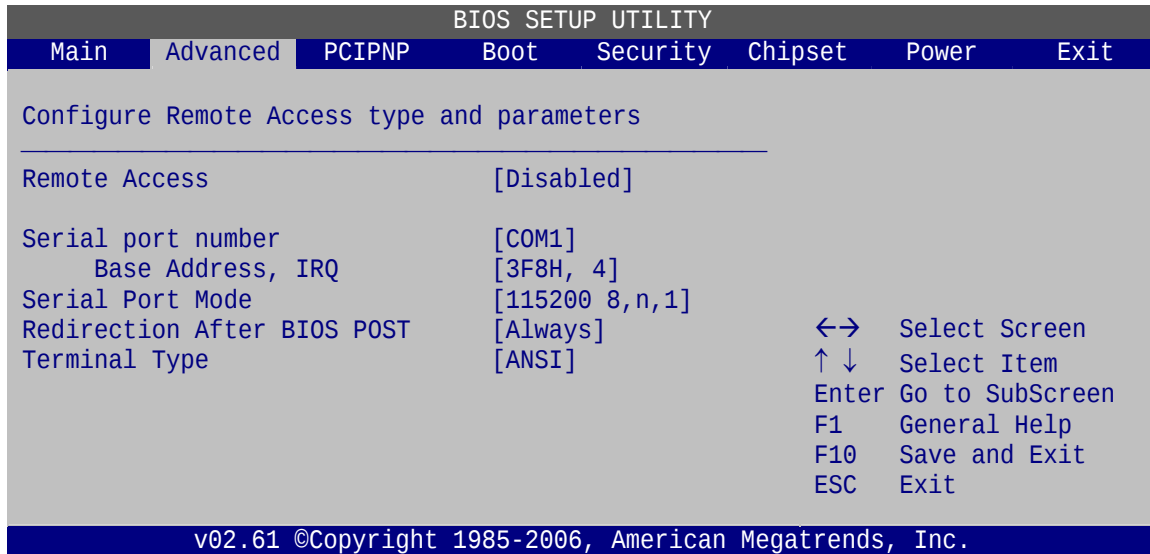
The **Current Jumper Setting** displays the AT Power Jumper setting.

- **AT** **DEFAULT** The AT power jumper setting is set to AT Power
- **ATX** The AT power jumper setting is set to ATX Power

5.3.6 Remote Access Configuration

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

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BIOS Menu 9: Remote Access Configuration

→ Remote Access [Disabled]

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

- | | | | |
|---|-----------------|----------------|---|
| → | Disabled | DEFAULT | Remote access is disabled. |
| → | Enabled | | Remote access configuration options shown below appear: |
| | | | Serial Port Number |
| | | | Serial Port Mode |
| | | | Flow Control |
| | | | Redirection after BIOS POST |
| | | | Terminal Type |
| | | | VT-UTF8 Combo Key Support |

These configuration options are discussed below.

→ Serial Port Number [COM1]

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

- ➔ **COM1 DEFAULT** System is remotely accessed through COM1
- ➔ **COM2** System is remotely accessed through COM2

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

➔ **Base Address, IRQ [2F8h,3]**

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

➔ **Serial Port Mode [115200 8,n,1]**

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

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



NOTE:

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

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

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

- ➔ **Disabled** The console is not redirected after POST
- ➔ **Boot Loader** Redirection is active during POST and during Boot Loader

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

➔ **Terminal Type [ANSI]**

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

- ➔ **ANSI** **DEFAULT** The target terminal type is ANSI
- ➔ **VT100** The target terminal type is VT100
- ➔ **VT-UTF8** The target terminal type is VT-UTF8

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

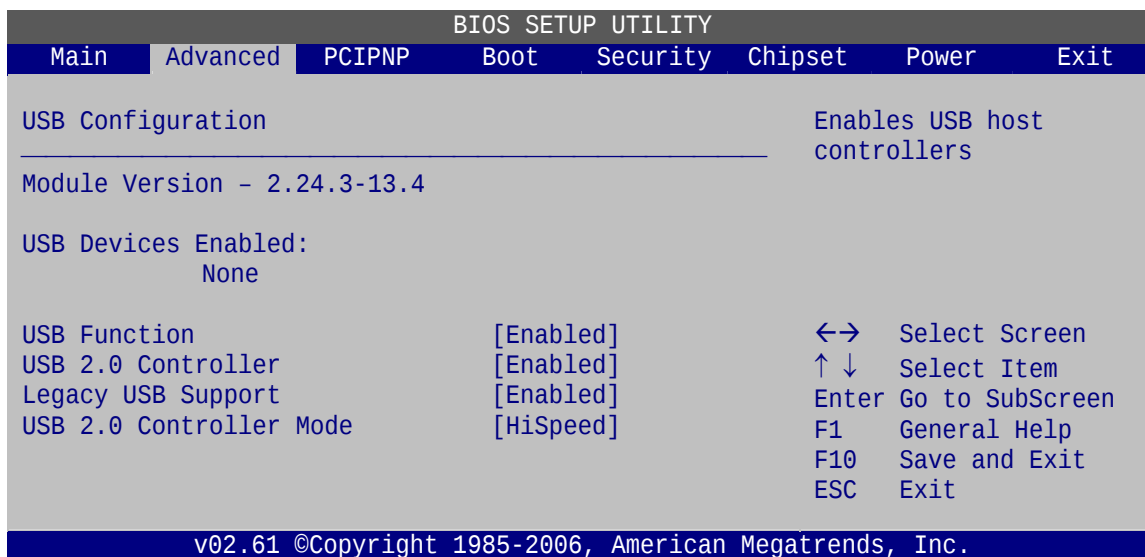
Use the **VT-UFT8 Combo Key Support** option to enable additional keys that are not provided by VT100 for the PC 101 keyboard.

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

- ➔ **Disabled** **DEFAULT** Disables the VT-UTF8 terminal keys
- ➔ **Enabled** Enables the VT-UTF8 combination key. Support for ANSI/VT100 terminals

5.3.7 USB Configuration

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



BIOS Menu 10: USB Configuration

➔ USB Configuration

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

- Module Version: x.xxxxx.xxxxx

➔ USB Devices Enabled

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

➔ USB 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 Controller [Enabled]

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

- ➔ **Disabled** USB 2.0 controller disabled
- ➔ **Enabled** **DEFAULT** USB 2.0 controller enabled

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→ Legacy USB Support [Enabled]

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

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

- **Disabled** Legacy USB support disabled
- **Enabled** **DEFAULT** Legacy USB support enabled
- **Auto** Legacy USB support disabled if no USB devices are connected

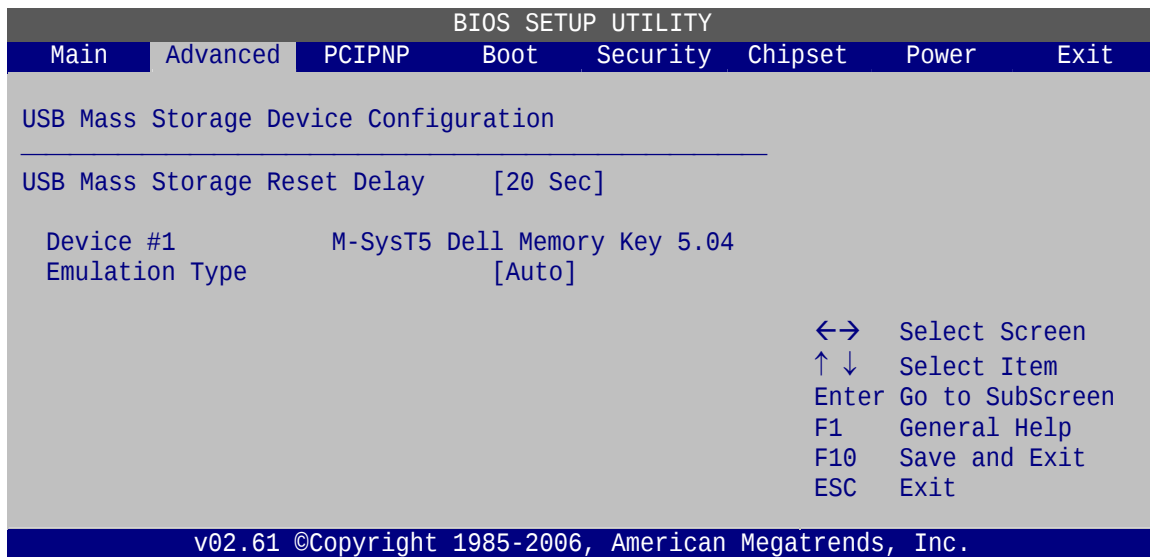
→ USB2.0 Controller Mode [HiSpeed]

Use the **USB2.0 Controller Mode** option to set the speed of the USB2.0 controller.

- **FullSpeed** The controller is capable of operating at 12 Mb/s
- **HiSpeed** **DEFAULT** The controller is capable of operating at 480 Mb/s

5.3.7.1 USB Mass Storage Device Configuration

Use the **USB Mass Storage Device Configuration** menu (**BIOS Menu 11**) to configure USB mass storage class devices.



BIOS Menu 11: USB Mass Storage Device Configuration

→ USB Mass Storage Reset Delay [20 Sec]

Use the **USB Mass Storage Reset Delay** option to set the number of seconds POST waits for the USB mass storage device after the start unit command.

- **10 Sec** POST waits 10 seconds for the USB mass storage device after the start unit command.
- **20 Sec** **DEFAULT** POST waits 20 seconds for the USB mass storage device after the start unit command.
- **30 Sec** POST waits 30 seconds for the USB mass storage device after the start unit command.
- **40 Sec** POST waits 40 seconds for the USB mass storage device after the start unit command.

→ Device

The **Device##** field lists the USB devices that are connected to the system.

→ Emulation Type [Auto]

Use the **Emulation Type** BIOS option to specify the type of emulation BIOS has to provide for the USB device.

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- | | | | |
|---|-------------------|----------------|--|
| ➔ | Auto | DEFAULT | BIOS auto-detects the current USB. |
| ➔ | Floppy | | The USB device will be emulated as a floppy drive. The device can be either A: or B: responding to INT13h calls that return DL = 0 or DL = 1 respectively. |
| ➔ | Forced FDD | | Allows a hard disk image to be connected as a floppy image. This option works only for drives formatted with FAT12, FAT16 or FAT32. |
| ➔ | Hard Disk | | Allows the USB device to be emulated as hard disk responding to INT13h calls that return DL values of 80h or above. |
| ➔ | CDROM | | Assumes the CD-ROM is formatted as bootable media. All the devices that support block sizes greater than 512 bytes can only be booted using this option. |

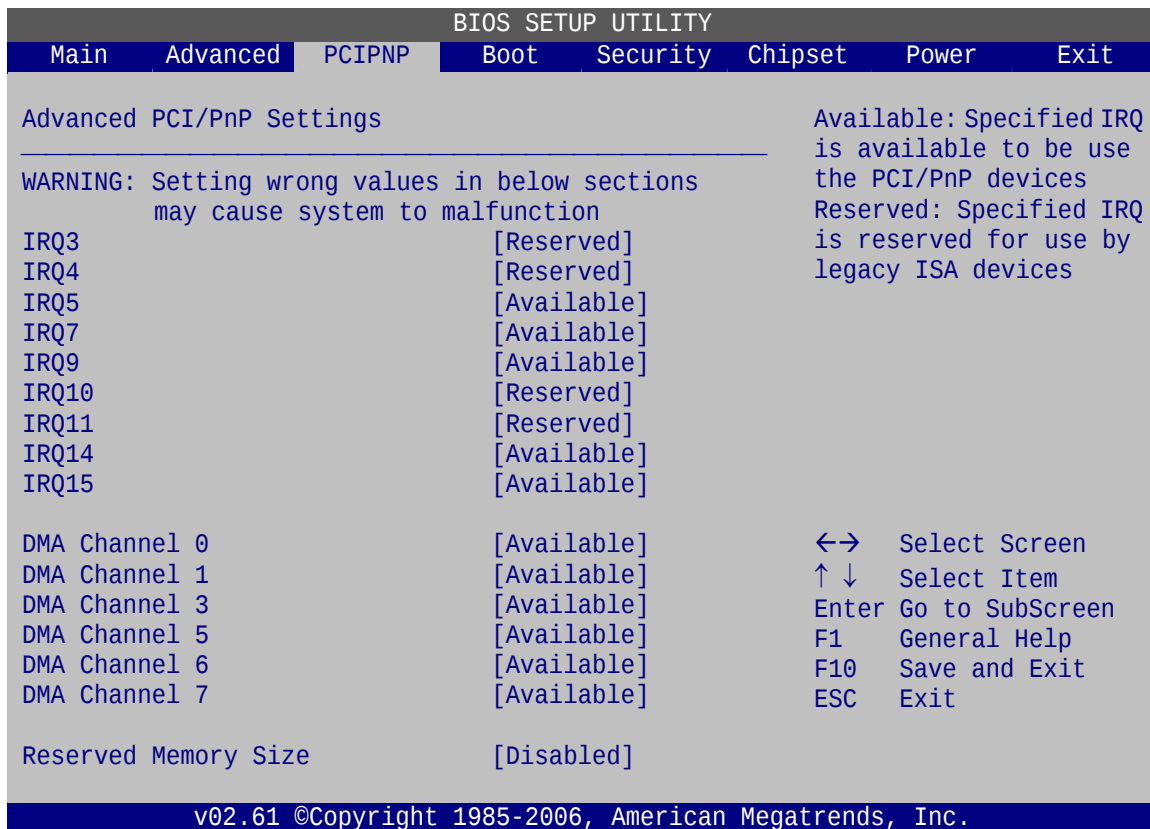
5.4 PCI/PnP

Use the **PCI/PnP** menu (**BIOS Menu 12**) to configure advanced PCI and PnP settings.



WARNING!

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



BIOS Menu 12: PCI/PnP Configuration

→ IRQ# [Available]

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

- **Available** **DEFAULT** The specified IRQ is available to be used by PCI/PnP devices
- **Reserved** The specified IRQ is reserved for use by Legacy ISA devices

Available IRQ addresses are:

- IRQ3
- IRQ4
- IRQ5
- IRQ7

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- IRQ9
- IRQ10
- IRQ 11
- IRQ 14
- IRQ 15

→ DMA Channel# [Available]

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

- | | | | |
|---|------------------|----------------|--|
| → | Available | DEFAULT | The specified DMA is available to be used by PCI/PnP devices |
| → | Reserved | | The specified DMA is reserved for use by Legacy ISA devices |

Available DMA Channels are:

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

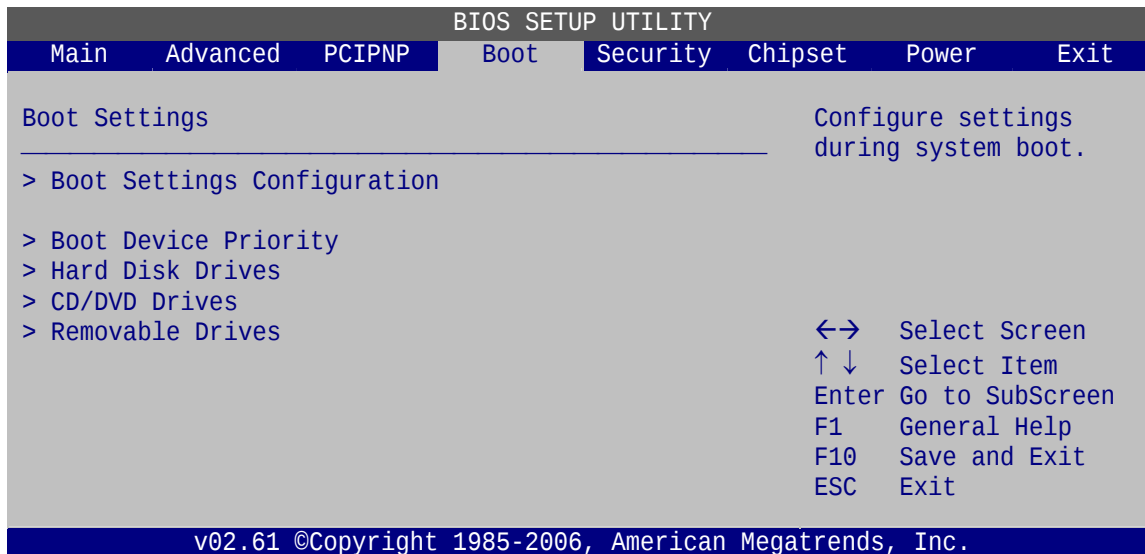
→ Reserved Memory Size [Disabled]

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

- | | | | |
|---|-----------------|----------------|---|
| → | Disabled | DEFAULT | No memory block reserved for legacy ISA devices |
| → | 16K | | 16 KB reserved for legacy ISA devices |
| → | 32K | | 32 KB reserved for legacy ISA devices |
| → | 64K | | 54 KB reserved for legacy ISA devices |

5.5 Boot

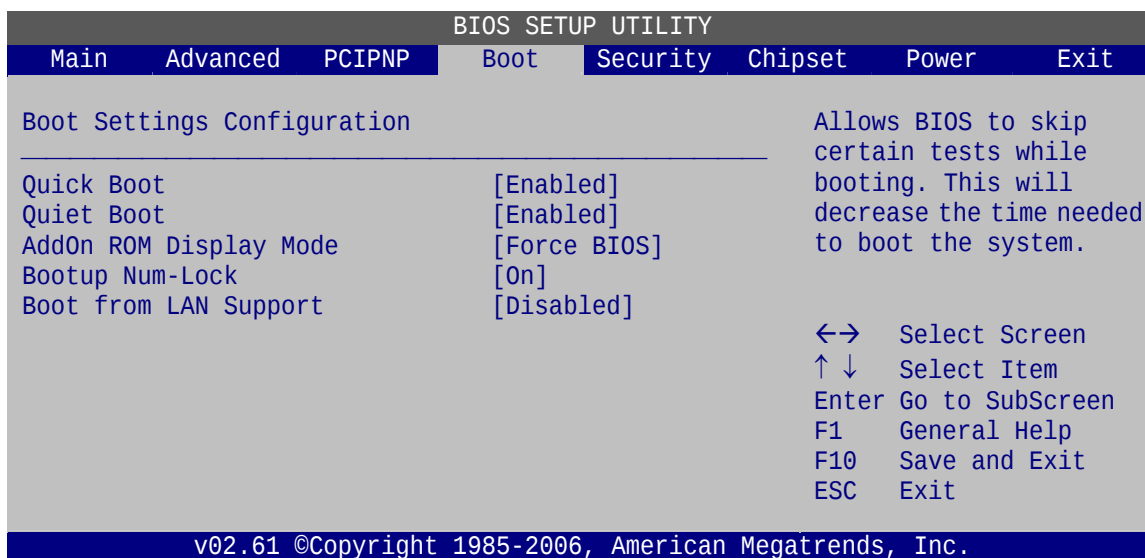
Use the **Boot** menu (**BIOS Menu 13**) to configure system boot options.



BIOS Menu 13: Boot

5.5.1 Boot Settings Configuration

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



BIOS Menu 14: Boot Settings Configuration

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→ Quick Boot [Enabled]

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

- | | | | |
|---|-----------------|----------------|---|
| → | Disabled | | No POST procedures are skipped |
| → | Enabled | DEFAULT | Some POST procedures are skipped to decrease the system boot time |

→ Boot From LAN Support [Disabled]

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

- | | | | |
|---|-----------------|----------------|---|
| → | Disabled | DEFAULT | Cannot be booted from a remote system through the LAN |
| → | Enabled | DEFAULT | Can be booted from a remote system through the LAN |

→ Quiet Boot [Disabled]

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

- | | | | |
|---|-----------------|----------------|---|
| → | Disabled | DEFAULT | Normal POST messages displayed |
| → | Enabled | | OEM Logo displayed instead of POST messages |

→ AddOn ROM Display Mode [Force BIOS]

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

- | | | | |
|---|---------------------|----------------|---|
| → | Force BIOS | DEFAULT | The system forces third party BIOS to display during system boot. |
| → | Keep Current | | The system displays normal information during system boot. |

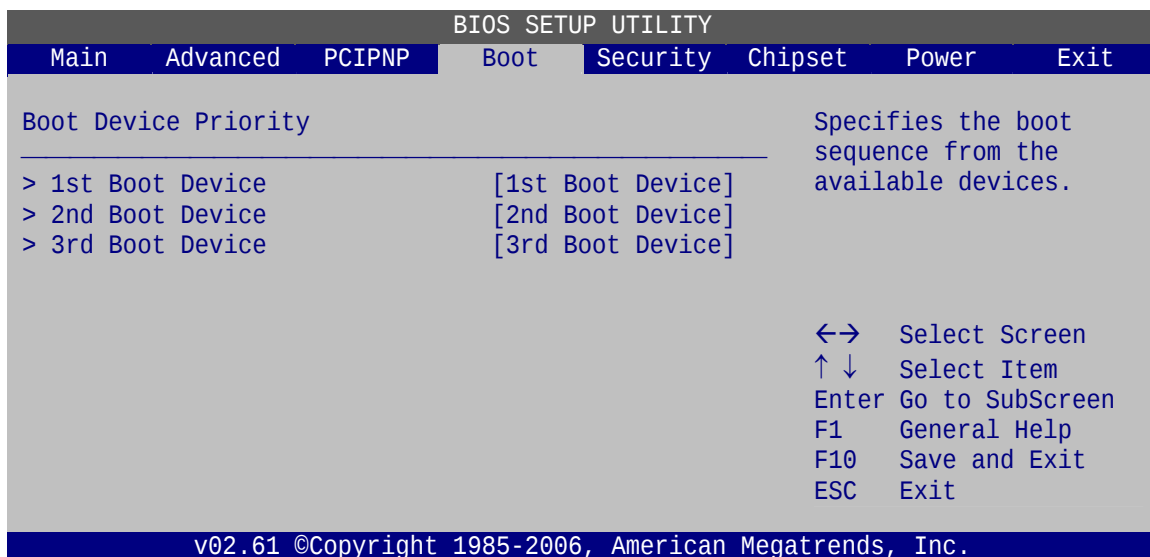
➔ **Bootup Num-Lock [On]**

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

- ➔ **Off** Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.
- ➔ **On DEFAULT** Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.

5.5.2 Boot Device Priority

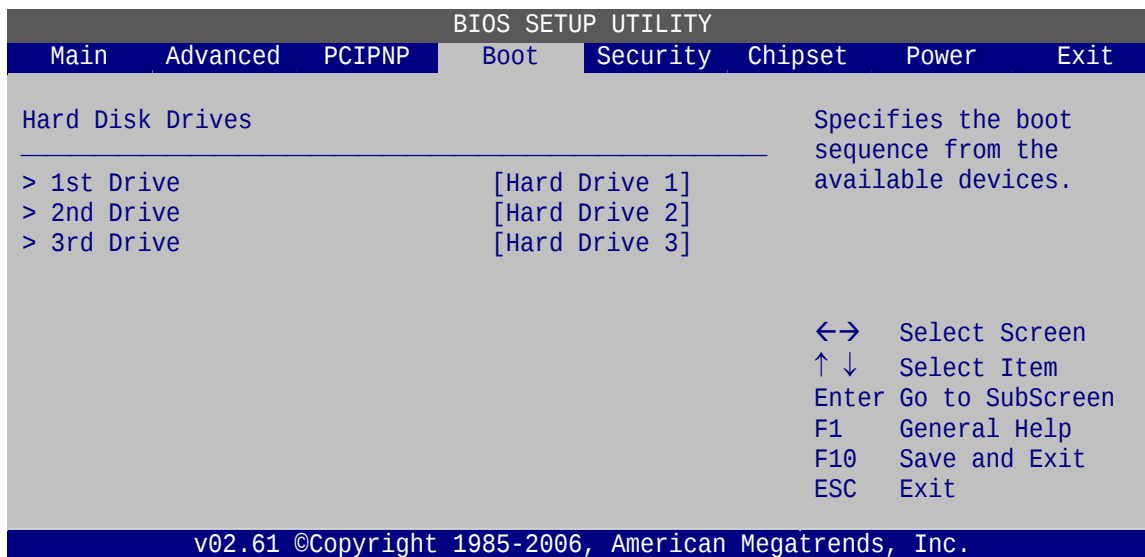
Use the **Boot Device Priority** menu (**BIOS Menu 15**) to specify the boot sequence from the available devices. The drive sequence also depends on the boot sequence in the individual device section.



BIOS Menu 15: Boot Device Priority Settings

5.5.3 Hard Disk Drives

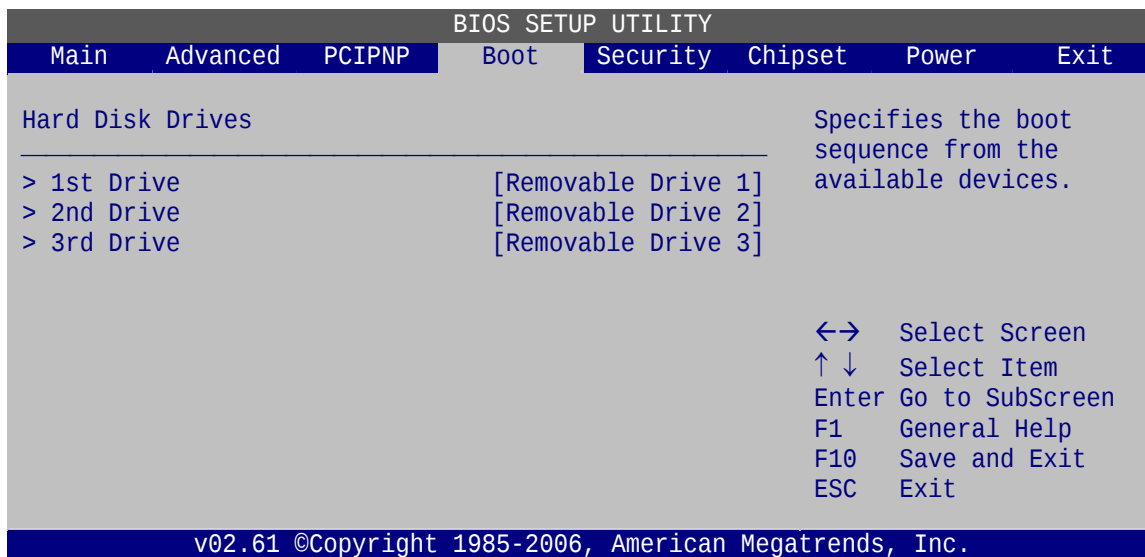
Use the **Hard Disk Drives** menu to specify the boot sequence of the available HDDs.
Only installed hard drives are shown.



BIOS Menu 16: Hard Disk Drives

5.5.4 Removable Drives

Use the **Removable Drives** menu (**BIOS Menu 17**) to specify the boot sequence of the removable drives. Only connected drives are shown.



BIOS Menu 17: Removable Drives

5.5.5 CD/DVD Drives

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

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

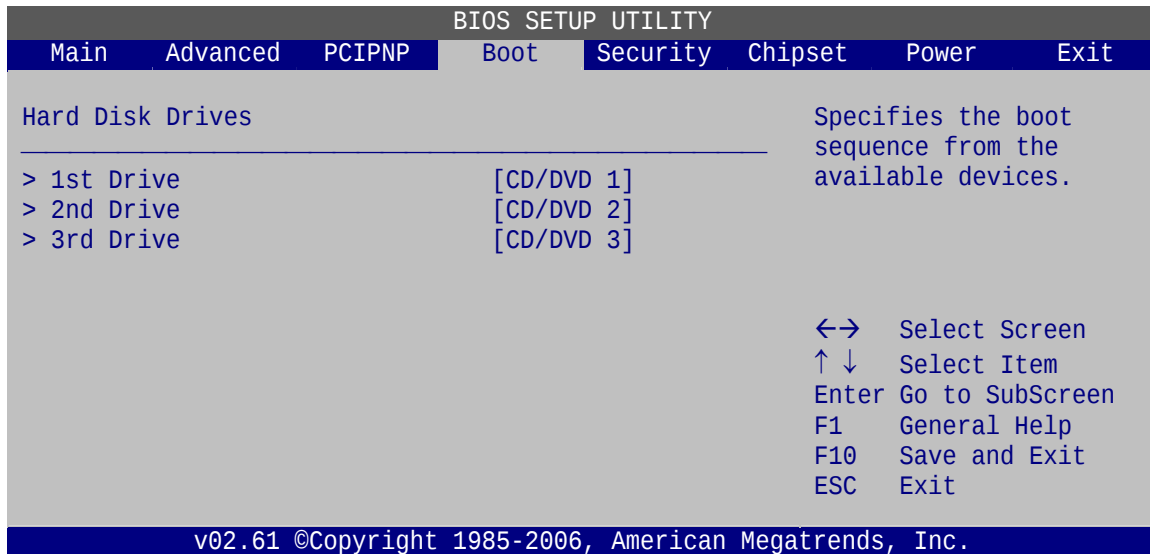


NOTE:

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

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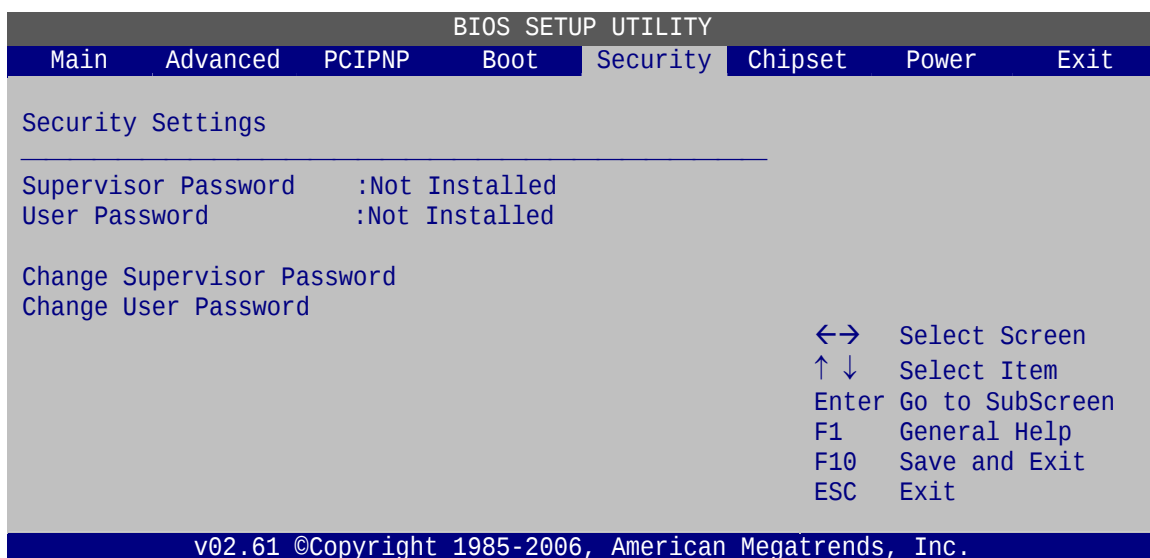
The boot sequence from the available devices is selected. If the “**1st Drive**” option is selected a list of available CD/DVD drives is shown. Select the first CD/DVD drive the system boots from. If the “**1st Drive**” is not used for booting this option may be disabled.



BIOS Menu 18: CD/DVD Drives

5.6 Security

Use the **Security** menu (**BIOS Menu 19**) to set system and user passwords.



BIOS Menu 19: Security

→ Change Supervisor Password

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

→ Change User Password

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

→ Clear User Password

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

→ Boot Sector Virus Protection [Disabled]

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

- | | | |
|------------|---------|---|
| → Disabled | DEFAULT | Disables the boot sector virus protection |
| → Enabled | | Enables the boot sector virus protection |

5.7 Chipset

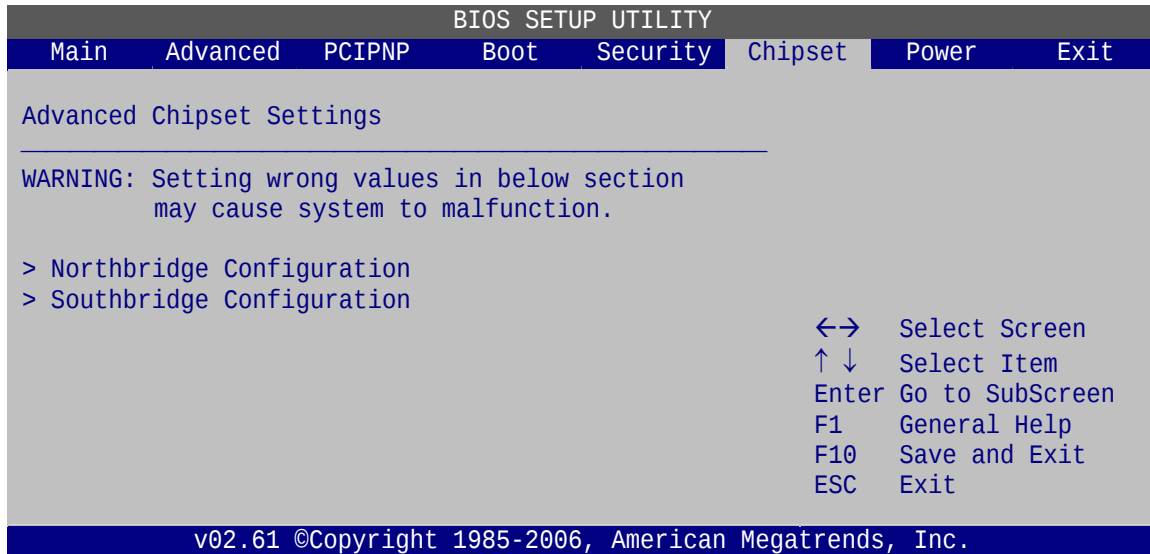
Use the **Chipset** menu (**BIOS Menu 20**) to access the Northbridge and Southbridge configuration menus



WARNING!

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

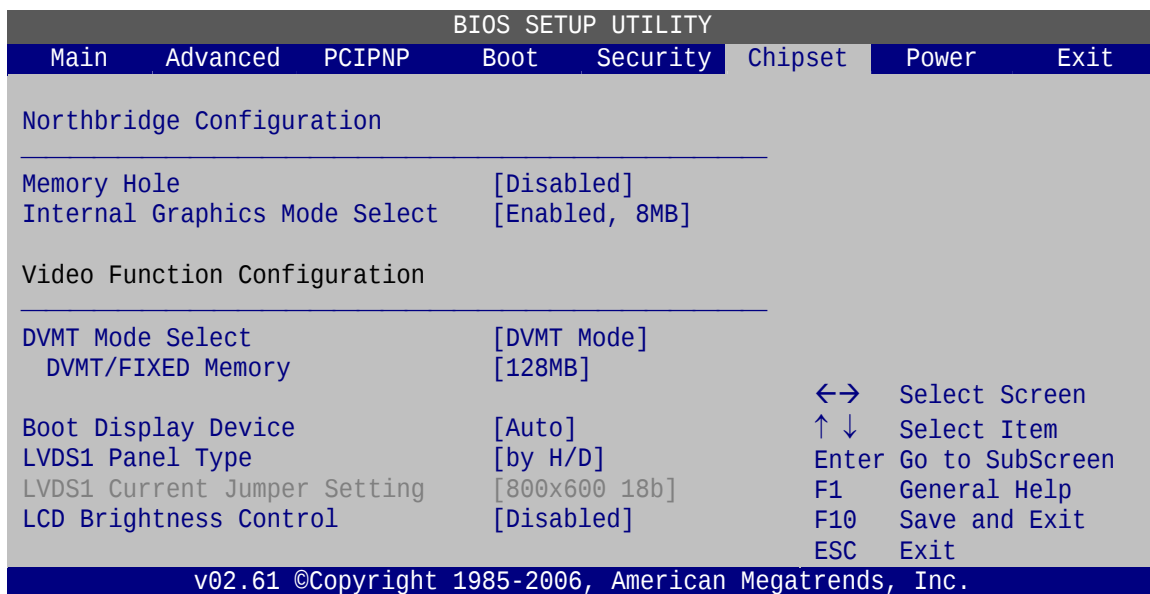
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BIOS Menu 20: Chipset

5.7.1 Northbridge Configuration

Use the **Northbridge Chipset Configuration** menu (**BIOS Menu 21**) to configure the Northbridge chipset.



BIOS Menu 21:Northbridge Chipset Configuration

➔ **Memory Hole [Disabled]**

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

- ➔ **Disabled** **DEFAULT** Memory is not reserved for ISA expansion cards
- ➔ **15 MB–16 MB** Between 15 MB and 16 MB of memory is reserved for ISA expansion cards

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

Use the **Internal Graphic Mode Select** option to specify the amount of system memory that can be used by the internal graphics device.

- ➔ **Disable**
- ➔ **Enable, 1 MB** 1 MB of memory used by internal graphics device
- ➔ **Enable, 8 MB** **DEFAULT** 8 MB of memory used by internal graphics device

➔ **DVMT Mode Select [DVMT Mode]**

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

- ➔ **Fixed Mode** A fixed portion of graphics memory is reserved as graphics memory.
- ➔ **DVMT Mode** **DEFAULT** Graphics memory is dynamically allocated according to the system and graphics needs.
- ➔ **Combo Mode** A fixed portion of graphics memory is reserved as graphics memory. If more memory is needed, graphics memory is dynamically allocated according to the system and graphics needs.

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→ DVMT/FIXED Memory [128 MB]

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

- 64 MB
- 128 MB Default

→ Boot Display Device [Auto]

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

- Auto DEFAULT
- CRT
- TV
- LFP

→ LVDS1 Panel Type

Use the **LVDS1 Panel Type** to determine the LCD panel resolution. Configuration options are listed below:

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

➔ **LVDS1 Current Jumper Setting**

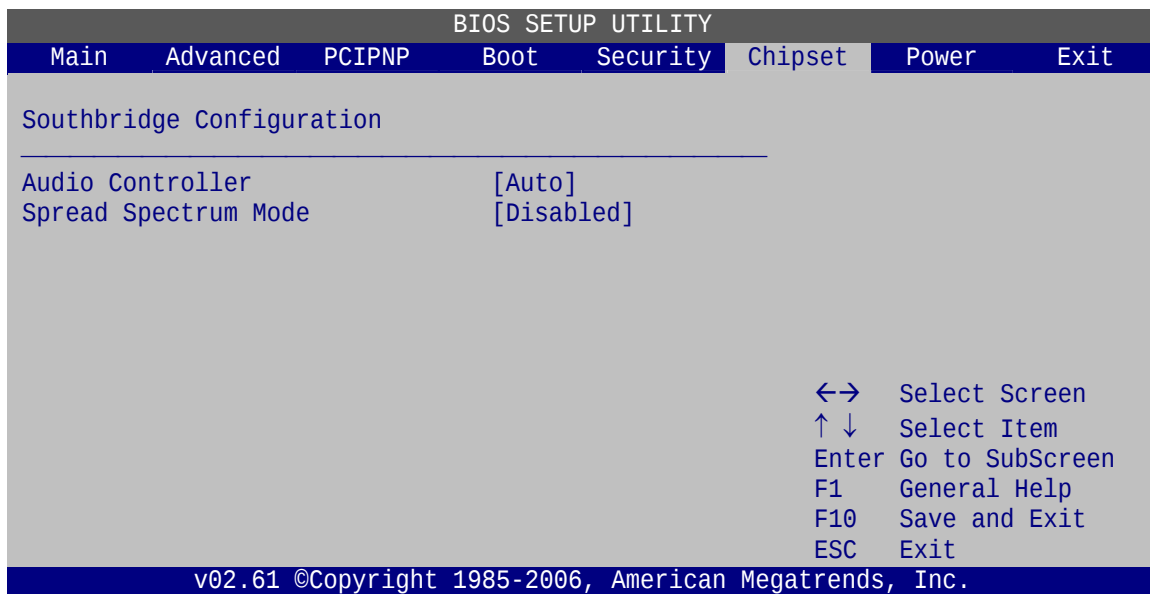
The **LVDS1 Current Jumper Setting** displays the current jumper setting configuration.

➔ **LCD Brightness Control**

Use the **LCD Brightness Control** option to specify the brightness of the LCD panel as a percentage. Default setting is 100%

5.7.2 Southbridge Configuration

Use the **Southbridge Configuration** menu (**BIOS Menu 22**) to configure the Southbridge chipset.



BIOS Menu 22:Southbridge Chipset Configuration

➔ **Audio Controller [Auto]**

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

- ➔ **Auto** **DEFAULT** The onboard audio controller is enabled
- ➔ **All Disabled** The onboard audio controller is disabled

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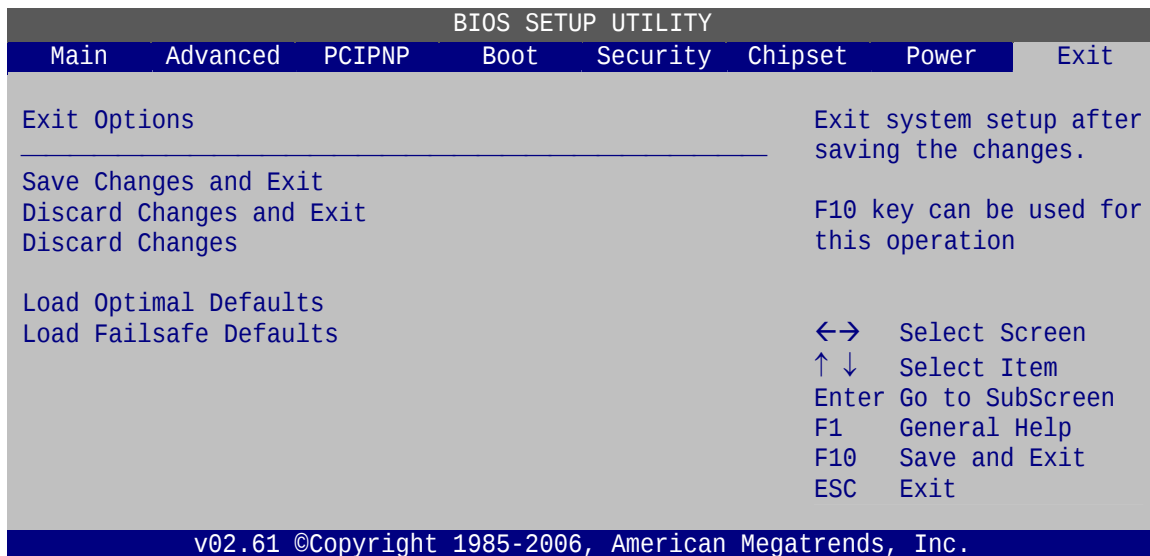
→ Spread Spectrum Mode [Disabled]

Use the **Spread Spectrum Mode** option to reduce the EMI. Excess EMI is generated when the system clock generator pulses have extreme values. Spreading the pulse spectrum modulates changes in the extreme values from spikes to flat curves, thus reducing the EMI. This benefit may in some cases be outweighed by problems with timing-critical devices, such as a clock-sensitive SCSI device.

- **Disabled** **DEFAULT** EMI not reduced
- **Enabled** EMI reduced

5.8 Exit

Use the **Exit** menu (**BIOS Menu 23**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 23:Exit

→ Save Changes and Exit

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

➔ **Discard Changes and Exit**

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

➔ **Discard Changes**

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

➔ **Load Optimal Defaults**

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

➔ **Load Failsafe Defaults**

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

Appendix

A

BIOS Options

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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

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- ☐ Windows 7
- ☐ Windows CE 5.0
- ☐ Windows CE 6.0
- ☐ Windows XP Embedded
- Linux
 - ☐ Fedora Core 12 (Constantine)
 - ☐ Fedora Core 11 (Leonidas)
 - ☐ Fedora Core 10 (Cambridge)
 - ☐ Fedora Core 8 (Werewolf)
 - ☐ Fedora Core 7 (Moonshine)
 - ☐ RedHat RHEL-5.4
 - ☐ RedHat 9 (Ghirke)
 - ☐ Ubuntu 8.10 (Intrepid)
 - ☐ Ubuntu 7.10 (Gutsy)
 - ☐ Ubuntu 6.10 (Edgy)
 - ☐ Debian 5.0 (Lenny)
 - ☐ Debian 4.0 (Etch)
 - ☐ SuSe 11.2
 - ☐ SuSe 10.3

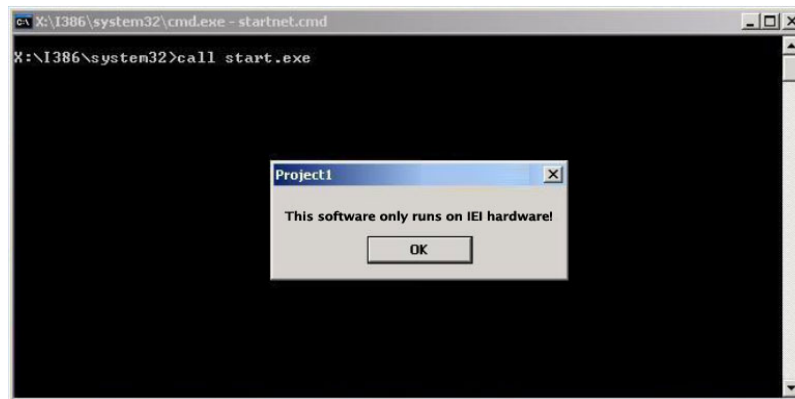


NOTE:

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.



B.2 Setup Procedure for Windows

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

Step 6: Hardware and BIOS setup

Step 7: Create partitions

Step 8: Install operating system, drivers and system applications.

Step 9: Build-up recovery partition

Step 10: Create factory default image

The detailed descriptions are described in the following sections.

**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-945GSE3. An unformatted and unpartitioned disk is recommended.
- Step 3:** Connect an optical disk drive to the NANO-945GSE3 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.

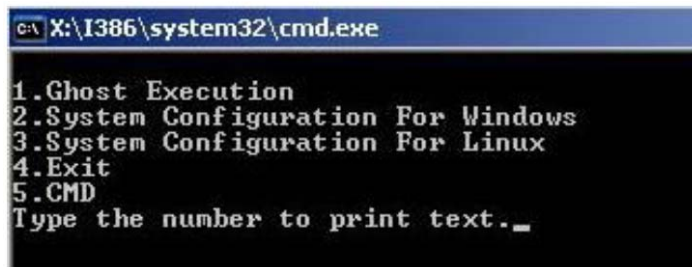


Figure B-1: Recovery Tool Setup Menu

Step 5: Press <5> then <Enter>.

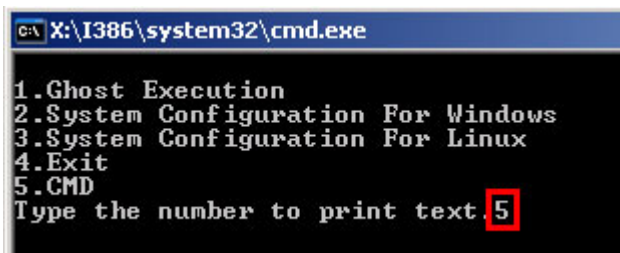


Figure B-2: Command Mode

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

```

X:\I386\SYSTEM32\CMD.EXE
X:\I386\SYSTEM32>diskpart → Starts the Microsoft disk partitioning tool.

Microsoft DiskPart version 5.2.3790.1830
Copyright (C) 1999-2001 Microsoft Corporation.
On computer: MININT-JUC

DISKPART>list vol → Show partition information

Volume ### Ltr Label Fs Type Size Status Info
-----
Volume 0 X CD_ROM CDFS DUD-ROM 405 MB Healthy Boot
Volume 1 D FAT32 Removeable 3854 MB Healthy

DISKPART>sel disk 0 → Select a disk
Disk 0 is now the selected disk.

DISKPART>create part pri size=2000 → Create partition 1 and assign a size.
This partition is for OS installation.
DiskPart succeeded in creating the specified partition.

DISKPART>assign letter=N → Assign partition 1 a code name (N).
DiskPart successfully assigned the drive letter or mount point.

DISKPART>create part pri size=1800 → Create partition 2 and assign a size.
This partition is for recovery images.
DiskPart succeeded in creating the specified partition.

DISKPART>assign letter=F → Assign partition 2 a code name (F).
DiskPart successfully assigned the drive letter or mount point.

DISKPART>exit → Exit diskpart

X:\I386\SYSTEM32>format n: /fs:ntfs /q /y → Format partition 1 (N) as NTFS format.
The type of the file system is RAW.
The new file system is NTFS.
QuickFormatting 2000M
Creating file system structures.
Format complete.
2048254 KB total disk space.
2035620 KB are available.

X:\I386\SYSTEM32>format f: /fs:ntfs /q /v:Recovery /y
The type of the file system is RAW.
The new file system is NTFS.
QuickFormatting 1800M
Creating file system structures.
Format complete.
1847474 KB total disk space.
1835860 KB are available.

X:\I386\SYSTEM32>exit → Exit Windows PE
  
```

Figure B-3: Partition Creation Commands


NOTE:

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

```
X:\I386\SYSTEM32>diskpart
Microsoft DiskPart version 5.2.3790.1830
Copyright (C) 1999-2001 Microsoft Corporation.
On computer: MININT-JUC

DISKPART> sel disk 0
Disk 0 is now the selected disk.

DISKPART> list part

   Partition ###   Type              Size          Offset
-----
Partition 1       Primary           2000 MB         32 KB
Partition 2       Primary          1804 MB        2000 MB

DISKPART> exit
```

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.

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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>.

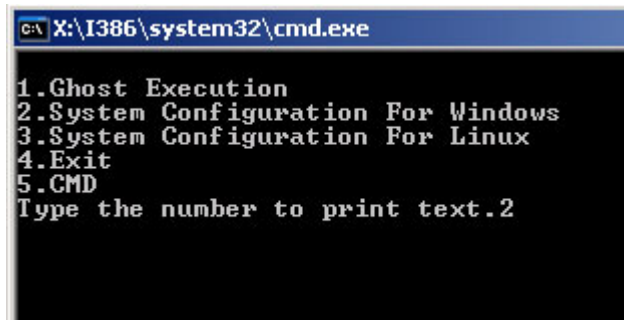


Figure B-4: System Configuration for Windows

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.

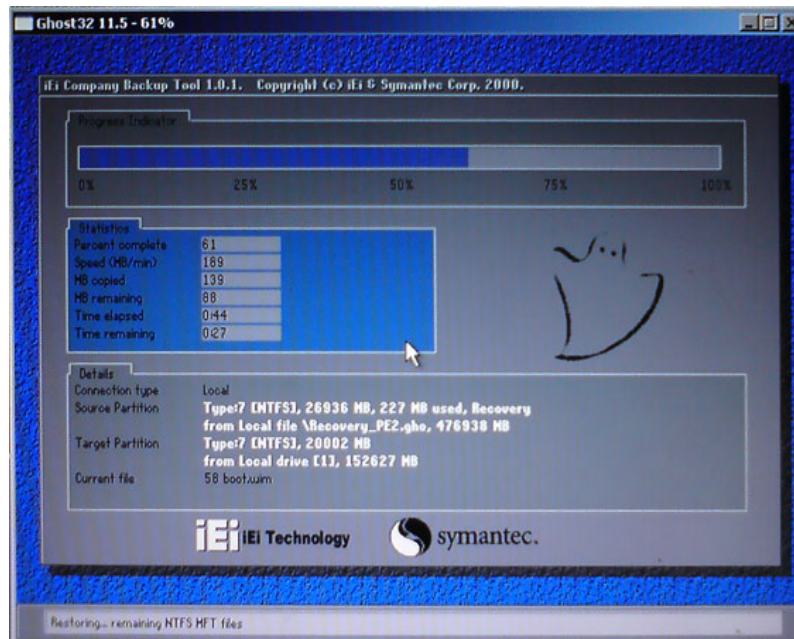


Figure B-5: Build-up Recovery Partition

Step 6: After completing the system configuration, press any key in the following window to reboot the system.

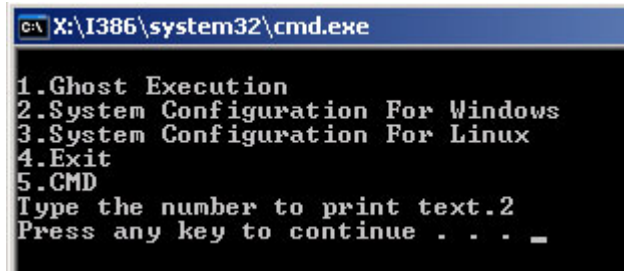


Figure B-6: Press any key to continue

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.

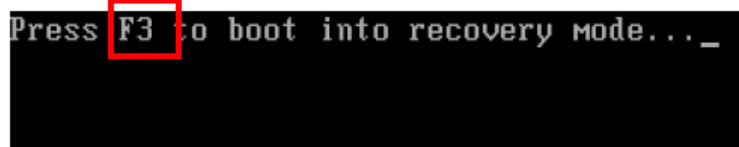


Figure B-7: Press F3 to Boot into Recovery Mode

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

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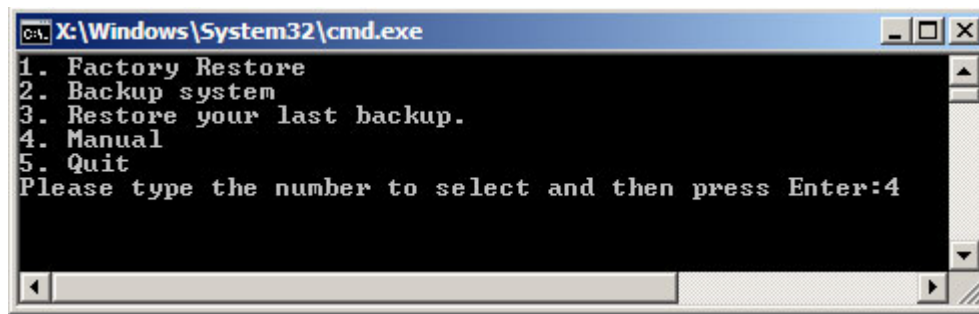


Figure B-8: Recovery Tool Menu

Step 3: The About Symantec Ghost window appears. Click **OK** button to continue.

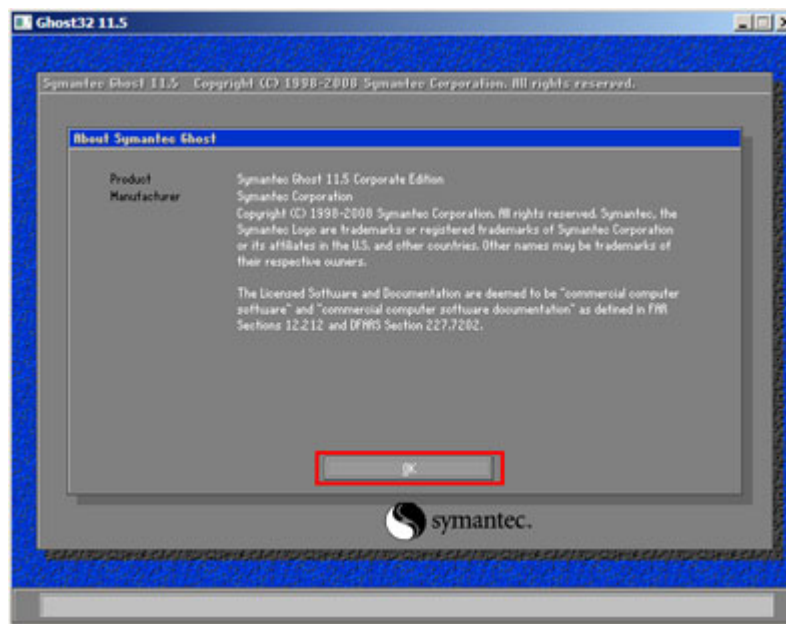


Figure B-9: About Symantec Ghost Window

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

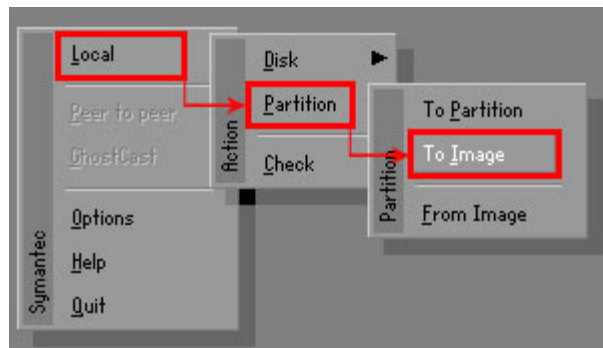


Figure B-10: Symantec Ghost Path

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

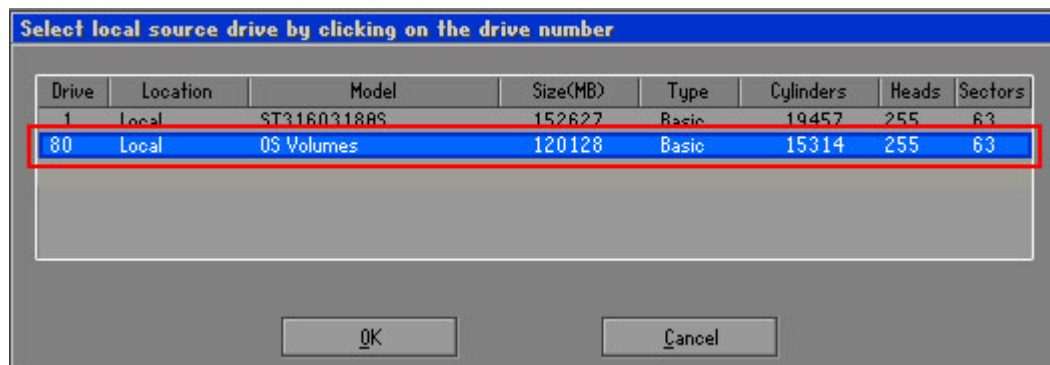


Figure B-11: Select a Local Source Drive

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

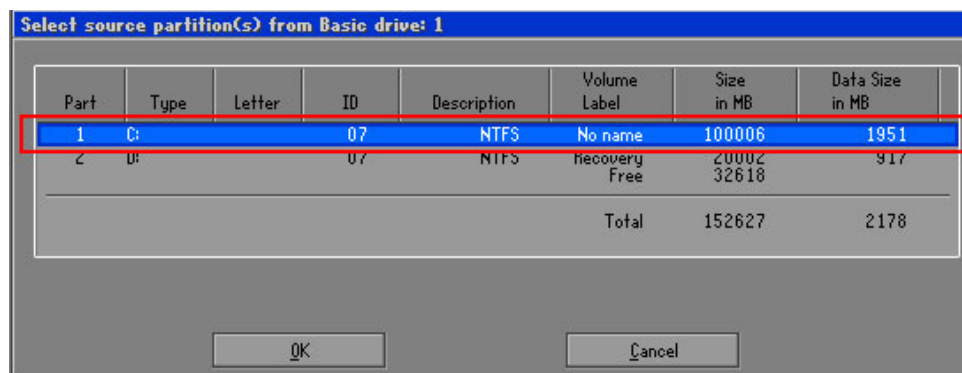


Figure B-12: Select a Source Partition from Basic Drive

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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**.

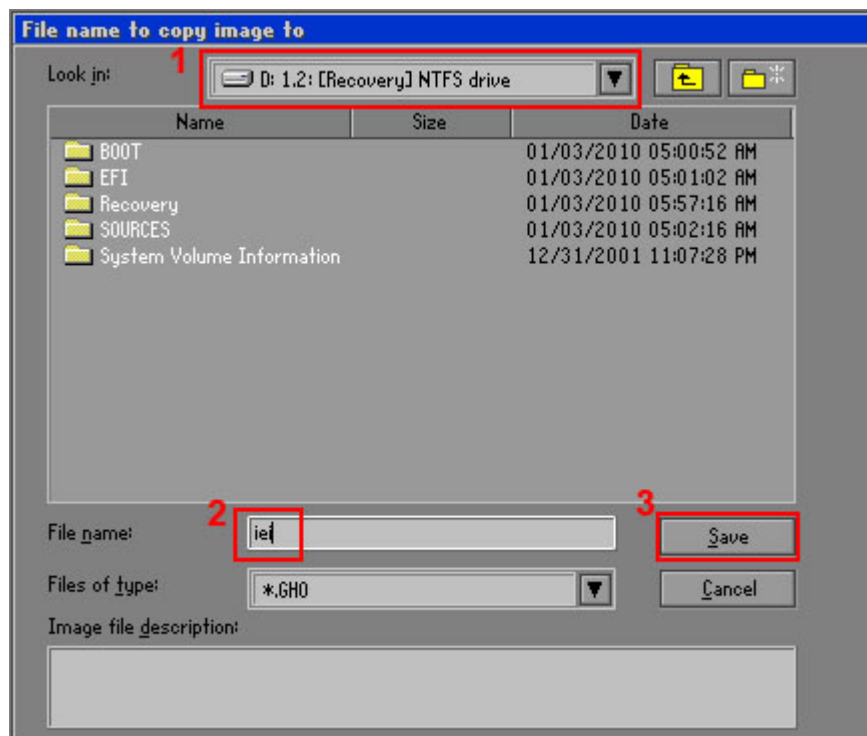


Figure B-13: File Name to Copy Image to

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

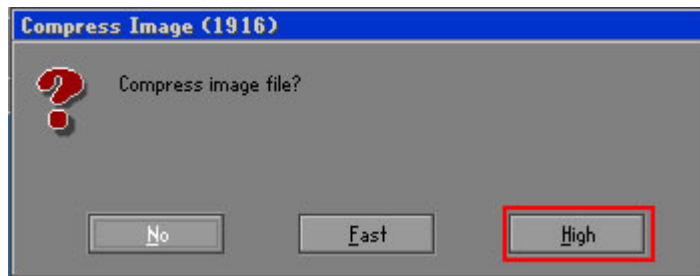


Figure B-14: Compress Image

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

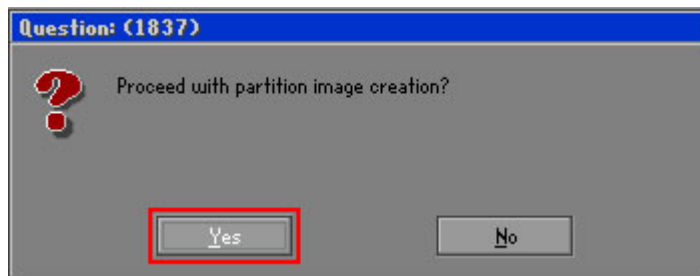


Figure B-15: Image Creation Confirmation

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

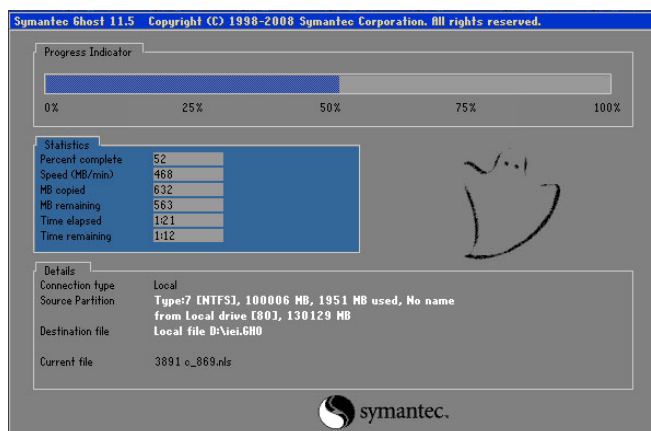


Figure B-16: Image Creation Complete

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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.

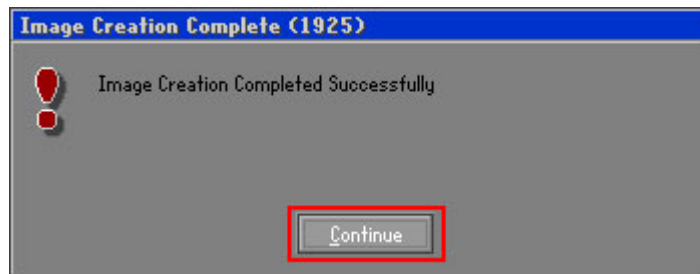


Figure B-17: Image Creation Complete

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

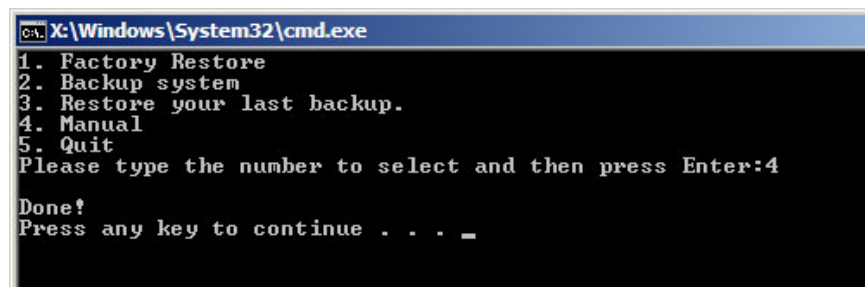


Figure B-18: Press Any Key to Continue

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.

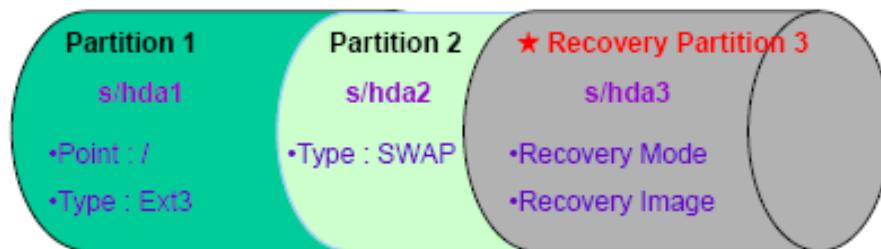


Figure B-19: Partitions for Linux

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.

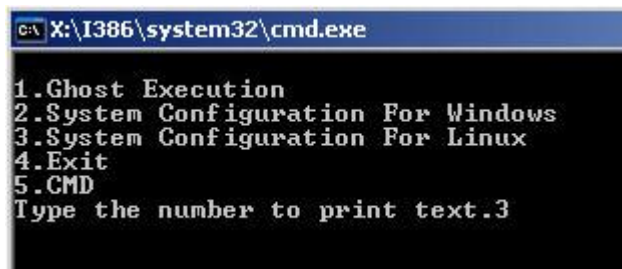


Figure B-20: System Configuration for Linux

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
```

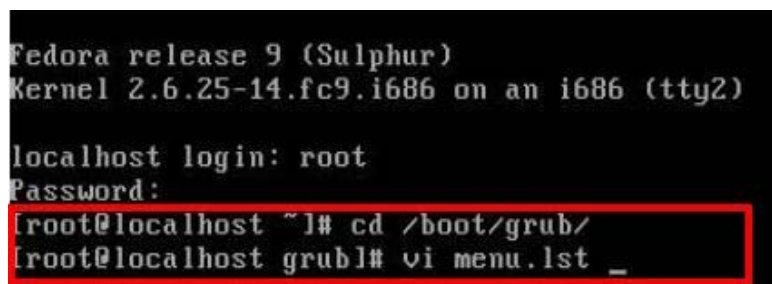


Figure B-21: Access menu.lst in Linux (Text Mode)

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

```
#boot=/dev/sda
default=0
timeout=10
splashimage=(hd0,0)/grub/splash.xpm.gz
hiddenmenu
title Fedora (2.6.25-14.fc9.i686)
    root (hd0,0)
    kernel /vmlinuz-2.6.25-14.fc9.i686 ro root=UUID=10f1acd
    ac38b5c78910 rhgb quiet
    initrd /initrd-2.6.25-14.fc9.i686.img

title Recovery Partition
    root (hd0,2)
    makeactive
    chainloader +1
```

- 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](#)

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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.

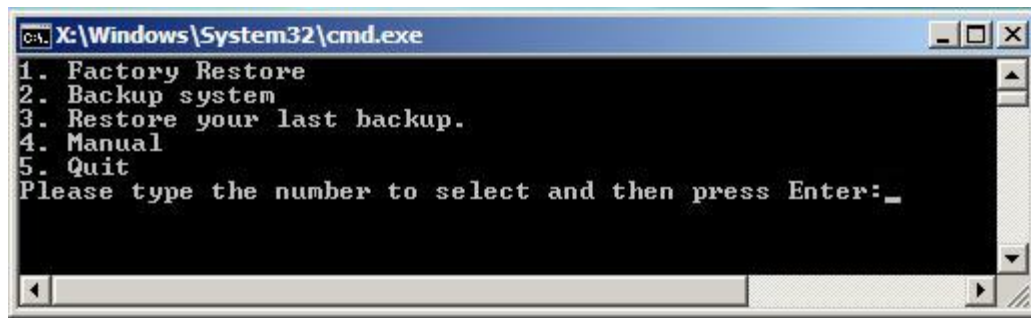


Figure B-23: Recovery Tool Main Menu

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

Step 10: 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.

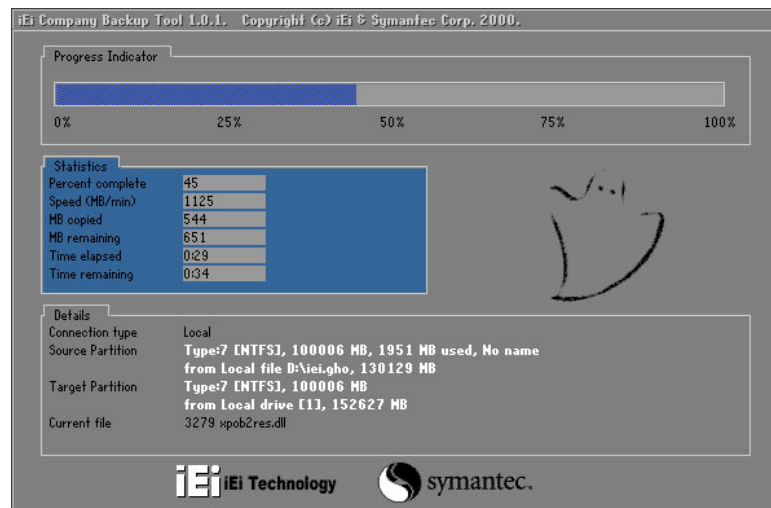


Figure B-24: Restore Factory Default

Step 11: The screen is shown as in **Figure B-25** when completed. Press any key to reboot the system.

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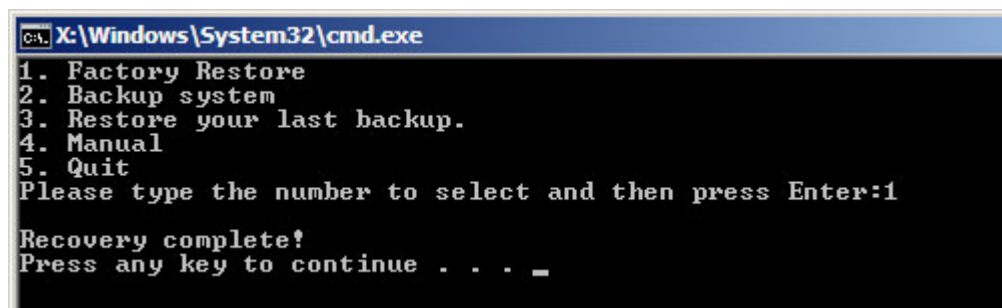


Figure B-25: Recovery Complete Window

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B.4.2 Backup System

To backup the system, please follow the steps below.

Step 12: Type <2> and press <Enter> in the main menu.

Step 13: 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.

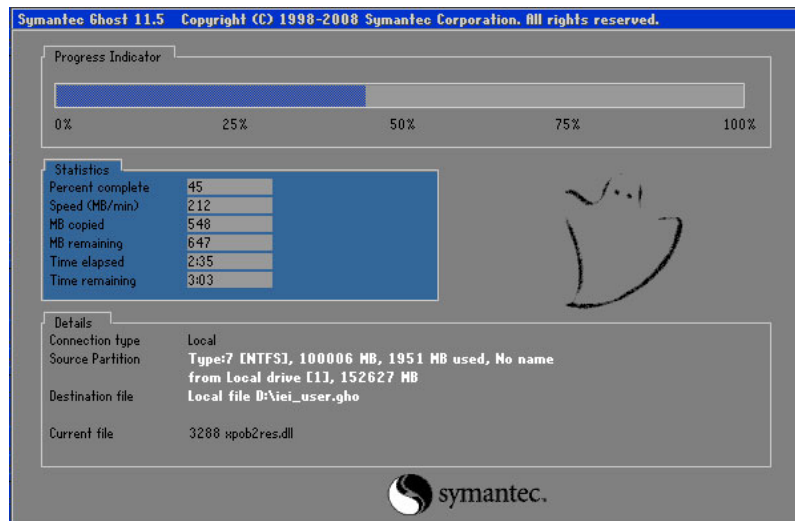


Figure B-26: Backup System

Step 14: The screen is shown as in **Figure B-27** when system backup is completed.

Press any key to reboot the system. 

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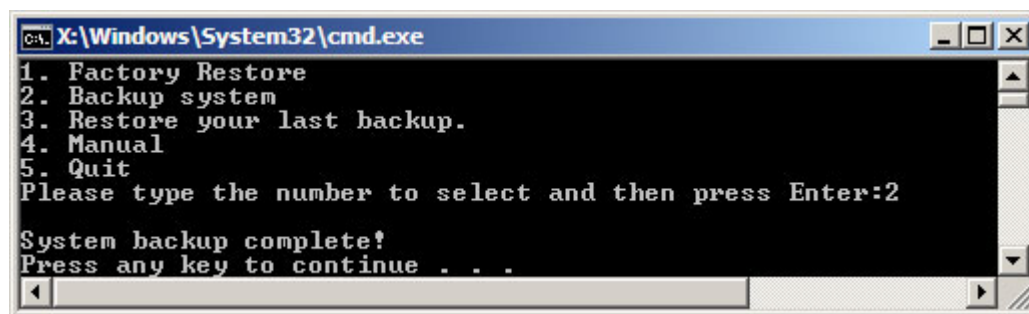


Figure B-27: System Backup Complete Window

B.4.3 Restore Your Last Backup

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

Step 15: Type <3> and press <Enter> in the main menu.

Step 16: The Symantec Ghost window appears and starts to restore the last backup image (iei_user.GHO).

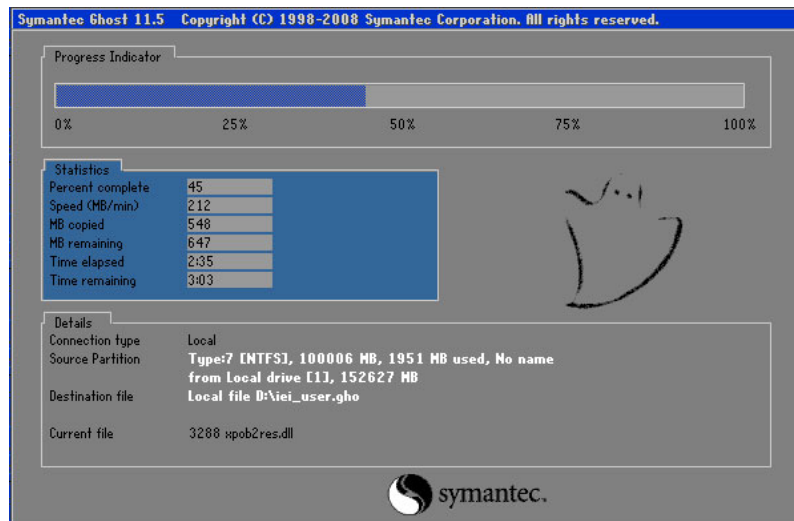


Figure B-28: Restore Backup

Step 17: The screen is shown as in **Figure B-29** when backup recovery is completed.

Press any key to reboot the system. 

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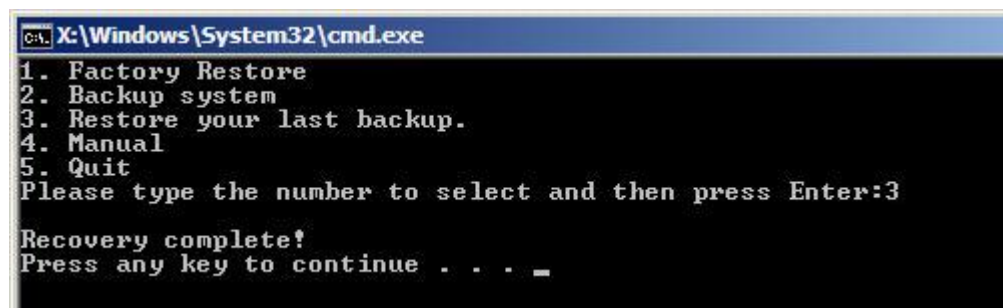


Figure B-29: Restore System Backup Complete Window

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B.4.4 Manual

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

Step 18: Type <4> and press <Enter> in the main menu.

Step 19: The Symantec Ghost window appears. Use the Ghost program to backup or recover the system manually.

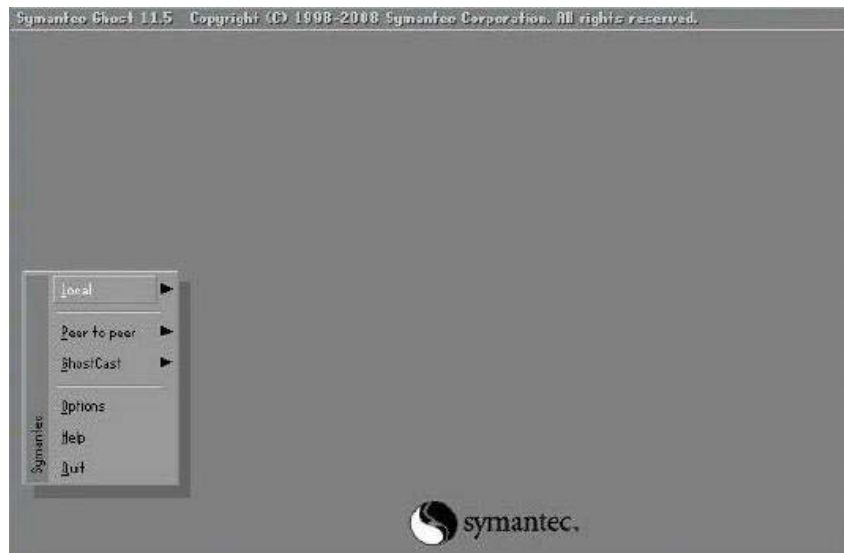


Figure B-30: Symantec Ghost Window

Step 20: When backup or recovery is completed, press any key to reboot the system.

Appendix

C

Terminology

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AC '97	Audio Codec 97 (AC'97) refers to a codec standard developed by Intel® in 1997.
ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
ATA	The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
ASKIR	Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude ("volume") of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
CompactFlash®	CompactFlash® is a solid-state storage device. CompactFlash® devices use flash memory in a standard size enclosure. Type II is thicker than Type I, but a Type II slot can support both types.
CMOS	Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.
COM	COM refers to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male DB-9 connector.
DAC	The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.
DDR	Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.

DMA	Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.
DIMM	Dual Inline Memory Modules are a type of RAM that offer a 64-bit data bus and have separate electrical contacts on each side of the module.
DIO	The digital inputs and digital outputs are general control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.
EHCI	The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.
EIDE	Enhanced IDE (EIDE) is a newer IDE interface standard that has data transfer rates between 4.0 MBps and 16.6 MBps.
EIST	Enhanced Intel® SpeedStep Technology (EIST) allows users to modify the power consumption levels and processor performance through application software. The application software changes the bus-to-core frequency ratio and the processor core voltage.
FSB	The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Northbridge chipset.
GbE	Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gbps and complies with the IEEE 802.3-2005 standard.
GPIO	General purpose input
HDD	Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.
ICH	The Input/Output Control Hub (ICH) is an Intel® Southbridge chipset.
IrDA	Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.
L1 Cache	The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.
L2 Cache	The Level 2 Cache (L2 Cache) is an external processor memory cache.

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LCD	Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.
LVDS	Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.
POST	The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.
RAM	Random Access Memory (RAM) is volatile memory that loses data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.
SATA	Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps.
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.
UART	Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.
UHCI	The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.
USB	The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates and USB 2.0 supports 480Mbps data transfer rates.
VGA	The Video Graphics Array (VGA) is a graphics display system developed by IBM.

Appendix

D

Digital I/O Interface

D.1 Introduction

The DIO connector on the NANO-945GSE3 is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.



NOTE:

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

D.2 DIO Connector Pinouts

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

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

Table D-1: Digital I/O Connector Pinouts

D.3 Assembly Language Samples

D.3.1 Enable the DIO Input Function

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

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

D.3.2 Enable the DIO Output Function

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

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

Appendix

E

Watchdog Timer


NOTE:

The following discussion applies to DOS. Contact IEI support or visit the IEI website for drivers for other operating systems.

The Watchdog Timer is a hardware-based timer that attempts to restart the system when it stops working. The system may stop working because of external EMI or software bugs. The Watchdog Timer ensures that standalone systems like ATMs will automatically attempt to restart in the case of system problems.

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 E-1: AH-6FH Sub-function

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

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

**NOTE:**

The Watchdog Timer is activated through software. The software application that activates the Watchdog Timer must also deactivate it when closed. If the Watchdog Timer is not deactivated, the system will automatically restart after the Timer has finished its countdown.

EXAMPLE PROGRAM:

; INITIAL TIMER PERIOD COUNTER

;

W_LOOP:

;

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

;

; ADD THE APPLICATION PROGRAM HERE

;

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

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

;

; EXIT ;

Appendix

F

Compatibility



NOTE:

The compatible items described here have been tested by the IEI R&D team and found to be compatible with the NANO-945GSE3

F.1 Compatible Operating Systems

The following operating systems have been successfully run on the NANO-945GSE3.

- MS-DOS 6.22
- Microsoft Windows XP (32-bit)
- Microsoft Windows XP Embedded

Appendix

G

Hazardous Materials Disclosure

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

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

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

Please refer to the table on the next page.

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

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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。