IEI Integration Corp.

MODEL:

NANO-HM650

EPIC SBC Supports Socket G2 Intel® 2nd generation Core™ **i7/i5/i3** and Celeron® CPU, VGA/HDMI, Dual PCIe GbE, Eight USB 2.0, Two SATA 6Gb/s, Three COM, PCI-104, HD Audio and RoHS

User Manual

Rev. 1.01 - 31 July, 2013

RoHS Lead Free

Revision

Date	Version	Changes
31 July, 2013	1.01	Update Section 3.2.2: Backlight Inverter Connector
3 February, 2012	1.00	Initial release

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Introduction

1.1 Introduction

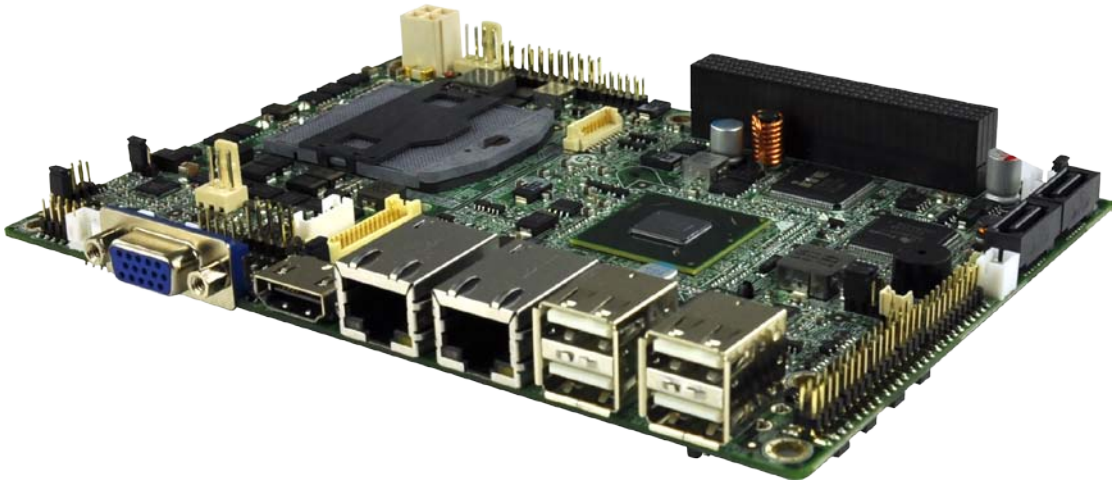


Figure 1-1: NANO-HM650

The NANO-HM650 EPIC SBC motherboard is a Socket G2 32nm Intel® Core™ i7/i5/i3 and Celeron® mobile processor platform. Up to one 8.0 GB 1066 MHz or 1333 MHz DDR3 SDRAM SO-DIMM is supported by the NANO-HM650.

The integrated Intel® HM65 System Chipset supports two GbE LAN ports through the dual Realtek RTL8111E Ethernet controllers (with ASF 2.0 support). The NANO-HM650 also supports two SATA 6Gb/s drives and provides 5 V SATA power.

The NANO-HM650 supports dual display via VGA, HDMI and an internal LVDS connector. Expansion and I/O include one PCIe mini card slot, one PCI-104 slot, four USB 2.0 connectors by pin header, four USB 2.0 connectors on the rear panel and one internal keyboard/mouse connector. High Definition Audio (HDA) support ensures HDA devices can be easily implemented on the NANO-HM650. Serial device connectivity is provided by two internal RS-232 connectors and one internal RS-422/485 connector.

1.2 Connectors

The connectors on the NANO-HM650 are shown in the figure below.

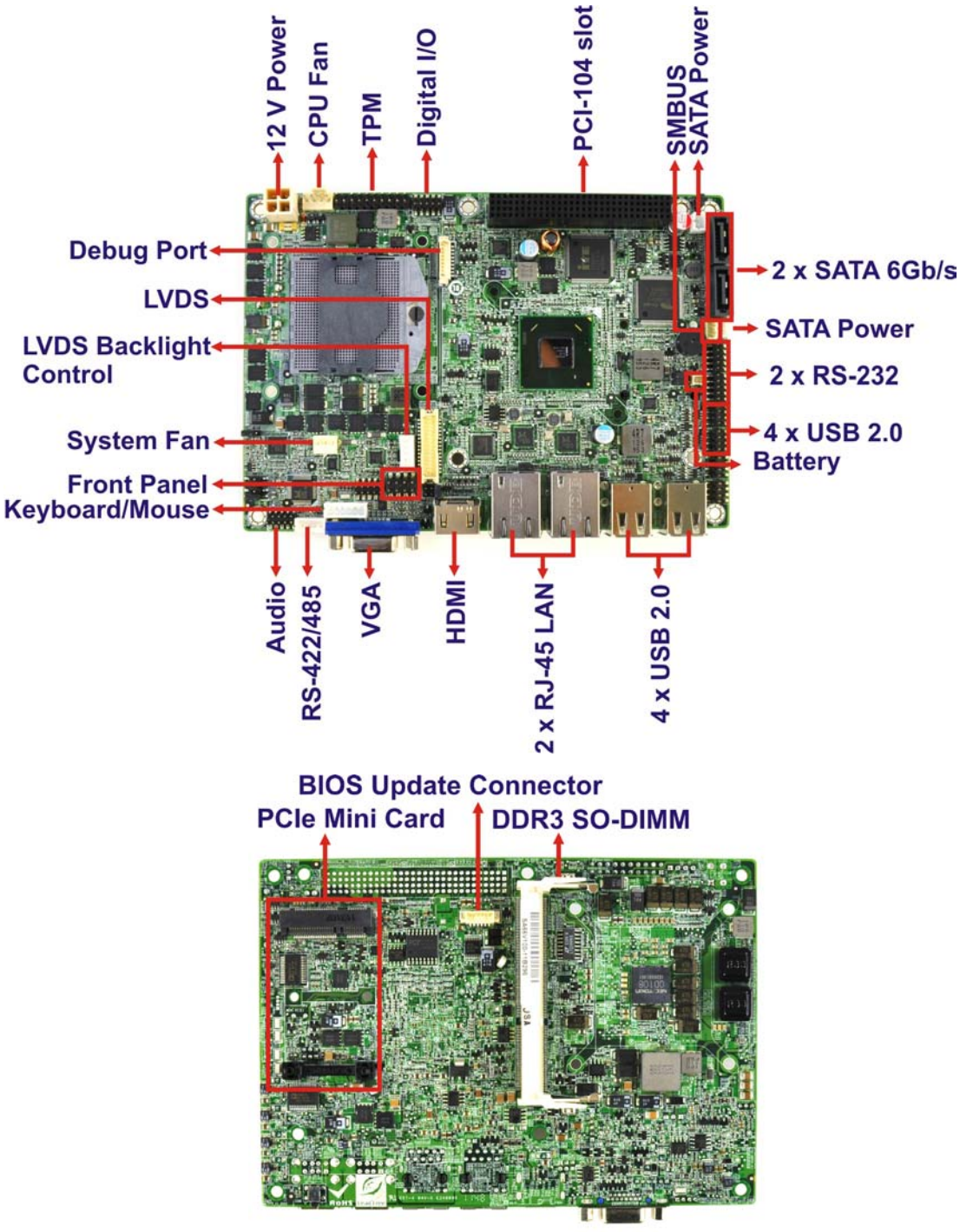


Figure 1-2: Connectors

1.3 Dimensions

The dimensions of the board are listed below:

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

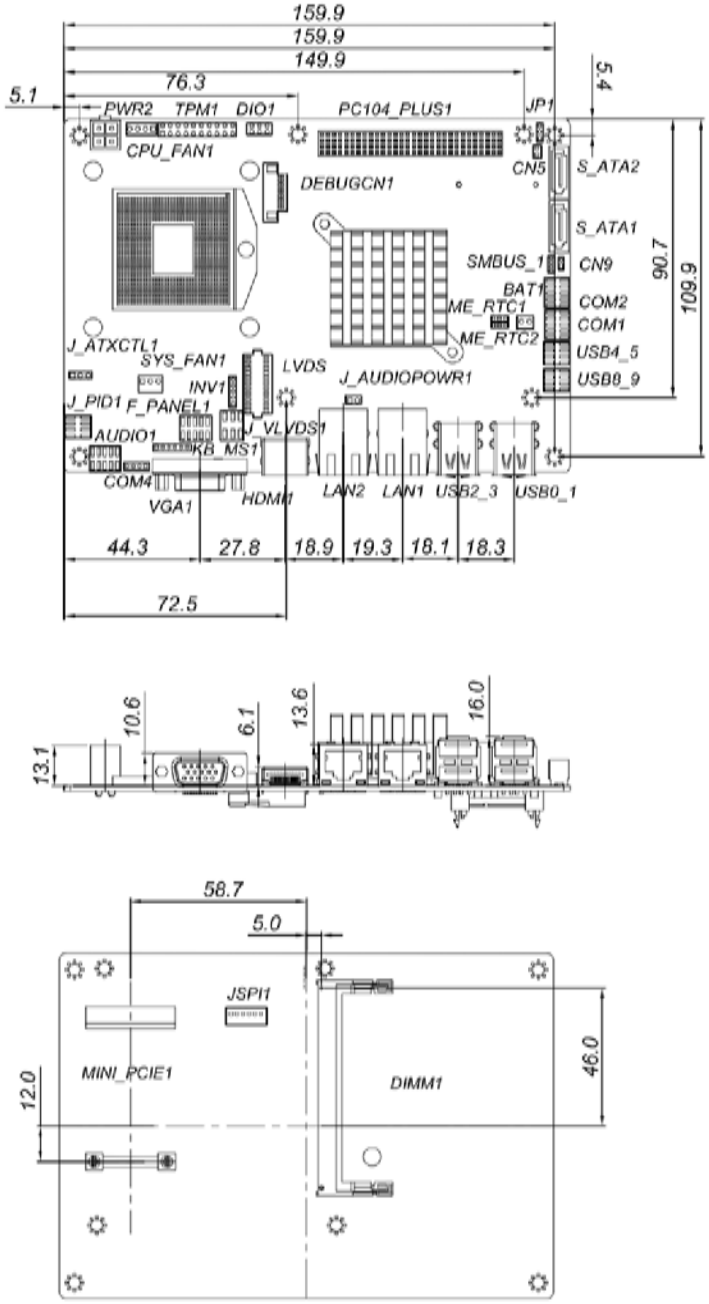


Figure 1-3: NANO-HM650 Dimensions (mm)

1.4 Data Flow

Figure 1-4 shows the data flow between the system chipset, the CPU and other components installed on the motherboard.

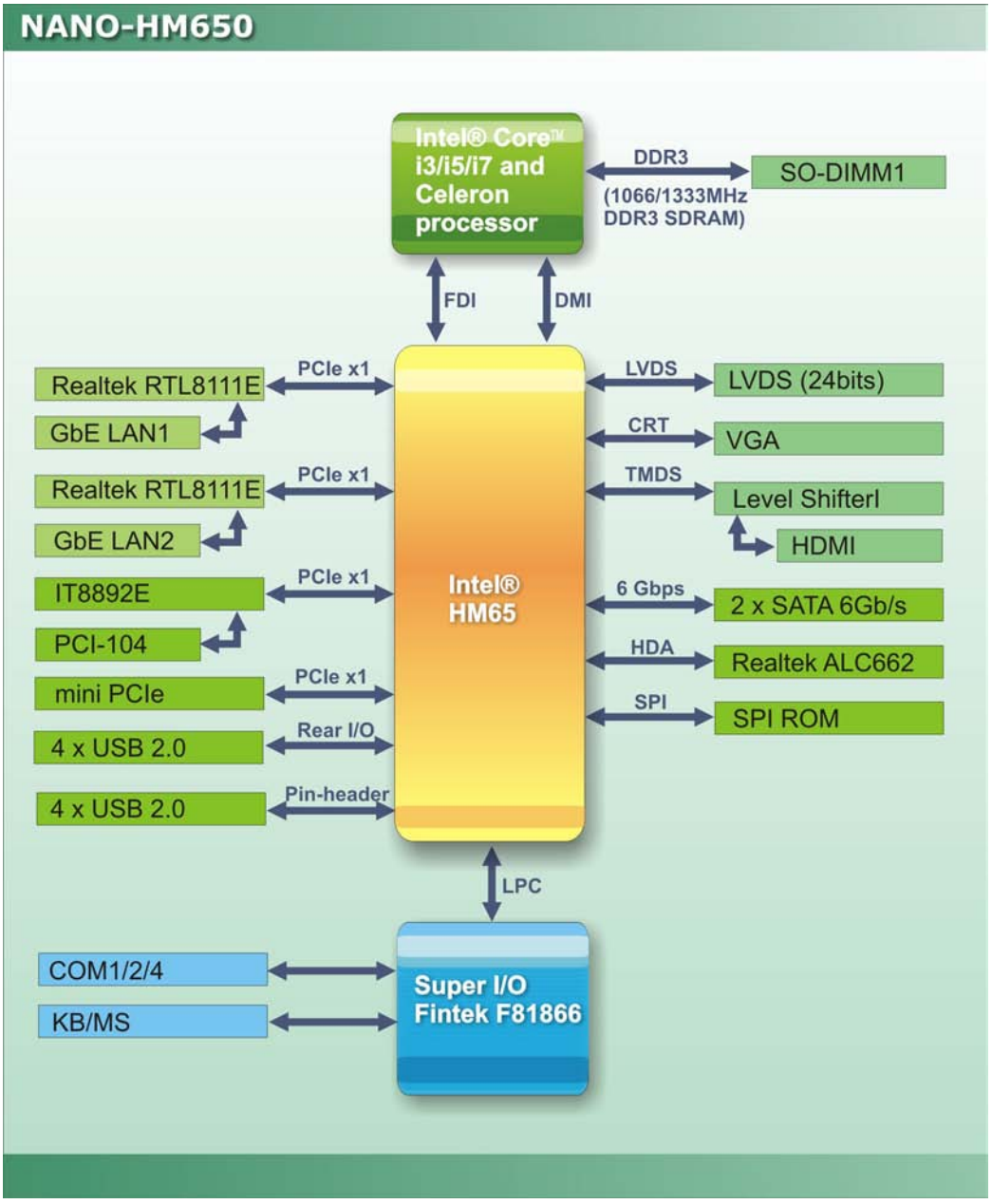


Figure 1-4: Data Flow Block Diagram

1.5 Technical Specifications

NANO-HM650 technical specifications are listed in table below.

Specification	NANO-HM650
Form Factor	EPIC SBC
Socket	Socket G2
CPU Supported	Intel® Core™ i7/i5/i3 and Celeron® mobile processor
System Chipset	Intel® HM65
Memory	One 204-pin 1066/1333 DDR3 SO-DIMM supported (system max. 8GB)
Audio	Realtek ALC662 HD codec
LAN	Dual PCIe LAN controller by Realtek RTL8111E with ASF 2.0 support
Super I/O	Fintek F81866
BIOS	UEFI BIOS
Programmable GPIO	8-bit digital I/O
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansion	
PCIe	One mini PCIe card slot
PCI-104	One PCI-104 slot
I/O Interface Connectors	
Audio Connector	One internal audio connector via 10-pin header
Display Ports	Analog CRT by VGA connector (2048x1536) 18/24 bits Dual channel LVDS (1600x1200) HDMI supports resolution up to 1080p
Ethernet	Two RJ-45 GbE ports
Serial Ports	Two RS-232 via 10-pin header One RS-422/485 via 4-pin wafer

Specification	NANO-HM650
USB Ports	Four external USB ports Four internal USB ports via two 8-pin header
Fan	One 4-pin CPU fan connector One 3-pin system fan connector
Keyboard/Mouse	One internal keyboard/mouse connector via 6-pin header
Storage	
Serial ATA	Two SATA 6Gb/s connectors Two 5V SATA power connectors
Environmental and Power Specifications	
Power Supply	12 V only ATX and AT power supported
Power Connector	One internal 4-pin Molex power connector for power supply
Power Consumption	12V@4.85A (2.60 GHz Intel® Core™ i5-2540M CPU with one 1333 MHz 4 GB DDR3 SO-DIMM)
Operating Temperature	-10ºC ~ 60ºC
Humidity	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	165 mm x 115 mm
Weight GW/NW	850 g / 350 g

Table 1-1: Technical Specifications

Chapter

2

Unpacking

2.1 Anti-static Precautions

WARNING!

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

Make sure to adhere to the following guidelines:

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

2.2 Unpacking Precautions

When the NANO-HM650 is unpacked, please do the following:

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

2.3 Packing List

NOTE:

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-HM650 was purchased from or contact an IEI sales representative directly by sending an email to sales@iei.com.tw.

The NANO-HM650 is shipped with the following components:

Quantity	Item and Part Number	Image
1	NANO-HM650 motherboard	
2	SATA with power cable kit (**P/N:** 32801-000201-100-RS)	
1	Power cable (**P/N**: 32100-087100-RS)	
2	RS-232 cable (**P/N**: 32205-002700-100-RS)	
1	Audio cable (**P/N:** 32000-072100-RS)	
1	Mini jumper pack (2.0mm)	
1	Utility CD	

1	One Key Recovery CD	
1	Quick Installation Guide	

2.4 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
Dual-port USB cable (**P/N**: 32001-008600-100-RS)	
RS-422/485 cable (**P/N**: 32205-003800-100-RS)	
Keyboard/Mouse cable (**P/N**: 32000-023800-RS)	
CPU Cooler for mobile socket-G up to 55 W processor, Copper, 60x60x27.6mm (**P/N**: CF-989A-RS-R12)	

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the jumpers and connectors.

3.1.1 NANO-HM650 Layout

The figures below show all the connectors and jumpers.

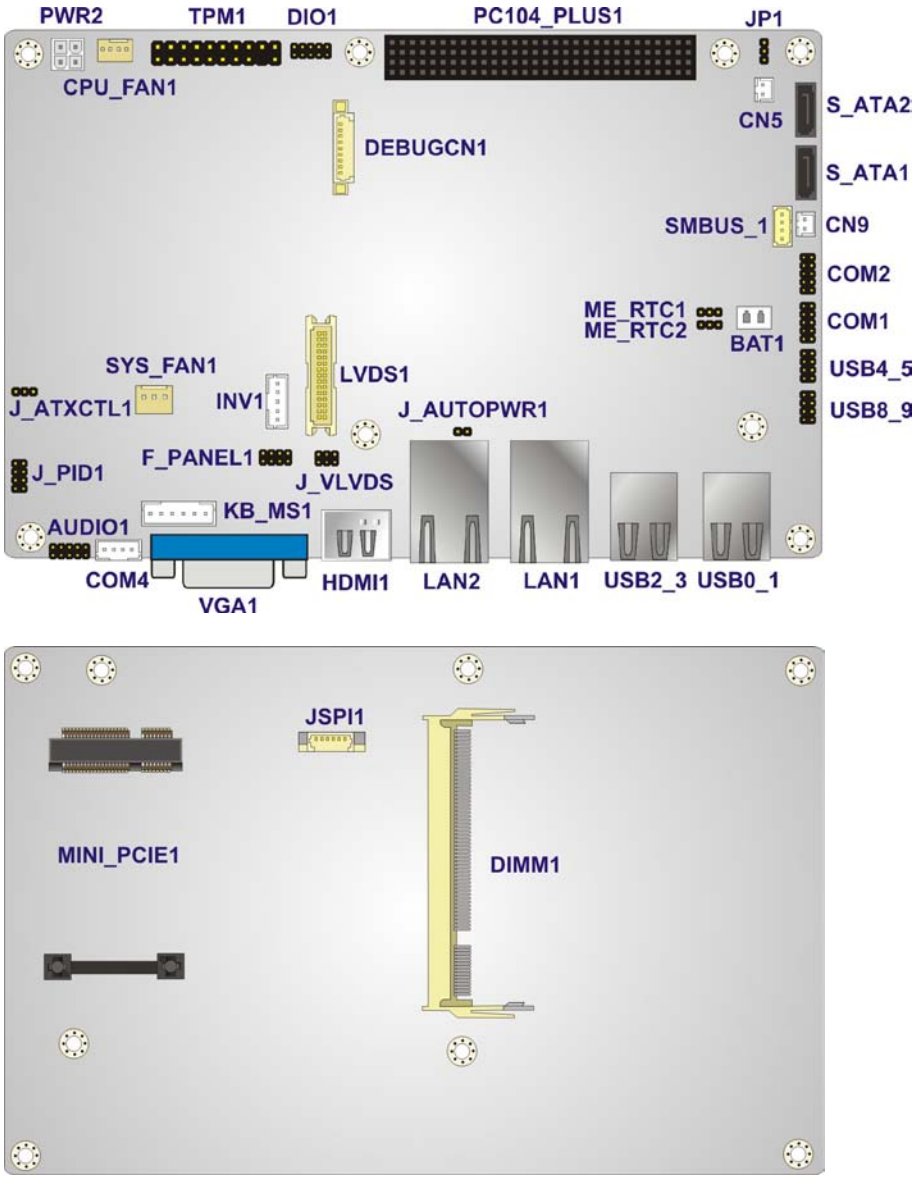


Figure 3-1: Connector and Jumper Locations

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
Audio connector	10-pin header	AUDIO1
Backlight inverter connector	5-pin wafer	INV1
Battery connector	2-pin wafer	BAT1
BIOS update connector	6-pin wafer	JSPI1
DDR3 SO-DIMM socket	204-pin socket	DIMM1
Debug port connector	9-pin	DEBUGCN1
Digital I/O connector	10-pin header	DIO1
Fan connector (CPU)	4-pin wafer	CPU_FAN1
Fan connector (system)	3-pin wafer	SYS_FAN1
Front panel connector	8-pin header	F_PANEL1
Keyboard and mouse connector	6-pin wafer	KB_MS1
LVDS LCD connector	30-pin crimp	LVDS1
PCI-104 slot	PCI-104 slot	PC104_PLUS1
PCIe mini card slot	PCIe mini card slot	MINI_PCIE1
Power connector	4-pin Molex	PWR2
RS-232 serial port connectors	10-pin header	COM1, COM2
RS-422/485 serial port connector	4-pin wafer	COM4
SATA 6Gb/s drive connectors	7-pin SATA	S_ATA1, S_ATA2
SATA power connectors	2-pin wafer	CN5, CN9
SMBus connector	4-pin wafer	SMBUS_1

TPM connector	20-pin connector	TPM1
USB connector	8-pin header	USB4_5,USB8_9

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

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

Connector	Type	Label
Ethernet connectors	RJ-45	LAN1，LAN2
HDMI connector	HDMI port	HDMI1
USB connectors	USB port	USB0_1，USB2_3
VGA connector	15-pin Female	VGA1

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the NANO-HM650.

3.2.1 Audio Connector

CN Label: **AUDIO1**

CN Type: 10-pin header

CN Location: See **Figure 3-2**

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

The audio connector is connected to external audio devices including speakers and microphones for the input and output of audio signals to and from the system.

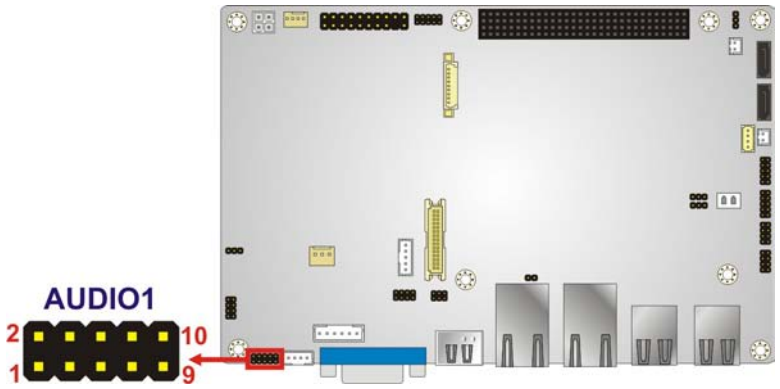


Figure 3-2: Audio Connector Location

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

Table 3-3: Audio Connector Pinouts

3.2.2 Backlight Inverter Connector

CN Label: INV1

CN Type: 5-pin wafer

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

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

The backlight inverter connector provides power to an LCD panel.

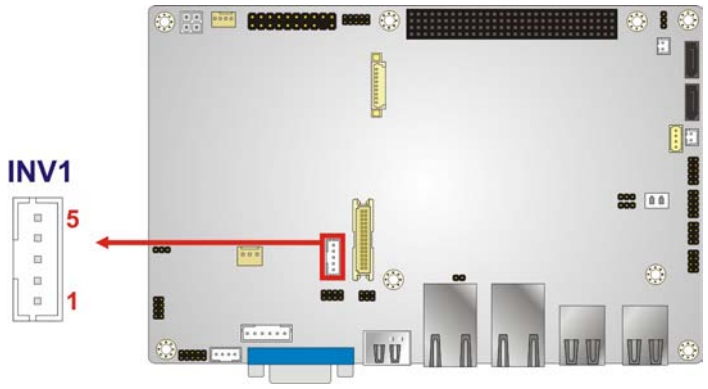


Figure 3-3: Backlight Inverter Connector Location

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

Table 3-4: Backlight Inverter Connector Pinouts

3.2.3 Battery Connector

CN Label: BAT1

CN Type: 2-pin wafer

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

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

The battery connector is connected to the system battery. The battery provides power to the system clock to retain the time when power is turned off.

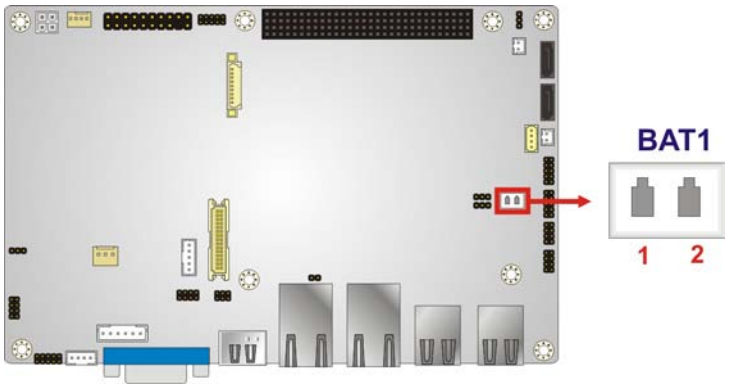


Figure 3-4: Battery Connector Location

Pin	Description
1	Battery+
2	Ground

Table 3-5: Battery Connector Pinouts

3.2.4 BIOS Update Connector

CN Label: JSPI1

CN Type: 6-pin wafer

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

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

The BIOS update connector is for BIOS updating only and is located on the solder side (back).

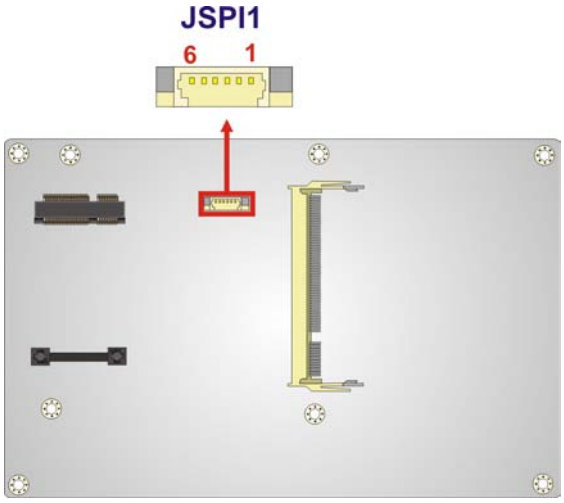


Figure 3-5: BIOS Update Connector Location

Pin	Description	Pin	Description
1	+SPI_VCC	2	SPI_CS#0_CN
3	SPI_SO0_CN	4	SPI_CLK0_CN
5	SPI_SI0_CN	6	GND

Table 3-6: BIOS Update Connector Pinouts

3.2.5 DDR3 SO-DIMM Socket

CN Label: DIMM1

CN Type: DDR3 SO-DIMM socket

CN Location: See **Figure 3-6**

The DDR3 SO-DIMM socket is for DDR3 SO-DIMM memory module.

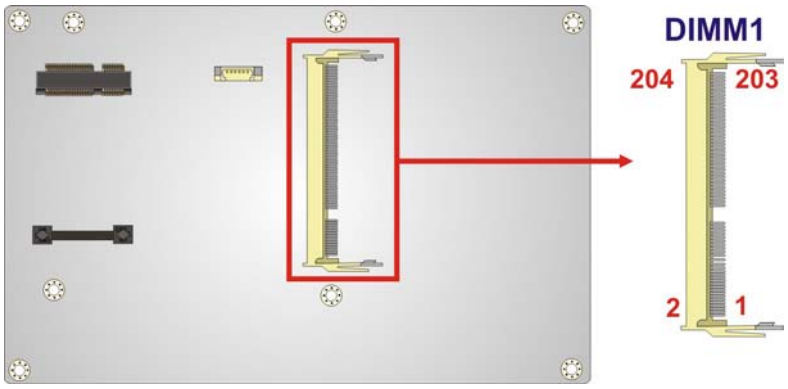


Figure 3-6: DDR3 SO-DIMM Socket Location

3.2.6 Debug Port Connector

CN Label:	DEBUGCN1
CN Type:	9-pin wafer
CN Location:	See **Figure 3-7**
CN Pinouts:	See **Table 3-7**

The debug port connector is for system debug.

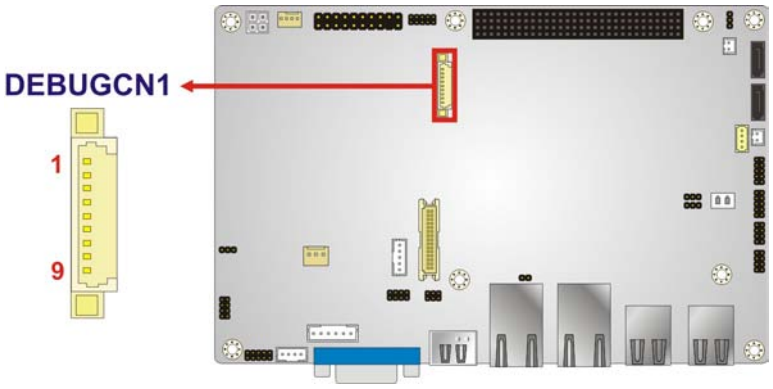


Figure 3-7: Debug Port Connector Location

Pin	Description
1	PLT_RST#
2	LPC_DEBUG_CLK
3	GND

Pin	Description
4	LPC_AD3
5	LPC_AD2
6	LPC_AD1
7	LPC_AD0
8	LPC_FRAME#
9	+3.3V

Table 3-7: Debug Port Connector Pinouts

3.2.7 Digital I/O Connector

CN Label: DIO1

CN Type: 10-pin header

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

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

The digital I/O connector provides programmable input and output for external devices. The digital I/O provides 4-bit output and 4-bit input.

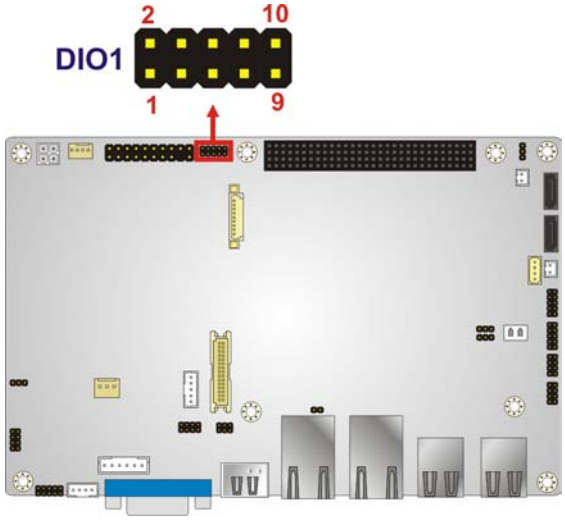


Figure 3-8: Digital I/O Connector Location

Pin	Description	Pin	Description
1	GND	2	+5V

Pin	Description	Pin	Description
3	DGPO3	4	DGPO2
5	DGPO1	6	DGPO0
7	DGPI3	8	DGPI2
9	DGPI1	10	DGPI0

Table 3-8: Digital I/O Connector Pinouts

3.2.8 Fan Connector (CPU)

CN Label: CPU_FAN1

CN Type: 4-pin wafer

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

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

The fan connector attaches to a CPU cooling fan.

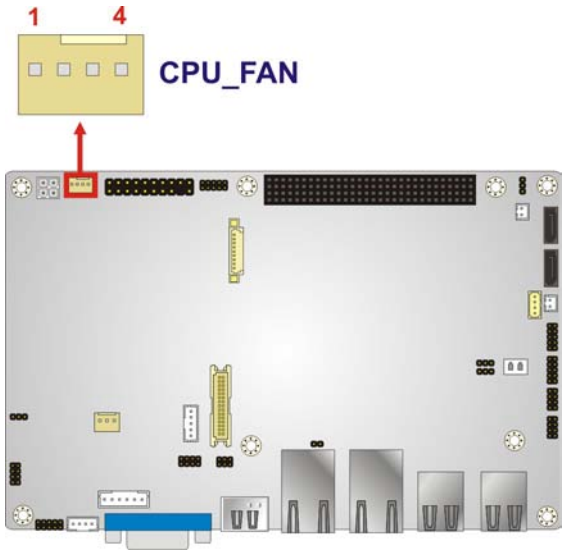


Figure 3-9: CPU Fan Connector Location

Pin	Description
1	GND
2	+12V
3	FANIO1

Pin	Description
4	FANOUT1

Table 3-9: CPU Fan Connector Pinouts

3.2.9 Fan Connector (System)

CN Label: **SYS_FAN1**

CN Type: 3-pin wafer

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

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

The fan connector attaches to a cooling fan.

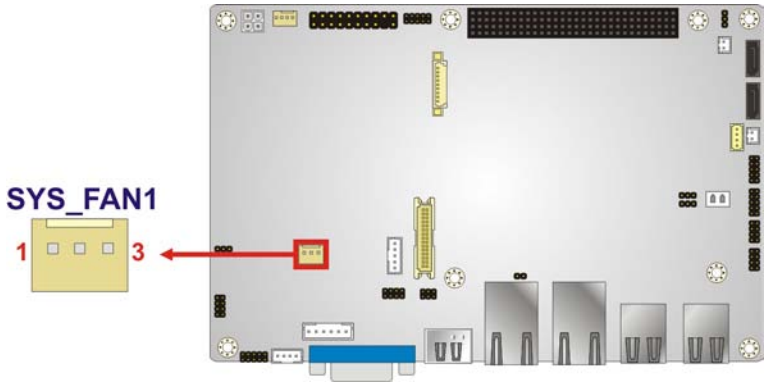


Figure 3-10: System Fan Connector Location

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

Table 3-10: System Fan Connector Pinouts

3.2.10 Front Panel Connector

CN Label: **F_PANEL1**

CN Type: 8-pin header

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

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

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

- Power button
- Reset
- Power LED
- HDD LED

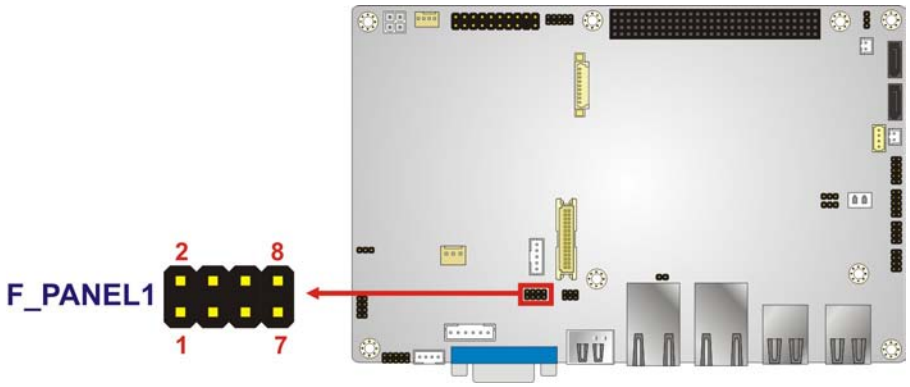


Figure 3-11: Front Panel Connector Location

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power Button	1	PWRBTN_SW#	Power LED	2	+V5S
	3	GND		4	GND
SATA LED	5	+V5S	Reset	6	EXTRST-
	7	SATA_LED#		8	GND

Table 3-11: Front Panel Connector Pinouts

3.2.11 Keyboard/Mouse Connector

CN Label: KB_MS1

CN Type: 6-pin wafer

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

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

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

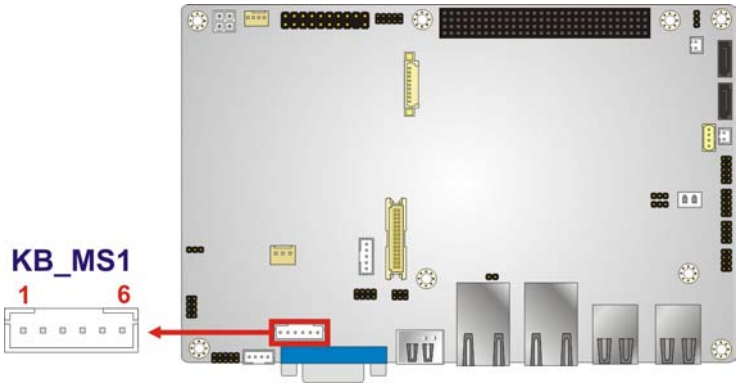


Figure 3-12: Keyboard/Mouse Connector Location

Pin	Description
1	VCC5_KBMS
2	MSDATA
3	MSCLK
4	KBDATA
5	KBCLK
6	GND

Table 3-12: Keyboard/Mouse Connector Pinouts

3.2.12 LVDS LCD Connector

CN Label: LVDS1

CN Type: 30-pin crimp

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

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

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

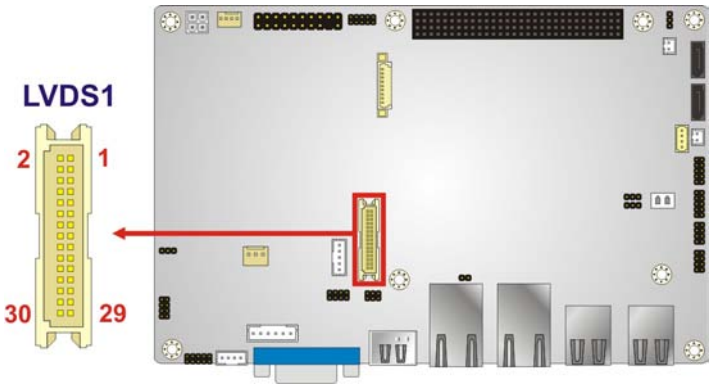


Figure 3-13: LVDS Connector Location

Pin	Description	Pin	Description
1	GND	2	GND
3	LVDSA_DATA0	4	LVDSA_DATA0#
5	LVDSA_DATA1	6	LVDSA_DATA1#
7	LVDSA_DATA2	8	LVDSA_DATA2#
9	LVDSA_CLK	10	LVDSA_CLK#
11	LVDSA_DATA3	12	LVDSA_DATA3#
13	GND	14	GND
15	LVDSB_DATA0	16	LVDSB_DATA0#
17	LVDSB_DATA1	18	LVDSB_DATA1#
19	LVDSB_DATA2	20	LVDSB_DATA2#
21	LVDSB_CLK	22	LVDSB_CLK#
23	LVDSB_DATA3	24	LVDSB_DATA3#
25	GND	26	GND
27	VCC_LCD	28	VCC_LCD
29	VCC_LCD	30	VCC_LCD

Table 3-13: LVDS Connector Pinouts

3.2.13 PCI-104 Slot

CN Label: PCI104_PLUS1

CN Type: PCI-104 slot

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

The PCI-104 connector is for installing a PCI-104 expansion card.

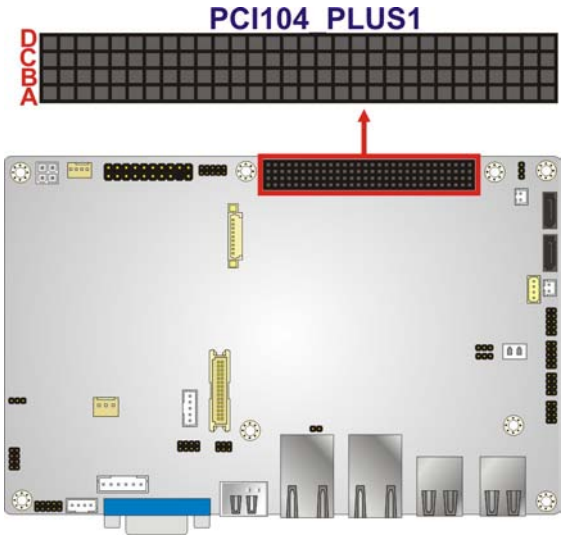


Figure 3-14: PCI-104 Connector Location

3.2.14 PCIe Mini Card Slot

CN Label:	MINI_PCIE1
CN Type:	PCIe Mini card slot
CN Location:	See **Figure 3-15**

The PCIe Mini card slot is for installing PCIe Mini expansion cards.

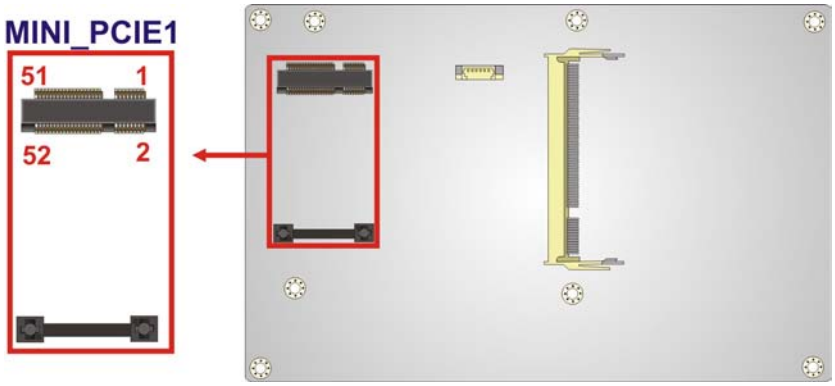


Figure 3-15: PCIe Mini Card Slot Location

3.2.15 Power Connector

CN Label: **PWR2**

CN Type: 4-pin Molex

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

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

The power connector supports the 12V power supply.

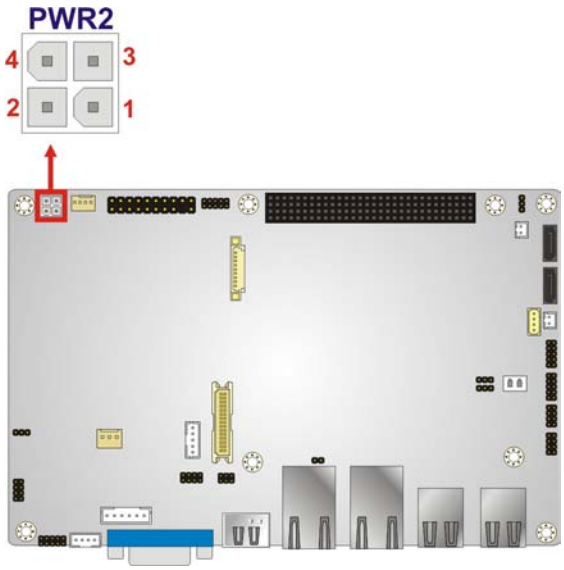


Figure 3-16: Power Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	+V12A_VIN	4	+V12A_VIN

Table 3-14: Power Connector Pinouts

3.2.16 SATA 6Gb/s Drive Connectors

CN Label: **S_ATA1**, **S_ATA2**

CN Type: 7-pin SATA drive connectors

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

The SATA drive connectors can be connected to SATA drives and support up to 6Gb/s data transfer rate.

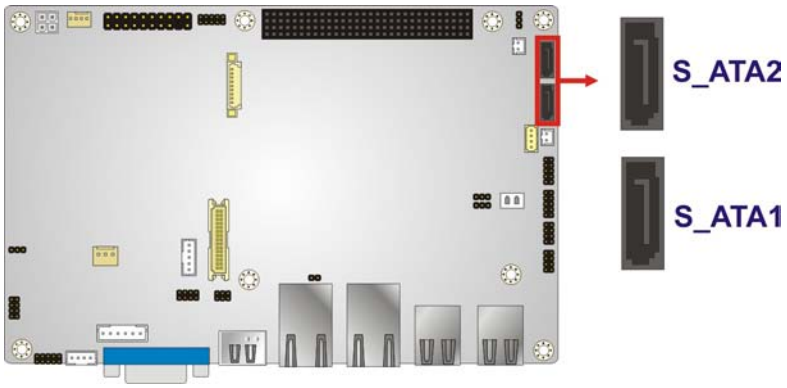


Figure 3-17: SATA Drive Connector Locations

3.2.17 SATA Power Connectors

CN Label:	**CN5**, **CN9**
CN Type:	2-pin wafer
CN Location:	See **Figure 3-18**
CN Pinouts:	See **Table 3-15**

The SATA power connectors provide +5V power output to the SATA connectors.

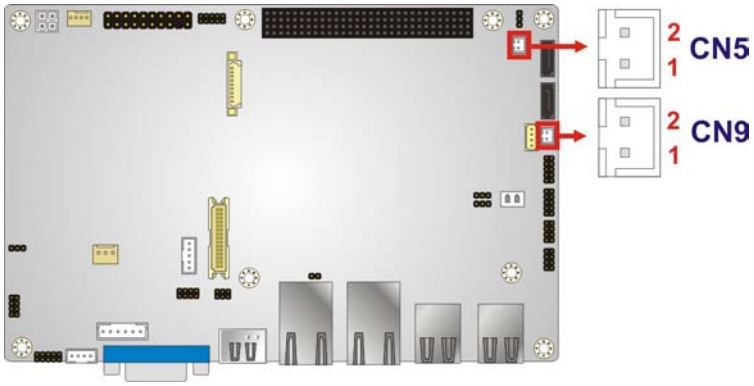


Figure 3-18: SATA Power Connector Locations

PIN NO.	DESCRIPTION
1	+5V
2	GND

Table 3-15: SATA Power Connector Pinouts

3.2.18 Serial Port Connectors (RS-232)

CN Label:	**COM1, COM2**
CN Type:	10-pin header
CN Location:	See **Figure 3-19**
CN Pinouts:	See **Table 3-16**

These connectors provide RS-232 communications.

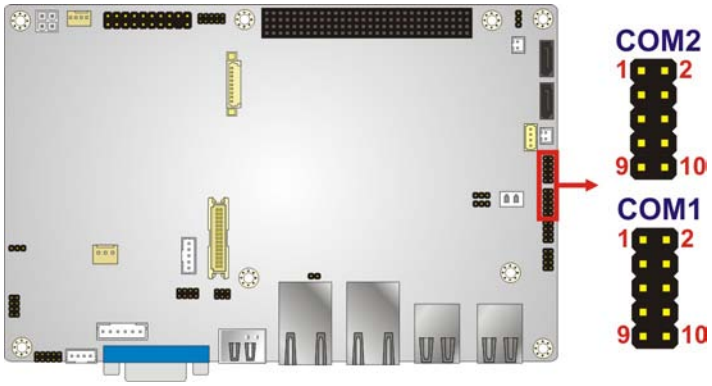


Figure 3-19: COM Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	NDCD1/2	2	NRXD1/2
3	NTXD1/2	4	NDTR1/2
5	GND	6	NDSR1/2
7	NRTS1/2	8	NCTS1/2
9	NRI1/2	10	GND

Table 3-16: COM Connector Pinouts

3.2.19 Serial Port Connector (RS-422/485)

CN Label:	COM4
CN Type:	4-pin wafer
CN Location:	See **Figure 3-20**
CN Pinouts:	See **Table 3-17**

This connector provides RS-422 or RS-485 communications.

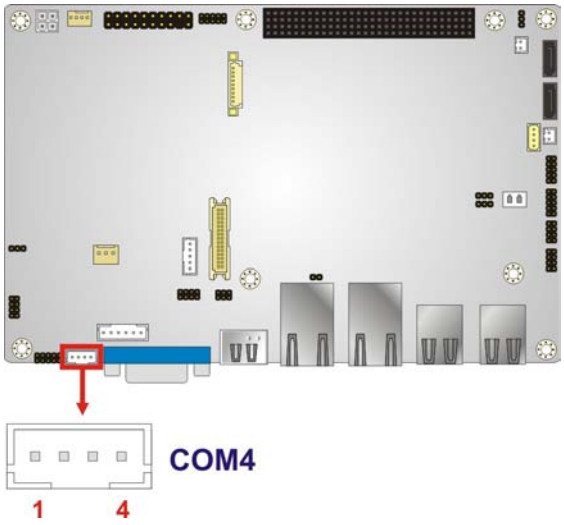


Figure 3-20: Serial Port Connector Location

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

Table 3-17: Serial Port Connector Pinouts

3.2.20 SMBus Connector

CN Label: **SMBUS_1**

CN Type: 4-pin wafer

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

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

The SMBus (System Management Bus) connector provides low-speed system management communications.

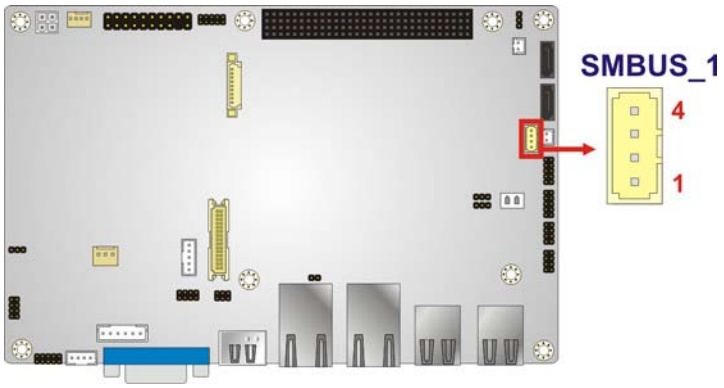


Figure 3-21: SMBus Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V_DUAL	2	SMBCLK_RESUME
3	SMBDATA_RESUME	4	GND

Table 3-18: SMBus Connector Pinouts

3.2.21 TPM Connector

CN Label: TPM1

CN Type: 20-pin header

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

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

The TPM connector connects to a Trusted Platform Module (TPM) module.

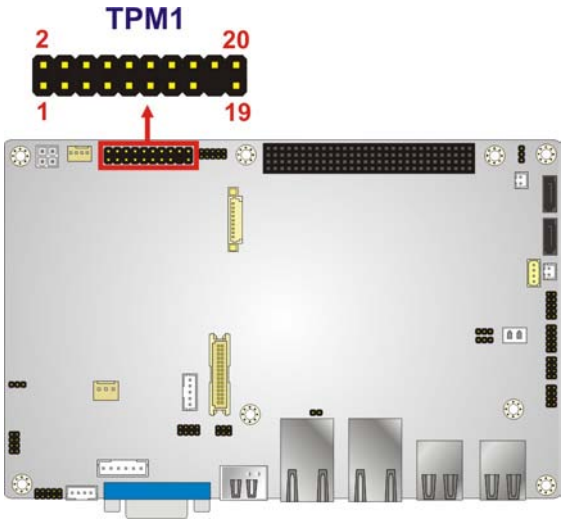


Figure 3-22: TPM Connector Pinout Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	TPMPCLK	2	GND
3	LPC_FRAME#	4	NC
5	BUF_PCIRST#	6	+5V
7	LPC_AD3	8	LPC_AD2
9	+3.3V	10	LPC_AD1
11	LPC_AD0	12	GND
13	SMBCLK	14	SMBDATA
15	+3V_DUAL	16	SERIRQ
17	GND	18	+3.3V
19	LPCPD_N	20	LDRQ0#

Table 3-19: TPM Connector Pinouts

3.2.22 USB Connectors

CN Label: **USB4_5, USB8_9**

CN Type: 8-pin header

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

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

The USB connectors connect to USB devices. Each pin header provides two USB ports.

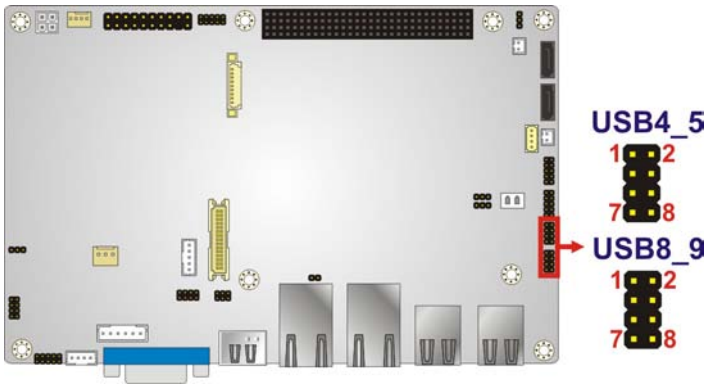


Figure 3-23: USB Connector Pinout Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	GND
3	USB20_C_N4/8	4	USB20_C_P5/9
5	USB20_C_P4/8	6	USB20_C_N5/9
7	GND	8	+5V

Table 3-20: USB Port Connector Pinouts

3.3 External Peripheral Interface Connector Panel

Figure 3-24 shows the NANO-HM650 external peripheral interface connector (EPIC) panel. The NANO-HM650 EPIC panel consists of the following:

- 2 x Ethernet connectors
- 1 x HDMI connector
- 4 x USB connectors
- 1 x VGA connector

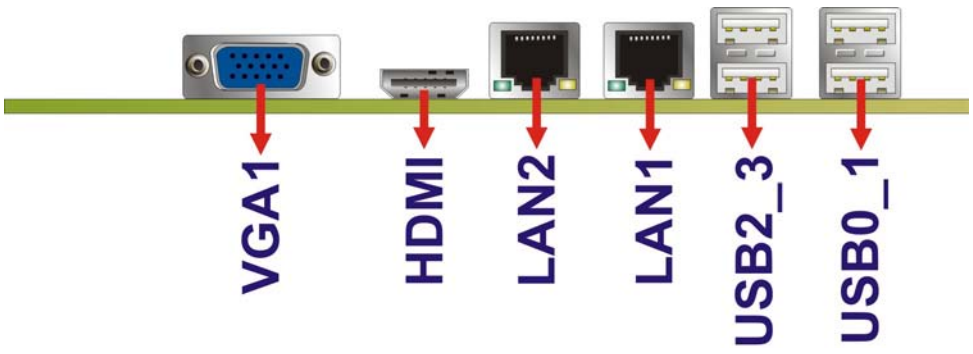


Figure 3-24: NANO-HM650 External Peripheral Interface Connector

3.3.1 Ethernet Connectors

CN Label: **LAN1, LAN2**

CN Type: RJ-45

CN Location: See **Figure 3-24**

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

The NANO-HM650 is equipped with two built-in RJ-45 Ethernet controllers. Each controller can connect to the LAN through one RJ-45 LAN connector.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	MDI0+	2	MDI0-
3	MDI1+	4	MDI1-
5	GND	6	GND
7	MDI2+	8	MDI2-
9	MDI3+	10	MDI3-
11	LINK100	12	LINK1000
13	ACT	14	+V3.3A_LAN1
15	GND	16	GND

Table 3-21: LAN Pinouts

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the speed. See **Table 3-22**.

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

Table 3-22: RJ-45 Ethernet Connector LEDs

Figure 3-25: RJ-45 Ethernet Connector

3.3.2 HDMI Connector

CN Label: **HDMI1**

CN Type: HDMI type A connector

CN Location: See **Figure 3-24**

CN Pinouts: See **Table 3-23**

The HDMI (High-Definition Multimedia Interface) connector connects to digital audio or video sources.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	HDMI_DATA2	13	NC
2	GND	14	NC
3	HDMI_DATA2#	15	HDMI_SCL
4	HDMI_DATA1	16	HDMI_SDA
5	GND	17	GND
6	HDMI_DATA1#	18	+5V
7	HDMI_DATA2	19	HDMI_HPD
8	GND		
9	HDMI_DATA2#		
10	HDMI_CLK		
11	GND		
12	HDMI_CLK#		

Table 3-23: HDMI Connector Pinouts

3.3.3 USB Connectors

CN Label: **USB0_1, USB2_3**

CN Type: USB port

CN Location: See **Figure 3-24**

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

The NANO-HM650 has four external USB 2.0 connectors. The USB connector can be connected to a USB device.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	5	USB_PN0/2
2	USB_PP0/2	6	GND
3	+5V	7	USB_PN1/3
4	USB_PP1/3	8	GND

Table 3-24: USB Port Connector Pinouts

3.3.4 VGA Connector

CN Label: VGA1

CN Type: 15-pin Female

CN Location: See **Figure 3-24**

CN Pinouts: See **Figure 3-26** and **Table 3-25**

The VGA connector connects to a monitor that accepts a standard VGA input.

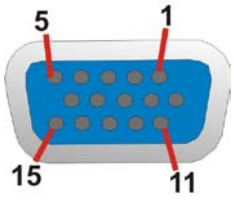


Figure 3-26: VGA Connector

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RED	2	GREEN
3	BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	VGAVCC	10	HOTPLUG
11	NC	12	DDCDAT
13	HSYNC	14	VSYNC
15	DDCCLK		

Table 3-25: VGA Connector Pinouts

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the NANO-HM650 may result in permanent damage to the NANO-HM650 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the NANO-HM650. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the NANO-HM650 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-HM650, place it on an antic-static pad. This reduces the possibility of ESD damaging the NANO-HM650.
- ***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.

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the NANO-HM650, NANO-HM650 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-HM650 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-HM650 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-HM650 off:
  - When working with the NANO-HM650, 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-HM650 **DO NOT:**

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

4.3 Basic Installation

WARNING:

A CPU should never be turned on without the specified cooling kit being installed. If the cooling kit (heat sink and fan) is not properly installed and the system turned on, permanent damage to the CPU, NANO-HM650 and other electronic components attached to the system may be incurred. Running a CPU without a cooling kit may also result in injury to the user.

The CPU, CPU cooling kit and DIMM are the most critical components of the NANO-HM650. If one of these component is not installed the NANO-HM650 cannot run.

4.3.1 Socket G2 CPU Installation

WARNING:

CPUs are expensive and sensitive components. When installing the CPU please be careful not to damage it in anyway. Make sure the CPU is installed properly and ensure the correct cooling kit is properly installed.

DO NOT touch the pins at the bottom of the CPU. When handling the CPU, only hold it on the sides.

To install a socket G2 CPU onto the NANO-HM650, follow the steps below:

Step 1: **Unlock the CPU retention screw.** When shipped, the retention screw of the CPU socket should be in the unlocked position. If it is not in the unlocked position, use a screwdriver to unlock the screw. See **Figure 4-1**.

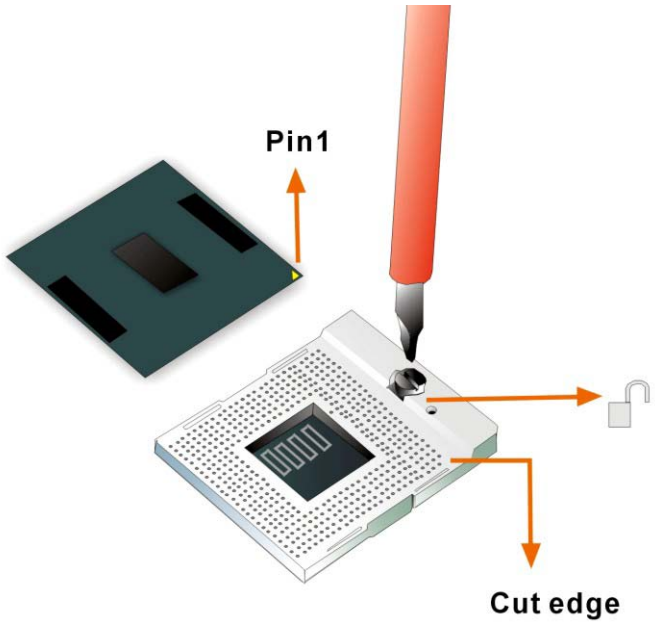


Figure 4-1: Make sure the CPU socket retention screw is unlocked

Step 2: **Inspect the CPU socket.** Make sure there are no bent pins and make sure the socket contacts are free of foreign material. If any debris is found, remove it with compressed air.

Step 3: **Correctly Orientate the CPU**. Make sure the IHS (integrated heat sink) side is facing upwards.

Step 4: **Correctly position the CPU.** Match the Pin 1 mark with the cut edge on the CPU socket. See **Figure 4-1**.

Step 5: **Align the CPU pins.** Carefully align the CPU pins with the holes in the CPU socket.

Step 6: **Insert the CPU.** Gently insert the CPU into the socket. If the CPU pins are properly aligned, the CPU should slide into the CPU socket smoothly.

Step 7: **Lock the retention screw.** Rotate the retention screw into the locked position. See **Figure 4-2**.

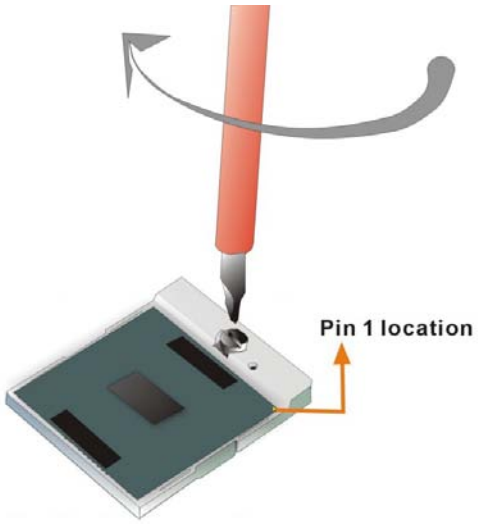


Figure 4-2: Lock the CPU Socket Retention Screw

4.3.2 Cooling Kit Installation

Figure 4-3: IEI CF-989A-RS Cooling Kit

An IEI Socket 989A CPU cooling kit can be purchased separately. (See **Chapter 3**) The cooling kit comprises a CPU heat sink and a cooling fan.

WARNING:

Do not wipe off (accidentally or otherwise) the pre-sprayed layer of thermal paste on the bottom of the heat sink. The thermal paste between the CPU and the heat sink is important for optimum heat dissipation.

To install the cooling kit, please follow the steps below.

Step 1: **Place the cooling kit onto the CPU**. Make sure the CPU cooling fan cable can be properly routed when the cooling kit is installed.

Step 2: **Properly align the cooling kit**. Make sure its four spring screw fasteners can pass through the pre-drilled holes on the PCB.

Step 3: **Secure the cooling kit**. From the solder side of the PCB, align the support bracket to the screw threads on heat sink that were inserted through the PCB holes. (See **Figure 4-4**)

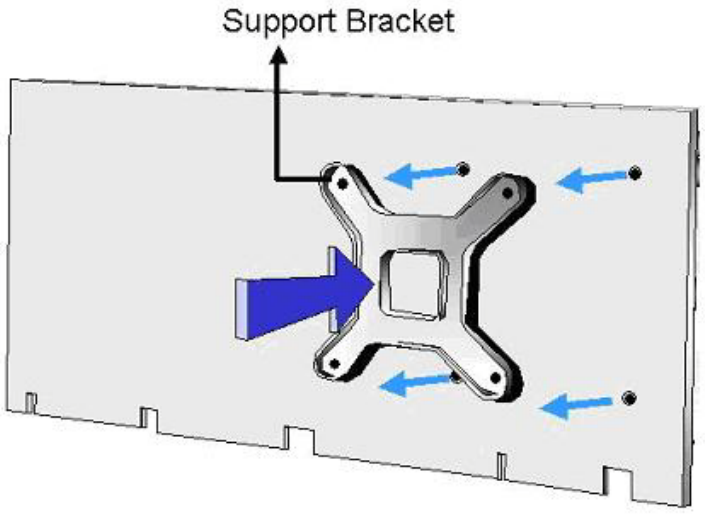


Figure 4-4: Cooling Kit Support Bracket

Step 4: **Tighten the screws**. Use a screwdriver to tighten the four screws. Tighten each nut a few turns at a time and do not over-tighten the screws.

Step 5: **Connect the fan cable**. Connect the cooling kit fan cable to the fan connector on the motherboard. Carefully route the cable and avoid heat generating chips and fan blades.

4.3.3 SO-DIMM Installation

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

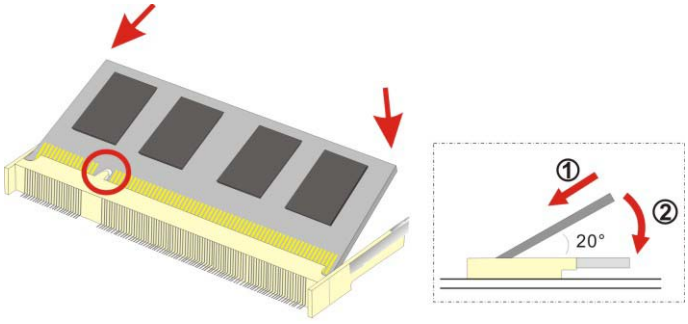


Figure 4-5: SO-DIMM Installation

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 20º angle. (See **Figure 4-4**)

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

4.4 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.

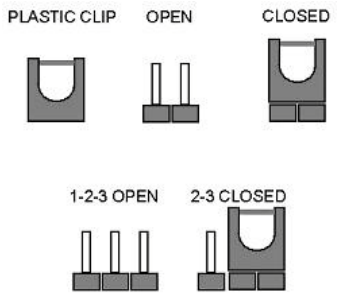


Figure 4-6: Jumper Locations

Before the NANO-HM650 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the NANO-HM650 are listed in **Table 4-1**.

Description	Type	Label
AT Auto Button Power Select	2-pin header	J_AUTOPWR1
AT/ATX Power Select	3-pin header	J_ATXCTL1
Clear CMOS	3-pin header	ME_RTC2
LCD Panel Type	8-pin header	J_PID1
LVDS LCD Voltage Select	6-pin header	J_VLVDS1
ME RTC Register	3-pin header	ME_RTC1
PCI-104 Power Select	3-pin header	JP1

Table 4-1: Jumpers

4.4.1 AT Auto Button Power Select Jumper

Jumper Label: J_AUTOPWR1

Jumper Type: 2-pin header

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

Jumper Location: See **Figure 4-6**

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

Setting	Description
Short	AT Mode
Open	ATX Mode (Default)

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

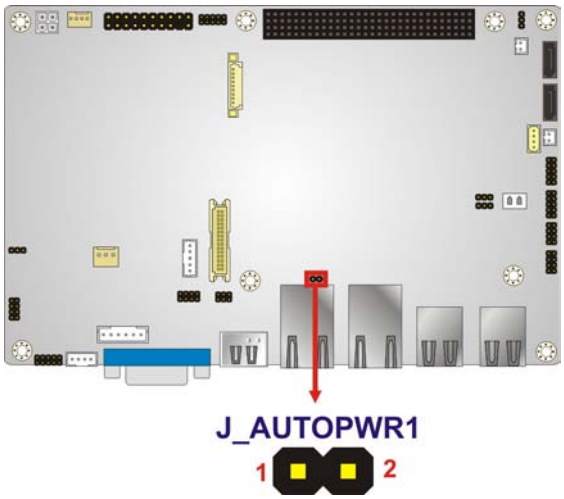


Figure 4-7: AT Auto Button Select Jumper Settings

4.4.2 AT/ATX Power Select Jumper

Jumper Label:	**J_ATXCTL1**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 4-3**
Jumper Location:	See **Figure 4-7**

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

AT Power Select	Description	
Short 1 - 2	ATX Mode	Default
Short 2 – 3	AT Mode	

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

The location of the AT/ATX Power Select jumper is shown in **Figure 4-7** below.

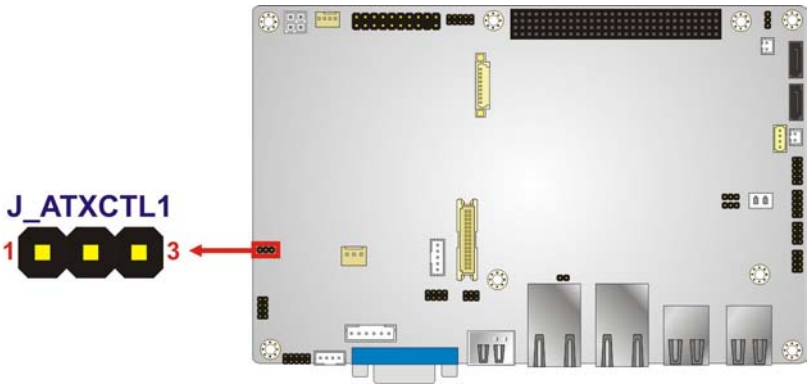


Figure 4-8: AT/ATX Power Select Jumper Location

4.4.3 Clear CMOS Jumper

Jumper Label:	**ME_RTC2**
Jumper Type:	3-pin header
Jumper Settings:	See **Table 4-4**
Jumper Location:	See **Figure 4-8**

If the NANO-HM650 fails to boot due to improper BIOS settings, the clear CMOS jumper clears the CMOS data and resets the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

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

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

After having done one of the above, save the changes and exit the CMOS Setup menu.

The clear CMOS jumper settings are shown in **Table 4-4**.

Clear CMOS	Description	
Short 1 - 2	Normal Operation	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 4-8** below.

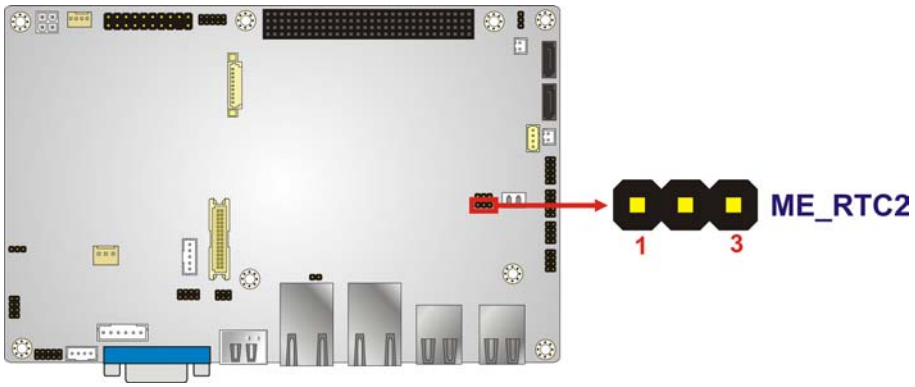


Figure 4-9: Clear CMOS Jumper

4.4.4 LCD Panel Type Jumper

Jumper Label: J_PID1

Jumper Type: 8-pin header

Jumper Settings: See **Table 4-5**

Jumper Location: See **Figure 4-9**

The LCD Panel Type jumper allows the LCD panel type to be set. The LCD Panel Type jumper settings are shown in **Table 4-5.**

Pin	Description
Open	640 x 480 (18-bit)
1-2	800 x 600 (18-bit)
3-4	1024 x 768 (18-bit)
1-2 and 3-4	1024 x 768 (24-bit)
5-6	1024 x 768 (48-bit)
1-2 and 5-6	1280 x 1024 (48-bit)

Pin	Description
3-4 and 5-6	1600 x 1200 (48-bit)
1-2 and 3-4 and 5-6	1280 x 768 (18-bit)
7-8	1200 x 800 (18-bit)
1-2 and 7-8	1366 x 768 (24-bit)
3-4 and 7-8	1440 x 900 (36-bit)
1-2 and 3-4 and 7-8	1440 x 900 (48-bit)
5-6 and 7-8	1680 x 1050 (48-bit)
1-2 and 5-6 and 7-8	1920 x 1080 (48-bit)
3-4 and 5-6 and 7-8	1920 x 1200 (48-bit)

Table 4-5: LVDS Screen Resolution Jumper Settings

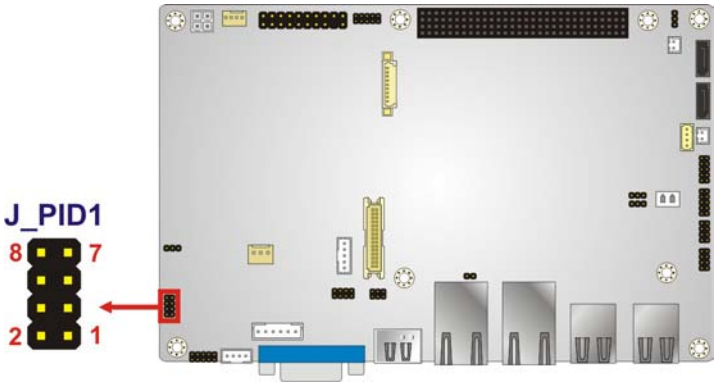


Figure 4-10: LVDS Screen Resolution Jumper Locations

4.4.5 LVDS Voltage Select Jumper

WARNING:

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

Jumper Label: J_VLVDS1

Jumper Type: 6-pin header

Jumper Settings: See Table 4-6

Jumper Location: See Figure 4-10

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

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

Table 4-6: LVDS Voltage Select Jumper Settings

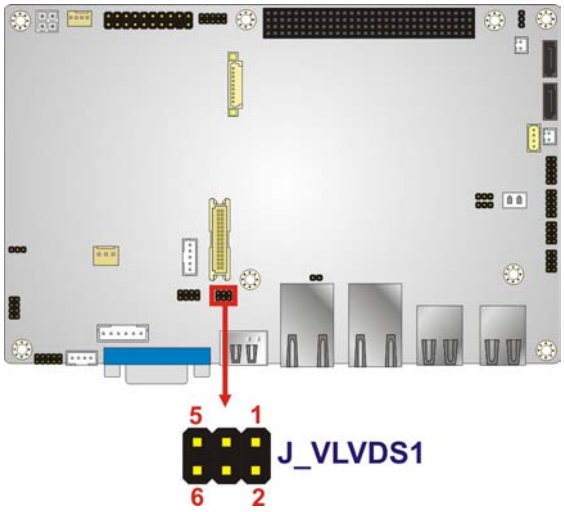


Figure 4-11: LVDS Voltage Select Jumper Locations

4.4.6 ME RTC Register Jumper

Jumper Label: ME_RTC1

Jumper Type: 3-pin header

Jumper Settings: See **Table 4-7**

Jumper Location: See **Figure 4-11**

The ME RTC Register jumper protects or clears the ME RTC registers. The ME RTC Register jumper settings are shown in **Table 4-4**.

Setting	Description	
Short 1-2	No OverWrite	Default

Setting	Description	
Short 2-3	Clear ME RTC registers	

Table 4-7: ME RTC Register Jumper Settings

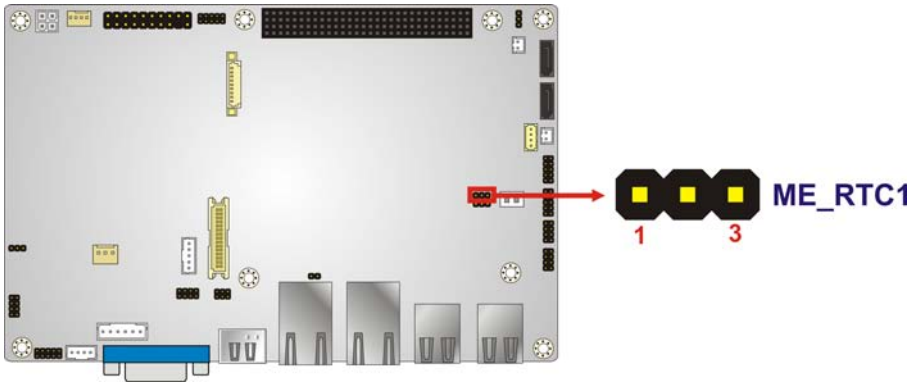


Figure 4-12: ME RTC Register Jumper Location

4.4.7 PCI-104 Power Select Jumper

Jumper Label: JP1

Jumper Type: 3-pin header

Jumper Settings: See **Table 4-8**

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

The PCI-104 power select jumper allows the user to select the PCI-104 power setting. The PCI-104 power select jumper settings are shown in **Table 4-4**.

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

Table 4-8: PCI-104 Power Select Jumper Settings

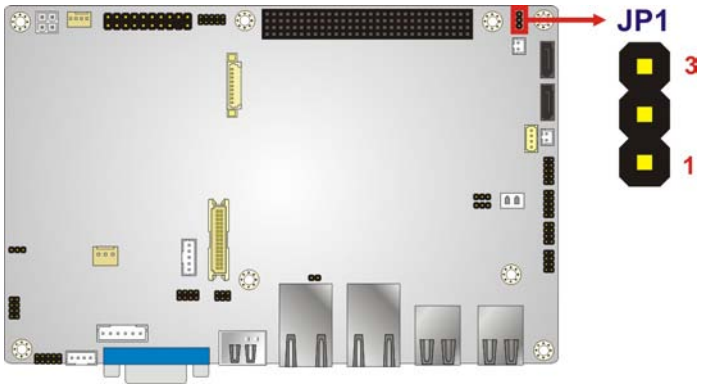


Figure 4-13: PCI-104 Power Select Jumper Location

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-HM650 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-HM650.

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

Step 2: **Connect the Power Cable to the Motherboard**. Connect the 4-pin (2x2) Molex type power cable connector to the AT/ATX power connector on the motherboard. See Figure 4-13.

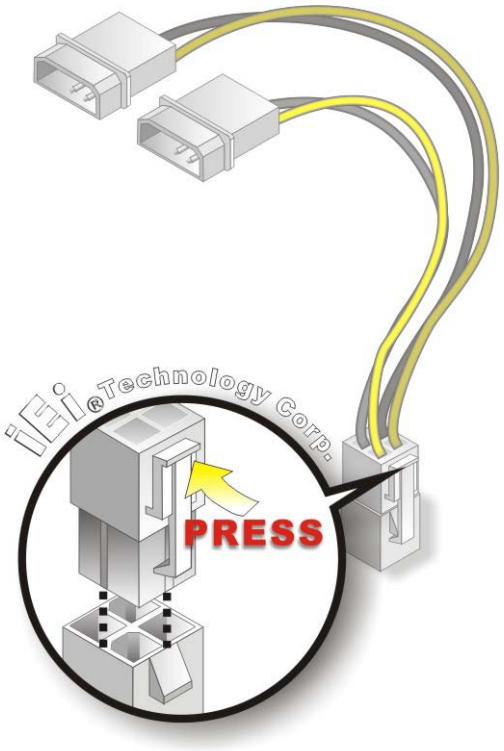


Figure 4-14: Power Cable to Motherboard Connection

Step 3: **Connect Power Cable to Power Supply**. Connect one of the 4-pin (1x4) Molex type power cable connectors to an AT/ATX power supply. See Figure 4-14.

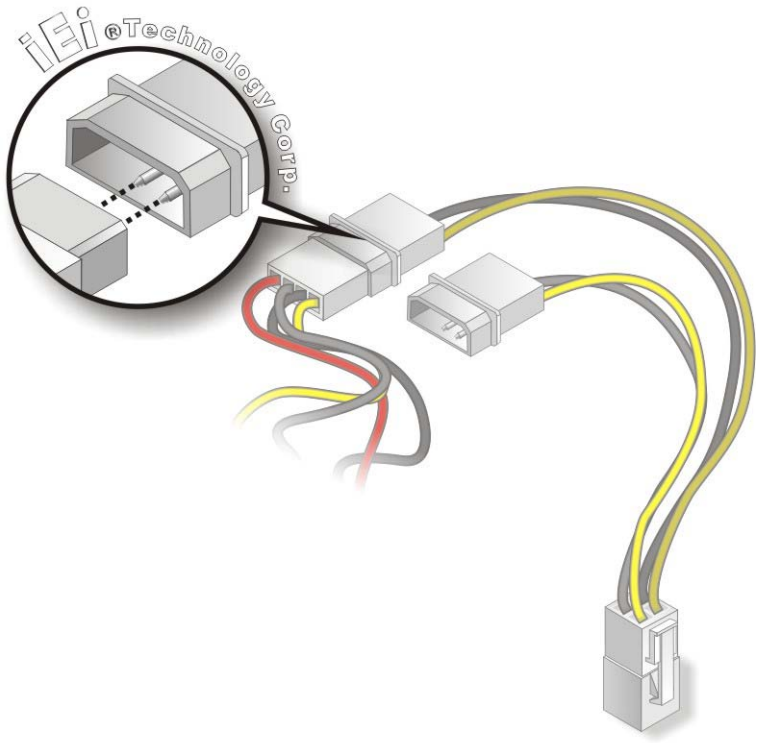


Figure 4-15: Connect Power Cable to Power Supply

4.5.2 Audio Kit Installation

The Audio Kit that came with the NANO-HM650 connects to the audio connector on the NANO-HM650. The audio kit consists of three audio jacks. Mic-in connects to a microphone. Line-in provides a stereo line-level input to connect to the output of an audio device. Line-out, a stereo line-level output, connects to two amplified speakers. To install the audio kit, please refer to the steps below:

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

Step 2: **Align pin 1**. Align pin 1 on the on-board connector with pin 1 on the audio kit connector. Pin 1 on the audio kit connector is indicated with a white dot. See Figure 4-15.

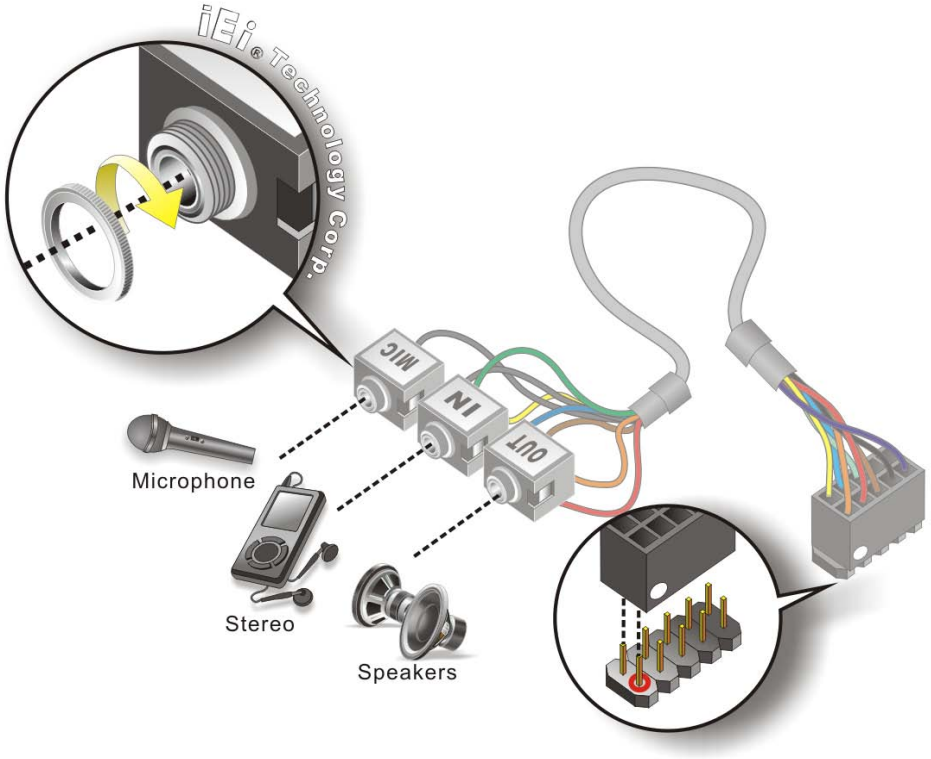


Figure 4-16: Audio Kit Cable Connection

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

4.5.3 Single RS-232 Cable Connection

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

Step 1: **Locate the connector**. The location of the RS-232 connector is shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Insert the connector into the serial port box header. See Figure 4-16. A key on the front of the cable connectors ensures the connector can only be installed in one direction.

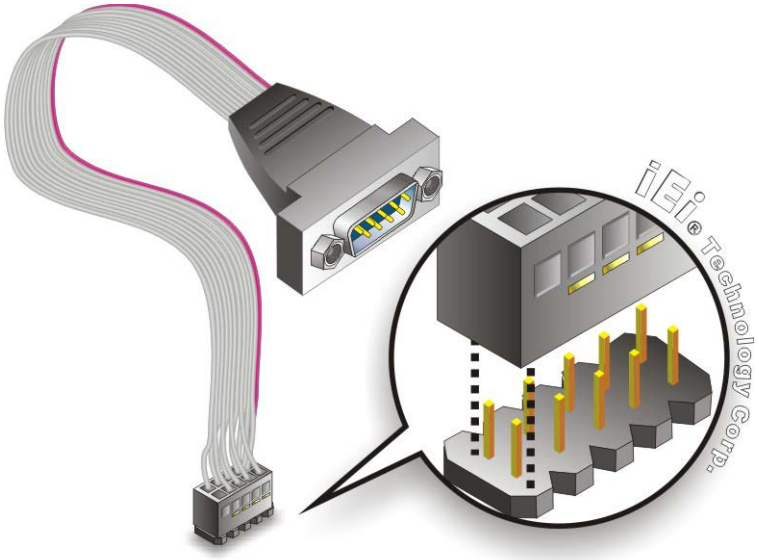


Figure 4-17: Single RS-232 Cable Connection

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

Step 4: **Connect the serial device**. Once the single RS-232 connector is connected to a chassis or bracket, a serial communications device can be connected to the system.

4.6 External Peripheral Interface Connection

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

- HDMI devices
- RJ-45 Ethernet cable connector
- USB devices
- VGA monitor

To install these devices, connect the corresponding cable connector from the actual device to the corresponding NANO-HM650 external peripheral interface connector making sure the pins are properly aligned.

4.6.1 HDMI Display Device Connection

The NANO-HM650 has one female HDMI connector on the external peripheral interface panel. The HDMI connectors are connected to digital display devices. To connect a digital display device to the NANO-HM650, please follow the instructions below.

Step 1: **Locate the HDMI connector**. The location of the HDMI connector is shown in another chapter.

Step 2: **Align the HDMI connector**. Align the male HDMI connector on the digital display device cable with the female HDMI connector on the external peripheral interface.

Step 3: **Insert the HDMI connector** Once the connectors are properly aligned with the male connector, insert the male connector from the digital display device into the female connector on the NANO-HM650.

Step 4: **Secure the connector.** Secure the HDMI connector from the digital display device to the external interface by tightening the two retention screws on either side of the connector.

4.6.2 LAN Connection

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

Step 1: **Locate the RJ-45 connectors**. The location of the LAN connector is shown in **Chapter 4**.

Step 2: **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the NANO-HM650. See Figure 4-17.

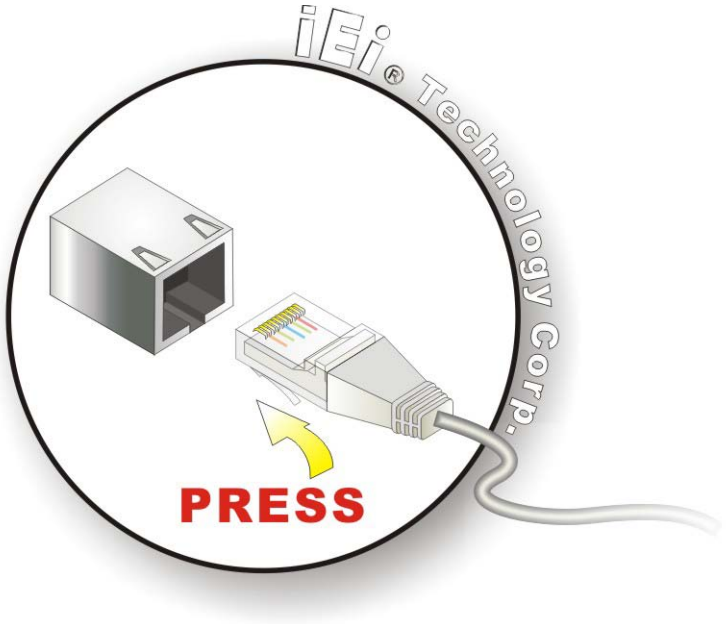


Figure 4-18: LAN Connection

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

4.6.3 USB Connection

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-HM650.

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 4-18.

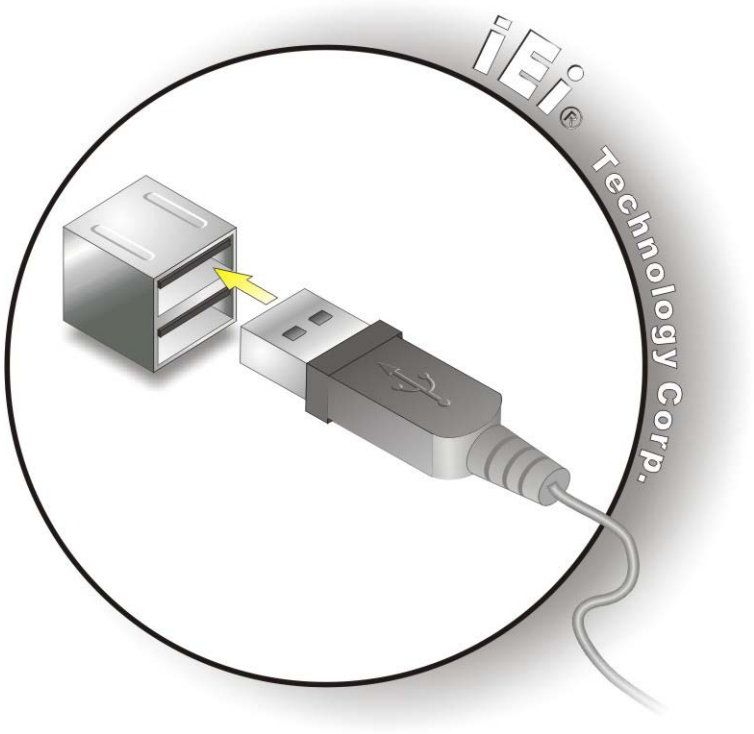


Figure 4-19: USB Connector

4.6.4 VGA Monitor Connection

The NANO-HM650 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-HM650, please follow the instructions below.

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

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

Step 3: **Insert the VGA connector** Once the connectors are properly aligned with the insert the male connector from the VGA screen into the female connector on the NANO-HM650. See Figure 4-19.

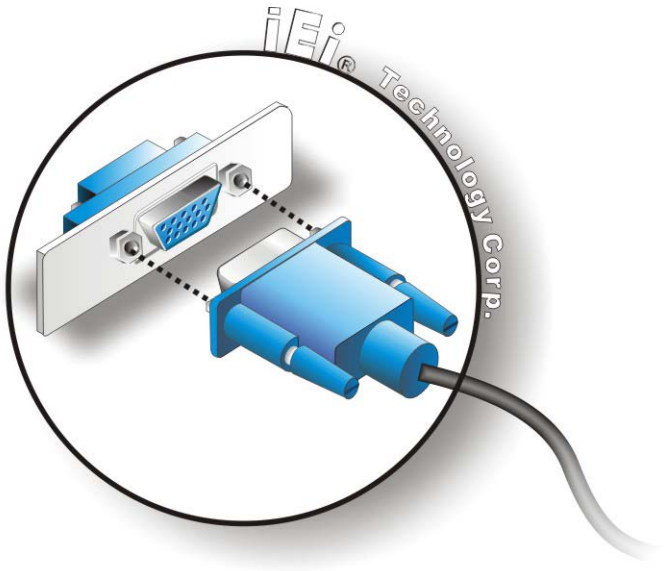


Figure 4-20: VGA Connector

Step 4: **Secure the connector**. Secure the DB-15 VGA connector from the VGA monitor to the external interface by tightening the two retention screws on either side of the connector.

Chapter

5

BIOS

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
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Load previous values.
F3 key	Load optimized defaults

Key	Function
F4 key	Save all the CMOS changes

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

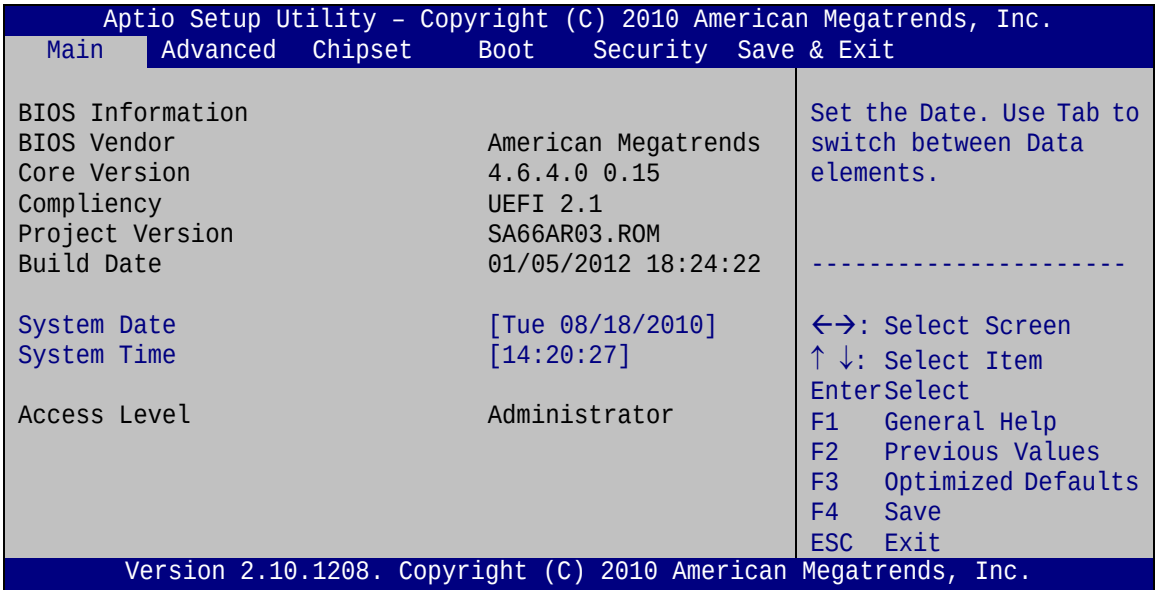
The **menu bar** on top of the BIOS screen has the following main items:

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

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

5.2 Main

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



BIOS Menu 1: Main

➔ BIOS Information

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

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

➔ System Date [xx/xx/xx]

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

➔ System Time [xx:xx:xx]

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

5.3 Advanced

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

WARNING!

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

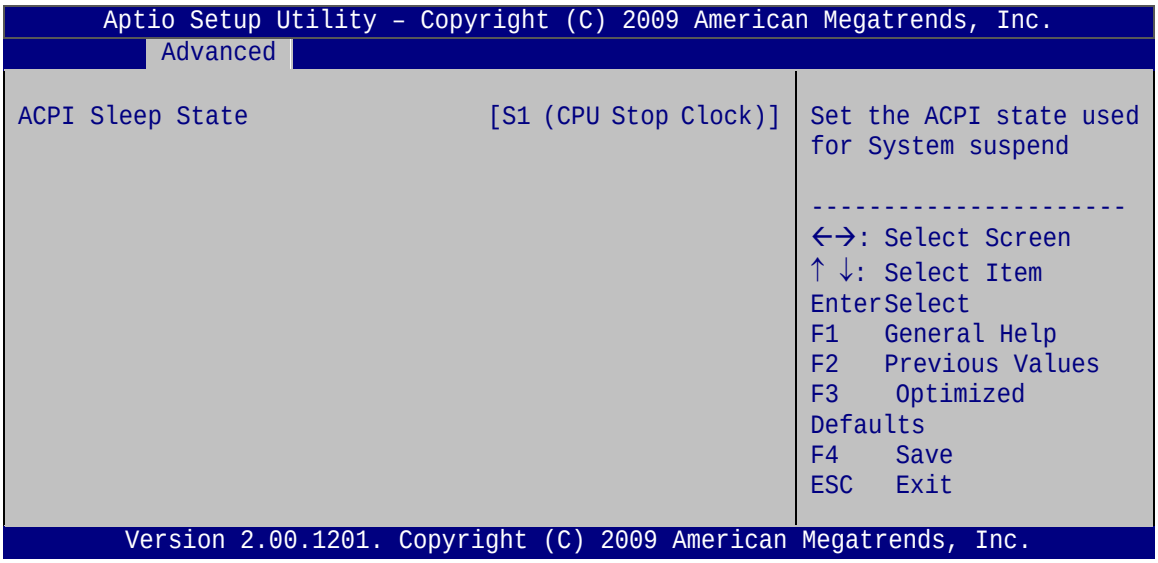
```
      Aptio Setup Utility – Copyright (C) 2009 American Megatrends, Inc.
  Main    Advanced   Chipset     Boot     Security   Save & Exit

> ACPI Settings                                  System ACPI Parameters
> Trusted Computing
> CPU Configuration
> SATA Configuration
> USB Configuration                              ----------------------
> Super IO Configuration                         ←→: Select Screen
> H/M Monitor                                    ↑ ↓: Select Item
> Serial Port Console Redirection                EnterSelect
                                                 F1   General Help
                                                 F2   Previous Values
                                                 F3    Optimized
                                                 Defaults
                                                 F4    Save
                                                 ESC   Exit
      Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```

BIOS Menu 2: Advanced

5.3.1 ACPI Configuration

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



BIOS Menu 3: ACPI Configuration

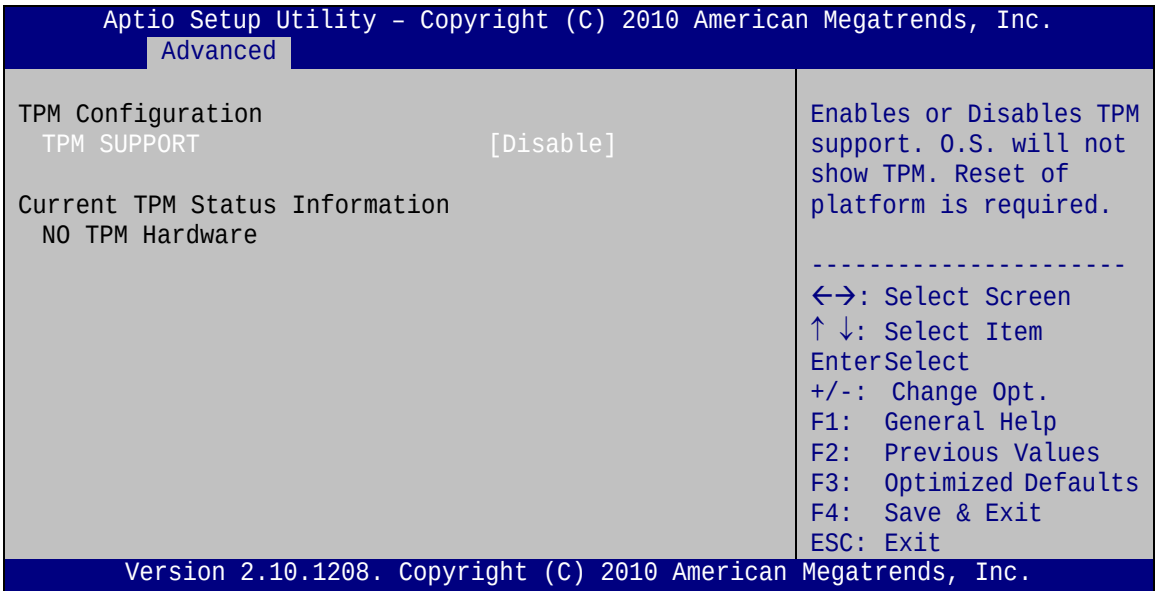
➔ ACPI Sleep State [S1 (CPU Stop Clock)]

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

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

5.3.2 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 4**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).



BIOS Menu 4: TPM Configuration

➔ TPM Support [Disable]

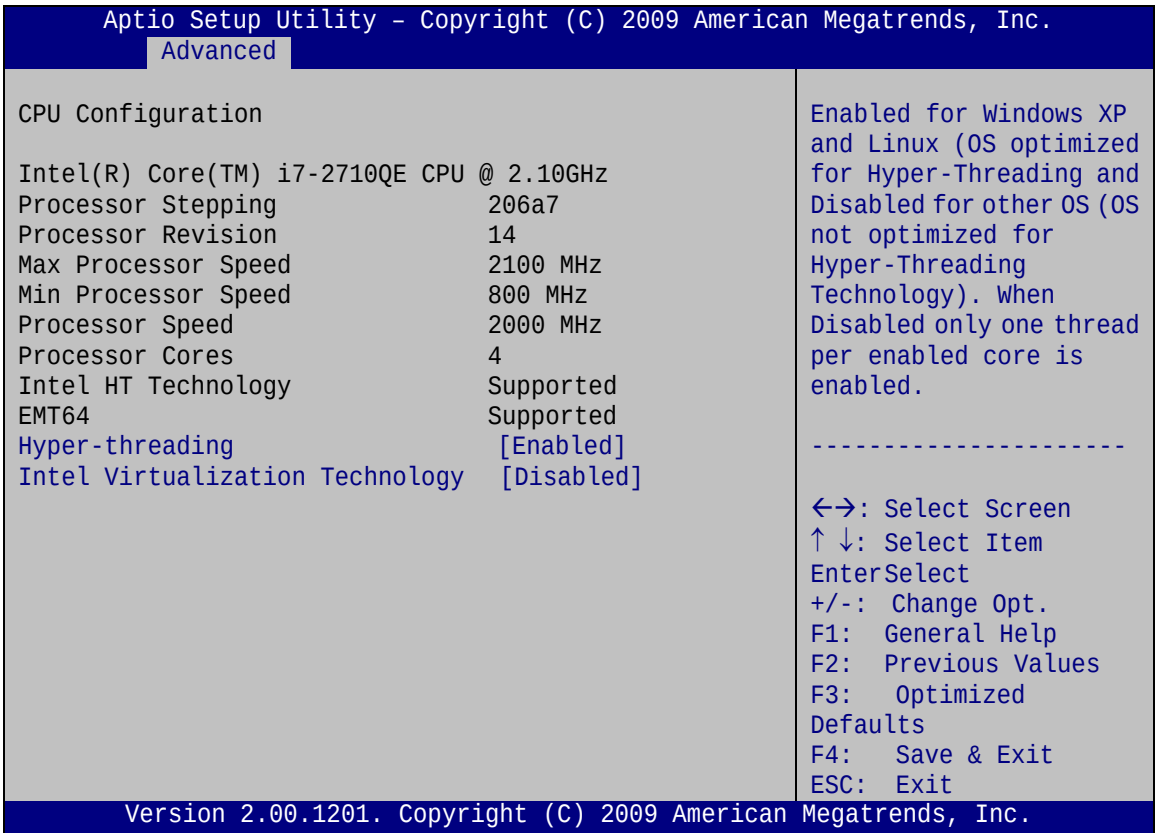
Use the **TPM Support** option to configure support for the TPM.

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

➔ **Enable** TPM support is enabled.

5.3.3 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 4**) to view detailed CPU specifications and configure the CPU.



BIOS Menu 5: CPU Configuration

The CPU Configuration menu (**BIOS Menu 4**) lists the following CPU details:

- Processor Type: Lists the brand name of the CPU being used
- Processor Stepping: Lists the CPU processing stepping
- Microcode Revision: Lists the microcode revision
- Max Processor Speed: Lists the maximum CPU processing speed.
- Min Processor Speed: Lists the minimum CPU processing speed.
- Processor Speed: Lists the CPU processing speed
- Processor Cores: Lists the number of the processor core
- Intel HT Technology: Indicates if the Intel HT Technology is supported by the CPU.
- EMT64: Indicates if the EM64T is supported by the CPU.

➔ Hyper-Threading [Enabled]

Use the Hyper-Threading option to enable or disable the CPU hyper threading function.

➔	**Disabled**		Disables the use of hyper threading technology
➔	**Enabled**	**DEFAULT**	Enables the use of hyper threading technology

➔ Intel® Virtualization Technology [Disabled]

Use the **Intel® Virtualization Technology** option to enable or disable virtualization on the system. When combined with third party software, Intel Virtualization technology allows several OSs to run on the same system at the same time.

➔	**Disabled**	**DEFAULT**	Disables Intel Virtualization Technology.
➔	**Enabled**		Enables Intel Virtualization Technology.

5.3.4 SATA Configuration

Use the **SATA Configuration** menu (**BIOS Menu 5**) to change and/or set the configuration of the SATA devices installed in the system.

```
Aptio Setup Utility – Copyright (C) 2009 American Megatrends, Inc.
        Advanced

SATA Controller(s)              [Enabled]       Enable or disable SATA
SATA Mode Selection             [IDE]           Device.

Serial ATA Port 0               Empty           ---------------------
  Software Preserve             Unknown         ←→: Select Screen
Serial ATA Port 1               Empty           ↑ ↓: Select Item
  Software Preserve             Unknown         EnterSelect
                                                F1   General Help
                                                F2   Previous Values
                                                F3    Optimized
                                                Defaults
                                                F4    Save
                                                ESC   Exit
        Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```

BIOS Menu 6: IDE Configuration

➔ SATA Controller(s) [Enabled]

Use the **SATA Controller(s)** option to enable or disable the use of SATA Devices.

➔ **Enabled**	**DEFAULT**	Enables SATA devices.
➔ **Disabled**		Disables SATA devices.

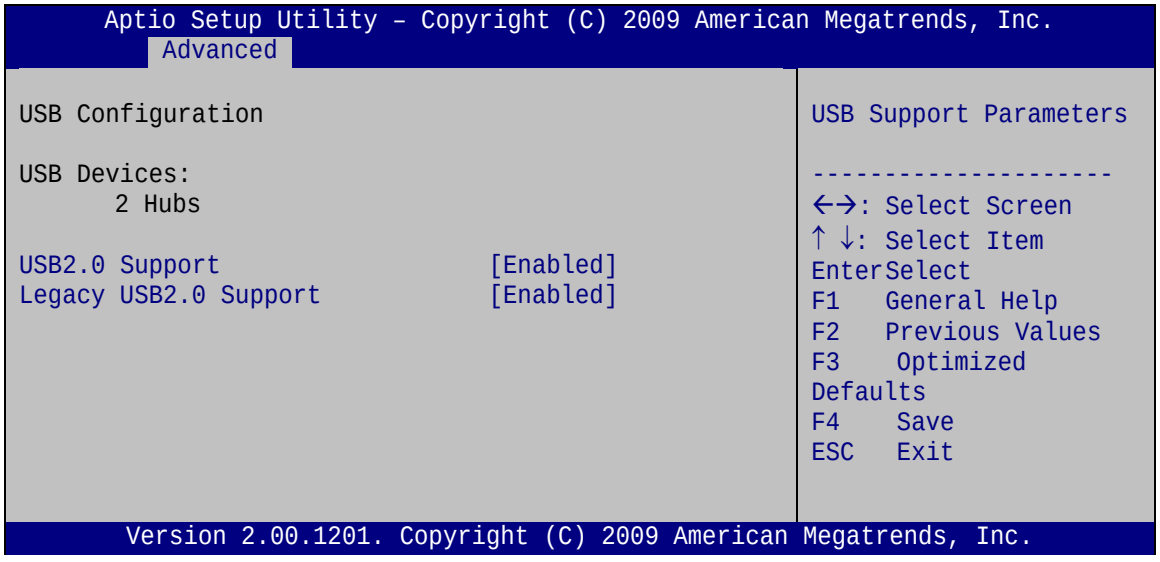
➔ SATA Mode Selection [IDE]

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

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

5.3.5 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 6**) to read USB configuration information and configure the USB settings.



BIOS Menu 7: USB Configuration

➔ USB Devices

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

➔ USB2.0 Support [Enabled]

Use the **USB2.0 Support** option to enable or disable USB2.0 support on the system.

➔	**Disabled**		USB2.0 support disabled
➔	**Enabled**	**DEFAULT**	USB2.0 support enabled

➔ Legacy USB2.0 Support [Enabled]

Use the **Legacy USB2.0 Support** BIOS option to enable USB mouse and USB keyboard support. Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

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

5.3.6 Super IO Configuration

Use the **Super IO Configuration** menu (**BIOS Menu 7**) to set or change the configurations for the FDD controllers, parallel ports and serial ports.

```
Aptio Setup Utility – Copyright (C) 2009 American Megatrends, Inc.
        Advanced
Super IO Configuration                    Set Parameters of Serial
                                          Port 1 (COMA)
Super IO Chip                  Fintek F81866
> Serial Port 1 Configuration
> Serial Port 3 Configuration             ---------------------
> Serial Port 6 Configuration             ←→: Select Screen
                                          ↑ ↓: Select Item
                                          EnterSelect
                                          F1   General Help
                                          F2   Previous Values
                                          F3    Optimized
                                          Defaults
                                          F4    Save
                                          ESC   Exit
Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```

BIOS Menu 8: Super IO Configuration

5.3.6.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 8**) to configure the serial port n.

```
Aptio Setup Utility – Copyright (C) 2009 American Megatrends, Inc.
        Advanced
Serial Port 1 Configuration               Enable or Disable Serial
                                          Port (COM)
Serial Port                    [Enabled]
Device Settings                IO=3F8h; IRQ=4
                                          ---------------------
Change Settings                [Auto]     ←→: Select Screen
                                          ↑ ↓: Select Item
                                          EnterSelect
                                          F1   General Help
                                          F2   Previous Values
                                          F3    Optimized
                                          Defaults
                                          F4    Save
                                          ESC   Exit
Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```

BIOS Menu 9: Serial Port n Configuration Menu

5.3.6.1.1 Serial Port 1 Configuration

➔ Serial Port [Enabled]

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

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

➔ Change Settings [Auto]

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

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=3F8h; IRQ=4**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ4
➔ **IO=3F8h; IRQ=3, 4**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4
➔ **IO=2F8h; IRQ=3, 4**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4
➔ **IO=2C0h; IRQ=3, 4**		Serial Port I/O port address is 2C0h and the interrupt address is IRQ3, 4
➔ **IO=2C8h; IRQ=3, 4**		Serial Port I/O port address is 2C8h and the interrupt address is IRQ3, 4

5.3.6.1.2 Serial Port 3 Configuration

➔ Serial Port [Enabled]

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

- ➔ **Disabled** Disable the serial port
- ➔ **Enabled** **DEFAULT** Enable the serial port

➔ Change Settings [Auto]

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

- ➔ **Auto** **DEFAULT** The serial port IO port address and interrupt address are automatically detected.
- ➔ **IO=3E8h; IRQ=10** Serial Port I/O port address is 3E8h and the interrupt address is IRQ10
- ➔ **IO=3E8h; IRQ=10, 11** Serial Port I/O port address is 3E8h and the interrupt address is IRQ10, 11
- ➔ **IO=2E8h; IRQ=10, 11** Serial Port I/O port address is 2E8h and the interrupt address is IRQ10, 11
- ➔ **IO=2D0h; IRQ=10, 11** Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11
- ➔ **IO=2D8h; IRQ=10, 11** Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11

5.3.6.1.3 Serial Port 6 Configuration

➔ Serial Port [Enabled]

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

- ➔ **Disabled** Disable the serial port
- ➔ **Enabled** **DEFAULT** Enable the serial port

➔ Change Settings [Auto]

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

➔	**Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔	**IO=2E0h; IRQ=10**		Serial Port I/O port address is 2E0h and the interrupt address is IRQ10
➔	**IO=2C0h; IRQ=10, 11**		Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11
➔	**IO=2C8h; IRQ=10, 11**		Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11
➔	**IO=2D0h; IRQ=10, 11**		Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11
➔	**IO=2E0h; IRQ=10, 11**		Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11

5.3.7 H/W Monitor

The H/W Monitor menu (**BIOS Menu 9**) shows the operating temperature, fan speeds and system voltages.

```
        Aptio Setup Utility – Copyright (C) 2009 American Megatrends, Inc.
                Advanced
 PC Health Status                                  |
                                                   |
 CPU Temperature                :+53 C             |
 SYS Temperature1               :N/A               |
 SYS Temperature2               :+29 C             |
 VCC3V                          :+3.296 V          |  ---------------------
 V_core                         :+1.056 V          |  ←→: Select Screen
 +1.05V                         :+1.512 V          |  ↑ ↓: Select Item
 VDDR                           :+1.616 V          |  EnterSelect
 VSB3V                          :+3.312 V          |  F1   General Help
 VBAT                           :+3.184 V          |  F2   Previous Values
 5VSB                           :+4.968 V          |  F3    Optimized
                                                   |  Defaults
                                                   |  F4    Save
                                                   |  ESC   Exit
        Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```

BIOS Menu 10: Hardware Health Configuration

➔ PC Health Status

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

- System Temperatures:
  - CPU Temperature
  - System Temperature1
  - System Temperature2
- Voltages:
  - VCC3V
  - V_core
  - +1.05V
  - VDDR
  - VSB3V
  - VBAT
  - 5VSB

5.3.8 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 10**) allows the console redirection options to be configured. Console redirection allows users to maintain a system remotely by re-directing keyboard input and text output through the serial port.

```
      Aptio Setup Utility – Copyright (C) 2009 American Megatrends, Inc.
          Advanced
  COM1                                          Console Redirection
  Console Redirection           [Disabled]      Enable or Disable
> Console Redirection Settings
                                                ---------------------
  COM2                                          ←→: Select Screen
  Console Redirection           [Disabled]      ↑ ↓: Select Item
> Console Redirection Settings                  EnterSelect
                                                F1   General Help
  COM3                                          F2   Previous Values
  Console Redirection           [Disabled]      F3    Optimized
> Console Redirection Settings                  Defaults
                                                F4    Save
  iAMT SOL                                      ESC   Exit
      Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```

BIOS Menu 11: Serial Port Console Redirection

➔ Console Redirection

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

➔ **Disabled** Disabled the console redirection function

➔ **Enabled** Enabled the console redirection function

5.3.8.1 Console Redirection Settings

The **Console Redirection Settings** menu (**BIOS Menu 11**) allows the console redirection options to be configured. The option is active when Console Redirection option is enabled.

```
Aptio Setup Utility – Copyright (C) 2009 American Megatrends, Inc.
        Advanced

COM1                                          Emulation: ANSI:
Console Redirection Settings                  Extended ASCII char set.
                                              VT100: ASCII char set.
Terminal Type                 [VT100+]        VT100+: Extends VT100 to
Bits per second               [115200]        support color, function
Data Bits                     [8]             keys, etc. VT-UTF8: Uses
Parity                        [None]          UTF8 encoding to map
Stop Bits                     [1]             Unicode chars onto 1 or
                                              more bytes.

                                              ----------------------
                                              ←→: Select Screen
                                              ↑ ↓: Select Item
                                              EnterSelect
                                              F1   General Help
                                              F2   Previous Values
                                              F3    Optimized
                                              Defaults
                                              F4    Save
                                              ESC   Exit
Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```

BIOS Menu 12: Console Redirection Settings

➔ Terminal Type [VT100+]

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

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

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

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

➔ Bits per second [115200]

Use the **Bits per second** option to specify the transmission speed of the serial port.

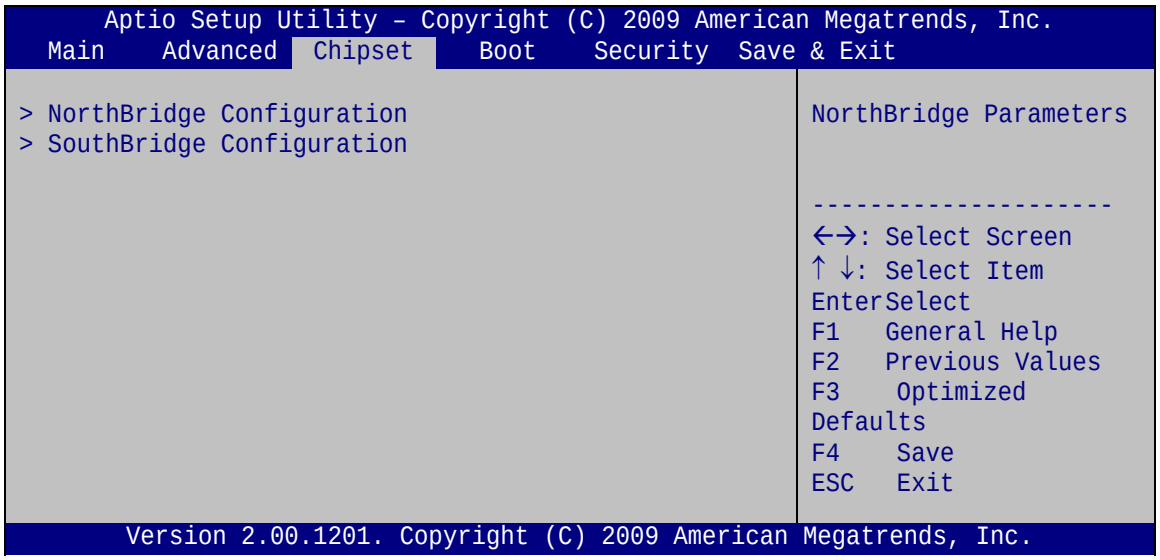
- ➔ **9600** The transmission speed is 9600
- ➔ **19200** The transmission speed is 19200
- ➔ **38400** The transmission speed is 38400
- ➔ **57600** The transmission speed is 57600
- ➔ **115200** **DEFAULT** The transmission speed is 115200

5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 12**) to access the Northbridge and Southbridge configuration menus

WARNING!

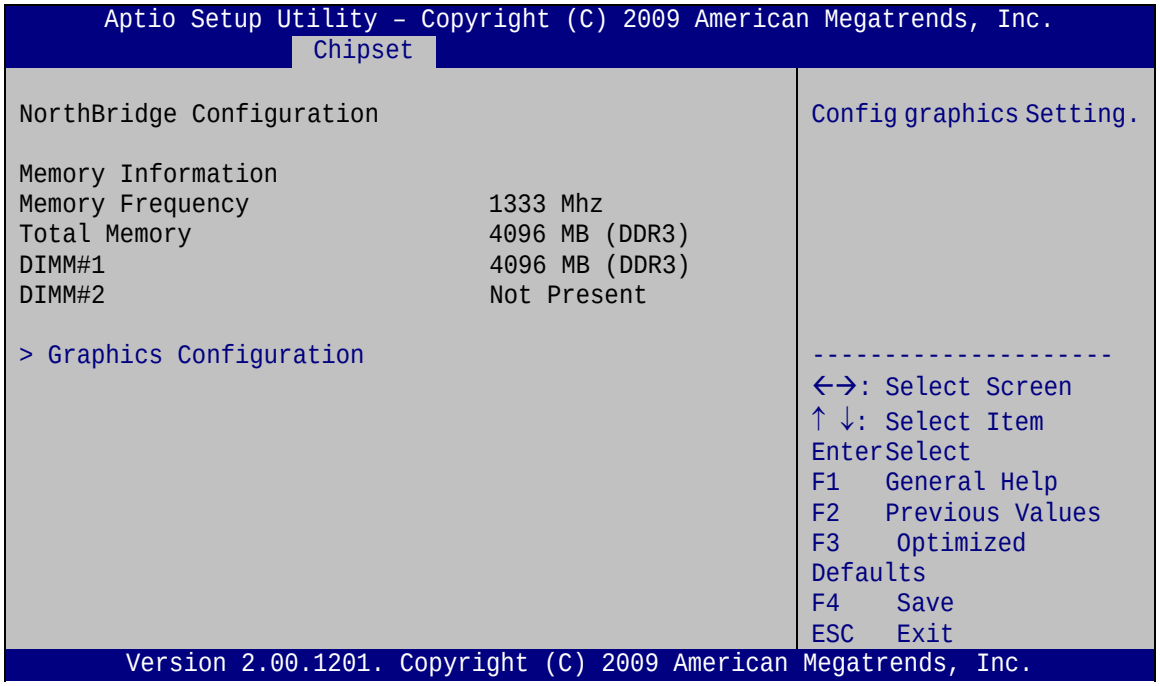
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.



BIOS Menu 13: Chipset

5.4.1 Northbridge Configuration

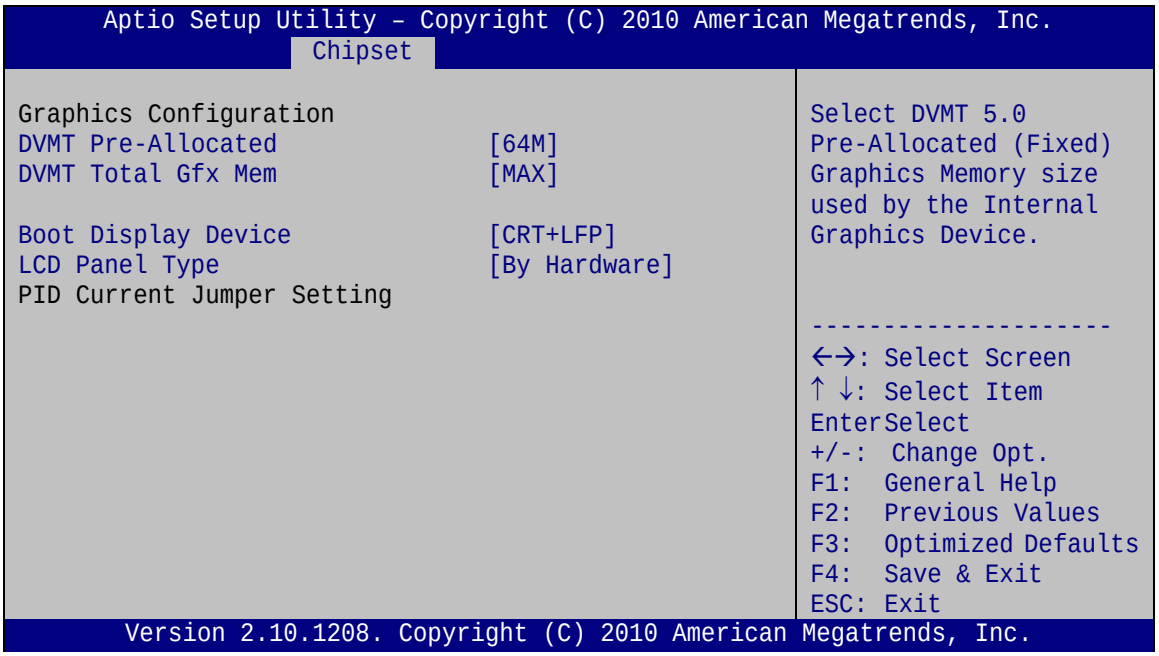
Use the **Northbridge Chipset Configuration** menu (**BIOS Menu 13**) to configure the Northbridge chipset.



BIOS Menu 14:Northbridge Chipset Configuration

5.4.1.1 Graphics Configuration

Use the **Graphics Configuration** submenu (**BIOS Menu 9**) to configure graphics options.



BIOS Menu 15: Northbridge Chipset Configuration

➔ DVMT Pre-Allocated [64 M]

Use the **DVMT Pre-Allocated** option to specify the amount of system memory that can be used by the Internal Graphics Device.

➔ **0M**		0 MB of memory used by internal graphics device
➔ **32 M**		32 MB of memory used by internal graphics device
➔ **64 M**	**DEFAULT**	64 MB of memory used by internal graphics device
➔ **96 M**		96 MB of memory used by internal graphics device
➔ **128 M**		128 MB of memory used by internal graphics device
➔ **160 M**		160 MB of memory used by internal graphics device

- ➔ **192 M** — 192 MB of memory used by internal graphics device
- ➔ **224 M** — 224 MB of memory used by internal graphics device
- ➔ **256 M** — 256 MB of memory used by internal graphics device
- ➔ **288 M** — 288 MB of memory used by internal graphics device
- ➔ **320 M** — 320 MB of memory used by internal graphics device
- ➔ **352 M** — 352 MB of memory used by internal graphics device
- ➔ **384 M** — 384 MB of memory used by internal graphics device
- ➔ **416 M** — 416 MB of memory used by internal graphics device
- ➔ **448 M** — 448 MB of memory used by internal graphics device
- ➔ **480 M** — 480 MB of memory used by internal graphics device
- ➔ **512 M** — 512 MB of memory used by internal graphics device

➔ DVMT Total Gfx Mem [MAX]

Use the **DVMT Total Gfx Mem** option to select the amount of DVMT5.0 total memory used by the Internal Graphics Device.

- ➔ **128M** — 128 MB of memory used by internal graphics device

➔ **256M**		256MB of memory used by internal graphics device
➔ **MAX**	**DEFAULT**	Maximum amount of memory used by internal graphics device

➔ Boot Display Device [CRT+LFP]

Use the **CRT+LFP** option to configure the boot display device function.

➔ **CRT+LFP**	**DEFAULT**	Enables CRT+LFP as the boot display device.
➔ **CRT**		Enables CRT as the boot display device.
➔ **HDMI**		Enables HDMI as the boot display device.
➔ **LFP**		Enables LFP as the boot display device.
➔ **HDMI2**		Enables HDMI2 as the boot display device.

➔ LCD Panel Type [By Hardware]

Use the **LCD Panel Type** option to select the LCD panel used by the Internal Graphics Device.

➔ **By Hardware**	**DEFAULT**	Selects the panel type by hardware.
➔ **640x480 18bit**		Sets the panel type to 640x480 18bit
➔ **800x480 18bit**		Sets the panel type to 800x480 18bit
➔ **800x600 18bit**		Sets the panel type to 800x600 18bit
➔ **1024x768 18bit**		Sets the panel type to 1024x768 18bit
➔ **1024x768 24bit**		Sets the panel type to 1024x768 24bit
➔ **1280x1024 48bit**		Sets the panel type to 1280x1024 48bit
➔ **1600x1200 48bit**		Sets the panel type to 1600x1200 48bit
➔ **1280x768 18bit**		Sets the panel type to 1280x768 18bit
➔ **1280x800 18bit**		Sets the panel type to 1280x800 18bit
➔ **1366x768 24bit**		Sets the panel type to 1366x768 24bit

- ➔ **1440x900 48bit** Sets the panel type to 1440x900 48bit
- ➔ **1600x900 48bit** Sets the panel type to 1600x900 48bit
- ➔ **1680x1050 48bit** Sets the panel type to 1680x1050 48bit
- ➔ **1920x1080 48bit** Sets the panel type to 1920x1080 48bit
- ➔ **1920x1200 48bit** Sets the panel type to 1920x1200 48bit

5.4.2 Southbridge Configuration

Use the **Southbridge Configuration** menu (**BIOS Menu 14**) to configure the Southbridge chipset.

```
Aptio Setup Utility – Copyright (C) 2009 American Megatrends, Inc.
                    Chipset
SouthBridge Configuration                    | Enabled or disabled
                                             | onboard NIC.
Auto Power Button Status        [OFF]        |
                                             |
PCH LAN Controller              [Enabled]    | ---------------------
Azalia                          [Enabled]    | ←→: Select Screen
Azalia Internal HDMI Codec      [Enabled]    | ↑ ↓: Select Item
                                             | EnterSelect
Restore AC Power Loss           [Last State] | F1   General Help
                                             | F2   Previous Values
                                             | F3    Optimized
                                             | Defaults
                                             | F4    Save
                                             | ESC   Exit
Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```

BIOS Menu 16:Southbridge Chipset Configuration

➔ PCH LAN Controller [Enabled]

Use the **PCH LAN Controller** option to enable or disable the PCH LAN controller.

- ➔ **Disabled** The onboard PCH LAN controller is disabled
- ➔ **Enabled** **DEFAULT** The onboard PCH LAN controller is enabled

➔ Azalia [Enabled]

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

- ➔ **Disabled** The onboard High Definition Audio controller is disabled
- ➔ **Enabled** **DEFAULT** The onboard High Definition Audio controller is detected automatically and enabled

➔ Azalia Internal HDMI Codec [Disabled]

Use the **Azalia internal HDMI Codec** option to enable or disable the internal HDMI codec for High Definition Audio.

- ➔ **Disabled** Disables the internal HDMI codec for High Definition Audio
- ➔ **Enabled** **DEFAULT** Enables the internal HDMI codec for High Definition Audio

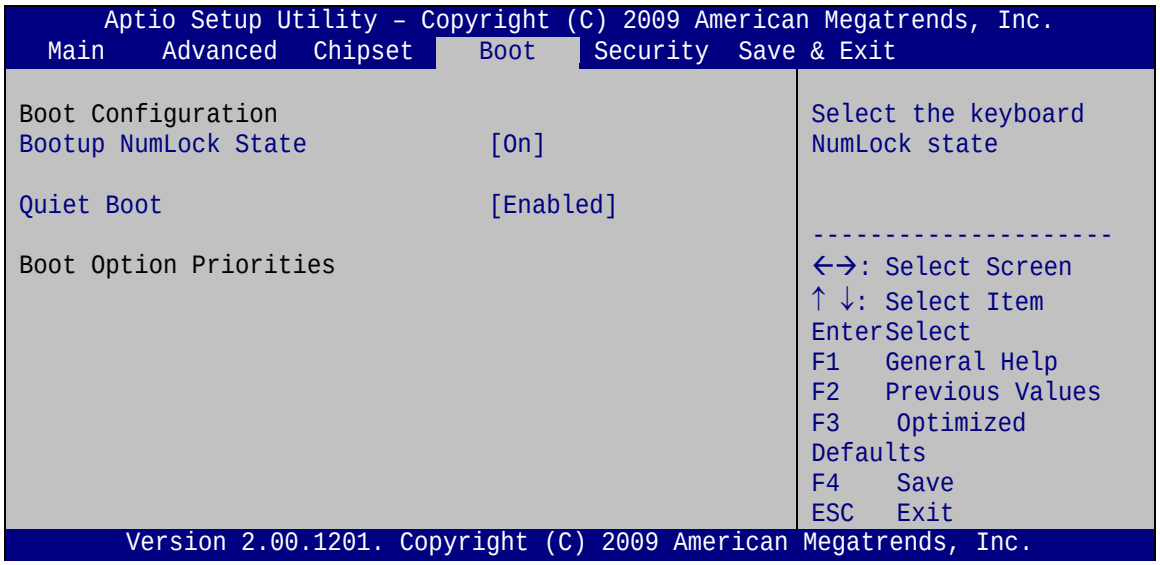
➔ Restore AC Power Loss [Last State]

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

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

5.5 Boot

Use the **Boot** menu (**BIOS Menu 16**) to configure system boot options.



BIOS Menu 17: Boot

➔ Bootup NumLock [On]

Use the **Bootup NumLock** 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.

➔ Quiet Boot [Enabled]

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

➔ **Disabled** Normal POST messages displayed

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

5.6 Security

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

```
      Aptio Setup Utility – Copyright (C) 2009 American Megatrends, Inc.
  Main    Advanced   Chipset     Boot    Security  Save & Exit

Password Description                          Set Setup Administrator
                                              Password
If ONLY the Administrator's password is set,
then this only limits access to Setup and is  ---------------------
only asked for when entering Setup            ←→: Select Screen
If ONLY the User's password is set, then this ↑ ↓: Select Item
is a power on password and must be entered to EnterSelect
boot or enter Setup. In Setup the User will   F1   General Help
have Administrator rights.                    F2   Previous Values
                                              F3    Optimized
Administrator Password                        Defaults
User Password                                 F4    Save
                                              ESC   Exit
      Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```

BIOS Menu 18: Security

➔ Administrator Password

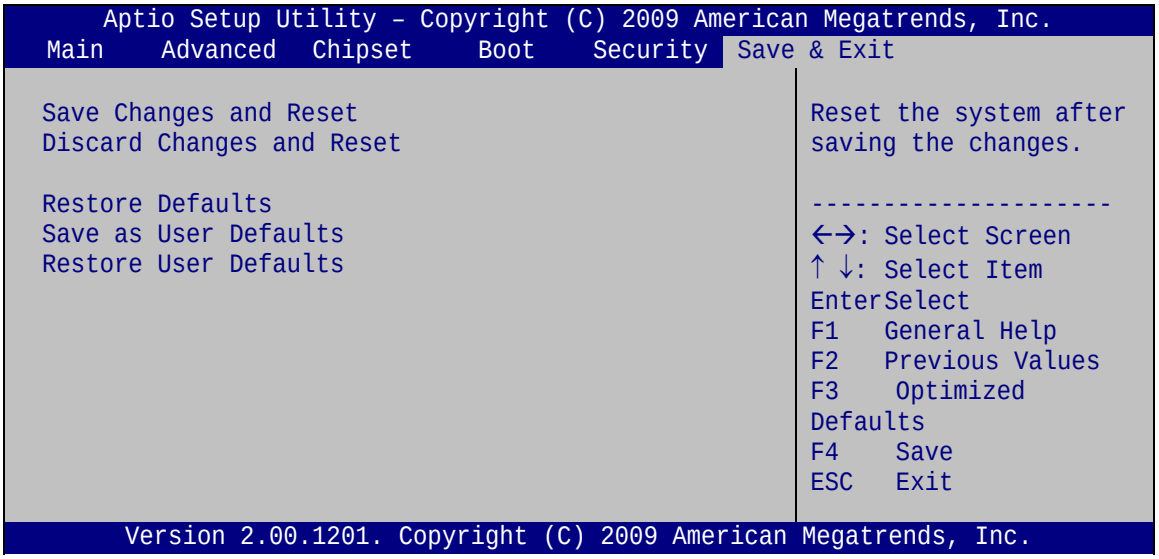
Use the **Administrator Password** to set or change a administrator password.

➔ User Password

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

5.7 Exit

Use the **Exit** menu (**BIOS Menu 18**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 19:Exit

➔ Save Changes and Reset

Use the **Save Changes and Reset** option to save the changes made to the BIOS options and reset the system.

➔ Discard Changes and Reset

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

➔ Restore Defaults

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

➔ Save as User Defaults

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

➔ Restore User Defaults

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

Chapter

6

Software Drivers

6.1 Available Software Drivers

NOTE:

The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. Visit the IEI website or contact technical support for the latest updates.

The following drivers can be installed on the system:

- Chipset
- Graphic
- LAN
- Audio

Installation instructions are given below.

6.2 Software Installation

All the drivers for the NANO-HM650 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 6-1).

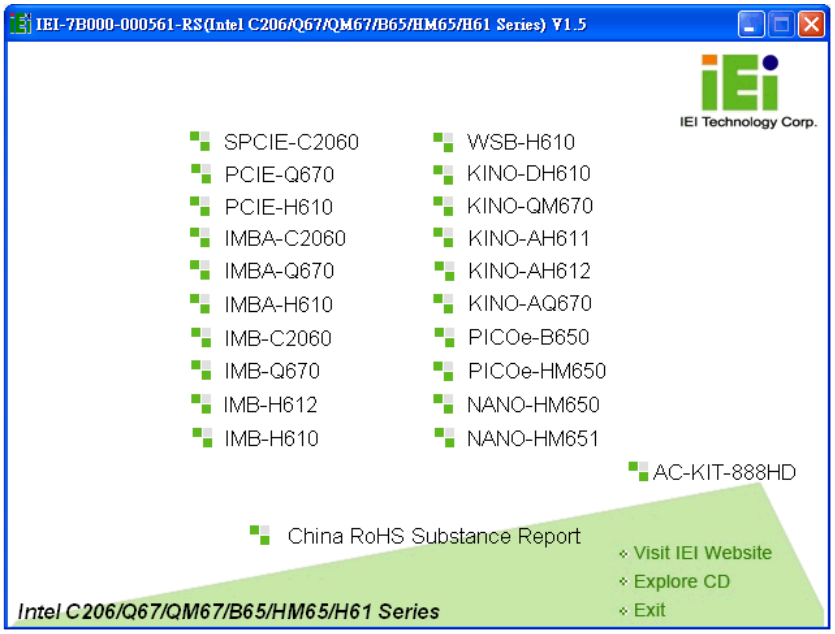


Figure 6-1: Introduction Screen

Step 3: Click NANO-HM650.

Step 4: A new screen with a list of available drivers appears (Figure 6-2).

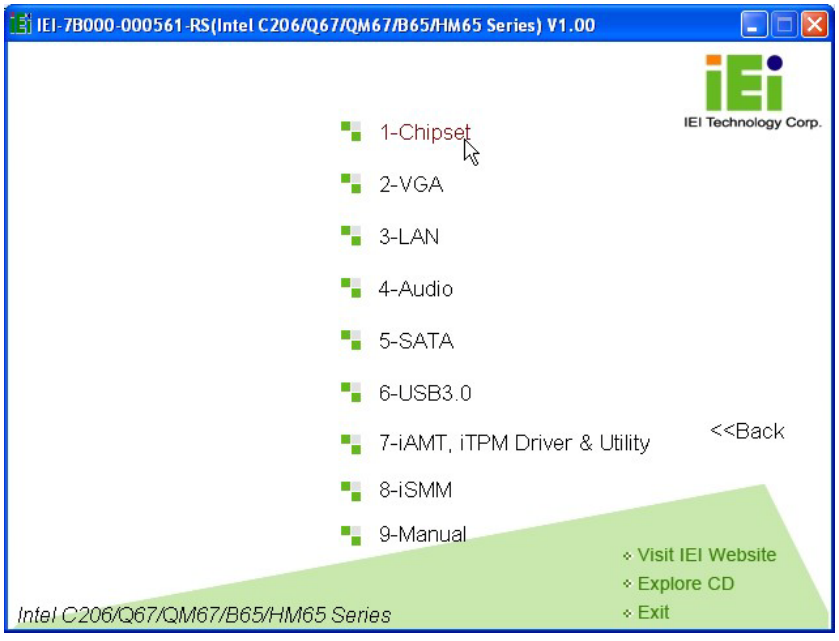


Figure 6-2: Available Drivers

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

6.3 Chipset Driver Installation

To install the chipset driver, please do the following.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click "**Chipset**".

Step 3: Locate the setup file and double click on it.

Step 4: The setup files are extracted as shown in **Figure 6-3**.

Figure 6-3: Chipset Driver Screen

Step 5: When the setup files are completely extracted the **Welcome Screen** in **Figure 6-4** appears.

Step 6: Click **Next** to continue.

Figure 6-4: Chipset Driver Welcome Screen

Step 7: The license agreement in **Figure 6-5** appears.

Step 8: Read the **License Agreement**.

Step 9: Click **Yes** to continue.

Figure 6-5: Chipset Driver License Agreement

Step 10: The **Read Me** file in **Figure 6-6** appears.

Step 11: Click **Next** to continue.

Figure 6-6: Chipset Driver Read Me File

Step 12: **Setup Operations** are performed as shown in **Figure 6-7**.

Step 13: Once the **Setup Operations** are complete, click **Next** to continue.

Figure 6-7: Chipset Driver Setup Operations

Step 14: The **Finish** screen in **Figure 6-8** appears.

Step 15: Select "**Yes, I want to restart this computer now**" and click **Finish**.

Figure 6-8: Chipset Driver Installation Finish Screen

6.4 Graphics Driver Installation

To install the Graphics driver, please do the following.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click "**VGA**" and select the folder which corresponds to the operating system.

Step 3: Double click the setup file.

Step 4: The **Welcome Screen** in **Figure 6-9** appears.

Step 5: Click **Next** to continue.

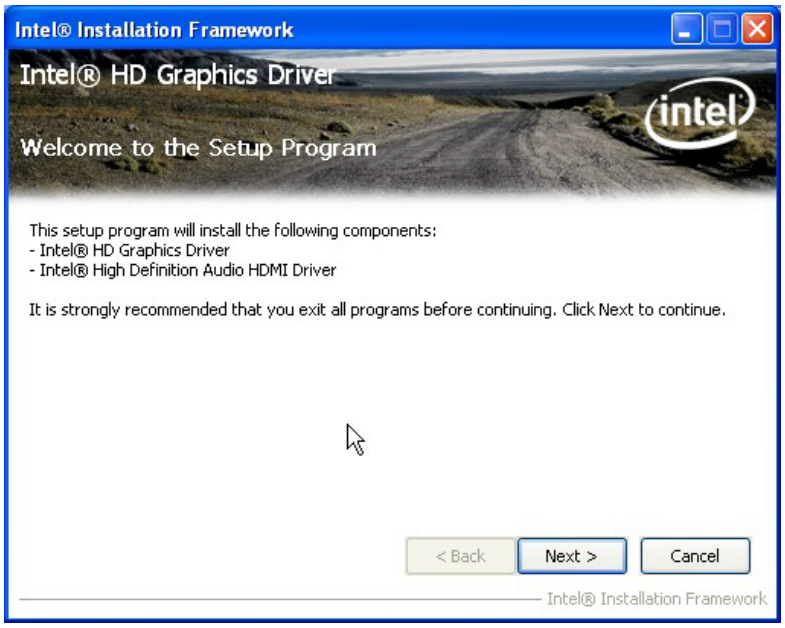


Figure 6-9: Graphics Driver Welcome Screen

Step 6: The **License Agreement** in **Figure 6-10** appears.

Step 7: Click **Yes** to accept the agreement and continue.

Figure 6-10: Graphics Driver License Agreement

Step 8: **Setup Operations** are performed as shown in **Figure 6-11**.

Step 9: Once the **Setup Operations** are complete, click **Next** to continue.

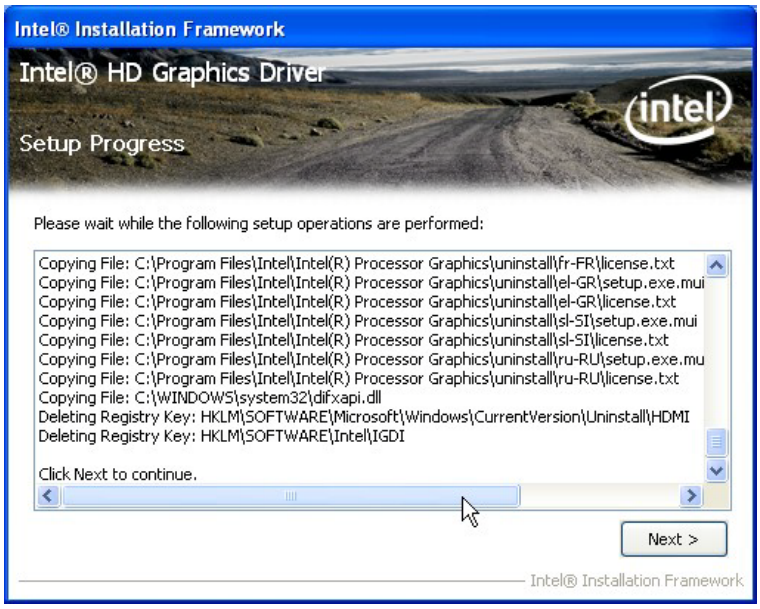


Figure 6-11: Graphics Driver Setup Operations

Step 10: The **Finish** screen in **Figure 6-12** appears.

Step 11: Select "**Yes, I want to restart this computer now**" and click **Finish**.

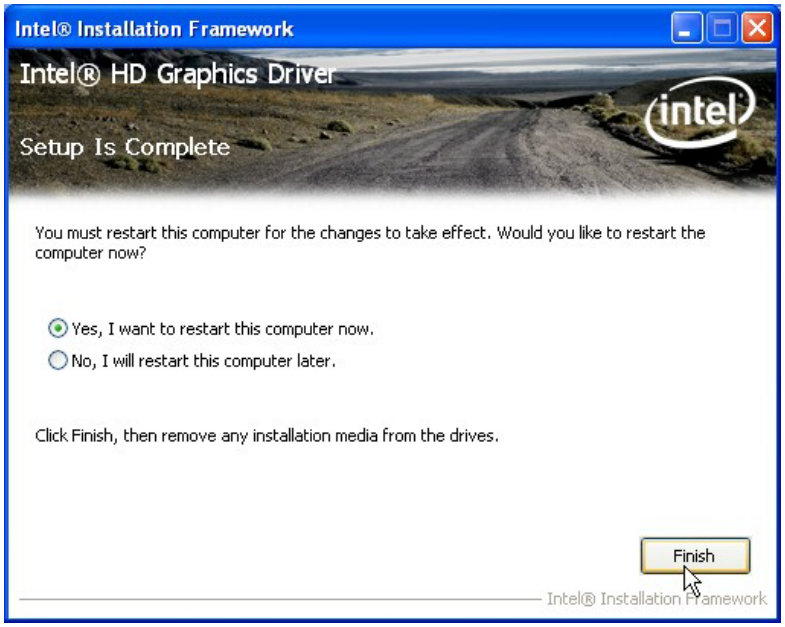


Figure 6-12: Graphics Driver Installation Finish Screen

6.5 LAN Driver Installation

To install the LAN driver, please do the following.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click "**LAN**" and select the folder which corresponds to the operating system.

Step 3: Double click the setup file.

Step 4: The **Welcome** screen in **Figure 6-13** appears.

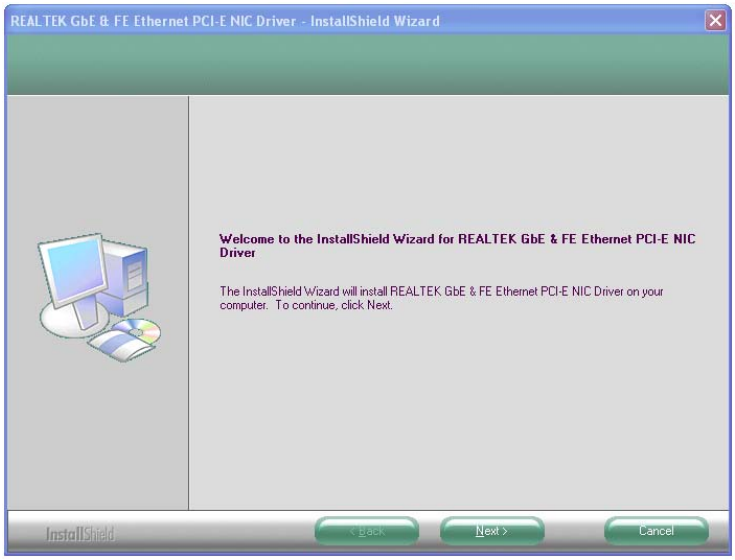


Figure 6-13: LAN Driver Welcome Screen

Step 5: Click **Next** to continue.

Step 6: The **Ready to Install the Program** Screen in **Figure 6-14** appears.

Step 7: Click **Install** to proceed with the installation.

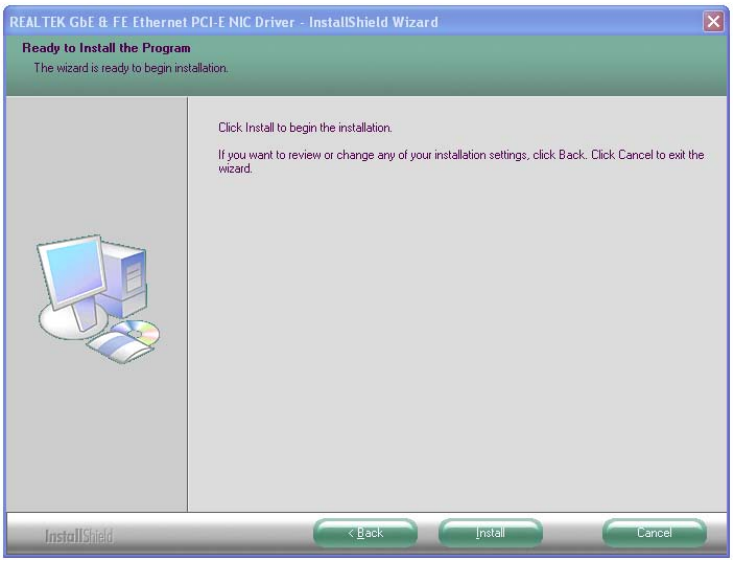


Figure 6-14: LAN Driver Ready to Install Screen

Step 8: The program begins to install.

Step 9: The **Setup Status** screen in **Figure 6-15** appears.

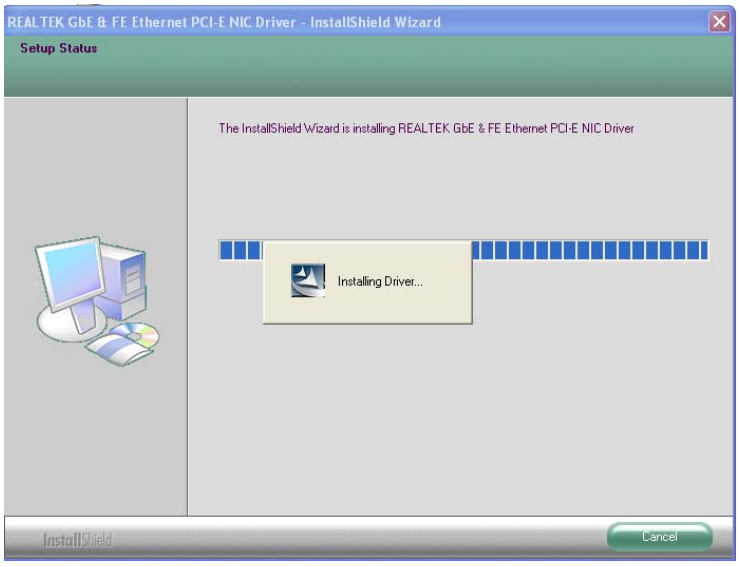


Figure 6-15: LAN Driver Setup Status Screen

Step 10: When the driver installation is complete, the screen in **Figure 6-16** appears.

Step 11: Click **Finish** to exit.

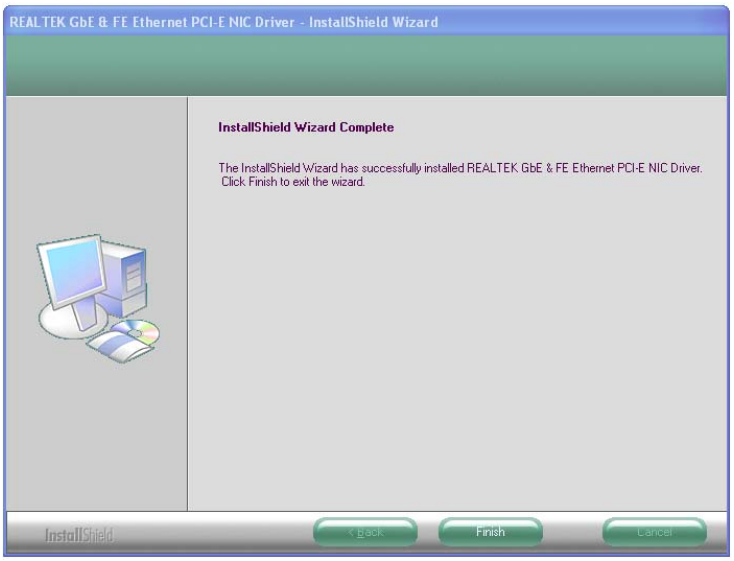


Figure 6-16: LAN Driver Installation Complete

6.6 Audio Driver Installation

To install the audio driver, please do the following.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click "**Audio**" and select the folder which corresponds to the operating system.

Step 3: Double click the setup file.

Step 4: The InstallShield Wizard starts to extracting files (**Figure 6-17**).

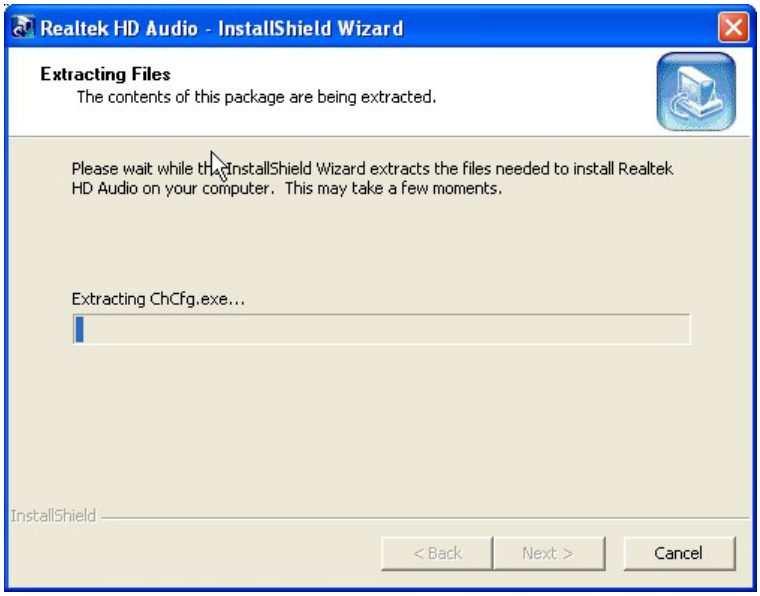


Figure 6-17: Audio Driver – Extracting Files

Step 5: The **Audio Driver Welcome** message in **Figure 6-18** appears.

Step 6: Click **Yes** to install the audio driver.

Figure 6-18: Audio Driver Welcome Screen

Step 7: The audio driver installation begins. See **Figure 6-19**.

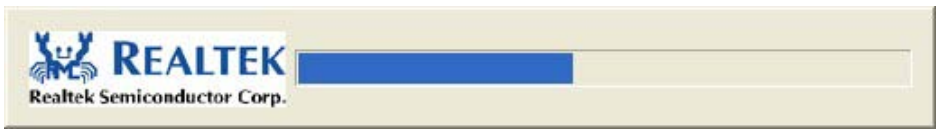


Figure 6-19: Audio Driver Installation

Step 8: When the installation is complete, the screen in **Figure 6-20** appears.

Step 9: Select "**Yes, I want to restart my computer now**" and click **OK**.

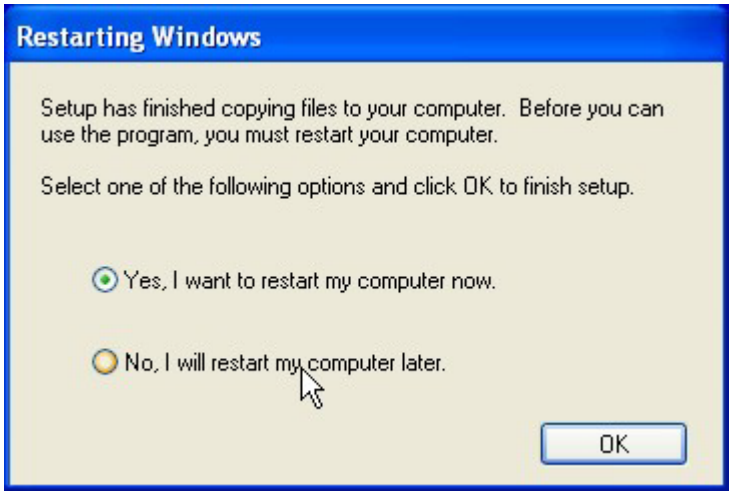


Figure 6-20: Audio Driver Installation Complete

Appendix

A

BIOS Menu Options

Appendix

B

One Key Recovery

B.1 One Key Recovery Introduction

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

NOTE:

The latest One Key Recovery software provides an auto recovery function that allows a system running Microsoft Windows OS to automatically restore from the factory default image after encountering a Blue Screen of Death (BSoD) or a hang for around 10 minutes. Please refer to Section B.3 for the detailed setup procedure.

The IEI One Key Recovery tool menu is shown below.

Figure B-1: IEI One Key Recovery Tool Menu

Prior to using the IEI One Key Recovery tool (as shown in **Figure B-1**) to backup or restore Windows system, five setup procedures are required.

1. Hardware and BIOS setup (see **Section B.2.1**)
2. Create partitions (see **Section B.2.2**)
3. Install operating system, drivers and system applications (see **Section B.2.3**)
4. Build the recovery partition (see **Section B.2.4**)
5. Create factory default image (see **Section B.2.5**)

After completing the five initial setup procedures as described above, users can access the recovery tool by pressing <**F3**> while booting up the system. The detailed information of each function is described in **Section B.5**.

NOTE:

The initial setup procedures for Linux system are described in **Section B.3**.

B.1.1 System Requirement

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.

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.

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 systems (OS). The supported OS versions are listed below.

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

B.2 Setup Procedure for Windows

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

Step 1: Hardware and BIOS setup (see **Section B.2.1**)

Step 2: Create partitions (see **Section B.2.2**)

Step 3: Install operating system, drivers and system applications (see **Section B.2.3**)

Step 4: Build the recovery partition (see **Section B.2.4**) or build the auto recovery partition (see **Section B.3**)

Step 5: Create factory default image (see **Section B.2.5**)

The detailed descriptions are described in the following sections.

NOTE:

The setup procedures described below are for Microsoft Windows operating system users. For Linux, most of the setup procedures are the same except for several steps 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 drive or SSD in the system. An unformatted and unpartitioned disk is recommended.

Step 3: Connect an optical disk drive to the system 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

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.

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

Step 2: **Boot the system from recovery CD**. When prompted, press any key to boot from the recovery CD. It will take a while to launch the recovery tool. Please be patient!

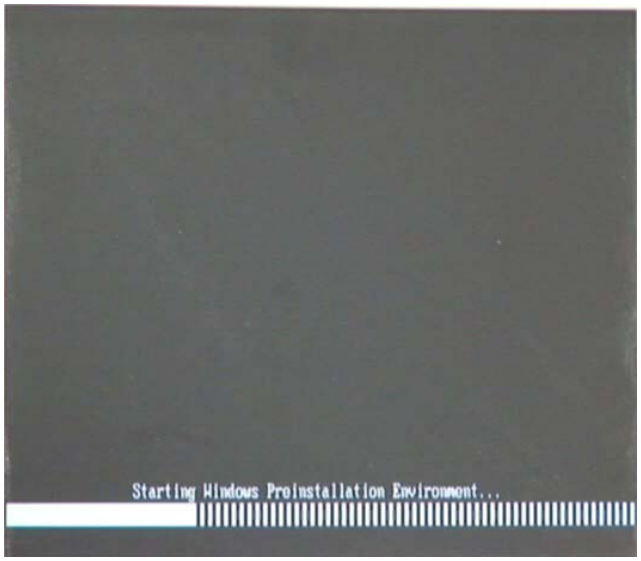


Figure B-2: Launching the Recovery Tool

Step 3: The recovery tool setup menu is shown as below.

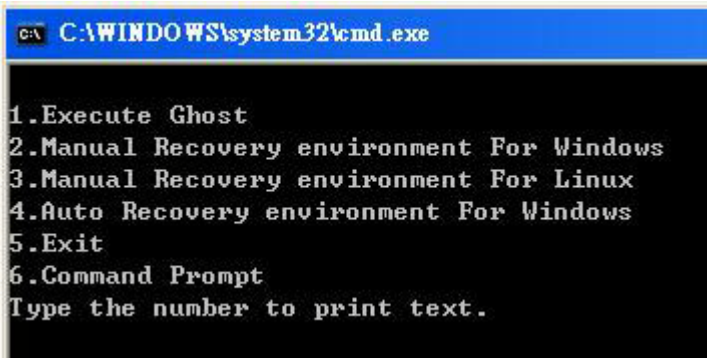


Figure B-3: Recovery Tool Setup Menu

Step 4: Press <**6**> then <Enter>.

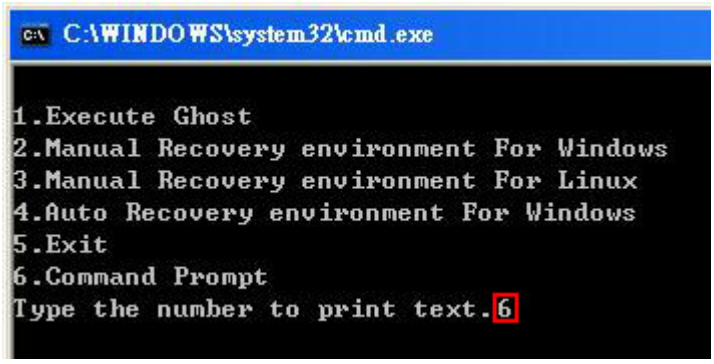


Figure B-4: Command Prompt

Step 5: The command prompt window appears. Type the following commands (marked in red) to create two partitions. One is for the OS installation; the other is for saving recovery files and images which will be an invisible partition.

(Press <Enter> after entering each line below)

system32>diskpart

DISKPART>list vol

DISKPART>sel disk 0

DISKPART>create part pri size= ___

DISKPART>assign letter=N

DISKPART>create part pri size= ___

DISKPART>assign letter=F

DISKPART>exit

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

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

system32>exit

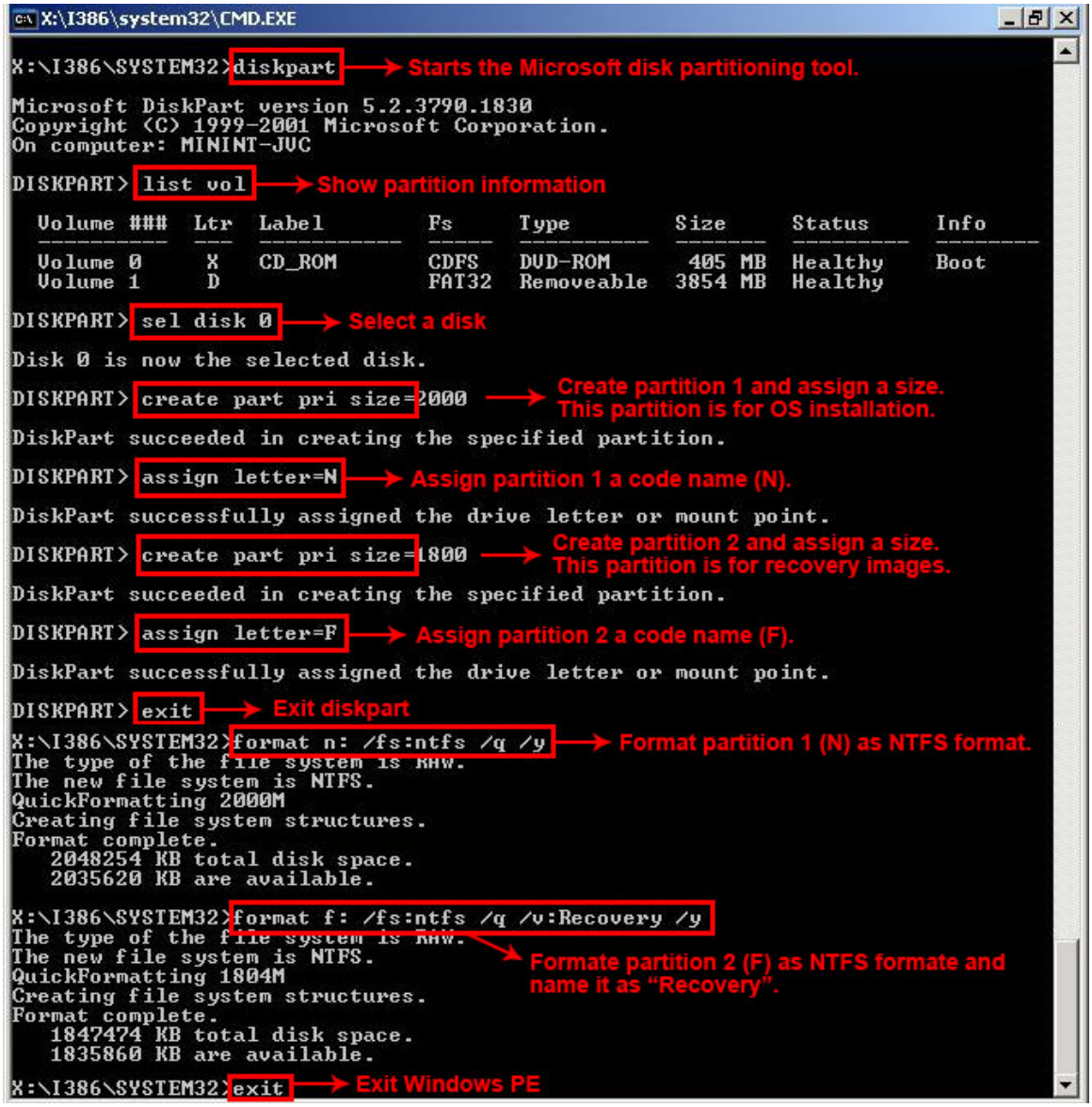
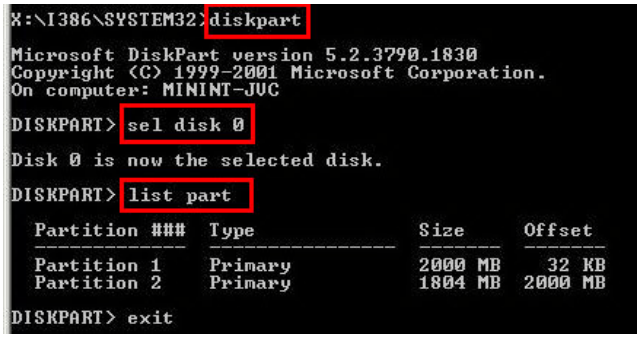


Figure B-5: Partition Creation Commands

NOTE:

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



Step 6: Press any key to exit the recovery tool and automatically reboot the system.

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

B.2.3 Install Operating System, Drivers and Applications

Install the operating system onto the unlabelled partition. The partition labeled "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 Building the Recovery Partition

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

Step 2: Start the system.

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

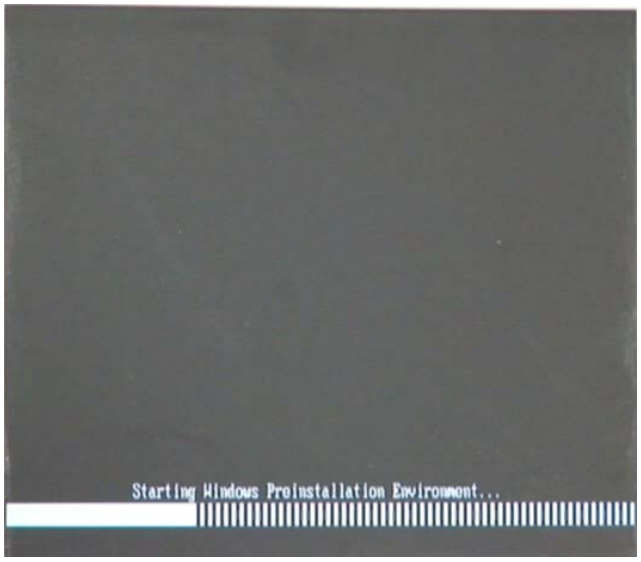


Figure B-6: Launching the Recovery Tool

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

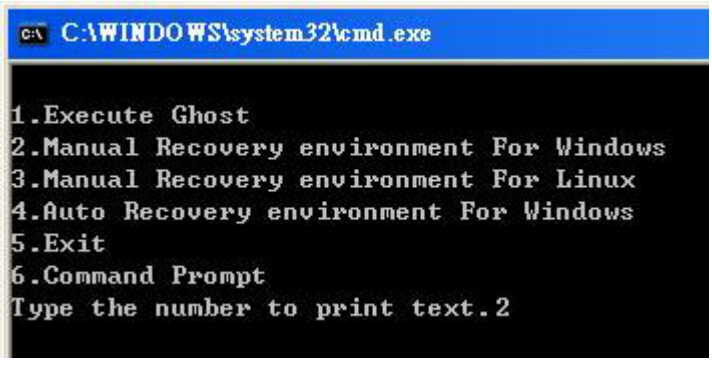


Figure B-7: Manual Recovery Environment for Windows

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

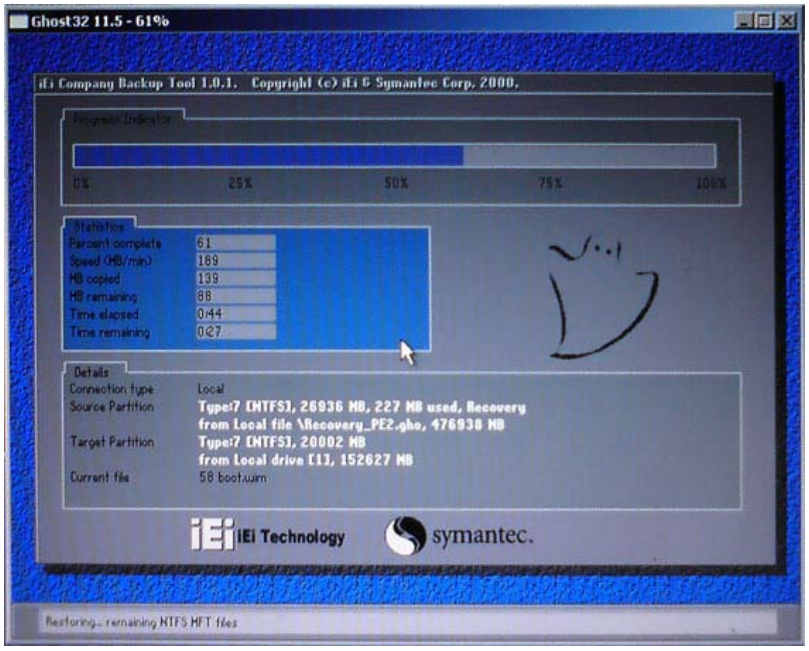


Figure B-8: Building the Recovery Partition

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

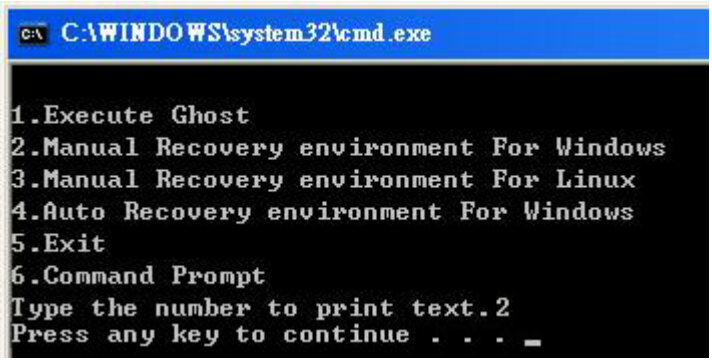


Figure B-9: Press Any Key to Continue

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-10**), 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.

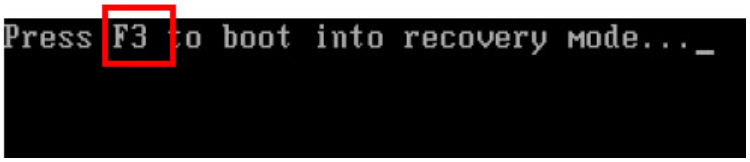


Figure B-10: Press F3 to Boot into Recovery Mode

Step 2: The recovery tool menu appears. Type <**4**> and press <**Enter**>. (**Figure B-11**)

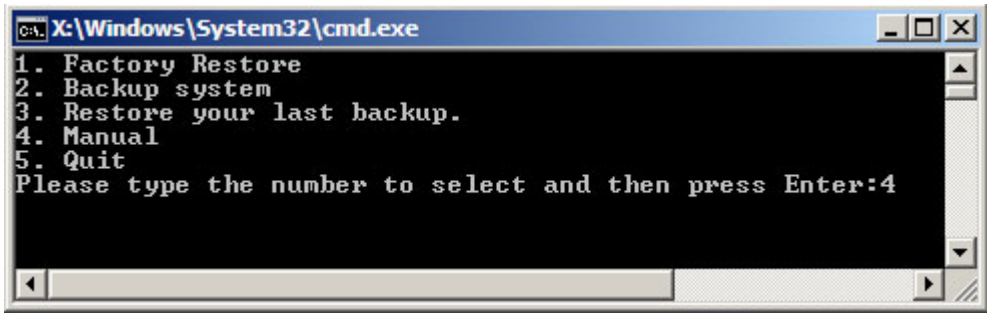


Figure B-11: Recovery Tool Menu

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

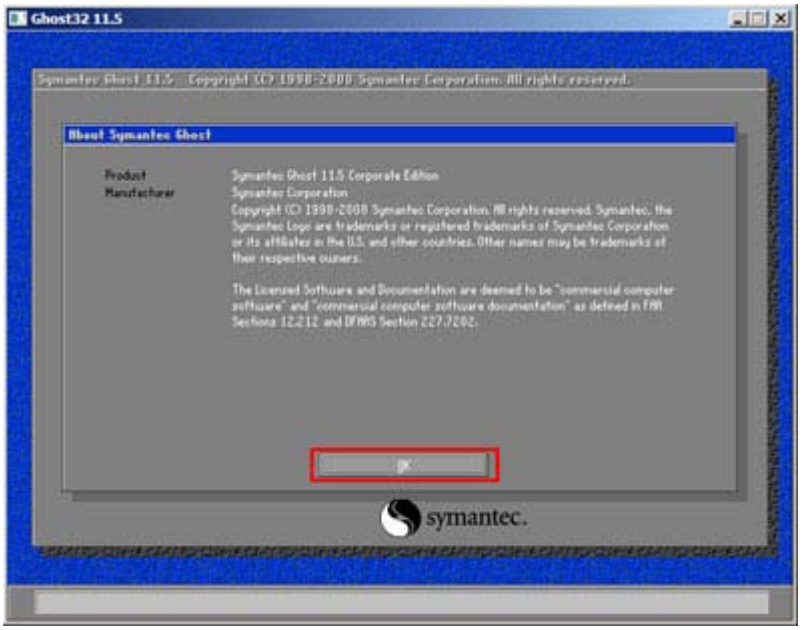


Figure B-12: About Symantec Ghost Window

Step 4: Use mouse to navigate to the option shown below (**Figure B-13**).

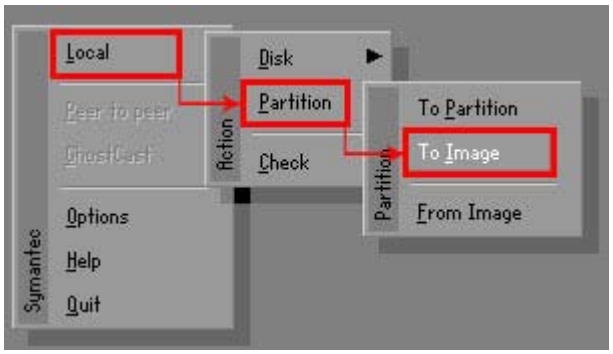


Figure B-13: Symantec Ghost Path

Step 5: Select the local source drive (Drive 1) as shown in **Figure B-14**. Then click OK.

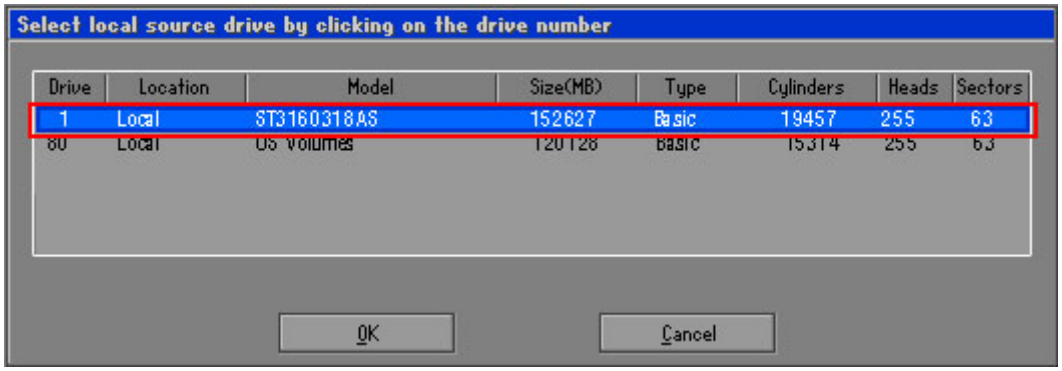


Figure B-14: Select a Local Source Drive

Step 6: Select a source partition (Part 1) from basic drive as shown in **Figure B-15**. Then click OK.

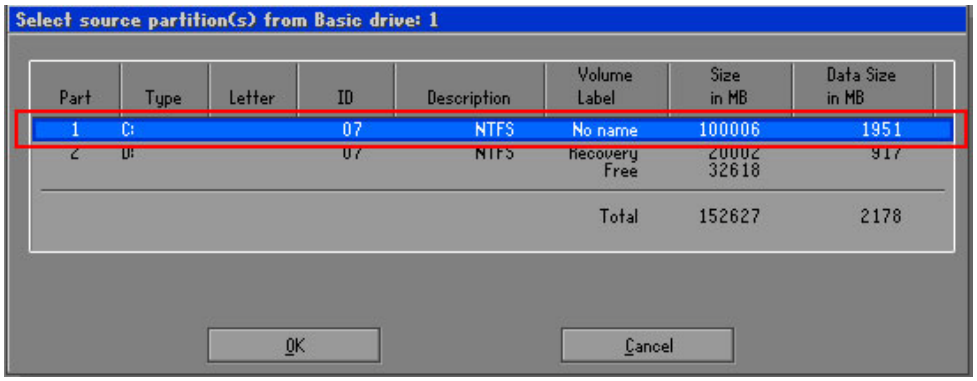


Figure B-15: Select a Source Partition from Basic Drive

Step 7: Select **1.2: [Recovery] NTFS drive** and enter a file name called **iei** (**Figure B-16**). 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**.

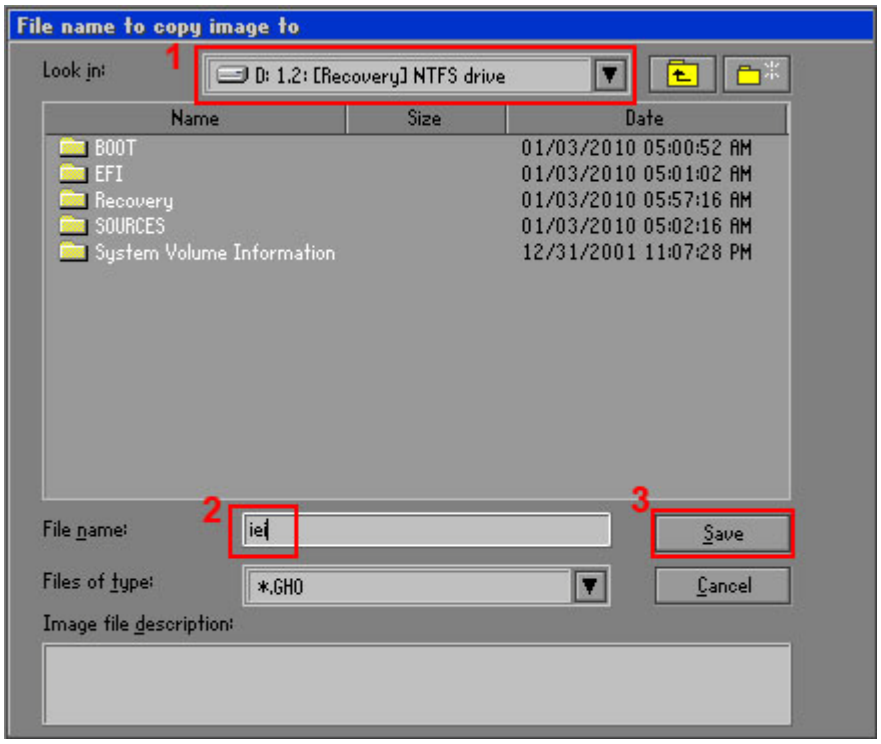


Figure B-16: File Name to Copy Image to

Step 8: When the Compress Image screen in **Figure B-17** prompts, click **High** to make the image file smaller.

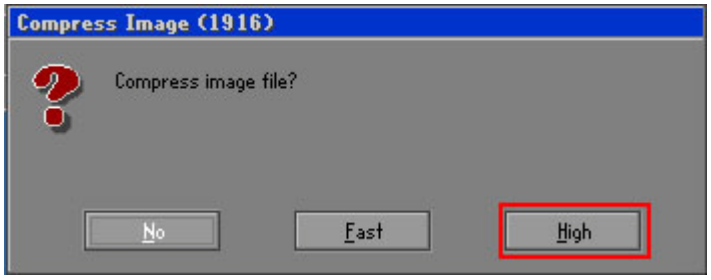


Figure B-17: Compress Image

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

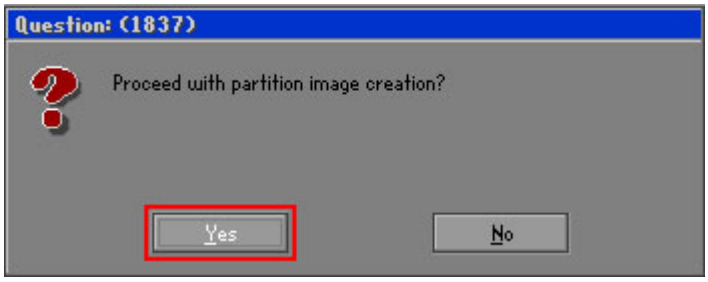


Figure B-18: Image Creation Confirmation

Step 10: The Symantec Ghost starts to create the factory default image (**Figure B-19**).

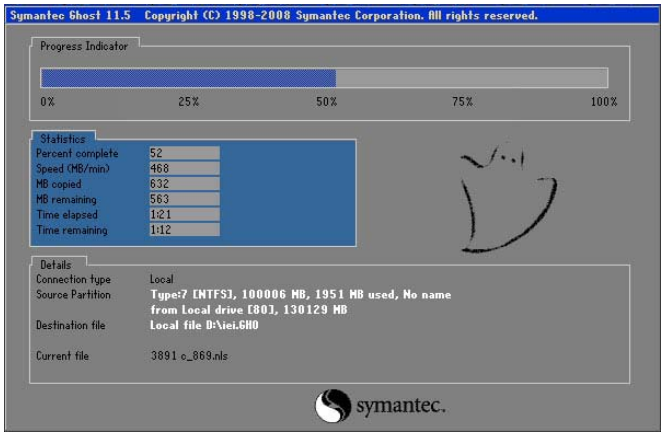


Figure B-19: Image Creation Complete

Step 11: When the image creation completes, a screen prompts as shown in **Figure B-20**. Click **Continue** and close the Ghost window to exit the program.

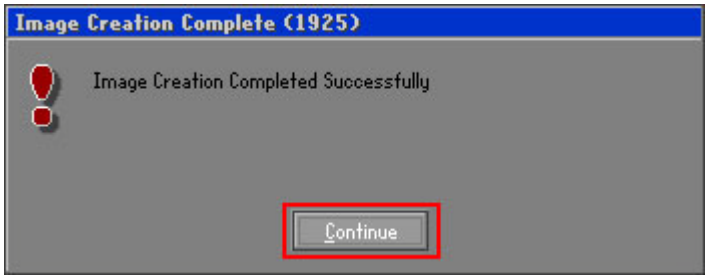


Figure B-20: Image Creation Complete

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

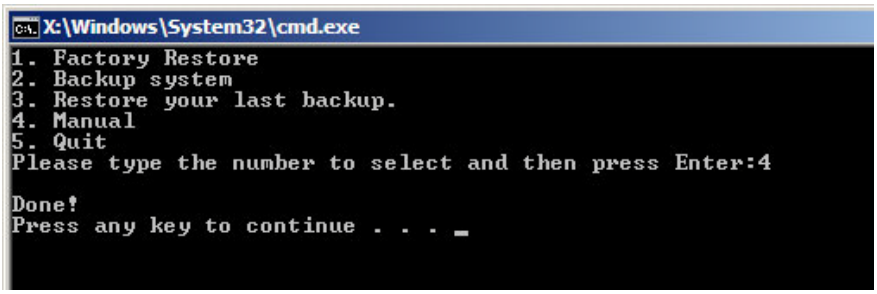


Figure B-21: Press Any Key to Continue

B.3 Auto Recovery Setup Procedure

The auto recovery function allows a system to automatically restore from the factory default image after encountering a Blue Screen of Death (BSoD) or a hang for around 10 minutes. To use the auto recovery function, follow the steps described in the following sections.

CAUTION:

The setup procedure may include a step to create a factory default image. It is suggested to configure the system to a factory default environment before the configuration, including driver and application installations.

Step 1: Follow the steps described in **Section B.2.1 ~ Section B.2.3** to setup BIOS, create partitions and install operating system.

Step 2: Install the auto recovery utility into the system by double clicking the **Utility/AUTORECOVERY-SETUP.exe** in the One Key Recovery CD. This utility MUST be installed in the system, otherwise, the system will automatically restore from the factory default image every ten (10) minutes.

Figure B-22: Auto Recovery Utility

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

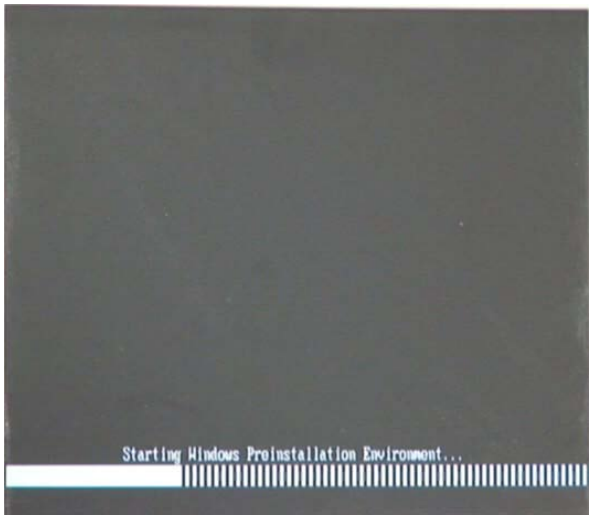


Figure B-23: Launching the Recovery Tool

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

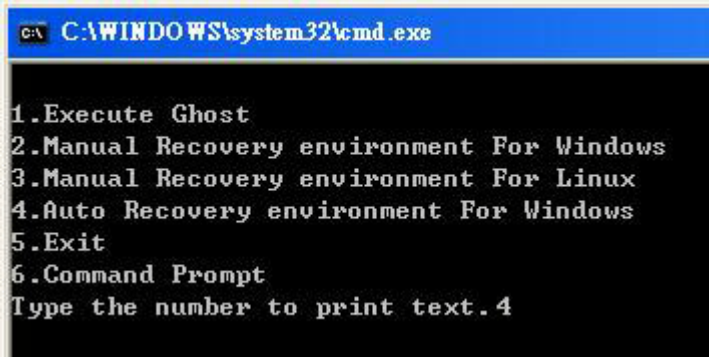


Figure B-24: Auto Recovery Environment for Windows

Step 5: The Symantec Ghost window appears and starts configuring the system to build an auto recovery partition. In this process the partition created for recovery files in **Section B.2.2** is hidden and the auto recovery tool is saved in this partition.

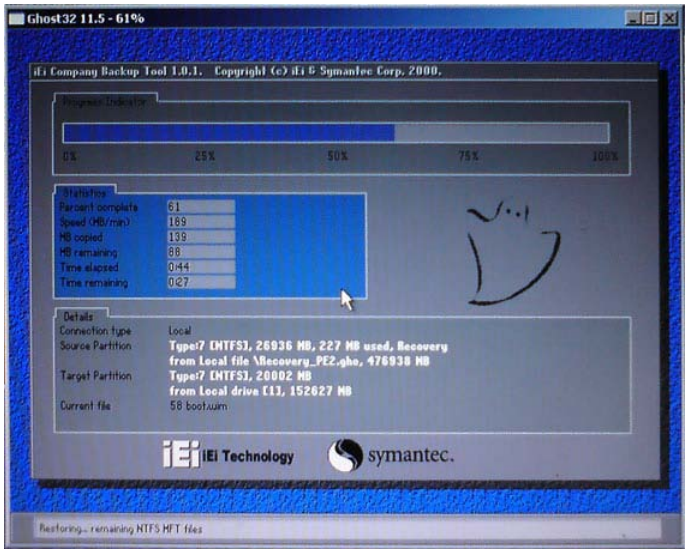


Figure B-25: Building the Auto Recovery Partition

Step 6: After completing the system configuration, the following message prompts to confirm whether to create a factory default image. Type **Y** to have the system create a factory default image automatically. Type **N** within 6 seconds to skip this process (The default option is YES). It is suggested to choose YES for this option.

Figure B-26: Factory Default Image Confirmation

Step 7: The Symantec Ghost starts to create the factory default image (**Figure B-27**).

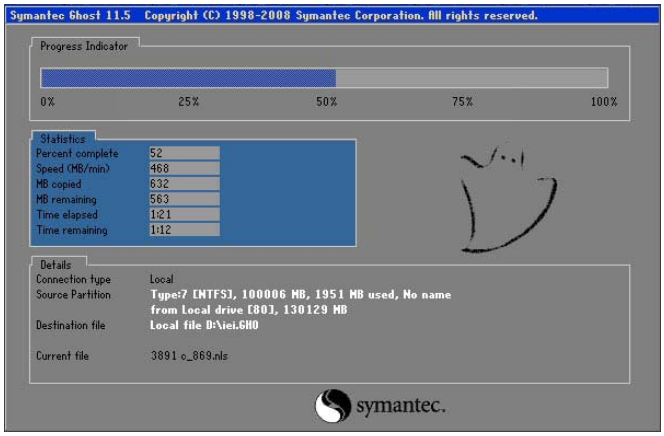


Figure B-27: Image Creation Complete

Step 8: After completing the system configuration, press any key in the following window to restart the system.

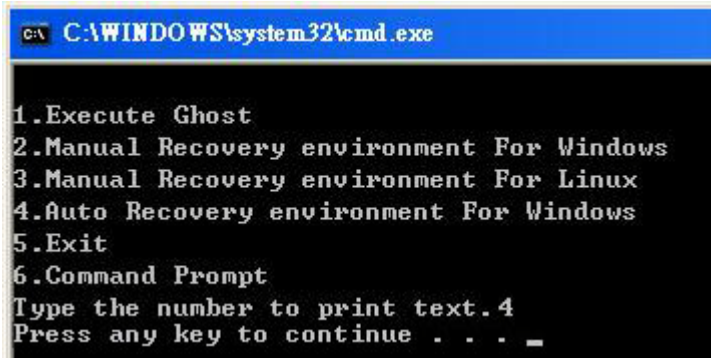
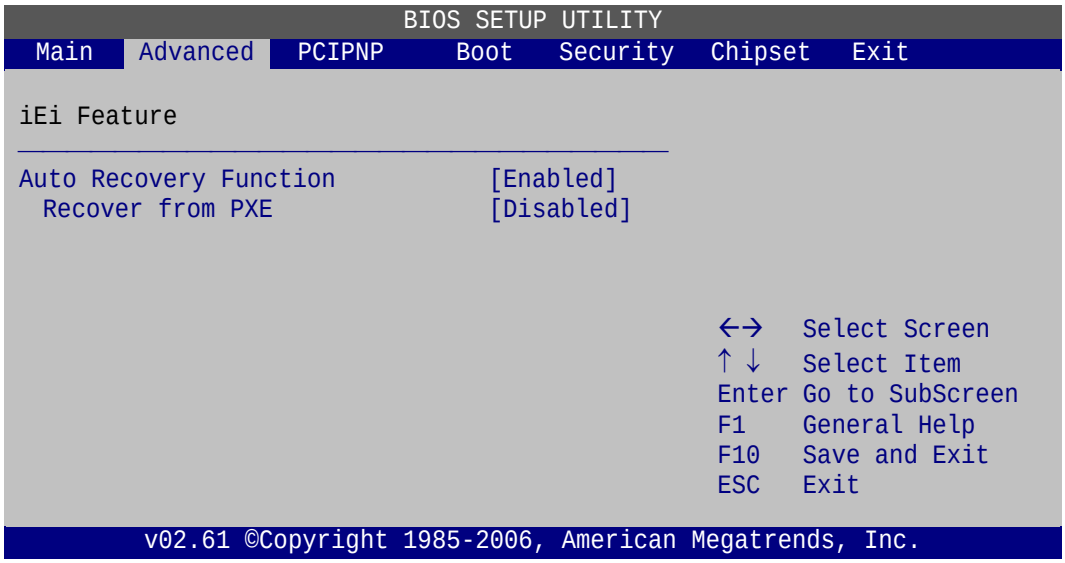


Figure B-28: Press any key to continue

Step 9: Eject the One Key Recovery CD and restart the system.

Step 10: Press the <**DELETE**> key as soon as the system is turned on to enter the BIOS.

Step 11: Enable the Auto Recovery Function option (**Advanced → iEi Feature → Auto Recovery Function**).



BIOS Menu 20: IEI Feature

Step 12: Save changes and restart the system. If the system encounters a Blue Screen of Death (BSoD) or a hang for around 10 minutes, it will automatically restore from the factory default image.

CAUTION:

The auto recovery function can only apply on a Microsoft Windows system running the following OS versions:

- Windows XP
- Windows Vista
- Windows 7

B.4 Setup Procedure for Linux

The initial setup procedure for Linux system is 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.

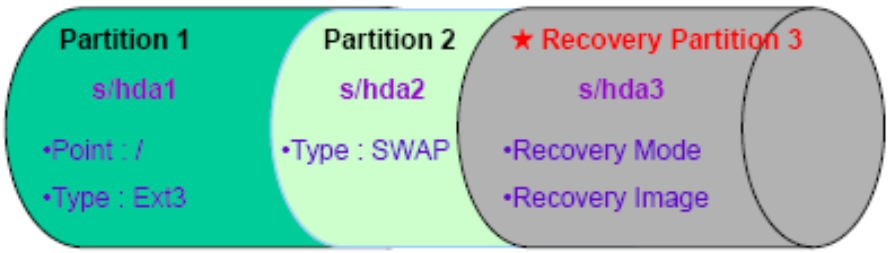


Figure B-29: Partitions for Linux

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 the 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-30**). The Symantec Ghost window appears and starts configuring the system to build a recovery partition. After completing the system configuration, press any key to reboot the system. Eject the recovery CD.

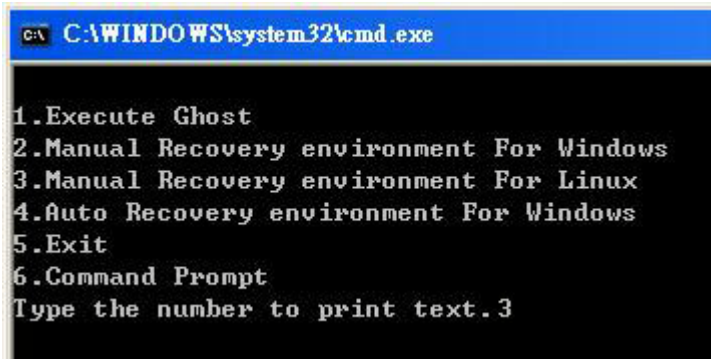


Figure B-30: Manual Recovery Environment for Linux

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, enter Administrator (root). When prompt appears, type:

cd /boot/grub

vi menu.lst

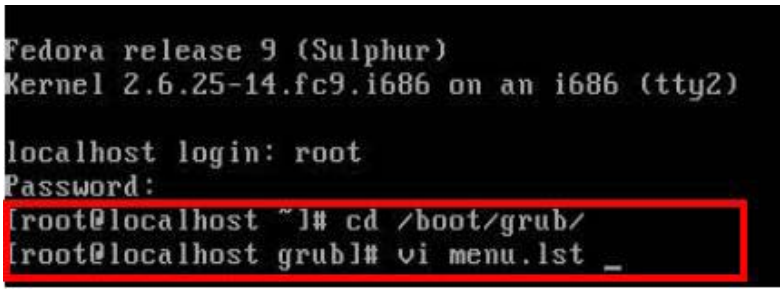
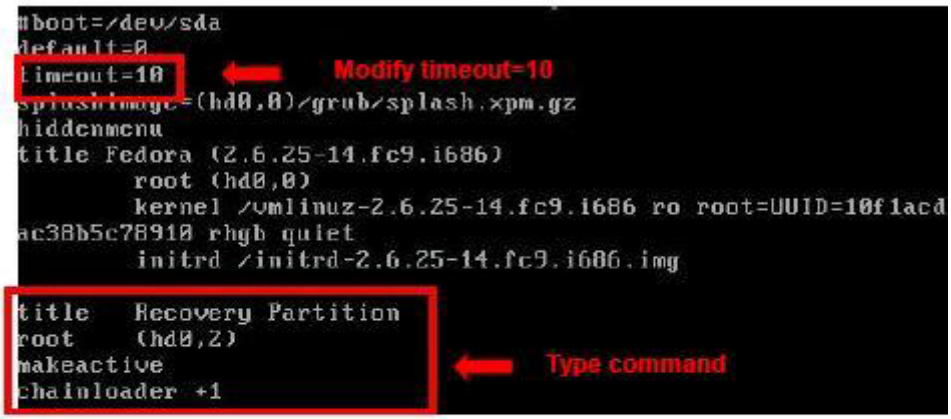


Figure B-31: Access menu.lst in Linux (Text Mode)

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



- Type command:

  title Recovery Partition

  root (hd0,2)

  makeactive

  chainloader +1

Step 7: The recovery tool menu appears. (**Figure B-32**)

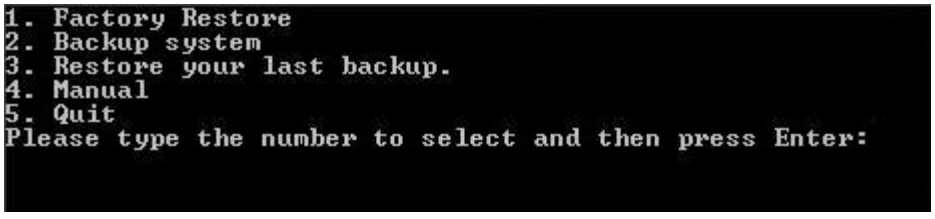


Figure B-32: Recovery Tool Menu

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.5 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. However, if the setup procedure in Section B.3 has been completed and the auto recovery function is enabled, the system will automatically restore from the factory default image without pressing the F3 key. The recovery tool main menu is shown below.

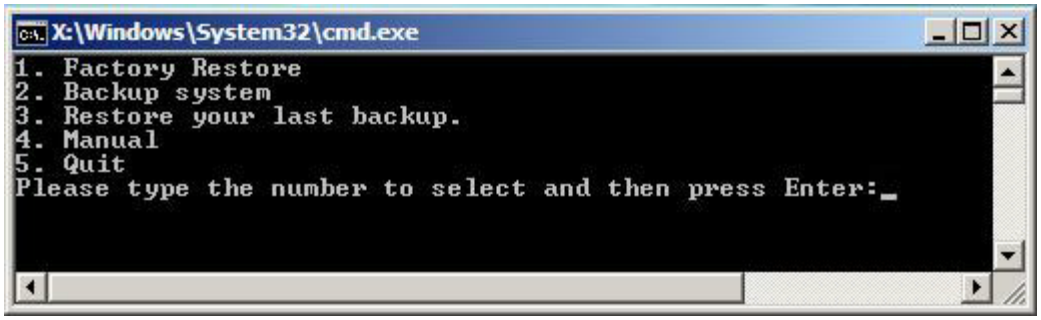


Figure B-33: Recovery Tool Main Menu

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.5.1 Factory Restore

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

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

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

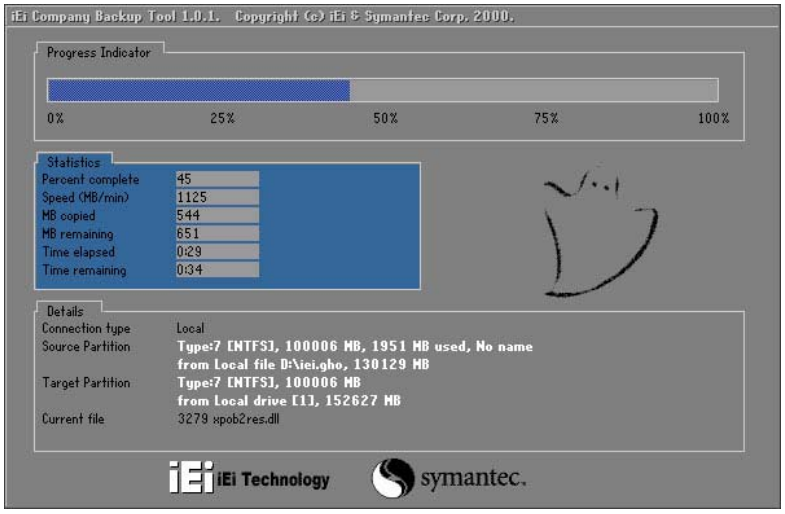


Figure B-34: Restore Factory Default

Step 3: The screen shown in **Figure B-35** appears when completed. Press any key to reboot the system.

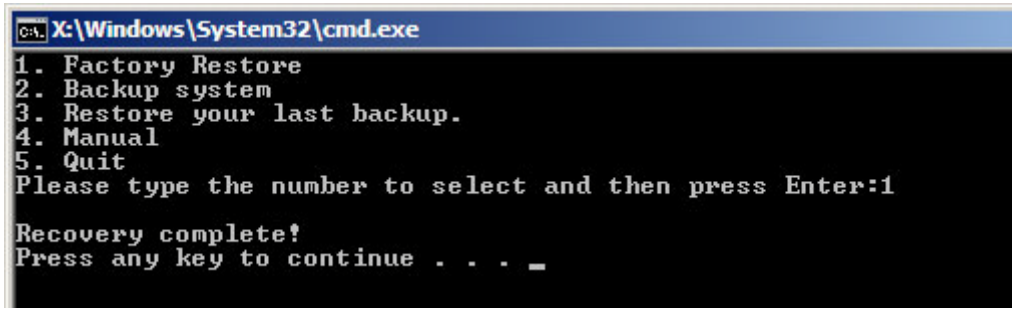


Figure B-35: Recovery Complete Window

B.5.2 Backup System

To backup the system, please follow the steps below.

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

Step 2: The Symantec Ghost window appears and starts to backup the system. A backup image called **iei_user.GHO** is created in the hidden Recovery partition.

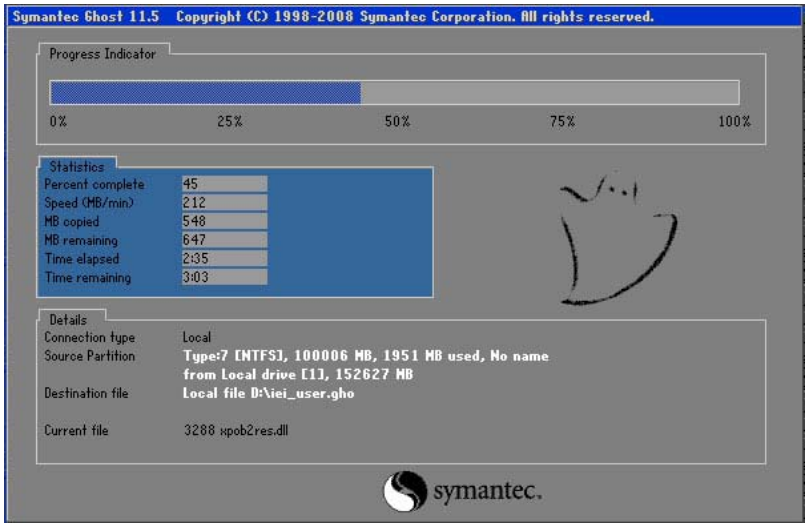


Figure B-36: Backup System

Step 3: The screen shown in **Figure B-37** appears when system backup is complete. Press any key to reboot the system.

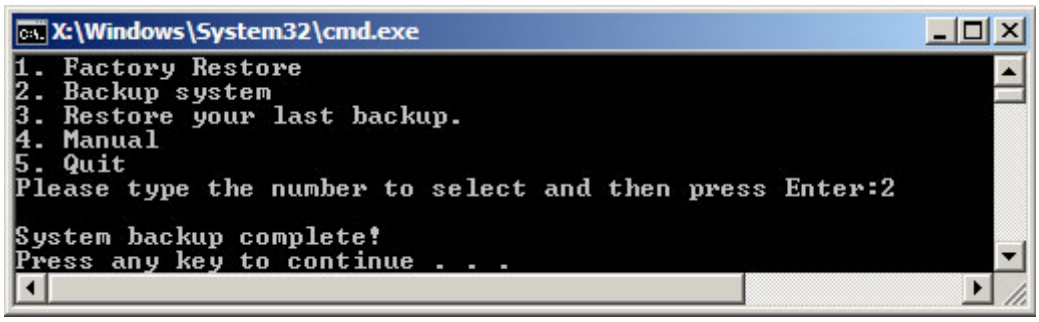


Figure B-37: System Backup Complete Window

B.5.3 Restore Your Last Backup

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

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

Step 2: The Symantec Ghost window appears and starts to restore the last backup image (iei_user.GHO).

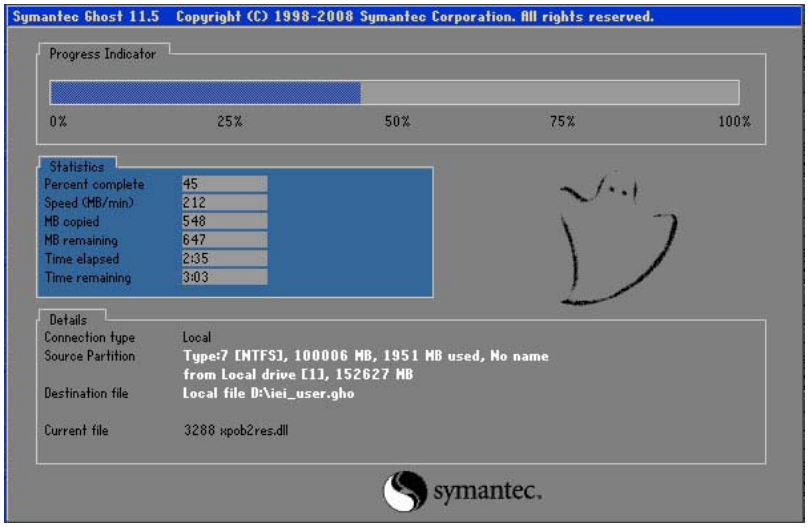


Figure B-38: Restore Backup

Step 3: The screen shown in **Figure B-39** appears when backup recovery is complete. Press any key to reboot the system.

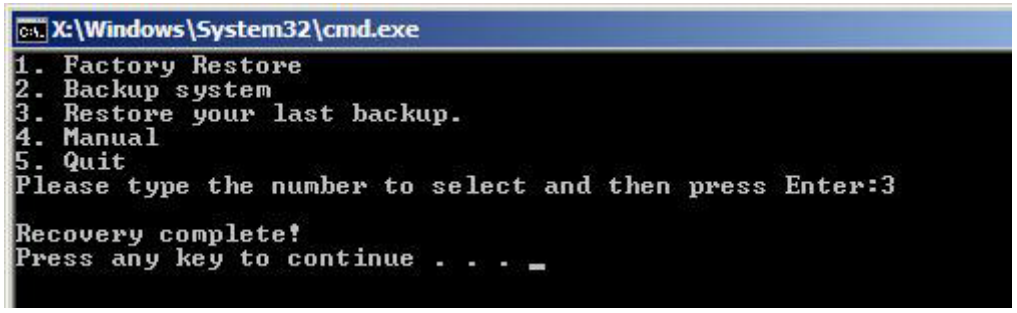


Figure B-39: Restore System Backup Complete Window

B.5.4 Manual

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

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

Step 2: The Symantec Ghost window appears. Use the Ghost program to backup or recover the system manually.

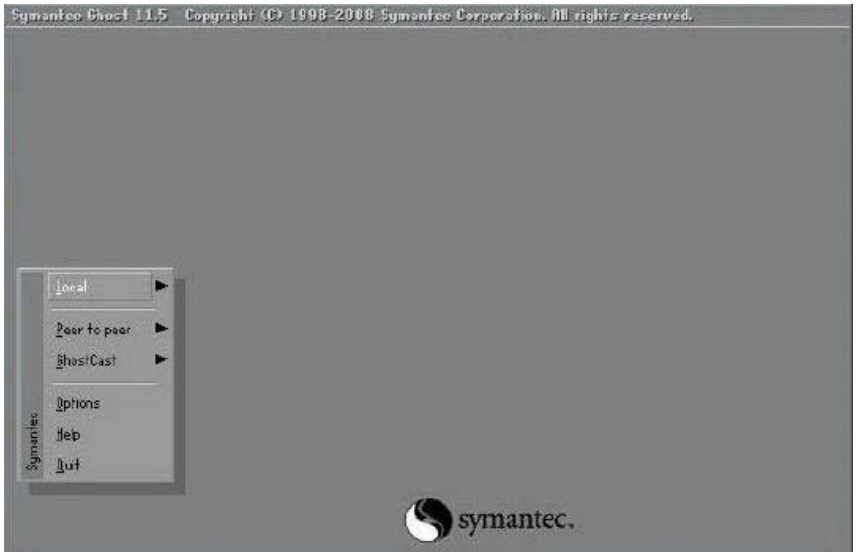
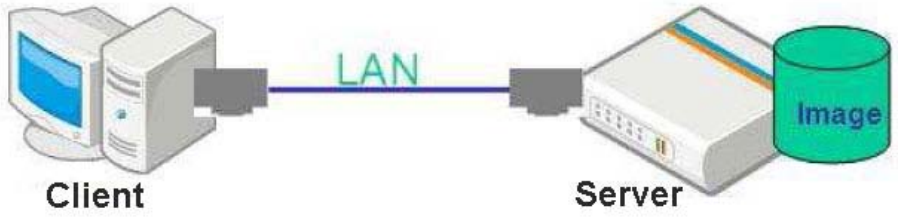


Figure B-40: Symantec Ghost Window

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

B.6 Restore Systems from a Linux Server through LAN

The One Key Recovery allows a client system to automatically restore to a factory default image saved in a Linux system (the server) through LAN connectivity after encountering a Blue Screen of Death (BSoD) or a hang for around 10 minutes. To be able to use this function, the client system and the Linux system MUST reside in the same domain.



NOTE:

The supported client OS includes:

- Windows 2000
- Windows 7
- Windows XP
- Windows CE
- Windows Vista
- Windows XP Embedded

Prior to restoring client systems from a Linux server, a few setup procedures are required.

Step 1: Configure DHCP server settings

Step 2: Configure TFTP settings

Step 3: Configure One Key Recovery server settings

Step 4: Start DHCP, TFTP and HTTP

Step 5: Create a shared directory

Step 6: Setup a client system for auto recovery

The detailed descriptions are described in the following sections. In this document, two types of Linux OS are used as examples to explain the configuration process – CentOS 5.5 (Kernel 2.6.18) and Debian 5.0.7 (Kernel 2.6.26).

B.6.1 Configure DHCP Server Settings

Step 1: Install the DHCP

#yum install dhcp (CentOS, commands marked in red)

#apt-get install dhcp3-server (Debian, commands marked in blue)

Step 2: Confirm the operating system default settings: dhcpd.conf.

CentOS

Use the following command to show the DHCP server sample location:

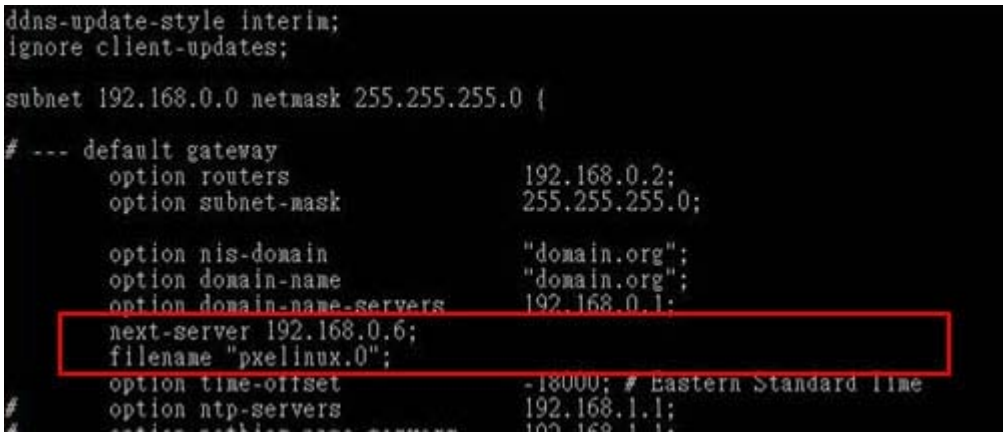
#vi /etc/dhcpd.conf

The DHCP server sample location is shown as below:

Use the following command to copy the DHCP server sample to etc/dhcpd.conf:

#cp /usr/share/doc/dhcp-3.0.5/dhcpd.conf.sample /etc/dhcpd.conf

#vi /etc/dhcpd.conf



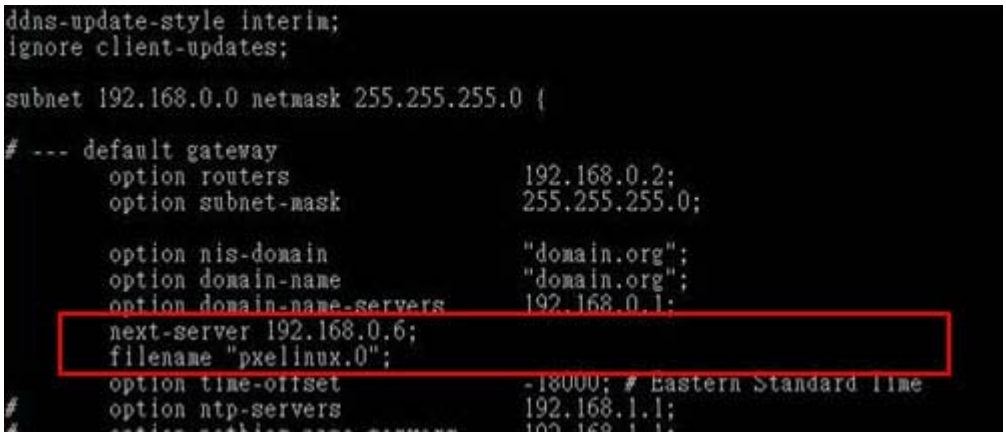
Debian

#vi /etc/dhcpd.conf

Edit “/etc/dhcpd.conf” for your environment. For example, add

next-server PXE server IP address;

filename “pxelinux.0”;



B.6.2 Configure TFTP Settings

Step 1: Install the tftp, httpd and syslinux.

#yum install tftp-server httpd syslinux (CentOS)

#apt-get install tftpd-hpa xinetd syslinux (Debian)

Step 2: Enable the TFTP server by editing the “/etc/xinetd.d/tftp” file and make it use the remap file. The “-vvv” is optional but it could definitely help on getting more information while running the remap file. For example:

CentOS

#vi /etc/xinetd.d/tftp

Modify:

disable = no

server_args = -s /tftpboot –m /tftpboot/tftpd.remap -vvv_

```
        socket_type             = dgram
        protocol                = udp
        wait                    = yes
        user                    = root
        server                  = /usr/sbin/in.tftpd
        server_args             = -s /tftpboot -m /tftpboot/tftpd.remap -vvv
        disable                 = no
        per_source              = 11
        cps                     = 100 2
        flags                   = IPv4
```

Debian

Replace the TFTP settings from “inetd” to “xinetd” and annotate the “inetd” by adding “#”.

#vi /etc/inetd.conf

Modify: #tftp dgram udp wait root /usr/sbin..... (as shown below)

```
#:BOOT: TFTP service is provided primarily for booting.  Most sites
#       run this only on machines acting as "boot servers."

#tftp           dgram   udp     wait    root  /usr/sbin/in.tftpd /usr/sbin/in.tftpd -s
 /var/lib/tftpboot
```

#vi /etc/xinetd.d/tftp

```
        socket_type             = dgram
        protocol                = udp
        wait                    = yes
        user                    = root
        server                  = /usr/sbin/in.tftpd
        server_args             = -s /tftpboot -m /tftpboot/tftpd.remap -vvv
        disable                 = no
        per_source              = 11
        cps                     = 100 2
        flags                   = IPv4
```

B.6.3 Configure One Key Recovery Server Settings

Step 1: Copy the **Utility/RECOVERYR10.TAR.BZ2** package from the One Key Recovery CD to the system (server side).

Step 2: Extract the recovery package to /.

#cp RecoveryR10.tar.bz2 /

#cd /

#tar –xvjf RecoveryR10.tar.bz2

Step 3: Copy “pxelinux.0” from “syslinux” and install to “/tftboot”.

#cp /usr/lib/syslinux/pxelinux.0 /tftpboot/

B.6.4 Start the DHCP, TFTP and HTTP

Start the DHCP, TFTP and HTTP. For example:

CentOS

#service xinetd restart

#service httpd restart

#service dhcpd restart

Debian

#/etc/init.d/xinetd reload

#/etc/init.d/xinetd restart

#/etc/init.d/dhcp3-server restart

B.6.5 Create Shared Directory

Step 1: Install the samba.

#yum install samba

Step 2: Create a shared directory for the factory default image.

#mkdir /share

#cd /share

#mkdir /image

#cp iei.gho /image

WARNING:

The file name of the factory default image must be **iei.gho**.

Step 3: Confirm the operating system default settings: smb.conf.

#vi /etc/samba/smb.conf

Modify:

[image]

comment = One Key Recovery

path = /share/image

browseable = yes

writable = yes

public = yes

create mask = 0644

directory mask = 0755

Step 4: Edit "/etc/samba/smb.conf" for your environment. For example:

```
# "security = user" is always a good idea. This will require a Unix account
# in this server for every user accessing the server. See
# /usr/share/doc/samba-doc/htmldocs/Samba3-HOWTO/ServerType.html
# in the samba-doc package for details.
   security = share
```

```
[image]
   comment = One Key Recovery
   path = /share/image
   browseable = yes
   writable = yes
   public = yes
   create mask = 0644
   directory mask = 0755
```

Step 5: Modify the hostname

#vi /etc/hostname

Modify: RecoveryServer

```
RecoveryServer
~
```

B.6.6 Setup a Client System for Auto Recovery

Step 1: Configure the following BIOS options of the client system.

Advanced → iEi Feature → Auto Recovery Function → **Enabled**

Advanced → iEi Feature → Recover from PXE → **Enabled**

Boot → Launch PXE OpROM → **Enabled**

Step 2: Continue to configure the **Boot Option Priorities** BIOS option of the client system:

Boot Option #1 → remain the default setting to boot from the original OS.

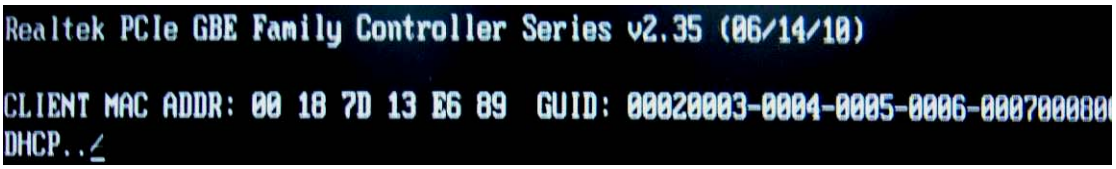
Boot Option #2 → select the boot from LAN option.

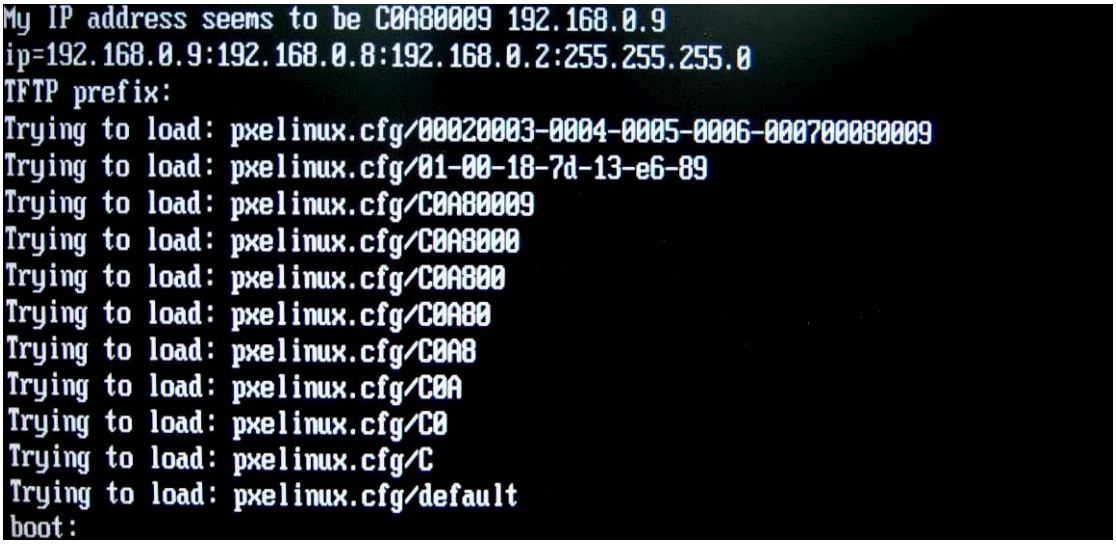
Step 3: Save changes and exit BIOS menu.

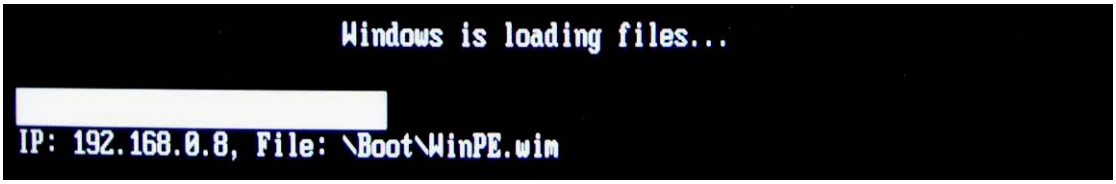
Exit → **Save Changes and Exit**

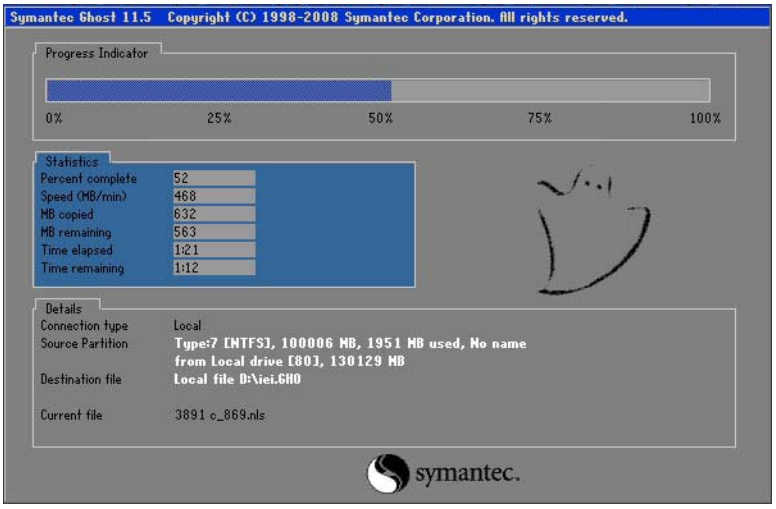
Step 4: Install the auto recovery utility into the system by double clicking the **Utility/AUTORECOVERY-SETUP.exe** in the One Key Recovery CD. This utility MUST be installed in the system, otherwise, the system will automatically restore from the factory default image every ten (10) minutes.

Step 5: Restart the client system from LAN. If the system encounters a Blue Screen of Death (BSoD) or a hang for around 10 minutes, it will automatically restore from the factory default image. The following screens will show when the system starts auto recovering.









NOTE:

A firewall or a SELinux is not in use in the whole setup process. If there is a firewall or a SELinux protecting the system, modify the configuration information to accommodate them.

B.7 Other Information

B.7.1 Using AHCI Mode or ALi M5283 / VIA VT6421A Controller

When the system uses AHCI mode or some specific SATA controllers such as ALi M5283 or VIA VT6421A, the SATA RAID/AHCI driver must be installed before using one key recovery. Please follow the steps below to install the SATA RAID/AHCI driver.

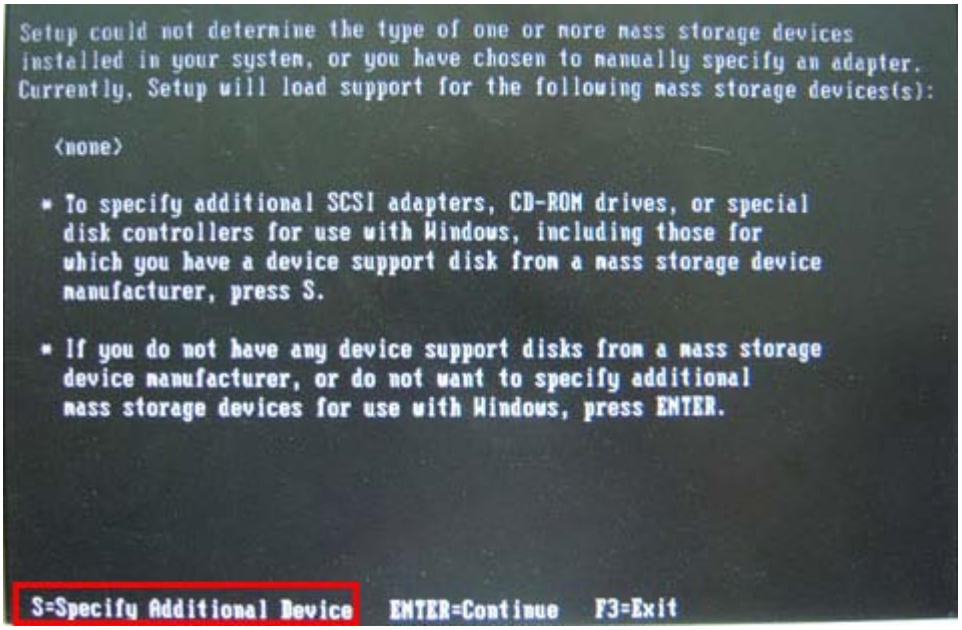
Step 1: Copy the SATA RAID/AHCI driver to a floppy disk and insert the floppy disk into a USB floppy disk drive. The SATA RAID/AHCI driver must be especially designed for the on-board SATA controller.

Step 2: Connect the USB floppy disk drive to the system.

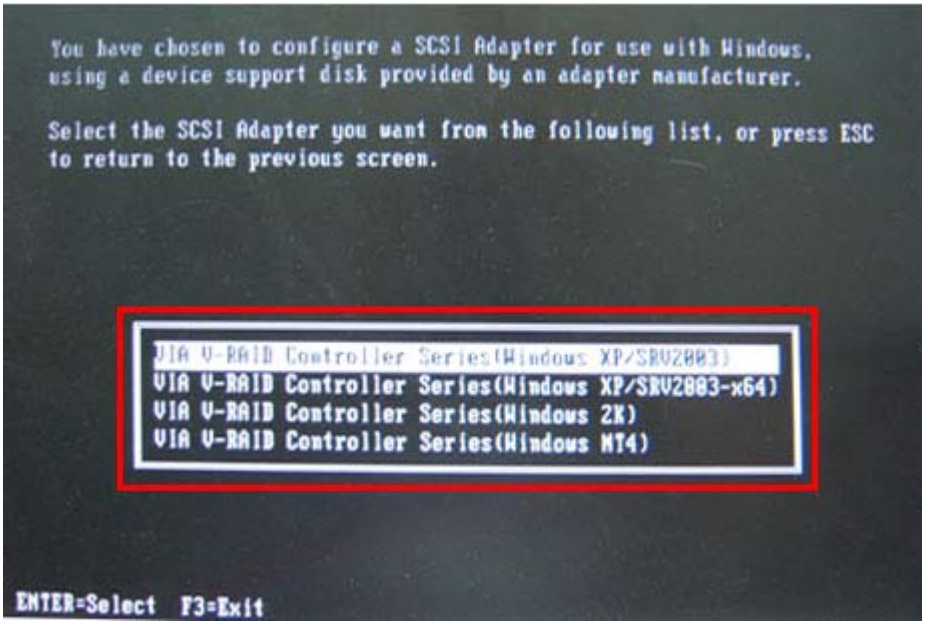
Step 3: Insert the One Key Recovery CD into the system and boot the system from the CD.

Step 4: When launching the recovery tool, press <**F6**>.

Step 5: When the following window appears, press <**S**> to select “Specify Additional Device”.



Step 6: In the following window, select a SATA controller mode used in the system. Then press <**Enter**>. The user can now start using the SATA HDD.



Step 7: After pressing <Enter>, the system will get into the recovery tool setup menu. Continue to follow the setup procedure from **Step 4** in **Section B.2.2 Create Partitions** to finish the whole setup process.

B.7.2 System Memory Requirement

To be able to access the recovery tool by pressing <**F3**> while booting up the system, please make sure to have enough system memory. The minimum memory requirement is listed below.

- **Using Award BIOS**: 128 MB system memory
- **Using AMI BIOS**: 512 MB system memory.

Appendix

C

Terminology

AC ’97	Audio Codec 97 (AC’97) refers to a codec standard developed by Intel® in 1997.
ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
ATA	The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.
APM	The Advanced Power Management (APM) application program interface (API) enables the inclusion of power management in the BIOS.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
ASKIR	Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude (“volume”) of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
CMOS	Complimentary metal-oxide-conductor is a type of integrated circuit used in chips like static RAM and microprocessors.
COM	COM is used to refer to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal

	computer is usually a male DE-9 connector.
DAC	The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.
DDR	Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.
DMA	Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.
DIMM	Dual Inline Memory Modules are a type of RAM that offer a 64-bit data bus and have separate electrical contacts on each side of the module.
EHCI	The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.
GbE	Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gbps and complies with the IEEE 802.3-2005 standard.
GPIO	General purpose input
IrDA	Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.
L1 Cache	The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.
L2 Cache	The Level 2 Cache (L2 Cache) is an external processor memory cache.
LVDS	Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.
MAC	The Media Access Control (MAC) protocol enables several terminals or network nodes to communicate in a LAN, or other multipoint networks.

PCIe	PCI Express (PCIe) is a communications bus that uses dual data lines for full-duplex (two-way) serial (point-to-point) communications between the SBC components and/or expansion cards and the SBC chipsets. Each line has a 2.5 Gbps data transmission rate and a 250 MBps sustained data transfer rate.
POST	The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.
QVGA	Quarter Video Graphics Array (QVGA) refers to a display with a resolution of 320 x 240 pixels.
RAM	Random Access Memory (RAM) is a form of storage used in computer. RAM is volatile memory, so it loses its data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.
SATA	Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA 3Gb/s bus has data transfer speeds of up to 3.0 Gbps.
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.
UART	Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.
UHCI	The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.
USB	The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates, while

	USB 2.0 supports 480Mbps data transfer rates.
VGA	The Video Graphics Array (VGA) is a graphics display system developed by IBM.

Appendix

D

Watchdog Timer

NOTE:

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

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

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

INT 15H:

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

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

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

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

NOTE:

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

Example program:

```
; INITIAL TIMER PERIOD COUNTER
;
W_LOOP:

        MOV     AX, 6F02H       ;setting the time-out value
        MOV     BL, 30H             ;time-out value is 48 seconds
        INT      15H
 ;
; ADD THE APPLICATION PROGRAM HERE
;
        CMP      EXIT_AP, 1         ;is the application over?
        JNE      W_LOOP     ;No, restart the application

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

Appendix

E

Hazardous Materials Disclosure

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

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

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

Please refer to the table on the next page.

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	X	O	O	O	O	X
Display	X	O	O	O	O	X
Printed Circuit Board	X	O	O	O	O	X
Metal Fasteners	X	O	O	O	O	O
Cable Assembly	X	O	O	O	O	X
Fan Assembly	X	O	O	O	O	X
Power Supply Assemblies	X	O	O	O	O	X
Battery	O	O	O	O	O	O

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006

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

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

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
壳体	X	O	O	O	O	X
显示	X	O	O	O	O	X
印刷电路板	X	O	O	O	O	X
金属螺帽	X	O	O	O	O	O
电缆组装	X	O	O	O	O	X
风扇组装	X	O	O	O	O	X
电力供应组装	X	O	O	O	O	X
电池	O	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。