IEI Technology Corp.

MODEL:

ECN-360A-HM65

Embedded System with Intel® Celeron® dual core 847E Processor, Dual HDMI, VGA, GbE, Two USB 3.0, Two USB 2.0, Three COM and RoHS Compliant

User Manual

Rev. 1.00 – 25 June 2013

RoHS Lead Free

Revision

Date	Version	Changes
25 June 2013	1.00	Initial release

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1

Introduction

1.1 Overview

Figure 1-1: ECN-360A-HM65

The ECN-360A-HM65 embedded system is a fanless system with two HDMI ports and one VGA port for dual display. It is powered by Intel® Celeron® dual core 847E 1.1GHz processor and supports two 204-pin DDR3 SDRAM SO-DIMM modules up to 8 GB (4GB memory preinstalled). The ECN-360A-HM65 supports a 2.5” SATA HDD with up to 6 Gb/s data transfer rate. Three serial ports, two USB 3.0 ports and two USB 2.0 ports ensure simplified connectivity to a variety of external peripheral devices.

1.2 Model Variations

The model variations of the ECN-360A-HM65 series are listed below.

Models	Wireless
ECN-360A-HM65/4G-R10	N/A
ECN-360AW-HM65/4G-R10	802.11b/g/n

Table 1-1: Model Variations

1.3 Features

The ECN-360A-HM65 features are listed below:

- On-board CPU: Intel Celeron® 847E dual core 1.1GHz
- Rich video output solution: 2 x HDMI + 1 x VGA
- Ruggedized embedded computer: support -10°C~60°C with air flow (SSD)

1.4 Technical Specifications

The ECN-360A-HM65 technical specifications are listed in **Table 1-1**.

Chassis	
Color	Black
Dimension (WxDxH)	255 x 130 x 63
System Fan	Fanless
Chassis Construction	SECC
Motherboard	
Motherboard model	NANO-HM651-847E
CPU	Intel® Celeron® dual core 847E 1.1GHz
Chipset	Intel® HM65
System Memory	2 x 204-pin DDR3 SDRAM SO-DIMM (System Max : 8GB) Pre-installed DDR3 4GB memory
Ethernet	2 x Realtek RTL8111E PCIe GbE controller
Storage	
Hard Drive	1 x 2.5" SATA HDD Bay
I/O interfaces	
USB	2 x USB 3.0 2 x USB 2.0
LAN	2 x RJ-45 LAN
RS-232	2 x RS-232 (DB-9 connector)
RS-422/485	1 x RS-422/485 (DB-9 connector)
Digital I/O	1 x DB-9 ; 8 bit Digital I/O , 4 bit input / 4 bit output
Display	1 x VGA 2 x HDMI
Resolution	VGA: Up to 2048 x 1536 @ 75Hz HDMI: Up to 1920 x 1200 @ 60Hz

Audio	1 x Line-out
Wireless	1 x 802.11 b/g/n (optional)
Expansions	
PCIe Mini	1 x Full size (reserved for Wi-Fi)
Power	
Power Input	9~36V DC (IDD-936260A) Power 1 : DC Jack Power 2: Terminal block
Power Consumption	12V@3.01A (Intel® Celeron® single core 827E 1.4GHz with 4GB DDR3 memory)
Reliability	
Mounting	Wall mount ; VESA 100
Operating Temperature	-10°C~55°C with air flow (SSD) 0°C~45°C with air flow (HDD)
Storage Temperature	-20°C ~ 60°C
Operating Shock	Half-sine wave shock 3G; 11ms; 3 shocks per axis
Operating Vibration	MIL-STD-810F 514.5C-1
Weight (Net/Gross)	2.2 kg / 3 kg
Safety / EMC	CE / FCC Class A
OS	
Supported OS	Microsoft® WES7E Microsoft® Windows® XP Embedded

Table 1-2: Technical Specifications

1.5 Front Panel

The front panel of the ECN-360A-HM65 has the following features (**Figure 1-2**):

- 1 x HDD LED
- 1 x Power button

Figure 1-2: ECN-360A-HM65 Front Panel

1.6 Rear Panel

The rear panel of the ECN-360A-HM65 has the following features (**Figure 1-3**):

- 1 x DIO connector
- 1 x Line-out
- 2 x HDMI connectors
- 1 x 9 V ~ 36 V power jack
- 1 x Reset button
- 2 x RJ-45 LAN connectors
- 2 x RS-232 (DB-9 connector)
- 1 x RS-422/485 (DB-9 connector)
- 1 x 9 V ~ 36 V terminal block
- 2 x USB 3.0 connectors
- 2 x USB 2.0 connectors
- 1 x VGA connector
- 2 x WiFi antenna connectors

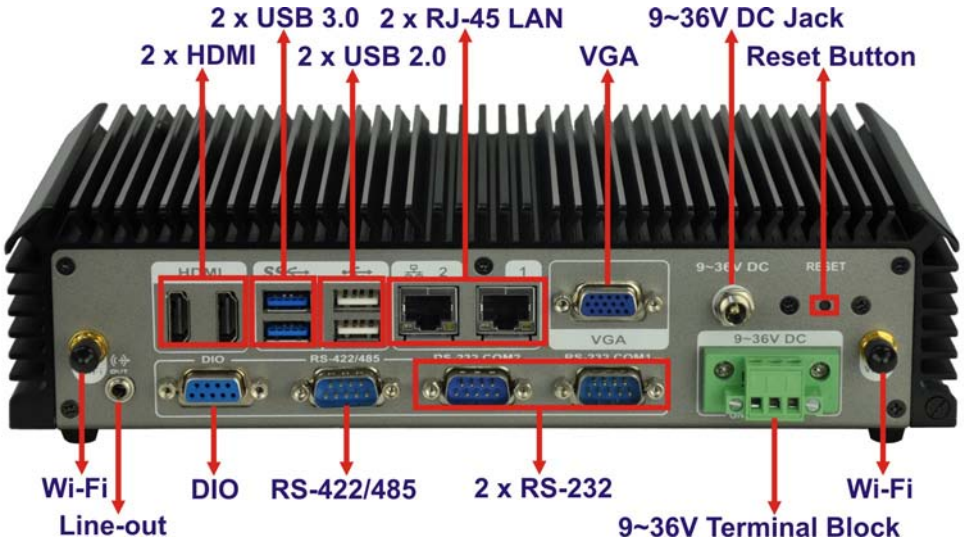


Figure 1-3: ECN-360A-HM65 Rear Panel

1.7 Dimensions

The physical dimensions are shown below:

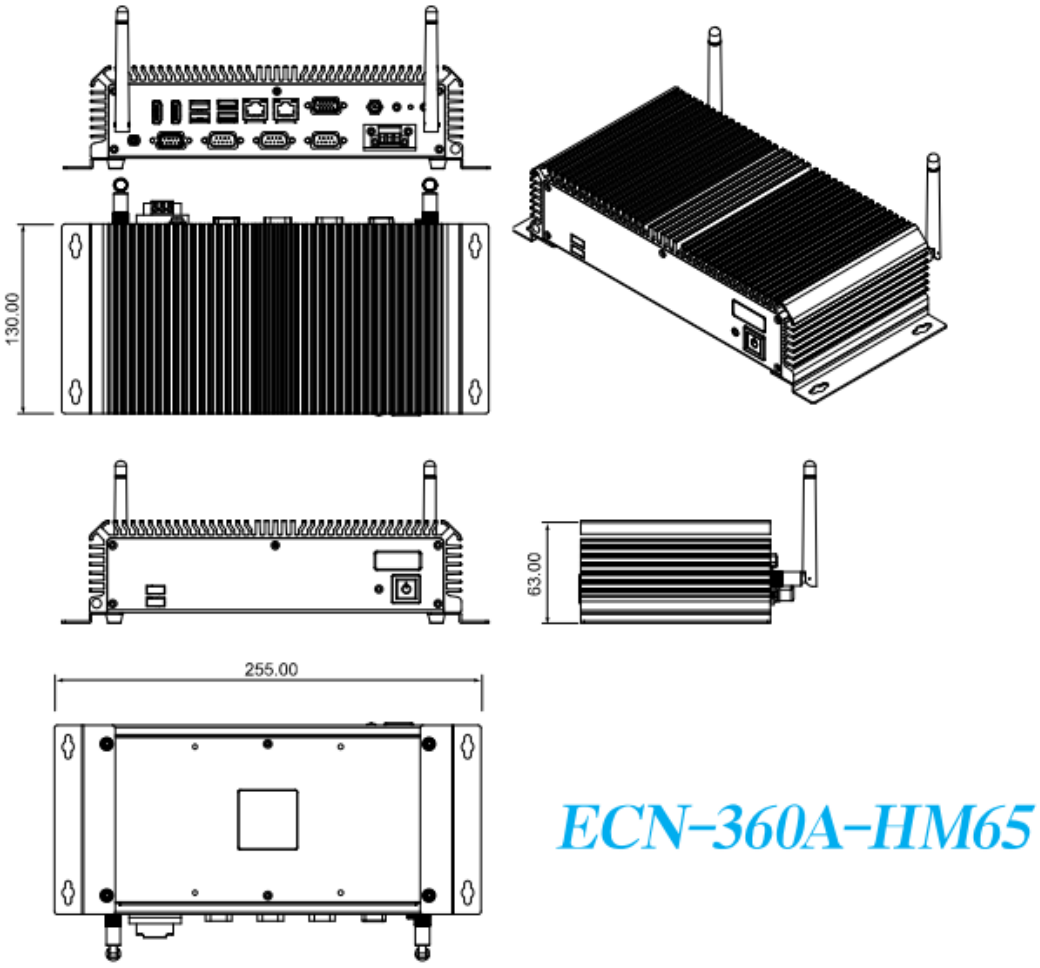


Figure 1-4: Physical Dimensions (mm)

Chapter

2

Unpacking

2.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during installation may result in permanent damage to the ECN-360A-HM65 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the ECN-360A-HM65. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the ECN-360A-HM65 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 ECN-360A-HM65, place it on an antic-static pad. This reduces the possibility of ESD damaging the ECN-360A-HM65.

2.2 Unpacking Precautions

When the ECN-360A-HM65 is unpacked, please do the following:

- Follow the anti-static precautions outlined in **Section 2.1**.
- Make sure the packing box is facing upwards so the ECN-360A-HM65 does not fall out of the box.
- Make sure all the components shown in **Section 2.3** are present.

2.3 Unpacking Checklist

NOTE:

If some of the components listed in the checklist below are missing, please do not proceed with the installation. Contact the IEI reseller or vendor you purchased the ECN-360A-HM65 from or contact an IEI sales representative directly. To contact an IEI sales representative, please send an email to sales@iei.com.tw.

The ECN-360A-HM65 is shipped with the following components:

Quantity	Item and Part Number	Image
1	ECN-360A-HM65	
1	power adapter	
1	power cord	
2	Mounting brackets	
1	Screw set	
2	wireless antenna (for wireless model)	

Quantity	Item and Part Number	Image
1	Utility CD	
1	One Key Recovery CD	

Table 2-1: Package List Contents

Chapter

3

Installation

3.1 Installation Precautions

During installation, be aware of the precautions below:

- **Read the user manual**: The user manual provides a complete description of the ECN-360A-HM65, installation instructions and configuration options.
- **DANGER! Disconnect Power**: Power to the ECN-360A-HM65 must be disconnected during the installation process, or before any attempt is made to access the rear panel. Electric shock and personal injury might occur if the rear panel of the ECN-360A-HM65 is opened while the power cord is still connected to an electrical outlet.
- **Qualified Personnel**: The ECN-360A-HM65 must be installed and operated only by trained and qualified personnel. Maintenance, upgrades, or repairs may only be carried out by qualified personnel who are familiar with the associated dangers.
- **Grounding**: The ECN-360A-HM65 should be properly grounded. The voltage feeds must not be overloaded. Adjust the cabling and provide external overcharge protection per the electrical values indicated on the label attached to the back of the ECN-360A-HM65.

3.2 Installation and Configuration Steps

The following installation steps must be followed.

Step 1: Unpack the ECN-360A-HM65.

Step 2: Install the HDD.

Step 3: Install the Wi-Fi antenna (Wi-Fi model only).

Step 4: Configure the system.

Step 5: Connect peripheral devices to the ECN-360A-HM65.

Step 6: Mount the ECN-360A-HM65.

3.3 Hard Disk Drive (HDD) Installation

To install the hard drive, please follow the steps below:

Step 1: Remove six retention screws from the bottom panel (**Figure 3-1**).

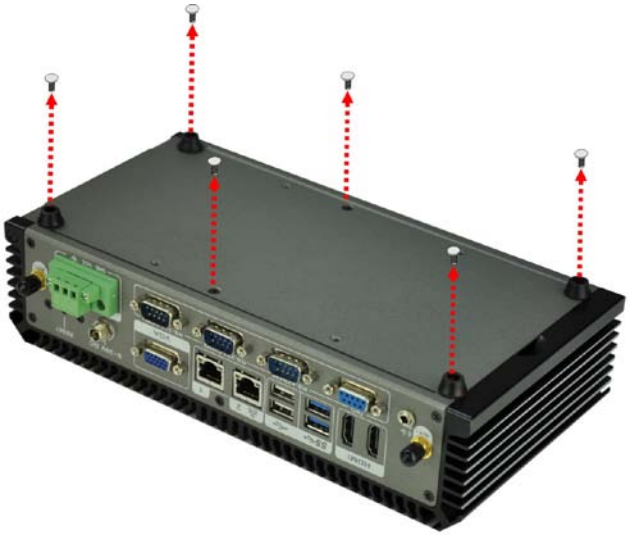


Figure 3-1: Retention Screws Removal

Step 2: Open the bottom panel and locate the HDD bracket (**Figure 3-2**).

Figure 3-2: HDD Bracket

Step 3: Attach the HDD to the HDD bracket, and then slide the HDD to connect the HDD to the SATA connector. Secure the HDD with the HDD bracket by four retention screws (**Figure 3-3**).

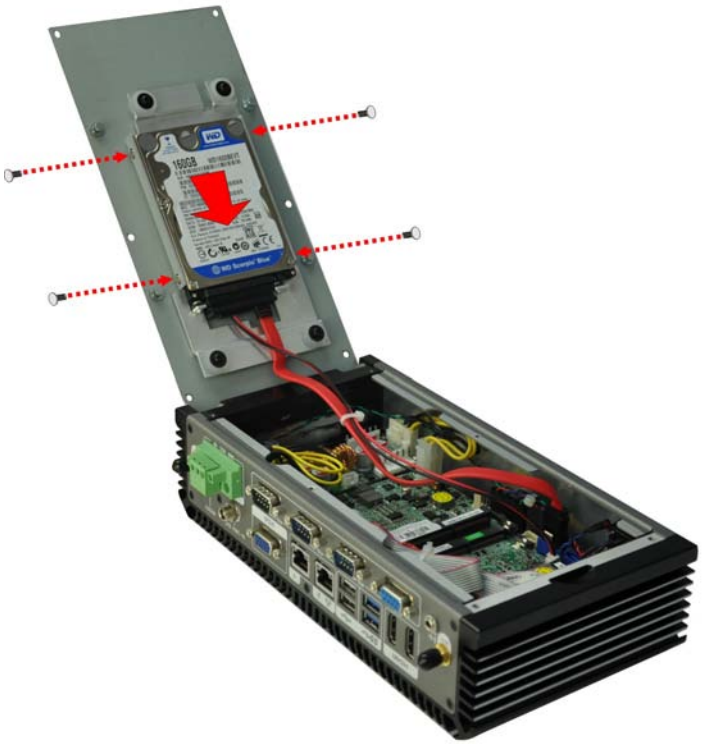


Figure 3-3: HDD Retention Screws

Step 4: Replace the HDD cover and secure it using six previously removed retention screws.

3.4 Wi-Fi Antenna Installation (Wireless Model Only)

To install the Wi-Fi antennas to the ECN-360A-HM65 series for efficient wireless network transmission, follow the steps below.

Step 1: Locate the antenna connectors on the rear panel of the embedded system.

Step 2: Install the antennas to the antenna connectors (**Figure 3-4**).

Figure 3-4: Wi-Fi Antenna Installation

3.5 Mounting Bracket Installation

To mount the embedded system onto a wall or some other surface using the two mounting brackets, please follow the steps below.

Step 1: Turn the embedded system over.

Step 2: Align the two retention screw holes in each bracket with the corresponding retention screw holes on the sides of the bottom surface.

Step 3: Secure the brackets to the system by inserting two retention screws into each bracket as illustrated in **Figure 3-5**.

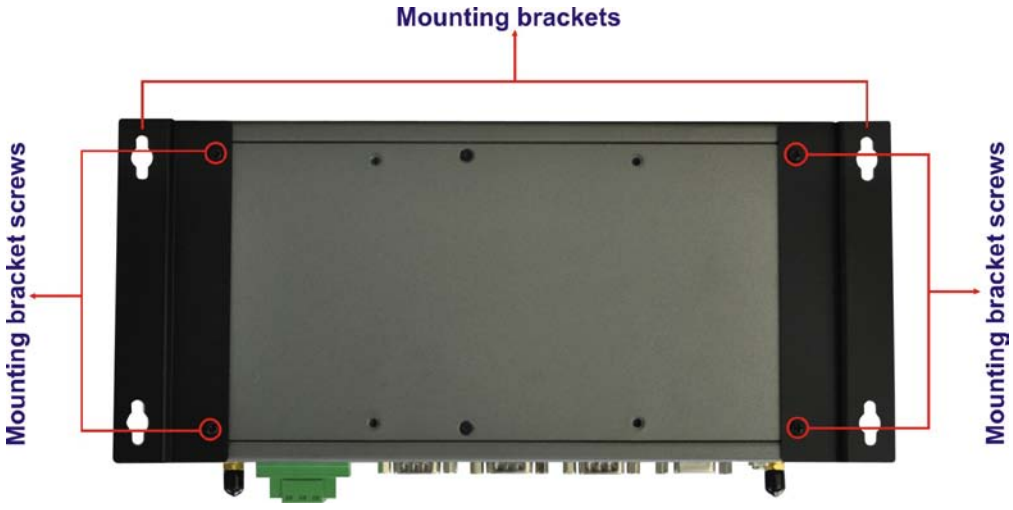


Figure 3-5: Mounting Bracket Retention Screws

Step 4: Drill holes in the intended installation surface.

Step 5: Align the mounting holes in the sides of the mounting brackets with the predrilled holes in the mounting surface.

NOTE:

To have the best system heat dissipation, please make sure to face the I/O panel downward (**Figure 3-5**) when mounting the system.

Step 6: Insert four retention screws, two in each bracket, to secure the system to the wall.

3.6 External Peripheral Interface Connectors

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

- Audio devices
- HDMI devices
- RJ-45 Ethernet cable
- Serial devices
- USB devices
- VGA monitor

To install these devices, connect the corresponding cable connector from the actual device to the corresponding ECN-360A-HM65 external peripheral interface connector making sure the pins are properly aligned.

3.6.1 Audio Connection

The audio jack on the external audio connector enables the ECN-360A-HM65 to be connected to a stereo sound setup. To install the audio devices, follow the steps below.

Step 1: **Identify the audio plugs**. The plugs on your home theater system or speakers may not match the colors on the rear panel. If audio plugs are plugged into the wrong jacks, sound quality will be very bad.

Step 2: **Plug the audio plug into the audio jack**. Plug the audio plug into the audio jack. If the plug on your speakers is different, an adapter will need to be used to plug them into the audio jack. The audio jack on the ECN-360A-HM65 is a line-out port which connects to a headphone or a speaker.

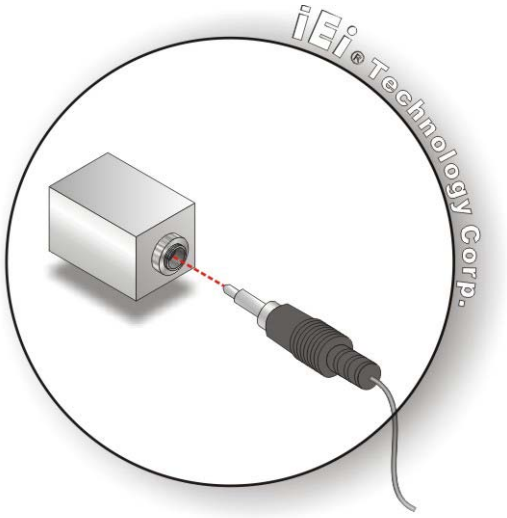


Figure 3-6: Audio Connector

Step 3: **Check audio clarity**. Check that the sound is coming through the right speakers by adjusting the balance front to rear and left to right.

3.6.2 HDMI Device Connection

The HDMI connector transmits a digital signal to compatible HDMI display devices such as a TV or computer screen. To connect the HDMI cable to the ECN-360A-HM65, follow the steps below.

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

Step 2: **Align the connector.** Align the HDMI connector with the HDMI port. Make sure the orientation of the connector is correct.

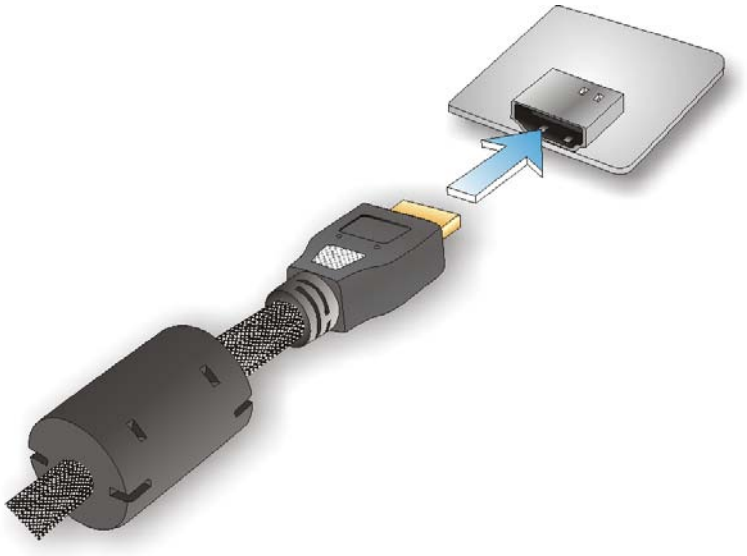


Figure 3-7: HDMI Connection

Step 3: **Insert the HDMI connector.** Gently insert the HDMI connector. The connector should engage with a gentle push. If the connector does not insert easily, check again that the connector is aligned correctly, and that the connector is being inserted with the right way up.

3.6.3 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 1**.

Step 2: **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the ECN-360A-HM65. See **Figure 3-8.**

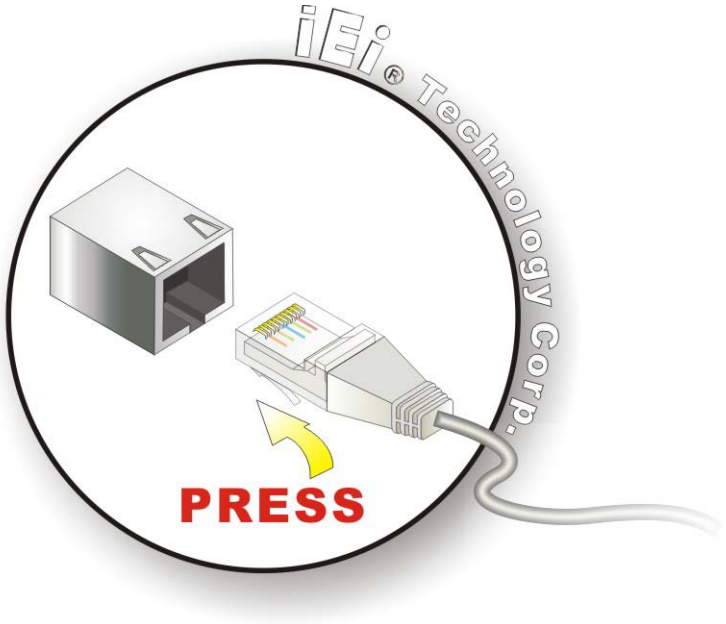


Figure 3-8: LAN Connection

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

3.6.4 DB-9 Serial Port Connection

There are two RS-232 DB-9 connectors and one RS-422/485 DB-9 connector of the ECN-360A-HM65 for serial device connection. Follow the steps below to connect a serial device to the DB-9 connector of the ECN-360A-HM65.

Step 1: **Locate the DB-9 connector**. The locations of the DB-9 connectors are shown in **Chapter 1**.

Step 2: **Insert the serial connector**. Insert the DB-9 connector of a serial device into the DB-9 connector on the rear panel. See **Figure 3-9**.

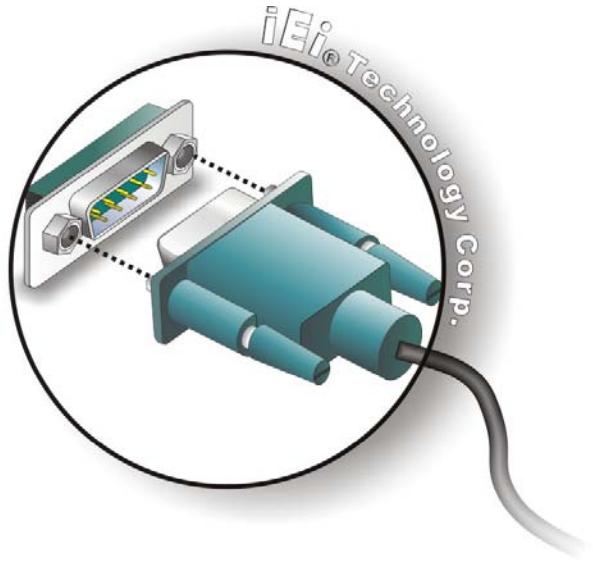


Figure 3-9: DB-9 Serial Port Connector

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

3.6.5 USB Device Connection

NOTE:

User must install the USB 3.0 driver before connecting a USB device to the system or else the system may not recognize the connected device.

There are four USB 3.0 connectors and two USB 2.0 connectors on the ECN-360A-HM65. To connect a USB device, please follow the instructions below.

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

Step 2: **Align the connectors.** Align the USB device connector with one of the connectors on the external peripheral interface. See **Figure 3-10**.

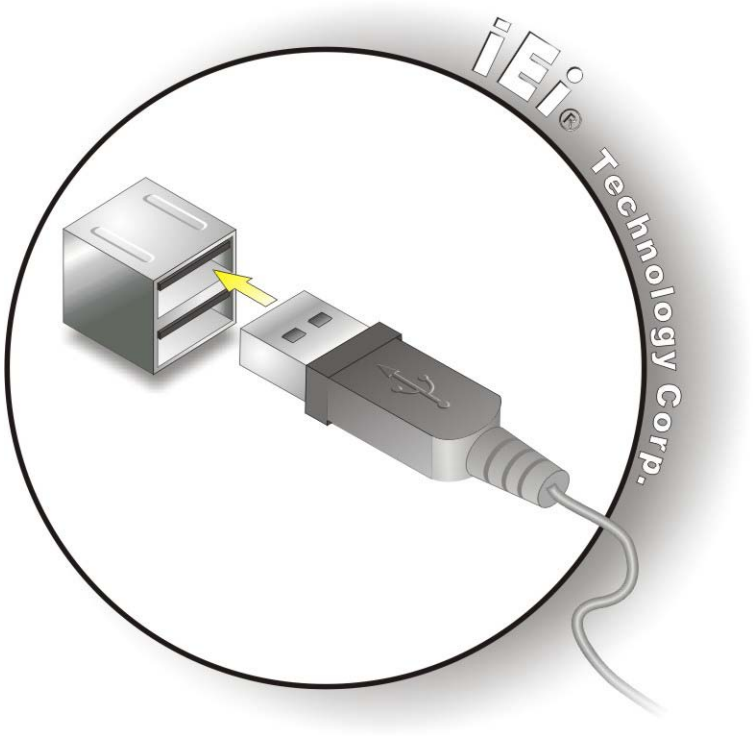


Figure 3-10: USB Device Connection

Step 3: **Insert the device connector.** Once aligned, gently insert the USB device connector into the onboard connector.

3.6.6 VGA Monitor Connection

The ECN-360A-HM65 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 ECN-360A-HM65, 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 1**.

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 ECN-360A-HM65. See **Figure 3-11**.

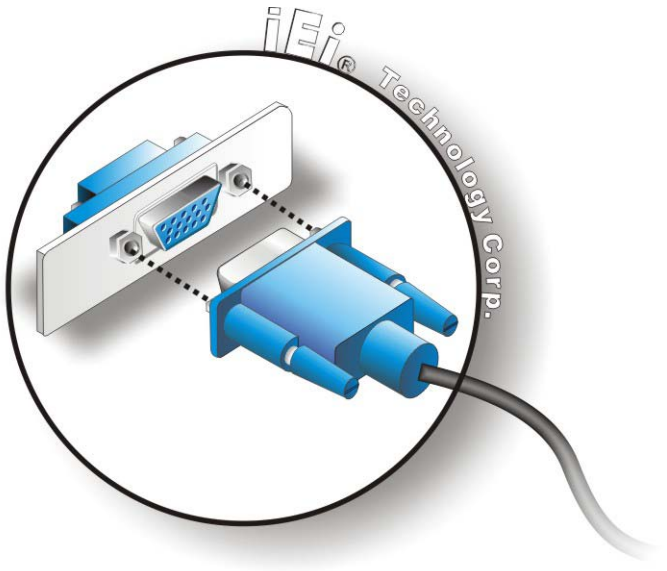


Figure 3-11: VGA Connector

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

4

System Motherboard

4.1 Peripheral Interface Connectors

The ECN-360A-HM651 embedded system motherboard comes with a number of peripheral interface connectors and configuration jumpers.

4.1.1 Layout

Figure 4-1 shows the on-board peripheral interface connectors and jumpers.

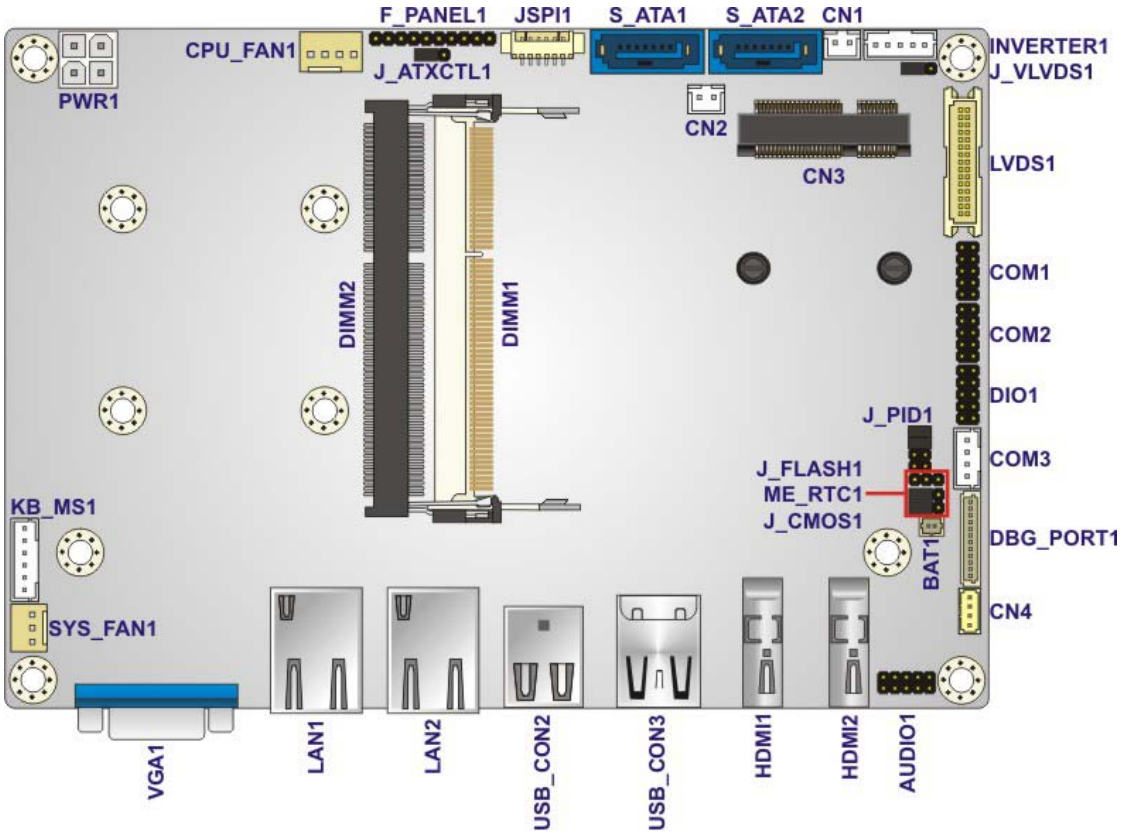


Figure 4-1: Connectors and Jumpers Locations

4.1.2 Internal Peripheral Connectors

Table 4-1 shows a list of the internal peripheral connectors on the motherboard. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
Audio connector	10-pin header	AUDIO1
Battery connector	2-pin wafer	BAT1
DDR3 SO-DIMM	204-pin SO-DIMM	DIMM1, DIMM2
Digital input/output (DIO) connector	10-pin header	DIO1
Debug port	12-pin connector	DBG_PORT1
Fan connector (CPU)	4-pin wafer	CPU_FAN1
Fan connector (system)	3-pin wafer	SYS_FAN1
Front panel connector	10-pin header	F_PANEL1
Inverter connector	5-pin wafer	INVERTER1
Keyboard and mouse connector	6-pin wafer	KB_MS1
LVDS connector	30-pin crimp	LVDS1
PCIe Mini connector	52-pin PCIe Mini slot	CN3
Power connector	4-pin connector	PWR1
SATA 6Gb/s connectors	7-pin SATA	S_ATA1, S_ATA2
SATA power connectors	2-pin wafer	CN1, CN2
Serial port connectors (RS-232)	10-pin header	COM1, COM2
Serial port connector (RS-422/485)	4-pin wafer	COM3
SMBus connector	4-pin wafer	CN4
SPI flash connector	8-pin wafer	JSPI1

Table 4-1: Peripheral Interface Connectors

4.1.3 External Interface Panel Connectors

Table 4-2 lists the rear panel connectors on the motherboard. Detailed descriptions of these connectors can be found in **Section 4.3**.

Connector	Type	Label
Ethernet connectors	RJ-45	LAN1, LAN2
HDMI connectors	HDMI	HDMI1, HDMI2
USB 2.0 ports	USB port	USB_CON2
USB 3.0 ports	USB port	USB_CON3
VGA port connector	15-pin female	VGA1

Table 4-2: Rear Panel Connectors

4.2 Internal Peripheral Connectors

This section has complete descriptions of all the internal peripheral connectors on the motherboard.

4.2.1 Audio Connector

CN Label: AUDIO1

CN Type: 10-pin header (2x5)

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

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

The 10-pin audio connector is connected to external audio devices including speakers and microphones for the input and output of audio signals to and from the system.

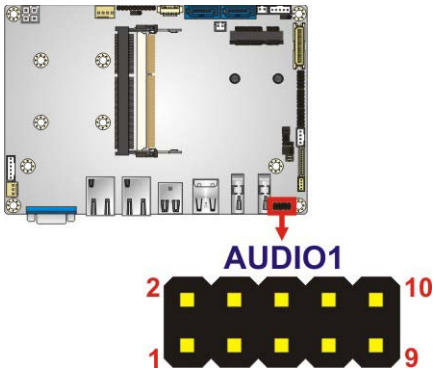


Figure 4-2: Audio Connector Location

Pin	Description	Pin	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 4-3: Audio Connector Pinouts

4.2.2 Battery Connector

CN Label: BAT1

CN Type: 2-pin wafer (1x2)

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

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

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

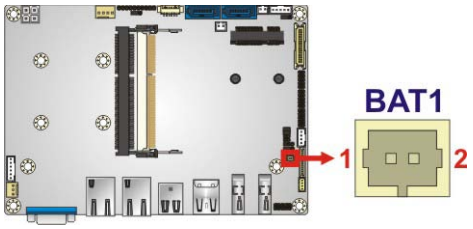


Figure 4-3: Battery Connector Location

Pin	Description
1	Battery+
2	Ground

Table 4-4: Battery Connector Pinouts

4.2.3 Digital Input/Output (DIO) Connector

CN Label: DIO1

CN Type: 10-pin header (2x5)

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

CN Pinouts: See **Table 4-5**

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

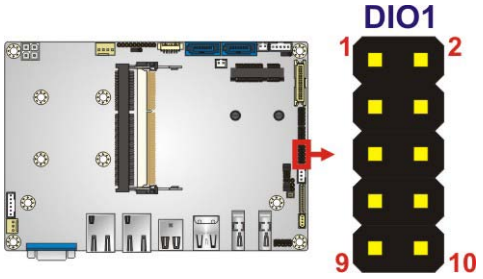


Figure 4-4: DIO Connector Location

Pin	Description	Pin	Description
1	GND	2	+5V
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 4-5: DIO Connector Connector Pinouts

4.2.4 Debug Connector

CN Label:	DBG_PORT1
CN Type:	12-pin connector (1x12)
CN Location:	See **Figure 4-5**
CN Pinouts:	See **Table 4-6**

The debug connector connects to a debug card for debugging.

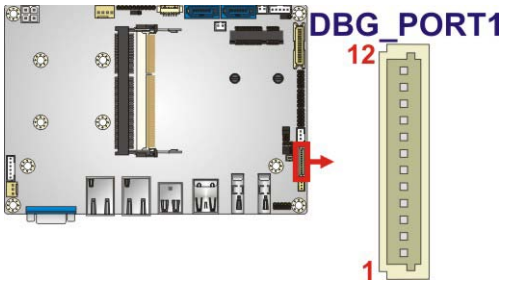


Figure 4-5: EC Debug Connector Location

Pin	Description
1	+V5S
2	+V3.3S
3	GND
4	INT_SERIRQ
5	LPC_AD3
6	LPC_AD2
7	LPC_AD1
8	LPC_AD0
9	LPC_FRAME#
10	BUF_PLT_RST#
11	CLK_PCI_TPM
12	GND

Table 4-6: Debug Connector Pinouts

4.2.5 Fan Connector (CPU)

CN Label: CPU_FAN1

CN Type: 4-pin wafer (1x4)

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

CN Pinouts: See **Table 4-7**

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

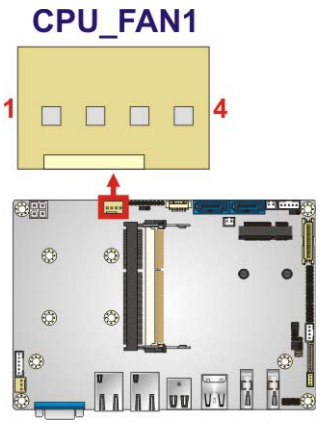


Figure 4-6: CPU Fan Connector Location

Pin	Description
1	GND
2	+12V
3	Rotation Signal
4	PWM Control Signal

Table 4-7: CPU Fan Connector Pinouts

4.2.6 Fan Connector (System)

CN Label: SYS_FAN1

CN Type: 3-pin wafer (1x3)

CN Location: See **Figure 4-7**

CN Pinouts: See **Table 4-8**

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

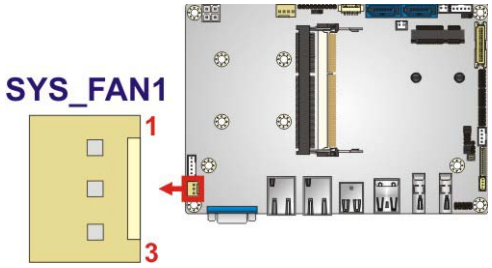


Figure 4-7: System Fan Connector Location

Pin	Description
1	Rotation Signal
2	+12V
3	GND

Table 4-8: System Fan Connector Pinouts

4.2.7 Front Panel Connector

CN Label: F_PANEL1

CN Type: 10-pin header (1x10)

CN Location: See **Figure 4-8**

CN Pinouts: See **Table 4-9**

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

- HDD LED
- Power button
- Power LED

- Reset

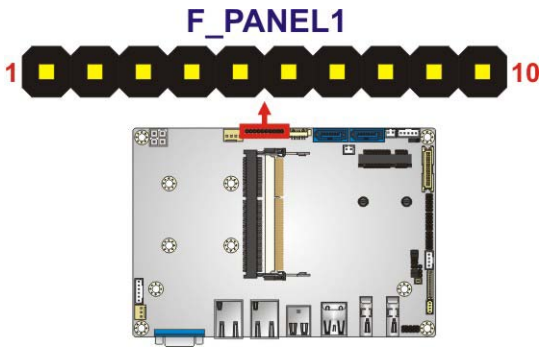


Figure 4-8: Front Panel Connector Location

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
	1	N/A	Power LED	6	PWR_LED+
Power Button	2	PWR_BTN+		7	PWR_LED+
	3	PWR_BTN-		8	PWR_LED-
HDD LED	4	HDD_LED+	Reset	9	RESET+
	5	HDD_LED-		10	RESET-

Table 4-9: Front Panel Connector Pinouts

4.2.8 LVDS Backlight Inverter Connector

CN Label: INVERTER1

CN Type: 5-pin wafer (1x5)

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

CN Pinouts: See **Table 4-10**

The backlight inverter connector provides power to an LCD panel.

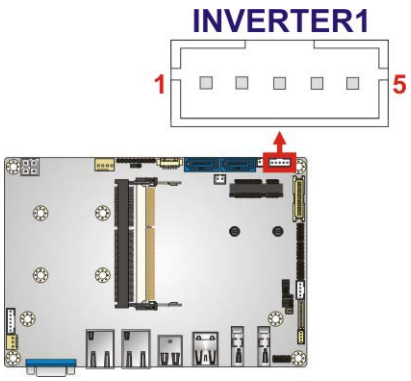


Figure 4-9: Backlight Inverter Connector Location

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

Table 4-10: Backlight Inverter Connector Pinouts

4.2.9 Keyboard/Mouse Connector

CN Label: KB_MS1

CN Type: 6-pin wafer (1x6)

CN Location: See **Figure 4-10**

CN Pinouts: See **Table 4-11**

The keyboard and mouse connector can be connected to a standard PS/2 cable or PS/2 Y-cable to add keyboard and mouse functionality to the system.

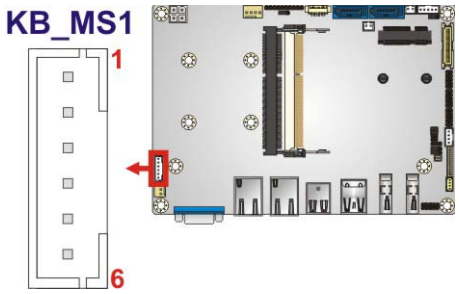


Figure 4-10: Keyboard/Mouse Connector Location

Pin	Description
1	VCC5_KBMS
2	MS DATA
3	MS CLK
4	KB DATA
5	KB CLK
6	GROUND

Table 4-11: Keyboard/Mouse Connector Pinouts

4.2.10 LVDS LCD Connector

CN Label: LVDS1

CN Type: 30-pin crimp (2x15)

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

CN Pinouts: See **Table 4-12**

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

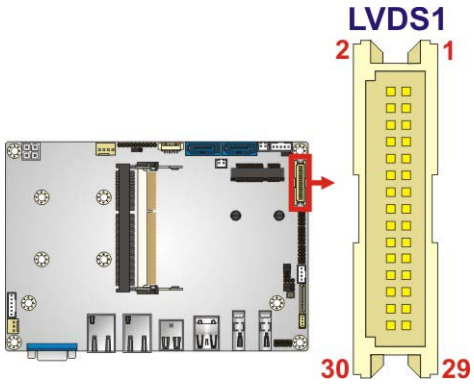


Figure 4-11: LVDS Connector Location

Pin	Description	Pin	Description
1	GND	2	GND
3	A_Y0	4	A_Y0#
5	A_Y1	6	A_Y1#
7	A_Y2	8	A_Y2#
9	A_CK	10	A_CK#
11	A_Y3	12	A_Y3#
13	GND	14	GND
15	B_Y0	16	B_Y0#
17	B_Y1	18	B_Y1#
19	B_Y2	20	B_Y2#
21	B_CK	22	B_CK#
23	B_Y3	24	B_Y3#
25	GND	26	GND
27	VCC/VCC3	28	VCC/VCC3
29	VCC/VCC3	30	VCC/VCC3

Table 4-12: LVDS Connector Pinouts

4.2.11 PCIe Mini Card Slot

CN Label: CN3

CN Type: PCIe Mini card slot

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

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

The PCIe Mini card slot enables a PCIe Mini card expansion module to be connected to the board. Cards supported include among others wireless LAN (WLAN) cards and mSATA cards.

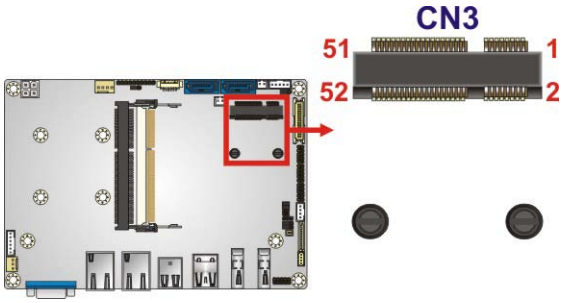


Figure 4-12: PCIe Mini Card Slot Location

Pin	Description	Pin	Description
1	PCIE_WAKE#	2	VCC3
3	N/C	4	GND
5	N/C	6	1.5V
7	N/C	8	N/C
9	GND	10	N/C
11	CLK-	12	N/C
13	CLK+	14	N/C
15	GND	16	N/C
17	PCIRST#	18	GND
19	N/C	20	VCC3
21	GND	22	PCIRST#
23	PERN2	24	3VDual
25	PERP2	26	GND
27	GND	28	1.5V
29	GND	30	SMBCLK
31	PETN2	32	SMBDATA
33	PETP2	34	GND
35	GND	36	USBD-

Pin	Description	Pin	Description
37	N/C	38	USBD+
39	N/C	40	GND
41	N/C	42	N/C
43	N/C	44	N/C
45	N/C	46	N/C
47	N/C	48	1.5V
49	N/C	50	GND
51	N/C	52	VCC3

Table 4-13: PCIe Mini Card Slot Pinouts

4.2.12 Power Connector

CN Label: PWR1

CN Type: 4-pin connector (2x2)

CN Location: See **Figure 4-13**

CN Pinouts: See **Table 4-14**

This connector accepts 12 V of power for the processor.

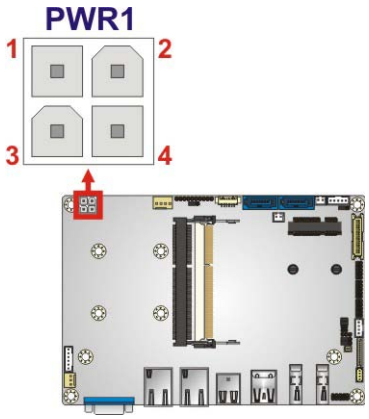


Figure 4-13: CPU Power Connector Location

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

Table 4-14: CPU Power Connector Pinouts

4.2.13 SATA 6Gb/s Connector

CN Label: S_ATA1, S_ATA2

CN Type: 7-pin SATA drive connector

CN Location: See **Figure 4-14**

CN Pinouts: See **Table 4-15**

The SATA connectors connect to SATA hard drives or optical drives with data transfer speeds as high as 6Gb/s.

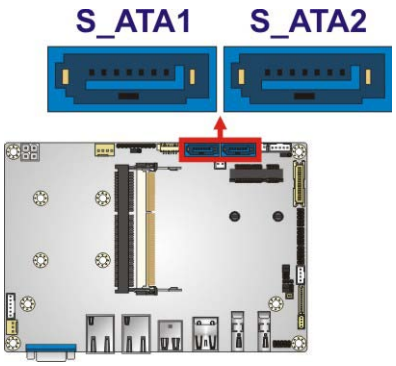


Figure 4-14: SATA Drive Connector Locations

Pin	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Table 4-15: SATA Drive Connector Pinouts

4.2.14 SATA Power Connectors

CN Label: CN1, CN2

CN Type: 2-pin wafer

CN Location: See **Figure 4-15**

CN Pinouts: See **Table 4-16**

Use the SATA Power Connector to connect to SATA device power connections. Total +5V SATA power is 2A (CN1+CN2).

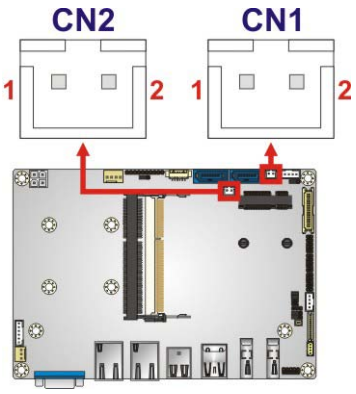


Figure 4-15: SATA Power Connector Locations

Pin	Description
1	+V5S
2	GND

Table 4-16: SATA Power Connector Pinouts

4.2.15 RS-232 Serial Port Connectors (COM 1 and COM 2)

CN Label: COM1, COM2

CN Type: 10-pin header (2x5)

CN Location: See **Figure 4-16**

CN Pinouts: See **Table 4-17**

The 10-pin serial port connectors provide three RS-232 serial communications channels. The COM serial port connectors can be connected to external RS-232 serial port devices.

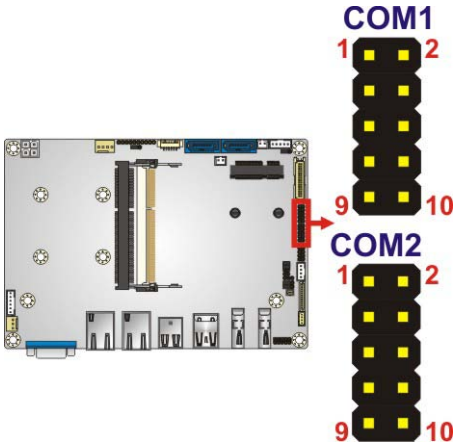


Figure 4-16: COM Connector Locations

Pin	Description	Pin	Description
1	-NDCD	6	-NCTS
2	-NDSR	7	-NDTR
3	NSIN	8	-XRI
4	-NRTS	9	GND
5	NSOUT	10	GND

Table 4-17: COM Connector Pinouts

4.2.16 RS-422/485 Serial Port Connector (COM3)

CN Label: COM3

CN Type: 4-pin wafer (1x4)

CN Location: See **Figure 4-17**

CN Pinouts: See **Table 4-18**

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

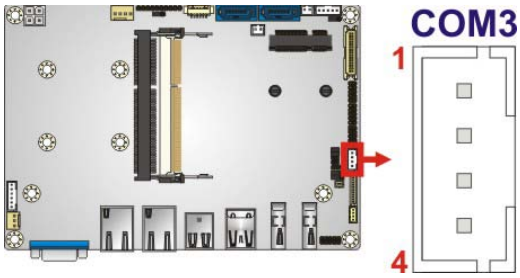


Figure 4-17: Serial Port Connector Location

Pin	Description
1	RXD422-
2	RXD422+
3	TXD422+/TXD485+
4	TXD422-/TXD485-

Table 4-18: Serial Port Connector Pinouts

Use the optional RS-422/485 cable to connect to a serial device. The pinouts of the DB-9 connector are listed below.

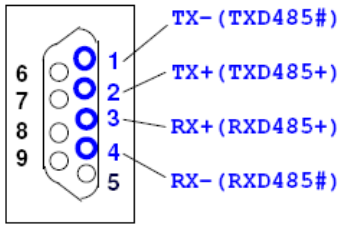
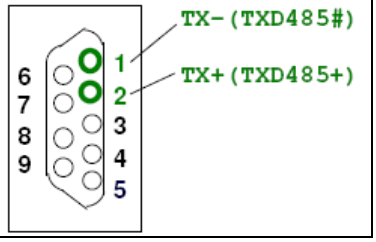
RS-422 Pinouts	RS-485 Pinouts
	

Table 4-19: DB-9 RS-422/485 Pinouts

4.2.17 SMBus Connector

CN Label: CN4

CN Type: 4-pin wafer (1x4)

CN Location: See **Figure 4-18**

CN Pinouts: See **Table 4-20**

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

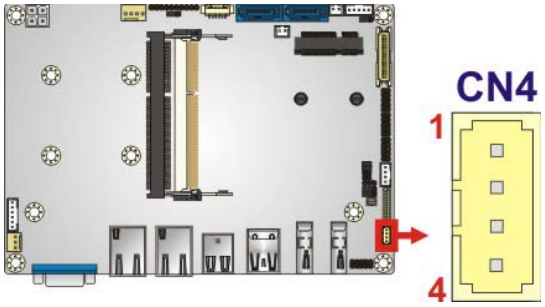


Figure 4-18: SMBus Connector Location

Pin	Description
1	GND
2	SMB_DATA
3	SMB_CLK
4	+V5S

Table 4-20: SMBus Connector Pinouts

4.2.18 SPI Flash Connector

CN Label: JSPI1

CN Type: 6-pin wafer (1x6)

CN Location: See **Figure 4-19**

CN Pinouts: See **Table 4-21**

The SPI Flash connector is used to flash the BIOS.

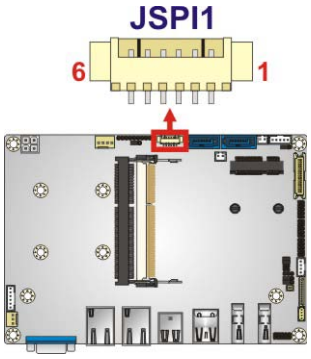


Figure 4-19: SPI Flash Connector Location

Pin	Description	Pin	Description
1	+V3.3M_SPI_CON	5	SPI_SI_SW
2	SPI_CS	6	GND
3	SPI_SO_SW	7	GND
4	SPI_CLK_SW	8	GND

Table 4-21: SPI Flash Connector

4.3 External Peripheral Interface Connector Panel

Figure 4-20 shows the motherboard external peripheral interface connector (EPIC) panel. The EPIC panel consists of the following:

- 2 x RJ-45 LAN connectors
- 2 x HDMI connectors
- 2 x USB 2.0 connectors
- 2 x USB 3.0 connectors
- 1 x VGA connector

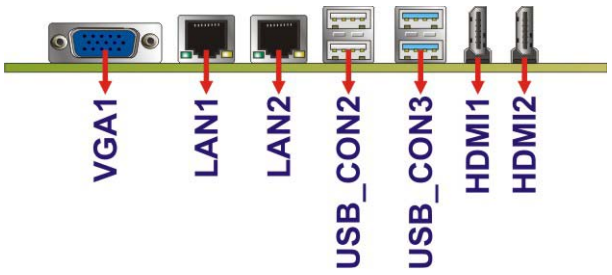


Figure 4-20: External Peripheral Interface Connectors

4.3.1 Ethernet Connectors

CN Label: LAN1 and LAN2

CN Type: RJ-45

CN Location: See **Figure 4-20**

CN Pinouts: See **Table 4-22**

The motherboard is equipped with two built-in RJ-45 Ethernet controllers. The controllers can connect to the LAN through two RJ-45 LAN connectors. There are two LEDs on the connector indicating the status of LAN. The pin assignments are listed in the following table:

Pin	Description	Pin	Description
1	LAN1_MDI0+	7	LAN1_MDI2+
2	LAN1_MDI0-	8	LAN1_MDI2-
3.	LAN1_MDI1+	9	LAN1_MDI3+
4.	LAN1_MDI1-	10	LAN1_MDI3-

Table 4-22: LAN Pinouts

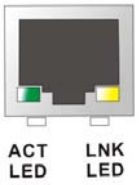


Figure 4-21: RJ-45 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one yellow (activity/link) and one green/orange (speed). The yellow LED indicates activity/link on the port and the green/orange LED indicates the connection speed. See **Table 4-23**.

ACT/LINK LED		SPEED LED	
STATUS	**DESCRIPTION**	**STATUS**	**DESCRIPTION**
OFF	No Link	OFF	10 Mbps connection
YELLOW	Link	GREEN	100 Mbps connection
BLINKING	Data activity	ORANGE	1000 Mbps connection

Table 4-23: RJ-45 Ethernet Connector LEDs

4.3.2 HDMI Connectors

CN Label: HDMI1, HDMI2

CN Type: HDMI connector

CN Location: See **Figure 4-20**

CN Pinouts: See **Table 4-24** and **Figure 4-22**

The HDMI connector connects to a display device with HDMI interface.

Pin	Description	Pin	Description
1	HDMI_DATA2	13	N/C
2	GND	14	N/C
3	HDMI_DATA2#	15	HDMI_SCL
4	HDMI_DATA1	16	HDMI_SDA
5	GND	17	GND
6	HDMI_DATA1#	18	+5V
7	HDMI_DATA0	19	HDMI_HPD
8	GND	20	HDMI_GND
9	HDMI_DATA0#	21	HDMI_GND
10	HDMI_CLK	22	HDMI_GND
11	GND	23	HDMI_GND
12	HDMI_CLK#		

Table 4-24: HDMI Connector Pinouts

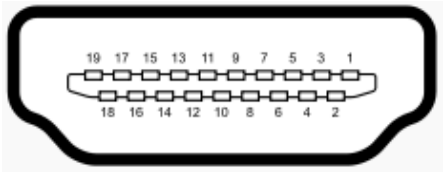


Figure 4-22: HDMI Connector

4.3.3 USB 2.0 Connectors

CN Label: USB_CON2

CN Type: USB 2.0 port

CN Location: See **Figure 4-20**

CN Pinouts: See **Table 4-25**

The motherboard has two external USB 2.0 ports. The ports connect to both USB 2.0 and USB 1.1 devices.

Pin	Description
1	VCC
2	DATA-
3	DATA+
4	GND

Table 4-25: USB 2.0 Port Pinouts

4.3.4 USB 3.0 Connectors

CN Label: USB_CON3

CN Type: USB 3.0 port

CN Location: See **Figure 4-20**

CN Pinouts: See **Table 4-26**

The USB 3.0 connector can be connected to a USB device.

Pin	Description
1	VBUS
2	D1-
3	D1+
4	GND1
5	STDA_SSRX1_N
6	STDA_SSRX1_P
7	GND_DRAIN
8	STDA_SSTX1_N
9	STDA_SSTX1_P

Table 4-26: USB 3.0 Port Pinouts

4.3.5 VGA Connector

CN Label:	VGA1
CN Type:	15-pin Female
CN Location:	See **Figure 4-20**
CN Pinouts:	See **Figure 4-23** and **Table 4-27**

The motherboard has a single 15-pin female connector for connectivity to standard display devices.

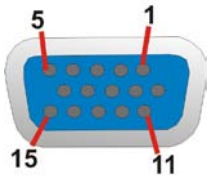


Figure 4-23: VGA Connector

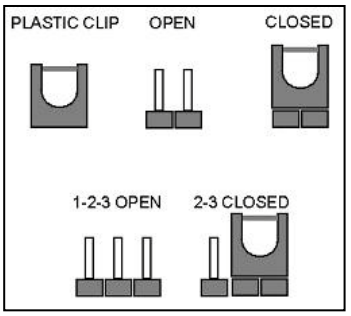
Pin	Description	Pin	Description
1	RED	2	GREEN
3	BLUE	4	NC
5	GND	6	VCC
7	GND	8	GND
9	VCC	10	GND
11	NC	12	DDC DAT
13	HSYNC	14	VSYNC
15	DDCCLK		

Table 4-27: VGA Connector Pinouts

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.



The jumpers on the motherboard are listed in **Table 4-28**.

Description	Label	Type
AT/ATX power mode select	J_ATXCTL1	3-pin header
Clear CMOS	J_CMOS1	3-pin header
LVDS voltage select	J_VLVDS1	3-pin header
LVDS panel resolution select	J_PID1	8-pin header
TPM setting	ME_RTC1	3-pin header
Flash descriptor security override	J_FLASH1	3-pin header

Table 4-28: Jumpers

4.4.1 AT/ATX Power Mode Select Jumper

Jumper Label: J_ATXCTL1

Jumper Type: 3-pin header

Jumper Settings: See **Table 4-29**

Jumper Location: See **Figure 4-24**

The AT/ATX Power Select jumper specifies the systems power mode as AT or ATX.

Setting	Description
Short 1-2	Use ATX power (Default)
Short 2-3	Use AT power

Table 4-29: AT/ATX Power Mode Jumper Settings

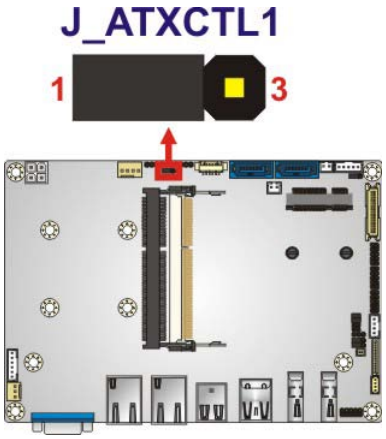


Figure 4-24: AT/ATX Power Mode Jumper Location

4.4.2 Clear CMOS Jumper

Jumper Label:	J_CMOS1
Jumper Type:	3-pin header
Jumper Settings:	See **Table 4-30**
Jumper Location:	See **Figure 4-25**

If the ECN-360A-HM65 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 4-30**.

Setting	Description
Short 1 - 2	Keep CMOS Setup (Default)
Short 2 - 3	Clear CMOS Setup

Table 4-30: Clear CMOS Jumper Settings

The location of the clear CMOS jumper is shown in **Figure 4-25** below.

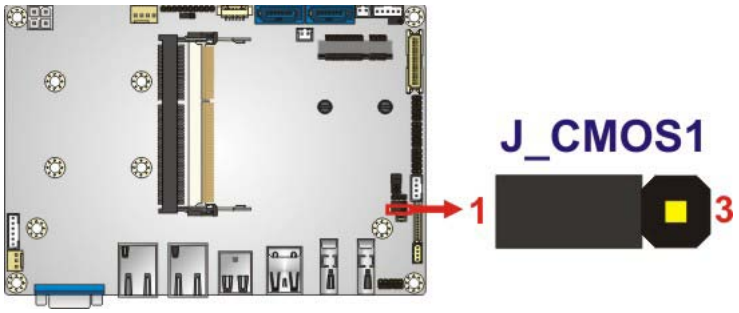


Figure 4-25: Clear CMOS Jumper

4.4.3 LVDS Voltage Selection 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: 3-pin header

Jumper Settings: See **Table 4-31**

Jumper Location: See **Figure 4-26**

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

Setting	Description
Short 1-2	+3.3 V (Default)
Short 2-3	+5.0 V

Table 4-31: LVDS Voltage Selection Jumper Settings

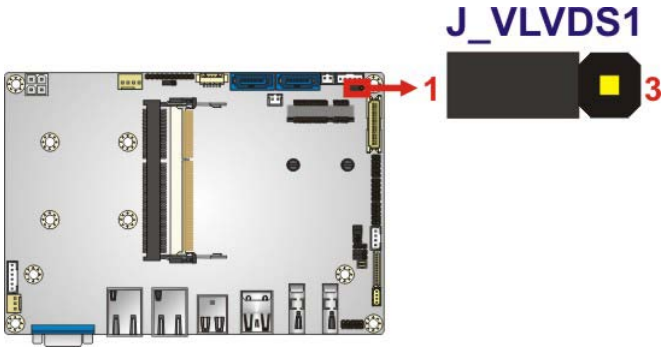


Figure 4-26: LVDS Voltage Selection Jumper Location

4.4.4 LVDS Panel Resolution Selection Jumper

Jumper Label: J_PID1

Jumper Type: 8-pin header

Jumper Settings: See **Table 4-32**

Jumper Location: See **Figure 4-27**

The **LVDS Panel Resolution Selection** jumper allows the LVDS screen voltage to be set.

The **LVDS Panel Resolution Selection** jumper settings are shown in **Table 4-32**.

Pin	Description
Open	640 X 480 (18bit)
1-2	800 X 480 (18bit)
3-4	800 X 600 (18bit)
1-2 and 3-4	1024 X 768 (18bit)
5-6	1024 X 768 (24bit)
1-2 and 5-6	1280 X 1024 (48bit)
3-4 and 5-6	1600 X 1200 (48bit)
1-2 and 3-4 and 5-6	1280 X 768 (18bit)
7-8	1280 X 800 (18bit)

Pin	Description
1-2 and 7-8	1366 X 768 (24bit)
3-4 and 7-8	1440 X 900 (48bit)
1-2 and 3-4 and 7-8	1600 X 900 (48bit)
5-6 and 7-8	1680 X 1050 (48bit)
1-2 and 5-6 and 7-8	1920 X 1080 (48bit)
3-4 and 5-6 and 7-8	1920 X 1200 (48bit)
Short all	LVDS Disabled

Table 4-32: LVDS Screen Resolution Jumper Settings

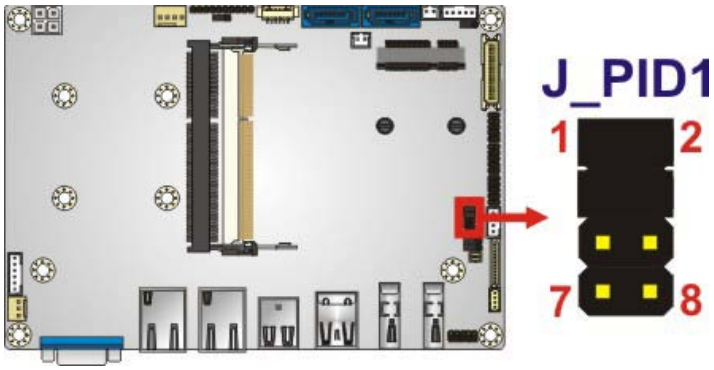


Figure 4-27: LVDS Screen Resolution Jumper Locations

4.4.5 TPM Setting Jumper

Jumper Label: ME_RTC1

Jumper Type: 3-pin header

Jumper Settings: See **Table 4-33**

Jumper Location: See **Figure 4-28**

The TPM Setting jumper configures the TPM setting.

Setting	Description
Short 1-2	Save ME RTC registers (Default)
Short 2-3	Clear ME RTC registers

Table 4-33: TPM Setting Jumper Settings

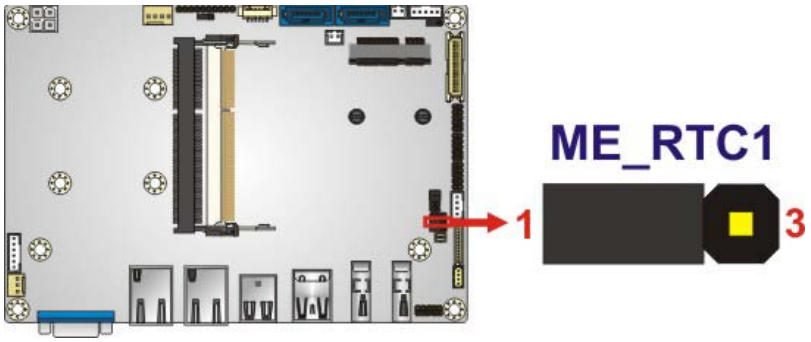


Figure 4-28: TPM Setting Jumper Location

4.4.6 Flash Descriptor Security Override Jumper

Jumper Label:	J_FLASH1
Jumper Type:	3-pin header
Jumper Settings:	See **Table 4-34**
Jumper Location:	See **Figure 4-29**

The Flash Descriptor Security Override jumper specifies whether to override the flash descriptor.

Setting	Description
Short 1-2	Disabled (No override)
Short 2-3	Enabled (Override)

Table 4-34: Flash Descriptor Security Override Jumper Settings

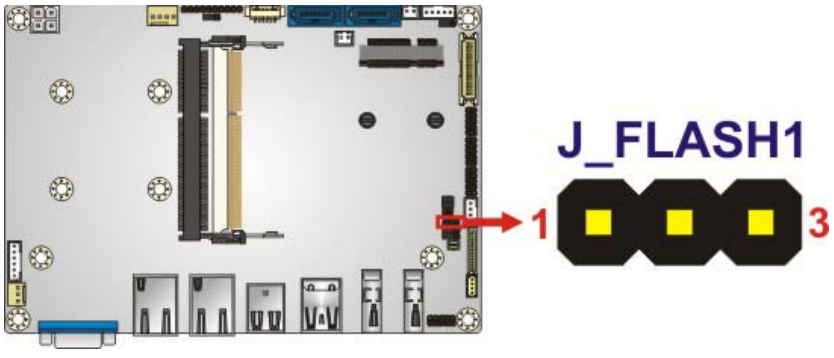


Figure 4-29: Flash Descriptor Security Override Jumper Location

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** or **F2** key as soon as the system is turned on or
2. Press the **DELETE** or **F2** key when the "**Press Del to enter SETUP**" message appears on the screen.

If the message disappears before the **DELETE** or **F2** key is pressed, restart the computer and try again.

5.1.2 Using Setup

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

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

Key	Function
F4 key	Save all the CMOS changes
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

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

5.1.4 Unable to Reboot After Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in Chapter **4**.

5.1.5 BIOS Menu Bar

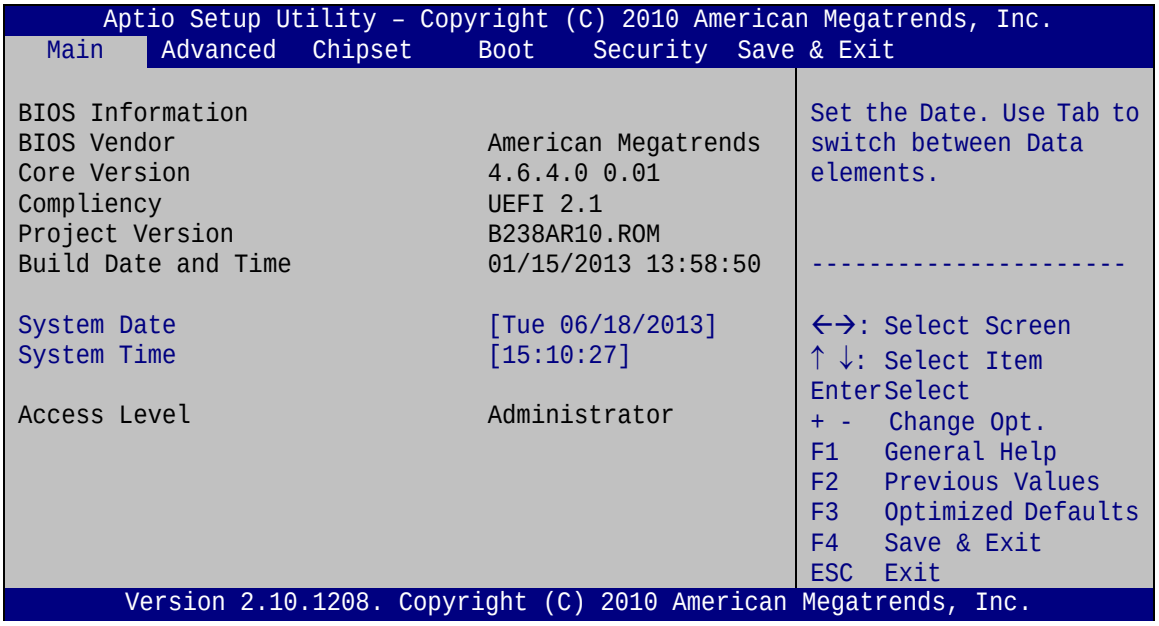
The **menu bar** on top of the BIOS screen has the following main items:

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

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

5.2 Main

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



BIOS Menu 1: Main

➔ System Overview

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

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

The System Overview field also has two user configurable fields:

➔ System Date [xx/xx/xx]

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

➔ System Time [xx:xx:xx]

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

5.3 Advanced

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

WARNING!

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

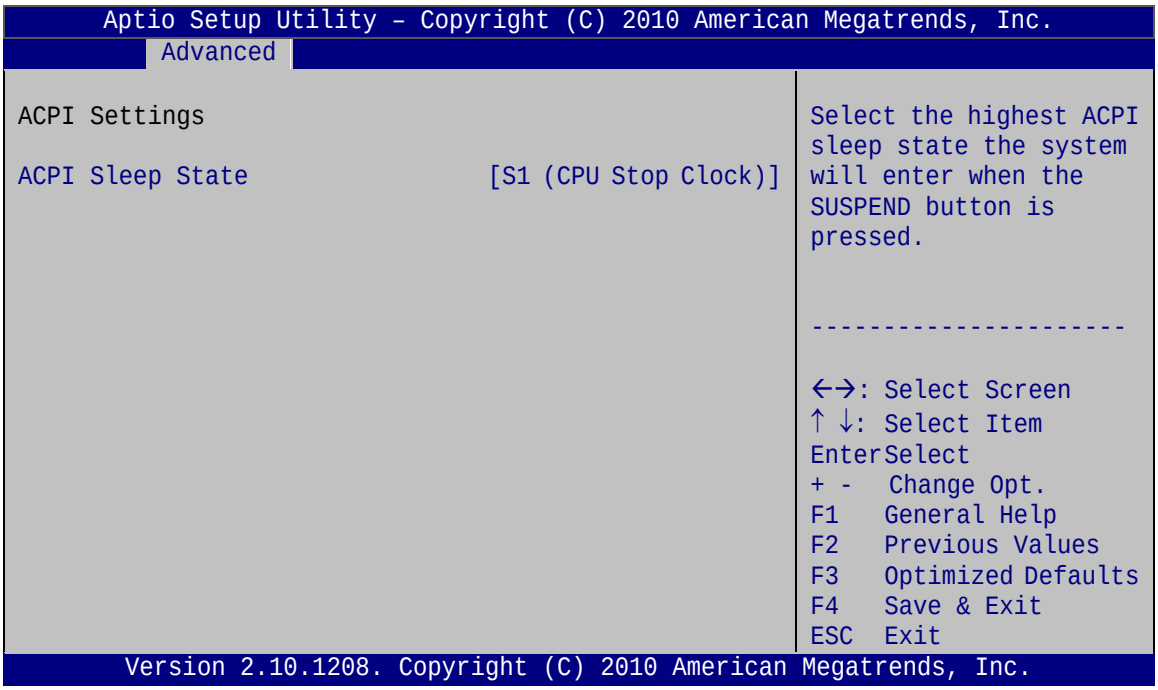
```
      Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
  Main    Advanced  Chipset     Boot     Security  Save & Exit

> ACPI Settings                                   System ACPI Parameters
> RTC Wake Settings
> CPU Configuration
> SATA Configuration
> USB Configuration                               ----------------------
> F81866 Super IO Configuration
> F81866 H/M Monitor                              ←→: Select Screen
> Serial Port Console Redirection                 ↑ ↓: Select Item
> iEi Feature                                     EnterSelect
                                                  + -   Change Opt.
                                                  F1    General Help
                                                  F2    Previous Values
                                                  F3    Optimized Defaults
                                                  F4    Save & Exit
                                                  ESC   Exit
        Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 2: Advanced

5.3.1 ACPI Settings

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



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.

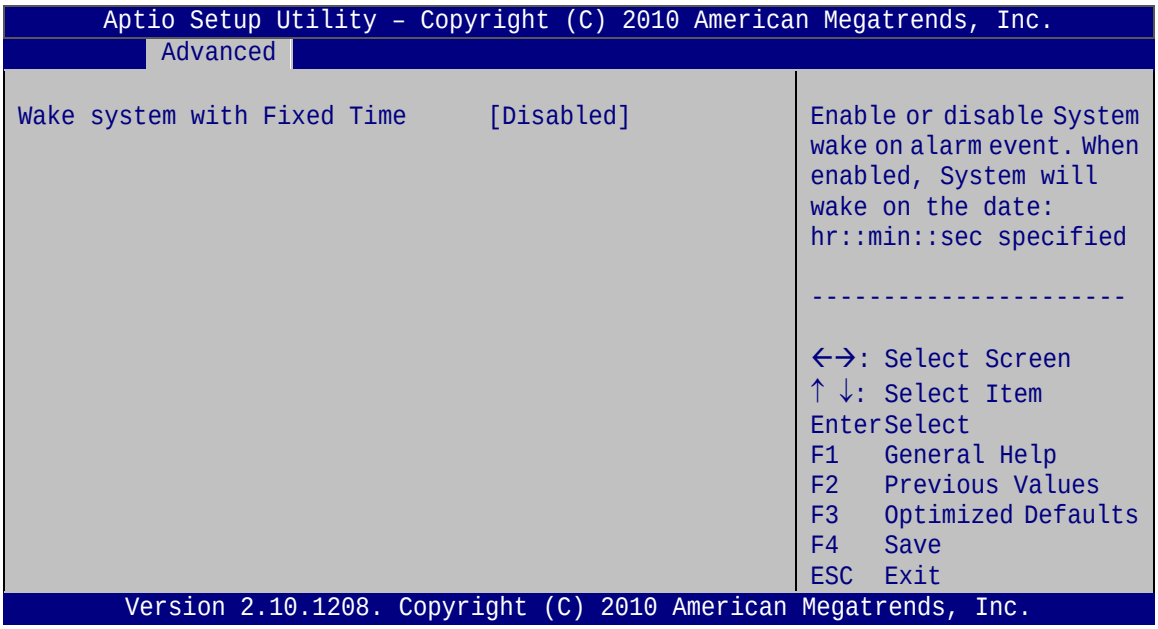
➔ **Suspend Disabled**

➔ **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 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 4**) configures RTC wake event.



BIOS Menu 4: RTC Wake Settings

➔ Wake system with Fixed Time [Disabled]

Use the **Wake system with Fixed Time** option to enable or disable the system wake on alarm event.

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

➔ **Enabled** If selected, the **Wake up every day** option appears allowing you to enable to disable the system to wake every day at the specified time. Besides, the following options appear with values that can be selected:

Wake up date

Wake up hour

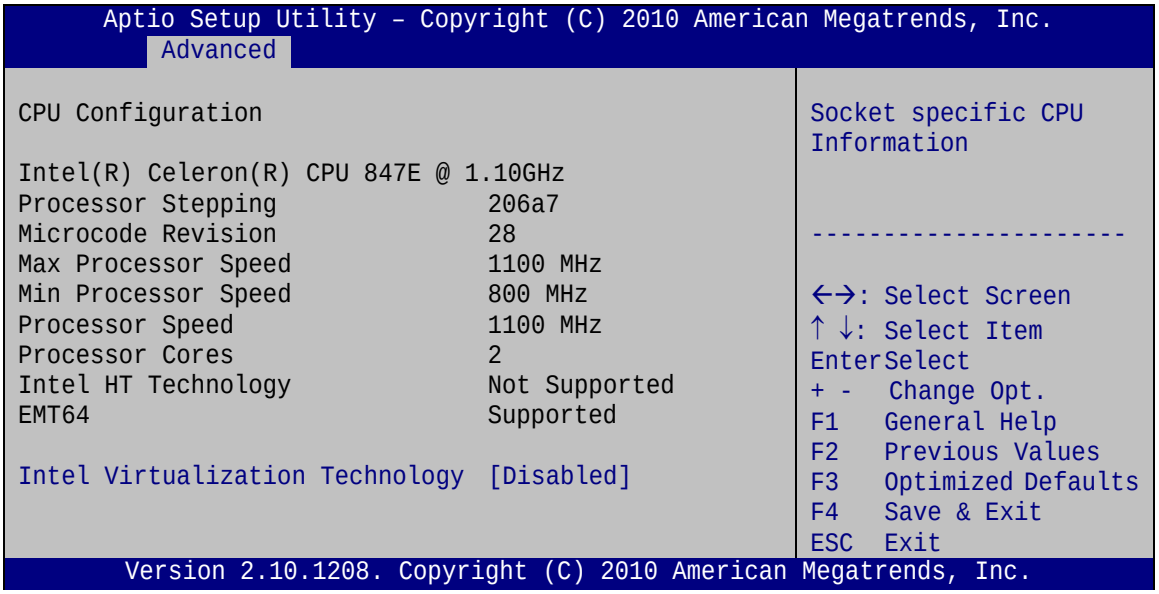
Wake up minute

Wake up second

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

5.3.3 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 5**) to enter the **CPU Information** submenu or enable Intel Virtualization Technology.



BIOS Menu 5: CPU Configuration

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

- Processor Type: Lists the brand name of the CPU being used
- Processor Stepping: Lists the CPU processing stepping
- Microcode Revision: Lists the microcode revision being used.
- 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 Intel HT Technology is supported by the CPU.
- EMT64: Indicates if EM64T is supported by the CPU.

➔ 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 Technology.	Virtualization
➔ **Enabled**		Enables Intel Virtualization Technology.	

5.3.4 SATA Configuration

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

```
Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
    Advanced
SATA Configuration                          Determines how SATA
                                            controller(S) operate.
SATA Mode Selection          [IDE]
S_ATA1                       Empty
S_ATA2                       Empty          ------------------

                                            ←→: Select Screen
                                            ↑ ↓: Select Item
                                            EnterSelect
                                            + -   Change Opt.
                                            F1    General Help
                                            F2    Previous Values
                                            F3    Optimized Defaults
                                            F4    Save & Exit
                                            ESC   Exit
Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 6: SATA Configuration

➔ SATA Mode Selection [IDE]

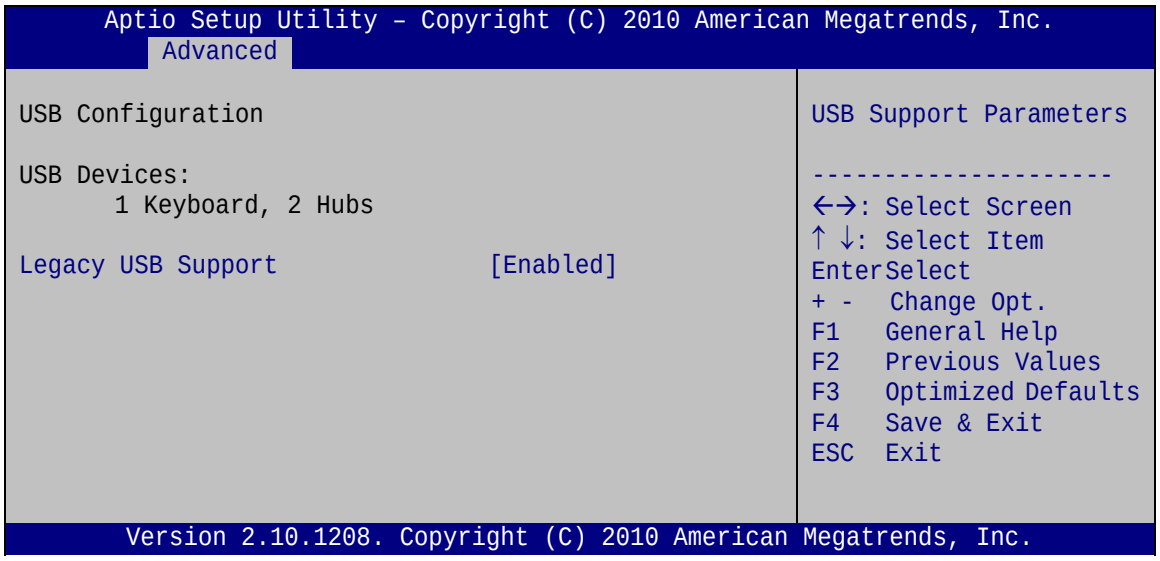
Use the **SATA Mode Selection** option to configure SATA devices as normal IDE devices.

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

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

5.3.5 USB Configuration

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



BIOS Menu 7: USB Configuration

➔ USB Devices

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

➔ Legacy USB Support [Enabled]

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

➔ **Enabled** **DEFAULT** Legacy USB support enabled

➔ **Disabled** Legacy USB support disabled

5.3.6 Super IO Configuration

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

```
Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
    Advanced
F81866 Super IO Configuration                  Set Parameters of Serial
                                               Port 1 (COMA)
F81866 Super IO Chip              F81866
> Serial Port 1 Configuration
> Serial Port 2 Configuration                  ---------------------
> Serial Port 3 Configuration                  ←→: Select Screen
                                               ↑ ↓: Select Item
                                               EnterSelect
                                               + -   Change Opt.
                                               F1    General Help
                                               F2    Previous Values
                                               F3    Optimized Defaults
                                               F4    Save & Exit
                                               ESC   Exit
Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 8: Super IO Configuration

5.3.6.1 Serial Port n Configuration

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

```
Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
    Advanced
Serial Port n Configuration                    Enable or Disable Serial
                                               Port (COM)
Serial Port                       [Enabled]
Device Settings                   IO=3F8h; IRQ=4
                                               ---------------------
Change Settings                   [Auto]       ←→: Select Screen
                                               ↑ ↓: Select Item
                                               EnterSelect
                                               = -   Change Opt.
                                               F1    General Help
                                               F2    Previous Values
                                               F3    Optimized Defaults
                                               F4    Save & Exit
                                               ESC   Exit
Version 2.10.1208. Copyright (C) 2010 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=3E8h; IRQ=3, 4**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4
➔	**IO=2E8h; IRQ=3, 4**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4

5.3.6.1.2 Serial Port 2 Configuration

➔ Serial Port [Enabled]

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

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

➔ Change Settings [Auto]

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

➔ **Auto**	**DEFAULT**	The serial port IO port address and interrupt address are automatically detected.
➔ **IO=2F8h; IRQ=3**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3
➔ **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=3E8h; IRQ=3, 4**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4
➔ **IO=2E8h; IRQ=3, 4**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4

5.3.6.1.3 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=3F8h; IRQ=10**	Serial Port I/O port address is 3F8h and the interrupt address is IRQ10
➔ **IO=2F8h; IRQ=10**	Serial Port I/O port address is 2F8h and the interrupt address is IRQ10
➔ **IO=3E8h; IRQ=10**	Serial Port I/O port address is 3E8h and the interrupt address is IRQ10
➔ **IO=2E8h; IRQ=10**	Serial Port I/O port address is 2E8h and the interrupt address is IRQ10
➔ **IO=2E0h; IRQ=10**	Serial Port I/O port address is 2E0h and the interrupt address is IRQ10

5.3.7 H/W Monitor

The H/W Monitor menu (**BIOS Menu 10**) contains the fan configuration submenus and displays operating temperature, fan speeds and system voltages.

```
        Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
                Advanced
 PC Health Status                                  Smart FAN Configuration

 CPU temperature                  :+42 C
 SYS temperature                  :+44 C
 CPU_FAN1 Speed                   :N/A
 SYS_FAN1 Speed                   :N/A
 VCC_CORE                         :+0.976 V
 +5VS                             :+5.171 V
 +12VS                            :+12.320 V
 +1.5V                            :+1.552 V
 VSB3V                            :+3.328 V
 VBAT                             :+3.296 V

 > Smart Fan Mode Configuration                  ----------------------
                                                 ←→: Select Screen
                                                 ↑ ↓: Select Item
                                                 EnterSelect
                                                 + -   Change Opt.
                                                 F1    General Help
                                                 F2    Previous Values
                                                 F3    Optimized Defaults
                                                 F4    Save & Exit
                                                 ESC   Exit
        Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 10: H/W Monitor

➔ PC Health Status

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

- System Temperatures:
  - CPU Temperature
  - System Temperature
- Fan Speed:
  - CPU Fan Speed
  - System Fan Speed
- Voltages:
  - VCC_core
  - +5VS
  - +12VS
  - +1.5V
  - VSB3V
  - VBAT

5.3.7.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration submenu** (**BIOS Menu 11**) to configure fan temperature and speed settings.

```
Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
        Advanced
Smart Fan Mode Configuration                    Smart Fan Mode Select

CPU Fan Smart Fan Control       [Auto Duty-Cycle Mode]
Temperature 1                   60
Temperature 2                   50
Temperature 3                   40
Temperature 4                   30
Duty Cycle 1                    85
Duty Cycle 2                    70
Duty Cycle 3                    60
Duty Cycle 4                    50
SYS Fan Smart Fan Control       [Manual Duty Mode]
Manual Duty Mode                100
                                                    ---------------------
                                                    ←→: Select Screen
                                                    ↑ ↓: Select Item
                                                    EnterSelect
                                                    + -   Change Opt.
                                                    F1    General Help
                                                    F2    Previous Values
                                                    F3    Optimized Defaults
                                                    F4    Save & Exit
                                                    ESC   Exit
Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 11: Smart Fan Mode Configuration

➔ CPU Fan Smart Fan Control [Auto Duty-Cycle Mode]

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

➔	**Manual Duty Mode**	The fan spins at the speed set in Manual by Duty-Cycle settings
➔	**Auto Duty-Cycle Mode** **DEFAULT**	The fan adjusts its speed using Auto by Duty-Cycle settings

➔ Temperature n

Use the + or – key to change the fan **Temperature n** value. Enter a decimal number between 0 and 100.

➔ SYS Fan Smart Fan Control [Auto Duty-Cycle Mode]

Use the **SYS Fan Smart Fan Control** option to configure the CPU Smart Fan.

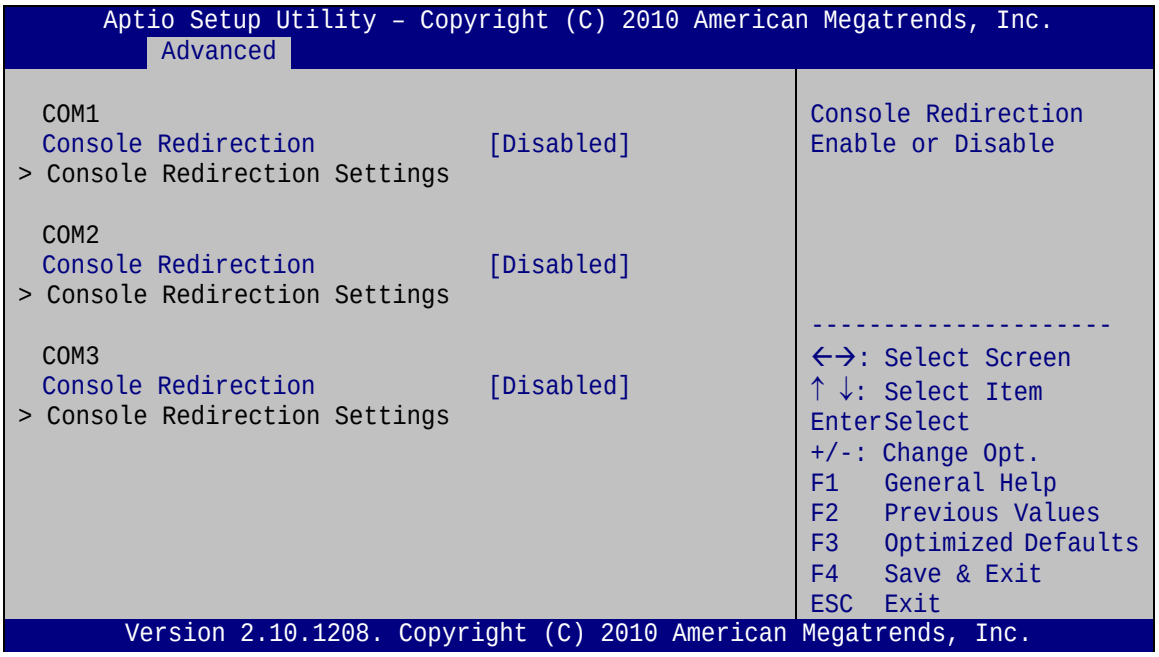
➔	**Manual Duty Mode**	The fan spins at the speed set in Manual by Duty-Cycle settings
➔	**Auto Duty-Cycle Mode** **DEFAULT**	The fan adjusts its speed using Auto by Duty-Cycle settings

➔ Temperature n

Use the + or – key to change the fan **Temperature n** value. Enter a decimal number between 0 and 100.

5.3.8 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 12**) 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.



BIOS Menu 12: Serial Port Console Redirection

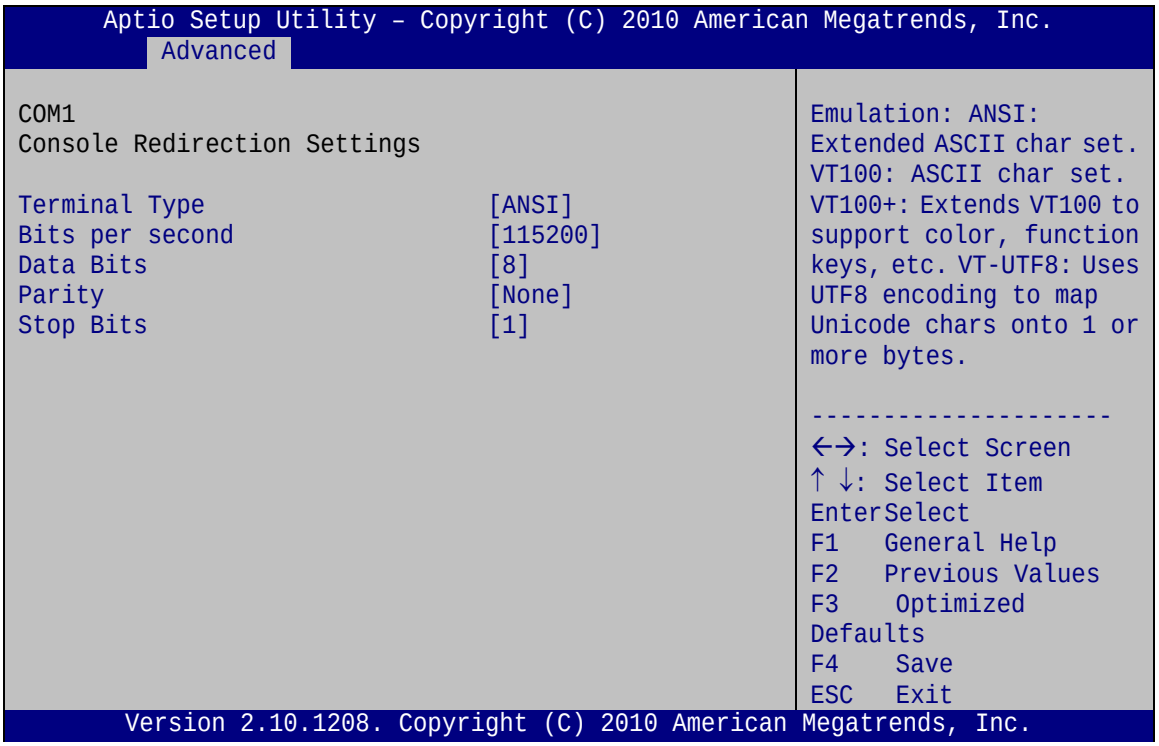
➔ Console Redirection [Disabled]

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

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

5.3.8.1 Console Redirection Settings

The **Console Redirection Settings** menu (**BIOS Menu 13**) allows the console redirection options to be configured. The option is active when Console Redirection option is enabled.



BIOS Menu 13: Console Redirection Settings

➔ Terminal Type [ANSI]

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

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

➔ Data Bits [8]

Use the **Data Bits** option to specify the number of data bits.

- ➔ **7** Sets the data bits at 7.
- ➔ **8** **DEFAULT** Sets the data bits at 8.

➔ Parity [None]

Use the **Parity** option to specify the parity bit that can be sent with the data bits for detecting the transmission errors.

- ➔ **None** **DEFAULT** No parity bit is sent with the data bits.
- ➔ **Even** The parity bit is 0 if the number of ones in the data bits is even.
- ➔ **Odd** The parity bit is 0 if the number of ones in the data bits is odd.
- ➔ **Mark** The parity bit is always 1. This option does not provide error detection.
- ➔ **Space** The parity bit is always 0. This option does not provide error detection.

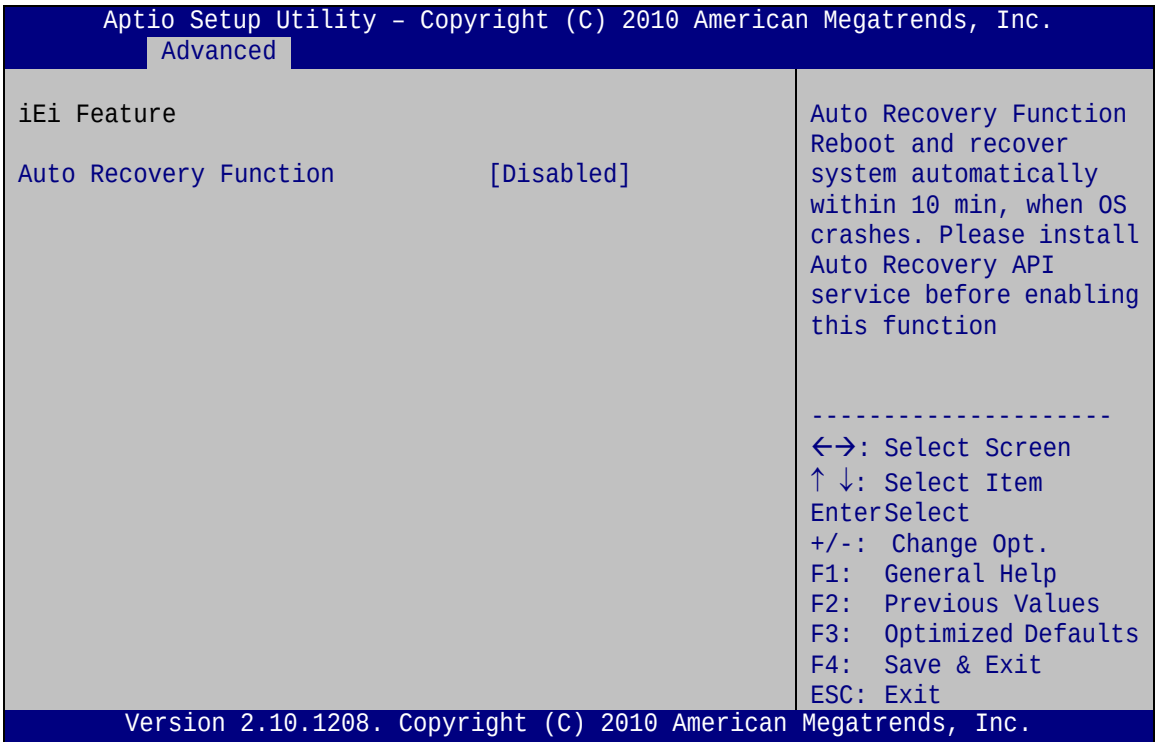
➔ Stop Bits [1]

Use the **Stop Bits** option to specify the number of stop bits used to indicate the end of a serial data packet. Communication with slow devices may require more than 1 stop bit.

- ➔ **1** **DEFAULT** Sets the number of stop bits at 1.
- ➔ **2** Sets the number of stop bits at 2.

5.4 iEi Feature

Use the **iEi Feature** menu (**BIOS Menu 14**) to configure the auto recovery function.



BIOS Menu 14: iEi Feature

➔ Auto Recovery Function [Disabled]

Use the **Auto Recovery Function** option to enable or disable auto recovery on the system.

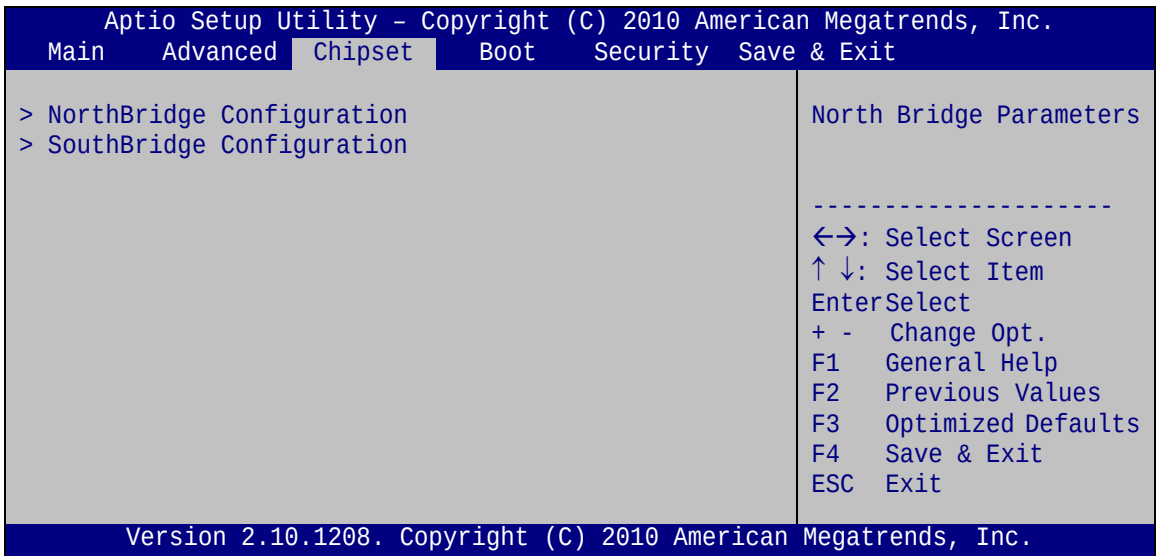
- ➔ **Disabled** **DEFAULT** Auto Recovery Function support disabled
- ➔ **Enabled** Auto Recovery Function support enabled

5.5 Chipset

Use the **Chipset** menu (**BIOS Menu 15**) to access the Northbridge, Southbridge, Integrated Graphics, and ME Subsystem configuration menus.

WARNING!

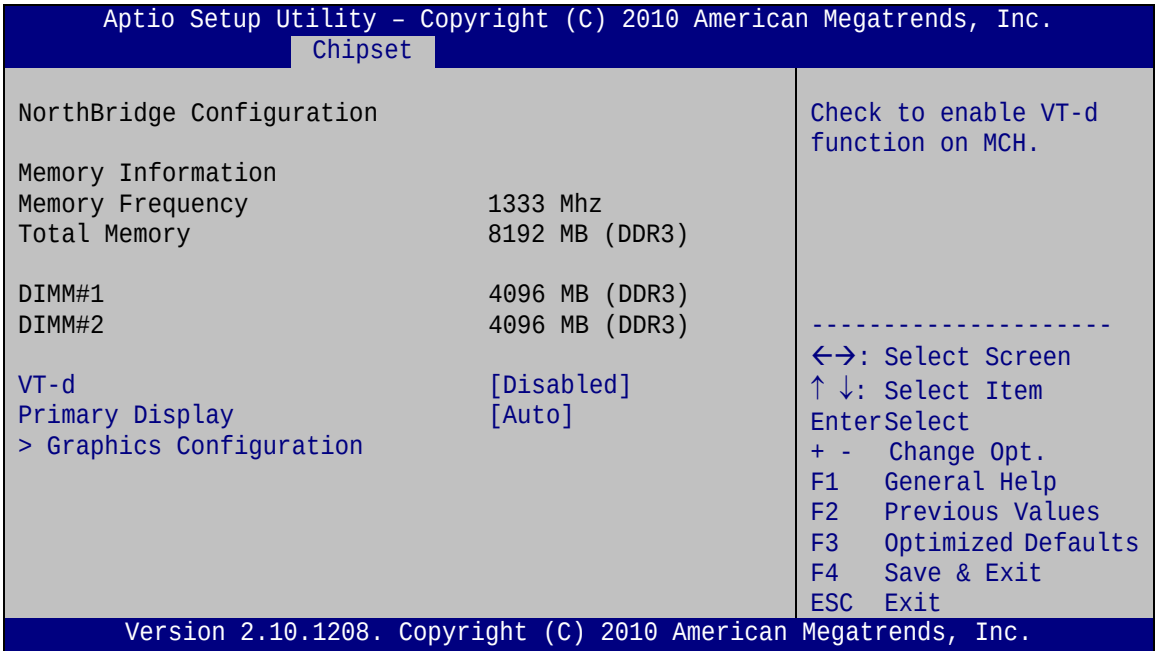
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.



BIOS Menu 15: Chipset

5.5.1 NorthBridge Configuration

Use the **NorthBridge Configuration** menu (**BIOS Menu 16**) to configure the Northbridge chipset.



BIOS Menu 16:Northbridge Configuration

➔ VT-d [Disabled]

Use the **VT-d** option to enable or disable VT-d support.

➔	**Disabled**	**DEFAULT**	Disables VT-d support.
➔	**Enabled**		Enables VT-d support.

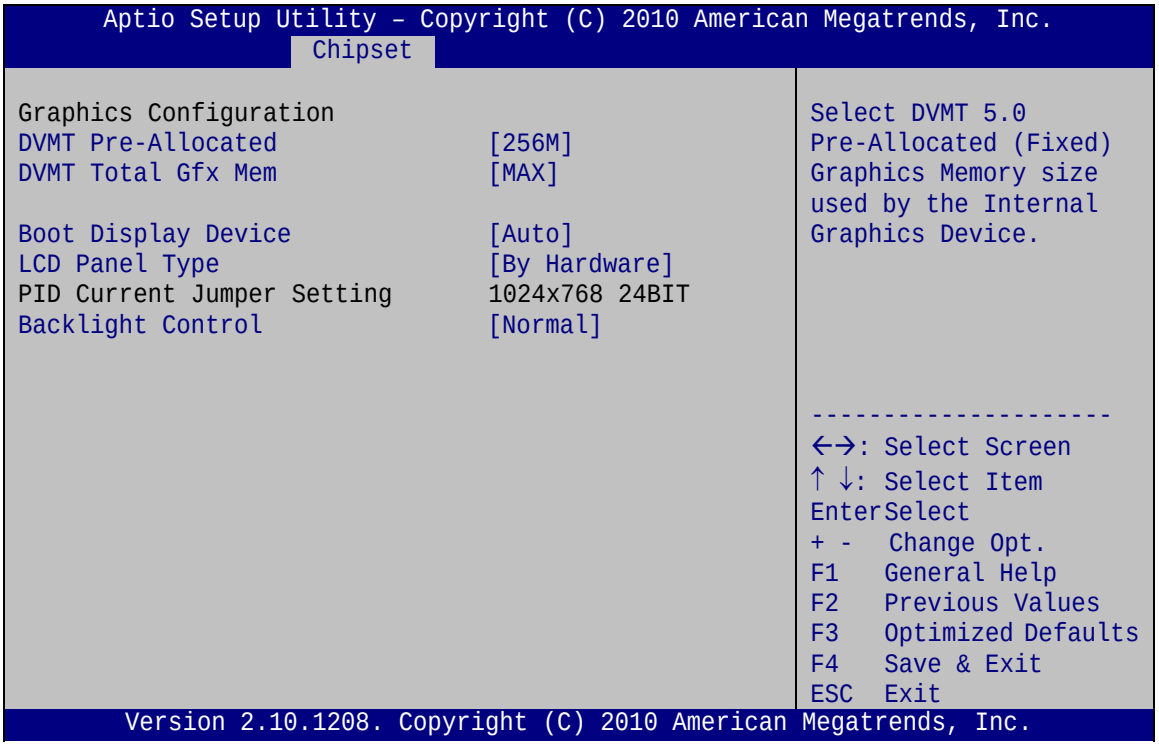
➔ Primary Display [Auto]

Use the **Primary Display** option to select the primary display controller the system uses. The following options are available:

- Auto **DEFAULT**
- IGFX
- PEG

5.5.1.1 Graphics Configuration

Use the **Graphics Configuration** menu to configure the video device connected to the system.



BIOS Menu 17:Graphics Configuration

➔ DVMT Pre-Allocated [64MB]

Use the **DVMT Pre-Allocated** option to specify the amount of memory that can be allocated as graphics memory. Configuration options are listed below.

- 32M
- 64M
- 128M
- 256M **DEFAULT**
- 512M

➔ DVMT Total Gfx Mem [MAX]

Use the **DVMT Total Gfx Mem** option to specify the total amount of memory that can be allocated as graphics memory. Configuration options are listed below.

- 128M
- 256M
- MAX **DEFAULT**

➔ Boot Display Device

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

- AUTO **DEFAULT**
- CRT
- LVDS
- HDMI1
- HDMI2

➔ LCD Panel Type [By Hardware]

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

- By Hardware **DEFAULT**
- 640x480 (18bit)
- 800x600 (18bit)
- 1024x768 (18bit)
- 1024x768 (24bit)
- 1280x800 (24bit)
- 1280x1024 (48bit)
- 1366x768 (24bit)
- 1440x900 (48bit)
- 1440x1050 (48bit)
- 1600x900 (48bit)
- 1600x1200 (48bit)
- 1680x1050 (48bit)

- 1920x1080 (48bit)
- 1920x1200 (48bit)
- 2048x1536 (48bit)

➔ Backlight Control [Normal]

Use the **Backlight Control** option to select backlight control mode.

➔ **Normal** **DEFAULT** Brightest at low voltage level.

➔ **Inverted** Brightest at high voltage level.

5.5.2 Southbridge Configuration

Use the **Southbridge Configuration** menu (**BIOS Menu 18**) to configure the Southbridge chipset.

```
Aptio Setup Utility – Copyright (C) 2010 American Megatrends, Inc.
                    Chipset
SouthBridge Configuration                    | Select AC power state
                                             | when power is re-applied
Auto Power Button Status        [Disable (ATX)] | after a power failure.
Restore AC Power Loss           [Last State] |
                                             | ---------------------
Azalia                          [Enabled]    | ←→: Select Screen
Azalia Internal HDMI codec      [Enabled]    | ↑ ↓: Select Item
                                             | EnterSelect
                                             | + -   Change Opt.
                                             | F1    General Help
                                             | F2    Previous Values
                                             | F3    Optimized Defaults
                                             | F4    Save & Exit
                                             | ESC   Exit
Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.
```

BIOS Menu 18: Southbridge Chipset Configuration

➔ Restore on AC Power Loss [Last State]

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

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

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

➔ Azalia [Enabled]

Use the **Azalia** 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

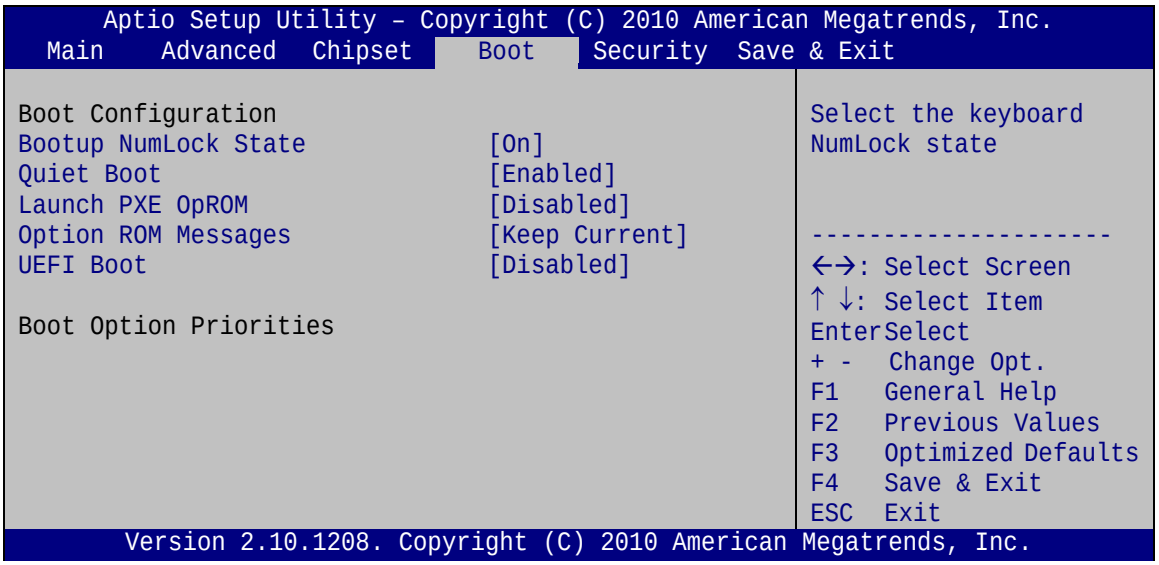
➔ Azalia internal HDMI codec [Enabled]

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

5.6 Boot

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



BIOS Menu 19: Boot

➔ Bootup NumLock State [On]

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

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

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

➔ Quiet Boot [Enabled]

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

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

➔ Launch PXE OpROM [Disabled]

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

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

➔ Option ROM Messages [Keep Current]

Use the **Option ROM Messages** option to set the Option ROM display mode.

➔	**Force BIOS**		Sets display mode to force BIOS.
➔	**Keep Current**	**DEFAULT**	Sets display mode to current.

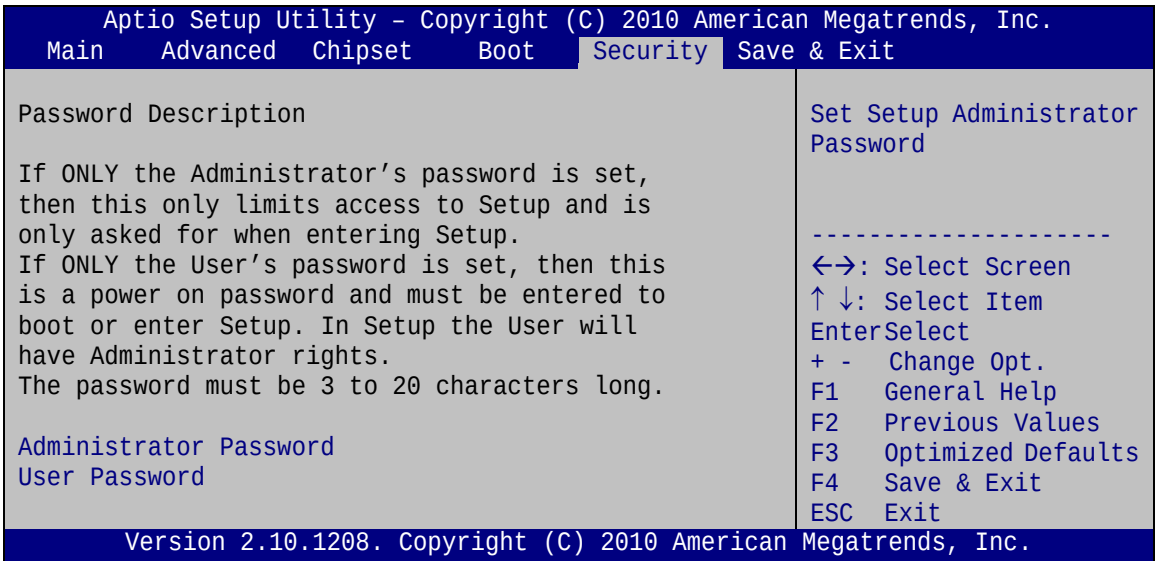
➔ UEFI Boot [Disabled]

Use the **UEFI Boot** option to enable or disable to boot from the UEFI devices.

➔	**Enabled**		Boot from UEFI devices is enabled.
➔	**Disabled**	**DEFAULT**	Boot from UEFI devices is disabled.

5.7 Security

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



BIOS Menu 20: Security

➔ Administrator Password

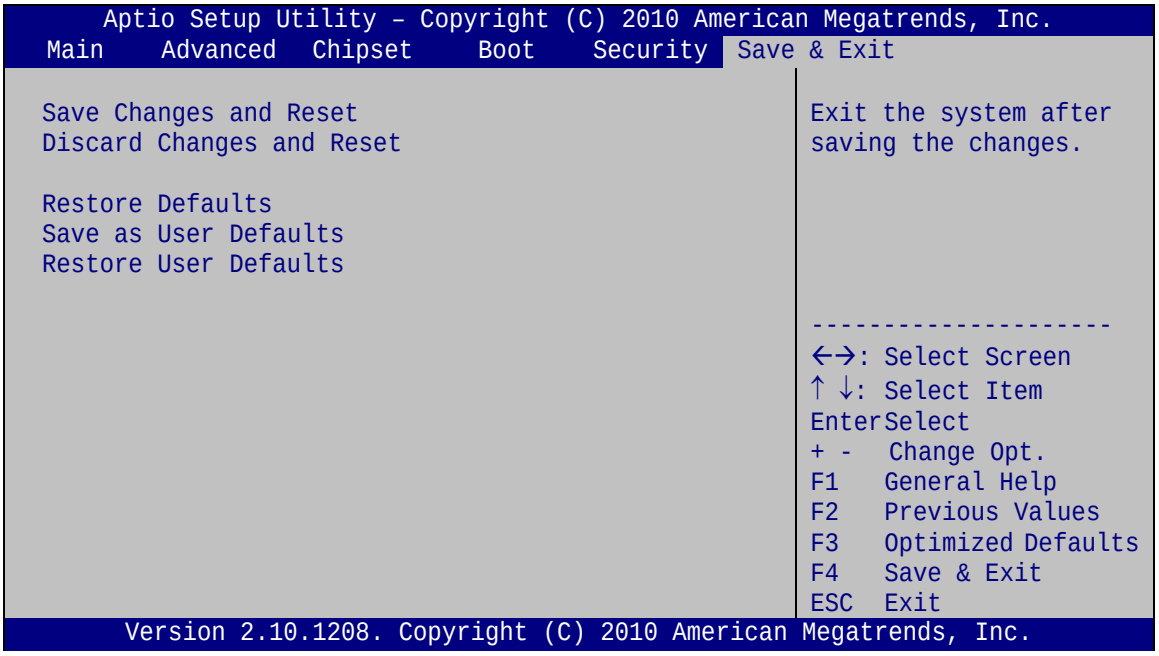
Use the **Administrator Password** to set or change a administrator password.

➔ User Password

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

5.8 Exit

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



BIOS Menu 21: Exit

➔ Save Changes and 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.

Appendix

A

Safety Precautions

WARNING:

The precautions outlined in this chapter should be strictly followed. Failure to follow these precautions may result in permanent damage to the ECN-360A-HM65.

A.1 Safety Precautions

Please follow the safety precautions outlined in the sections that follow:

A.1.1 General Safety Precautions

Please ensure the following safety precautions are adhered to at all times.

- ***Follow the electrostatic precautions*** outlined below whenever the ECN-360A-HM65 is opened.
- ***Make sure the power is turned off and the power cord is disconnected*** whenever the ECN-360A-HM65 is being installed, moved or modified.
- ***Do not apply voltage levels that exceed the specified voltage range***. Doing so may cause fire and/or an electrical shock.
- ***Electric shocks can occur*** if the ECN-360A-HM65 chassis is opened when the ECN-360A-HM65 is running.
- ***Do not drop or insert any objects*** into the ventilation openings of the ECN-360A-HM65.
- ***If considerable amounts of dust, water, or fluids enter the ECN-360A-HM65***, turn off the power supply immediately, unplug the power cord, and contact the ECN-360A-HM65 vendor.
- **DO NOT**:
  - Drop the ECN-360A-HM65 against a hard surface.
  - Strike or exert excessive force onto the ECN-360A-HM65.
  - Touch any of the ECN-360A-HM65 with a sharp object
  - In a site where the ambient temperature exceeds the rated temperature

A.1.2 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the ECN-360A-HM65 may result in permanent damage to the ECN-360A-HM65 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the ECN-360A-HM65. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the ECN-360A-HM65 is opened and any of the electrical components are 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 any electrical component.
- ***Self-grounding***: Before handling any electrical component, touch any grounded conducting material. During the time the electrical component is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad***: When configuring or working with an electrical component, place it on an antic-static pad. This reduces the possibility of ESD damage.
- ***Only handle the edges of the electrical component***: When handling the electrical component, hold the electrical component by its edges.

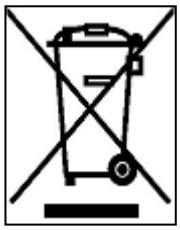
A.1.3 Product Disposal

CAUTION:

Risk of explosion if battery is replaced by and incorrect type. Only certified engineers should replace the on-board battery.

Dispose of used batteries according to instructions and local regulations.

- Outside the European Union - If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority so as to comply with the correct disposal method.
- Within the European Union:



EU-wide legislation, as implemented in each Member State, requires that waste electrical and electronic products carrying the mark (left) must be disposed of separately from normal household waste. This includes monitors and electrical accessories, such as signal cables or power cords. When you need to dispose of your display products, please follow the guidance of your local authority, or ask the shop where you purchased the product. The mark on electrical and electronic products only applies to the current European Union Member States.

Please follow the national guidelines for electrical and electronic product disposal.

A.2 Maintenance and Cleaning Precautions

When maintaining or cleaning the ECN-360A-HM65, please follow the guidelines below.

A.2.1 Maintenance and Cleaning

Prior to cleaning any part or component of the ECN-360A-HM65, please read the details below.

- The interior of the ECN-360A-HM65X does not require cleaning. Keep fluids away from the ECN-360A-HM65 interior.
- Be cautious of all small removable components when vacuuming the ECN-360A-HM65.
- Turn the ECN-360A-HM65 off before cleaning the ECN-360A-HM65.
- Never drop any objects or liquids through the openings of the ECN-360A-HM65.
- Be cautious of any possible allergic reactions to solvents or chemicals used when cleaning the ECN-360A-HM65.
- Avoid eating, drinking and smoking within vicinity of the ECN-360A-HM65.

A.2.2 Cleaning Tools

Some components in the ECN-360A-HM65 may only be cleaned using a product specifically designed for the purpose. In such case, the product will be explicitly mentioned in the cleaning tips. Below is a list of items to use when cleaning the ECN-360A-HM65.

- ***Cloth*** – Although paper towels or tissues can be used, a soft, clean piece of cloth is recommended when cleaning the ECN-360A-HM65.
- ***Water or rubbing alcohol*** – A cloth moistened with water or rubbing alcohol can be used to clean the LECN-360A-HM65.
- ***Using solvents*** – The use of solvents is not recommended when cleaning the LECN-360A-HM65 as they may damage the plastic parts.
- ***Vacuum cleaner*** – Using a vacuum specifically designed for computers is one of the best methods of cleaning the ECN-360A-HM65. Dust and dirt can restrict the airflow in the ECN-360A-HM65 and cause its circuitry to corrode.
- ***Cotton swabs*** - Cotton swaps moistened with rubbing alcohol or water are excellent tools for wiping hard to reach areas.
- ***Foam swabs*** - Whenever possible, it is best to use lint free swabs such as foam swabs for cleaning.

Appendix

B

BIOS Menu Options

Appendix

C

One Key Recovery

C.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 C.3 for the detailed setup procedure.

The IEI One Key Recovery tool menu is shown below.

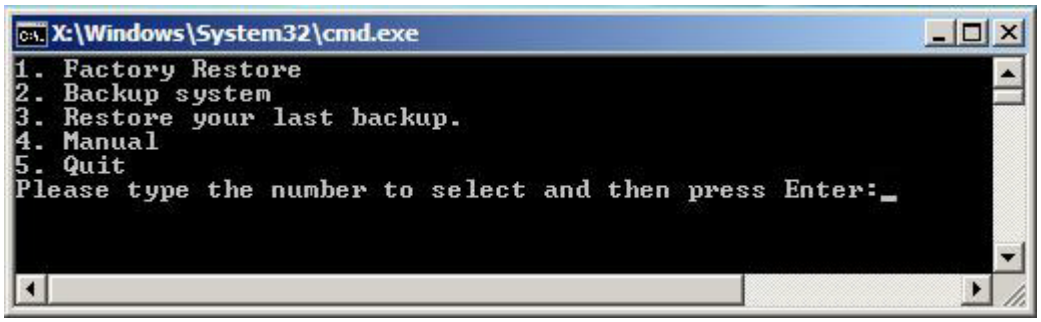


Figure C-1: IEI One Key Recovery Tool Menu

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

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

NOTE:

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

C.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.

C.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.

C.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 C.2.1**)

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

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

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

Step 5: Create factory default image (see **Section C.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 C.3**.

C.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.

C.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!

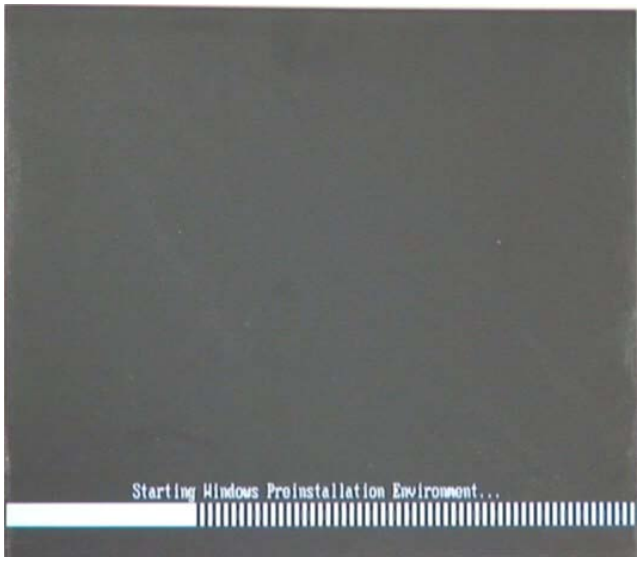


Figure C-2: Launching the Recovery Tool

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

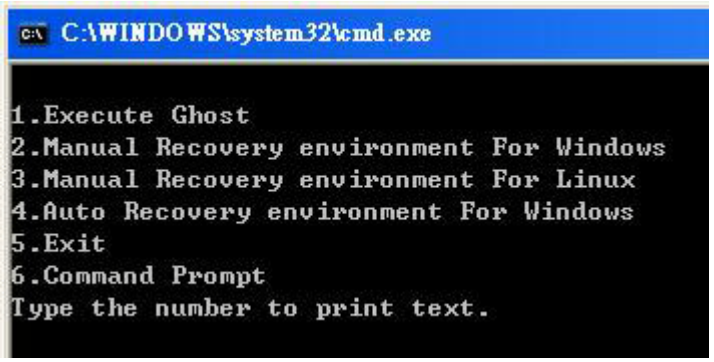


Figure C-3: Recovery Tool Setup Menu

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

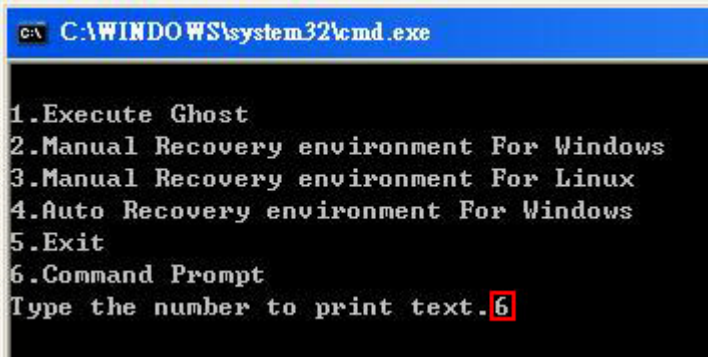


Figure C-4: Command Prompt

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

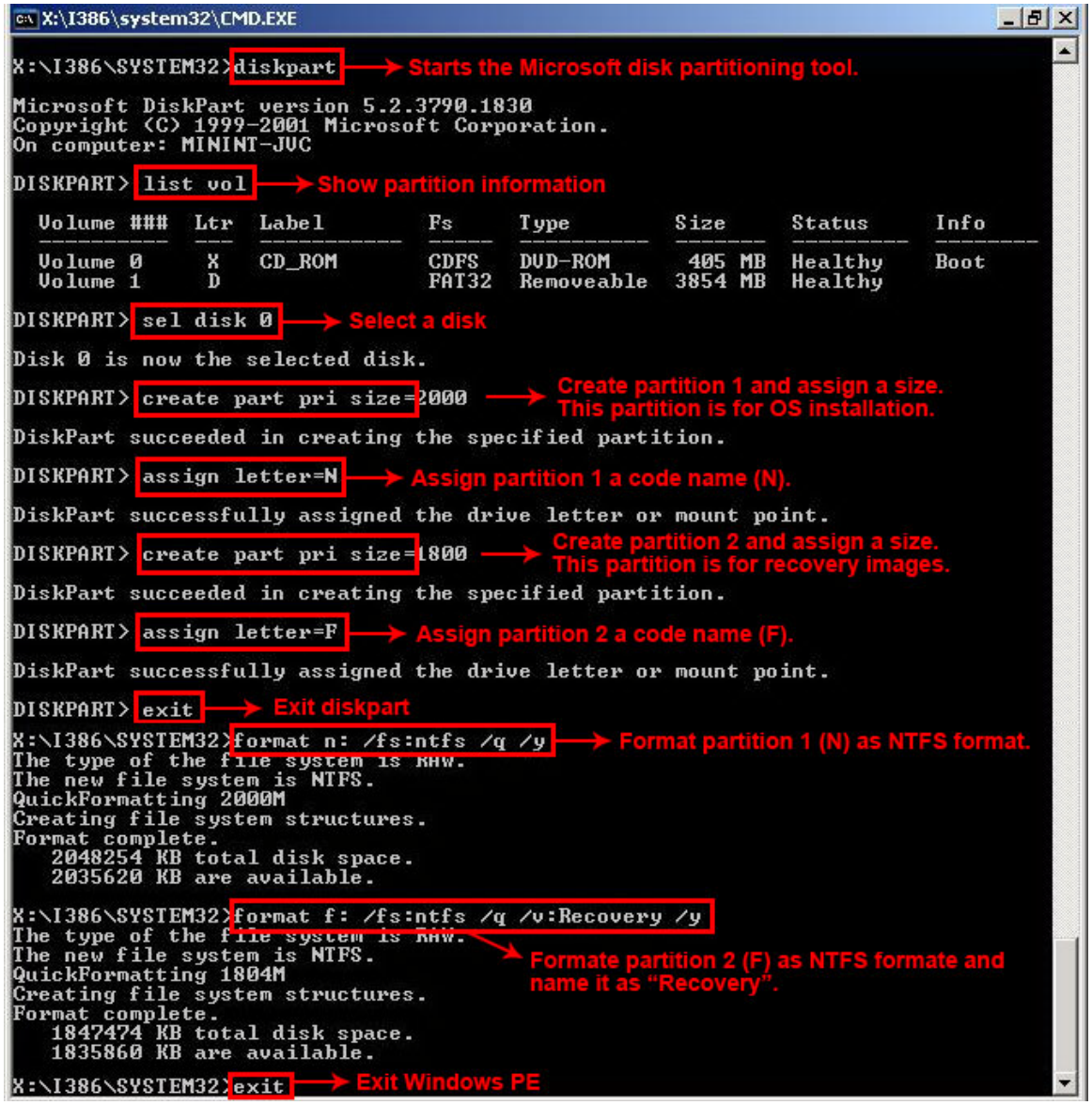
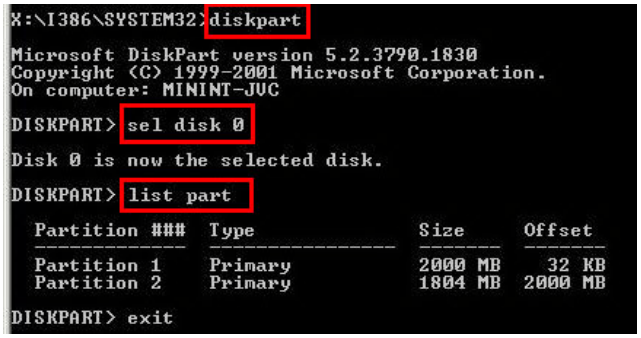


Figure C-5: Partition Creation Commands

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.

C.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.

C.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!

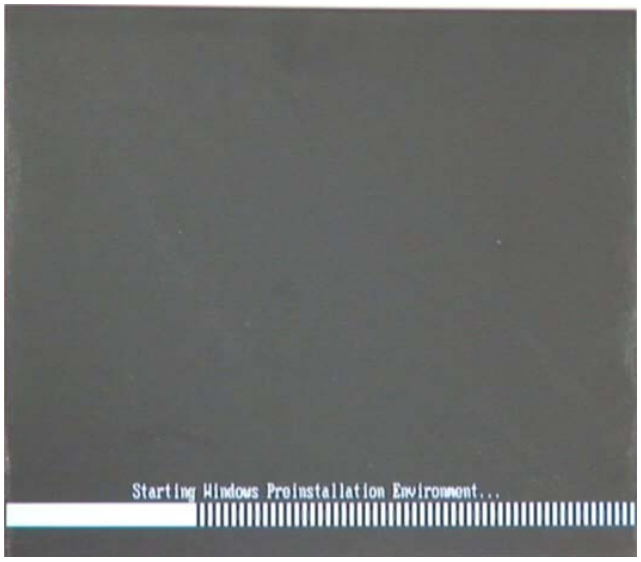


Figure C-6: Launching the Recovery Tool

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

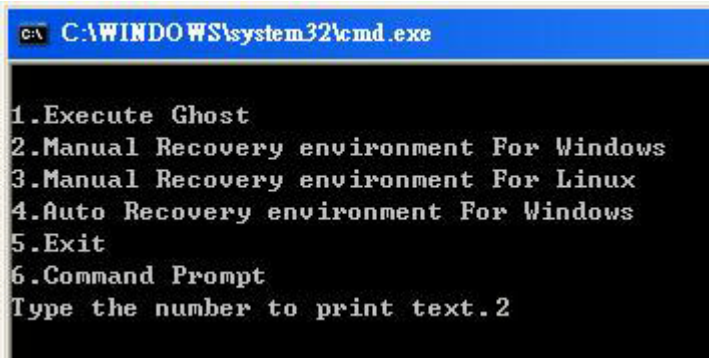


Figure C-7: Manual Recovery Environment for Windows

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 C.2.2** is hidden and the recovery tool is saved in this partition.

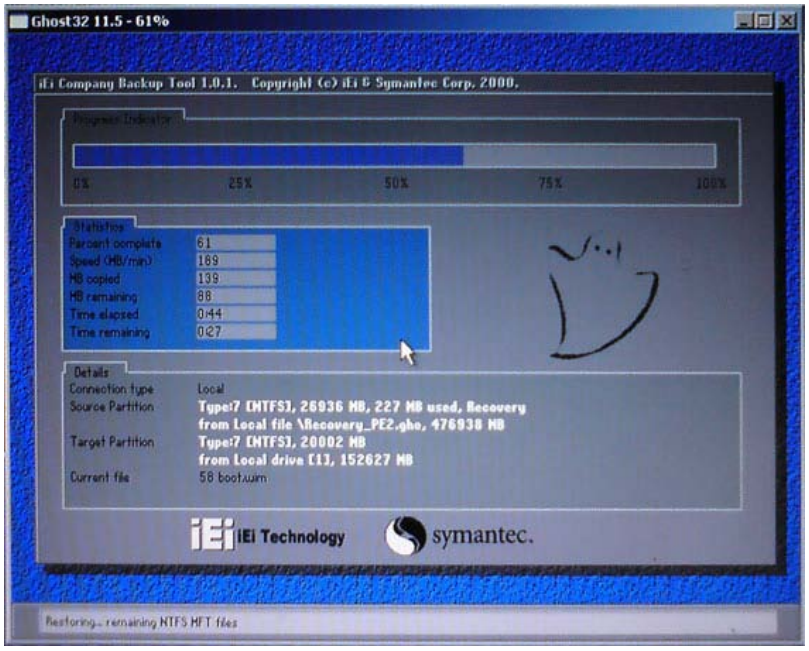


Figure C-8: Building the Recovery Partition

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

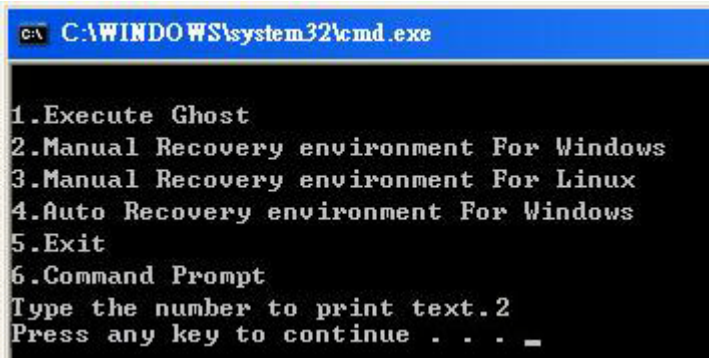


Figure C-9: Press Any Key to Continue

Step 7: Eject the recovery CD.

C.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 C-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.

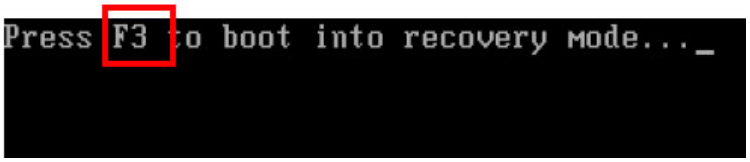


Figure C-10: Press F3 to Boot into Recovery Mode

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

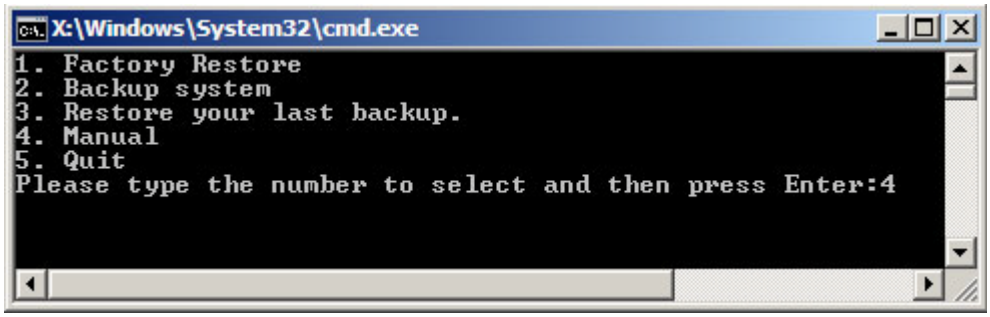


Figure C-11: Recovery Tool Menu

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

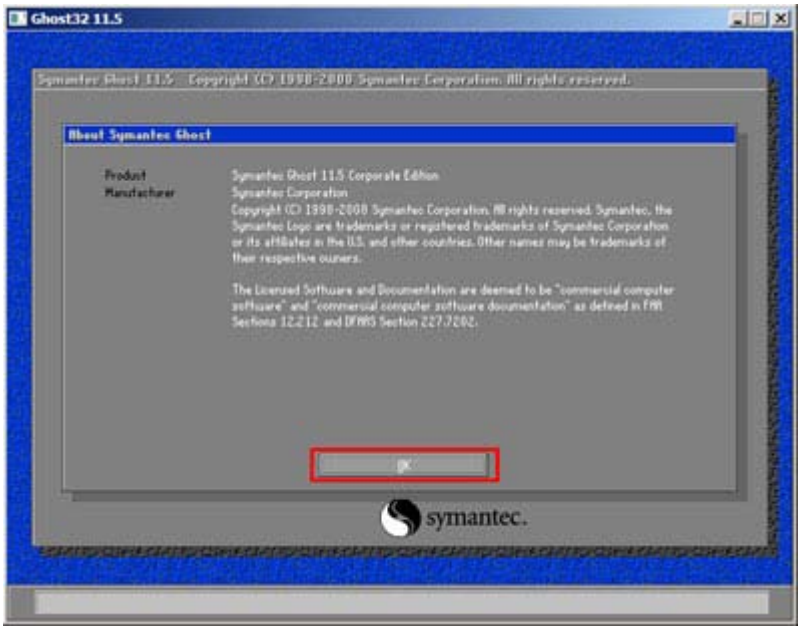


Figure C-12: About Symantec Ghost Window

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

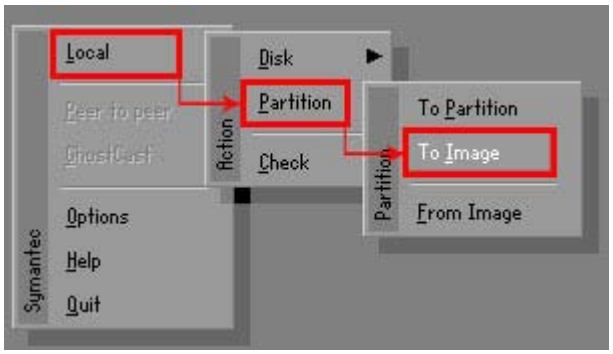


Figure C-13: Symantec Ghost Path

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

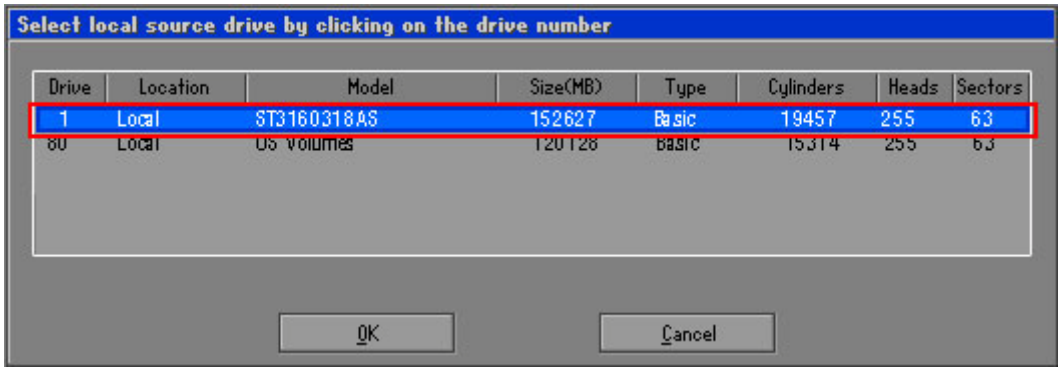


Figure C-14: Select a Local Source Drive

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

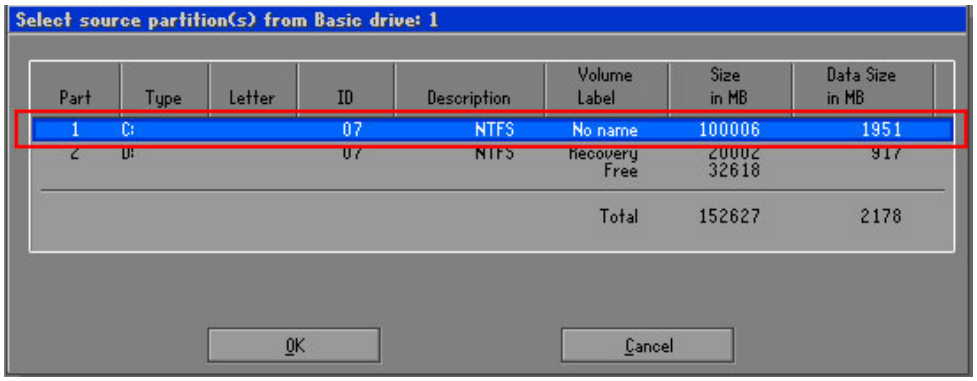


Figure C-15: Select a Source Partition from Basic Drive

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

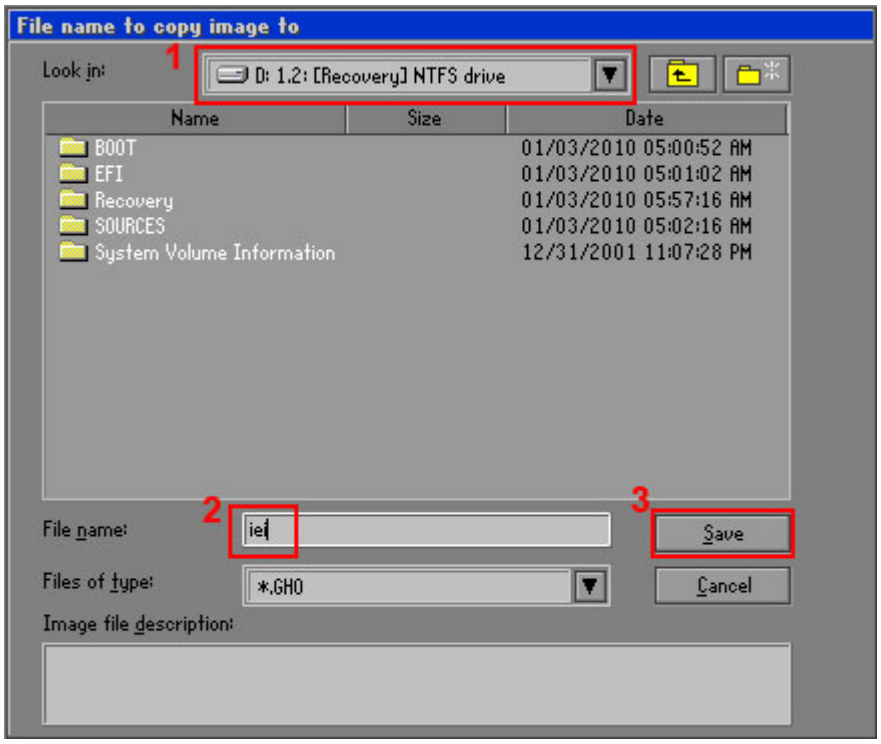


Figure C-16: File Name to Copy Image to

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

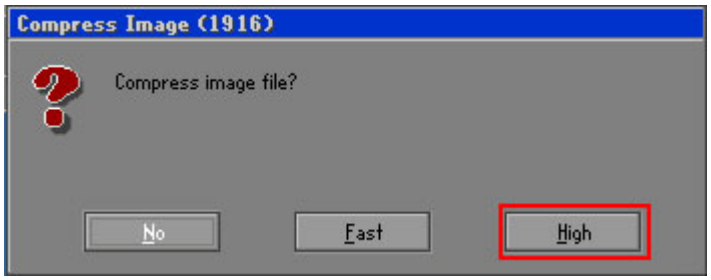


Figure C-17: Compress Image

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

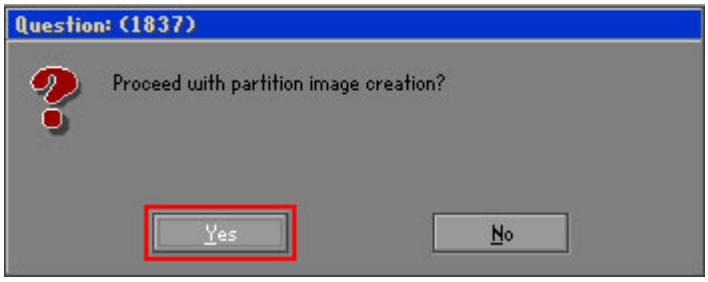


Figure C-18: Image Creation Confirmation

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

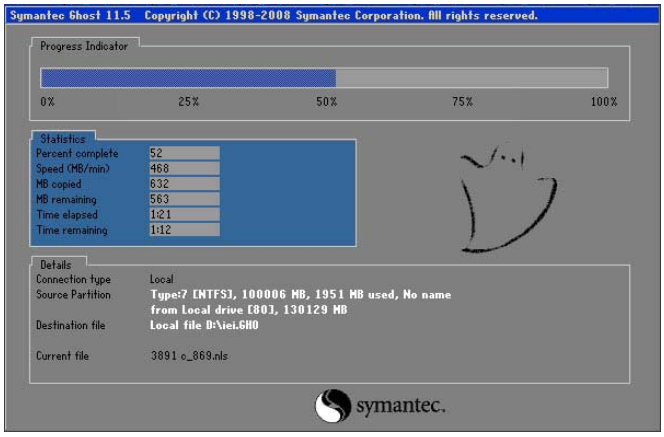


Figure C-19: Image Creation Complete

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

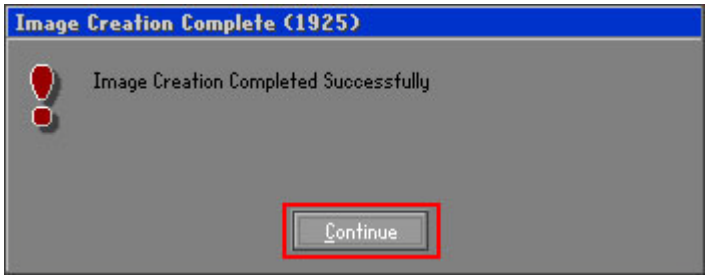


Figure C-20: Image Creation Complete

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

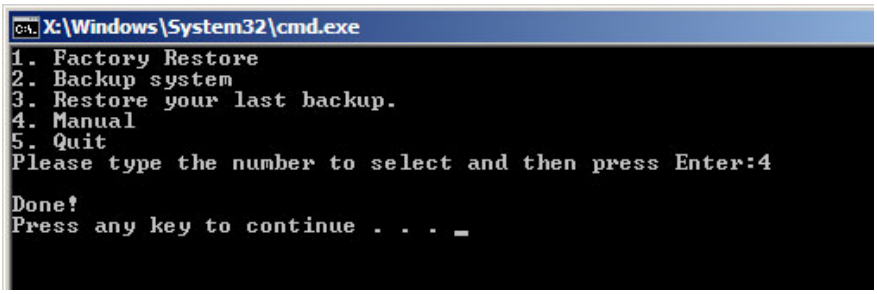


Figure C-21: Press Any Key to Continue

C.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 C.2.1 ~ Section C.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 C-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!

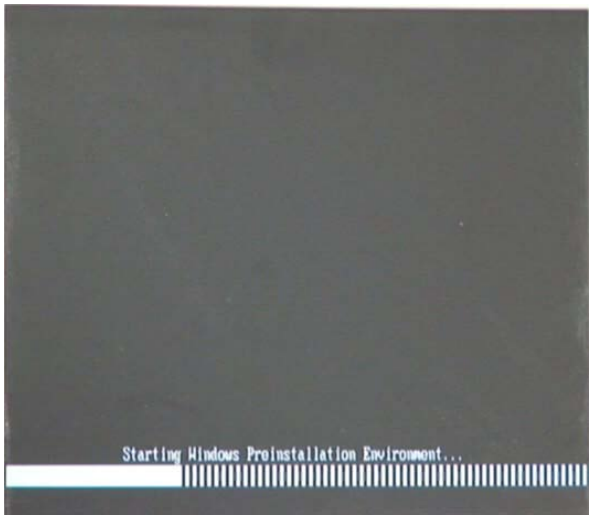


Figure C-23: Launching the Recovery Tool

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

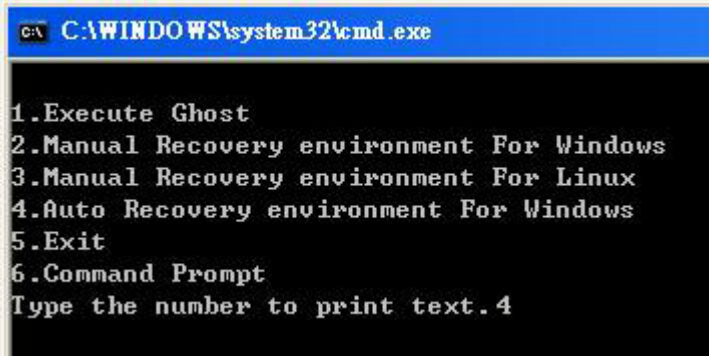


Figure C-24: Auto Recovery Environment for Windows

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 C.2.2** is hidden and the auto recovery tool is saved in this partition.

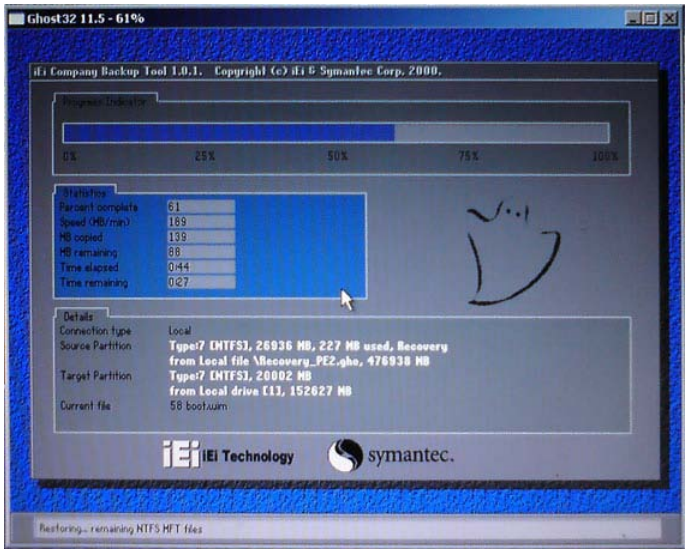


Figure C-25: Building the Auto Recovery Partition

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 C-26: Factory Default Image Confirmation

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

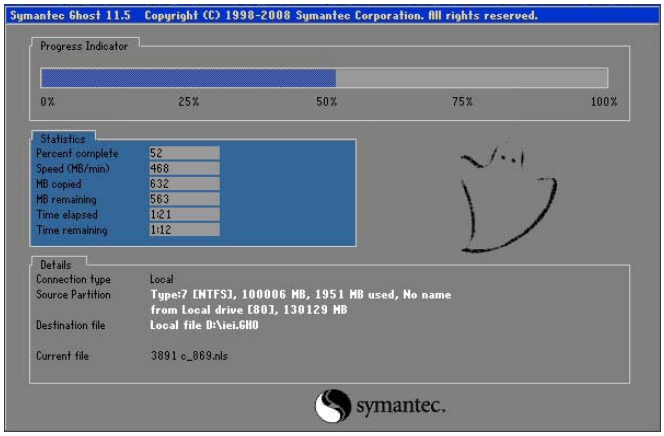


Figure C-27: Image Creation Complete

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

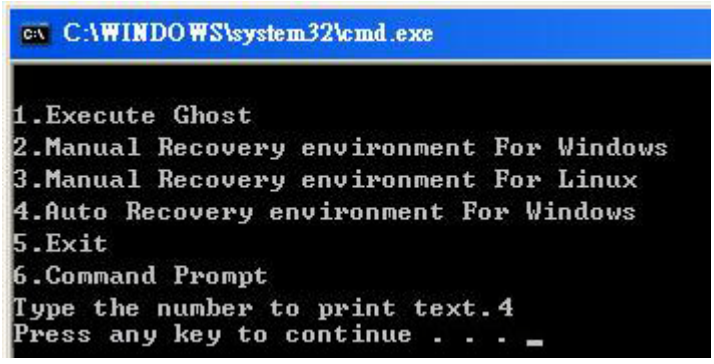
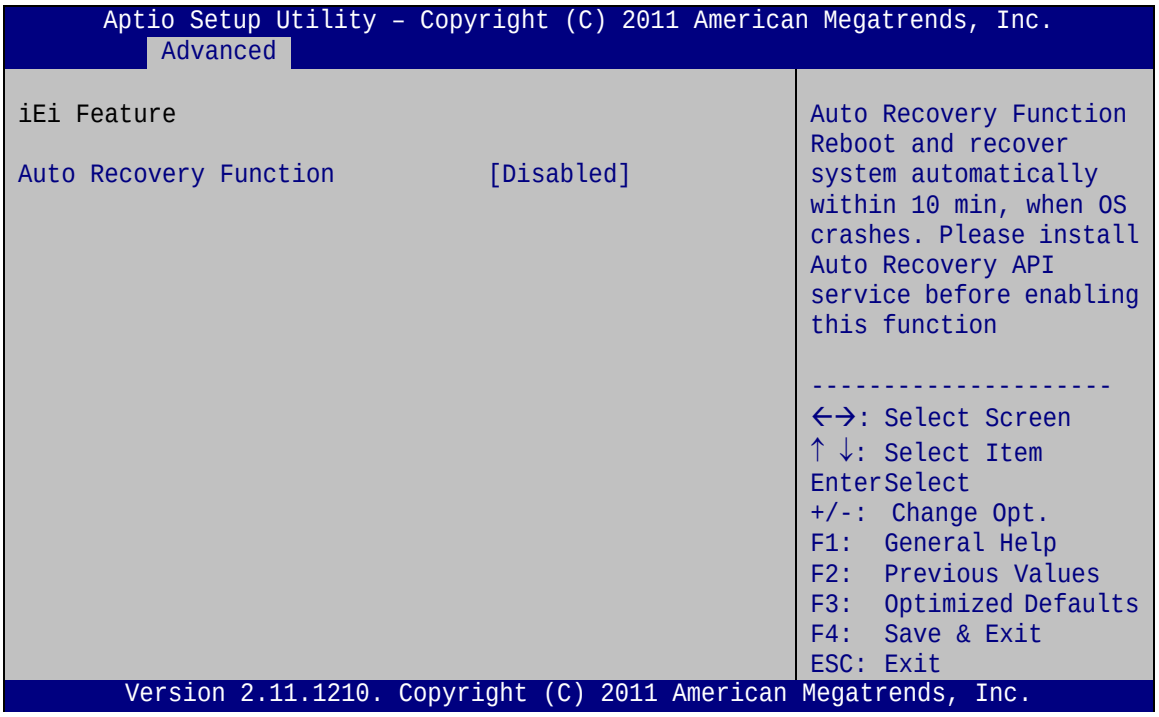


Figure C-28: Press any key to continue

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 22: 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

C.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 C.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.

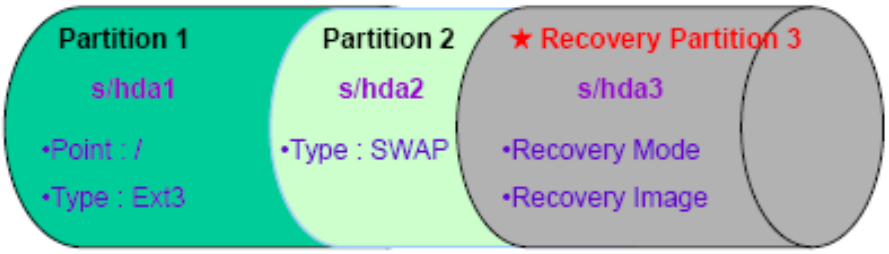


Figure C-29: Partitions for Linux

Step 3: **Create a recovery partition**. Insert the recovery CD into the optical disk drive. Follow **Step 1** ~ **Step 3** described in **Section C.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 C-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.

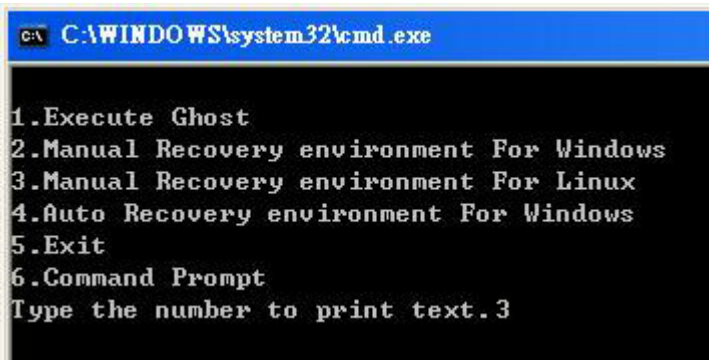


Figure C-30: Manual Recovery Environment for Linux

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

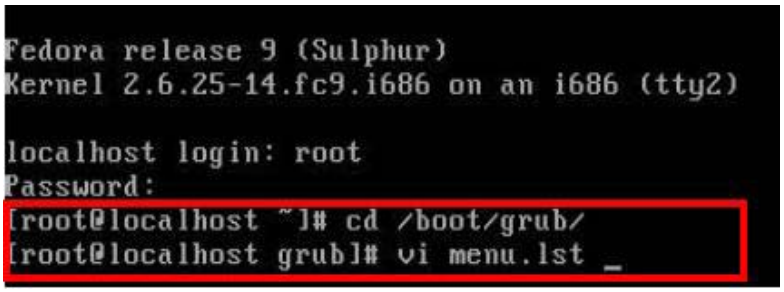
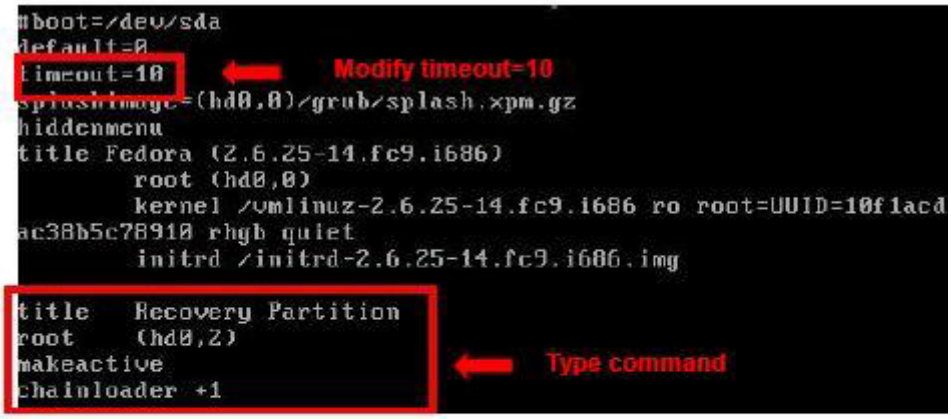


Figure C-31: Access menu.lst in Linux (Text Mode)

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 C-32**)

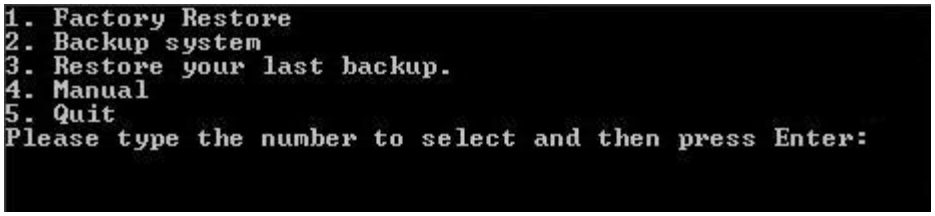


Figure C-32: Recovery Tool Menu

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

C.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 C.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.

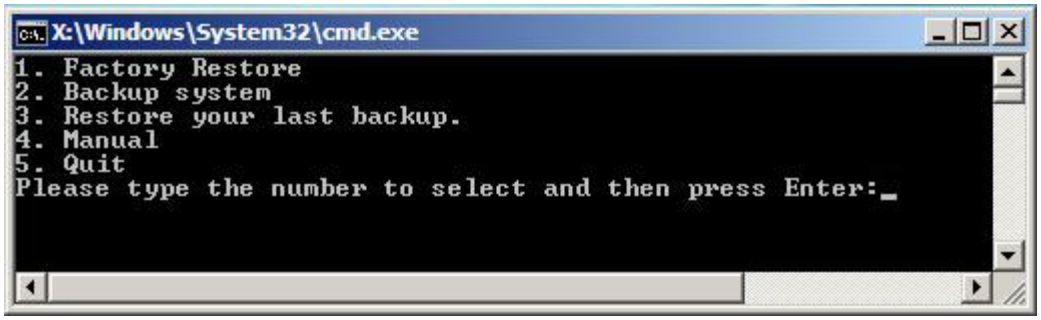


Figure C-33: Recovery Tool Main Menu

The recovery tool has several functions including:

1. **Factory Restore**: Restore the factory default image (iei.GHO) created in Section C.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).

C.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.

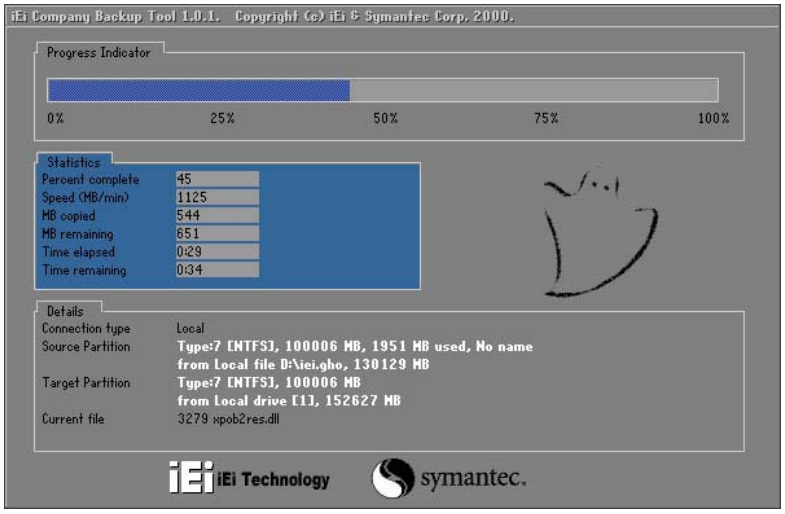


Figure C-34: Restore Factory Default

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

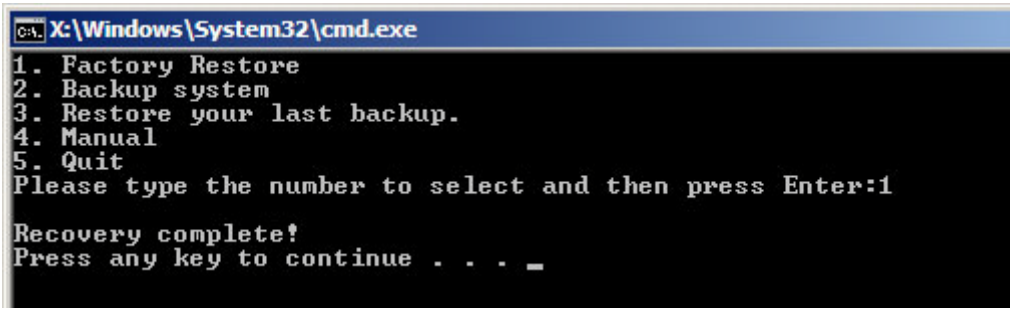


Figure C-35: Recovery Complete Window

C.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.

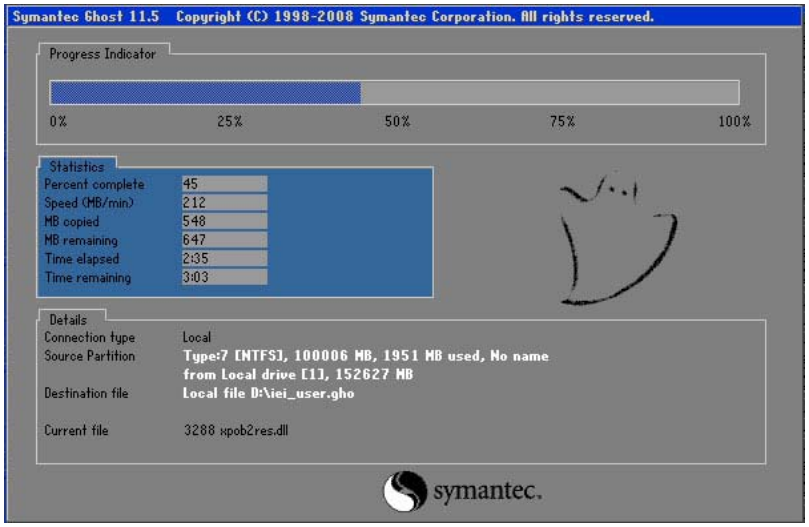


Figure C-36: Backup System

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

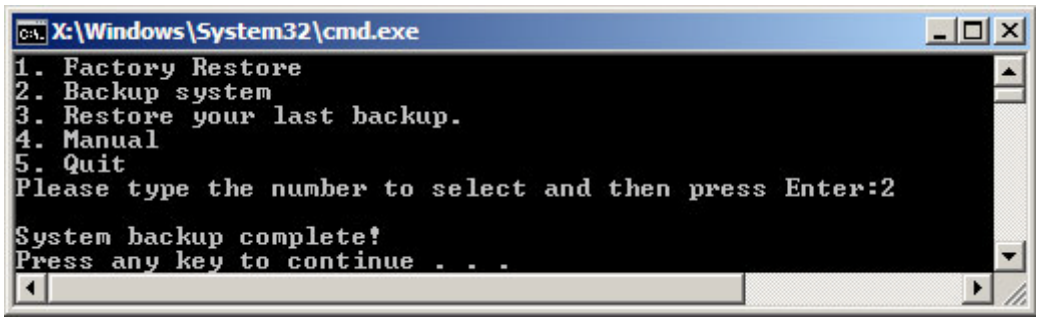


Figure C-37: System Backup Complete Window

C.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).

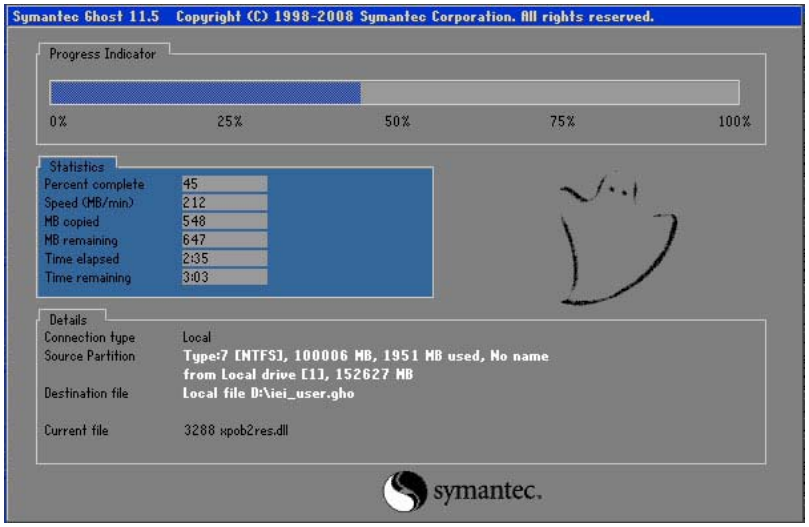


Figure C-38: Restore Backup

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

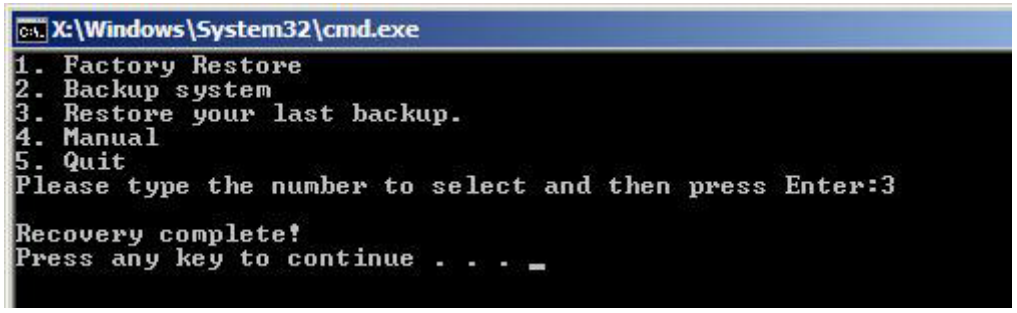


Figure C-39: Restore System Backup Complete Window

C.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.

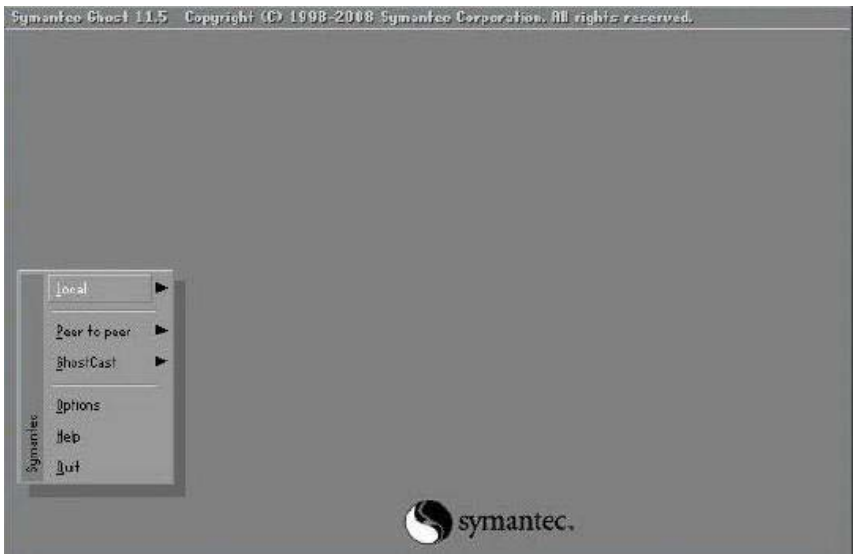
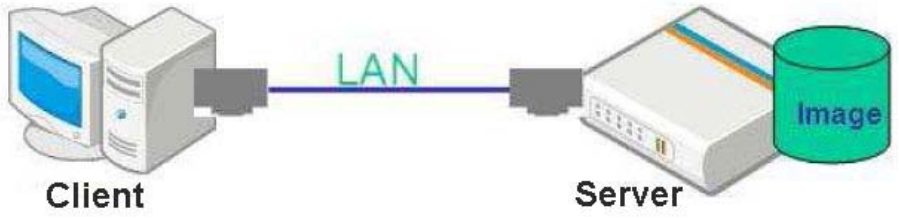


Figure C-40: Symantec Ghost Window

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

C.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 XP
- Windows Vista
- Windows 7
- Windows CE
- 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).

C.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:

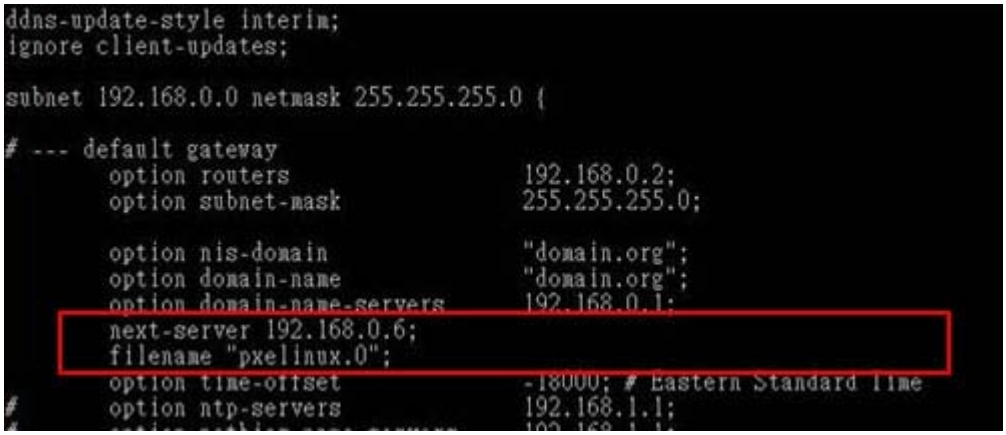
#vi /etc/dhcpd.conf

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



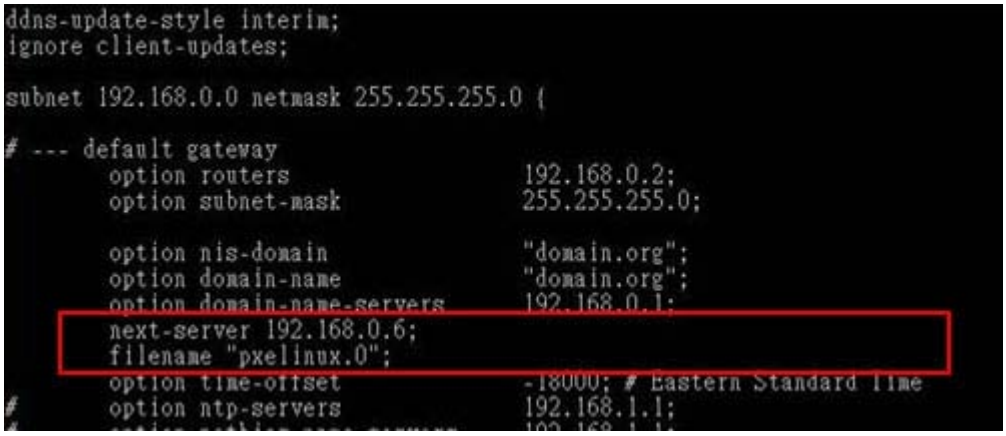
Debian

#vi /etc/dhcpd.conf

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

next-server PXE server IP address;

filename “pxelinux.0”;



C.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:

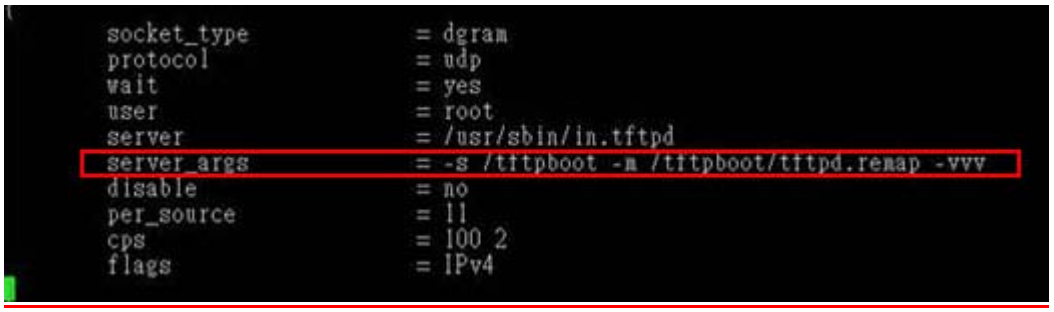
CentOS

#vi /etc/xinetd.d/tftp

Modify:

disable = no

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



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
```

C.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/

C.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

C.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
~
```

C.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.

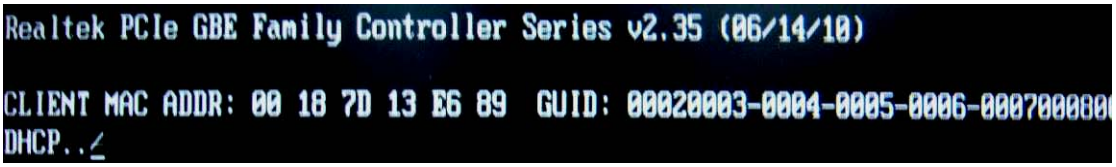
Boot Option #2 → select the boot from LAN option.

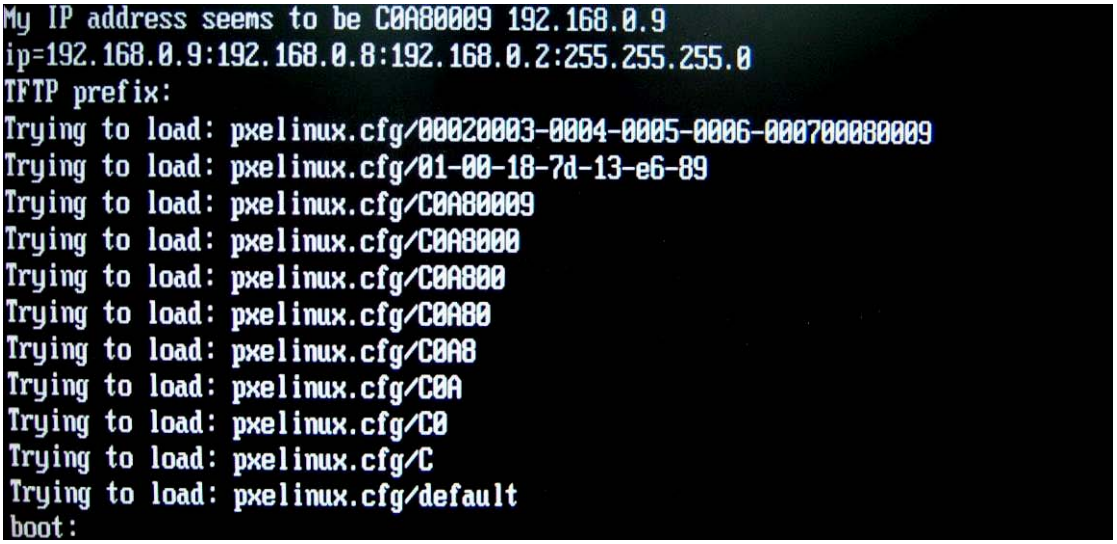
Step 3: Save changes and exit BIOS menu.

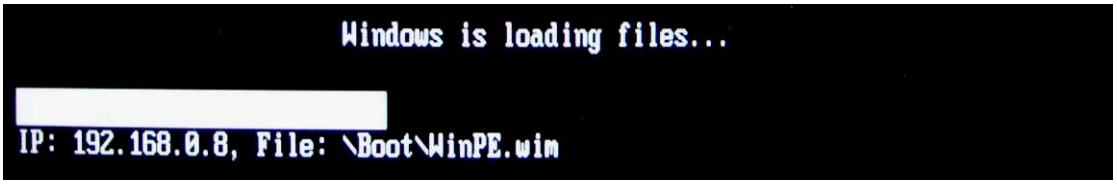
Exit → **Save Changes and Exit**

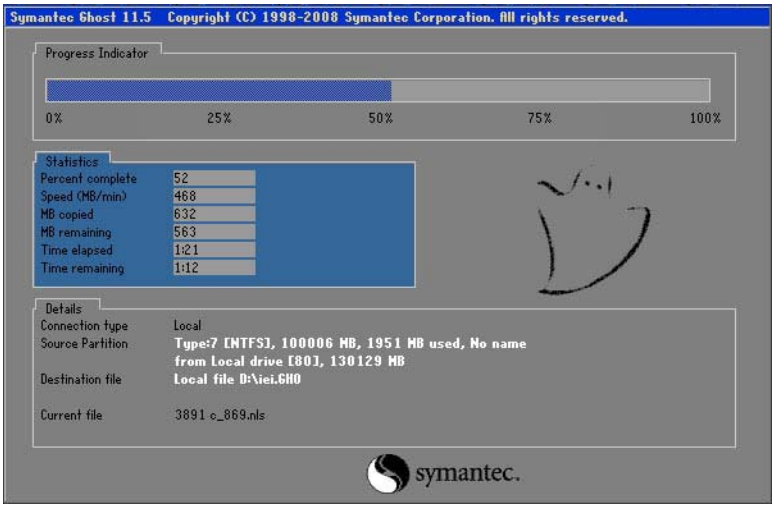
Step 4: Install the auto recovery utility into the system by double clicking the **Utility/AUTORECOVERY-SETUP.exe** in the One Key Recovery CD. This utility MUST be installed in the system, otherwise, the system will automatically restore from the factory default image every ten (10) minutes.

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.

C.7 Other Information

C.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.

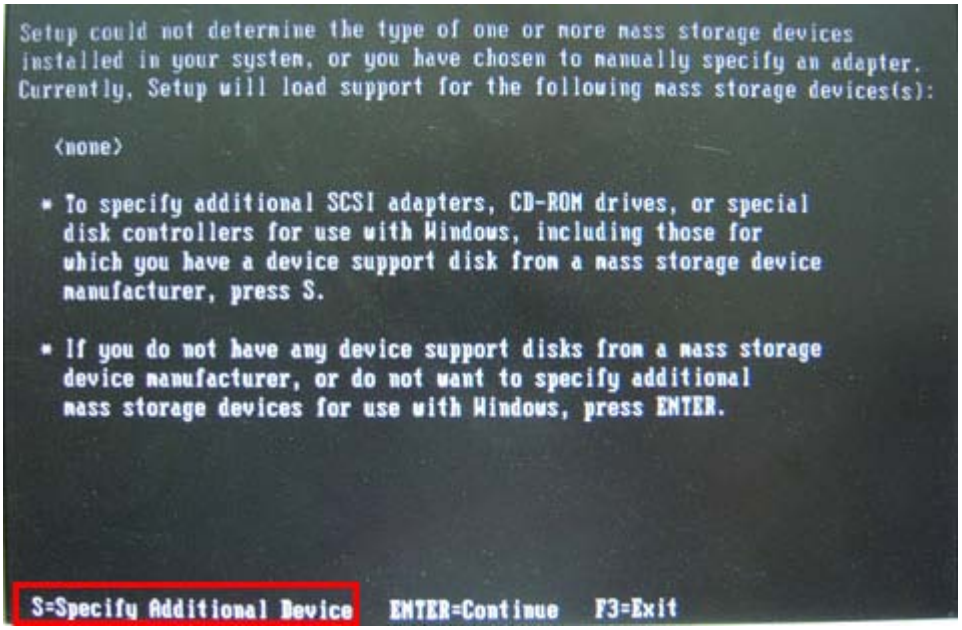
Step 1: Copy the SATA RAID/AHCI driver to a floppy disk and insert the floppy disk into a USB floppy disk drive. The SATA RAID/AHCI driver must be especially designed for the on-board SATA controller.

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

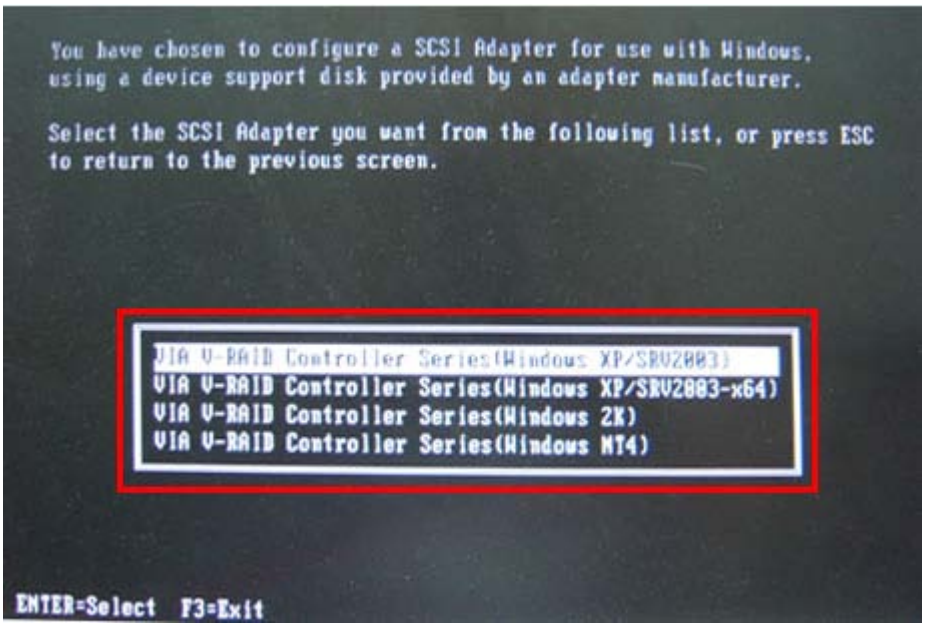
Step 3: Insert the One Key Recovery CD into the system and boot the system from the CD.

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 C.2.2 Create Partitions** to finish the whole setup process.

C.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

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, 05          ;time-out value is 5 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 Materials Disclosure Table for IPB Products Certified as RoHS Compliant Under 2002/95/EC Without Mercury

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

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

Please refer to the table on the next page.

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

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

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

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

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

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