



IEI Technology Corp.



**MODEL:**

**KINO-PVN-D5251/D4251**

**Mini ITX SBC with Intel® Atom™ processor D425/D525  
VGA, DVI-DL, HDMI Supported by Nvidia GT218  
Dual GbE LAN, Eight USB 2.0, Two SATA 3Gb/s  
RS-232, RS-232/422/485, PCIe, PCIe Mini, Audio, RoHS**

## **User Manual**

**Rev. 1.01 – 6 July, 2011**



# Revision

Date	Version	Changes
6 July, 2011	1.01	Added Graphics Driver Installation Reminder to Section 4.10 Software Installation.
28 January, 2011	1.00	Initial release

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Chapter

1

# Introduction

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## 1.1 Introduction

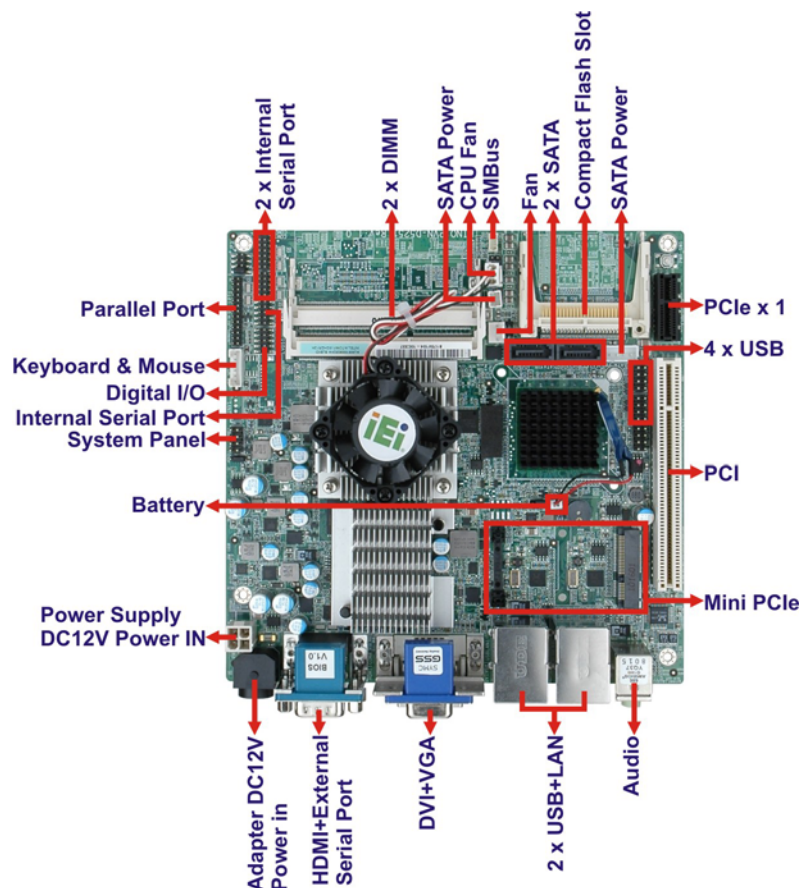


Figure 1-1: KINO-PVN-D5251/D4251 Front view



Figure 1-2: KINO-PVN-D5251/D4251 Solder view

## KINO-PVN-D5251/D4251/ Mini ITX SBC

The KINO-PVN-D5251/D4251 EPIC motherboard is an Intel® Atom™ processor D525 or D425 platform. Up to two 4.0 GB 800 MHz DDR3 SDRAM SO-DIMMs are supported by the KINO-PVN-D5251/D4251.

The integrated Intel® ICH8M Chipset supports two GbE LAN ports through two Realtek RTL8111E Ethernet controllers (with ASF 2.0 support). The KINO-PVN-D5251/D4251 also supports two SATA 3Gb/s drives and provides 5 V SATA power.

The KINO-PVN-D5251/D4251 supports dual display via HDMI and VGA, HDMI and DVI, VGA and DVI, or VGA and VGA (by DVI to VGA adapter). Eight USB 2.0 channels, one PCI slot, one PCIe Mini socket, and one PCIe x1 slot provide flexible expansion options. High Definition Audio (HDA) support ensures HDA devices can be easily implemented on the KINO-PVN-D5251/D4251. Serial device connectivity is provided by three internal RS-232 ports and one internal RS-232/422/485 connector.

## 1.2 Connectors

The connectors on the KINO-PVN-D5251/D4251 are shown in the figure below.

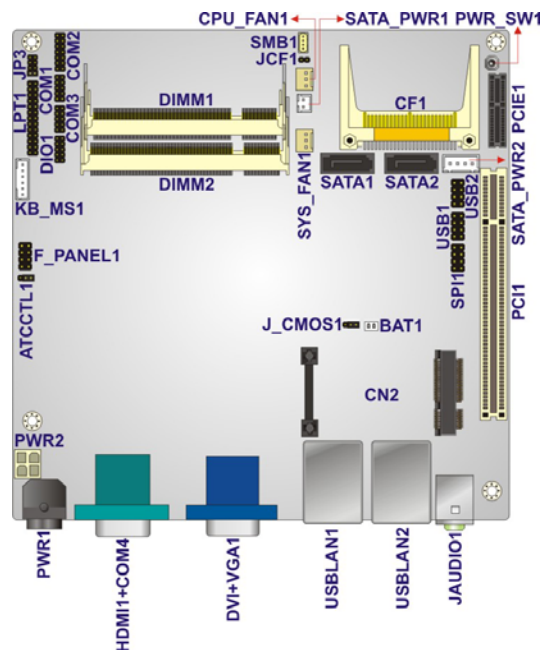


Figure 1-3: Connectors Front view

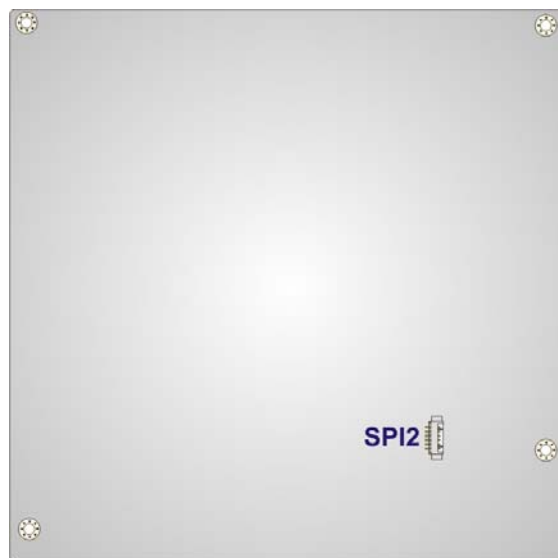


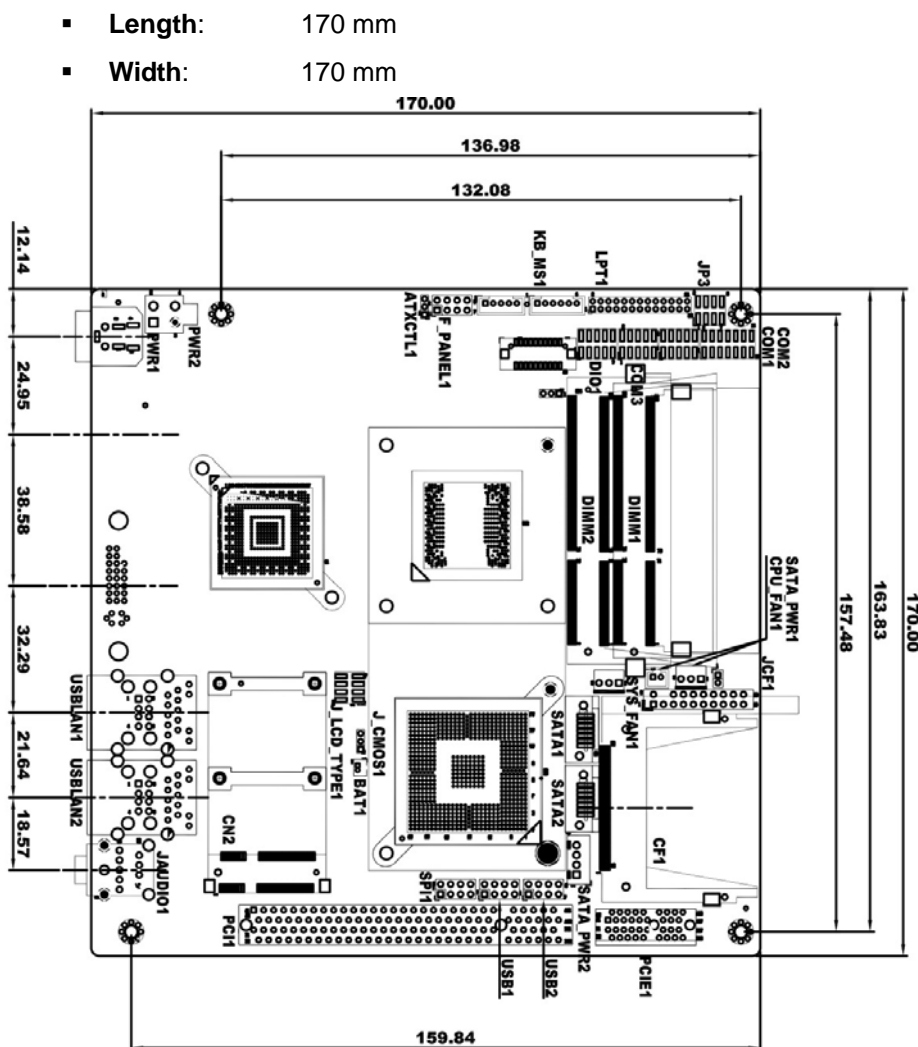
Figure 1-4: Connectors Solder view



## KINO-PVN-D5251/D4251/ Mini ITX SBC

## 1.3 Dimensions

- The dimensions of the board are listed below:



## 1.4 Data Flow

Figure 1-6 shows the data flow between the two on-board chipsets and other components installed on the motherboard and described in the following sections of this chapter.

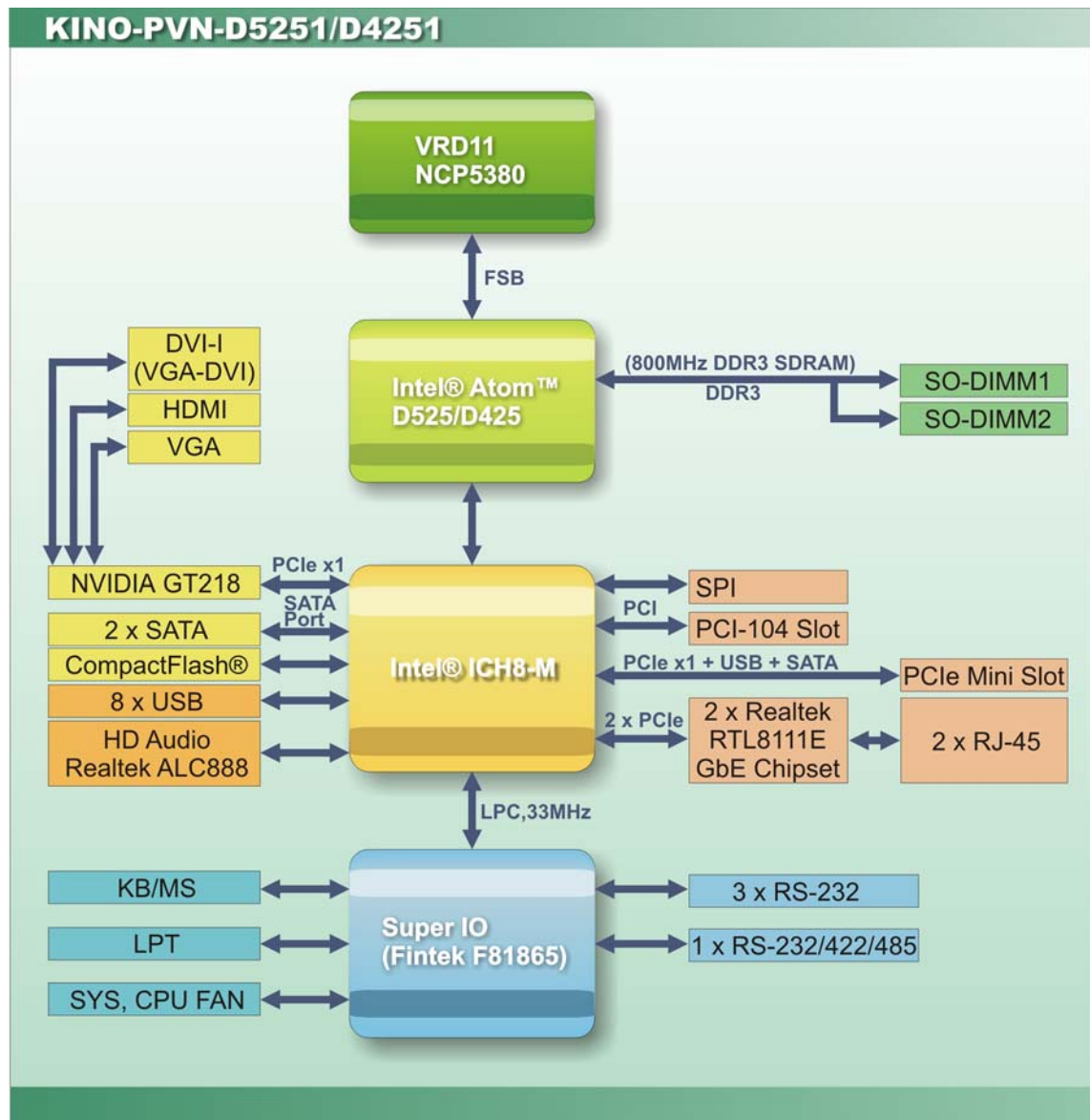


Figure 1-6: Data Flow Block Diagram

## KINO-PVN-D5251/D4251/ Mini ITX SBC

### 1.5 Technical Specifications

KINO-PVN-D5251/D4251 technical specifications are listed in table below.

Specification	KINO-PVN-D5251/D4251
<b>Form Factor</b>	Mini ITX
<b>CPU Options</b>	Intel® Atom™ processor D525, 1.8 GHz/1 MB L2 cache Intel® Atom™ processor D425, 1.8 GHz/512 KB L2 cache
<b>Express Chipset</b>	Intel® ICH8M
<b>Graphics Engine</b>	Nvidia GT218-ION
<b>Memory</b>	Two 204-pin SO-DIMM sockets support 800 MHz 4.0 GB (max.) DDR3 SDRAM SO-DIMM
<b>Audio</b>	Realtek ALC888 HD audio codec
<b>LAN</b>	Two Realtek RTL8111E PCIe GbE controllers with ASF 2.0 support on LAN1
<b>Super I/O</b>	Fintek F81865
<b>Digital I/O</b>	8-bit, 4-bit input/4-bit output
<b>BIOS</b>	UEFI BIOS label
<b>SMBus</b>	One 4-pin wafer connector
<b>Watchdog Timer</b>	Software programmable supports 1~255 sec. system reset
<b>Expansion</b>	
<b>PCIe</b>	One PCIe Mini slot, One PCIe x1 slot
<b>PCI</b>	One PCI slot (PCIe + USB + SATA signal) support
<b>I/O Interface Connectors</b>	

Specification	KINO-PVN-D5251/D4251
<b>Display Ports</b>	<p>Dual display supported by HDMI+VGA/ HDMI+DVI / VGA+DVI/ VGA+VGA (by DVI to VGA adapter)</p> <p>Analog CRT support by Nvidia GT218 (Resolution support up to 2048x1536)</p> <p>CRT hot plug supported</p> <p>Dual Link DVI-I support by Nvidia GT218 with DDR3 512MB memory (Resolution support up to 2560x1600)</p> <p>HDMI supported by Nvidia GT218 (Resolution support up to 1080p)</p>
<b>Ethernet</b>	Two RJ-45 GbE ports
<b>Serial Ports</b>	<p>One RS-232 via Rear I/O</p> <p>Two RS-232 via four 10-pin headers</p> <p>One RS-232/422/485 via 14-pin header</p>
<b>USB 2.0/1.1 Ports</b>	<p>Four external USB ports</p> <p>Four internal USB ports via 8-pin headers</p>
<b>Parallel Ports</b>	One LPT connector via 26-pin header
<b>Storage</b>	
<b>Serial ATA</b>	<p>Two SATA 3.0 Gb/s connectors</p> <p>One 5 V SATA power connector</p> <p>One 5 V/12 V SATA power connector</p>
<b>Environmental and Power Specifications</b>	
<b>Power Supply</b>	<p>12 V only</p> <p>ATX and AT power supported</p>
<b>Power Connector</b>	<p>One external DIN 4-pin DC jack</p> <p>One internal 4-pin power connector</p>
<b>Power Consumption</b>	12 V @ 2.42A (Intel® Atom™ D525 1.8GHz with DDR3 1333MHz 1GB*2 DIMM)
<b>Operating Temperature</b>	-10°C ~ 60°C
<b>Humidity</b>	5% ~ 95% (non-condensing)



## KINO-PVN-D5251/D4251/ Mini ITX SBC

Specification	KINO-PVN-D5251/D4251
Physical Specifications	
Dimensions	170 mm x 170 mm
Weight GW/NW	900 g / 360 g

Table 1-1: Technical Specifications



**Chapter****2**

# Unpacking

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## KINO-PVN-D5251/D4251/ Mini ITX SBC

## 2.1 Anti-static Precautions

**WARNING!**

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

Make sure to adhere to the following guidelines:

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

## 2.2 Unpacking Precautions

When the KINO-PVN-D5251/D4251 is unpacked, please do the following:

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







## 2.3 Packing List






### NOTE:

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the KINO-PVN-D5251/D4251 was purchased from or contact an IEI sales representative directly by sending an email to [sales@iei.com.tw](mailto:sales@iei.com.tw).

The KINO-PVN-D5251/D4251 is shipped with the following components:






Quantity	Item and Part Number	Image
1	KINO-PVN-D5251-R10 or KINO-PVN-D4251-R10 single board computer	
1	SATA and 5 V power cable (P/N: 32801-000100-100-RS)	
	SATA and 5 V/12 V power cable (P/N: 32801-000201-100-RS)	
1	RS-232 cable with bracket (P/N: 19800-000300-100-RS)	
1	I/O shielding (P/N: 45014-0032C0-00-RS)	
1	DVI to VGA adapter (P/N: 33Z00-000031-RS)	

## KINO-PVN-D5251/D4251/ Mini ITX SBC

1	Mini jumper pack (2.0mm) (P/N: 33100-000033-RS)	
1	Utility CD	
1	Quick Installation Guide	

### 2.3.1 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
LPT cable (P/N: 32200-015100-RS)	
KB/MS PS/2 Y-cable (P/N: 32000-0023800-RS)	
AT 12V cable (P/N: 32100-192900-RS)	
Dual RS-232/422/485 cable with bracket (P/N: 19800-000110-RS)	
Dual port USB cable with bracket (P/N: CB-USB02-RS)	



Chapter

3

# Connectors

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## KINO-PVN-D5251/D4251/ Mini ITX SBC

### 3.1 Peripheral Interface Connectors

This chapter details all the jumpers and connectors.

#### 3.1.1 KINO-PVN-D5251/D4251 Layout

The figures below show all the connectors and jumpers.

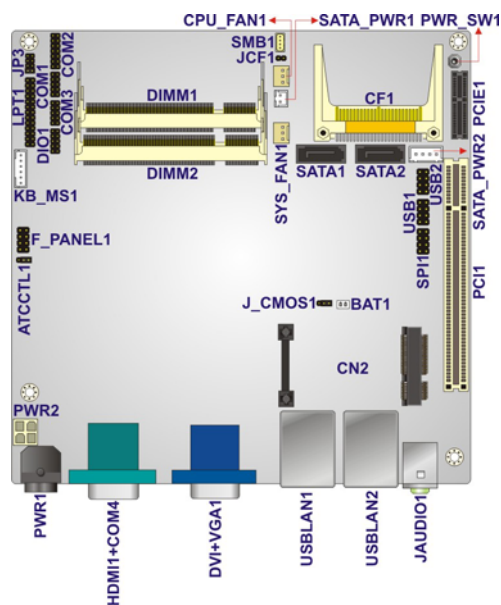


Figure 3-1: Connector and Jumper Locations Front view



Figure 3 2: Connector and Jumper Locations Solder view

### 3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
12 V Power connector	4-pin connector	PWR2
CompactFlash® slot	50-pin header	CF1
Digital I/O connector	10-pin header	DIO1
Fan connector (CPU)	4-pin wafer	CPU_FAN1
Flash SPI ROM (GT218)	6-pin header	SPI2
Front panel connector	8-pin header	F_PANEL1
Keyboard and mouse connector	6-pin wafer	KB/MS1
Parallel port connector	26-pin header	LPT1
PCIe Mini card slot	PCIe Mini card slot	CN2
Serial ATA (SATA) drive connector	7-pin SATA	SATA1, SATA2
SATA power connector	2-pin wafer, 4-pin wafer	SATA_PWR1, SATA_PWR2
Serial port connector (RS-232)	10-pin header	COM1, COM3
Serial port connector (RS-232)	14-pin header	COM2
SMBus connector	4-pin wafer	SMB1
SPI flash connector	8-pin header	SPI1
USB connector	8-pin header	USB1, USB2

**Table 3-1: Peripheral Interface Connectors**

## KINO-PVN-D5251/D4251/ Mini ITX SBC

### 3.1.3 External Interface Panel Connectors

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

Connector	Type	Label
Audio connector	Line-out, Mic	JAUDIO1
Ethernet and USB connector	RJ-45	USBLAN1, USBLAN2
Power connector	5-pin connector	PWR1
Serial port connector	9-pin male	COM4
VGA+DVI port connector	15-pin connector, 24-pin connector	DVIVGA1

**Table 3-2: Rear Panel Connectors**

## 3.2 Internal Peripheral Connectors

The section describes all of the connectors on the KINO-PVN-D5251/D4251.

### 3.2.1 12V Power Connector

**CN Label:** PWR2

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

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

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

The connector supports the 12V power supply.

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

**Table 3-3: 12 V Power Connector Pinouts**

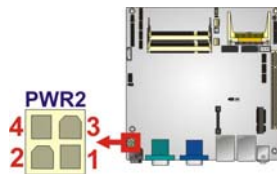


Figure 3-3: 12 V Power Connector

### 3.2.2 CompactFlash® Slot

**CN Label:** CF1

**CN Type:** CompactFlash® card slot

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

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

A CompactFlash® Type I/II card can be used in this slot.

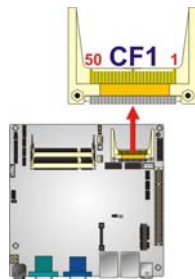


Figure 3-4: CompactFlash® Slot Location

Pin	Description	Pin	Description
1	GND	26	CD1#
2	D3	27	D11
3	D4	28	D12
4	D5	29	D13
5	D6	30	D14
6	D7	31	D15
7	CE#	32	CE2#
8	A10	33	VS1
9	OE#	34	IOR#
10	A9	35	IOW#

## KINO-PVN-D5251/D4251/ Mini ITX SBC

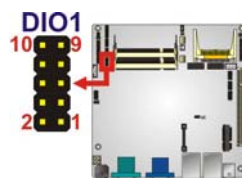
Pin	Description	Pin	Description
11	A8	36	WE#
12	A7	37	IRQ
13	VCC	38	VCC
14	A6	39	CSEL#
15	A5	40	VS2#
16	A4	41	RESET#
17	A3	42	WAIT#
18	A2	43	INPACK#
19	A1	44	REG#
20	A0	45	BVD2
21	D0	46	BVD1
22	D1	47	D8
23	D2	48	D9
24	IOCS16#	49	D10
25	CD2#	50	GND2

**Table 3-4: CompactFlash® Slot Pinouts**

### 3.2.3 Digital I/O Connector

- CN Label:** DIO1
- CN Type:** 10-pin header
- CN Location:** See **Figure 3-5**
- CN Pinouts:** See **Table 3-5**

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



**Figure 3-5: Digital I/O Connector Locations**



Pin	Description	Pin	Description
1	Ground	2	VCC
3	DOUT3	4	DOUT2
5	DOUT1	6	DOUT0
7	DIN3	8	DIN2
9	DIN1	10	DIN0

Table 3-5: Digital I/O Connector Pinouts

### 3.2.4 Fan Connector (CPU)

**CN Label:** CPU\_FAN1

**CN Type:** 4-pin wafer

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

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

The fan connector attaches to a CPU cooling fan.

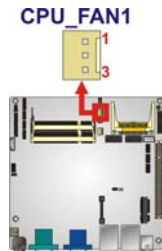


Figure 3-6: CPU Fan Connector Location

Pin	Description
1	Ground
2	+12V
3	CPUFANIN

Table 3-6: CPU Fan Connector Pinouts

## 3.2.5 Flash SPI ROM (GT218)

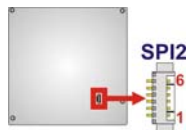
**CN Label:** SPI2

**CN Type:** 6-pin header (2x4)

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

**CN Pinouts:** See **Table 3-7**

The connector provides a GT218 BIOS update.



**Figure 3-7: Flash SPI ROM (GT218) Connector Location**

Pin	Description	Pin	Description
1	GT218_SPI_VCC	2	ROM_2N_CS#
3	ROM_2N_SO	4	ROM_2N_SCLK
5	ROM_2N_SI	6	GND

**Table 3-7: Flash SPI ROM (GT218) Connector Pinouts**

## 3.2.6 Front Panel Connector

**CN Label:** F\_PANEL1

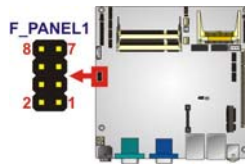
**CN Type:** 8-pin header (2x4)

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

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

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

- Power button
- Reset
- Power LED
- HDD LED


**Figure 3-8: Front Panel Connector Location**

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power Button	1	PWRBTSW-	Power LED	2	VCC
	3	GROUND		4	GROUND
HDD LED	5	VCC	Reset	6	SYSRST-
	7	-HDLED		8	GROUND

**Table 3-8: Front Panel Connector Pinouts**

### 3.2.7 Keyboard/Mouse Connector

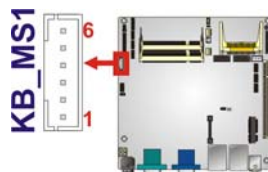
**CN Label:** KB/MS1

**CN Type:** 6-pin wafer (1x6)

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

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

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


**Figure 3-9: Keyboard/Mouse Connector Location**

Pin	Description
1	VCC
2	Mouse Data
3	Mouse Clock
4	Keyboard Data
5	Keyboard Clock

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Pin	Description
6	GND

**Table 3-9: Keyboard/Mouse Connector Pinouts**

### 3.2.8 Parallel Port Connector

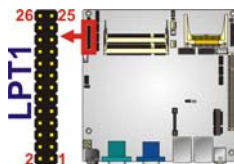
**CN Label:** LPT1

**CN Type:** 26-pin box header

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

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

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



**Figure 3-10: Parallel Port Connector Location**

Pin	Description	Pin	Description
1	STROBE#	2	AUTO FORM FEED #
3	DATA0	4	ERROR#
5	DATA1	6	INITIALIZE#
7	DATA2	8	PRINTER SELECT LN#
9	DATA3	10	GND
11	DATA4	12	GND
13	DATA5	14	GND
15	DATA6	16	GND
17	DATA7	18	GND
19	ACKNOWLEDGE#	20	GND
21	BUSY	22	GND
23	PAPER EMPTY	24	GND

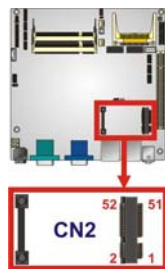
Pin	Description	Pin	Description
25	PRINTER SELECT	26	NC

**Table 3-10: Parallel Port Connector Pinouts**

### 3.2.9 PCIe Mini Card Slot

- CN Label:** CN2
- CN Type:** PCIe Mini card slot
- CN Location:** See **Figure 3-11**
- CN Pinouts:** See **Table 3-11**

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


**Figure 3-11: PCIe Mini Card Slot Location**

Pin	Description	Pin	Description
1	PCIE_WAKE#	2	VCC3
3	N/C	4	GND
5	N/C	6	1.5 V
7	N/C	8	NC
9	GND	10	NC
11	CLK-	12	NC
13	CLK+	14	NC
15	GND	16	NC
17	PCIRST#	18	GND
19	N/C	20	VCC3
21	GND	22	PCIRST#
23	PERN2	24	3VDual



## KINO-PVN-D5251/D4251/ Mini ITX SBC

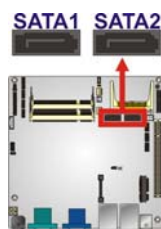
Pin	Description	Pin	Description
25	PERP2	26	GND
27	GND	28	1.5 V
29	GND	30	SMBCLK
31	PETN2	32	SMBDATA
33	PETP2	34	GND
35	GND	36	USBD-
37	GND	38	USBD+
39	VCC3	40	GND
41	VCC3	42	N/C
43	GND	44	N/C
45	N/C	46	N/C
47	N/C	48	1.5 V
49	N/C	50	GND
51	N/C	52	VCC3

**Table 3-11: PCIe Mini Card Slot Pinouts**

### 3.2.10 SATA Drive Connectors

- CN Label:** SATA1, SATA2
- CN Type:** 7-pin SATA drive connectors
- CN Location:** See Figure 3-12
- CN Pinouts:** See Table 3-12

The two SATA 3Gb/s drive connectors are each connected to a SATA 3Gb/s drive. The SATA 3Gb/s drives transfer data at speeds as high as 3.0 Gb/s.



**Figure 3-12: SATA Drive Connector Locations**

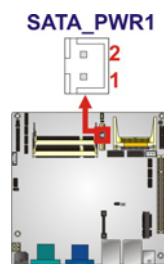
Pin	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

**Table 3-12: SATA Drive Connector Pinouts**

### 3.2.11 SATA Power Connector

- CN Label:** SATA\_PWR1
- CN Type:** 2-pin wafer
- CN Location:** See Figure 3-13
- CN Pinouts:** See Table 3-13

The SATA Power Connector provides power output to the SATA connectors.



**Figure 3-13: SATA Power Connector Locations**

Pin	Description
1	+5V
2	GND

**Table 3-13: SATA Power Connector Pinouts**

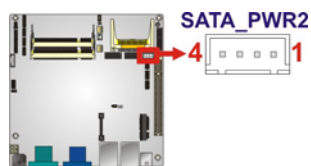
- CN Label:** SATA\_PWR2
- CN Type:** 4-pin wafer

## KINO-PVN-D5251/D4251/ Mini ITX SBC

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

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

The SATA Power Connector provides power output to the SATA connectors.



**Figure 3-14: SATA Power Connector Locations**

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

**Table 3-14: SATA Power Connector Pinouts**

### 3.2.12 Serial Port Connectors (RS-232)

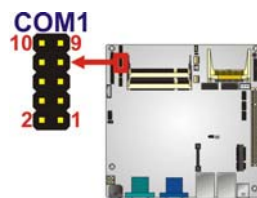
**CN Label:** COM1, COM3

**CN Type:** 10-pin header (2x5)

**CN Location:** See Figure 3-15 and Figure 3-16

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

This connector provides RS-232 communications.



**Figure 3-15: Serial Port (COM1) Connector Pinout Locations**

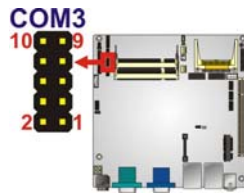


Figure 3-16: Serial Port (COM3) Connector Pinout Locations

Pin	Description	Pin	Description
1	Data Carrier Direct (DCD)	2	Data Set Ready (DSR)
3	Receive Data (RXD)	4	Request To Send (RTS)
5	Transmit Data (TXD)	6	Clear To Send (CTS)
7	Data Terminal Ready (DTR)	8	Ring Indicator (RI)
9	Ground (GND)	10	N/C

Table 3-15: Serial Port Connector Pinouts

### 3.2.13 Serial Port Connector (RS-232)

**CN Label:** COM2

**CN Type:** 14-pin header (2x7)

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

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

Used for RS-232/422/485 communications.

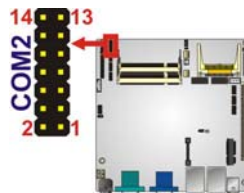


Figure 3-17: Serial Port (COM2) Connector Location

Pin	Description	Pin	Description
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI

## KINO-PVN-D5251/D4251/ Mini ITX SBC

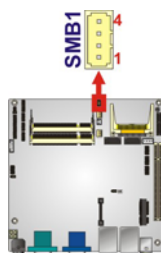
Pin	Description	Pin	Description
9	GND	10	N/C
11	TXD485+	12	TXD485#
13	RXD485+	14	RXD485#

**Table 3-16: Serial Port (COM2) Connector Pinouts**

### 3.2.14 SMBus Connector

- CN Label:** SMB1
- CN Type:** 4-pin wafer (1x4)
- CN Location:** See **Figure 3-18**
- CN Pinouts:** See **Table 3-17**

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



**Figure 3-18: SMBus Connector Locations**

Pin	Description
1	GND
2	SMBDATA
3	SMBCLK
4	VCC5

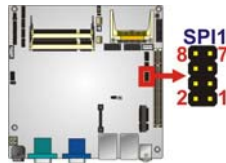
**Table 3-17: SMBus Connector Pinouts**



### 3.2.15 SPI Flash Connector

- CN Label:** SPI1
- CN Type:** 8-pin header (2x4)
- CN Location:** See **Figure 3-19**
- CN Pinouts:** See **Table 3-18**

The 8-pin SPI Flash connector is used to flash the BIOS.



**Figure 3-19: SPI Flash Connector**

Pin	Description	Pin	Description
1	SPI_VCC	2	GND
3	SPI_CS	4	SPI_CLK
5	SPI_SO	6	SPI_SI
7	NC	8	NC

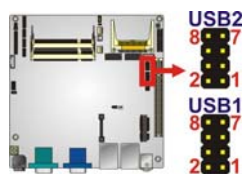
**Table 3-18: SPI Flash Connector Pinouts**

### 3.2.16 USB Connectors

- CN Label:** USB1, USB2
- CN Type:** 8-pin header (2x4)
- CN Location:** See **Figure 3-20**
- CN Pinouts:** See **Table 3-19**

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

## KINO-PVN-D5251/D4251/ Mini ITX SBC



**Figure 3-20: USB Connector Pinout Locations**

Pin	Description	Pin	Description
1	VCC	2	GND
3	DATA-	4	DATA+
5	DATA+	6	DATA-
7	GND	8	VCC

**Table 3-19: USB Port Connector Pinouts**

### 3.3 External Peripheral Interface Connector Panel

**Figure 3-21** shows the KINO-PVN-D5251/D4251 external peripheral interface connector (EPIC) panel. The KINO-PVN-D5251/D4251 EPIC panel consists of the following:

- 4 x USB connectors
- 2 x Ethernet connector
- 1 x Line-out
- 1x Microphone
- 1 x VGA
- 1 x DVI port
- 1 x Serial port (RS-232)
- 1 x HDMI
- 1 x 12 V DC input

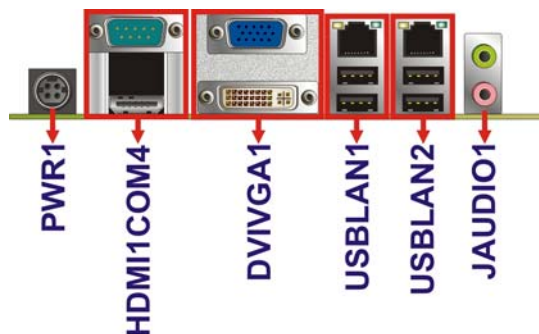


Figure 3-21: KINO-PVN-D5251/D4251 External Peripheral Interface Connector

### 3.3.1 Audio Connector

CN Label:	JAUDIO1
CN Type:	Line-out, Mic
CN Location:	See Figure 3-21

The audio jacks connect to external audio devices.

- **Line-out port (Lime):** Connects to a headphone or a speaker. With multi-channel configurations, this port can also connect to front speakers.
- **Microphone (Pink):** Connects a microphone.



Figure 3-22: Audio Connector

### 3.3.2 Ethernet and USB Connector

CN Label:	USBLAN1, USBLAN2
CN Type:	RJ-45 port, USB port
CN Location:	See Figure 3-21
CN Pinouts:	See Table 3-20, Table 3-22

## KINO-PVN-D5251/D4251/ Mini ITX SBC

The KINO-PVN-D5251/D4251 is equipped with two built-in RJ-45 Ethernet controllers. The controllers can connect to the LAN through the RJ-45 LAN connectors.

Pin	Description	Pin	Description
P1	3.3V supply	P2	LAN signal differential pair (0+)
P3	LAN signal differential pair (0-)	P4	LAN signal differential pair (1+)
P5	LAN signal differential pair (1-)	P6	LAN signal differential pair (2+)
P7	LAN signal differential pair (2-)	P8	LAN signal differential pair (3+)
P9	LAN signal differential pair (3-)	P10	GND
P11	Right LED signal(-)	P12	Right LED signal(+)
P13	Left LED signal(-)	P14	Left LED signal(+)
9	Chassis GND	10	Chassis GND
11	Chassis GND	12	Chassis GND
13	Chassis GND	14	Chassis GND
15	Chassis GND	16	Chassis GND

**Table 3-20: LAN Pinouts**

The RJ-45 Ethernet connectors have two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the speed. See **Table 3-21**.

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

**Table 3-21: RJ-45 Ethernet Connector LEDs**



**Figure 3-23: RJ-45 Ethernet Connector**

The USB connector can be connected to a USB device.

Pin	Description
1	VCC
2	DATA0-
3	DATA0+
4	GND
5	VCC
6	DATA1-
7	DATA1+
8	GND

**Table 3-22: USB Pinouts**

### 3.3.3 Power Connector

<b>CN Label:</b>	<b>PWR1</b>
<b>CN Type:</b>	5-pin connector
<b>CN Location:</b>	See <b>Figure 3-21</b>
<b>CN Pinouts:</b>	See <b>Table 3-23</b>

The connector supports the 12V power adapter.

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

**Table 3-23: Power Connector Pinouts**

### 3.3.4 Serial Port Connector

<b>CN Label:</b>	<b>COM4</b>
<b>CN Type:</b>	9-pin male
<b>CN Location:</b>	<b>Figure 3-21</b>



## KINO-PVN-D5251/D4251/ Mini ITX SBC

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

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

Pin	Description
1	DATA CARRIER DETECT (DCD)
2	DATA SET READY (DSR)
3	RECEIVE DATA (RXD)
4	REQUEST TO SEND (RTS)
5	TRANSMIT DATA (TXD)
6	CLEAR TO SEND (CTS)
7	DATA TERMINAL READY (DTR)
8	RING INDICATOR (RI)
9	GND (GND)
10	N/C

**Table 3-24: Serial Port Pinouts**

### 3.3.5 VGA+DVI Port Connector

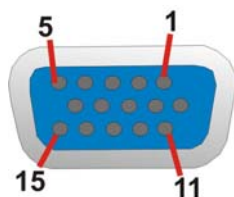
**CN Label:** DVIVGA1

**CN Type:** 15-pin Female VGA connector, 24-pin DVI connector

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

**CN Pinouts:** See **Table 3-25, Table 3-26**

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



**Figure 3-24: VGA Connector**

Pin	Description	Pin	Description
1	RED	2	GREEN

Pin	Description	Pin	Description
3	BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	CRT_VCC	10	Display_GND
11	NC	12	DDCDAT
13	HSYNC	14	VSYNC
15	DDCCLK		

**Table 3-25: VGA Connector Pinouts**

The 25-pin Digital Visual Interface (DVI) connector connects to high-speed, high-resolution digital displays. The DVI-I connector supports both digital and analog signals.

Pin	Description	Pin	Description	Pin	Description
1	Data2-	10	Data1+	19	GND
2	Data2+	11	GND	20	N/C
3	GND	12	N/C	21	N/C
4	N/C	13	N/C	22	GND
5	N/C	14	+5V Power	23	Clock +
6	DDC Clock	15	GND	24	Clock -
7	DDC Data	16	Hot Plug Detect	25	GND
8	N/C	17	Data0-		
9	Data1-	18	Data0+		

**Table 3-26: DVI Connector Pinouts**

Chapter

4

# Installation

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## 4.1 Anti-static Precautions



### WARNING:

Failure to take ESD precautions during the installation of the KINO-PVN-D5251/D4251 may result in permanent damage to the KINO-PVN-D5251/D4251 and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the KINO-PVN-D5251/D4251. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the KINO-PVN-D5251/D4251 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 KINO-PVN-D5251/D4251, place it on an anti-static pad. This reduces the possibility of ESD damaging the KINO-PVN-D5251/D4251.
- ***Only handle the edges of the PCB:*** When handling the PCB, hold the PCB by the edges.

## 4.2 Installation Considerations

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### NOTE:

The following installation notices and installation considerations should be read and understood before the KINO-PVN-D5251/D4251 is installed. All installation notices pertaining to the installation of the KINO-PVN-D5251/D4251 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the KINO-PVN-D5251/D4251 and injury to the person installing the motherboard.

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### 4.2.1 Installation Notices

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### WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the KINO-PVN-D5251/D4251, KINO-PVN-D5251/D4251 components and injury to the user.

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

- Read the user manual:
  - The user manual provides a complete description of the KINO-PVN-D5251/D4251 installation instructions and configuration options.
- Wear an electrostatic discharge cuff (ESD):
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- Place the KINO-PVN-D5251/D4251 on an antistatic pad:
  - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.



- Turn all power to the KINO-PVN-D5251/D4251 off:
  - When working with the KINO-PVN-D5251/D4251, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the KINO-PVN-D5251/D4251 **DO NOT:**

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

## 4.3 Unpacking

When the KINO-PVN-D5251/D4251 is unpacked, please check all the unpacking list items listed in Chapter 3 are indeed present. If any of the unpacking list items are not available please contact the KINO-PVN-D5251/D4251 vendor reseller/vendor where the KINO-PVN-D5251/D4251 was purchased or contact an IEI sales representative.

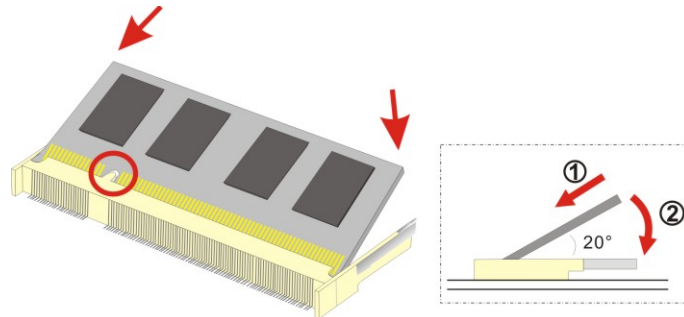
## 4.4 SO-DIMM Installation

SO-DIMM is a critical component of the KINO-PVN-D5251/D4251. If it is not installed the KINO-PVN-D5251/D4251 cannot run.

## KINO-PVN-D5251/D4251/ Mini ITX SBC

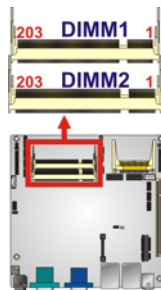
## 4.4.1 SO-DIMM Installation

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



**Figure 4-1: SO-DIMM Installation**

**Step 1:** Locate the SO-DIMM socket on the board (See the figure below). Place the board on an anti-static mat.



**Figure 4-2: SO-DIMM Connector Location**

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

**Step 3:** Insert the SO-DIMM. Push the memory in at a 20° angle. (See **Figure 4-1**)

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

## 4.5 CompactFlash® Installation



### NOTE:

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

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

**Step 1: Locate the CF card socket.** Locate the CompactFlash® slot.

**Step 2: Align the CF card.** Align the CompactFlash® card. The label side should be facing away from the board. The grooves on the CompactFlash® slot ensure that the card cannot be inserted the wrong way.

**Step 3: Insert the CF card.** Push until the CompactFlash® card is firmly seated in the slot. See Figure 4-3.

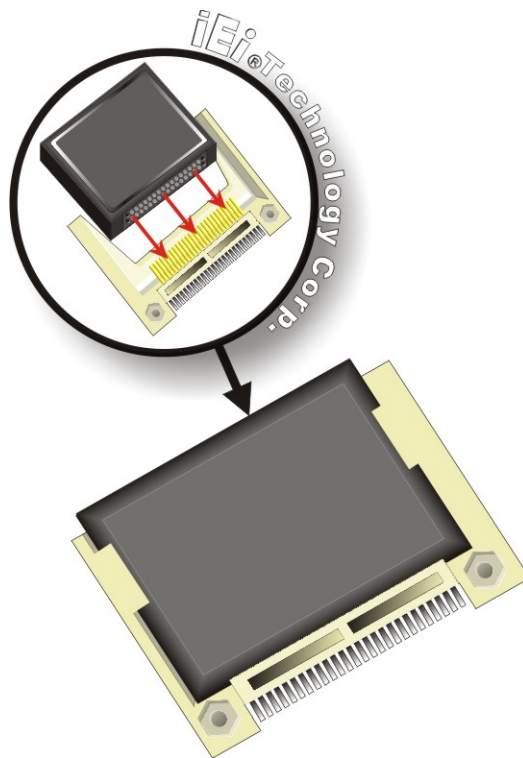


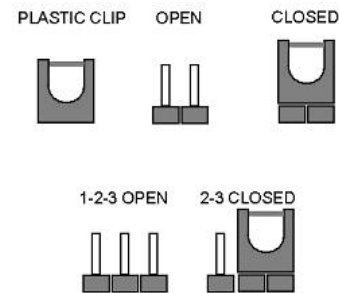
Figure 4-3: CompactFlash® Card Installation

## 4.6 Jumper Settings



### NOTE:

A jumper is a metal bridge used to close an electrical circuit. It consists of two or three metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.



Before the KINO-PVN-D5251/D4251 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the KINO-PVN-D5251/D4251 are listed in **Table 4-1**.

Description	Type	Label
AT/ATX Power setting	3-pin wafer	ATXCTL1
Clear CMOS	3-pin header	J_CMOS1
CompactFlash® setting	2-pin header	JCF1
Serial port setting	8-pin header	JP3

**Table 4-1: Jumpers**

### 4.6.1 AT/ATX Power Select Jumper Settings

**Jumper Label:** ATXCTL1

**Jumper Type:** 3-pin header (1x3)

**Jumper Settings:** See **Table 4-2**

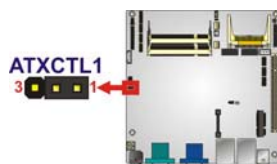
**Jumper Location:** See **Figure 4-4**

The AT/ATX Power Select jumper specifies the systems power mode as AT or ATX. AT/ATX Power Select jumper settings are shown in **Table 4-2**.

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

**Table 4-2: AT/ATX Power Select Jumper Settings**

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



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

#### 4.6.2 Clear CMOS Jumper

**Jumper Label:** J\_CMOS1  
**Jumper Type:** 3-pin header (1x3)  
**Jumper Settings:** See **Table 4-3**  
**Jumper Location:** See **Figure 4-5**

If the KINO-PVN-D5251/D4251 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.



## KINO-PVN-D5251/D4251/ Mini ITX SBC

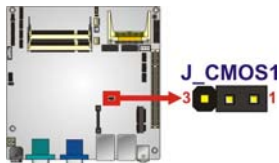
After having done one of the above, save the changes and exit the CMOS Setup menu.

The clear CMOS jumper settings are shown in **Table 4-3**.

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

**Table 4-3: Clear CMOS Jumper Settings**

The location of the clear CMOS jumper is shown in **Figure 4-5** below.



**Figure 4-5: Clear CMOS Jumper**

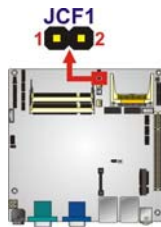
### 4.6.3 CompactFlash® Card Setup Jumper

<b>Jumper Label:</b>	<b>JCF1</b>
<b>Jumper Type:</b>	2-pin header
<b>Jumper Settings:</b>	See <b>Table 4-4</b>
<b>Jumper Location:</b>	See <b>Figure 4-6</b>

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

Setting	Description
Open	Slave
Closed	Master

**Table 4-4: CompactFlash® Setup Jumper Settings**



**Figure 4-6: CompactFlash® Setup Jumper Location**

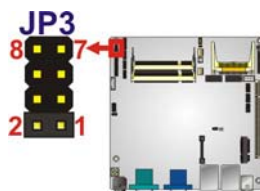
#### 4.6.4 Serial Port Setting Jumper

<b>Jumper Label:</b>	<b>JP3</b>
<b>Jumper Type:</b>	8-pin header
<b>Jumper Settings:</b>	See <b>Table 4-5</b>
<b>Jumper Location:</b>	See <b>Figure 4-7</b>

Used for RS-232/422/485 communications.

Pin	Description
Short 1-2	RS-232 (Default)
Short 3-4	RS-422
Short 5-6	RS-485
Short 7-8	RS-485 use RTS Control

**Table 4-5: Serial Port Jumper Settings**



**Figure 4-7: Serial Port Jumper Locations**

## 4.7 Chassis Installation

### 4.7.1 Airflow

**WARNING:**

Airflow is critical to the cooling of the CPU and other onboard components. The chassis in which the KINO-PVN-D5251/D4251 must have air vents to allow cool air to move into the system and hot air to move out.

---

The KINO-PVN-D5251/D4251 must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

### 4.7.2 Motherboard Installation

To install the KINO-PVN-D5251/D4251 motherboard into the chassis please refer to the reference material that came with the chassis.

## 4.8 Internal Peripheral Device Connections

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

### 4.8.1 AT/ATX Power Connection

Follow the instructions below to connect the KINO-PVN-D5251/D4251 to an AT or ATX power supply.

---

**WARNING:**

Disconnect the power supply power cord from its AC power source to prevent a sudden power surge to the KINO-PVN-D5251/D4251.

---

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

**Step 2:** **Connect the Power Cable to the Motherboard.** Connect the 4-pin (2x2) Molex type power cable connector to the AT/ATX power connector on the motherboard. See Figure 4-8.

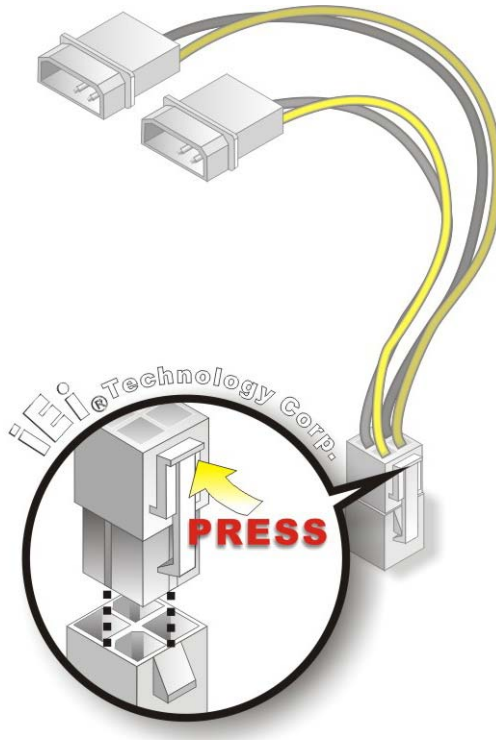


Figure 4-8: Power Cable to Motherboard Connection

**Step 3:** **Connect Power Cable to Power Supply.** Connect one of the 4-pin (1x4) Molex type power cable connectors to an AT/ATX power supply. See Figure 4-9.

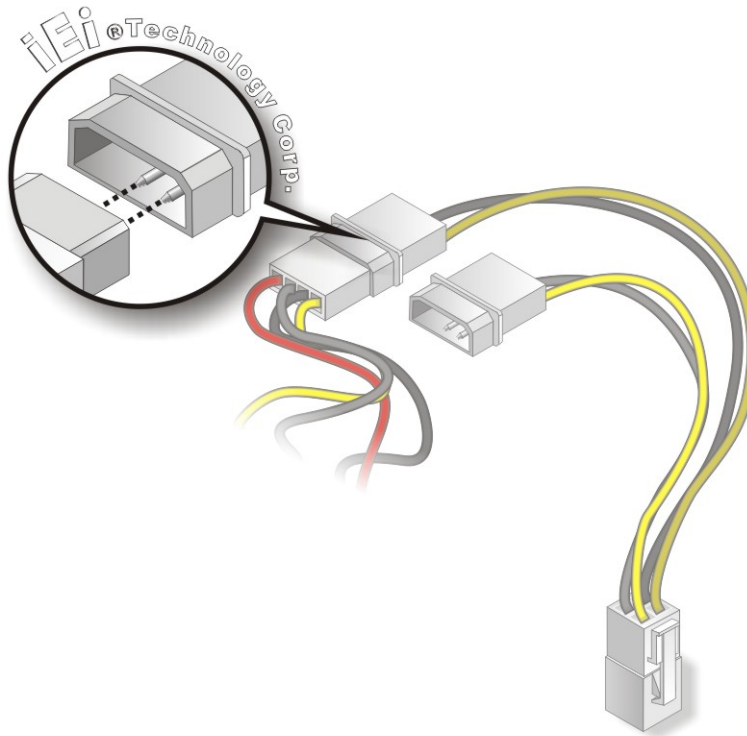


Figure 4-9: Connect Power Cable to Power Supply

#### 4.8.2 Single RS-232 Cable with Slot Bracket

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

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

**Step 2: Insert the cable connector.** Insert the connector into the serial port box header. See Figure 4-10. A key on the front of the cable connectors ensures the connector can only be installed in one direction.



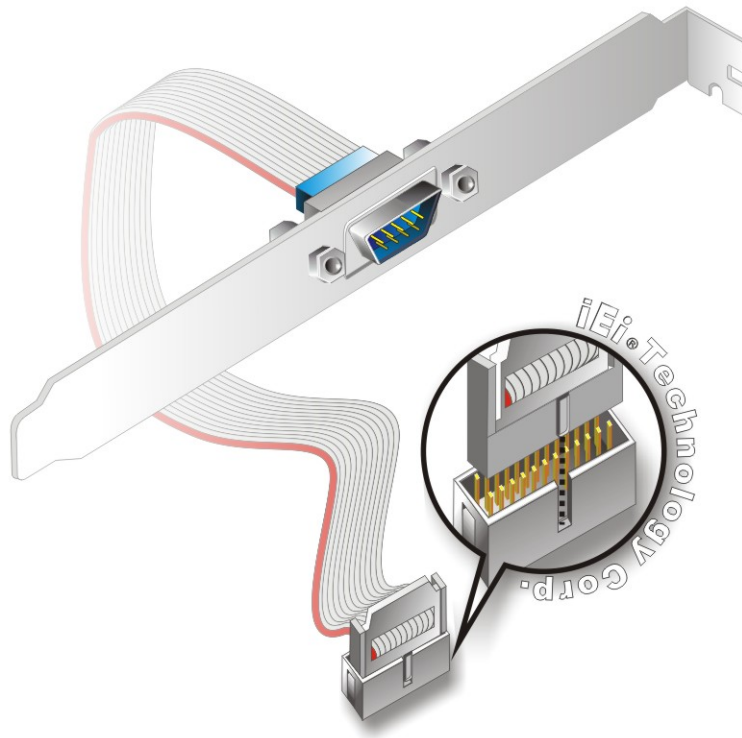


Figure 4-10: Single RS-232 Cable Installation

**Step 3: Secure the bracket.** The single RS-232 connector has one D-sub 9 male connector secured to a bracket. To secure the bracket to the chassis please refer to the reference material that came with the chassis

## 4.9 External Peripheral Interface Connection

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

- RJ-45 Ethernet cable connector
- Serial devices
- USB devices
- VGA monitor
- DVI devices
- Audio devices

## KINO-PVN-D5251/D4251/ Mini ITX SBC

To install these devices, connect the corresponding cable connector from the actual device to the corresponding KINO-PVN-D5251/D4251 external peripheral interface connector making sure the pins are properly aligned.

### 4.9.1 Audio Connector

The audio jacks on the external audio connector enable the KINO-PVN-D5251/D4251 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 plugs into the audio jacks.** Plug the audio plugs into the audio jacks. If the plugs on your speakers are different, an adapter will need to be used to plug them into the audio jacks.

- **Line-out port (Lime):** Connects to a headphone or a speaker.
- **Microphone (Pink):** Connects to a microphone.

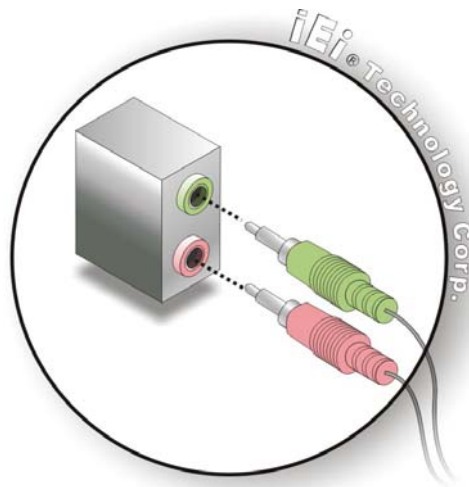


Figure 4-11: Audio Connector

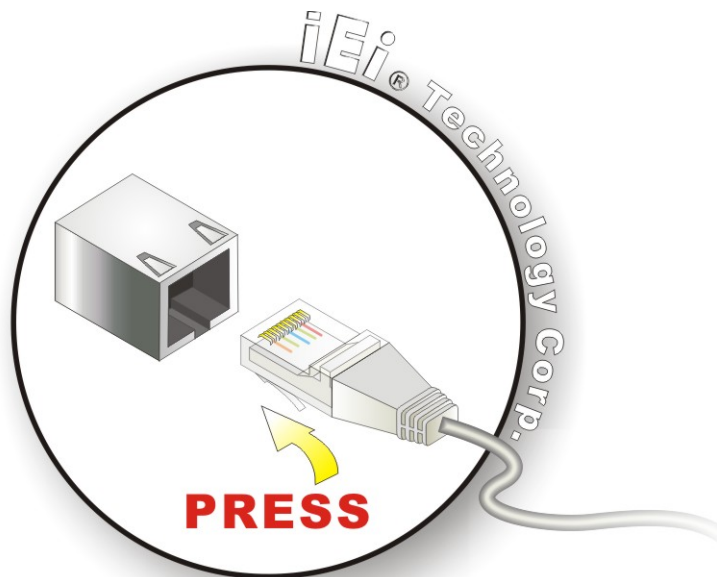
**Step 3: Check audio clarity.** Check that the sound is coming through the right speakers by adjusting the balance front to rear and left to right.

### 4.9.2 LAN Connection (Dual Connector)

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 3.

**Step 2:** **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the KINO-PVN-D5251/D4251. See Figure 4-12.



**Figure 4-12: LAN Connection**

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

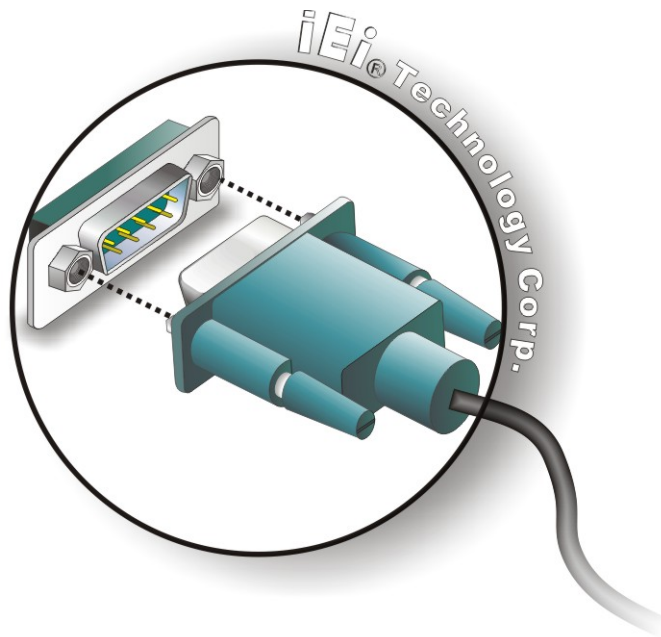
### 4.9.3 Serial Device Connection

The KINO-PVN-D5251/D4251 has a single female DB-9 connector on the external peripheral interface panel for a serial device. Follow the steps below to connect a serial device to the KINO-PVN-D5251/D4251.

## KINO-PVN-D5251/D4251/ Mini ITX SBC

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

**Step 2:** **Insert the serial connector.** Insert the DB-9 connector of a serial device into the DB-9 connector on the external peripheral interface. See Figure 4-13.



**Figure 4-13: Serial Device Connector**

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

### 4.9.4 USB Connection (Quad Connector)

The external USB Series "A" receptacle connectors provide easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the KINO-PVN-D5251/D4251.

**Step 1:** **Locate the USB Series "A" receptacle connectors.** The location of the USB Series "A" receptacle connectors are shown in **Chapter 3**.



**Step 2:** Insert a USB Series "A" plug. Insert the USB Series "A" plug of a device into the USB Series "A" receptacle on the external peripheral interface. See Figure 4-14.

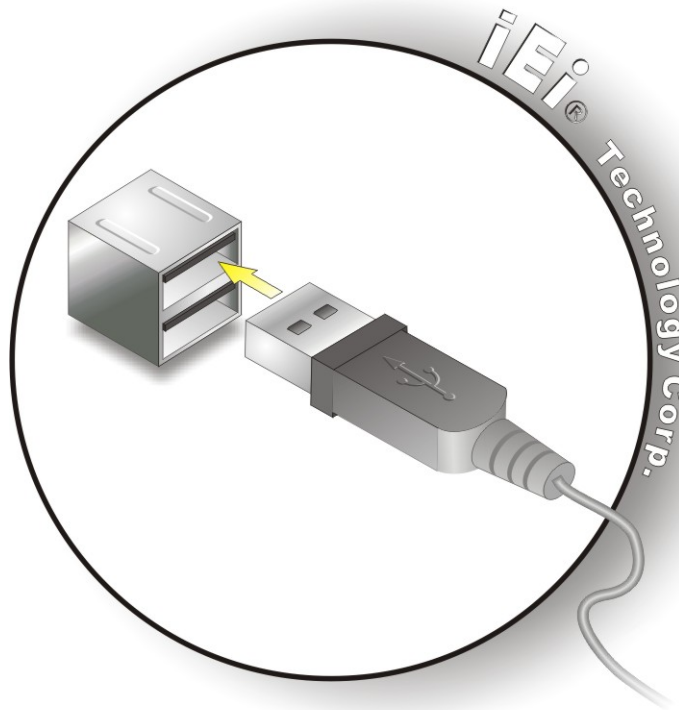


Figure 4-14: USB Connector

#### 4.9.5 VGA Monitor Connection

The KINO-PVN-D5251/D4251 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 KINO-PVN-D5251/D4251, please follow the instructions below.

- Step 1:** Locate the female DB-15 connector. The location of the female DB-15 connector is shown in **Chapter 3**.
- Step 2:** Align the VGA connector. Align the male DB-15 connector on the VGA screen cable with the female DB-15 connector on the external peripheral interface.



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**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 KINO-PVN-D5251/D4251. See Figure 4-15.

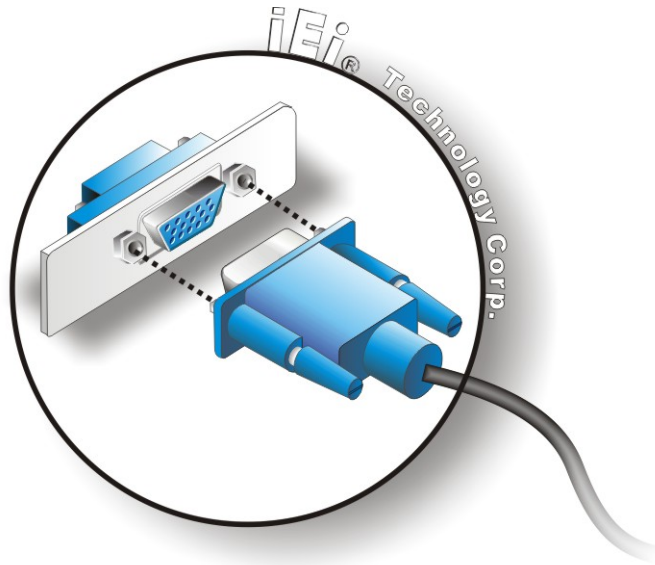


Figure 4-15: VGA Connector

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

### 4.9.6 DVI Display Device Connection

The KINO-PVN-D5251/D4251 has a single female DVI-I connector on the external peripheral interface panel. The DVI-I connector is connected to a digital display device. To connect a digital display device to the KINO-PVN-D5251/D4251, please follow the instructions below.

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

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

**Step 3: Insert the DVI-I connector** Once the connectors are properly aligned with the male connector, insert the male connector from the digital display device into the female connector on the KINO-PVN-D5251/D4251. See Figure 4-16.

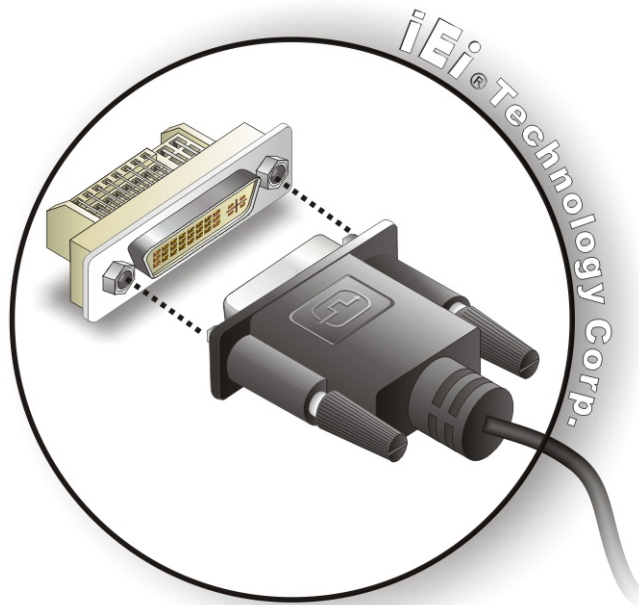


Figure 4-16: DVI Connector

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

## 4.10 Software Installation

All the drivers for the KINO-PVN-D5251/D4251 are on the CD that came with the system. To install the drivers, please follow the steps below.

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

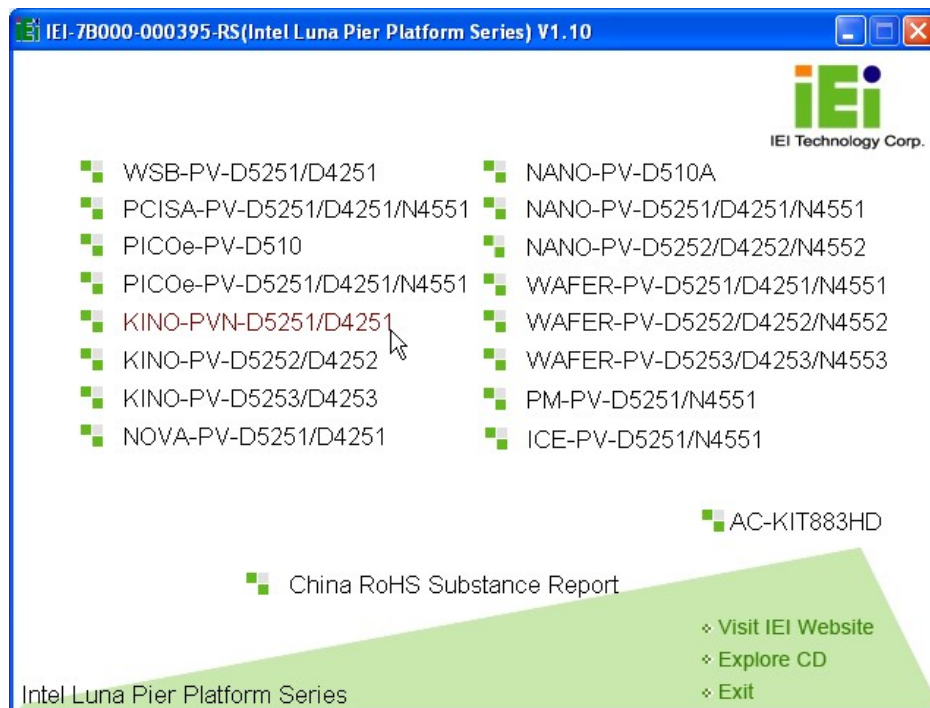
## KINO-PVN-D5251/D4251/ Mini ITX SBC



### NOTE:

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

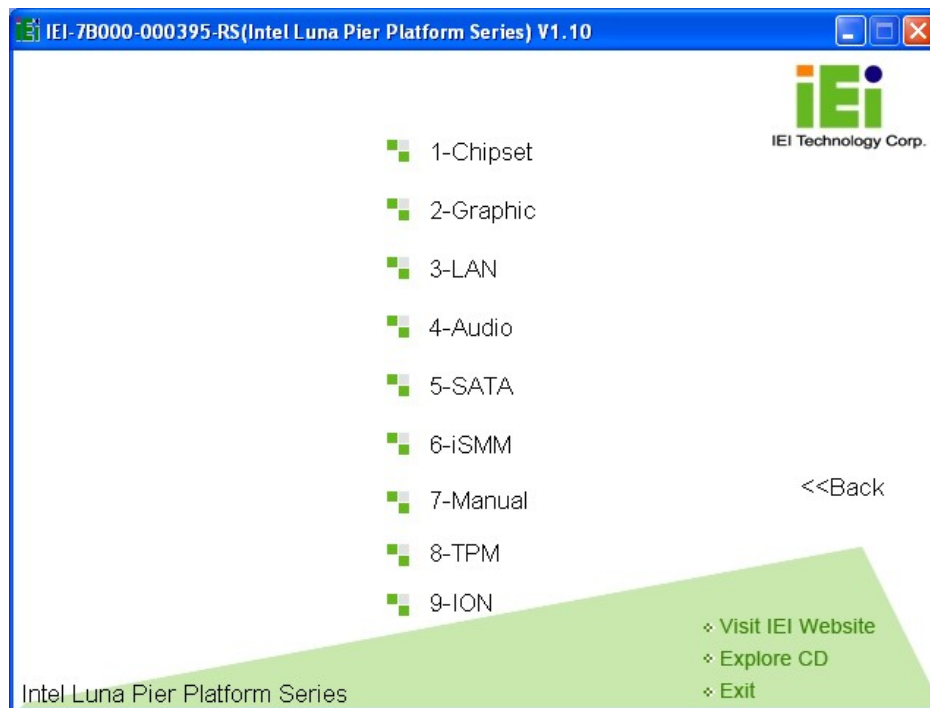
**Step 2:** The driver main menu appears (**Figure 4-17**).



**Figure 4-17: Introduction Screen**

**Step 3:** Click **KINO-PVN-D5251/D4251**.

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



**Figure 4-18: Available Drivers**

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

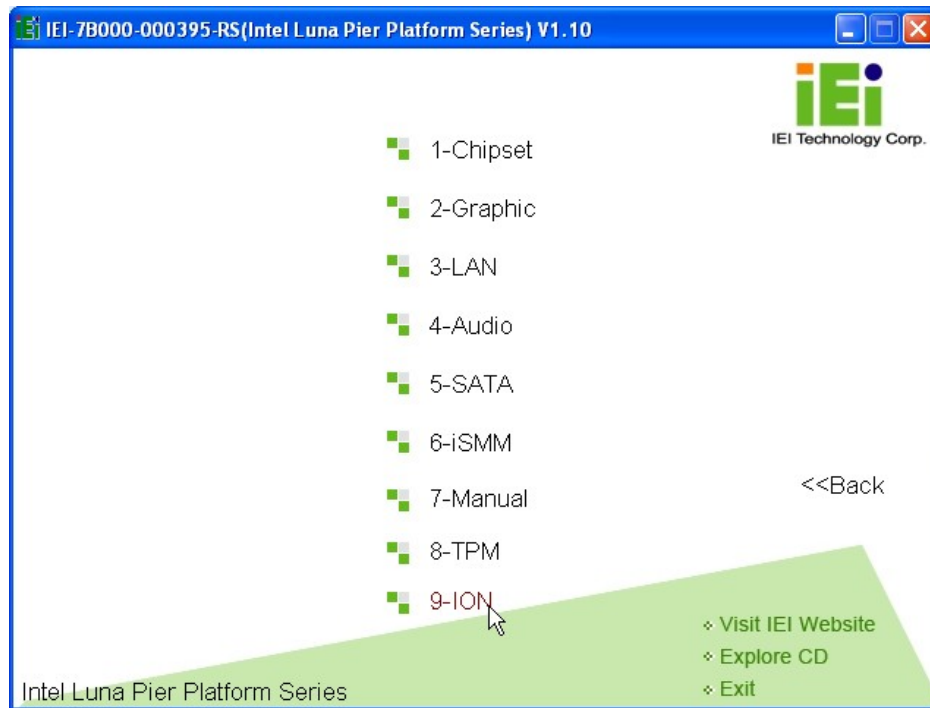


**IMPORTANT:**

In order for system graphics to function correctly, user **MUST** install the ION driver. See **Figure 4-19**.



## KINO-PVN-D5251/D4251/ Mini ITX SBC



**Figure 4-19: Graphics Driver Installation Reminder**



**Chapter****5**

# **BIOS Screens**

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

1. Press the **F2** key as soon as the system is turned on or
2. Press the **F2** key when the “**Press F2 to enter SETUP**” message appears on the screen.

If the message disappears before the **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, 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
+	Increase the numeric value or make changes
-	Decrease the numeric value or make changes
Page up	Move to the next page
Page down	Move to the previous page
Esc	Main Menu – Quit and do not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu

Key	Function
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F9 key	Load optimized defaults
F10 key	Save changes and Exit BIOS

**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

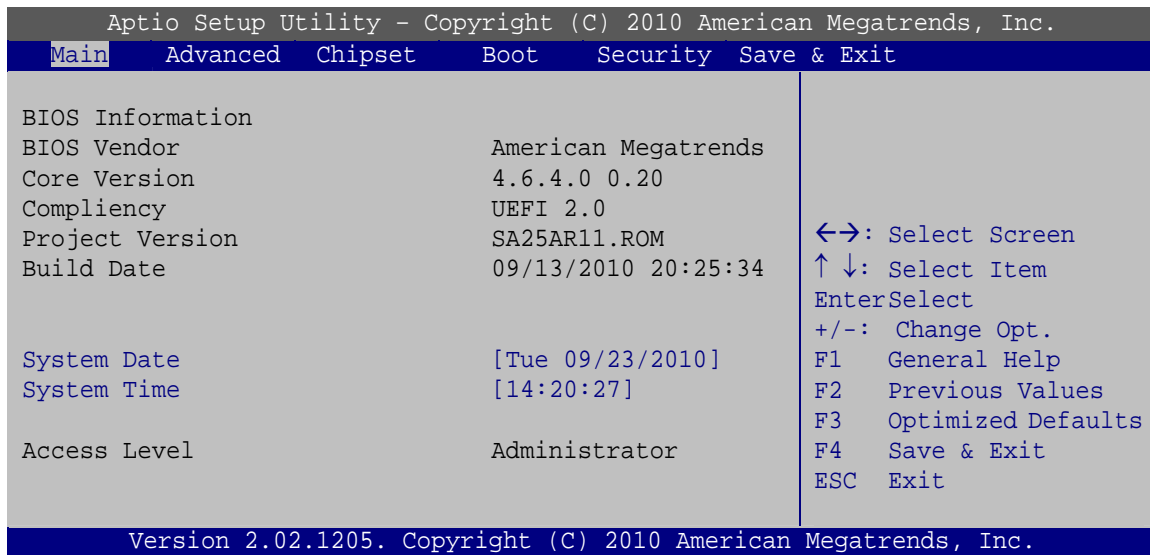
The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

## KINO-PVN-D5251/D4251/ Mini ITX SBC

### 5.2 Main

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

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



#### BIOS Menu 1: Main

#### → BIOS Information

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

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

The System Overview field also has two user configurable fields:

#### → System Date [xx/xx/xx]

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

→ **System Time [xx:xx:xx]**

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

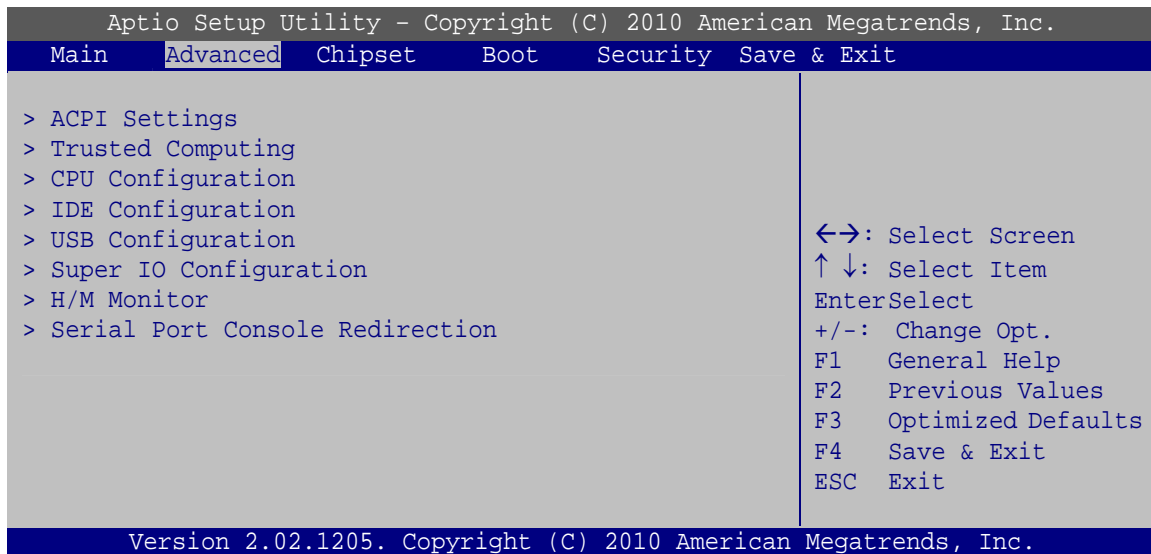
## 5.3 Advanced

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



### WARNING!

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



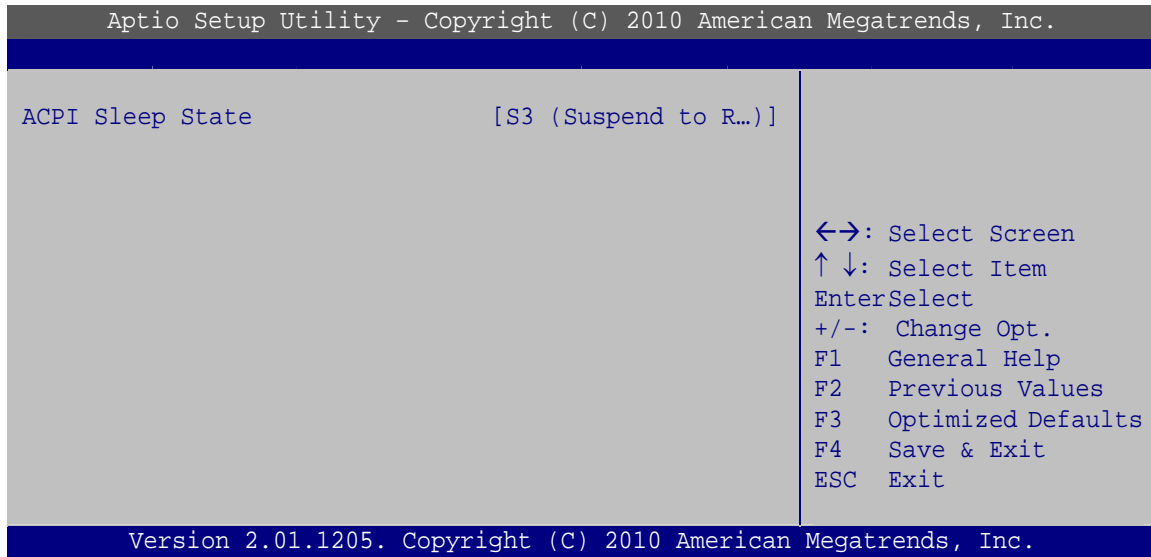
**BIOS Menu 2: Advanced**



## KINO-PVN-D5251/D4251/ Mini ITX SBC

### 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 Settings

##### → ACPI Sleep State [S3 (Suspend to RAM)]

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

##### → Suspend Disabled

##### → S1 (CPU Stop Clock)

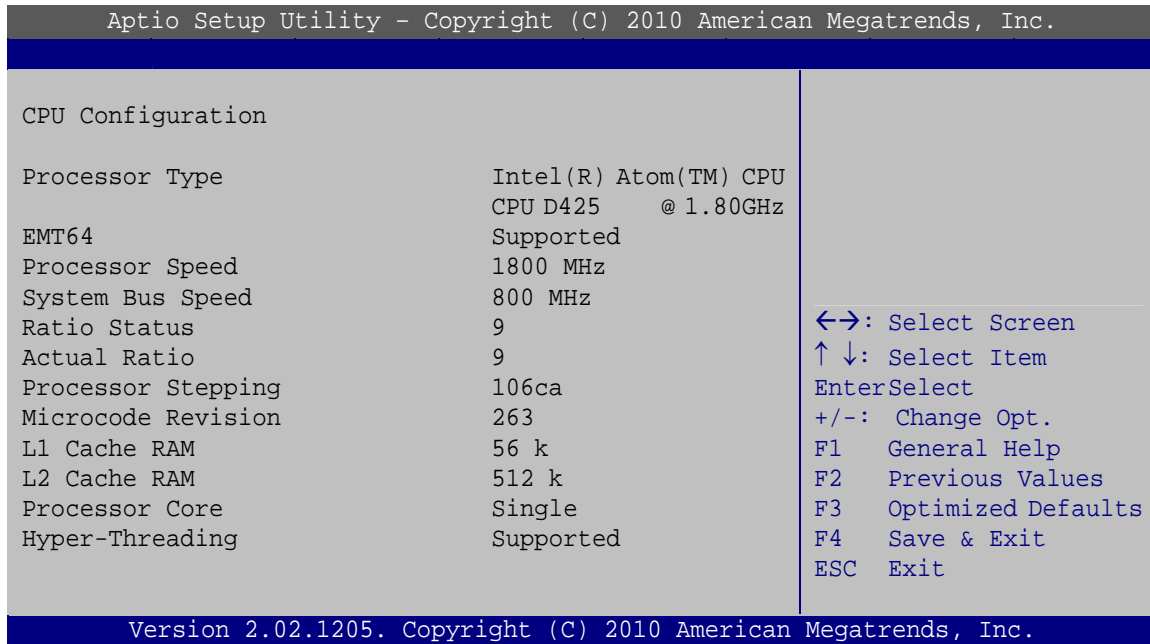
The system enters S1(POS) sleep state. The system appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.

##### → S3 (Suspend to RAM) **DEFAULT**

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 CPU Configuration

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



#### BIOS Menu 4: CPU Configuration

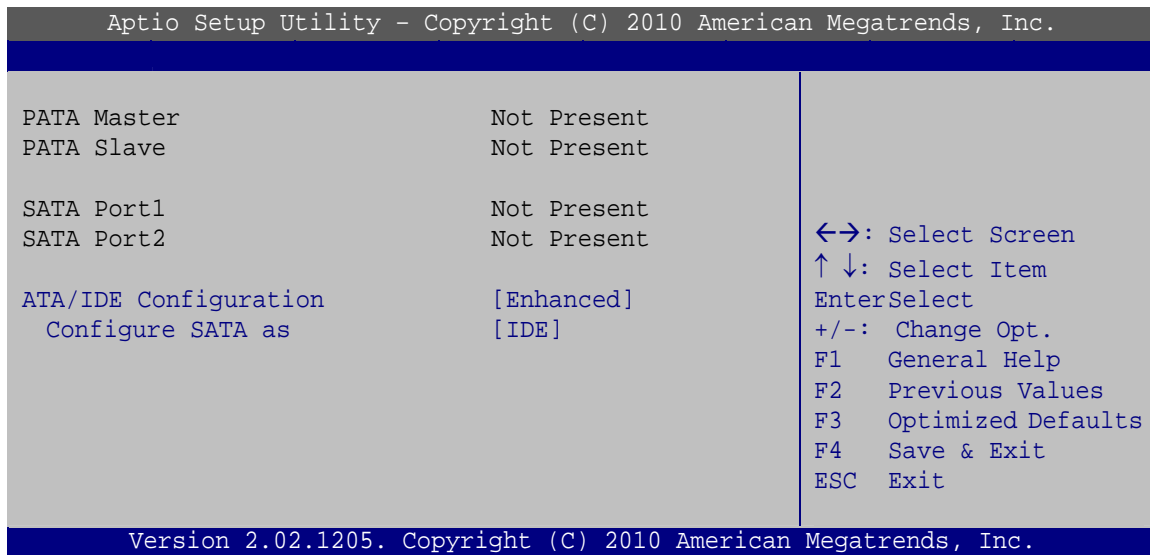
The CPU Configuration menu (**BIOS Menu 4**) lists the following CPU details:

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

## KINO-PVN-D5251/D4251/ Mini ITX SBC

### 5.3.3 SATA Configuration

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



#### BIOS Menu 5: IDE Configuration

#### → ATA/IDE Configurations [Enhanced]

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

- **Disabled** Disables the on-board ATA/IDE controller.
- **Compatible** Configures the on-board ATA/IDE controller to be in compatible mode. In this mode, a SATA channel will replace one of the IDE channels. This mode supports up to 4 storage devices.
- **Enhanced** **DEFAULT** Configures the on-board ATA/IDE controller to be in Enhanced mode. In this mode, IDE channels and SATA channels are separated. This mode supports up to 6 storage devices. Some legacy OS do not support this mode.

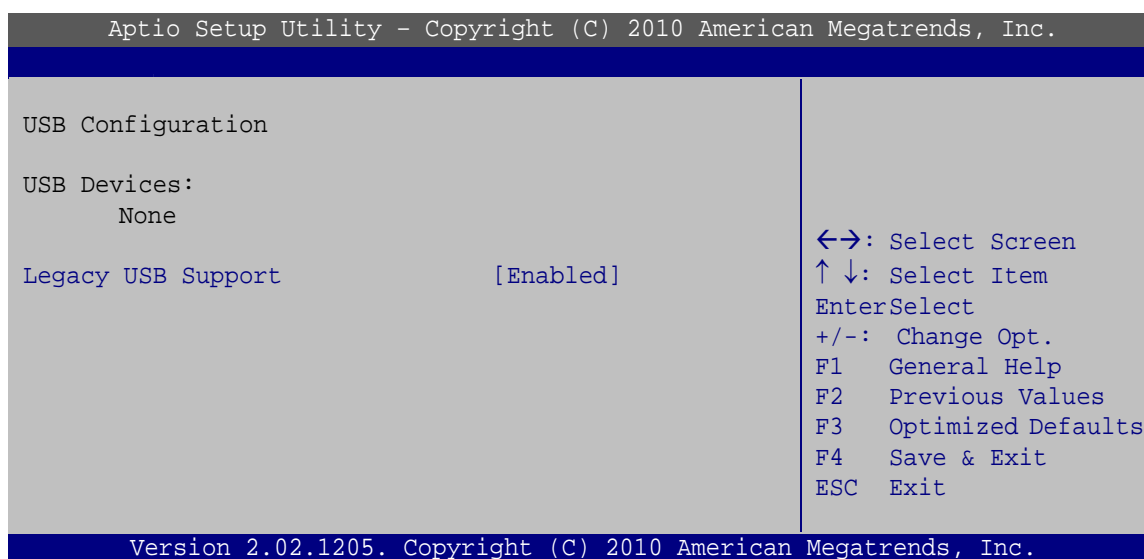
### ➔ Configure SATA as [IDE]

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

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

## 5.3.4 USB Configuration

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



### BIOS Menu 6: USB Configuration

#### ➔ USB Devices

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

#### ➔ Legacy USB Support [Enabled]

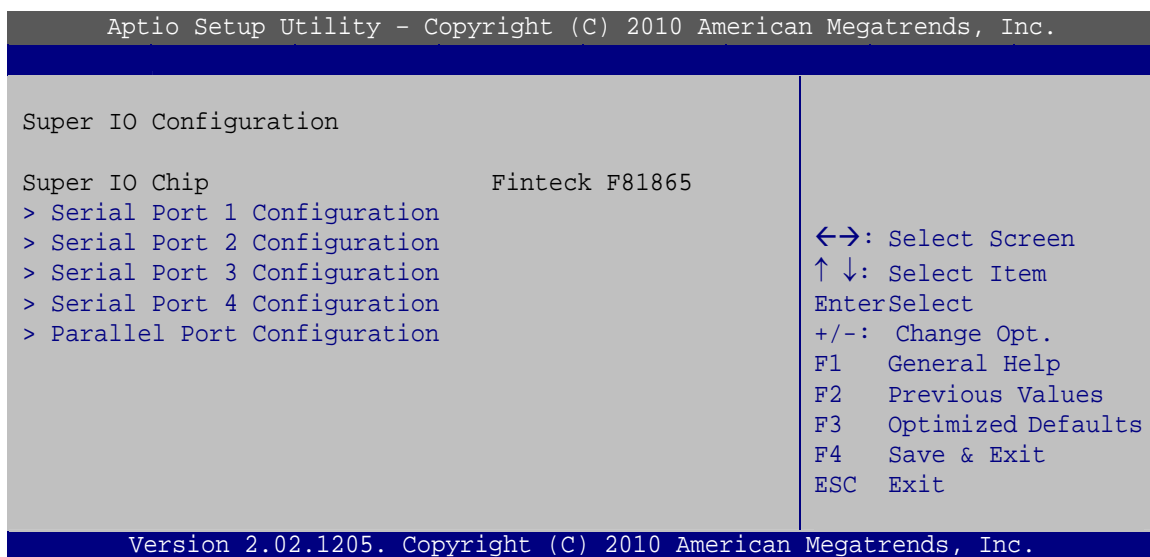
Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support. Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled,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

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

### 5.3.5 Super IO Configuration

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

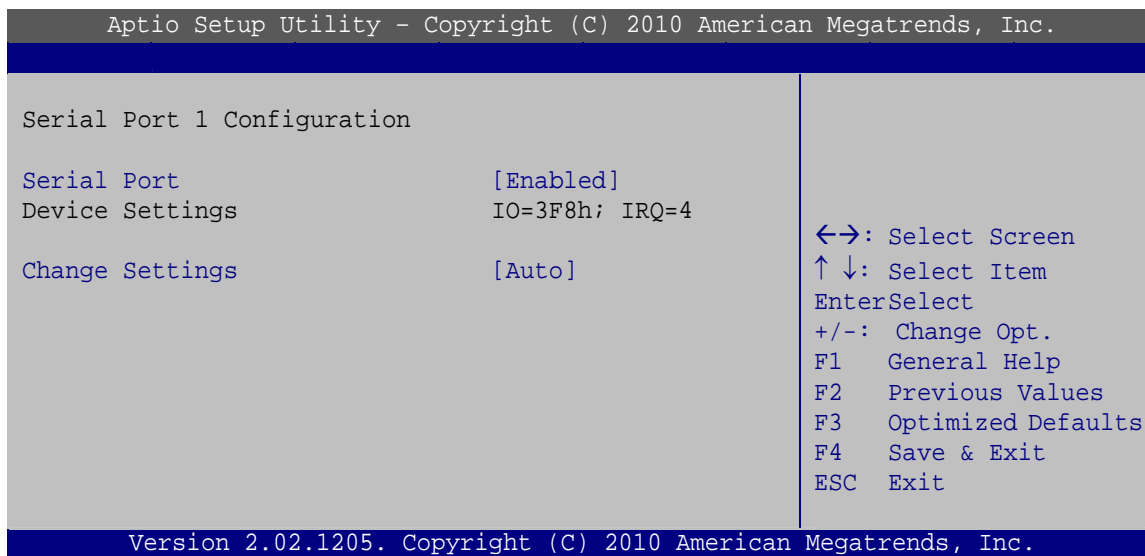


**BIOS Menu 7: Super IO Configuration**



### 5.3.5.1 Serial Port 1 Configuration

Use the **Serial Port 1 Configuration** menu (**BIOS Menu 8**) to configure the serial port n.



**BIOS Menu 8: Serial Port n Configuration Menu**

### 5.3.5.1.1 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

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- ➔ **IO=3F8h;**  
**IRQ=3, 4**      Serial Port I/O port address is 3F8h and the interrupt address is IRQ3 and IRQ4
- ➔ **IO=2F8h;**  
**IRQ=3, 4**      Serial Port I/O port address is 2F8h and the interrupt address is IRQ3 and IRQ4
- ➔ **IO=2C0h;**  
**IRQ=3, 4**      Serial Port I/O port address is 2C0h and the interrupt address is IRQ3 and IRQ4
- ➔ **IO=2C8h;**  
**IRQ=3, 4**      Serial Port I/O port address is 2C8h and the interrupt address is IRQ3 and IRQ4

### 5.3.5.1.2 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=3E8h;**  
**IRQ=11**      Serial Port I/O port address is 3E8h and the interrupt address is IRQ11
- ➔ **IO=3E8h;**  
**IRQ=10, 11**      Serial Port I/O port address is 3E8h and the interrupt address is IRQ10, 11
- ➔ **IO=2E8h;**  
**IRQ=10, 11**      Serial Port I/O port address is 2E8h and the interrupt address is IRQ10, 11
- ➔ **IO=2D0h;**  
**IRQ=10, 11**      Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11

- ➔ **IO=2D8h;**  
**IRQ=10, 11**      Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11

#### ➔ **Serial Port 2 Mode [RS232]**

Use the **Serial Port 2 Mode** option to set the Serial Port 2 signaling mode.

- ➔ **RS232**      **DEFAULT**      Serial Port 2 signaling mode is RS-232
- ➔ **RS422/RS485**      Serial Port 2 signaling mode is RS-422/RS-485

### 5.3.5.1.3 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=2E8h;**  
**IRQ=10**      Serial Port I/O port address is 2E8h and the interrupt address is IRQ10
- ➔ **IO=3E8h;**  
**IRQ=10, 11**      Serial Port I/O port address is 3E8h and the interrupt address is IRQ10, 11
- ➔ **IO=2E8h;**  
**IRQ=10, 11**      Serial Port I/O port address is 2E8h and the interrupt address is IRQ10, 11
- ➔ **IO=2D0h;**  
**IRQ=10, 11**      Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11

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- ➔ **IO=2D8h;**  
**IRQ=10, 11**      Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11

### 5.3.5.1.4 Serial Port 4 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

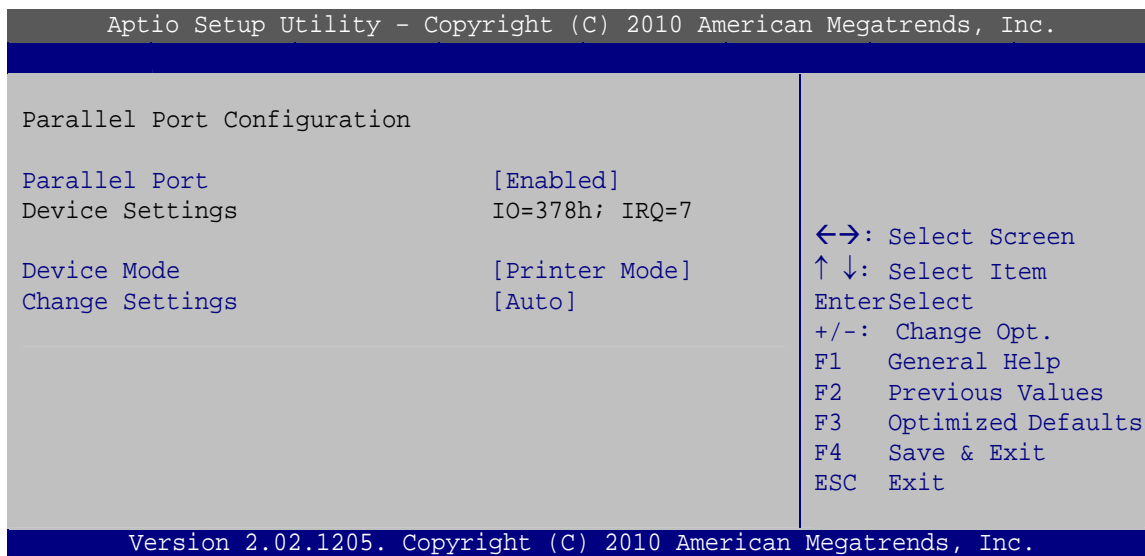
#### ➔ Change Settings [Auto]

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=2C0h;**  
**IRQ=10**      Serial port I/O port address is 2E8h and the interrupt address is IRQ10
- ➔ **IO=2C0h;**  
**IRQ=10, 11**      Serial port I/O port address is **2C0h** and the interrupt address is IRQ10, 11
- ➔ **IO=2C8h;**  
**IRQ=10, 11**      Serial port I/O port address is 2C8h and the interrupt address is IRQ10, 11
- ➔ **IO=2D0h;**  
**IRQ=10, 11**      Serial port I/O port address is 2D0h and the interrupt address is IRQ10 and IRQ11
- ➔ **IO=2D8h;**  
**IRQ=10, 11**      Serial port I/O port address is DC8h and the interrupt address is IRQ10 and IRQ11
- ➔ **IO=2E0h;**  
**IRQ=10, 11**      Serial port I/O port address is 2E0h and the interrupt address is IRQ10 and IRQ11

### 5.3.5.2 Parallel Port Configuration

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



#### BIOS Menu 9: Parallel Port Configuration Menu

##### ➔ Parallel Port [Enabled]

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

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

##### ➔ Change Settings [Auto]

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

- ➔ **Auto              DEFAULT**      The parallel port IO port address and interrupt address are automatically detected.
- ➔ **IO=378h;                      Parallel Port I/O port address is 378h and the**  
**IRQ=7                              interrupt address is IRQ7**
- ➔ **IO=278h;                      Parallel Port I/O port address is 278h and the**  
**IRQ=7                              interrupt address is IRQ7**



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

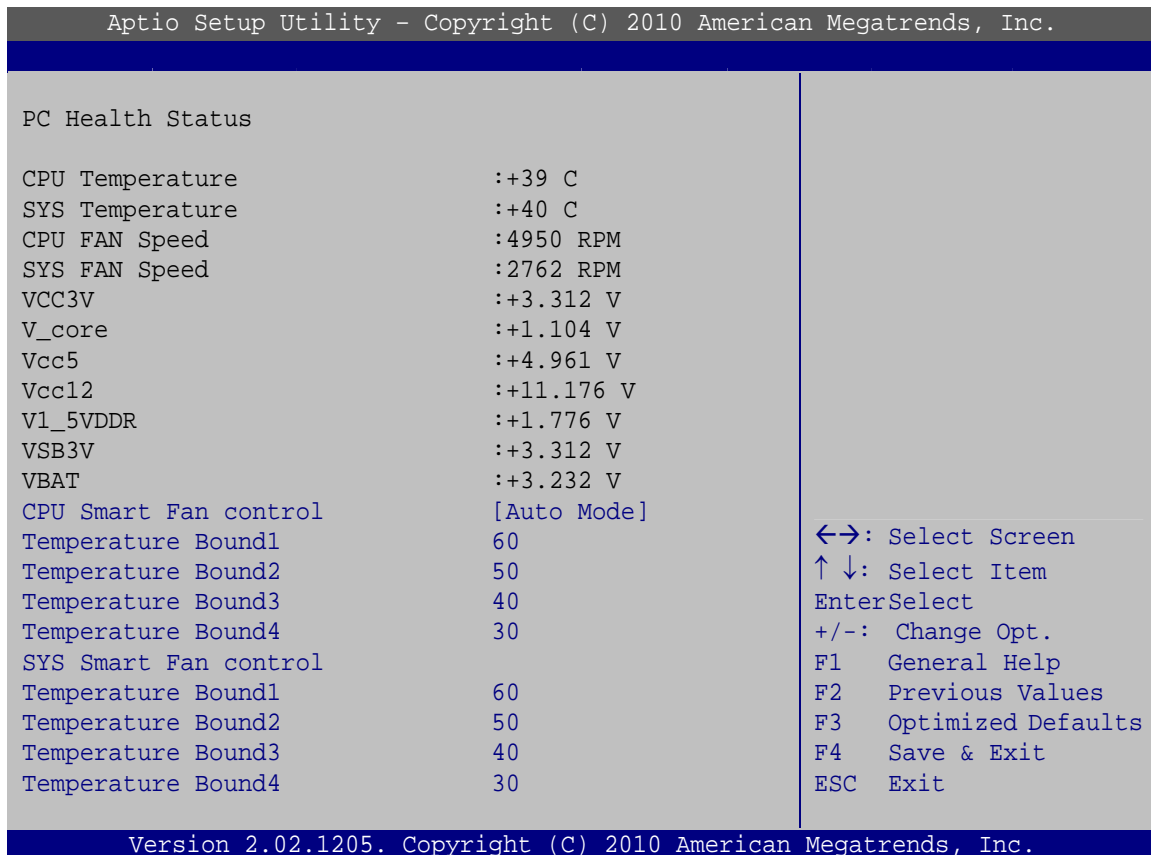
### ➔ **Device Mode [Printer Mode]**

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

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

### 5.3.6 H/W Monitor

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



#### BIOS Menu 10: Hardware Health Configuration

##### ➔ PC Health Status

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

- System Temperatures:
  - CPU Temperature
  - System Temperature
- Fan Speeds:
  - CPU Fan Speed
  - SYS Fan Speed

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- Voltages:
  - V\_core
  - Vcc5
  - Vcc12
  - V1\_5VDDR
  - VSB3V
  - VBAT

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

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

#### ➔ Auto Mode

The fan adjusts its speed using these settings:

Temperature Bound 1

Temperature Bound 2

Temperature Bound 3

Temperature Bound 4

#### ➔ Manual Mode

The fan spins at the speed set in:

Manual Duty Cycle Setting

### ➔ SYS Smart Fan control [Auto Mode]

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

#### ➔ Auto Mode

The fan adjusts its speed using these settings:

Temperature Bound 1

Temperature Bound 2

Temperature Bound 3

Temperature Bound 4

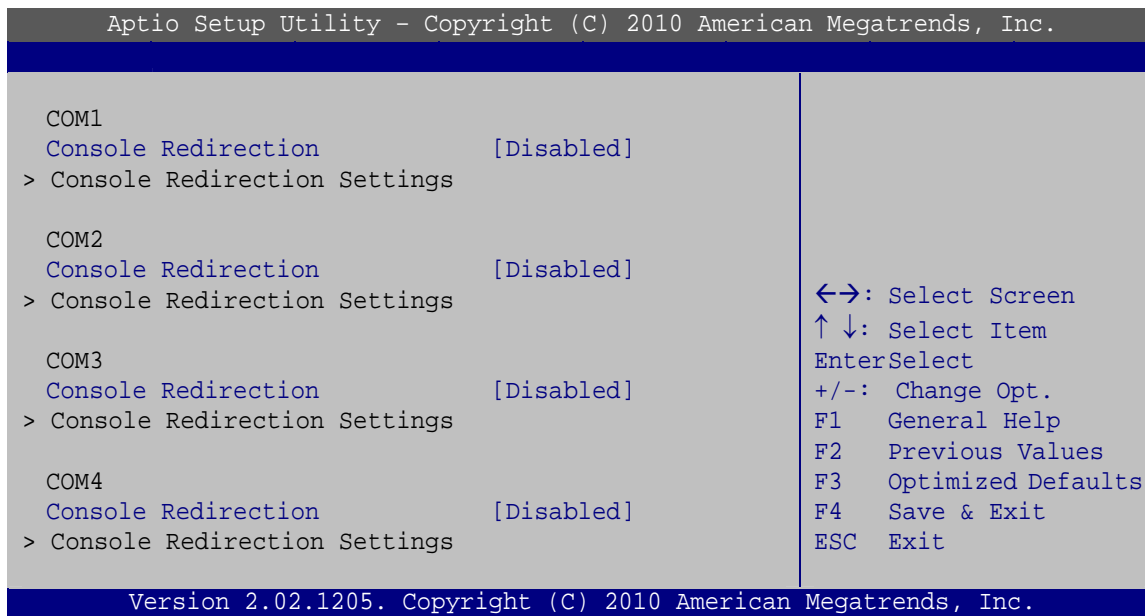
#### ➔ Manual Mode

The fan spins at the speed set in:

Manual Duty Cycle Setting

### 5.3.7 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 11**) 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 11: 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

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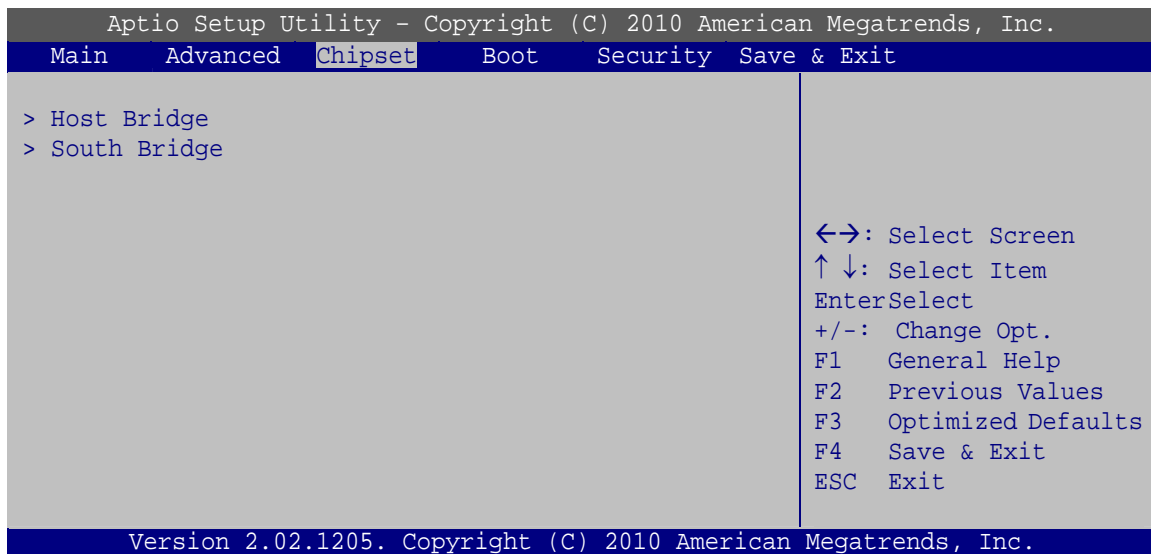
## 5.4 Chipset

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



### WARNING!

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

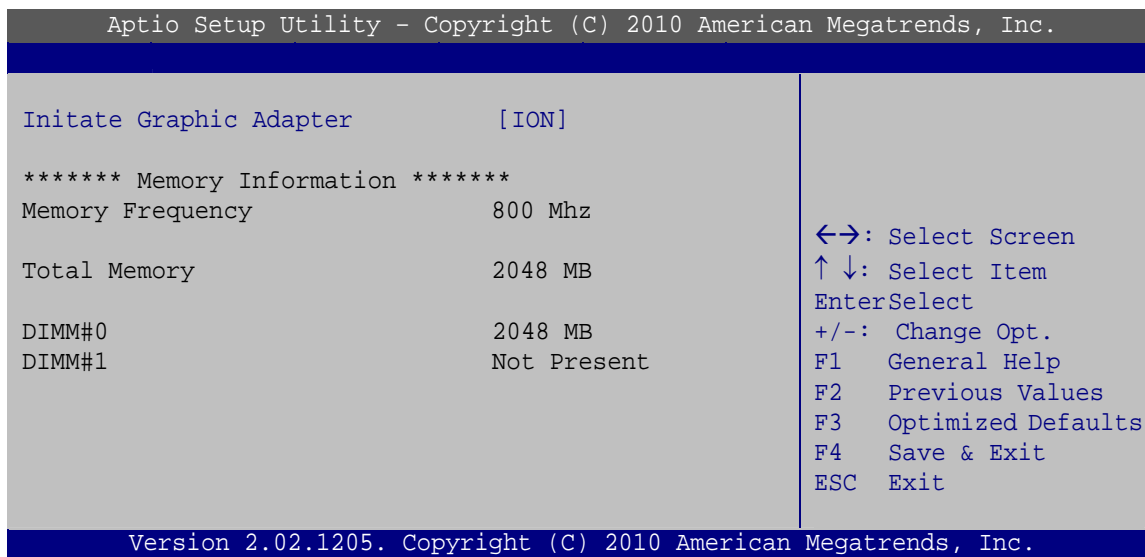


**BIOS Menu 12: Chipset**



### 5.4.1 Host Bridge Configuration

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



#### BIOS Menu 13: Host Bridge Chipset Configuration

##### ➔ Initiate Graphic Adapter [ION]

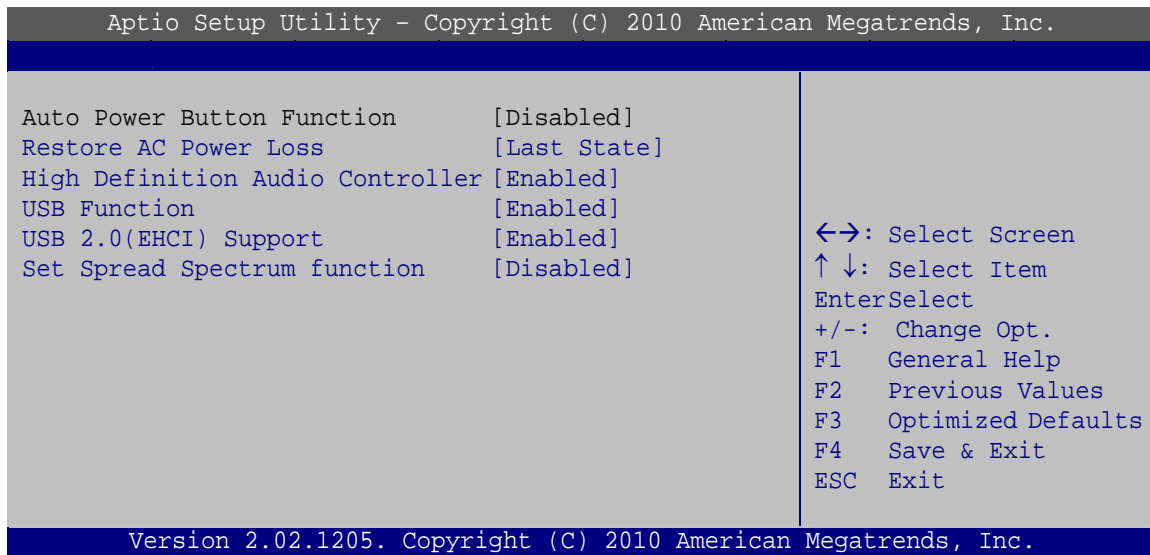
Use **Initiate Graphic Adapter** option to select which graphics controller to use as the primary boot device. Select either an ION graphics controller or a combination of PCI graphics controller and PCI express (PEG) controller. Configuration options are listed in the table below:

- |   |                |                |                                      |
|---|----------------|----------------|--------------------------------------|
| ➔ | <b>ION</b>     | <b>DEFAULT</b> | Enables ION graphics controller.     |
| ➔ | <b>PCI/PEG</b> |                | Enables PCI/PEG graphics controller. |

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### 5.4.2 South Bridge Configuration

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



#### BIOS Menu 14: South Bridge Chipset Configuration

##### → Restore AC Power Loss [Last State]

Use the **Restore AC Power Loss** to select which AC power state is applied after power failure.

- **Power Off** Restores the system to power off.
- **Power On** Restores the system to power on.
- **Last State** **DEFAULT** Restores the system to last power state.

##### → HD Audio Controller [Enabled]

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

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

➔ **USB Function [Enabled]**

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

- ➔ **Disabled**                      USB function support disabled
- ➔ **Enabled      DEFAULT**      USB function support enabled

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

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

- ➔ **Enabled      DEFAULT**      USB 2.0 (EHCI) support enabled
- ➔ **Disabled**                      USB 2.0 (EHCI) support disabled

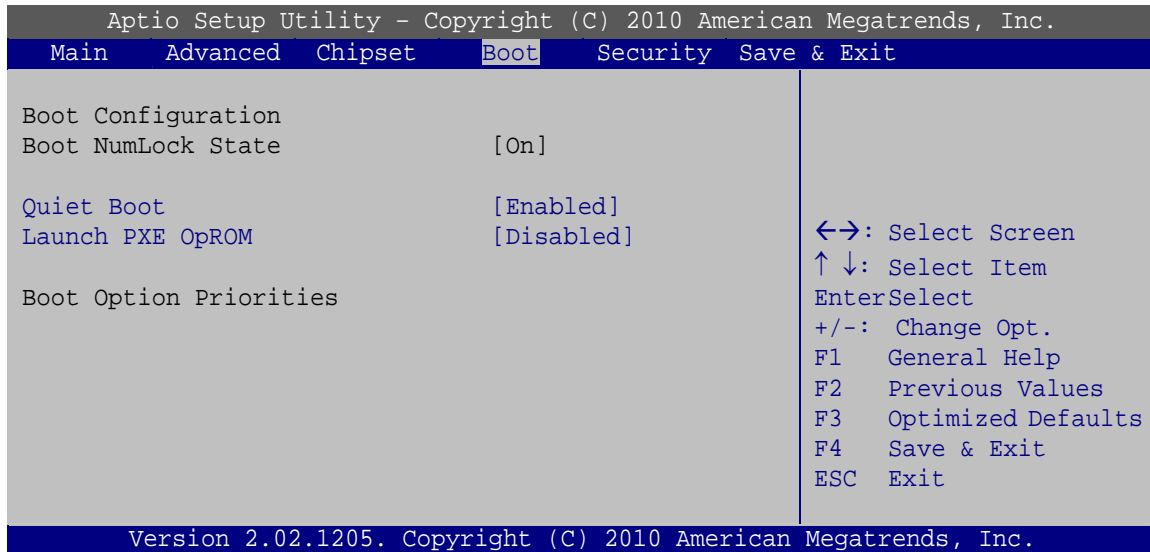
➔ **Set Spread Spectrum Function [Disabled]**

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

- ➔ **Disabled      DEFAULT**      The spread spectrum mode is disabled
- ➔ **Enabled**                      The spread spectrum mode is enabled

## 5.5 Boot

Use the **Boot** menu (**BIOS Menu 15**) to configure system boot options.



### BIOS Menu 15: 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.

- |   |                 |                |   |
|---|-----------------|----------------|---|
| → | <b>Disabled</b> |                | Normal POST messages displayed              |
| → | <b>Enabled</b>  | <b>DEFAULT</b> | OEM Logo displayed instead of POST messages |

**→ Launch PXE OpROM [Disabled]**

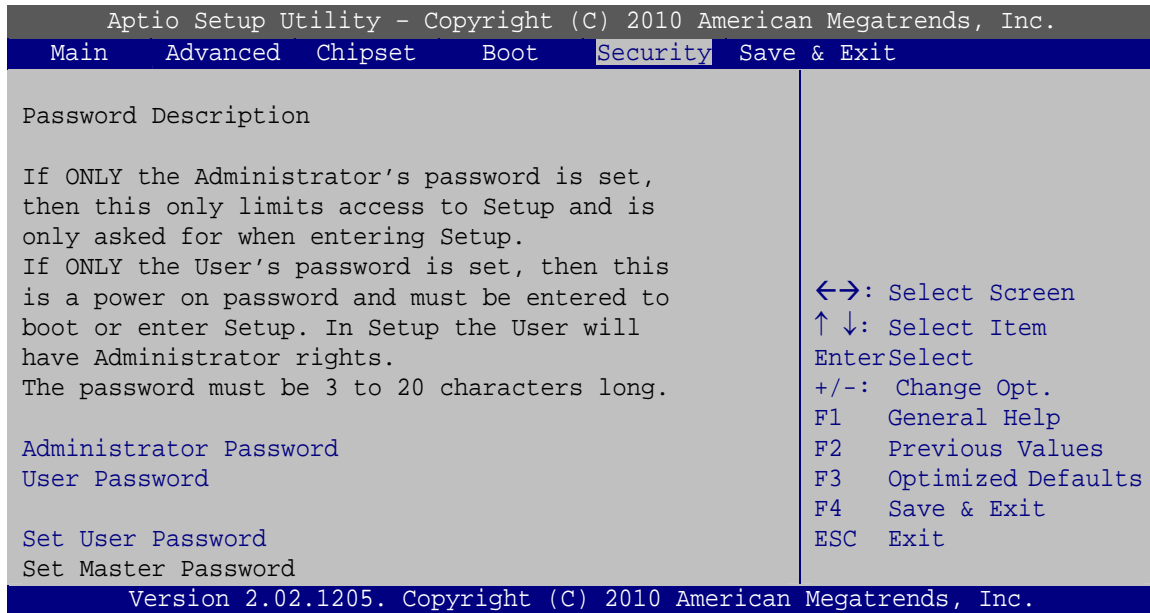
Use the **Launch PXE OpROM** option to enable or disable boot option for legacy network devices.

- |   |                 |                |                            |
|---|-----------------|----------------|----------------------------|
| → | <b>Disabled</b> | <b>DEFAULT</b> | Ignore all PXE Option ROMs |
| → | <b>Enabled</b>  |                | Load PXE Option ROMs.      |



## 5.6 Security

Use the **Security** menu (**BIOS Menu 16**) to set system and user passwords.



### BIOS Menu 16: Security

#### ➔ Administrator Password

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

#### ➔ User Password

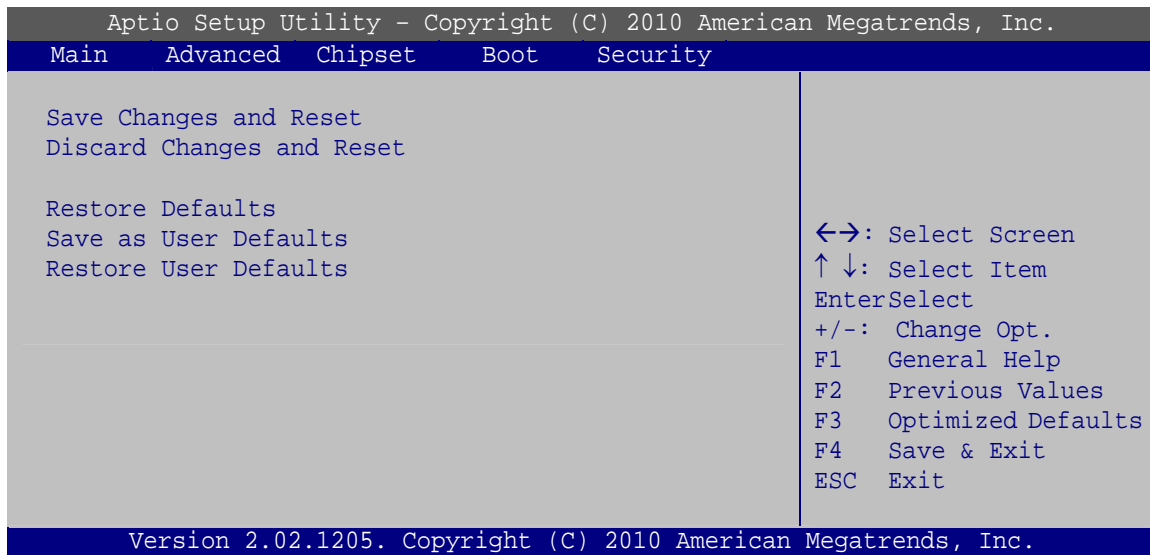
Use the **User Password** option to set or change a user password.

#### ➔ Set User Password

Use the **Set User Password** option to set or change an HDD password.

## 5.7 Exit

Use the **Exit** menu (**BIOS Menu 17**) to load default BIOS values, optimal failsafe values and to save configuration changes.



### BIOS Menu 17:Exit

#### → Save Changes and Reset

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

#### → Discard Changes and Reset

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

#### → Restore Defaults

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

#### → Save as User Defaults

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

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### ➔ Restore User Defaults

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

Appendix

A

# BIOS Options

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

<b>BIOS Information .....</b>	<b>63</b>
<b>System Date [xx/xx/xx] .....</b>	<b>63</b>
<b>System Time [xx:xx:xx] .....</b>	<b>64</b>
<b>ACPI Sleep State [S3 (Suspend to RAM)] .....</b>	<b>65</b>
<b>ATA/IDE Configurations [Enhanced] .....</b>	<b>67</b>
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<b>Change Settings [Auto] .....</b>	<b>70</b>
<b>Serial Port [Enabled] .....</b>	<b>71</b>
<b>Change Settings [Auto] .....</b>	<b>71</b>
<b>Serial Port 2 Mode [RS232] .....</b>	<b>72</b>
<b>Serial Port [Enabled] .....</b>	<b>72</b>
<b>Change Settings [Auto] .....</b>	<b>72</b>
<b>Serial Port [Enabled] .....</b>	<b>73</b>
<b>Change Settings [Auto] .....</b>	<b>73</b>
<b>Parallel Port [Enabled] .....</b>	<b>74</b>
<b>Change Settings [Auto] .....</b>	<b>74</b>
<b>Device Mode [Printer Mode] .....</b>	<b>75</b>
<b>PC Health Status .....</b>	<b>76</b>
<b>CPU Smart Fan control [Auto Mode] .....</b>	<b>77</b>
<b>SYS Smart Fan control [Auto Mode] .....</b>	<b>77</b>
<b>Console Redirection [Disabled] .....</b>	<b>78</b>
<b>Initate Graphic Adapter [ION] .....</b>	<b>80</b>
<b>Restore AC Power Loss [Last State] .....</b>	<b>81</b>
<b>HD Audio Controller [Enabled] .....</b>	<b>81</b>
<b>USB Function [Enabled] .....</b>	<b>82</b>
<b>USB 2.0 (EHCI) Support [Enabled] .....</b>	<b>82</b>
<b>Set Spread Spectrum Function [Disabled] .....</b>	<b>82</b>
<b>Bootup NumLock State [On] .....</b>	<b>83</b>
<b>Quiet Boot [Enabled] .....</b>	<b>84</b>
<b>Launch PXE OpROM [Disabled] .....</b>	<b>84</b>



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**Appendix****B**

# **One Key Recovery**

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## B.1 One Key Recovery Introduction

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

The IEI One Key Recovery tool menu is shown below.

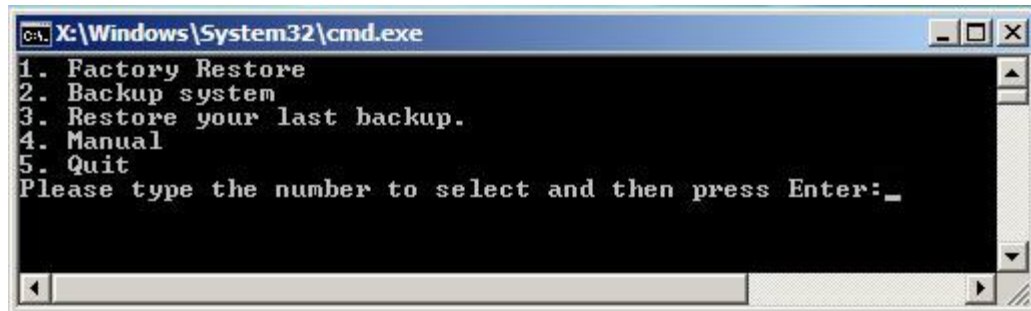


Figure B-1: IEI One Key Recovery Tool Menu

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

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

After completing the five initial setup procedures as described above, users can access the recovery tool by pressing <F3> while booting up the system. The detailed information of each function is described in **Section B.4**.



### NOTE:

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

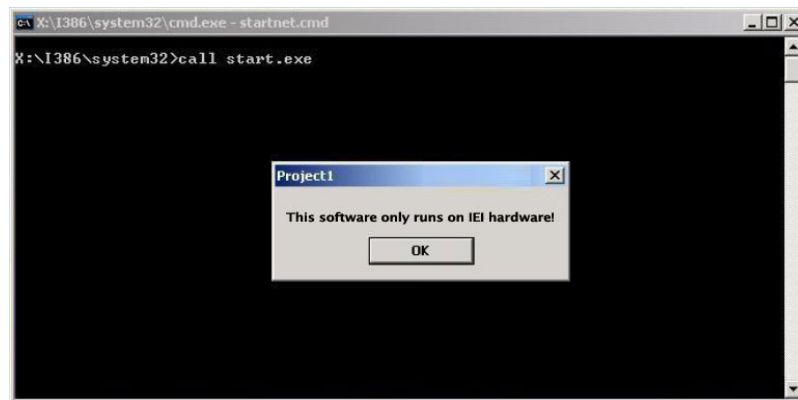
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### B.1.1 System Requirement



#### NOTE:

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



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

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

	OS	OS IMAGE AFTER GHOST	Compression Ratio
Windows® 7	<b>7 GB</b>	<b>5 GB</b>	70%
Windows® XPE	<b>776 MB</b>	<b>560 MB</b>	70%
Windows® CE 6.0	<b>36 MB</b>	<b>28 MB</b>	77%

**NOTE:**

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

### B.1.2 Supported Operating System

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

- Microsoft Windows
  - Windows XP (Service Pack 2 or 3 required)
  - Windows Vista
  - Windows 7
  - Windows CE 5.0
  - Windows CE 6.0
  - Windows XP Embedded
- Linux
  - Fedora Core 12 (Constantine)
  - Fedora Core 11 (Leonidas)
  - Fedora Core 10 (Cambridge)
  - Fedora Core 8 (Werewolf)
  - Fedora Core 7 (Moonshine)
  - RedHat RHEL-5.4
  - RedHat 9 (Ghirke)
  - Ubuntu 8.10 (Intrepid)
  - Ubuntu 7.10 (Gutsy)
  - Ubuntu 6.10 (Edgy)
  - Debian 5.0 (Lenny)
  - Debian 4.0 (Etch)
  - SuSe 11.2
  - SuSe 10.3



**NOTE:**

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

## B.2 Setup Procedure for Windows

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

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

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

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

**Step 4:** Build-up recovery partition (see **Section B.2.4**)

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

The detailed descriptions are described in the following sections.

**NOTE:**

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

### B.2.1 Hardware and BIOS Setup

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

**Step 2:** Install a hard 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 <F2> key as soon as the system is turned on to enter the BIOS.

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

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

## B.2.2 Create Partitions

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

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

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

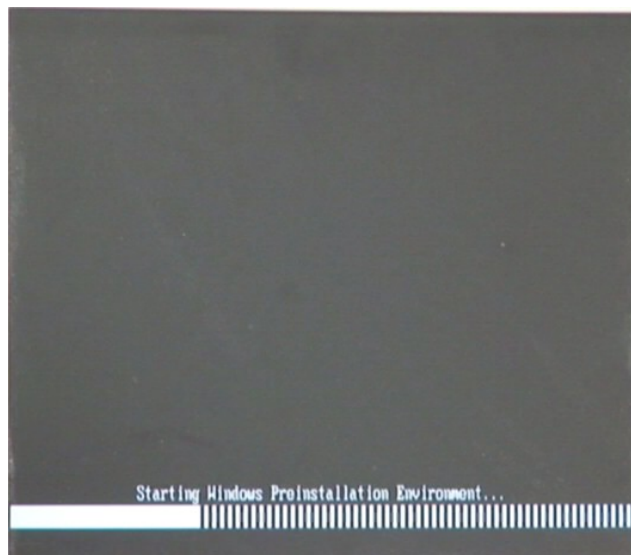
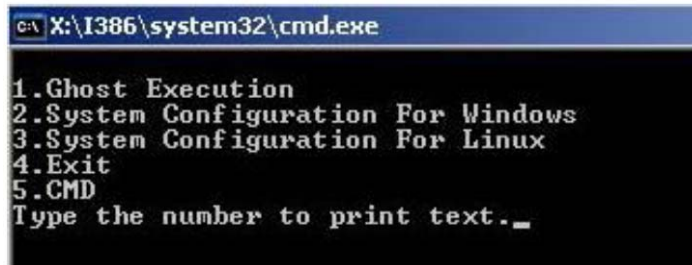


Figure B-2: Launching the Recovery Tool

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

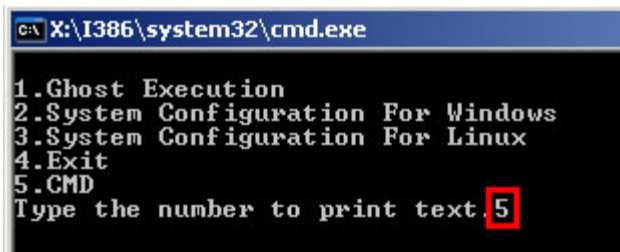
A screenshot of a command prompt window titled "C:\X:\I386\system32\cmd.exe". The window displays a menu with five options: 1. Ghost Execution, 2. System Configuration For Windows, 3. System Configuration For Linux, 4. Exit, and 5. CMD. Below the menu, it says "Type the number to print text.\_".

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

1. Ghost Execution
2. System Configuration For Windows
3. System Configuration For Linux
4. Exit
5. CMD
Type the number to print text._
```

Figure B-3: Recovery Tool Setup Menu

**Step 4:** Press <5> then <Enter>.

A screenshot of a command prompt window titled "C:\X:\I386\system32\cmd.exe". The window displays the same menu as Figure B-3. The number "5" is highlighted in a red box next to the "5. CMD" option, indicating it has been selected.

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

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

Figure B-4: Command Mode

**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

```

X:\I386\SYSTEM32\CMD.EXE
X:\I386\SYSTEM32>diskpart → Starts the Microsoft disk partitioning tool.
Microsoft DiskPart version 5.2.3790.1830
Copyright (C) 1999-2001 Microsoft Corporation.
On computer: MININT-JUC
DISKPART> list vol → Show partition information

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

DISKPART> sel disk 0 → Select a disk
Disk 0 is now the selected disk.
DISKPART> create part pri size=2000 → Create partition 1 and assign a size.
                                         This partition is for OS installation.
DiskPart succeeded in creating the specified partition.
DISKPART> assign letter=N → Assign partition 1 a code name (N).
DiskPart successfully assigned the drive letter or mount point.
DISKPART> create part pri size=1800 → Create partition 2 and assign a size.
                                         This partition is for recovery images.
DiskPart succeeded in creating the specified partition.
DISKPART> assign letter=F → Assign partition 2 a code name (F).
DiskPart successfully assigned the drive letter or mount point.
DISKPART> exit → Exit diskpart
X:\I386\SYSTEM32>format n: /fs:ntfs /q /y → Format partition 1 (N) as NTFS format.
The type of the file system is ntfs.
The new file system is NTFS.
QuickFormatting 2000M
Creating file system structures.
Format complete.
2048254 KB total disk space.
2035620 KB are available.
X:\I386\SYSTEM32>format f: /fs:ntfs /q /v:Recovery /y
The type of the file system is ntfs.
The new file system is NTFS.
QuickFormatting 1804M
Creating file system structures.
Format complete.
1847474 KB total disk space.
1835860 KB are available.
X:\I386\SYSTEM32>exit → Exit Windows PE
  
```

Figure B-5: Partition Creation Commands



## NOTE:

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

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

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

DISKPART> list part

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

DISKPART> exit
```

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

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

## B.2.3 Install Operating System, Drivers and Applications

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



## NOTE:

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

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



### B.2.4 Build-up Recovery Partition

- Step 1:** Put the recover CD in the optical drive.
- Step 2:** Start the system.
- Step 3:** **Boot the system from recovery CD.** When prompted, press any key to boot from the recovery CD. It will take a while to launch the recovery tool. Please be patient!

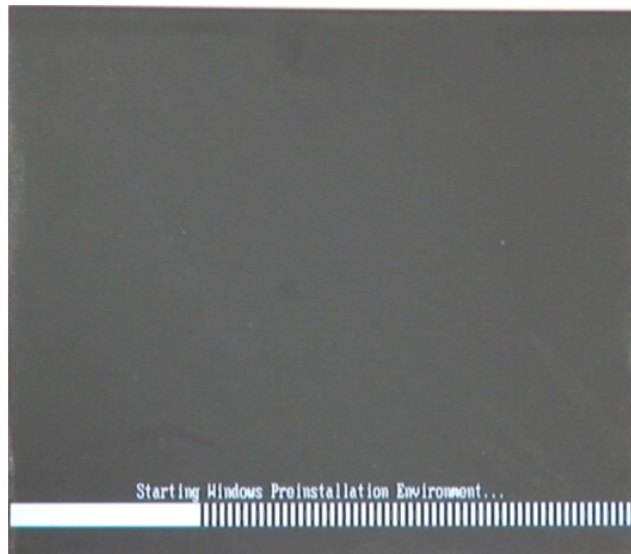


Figure B-6: Launching the Recovery Tool

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

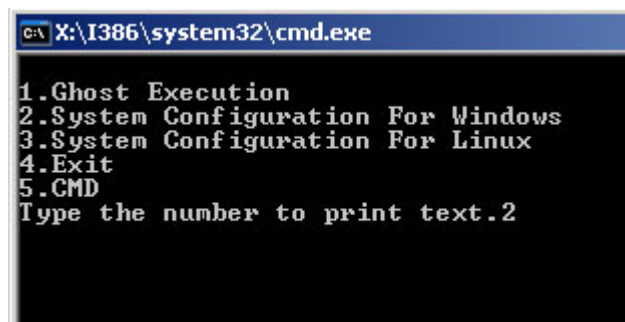
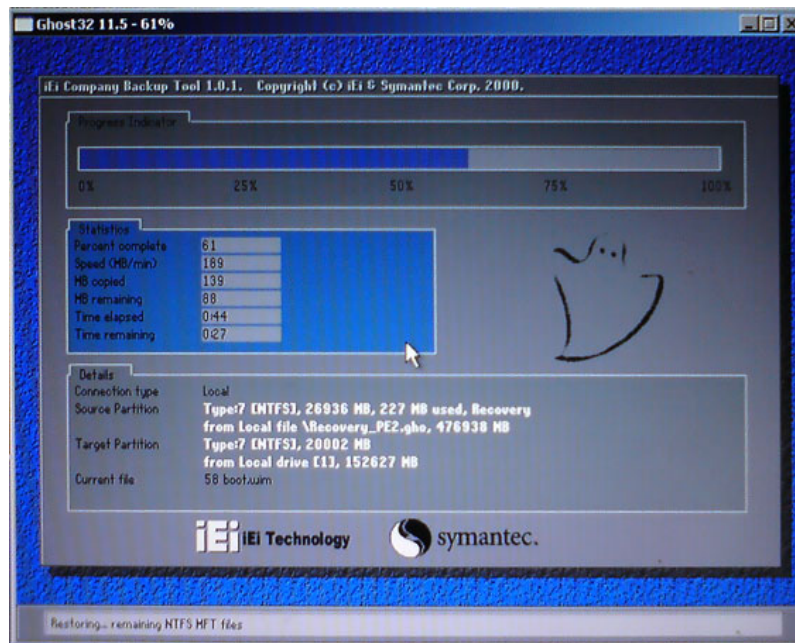


Figure B-7: System Configuration for Windows

- Step 5:** The Symantec Ghost window appears and starts configuring the system to build-up a recovery partition. In this process, the partition which is created for

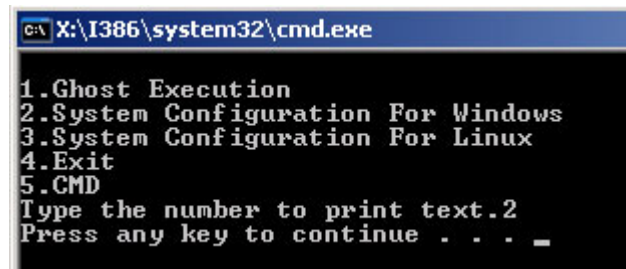
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recovery files in **Section B.2.2** is hidden and the recovery tool is saved in this partition.



**Figure B-8: Build-up Recovery Partition**

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



**Figure B-9: Press any key to continue**

**Step 7:** Eject the recovery CD.

## B.2.5 Create Factory Default Image



### NOTE:

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

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

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

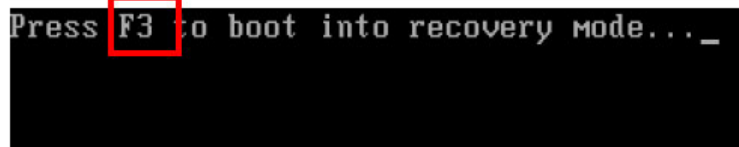


Figure B-10: Press F3 to Boot into Recovery Mode

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

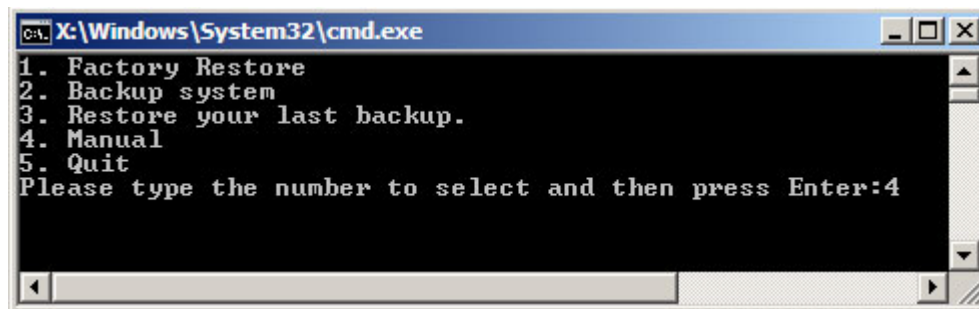


Figure B-11: Recovery Tool Menu

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

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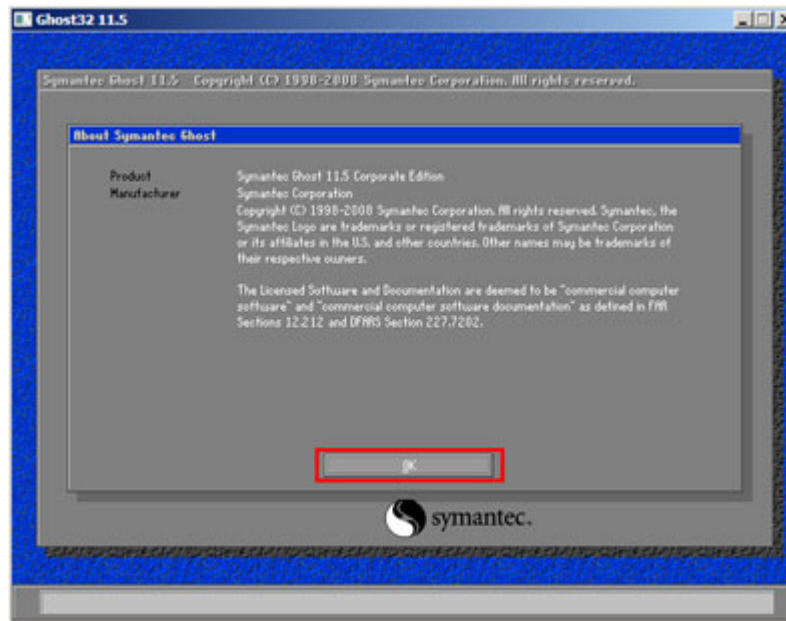


Figure B-12: About Symantec Ghost Window

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

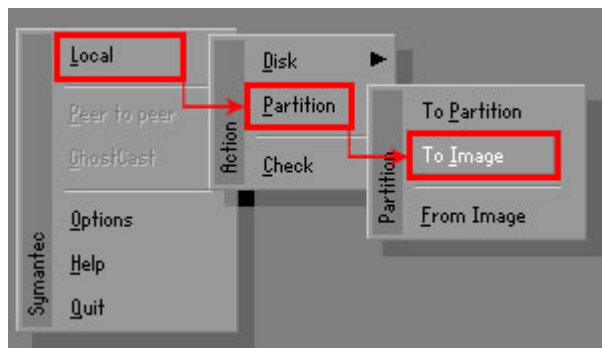
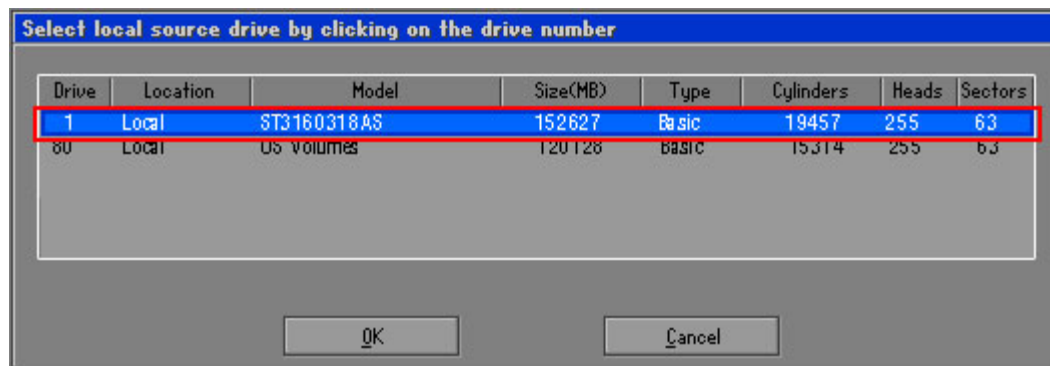


Figure B-13: Symantec Ghost Path

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

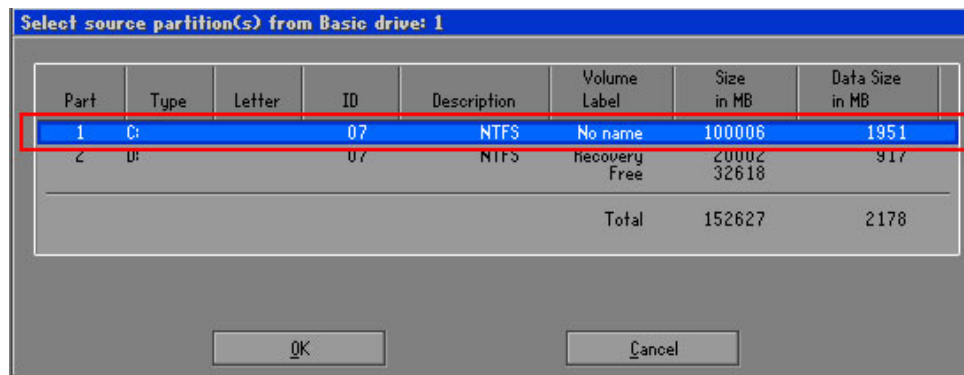




**Figure B-14: Select a Local Source Drive**

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

Then click OK.



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

**Step 7:** Select **1.2: [Recovery] NTFS drive** and enter a file name called **iei** (**Figure B-16**). Click **Save**. The factory default image will then be saved in the selected recovery drive and named **IEI.GHO**.



**WARNING:**

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



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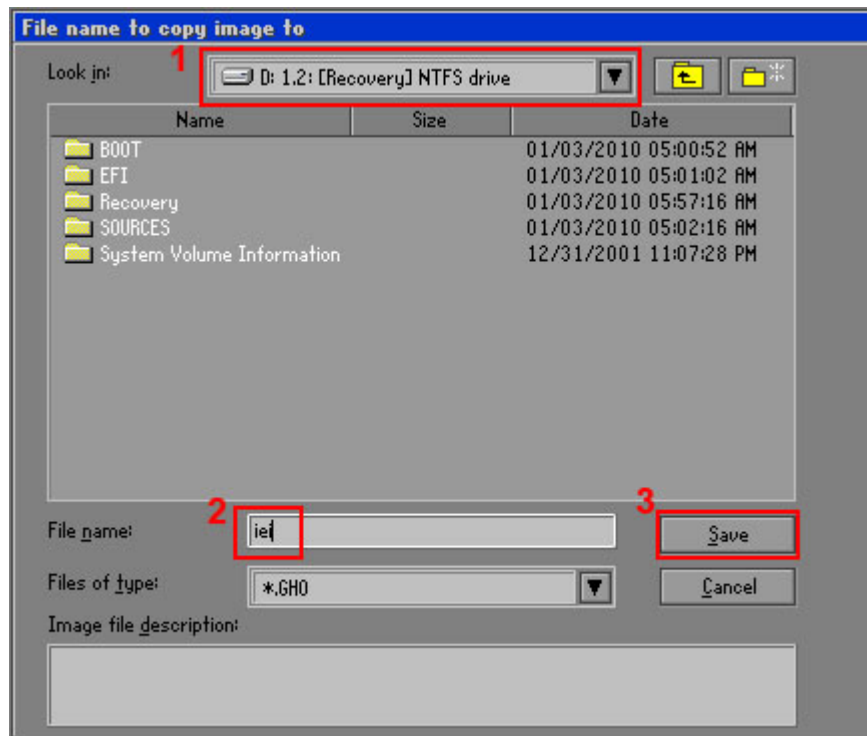


Figure B-16: File Name to Copy Image to

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

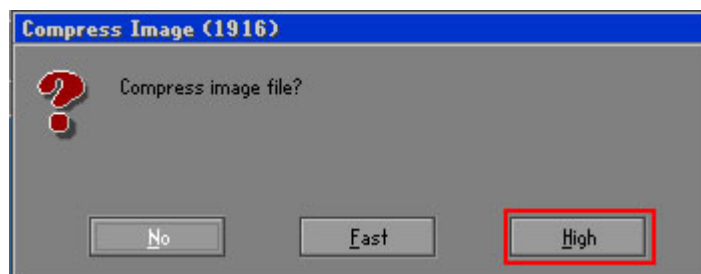
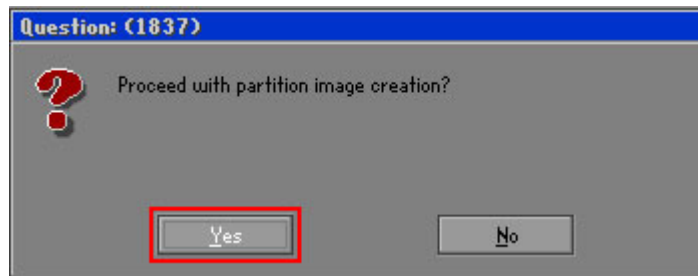


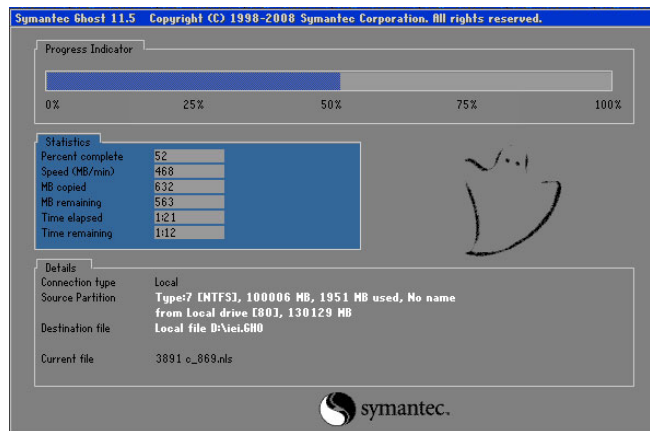
Figure B-17: Compress Image

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



**Figure B-18: Image Creation Confirmation**

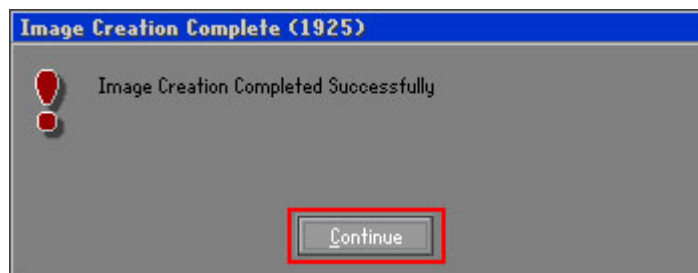
**Step 10:** The Symantec Ghost starts to create the factory default image (**Figure B-19**).



**Figure B-19: Image Creation Complete**

**Step 11:** When the image creation completes, a screen prompts as shown in **Figure B-20**.

Click **Continue** and close the Ghost window to exit the program.



**Figure B-20: Image Creation Complete**

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

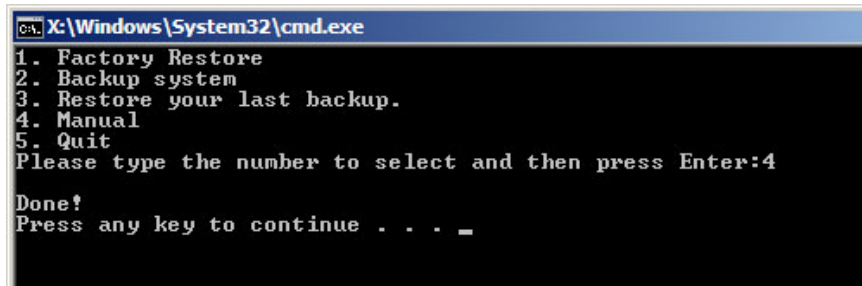


Figure B-21: Press Any Key to Continue

### B.3 Setup Procedure for Linux

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

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

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



#### NOTE:

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

While installing Linux OS, please create two partitions:

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

**NOTE:**

Please reserve enough space for partition 3 for saving recovery images.

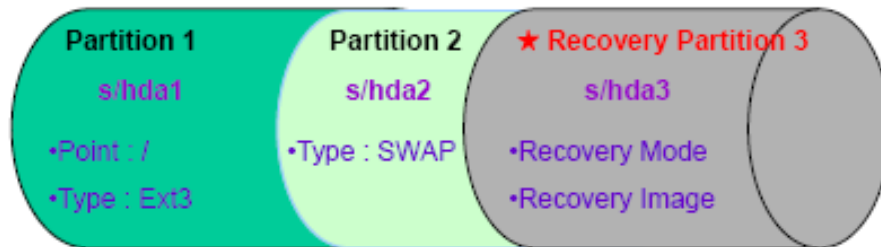


Figure B-22: Partitions for Linux

**Step 3: Create a recovery partition.** Insert the recovery CD into the optical disk drive.

Follow **Step 1 ~ Step 3** described in **Section B.2.2**. Then type the following commands (marked in red) to create a partition for recovery images.

```
system32>diskpart
DISKPART>list vol
DISKPART>sel disk 0
DISKPART>create part pri size= ____
DISKPART>assign letter=N
DISKPART>exit
system32>format N: /fs:ntfs /q /v:Recovery /y
system32>exit
```

**Step 4: Build-up recovery partition.** Press any key to boot from the recovery CD. It will take a while to launch the recovery tool. Please be patient. When the recovery tool setup menu appears, type <3> and press <Enter> (**Figure B-23**). The Symantec Ghost window appears and starts configuring the system to build-up a recovery partition. After completing the system configuration, press any key to reboot the system. Eject the recovery CD.

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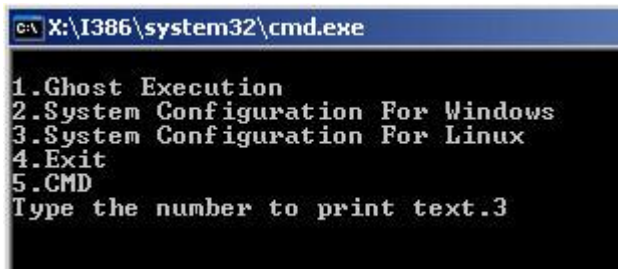


Figure B-23: System Configuration for Linux

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

```
cd /boot/grub
```

```
vi menu.lst
```

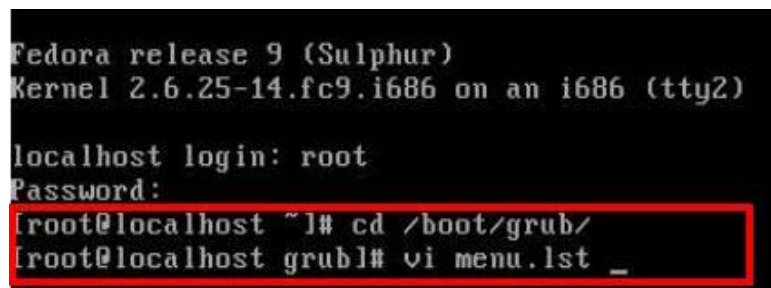


Figure B-24: Access menu.lst in Linux (Text Mode)

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



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

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

- Type command:  
title Recovery Partition  
root (hd0,2)  
makeactive  
chainloader +1

**Step 7:** The recovery tool menu appears. (Figure B-25)

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

Figure B-25: Recovery Tool Menu

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

## B.4 Recovery Tool Functions

After completing the initial setup procedures as described above, users can access the recovery tool by pressing **<F3>** while booting up the system. The main menu of the recovery tool is shown below.

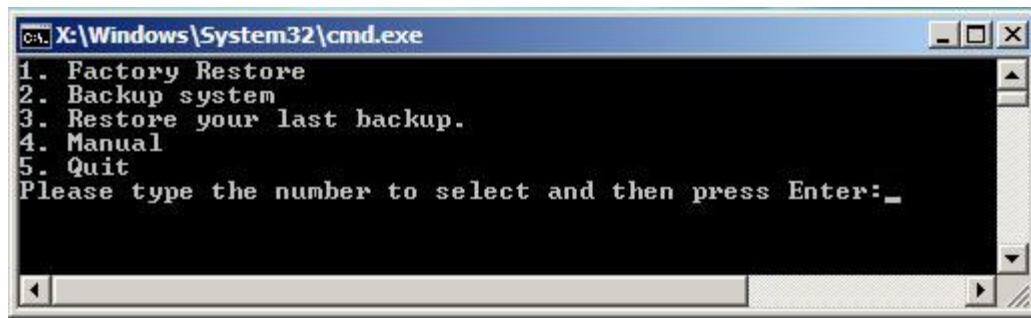


Figure B-26: Recovery Tool Main Menu

The recovery tool has several functions including:

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

**WARNING:**

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

**WARNING:**

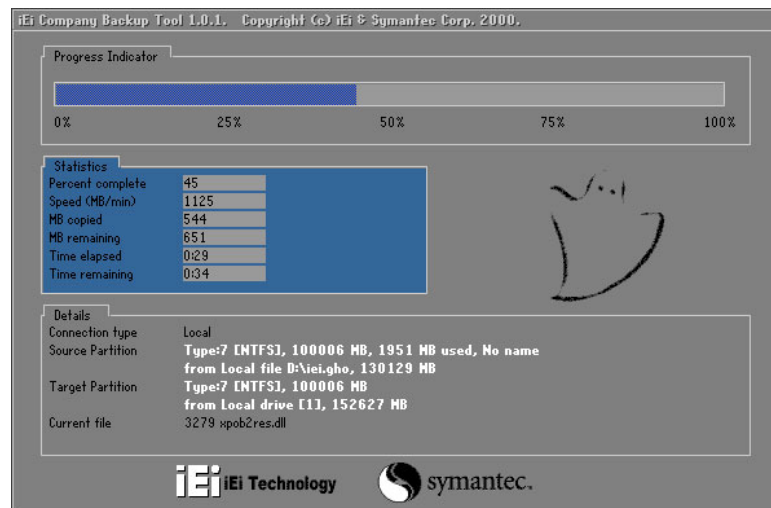
All data in the system will be deleted during the system recovery. Please backup the system files before restoring the system (either Factory Restore or Restore Backup).

### B.4.1 Factory Restore

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

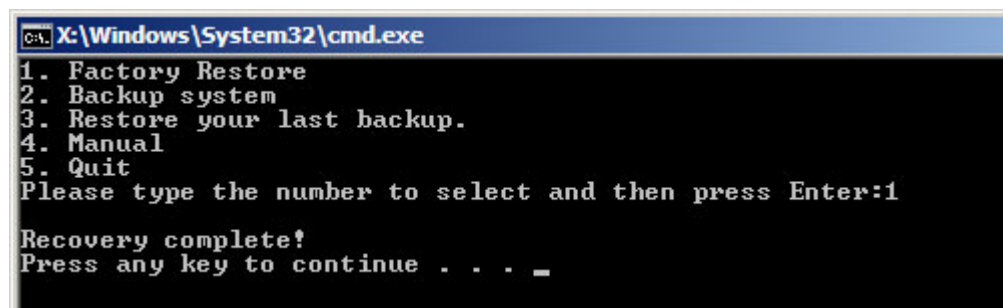
**Step 1:** Type <1> and press <Enter> in the main menu.

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



**Figure B-27: Restore Factory Default**

**Step 3:** The screen is shown as in **Figure B-28** when completed. Press any key to reboot the system.



**Figure B-28: Recovery Complete Window**

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### B.4.2 Backup System

To backup the system, please follow the steps below.

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

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

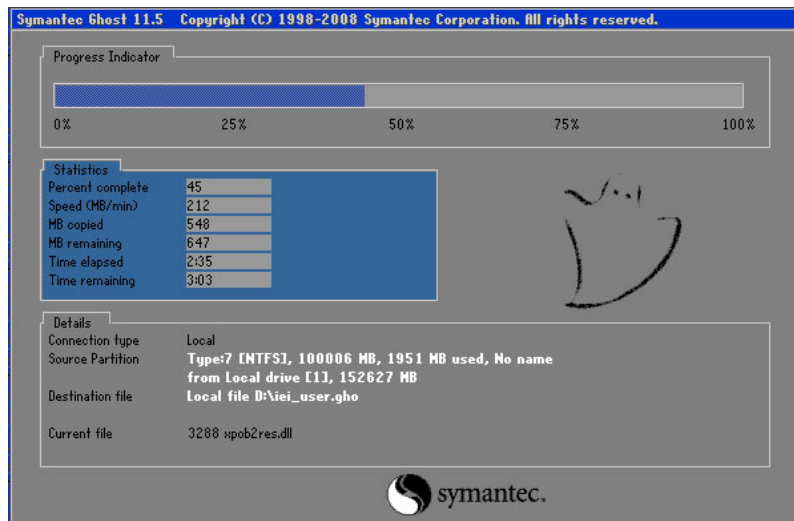


Figure B-29: Backup System

**Step 3:** The screen is shown as in **Figure B-30** when system backup is completed.

Press any key to reboot the system.

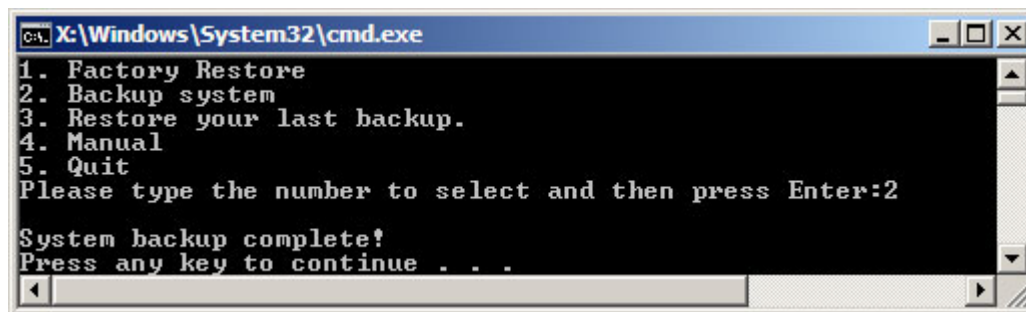


Figure B-30: System Backup Complete Window

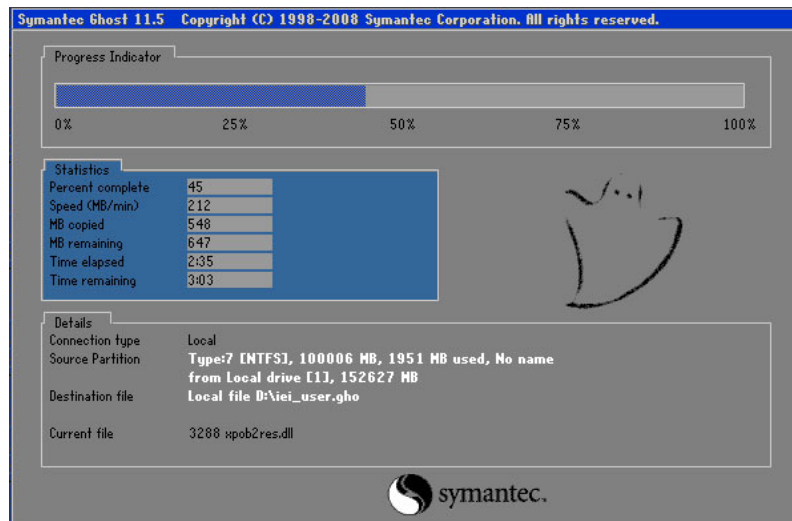


### B.4.3 Restore Your Last Backup

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

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

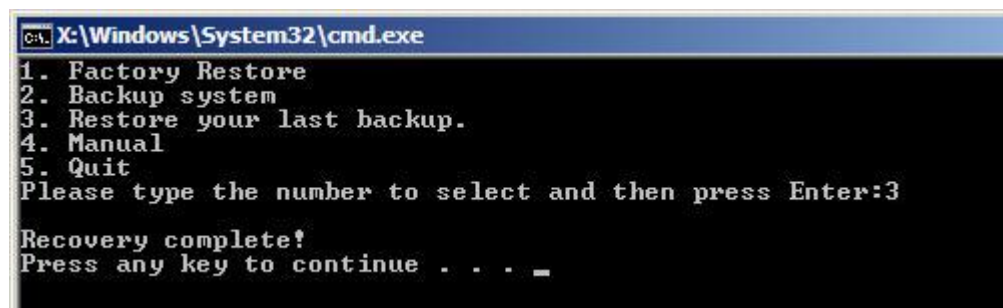
**Step 2:** The Symantec Ghost window appears and starts to restore the last backup image (iei\_user.GHO).



**Figure B-31: Restore Backup**

**Step 3:** The screen is shown as in **Figure B-32** when backup recovery is completed.

Press any key to reboot the system.



**Figure B-32: Restore System Backup Complete Window**



## KINO-PVN-D5251/D4251/ Mini ITX SBC

### B.4.4 Manual

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

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

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

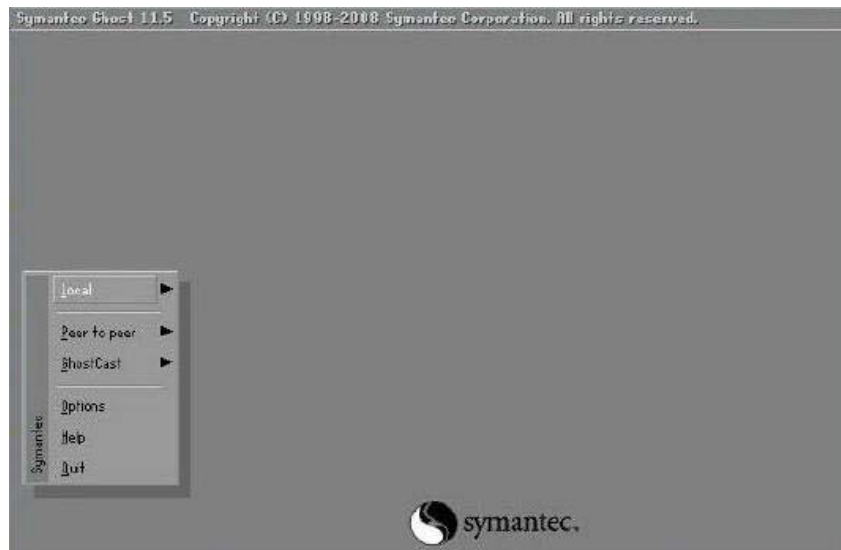


Figure B-33: Symantec Ghost Window

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

## B.5 Other Information

### B.5.1 Using AHCI Mode or ALi M5283 / VIA VT6421A Controller

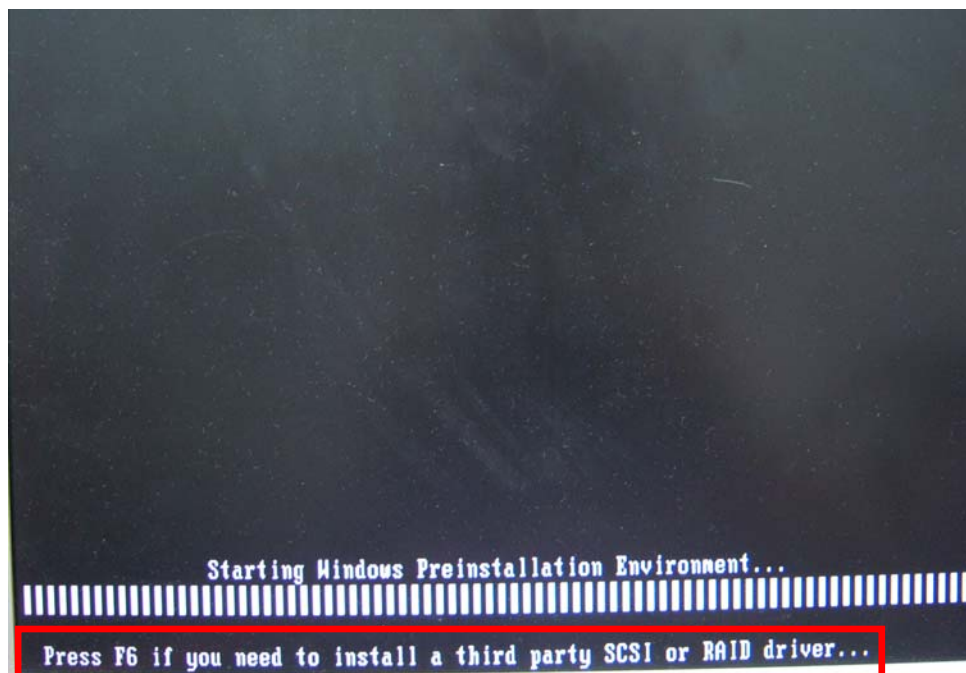
When the system uses AHCI mode or some specific SATA controllers such as ALi M5283 or VIA VT6421A, the SATA RAID/AHCI driver must be installed before using one key recovery. Please follow the steps below to install the SATA RAID/AHCI driver.

**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.

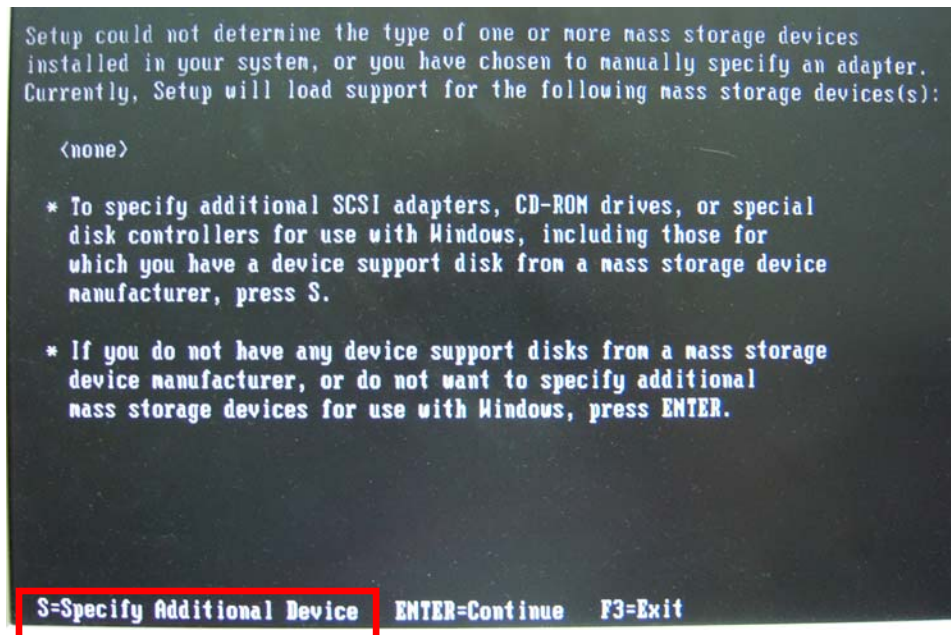
**Step 3:** Insert the One Key Recovery CD into the system and boot the system from the CD.

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

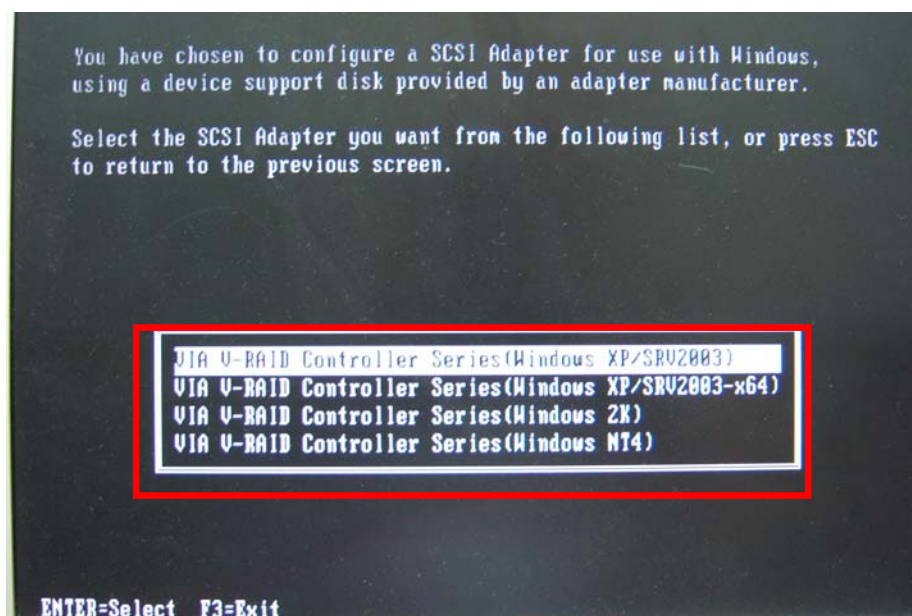


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**Step 5:** When the following window appears, press <S> to select “Specify Additional Device”.



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



**Step 7:** After pressing <Enter>, the system will get into the recovery tool setup menu.

Continue to follow the setup procedure from **Step 4** in **Section B.2.2 Create Partitions** to finish the whole setup process.

### B.5.2 System Memory Requirement

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

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



## Appendix

## C

# Terminology

---



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

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

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

Appendix

**D**

# Digital I/O Interface

---

## D.1 Introduction

The DIO connector on the KINO-PVN-D5251/D4251 is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.



### NOTE:

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

## D.2 DIO Connector Pinouts

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

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

**Table D-1: Digital I/O Connector Pinouts**



## **D.3 Assembly Language Samples**

### **D.3.1 Enable the DIO Input Function**

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

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

### **D.3.2 Enable the DIO Output Function**

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

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

## Appendix

# E

# Watchdog Timer



### NOTE:

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

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

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

INT 15H:

#### AH – 6FH Sub-function:

AL – 2:	Sets the Watchdog Timer's period.
---------	-----------------------------------

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AH – 6FH Sub-function:	
BL:	Time-out value (Its unit-second is dependent on the item “Watchdog Timer unit select” in CMOS setup).

**Table E-1: AH-6FH Sub-function**

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

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



### NOTE:

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

### EXAMPLE PROGRAM:

**; INITIAL TIMER PERIOD COUNTER**

;

**W\_LOOP:**

;

```

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

```

;

**; ADD THE APPLICATION PROGRAM HERE**

;

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

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

;
; EXIT ;
```

Appendix

F

# Hazardous Materials Disclosure

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

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

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

Please refer to the table on the next page.

## KINO-PVN-D5251/D4251/ Mini ITX SBC

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
<p>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</p> <p>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</p>						

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	XXXX	O	O	O	O	XXXX
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
<p>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。</p> <p>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。</p>						