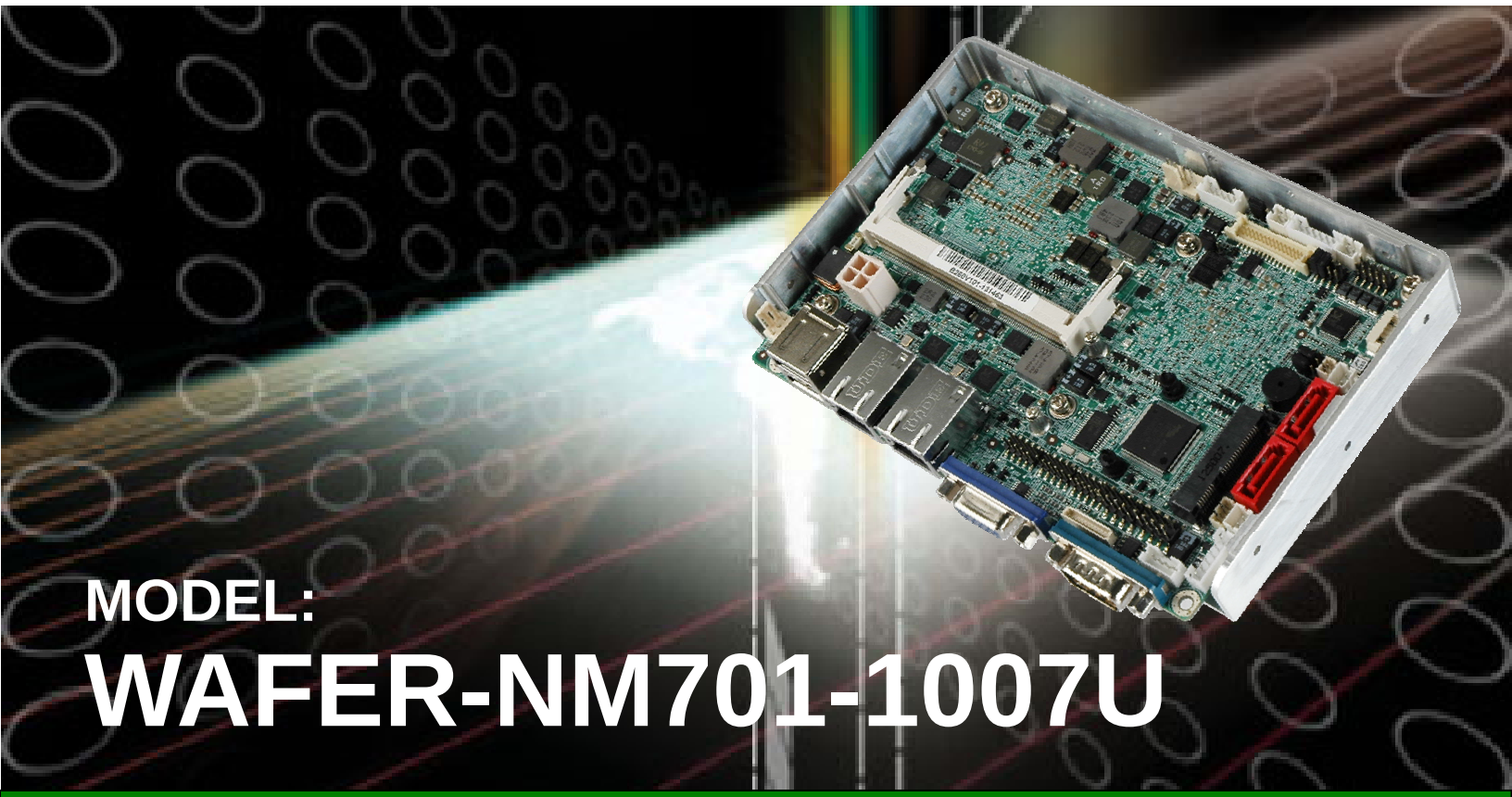
IEI Integration Corp.



MODEL:

WAFER-NM701-1007U

3.5" SBC with Intel® Mobile Celeron® 1007U CPU and Intel® NM70 Chipset, DDR3, VGA, LVDS, Dual PCIe GbE, USB 2.0, mSATA, SATA 3Gb/s, Audio and RoHS

User Manual

Rev. 1.02 – August 27, 2015

RoHS Lead Free

Revision

Date	Version	Changes
August 27, 2015	1.02	Updated Section 1.4: Dimensions Updated Section 4.5: Chassis Installation
October 22, 2013	1.01	Changed the model name from WAFER-NM701-847 to WAFER-NM701-1007U Updated the CPU spec
2 April, 2013	1.00	Initial release

Copyright

COPYRIGHT NOTICE

The information in this document is subject to change without prior notice in order to improve reliability, design and function and does not represent a commitment on the part of the manufacturer.

In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation, even if advised of the possibility of such damages.

TRADEMARKS

All registered trademarks and product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective owners.

Manual Conventions

WARNING

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously.

CAUTION

Cautionary messages should be heeded to help reduce the chance of losing data or damaging the product.

NOTE

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes.

HOT SURFACE

This symbol indicates a hot surface that should not be touched without taking care.

Table of Contents

List of Figures

List of Tables

BIOS Menus

Chapter

1

Introduction

1.1 Introduction

Figure 1-1: WAFER-NM701-1007U

The WAFER-NM701-1007U is a 3.5” SBC with an Intel® mobile Celeron® 1007U processor and Intel® NM70 Express Chipset. It supports one 1333 MHz or 1066 MHz DDR3 SO-DIMM memory and dual display output, including one VGA and one LVDS. With the heat sink enclosure design, the WAFER-NM701-1007U is ideal for easy fanless assembly solution.

The WAFER-NM701-1007U provides one PCIe Mini card slot which is compatible with mSATA SSD storage. Other expansion options include two SATA 3Gb/s connectors, four serial ports, six USB 2.0 ports and one audio connector.

1.2 Features

Some of the WAFER-NM701-1007U motherboard features are listed below:

- 3.5” form factor
- On-board Intel® mobile Celeron® 1007U processor (dual-core, 1.5 GHz)
- Intel® NM70 Express Chipset
- Supports one 1333/1066 MHz DDR3 SO-DIMM (up to 8 GB)
- VGA and LVDS interfaces for dual display
- PCIe Mini card slot with mSATA support

- Dual GbE
- Complete I/O with two SATA 3Gb/s, four COM, six USB 2.0 and audio
- RoHS compliant

1.3 Connectors

The connectors on the WAFER-NM701-1007U are shown in the figure below.

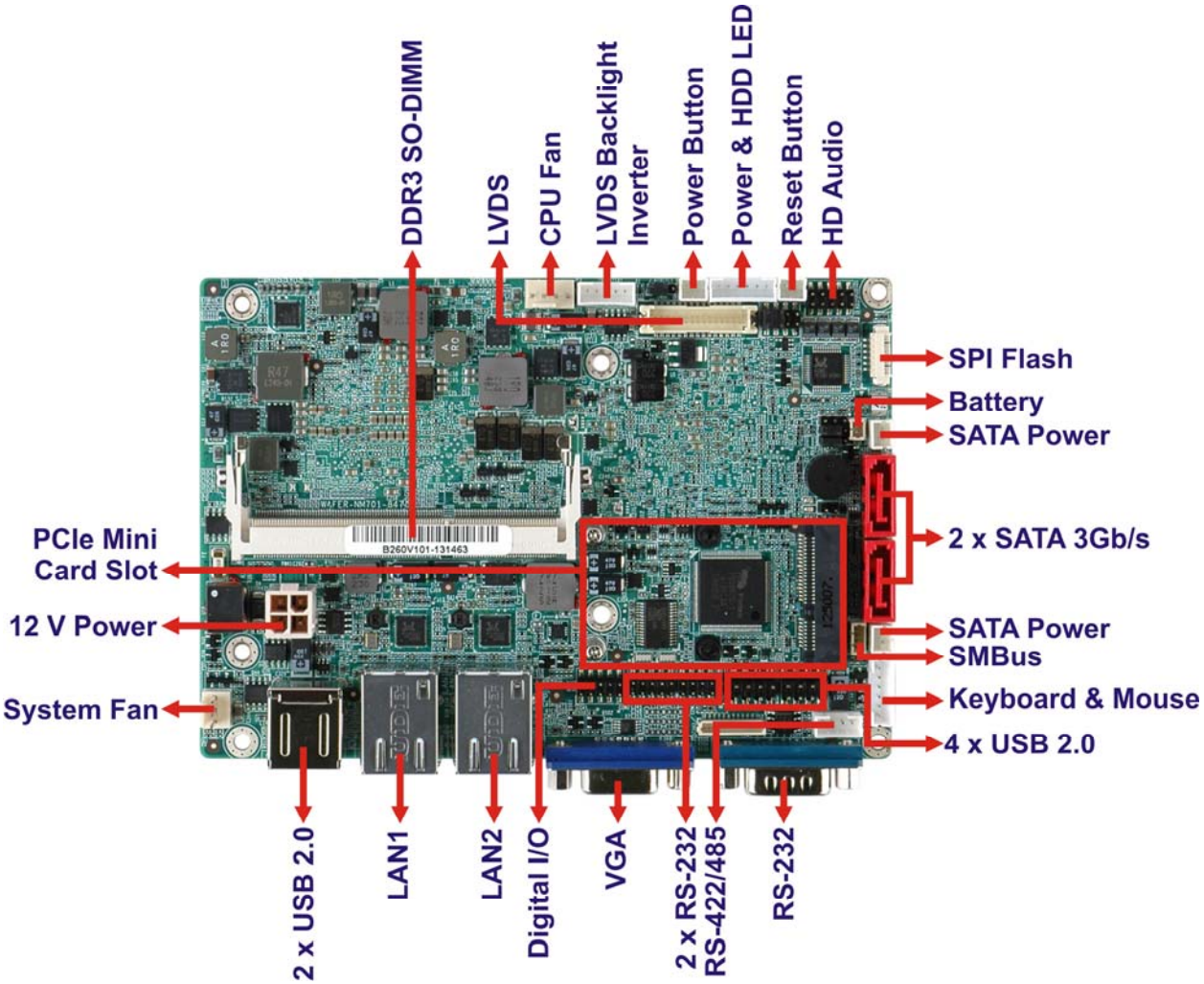
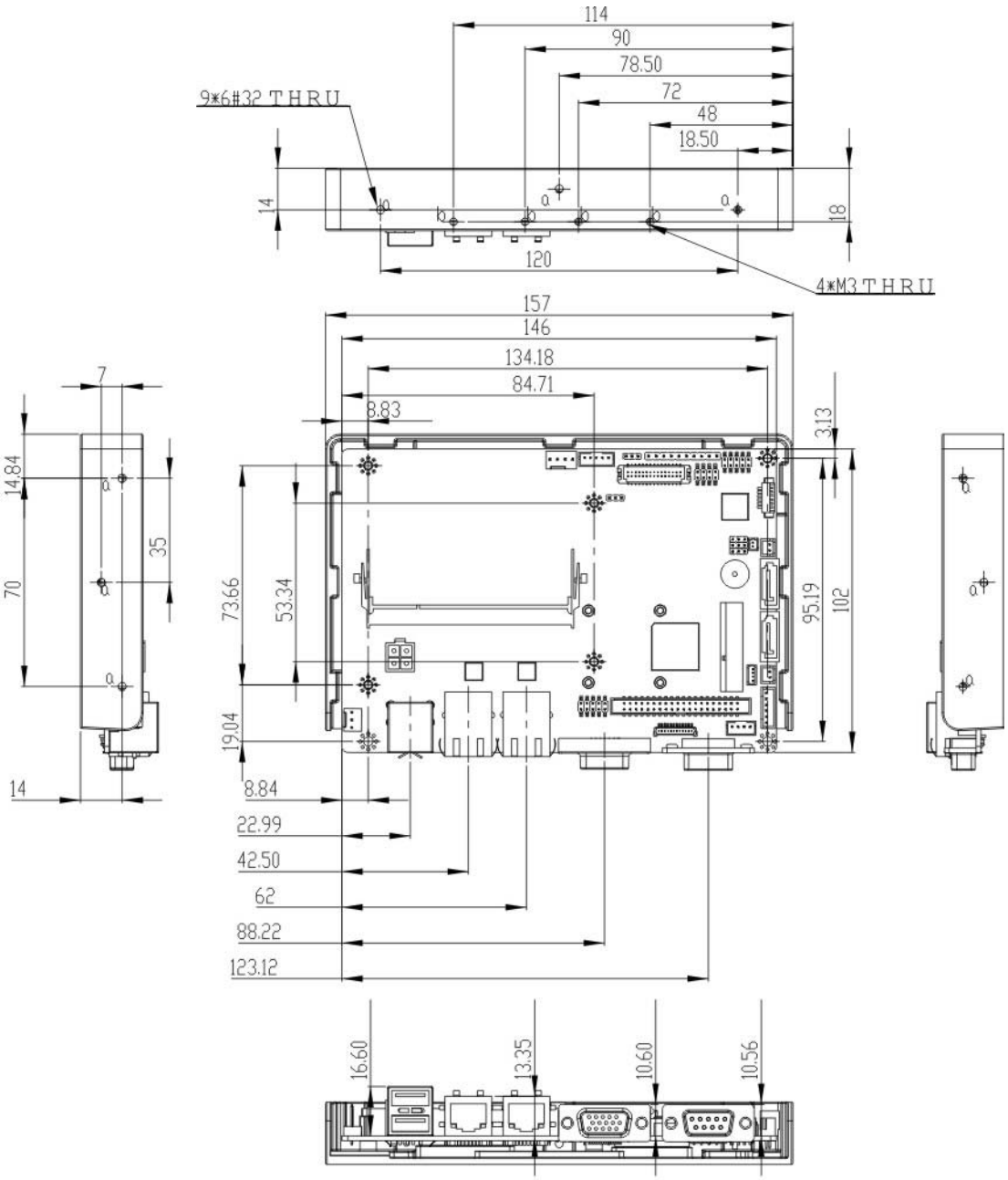


Figure 1-2: Connectors

1.4 Dimensions

The main dimensions of the WAFER-NM701-1007U are shown in the diagram below.



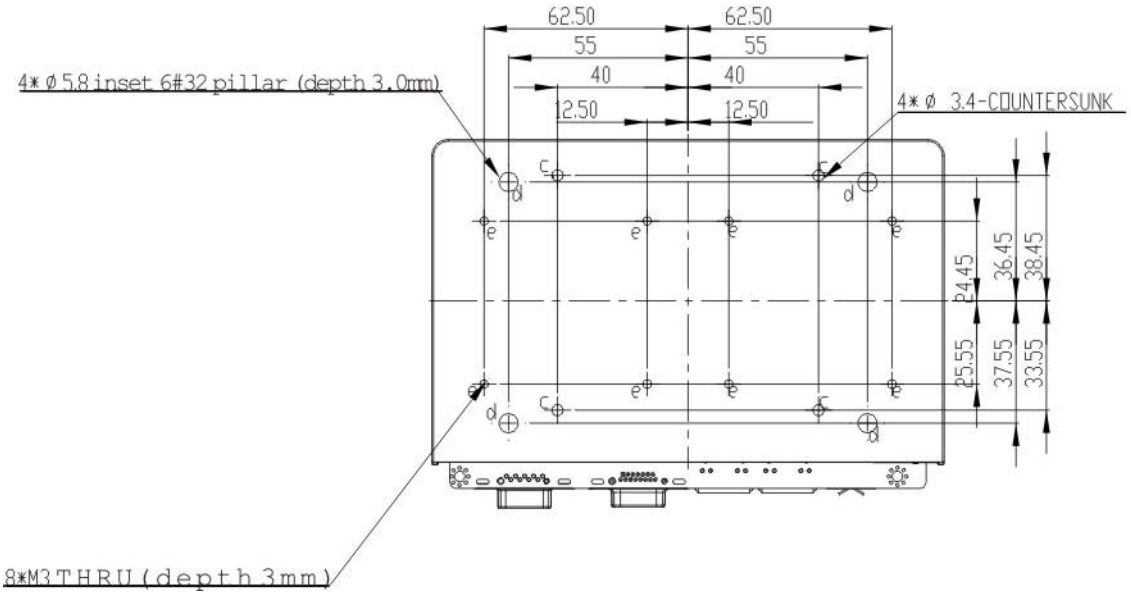


Figure 1-3: WAFER-NM701-1007U Dimensions (mm)

.

1.5 Data Flow

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

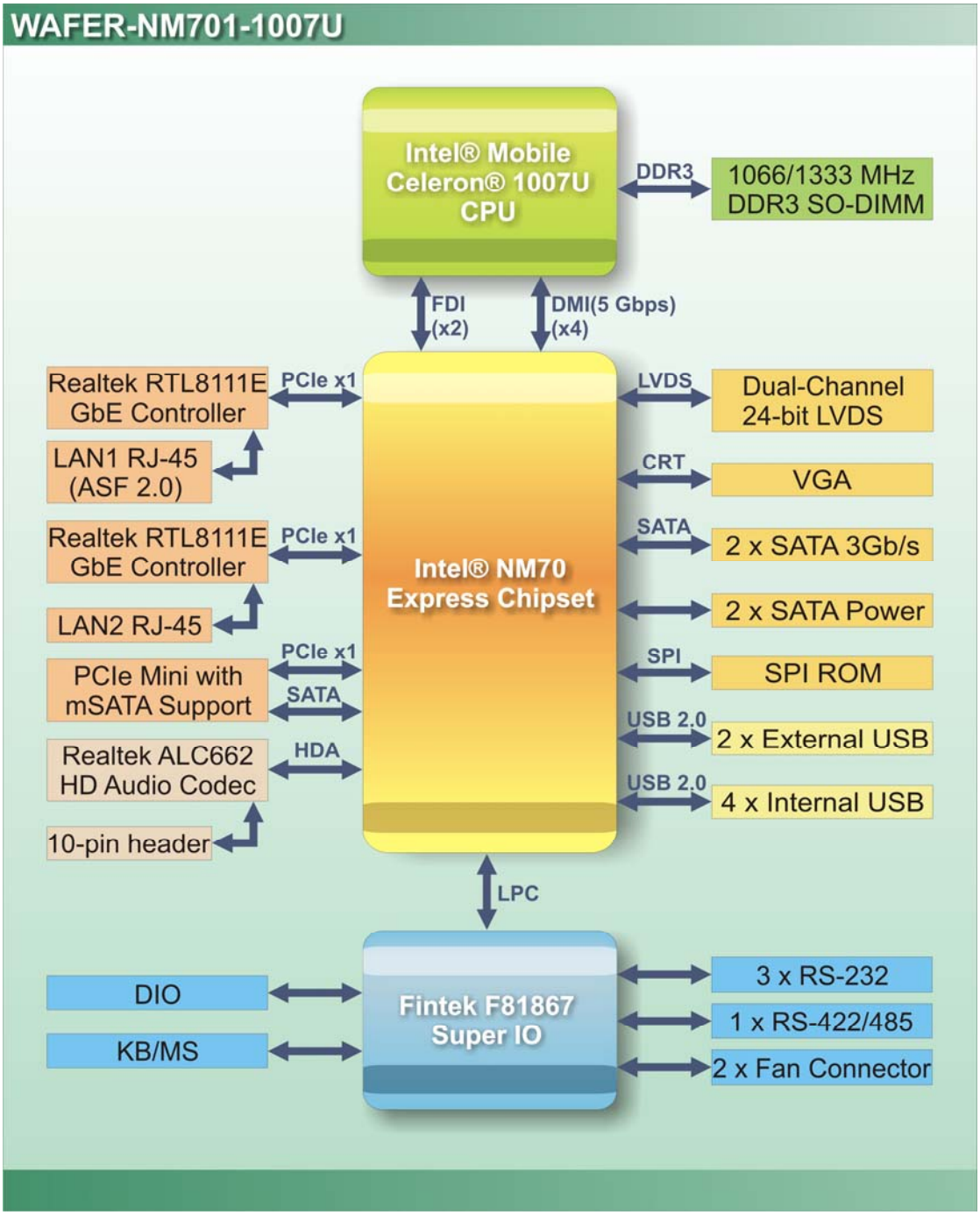


Figure 1-4: Data Flow Diagram

1.6 Technical Specifications

The WAFER-NM701-1007U technical specifications are listed below.

Specification/Model	WAFER-NM701-1007U
Form Factor	3.5”
System CPU	1.5 GHz Intel® mobile Celeron® 1007U dual-core CPU
Express Chipset	Intel® NM70
Memory	One 204-pin 1333/1066 MHz DDR3 SO-DIMM support (up to 8 GB)
Graphics Engine	Intel® HD Graphics Gen 6 with DirectX 10.1 and OpenGL 3.0 support Full MPEG-2, VC1, AVC decoding
Display	Dual display output support VGA is integrated in the Intel® NM70 Express Chipset (2048x1536@75MHz) 24-bit dual-channel LVDS is integrated in the Intel® NM70 Express Chipset (1920x1600@60MHz)
Ethernet	Dual Realtek RTL8111E PCIe GbE controller (LAN1 with ASF 2.0 support)
BIOS	UEFI BIOS
Super I/O Controller	Fintek F81867
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansions	One full-size/half-size PCIe Mini card slot with mSATA support
Audio	Realtek ALC662 HD Audio codec One 10-pin header
COM	Three RS-232 (one by external connector; two by on-board pin headers) One RS-422/485 by internal 4-pin wafer connector
Digital I/O	One 8-bit digital input/output connector (4-bit input/4-bit output)
Fan	One 4-pin CPU fan connector One 3-pin system fan connector
Keyboard/Mouse	One internal 6-pin wafer connector
SATA	Two SATA 3Gb/s ports with 5 V power

Specification/Model	WAFER-NM701-1007U
SMBus	One 4-pin wafer connector
USB	Six USB 2.0/1.1 devices supported: Two by external connectors Four by on-board pin headers
Power Supply	12 V only AT and ATX support One internal 4-pin (2x2) power connector
Power Consumption	12V @ 2.72A (1.5 GHz Intel® mobile Celeron® 1007U CPU with 8 GB 1333 MHz DDR3 SO-DIMM memory)
Operating Temperature	-10ºC ~ 60ºC
Storage Temperature	-20ºC ~ 85ºC
Humidity (Operating)	5% ~ 95% (non-condensing)
Dimensions (LxW)	146 mm x 102 mm
Weight (GW/NW)	600 g/250 g

Table 1-1: WAFER-NM701-1007U Specifications

Chapter

2

Packing List

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 WAFER-NM701-1007U 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 WAFER-NM701-1007U was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The WAFER-NM701-1007U is shipped with the following components:

Quantity	Item and Part Number	Image
1	WAFER-NM701-1007U motherboard with heat sink enclosure	
2	SATA and power cable (**P/N**: 32801-000201-100-RS)	
2	Plastic shaft for securing a half-size PCIe Mini card (**P/N**: 43124-0010C2-01-RS)	
1	Audio cable (**P/N**: 32000-072100-RS)	
1	RS-232 cable (**P/N**: 32200-000049-RS)	
1	PS/2 KB/MS Y-cable (**P/N**: 32000-023800-RS)	

Quantity	Item and Part Number	Image
1	Power cable (**P/N**: 32100-087100-RS)	
1	Mini jumper pack	
1	One Key Recovery CD	
1	Utility CD	
1	Quick Installation Guide	

Table 2-1: Packing List

2.4 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
Dual-port USB cable (**P/N**: 32001-002700-200-RS)	
RS-232 cable (**P/N**: 32200-000049-RS)	
RS-422/485 cable (200 mm) (**P/N**: 32205-003800-100-RS)	

Table 2-2: Optional Items

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the jumpers and connectors.

3.1.1 WAFER-NM701-1007U Layout

The figure below shows all the connectors and jumpers.

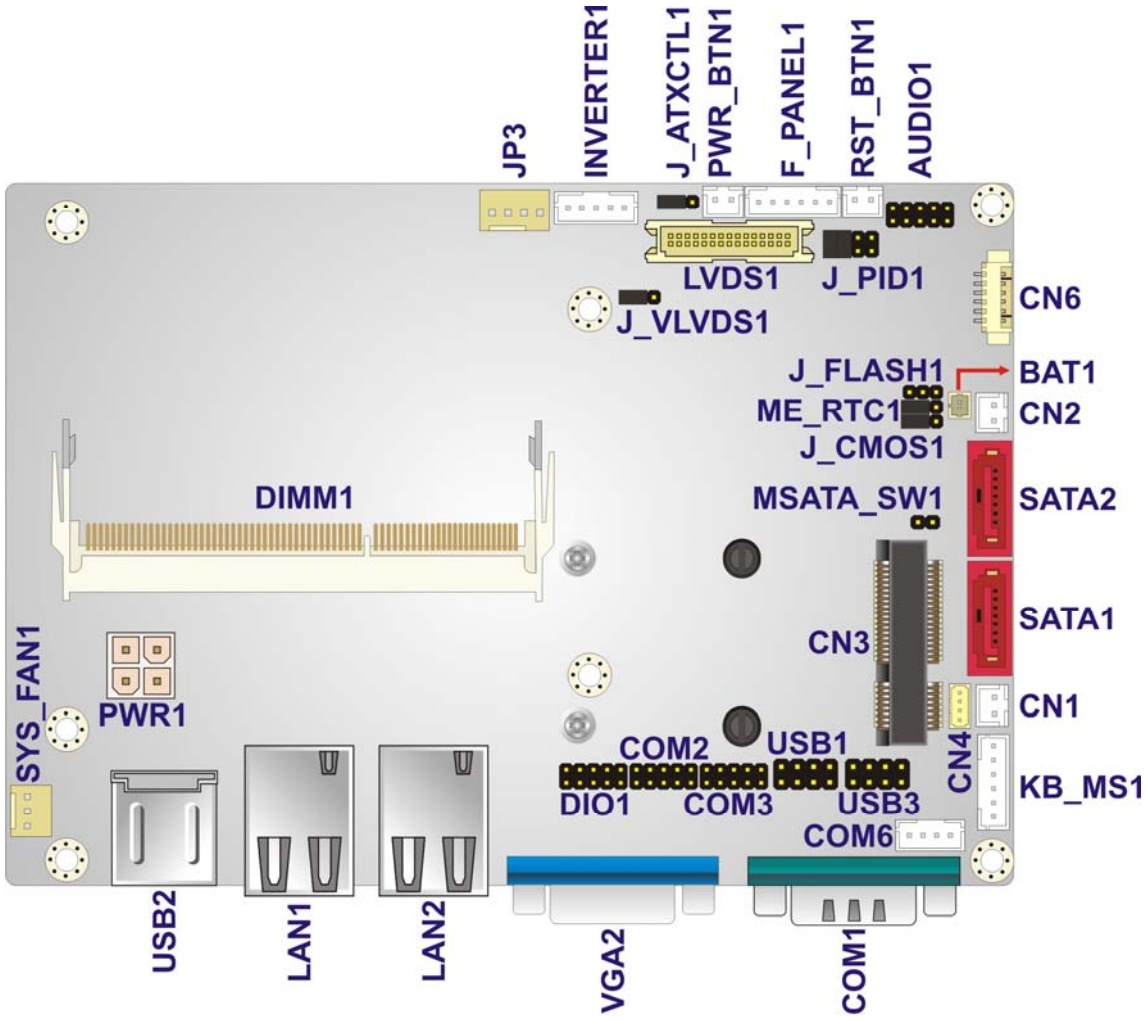


Figure 3-1: Connectors and Jumpers

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
5 V SATA power connectors	2-pin wafer	CN1, CN2
12 V power connector	4-pin Molex power connector	PWR1
Audio connector	10-pin header	AUDIO1
Backlight inverter connector	5-pin wafer	INVERTER1
Battery connector	2-pin wafer	BAT1
Digital Input/Output (DIO) connector	10-pin header	DIO1
Fan connector (CPU)	4-pin wafer	JP3
Fan connector (system)	3-pin wafer	SYS_FAN1
Keyboard and mouse connector	6-pin wafer	KB_MS1
LVDS connector	30-pin crimp	LVDS1
PCIe Mini card slot	52-pin PCIe Mini	CN3
Power & HDD LED connector	6-pin wafer	F_PANEL1
Power button connector	2-pin wafer	PWR_BTN1
Reset button connector	2-pin wafer	RST_BTN1
RS-232 serial port connectors	10-pin header	COM2, COM3
RS-422/485 serial port connector	4-pin wafer	COM6
SATA 3Gb/s drive connectors	7-pin SATA	SATA1, SATA2
SMBus connector	4-pin wafer	CN4
SO-DIMM connector	204-pin SO-DIMM connector	DIMM1
SPI flash connector	6-pin wafer	CN6
USB 2.0 connectors	8-pin header	USB1, USB3

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

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

Connector	Type	Label
Dual USB port	Dual USB port	USB2
Ethernet connectors	RJ-45	LAN1, LAN2
RS-232 serial port connector	Male DB-9	COM1
VGA connector	15-pin female	VGA2

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the WAFER-NM701-1007U.

3.2.1 5 V SATA Power Connectors

CN Label: **CN1, CN2**

CN Type: 2-pin wafer

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

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

Use the 5 V SATA power connectors to connect to SATA device power connection.

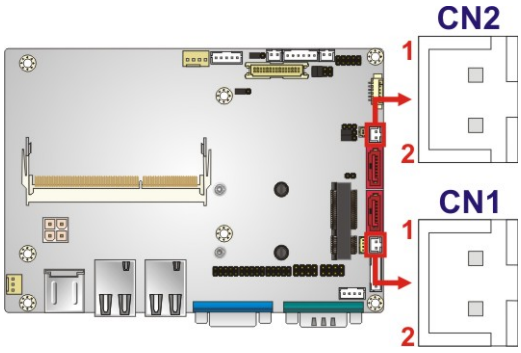


Figure 3-2: 5 V SATA Power Connector Locations

Pin No.	Description
1	+V5S
2	Ground

Table 3-3: 5 V SATA Power Connector Pinouts

3.2.2 12 V Power Connector

CN Label: **PWR1**

CN Type: 4-pin Molex power connector

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

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

The power connector is connected to an external power supply and supports 12V power input. Power is provided to the system, from the power supply through this connector.

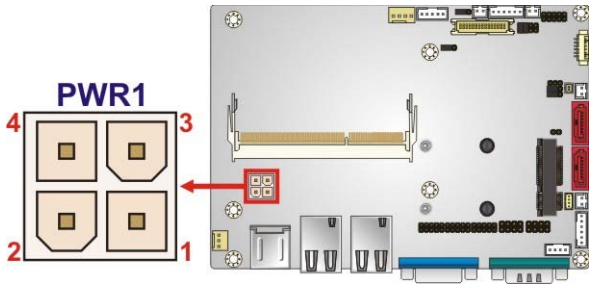


Figure 3-3: 12 V Power Connector Location

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

Table 3-4: 12 V Power Connector Pinouts

3.2.3 Audio Connector

CN Label: **AUDIO1**

CN Type: 10-pin header

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

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

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

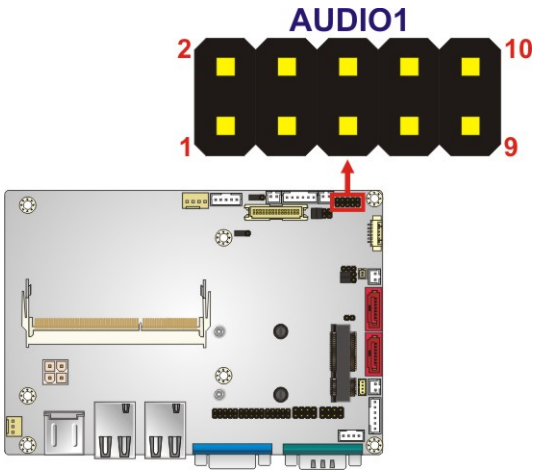


Figure 3-4: Audio Connector Location

Pin	Description	Pin	Description
1	LFRONT-R	2	LLINE-R
3	GND	4	GND
5	LFRONT-L	6	LLINE-L
7	GND	8	GND
9	LMIC1-CONN-R	10	LMIC1-CONN-L

Table 3-5: Audio Connector Pinouts

3.2.4 Backlight Inverter Connector

CN Label: **INVERTER1**

CN Type: 5-pin wafer

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

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

The backlight inverter connector provides the backlight on the LCD display connected to the WAFER-NM701-1007U with +12V of power.

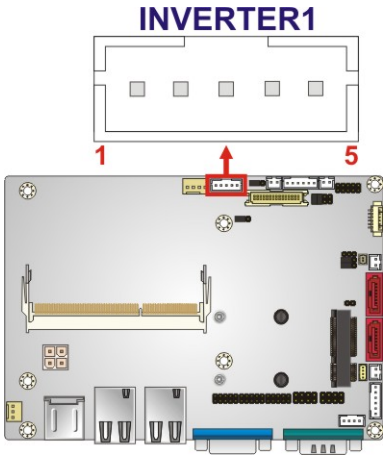


Figure 3-5: Backlight Inverter Connector Location

Pin	Description
1	BRIGHTNESS
2	GND
3	+V12S_LCD_BKL
4	GND
5	ENABKL

Table 3-6: Backlight Inverter Connector Pinouts

3.2.5 Battery Connector

CAUTION:

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

Dispose of used batteries according to instructions and local regulations.

CN Label: **BAT1**

CN Type: 2-pin wafer

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

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

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

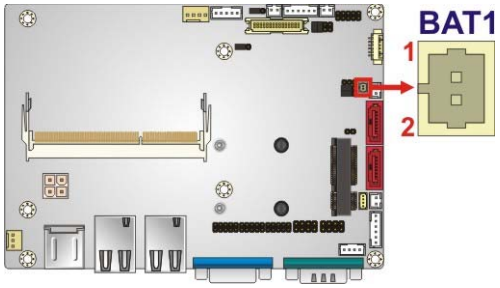


Figure 3-6: Battery Connector Location

Pin	Description
1	VBATT
2	GND

Table 3-7: Battery Connector Pinouts

3.2.6 Digital Input/Output (DIO) Connector

CN Label: **DIO1**

CN Type: 10-pin header

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

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

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

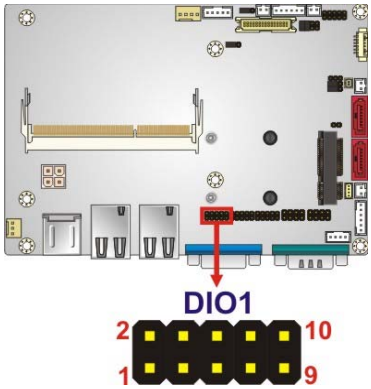


Figure 3-7: Digital I/O Connector Location

Pin	Description	Pin	Description
1	GND	2	+V5S
3	DOUT3	4	DOUT2
5	DOUT1	6	DOUT0
7	DIN3	8	DIN2
9	DIN1	10	DIN0

Table 3-8: Digital I/O Connector Pinouts

3.2.7 Fan Connector (CPU)

CN Label: **JP3**

CN Type: 4-pin wafer

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

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

The fan connector attaches to a CPU cooling fan.

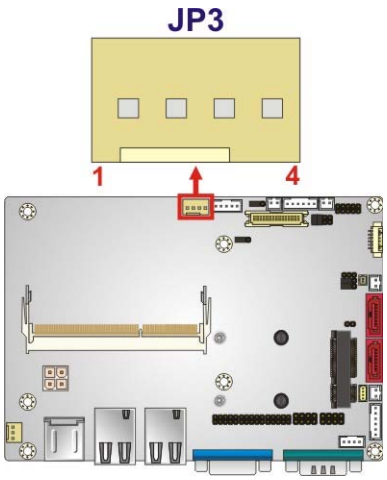


Figure 3-8: CPU Fan Connector Location

PIN NO.	DESCRIPTION
1	GND
2	+V12S
3	Rotation Signal
4	PWM Control Signal

Table 3-9: CPU Fan Connector Pinouts

3.2.8 Fan Connector (System)

CN Label:	**SYS_FAN1**
CN Type:	3-pin wafer
CN Location:	See **Figure 3-9**
CN Pinouts:	See **Table 3-10**

The fan connector attaches to a system cooling fan.

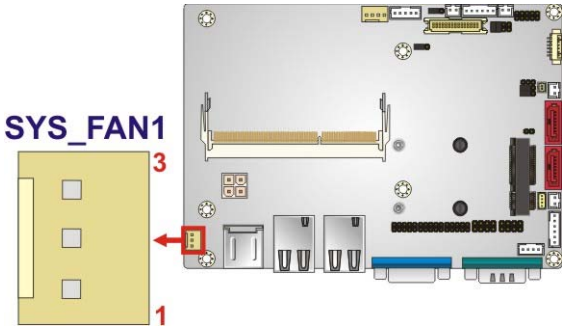


Figure 3-9: System Fan Connector Location

PIN NO.	DESCRIPTION
1	Rotation Signal
2	+12V
3	GND

Table 3-10: System Fan Connector Pinouts

3.2.9 Keyboard/Mouse Connector

CN Label:	**KB_MS1**
CN Type:	6-pin wafer
CN Location:	See **Figure 3-10**
CN Pinouts:	See **Table 3-11**

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

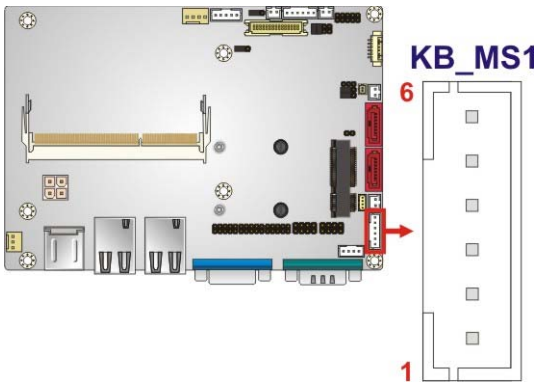


Figure 3-10: Keyboard/Mouse Connector Location

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

Table 3-11: Keyboard/Mouse Connector Pinouts

3.2.10 LVDS Connector

CN Label: **LVDS1**

CN Type: 30-pin crimp

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

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

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

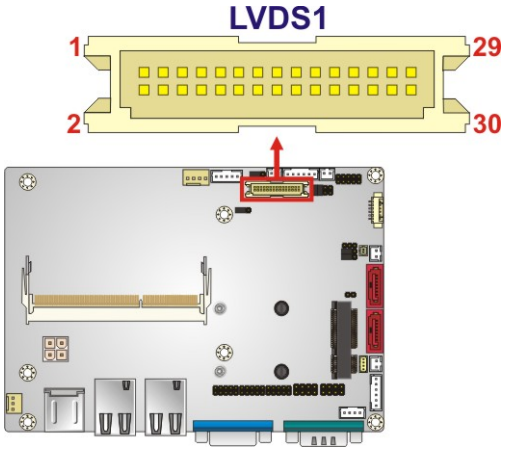


Figure 3-11: LVDS Connector Location

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

Table 3-12: LVDS1 Connector Pinouts

3.2.11 PCIe Mini Card Slot

CN Label: **CN3**

CN Type: 52-pin PCIe Mini card slot

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

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

The PCIe Mini card slot enables a full-size/half-size PCIe Mini expansion module to be connected to the board, such as a wireless LAN (WLAN) card or PCIe Mini disk on module (DOM) SSD card.

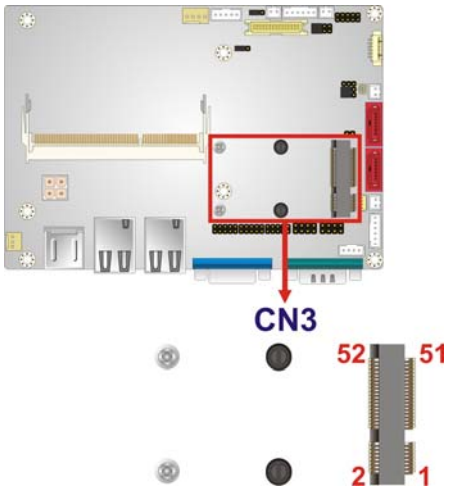


Figure 3-12: PCIe Mini Card Slot Location

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

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

Table 3-13: PCIe Mini Card Slot Pinouts

3.2.12 Power & HDD LED Connector

CN Label: **F_PANEL1**

CN Type: 6-pin wafer

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

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

The LED connector connects to an HDD indicator LED and a power LED on the system chassis to inform the user about HDD activity and the power on/off status of the system.

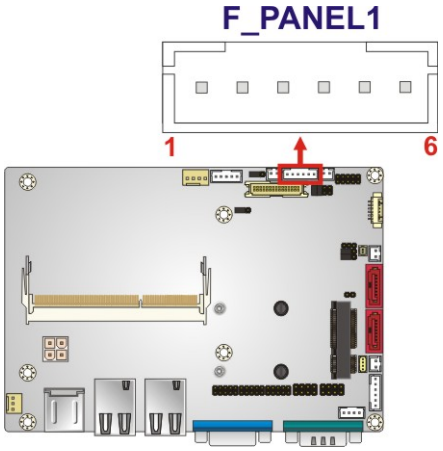


Figure 3-13: Power & HDD LED Connector Location

	Pin	Description
+5V	1	VCC
	2	GND
Power LED	3	POWER_LED+
	4	POWER_LED-
HDD LED	5	HDD_LED+
	6	HDD_LED-

Table 3-14: Power & HDD LED Connector Pinouts

3.2.13 Power Button Connector

CN Label: **PWR_BTN1**

CN Type: 2-pin wafer

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

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

The power button connector is connected to a power switch on the system chassis to enable users to turn the system on and off.

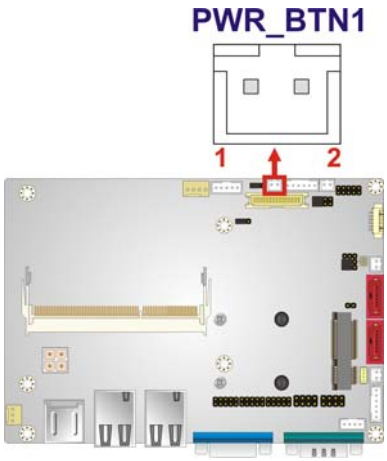


Figure 3-14: Power Button Connector Location

Pin	Description
1	PWR_BTN+
2	PWR_BTN-

Table 3-15: Power Button Connector Pinouts

3.2.14 Reset Button Connector

CN Label: **RST_BTN1**

CN Type: 2-pin wafer

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

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

The reset button connector is connected to a reset switch on the system chassis to enable users to reboot the system when the system is turned on.

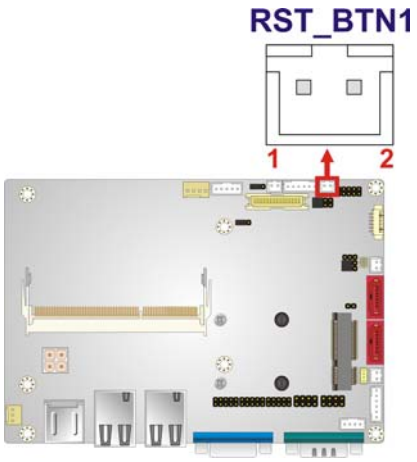


Figure 3-15: Reset Button Connector Location

Pin	Description
1	RESET+
2	RESET-

Table 3-16: Reset Button Connector Pinouts

3.2.15 RS-232 Serial Port Connectors

CN Label: **COM2, COM3**

CN Type: 10-pin header

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

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

Each of these connectors provides one RS-232 serial communications channel. The COM serial port connector can be connected to an external RS-232 serial port device.

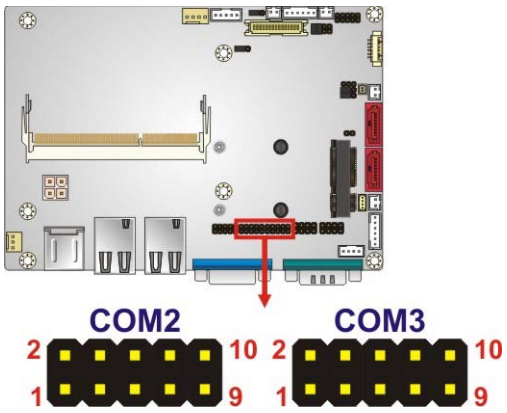


Figure 3-16: RS-232 Serial Port Connector Locations

Pin	Description	Pin	Description
1	-NDCD2	2	-NDSR2
3	NSIN2	4	-NRTS2
5	NSOUT2	6	-NCTS2
7	-NDTR2	8	-XRI2
9	GND	10	GND

Table 3-17: RS-232 Serial Port Connector Pinouts

3.2.16 RS-422/485 Serial Port Connector

CN Label: **COM6**

CN Type: 4-pin wafer

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

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

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

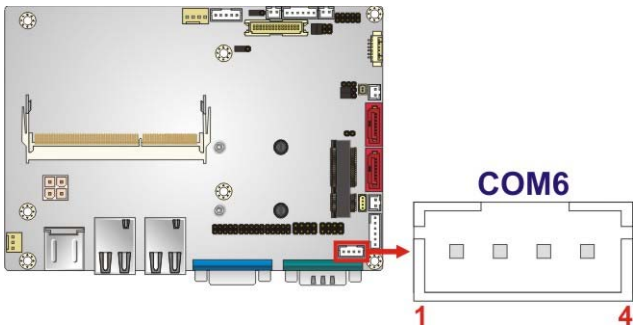


Figure 3-17: RS-422/485 Connector Location

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

Table 3-18: RS-422/485 Connector Pinouts

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

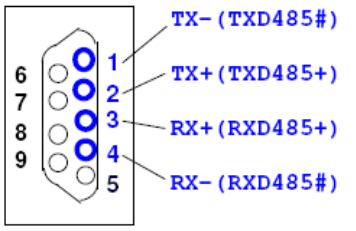
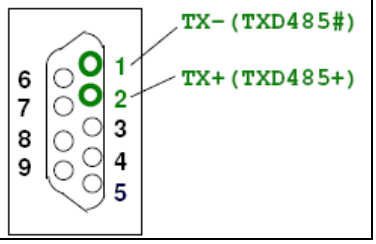
RS-422 Pinouts	RS-485 Pinouts
	

Table 3-19: DB-9 RS-422/485 Pinouts

3.2.17 SATA 3Gb/s Drive Connectors

CN Label: **SATA1, SATA2**

CN Type: 7-pin SATA drive connector

CN Location: See **Figure 3-18**

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

The SATA drive connectors can be connected to SATA drives and support up to 3Gb/s data transfer rate.

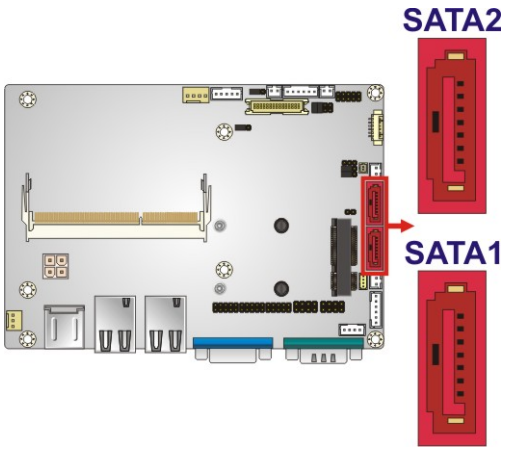


Figure 3-18: SATA Drive Connector Locations

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

Table 3-20: SATA Drive Connector Pinouts

3.2.18 SMBus Connector

CN Label: **CN4**

CN Type: 4-pin wafer

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

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

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

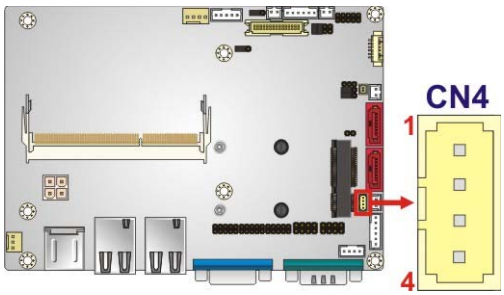


Figure 3-19: SMBus Connector Location

Pin	Description
1	GND
2	SMB_DATA
3	SMB_CLK
4	+V5S

Table 3-21: SMBus Connector Pinouts

3.2.19 SO-DIMM Connector

CN Label: **DIMM1**

CN Type: 204-pin DDR3 SO-DIMM connector

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

The SO-DIMM connector is for installing memory on the system.

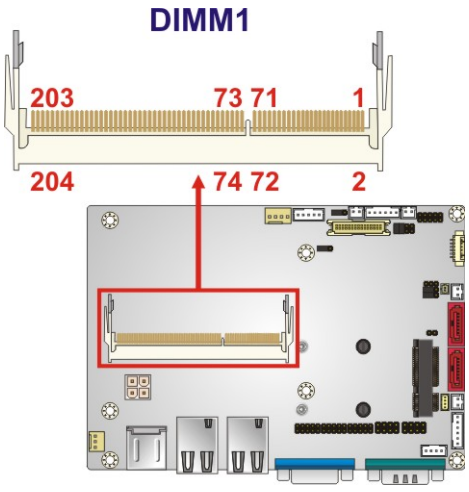


Figure 3-20: SO-DIMM Connector Location

3.2.20 SPI Flash Connector

CN Label: **CN6**

CN Type: 6-pin wafer

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

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

The SPI connector is used to flash the BIOS.

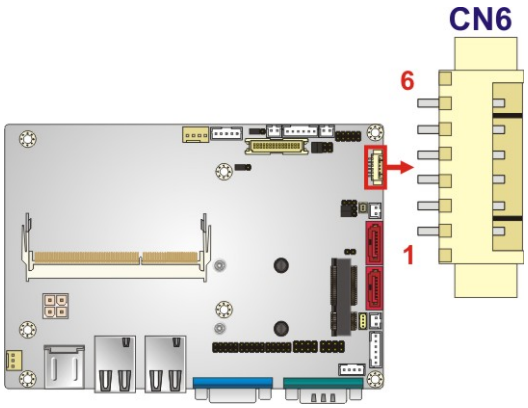


Figure 3-21: SPI Flash Connector Location

Pin	Description
1	+3.3V
2	SPI_CS
3	SPI_SO
4	SPI_CLK
5	SPI_SI
6	GND

Table 3-22: SPI Flash Connector Pinouts

3.2.21 USB Connectors

CN Label: **USB1, USB3**

CN Type: 8-pin header

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

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

Each USB connector provides connectivity to two USB 2.0/1.1 ports.

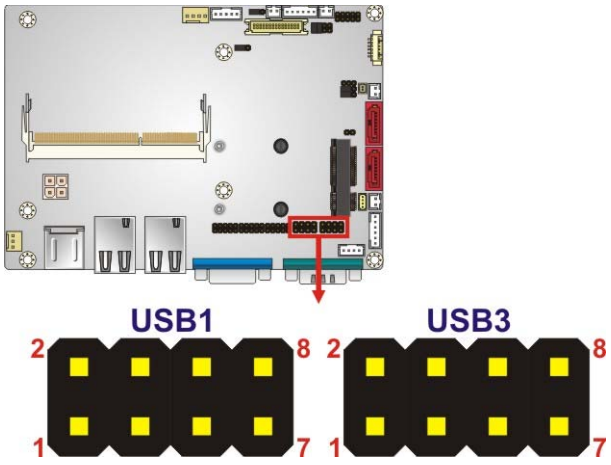


Figure 3-22: USB Connector Locations

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

Table 3-23: USB Connector Pinouts

3.3 External Peripheral Interface Connector Panel

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

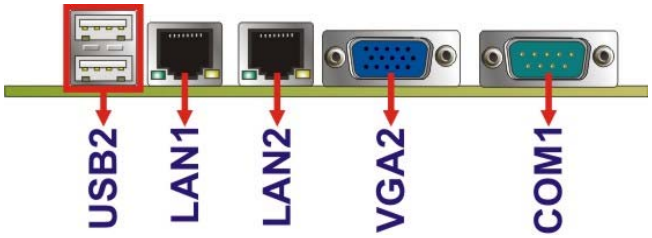


Figure 3-23: External Peripheral Interface Connector

3.3.1 Ethernet Connectors

CN Label: **LAN1, LAN2**

CN Type: RJ-45 connector

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

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

The WAFER-NM701-1007U is equipped with two built-in RJ-45 Ethernet controllers. Each controller can connect to the LAN through one RJ-45 LAN connector.

Pin	Description	Pin	Description
1	LAN1_MDI0+	5	LAN1_MDI2+
2	LAN1_MDI0-	6	LAN1_MDI2-
3	LAN1_MDI1+	7	LAN1_MDI3+
4	LAN1_MDI1-	8	LAN1_MDI3-

Table 3-24: LAN Pinouts

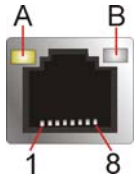


Figure 3-24: RJ-45 Ethernet Connector

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

Table 3-25: RJ-45 Ethernet Connector LEDs

3.3.2 RS-232 Serial Port Connector (COM1)

CN Label: **COM1**

CN Type: Male DB-9 connector

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

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

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

Pin	Description	Pin	Description
1	DATA CARRIER DETECT (DCD1)	6	DATA SET READY (DSR1)
2	RECEIVE DATA (RXD1)	7	REQUEST TO SEND (RTS1)
3	TRANSMIT DATA (TXD1)	8	CLEAR TO SEND (CTS1)
4	DATA TERMINAL READY (DTR1)	9	RING INDICATOR (RI1)
5	GND		

Table 3-26: RS-232 Serial Port (COM 1) Pinouts

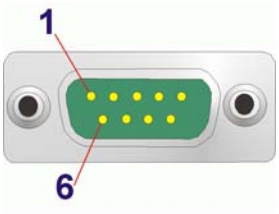


Figure 3-25: COM1 Pinout Locations

3.3.3 USB Connectors

CN Label: **USB2**

CN Type: Dual USB port

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

CN Pinouts: See **Table 3-27**

The ports connect to both USB 2.0 and USB 1.1 devices.

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

Table 3-27: USB Port Pinouts

3.3.4 VGA Connector

CN Label: **VGA2**

CN Type: 15-pin female

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

CN Pinouts: See **Figure 3-26** and **Table 3-28**

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

Pin	Description	Pin	Description
1	BR	2	BG
3	BB	4	NC
5	GND	6	CRT_PLUG#
7	GND	8	GND
9	CRT_VCC	10	GND
11	NC	12	5VDDCDA
13	5HSYNC	14	5VSYNC
15	5DDCCLK		

Table 3-28: VGA Connector Pinouts

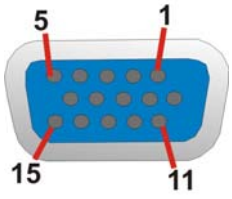


Figure 3-26: VGA Connector

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

Failure to take ESD precautions during the installation of the WAFER-NM701-1007U may result in permanent damage to the WAFER-NM701-1007U and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the WAFER-NM701-1007U. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the WAFER-NM701-1007U 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 WAFER-NM701-1007U, place it on an anti-static pad. This reduces the possibility of ESD damaging the WAFER-NM701-1007U.
- ***Only handle the edges of the PCB***:-: When handling the PCB, hold the PCB by the edges.

4.2 Installation Considerations

NOTE:

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

WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the components and injury to the user.

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

- Read the user manual:
  - The user manual provides a complete description of the WAFER-NM701-1007U 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 WAFER-NM701-1007U 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 WAFER-NM701-1007U off:
  - When working with the WAFER-NM701-1007U, 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 WAFER-NM701-1007U **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 SO-DIMM Installation

WARNING:

Using incorrectly specified SO-DIMM may cause permanent damage to the WAFER-NM701-1007U. Please make sure the purchased SO-DIMM complies with the memory specifications of the WAFER-NM701-1007U. SO-DIMM specifications compliant with the WAFER-NM701-1007U are listed in Chapter 1.

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

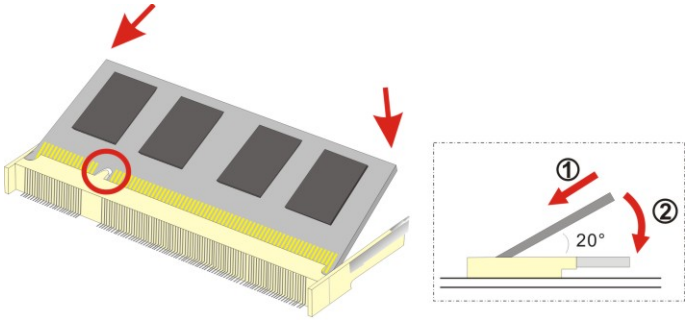


Figure 4-1: SO-DIMM Installation

Step 1: **Locate the SO-DIMM socket**. Place the WAFER-NM701-1007U on an anti-static pad with the solder side facing up.

Step 2: **Align the SO-DIMM with the socket**. The SO-DIMM must be oriented in such a way that the notch in the middle of the SO-DIMM must be aligned with the plastic bridge in the socket.

Step 3: **Insert the SO-DIMM**. Push the SO-DIMM chip into the socket at an angle. (See **Figure 4-1**)

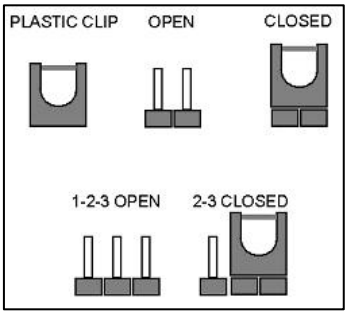
Step 4: **Open the SO-DIMM socket arms**. Gently pull the arms of the SO-DIMM socket out and push the rear of the SO-DIMM down. (See **Figure 4-1**)

Step 5: **Secure the SO-DIMM**. Release the arms on the SO-DIMM socket. They clip into place and secure the SO-DIMM in the socket.

4.4 Jumper Settings

NOTE:

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



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

Description	Label	Type
AT/ATX power selection	J_ATXCTL1	3-pin header
Clear CMOS	J_CMOS1	3-pin header
Clear ME RTC registers	ME_RTC1	3-pin header
Flash descriptor security override	J_FLASH1	3-pin header
LVDS panel resolution selection	J_PID1	8-pin header
LVDS voltage selection	J_VLVDS1	3-pin header
mSATA detecting mode selection	MSATA_SW1	2-pin header

Table 4-1: Jumpers

4.4.1 AT/ATX Power Selection Jumper

Jumper Label: **J_ATXCTL1**

Jumper Type: 3-pin header

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

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

The AT/ATX power selection jumper specifies the system power mode as AT or ATX.

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

Table 4-2: AT/ATX Power Selection Jumper Settings

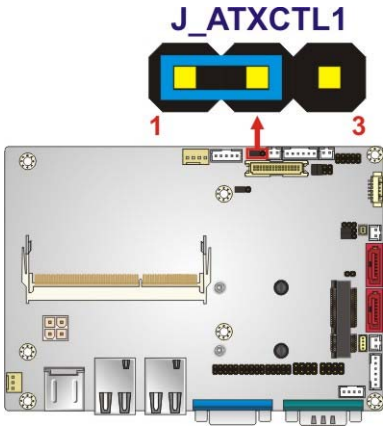


Figure 4-2: AT/ATX Power Selection Jumper Location

4.4.2 Clear CMOS Jumper

Jumper Label: **J_CMOS1**

Jumper Type: 3-pin header

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

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

To reset the BIOS, move the jumper to the "Clear BIOS" position for 3 seconds or more, and then move back to the default position.

Setting	Description
Short 1-2	Normal (Default)
Short 2-3	Clear BIOS

Table 4-3: Clear CMOS Jumper Settings

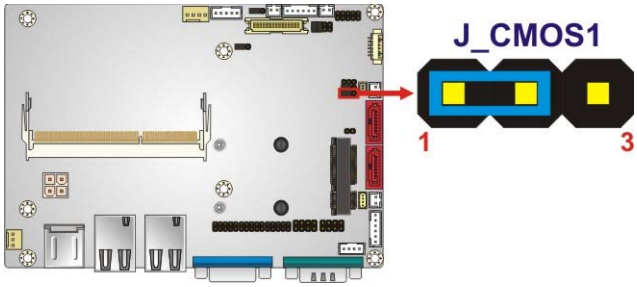


Figure 4-3: Clear CMOS Jumper Location

4.4.3 Clear ME RTC Registers Jumper

Jumper Label: **ME_RTC1**

Jumper Type: 3-pin header

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

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

This jumper allows resetting the RTC registers used for the Intel® Management Engine when the on-board battery is changed.

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

Table 4-4: Clear ME RTC Registers Jumper Settings

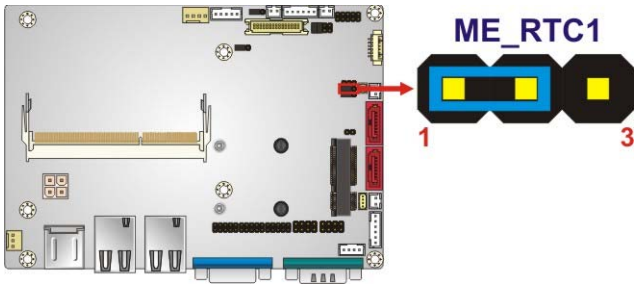


Figure 4-4: Clear ME RTC Registers Jumper Location

4.4.4 Flash Descriptor Security Override Jumper

Jumper Label: **J_FLASH1**

Jumper Type: 3-pin header

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

Jumper Location: See **Figure 4-5**

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

Setting	Description
Short 1-2	Disabled (Default)
Short 2-3	Enabled

Table 4-5: Flash Descriptor Security Override Jumper Settings

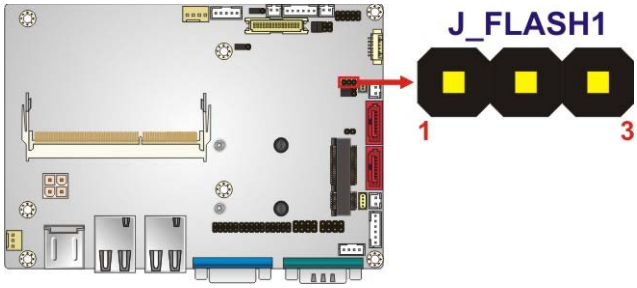


Figure 4-5: Flash Descriptor Security Override Jumper Location

4.4.5 LVDS Panel Resolution Selection Jumper

Jumper Label: **J_PID1**

Jumper Type: 8-pin header

Jumper Settings: See **Table 4-6**

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

Selects the resolution of the LCD panel connected to the LVDS connector.

Pin	Description
OPEN	640 X 480 (18-bit)
1-2	800 X 480 (18-bit)

Pin	Description
3-4	800 X 600 (18-bit)
1-2 & 3-4	1024 X 768 (18-bit) Default
5-6	1024 X 768 (24-bit)
1-2 & 5-6	1280 X 1024 (48-bit)
3-4 & 5-6	1600 X 1200 (48-bit)
1-2 & 3-4 & 5-6	1280 X 768 (18-bit)
7-8	1280 X 800 (18-bit)
1-2 & 7-8	1366 X 768 (24-bit)
3-4 & 7-8	1440 X 900 (48-bit)
1-2 & 3-4 & 7-8	1600 X 900 (48-bit)
5-6 & 7-8	1680 X 1050 (48-bit)
1-2 & 5-6 & 7-8	1920 X 1080 (48-bit)
3-4 & 5-6 & 7-8	1920 X 1200 (48-bit)
1-2 & 3-4 & 5-6 & 7-8	LVDS disabled

Table 4-6: LVDS Panel Resolution

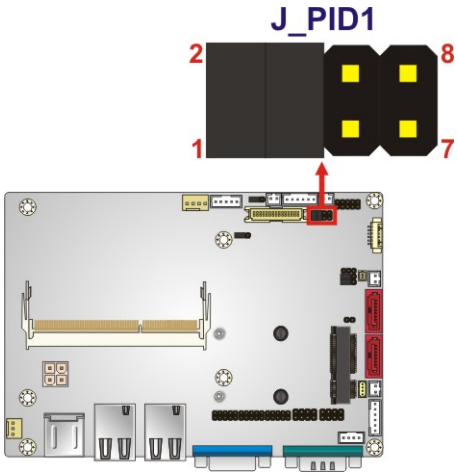


Figure 4-6: LVDS Panel Resolution Selection Jumper Location

4.4.6 LVDS Voltage Selection

WARNING:

Permanent damage to the screen and WAFER-NM701-1007U may occur if the wrong voltage is selected with this jumper. Please refer to the user guide that came with the monitor to select the correct voltage.

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

Sets the voltage provided to the monitor by LVDS.

Setting	Description
Short 1-2	3.3V (Default)
Short 2-3	5V

Table 4-7: LVDS Voltage Selection Jumper Settings

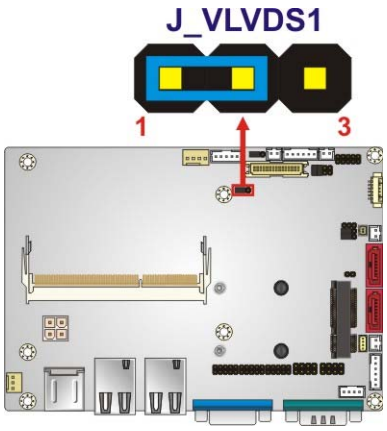


Figure 4-7: LVDS Voltage Selection Jumper Location

4.4.7 mSATA Detecting Mode Selection Jumper

Jumper Label:	**MSATA_SW1**
Jumper Type:	2-pin header
Jumper Settings:	See **Table 4-8**
Jumper Location:	See **Figure 4-8**

The jumper configures the PCIe Mini slot to automatically detect mSATA device or to force mSATA to be enabled.

Setting	Description
Open	Auto-detect mSATA device (Default)
Short 1-2	Enable mSATA

Table 4-8: mSATA Detecting Mode Selection Jumper Settings

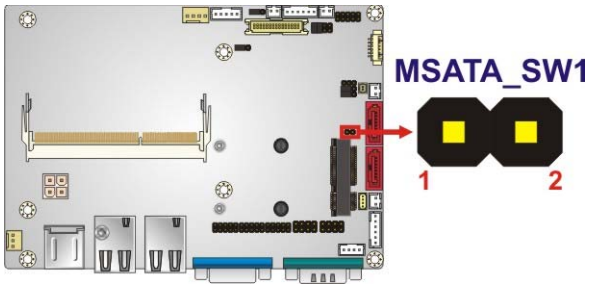


Figure 4-8: mSATA Detecting Mode Selection Jumper Location

4.5 Chassis Installation

4.5.1 Heat Sink Enclosure

WARNING:

Never run the WAFER-NM701-1007U without the heat sink enclosure secured to the board. The heat sink enclosure ensures the system remains cool and does not need addition heat sinks to cool the system.

WARNING:

When running the WAFER-NM701-1007U, do not put the WAFER-NM701-1007U directly on a surface that can not dissipate system heat, especially the wooden or plastic desk. It is highly recommended to run the WAFER-NM701-1007U

→ on a heat dissipation surface or

→ using copper pillars to hold the board up from the desk below

When the WAFER-NM701-1007U is shipped, it is secured to a heat sink enclosure with five retention screws. If the WAFER-NM701-1007U must be removed from the heat sink enclosure, the five retention screws must be removed.

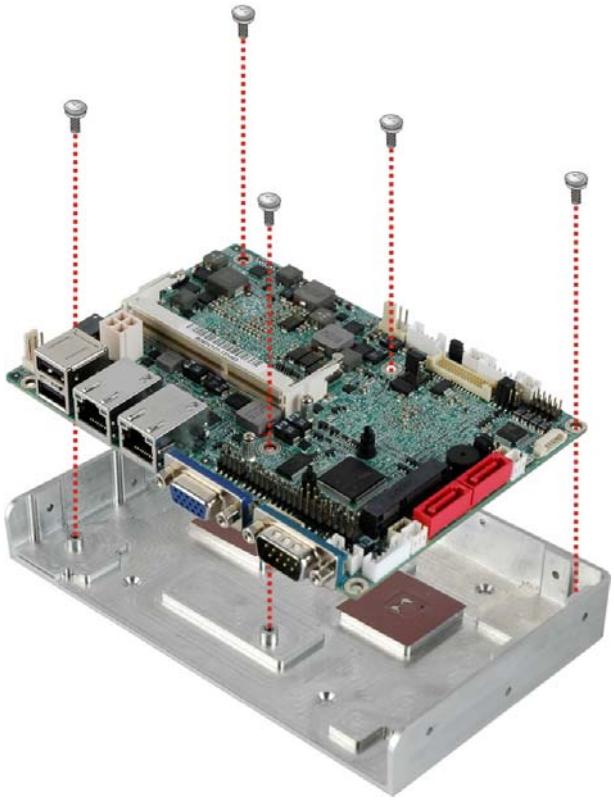


Figure 4-9: Heat Sink Enclosure Retention Screws

4.5.2 Motherboard Installation

Each side of the heat sink enclosure has several screw holes allowing the WAFER-NM701-1007U to be mounted into a chassis (please refer to **Figure 1-3** for the detailed dimensions). The user can design or select a chassis that has screw holes matching up with the holes on the heat sink enclosure for installing the WAFER-NM701-1007U. The following diagram shows an example of motherboard installation.

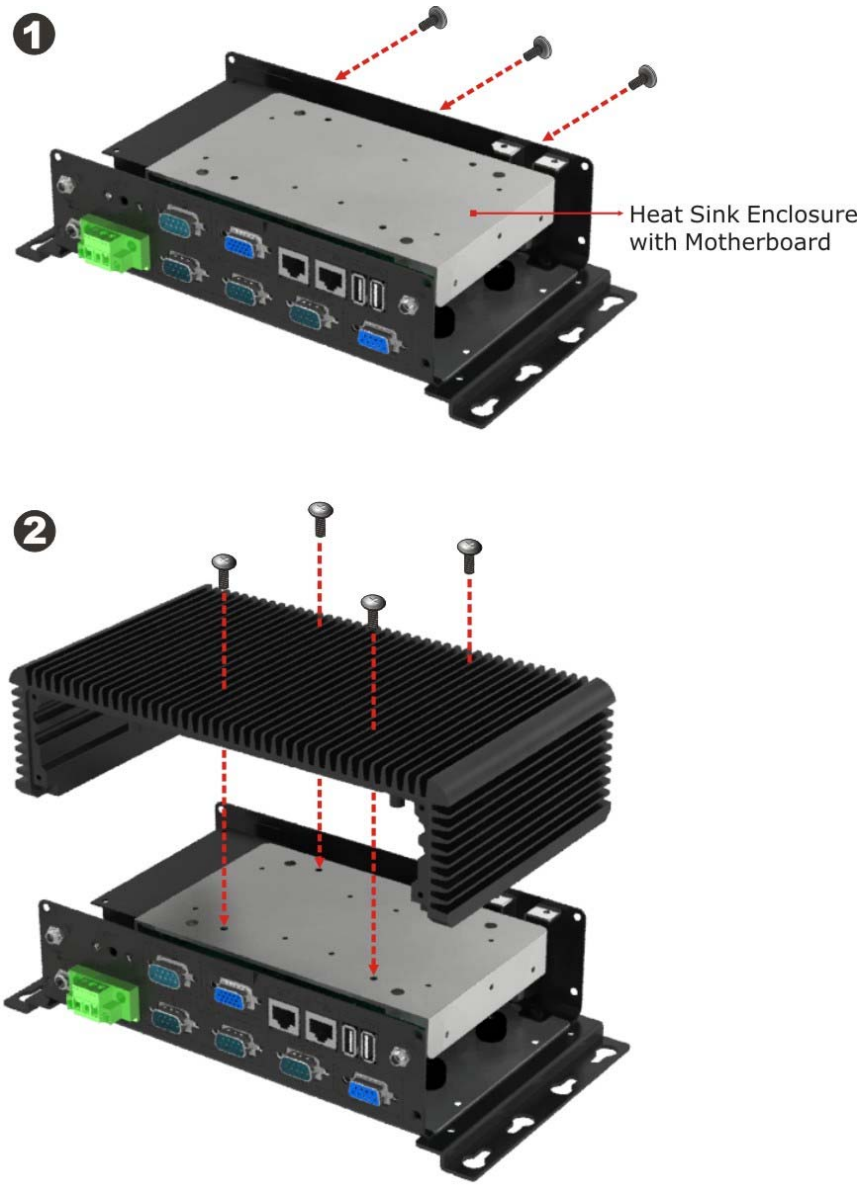


Figure 4-10: Motherboard Installation Example

4.6 Internal Peripheral Device Connections

This section outlines the installation of peripheral devices to the on-board connectors.

4.6.1 AT/ATX Power Connection

Follow the instructions below to connect the WAFER-NM701-1007U 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 WAFER-NM701-1007U.

Step 1: **Locate the power cable**. The power cable is shown in the packing list in **Chapter 2**.

Step 2: **Connect the Power Cable to the Motherboard**. Connect the 4-pin (2x2) Molex type power cable connector to the power connector on the motherboard. See **Figure 4-11**.

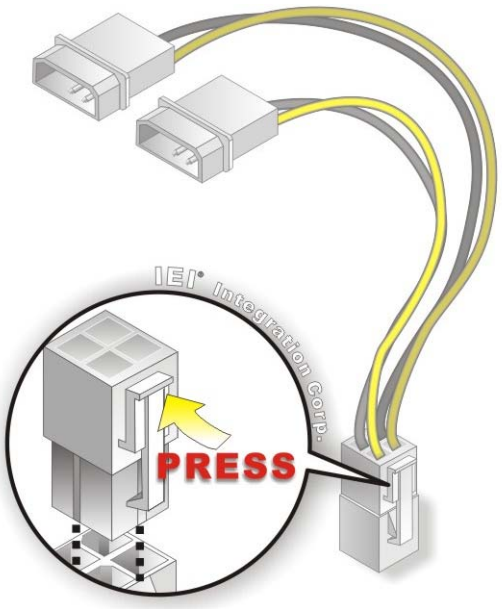


Figure 4-11: Power Cable to Motherboard Connection

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 4-12**.

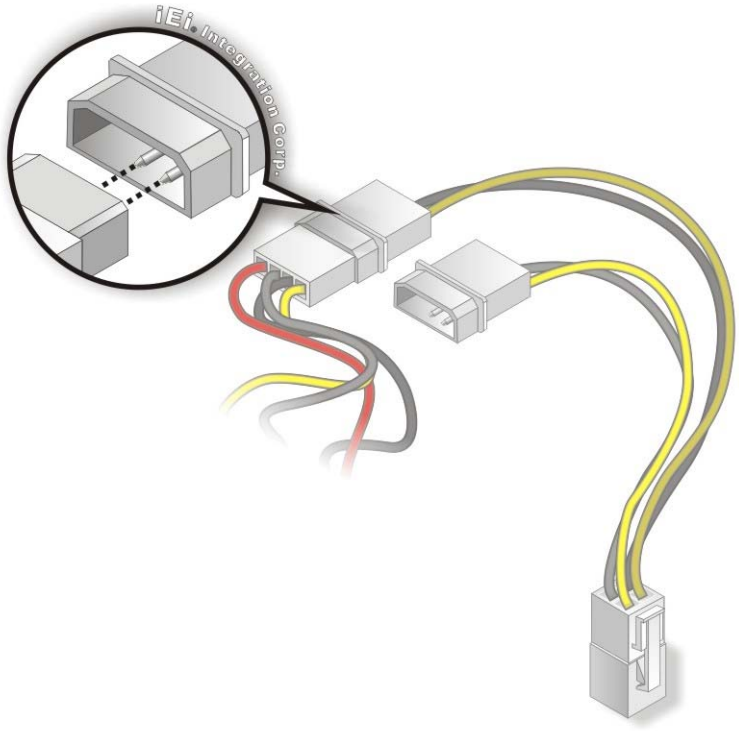


Figure 4-12: Connect Power Cable to Power Supply

4.6.2 Audio Kit Installation

The Audio Kit that came with the WAFER-NM701-1007U connects to the 10-pin audio connector on the WAFER-NM701-1007U. The audio kit consists of three audio jacks. One audio jack, Mic In, connects to a microphone. The remaining two audio jacks, Line-In and Line-Out, connect to two speakers. To install the audio kit, please refer to the steps below:

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

Step 2: **Align pin 1**. Align pin 1 on the on-board connector with pin 1 on the audio kit connector. Pin 1 on the audio kit connector is indicated with a white dot. See **Figure 4-13**.

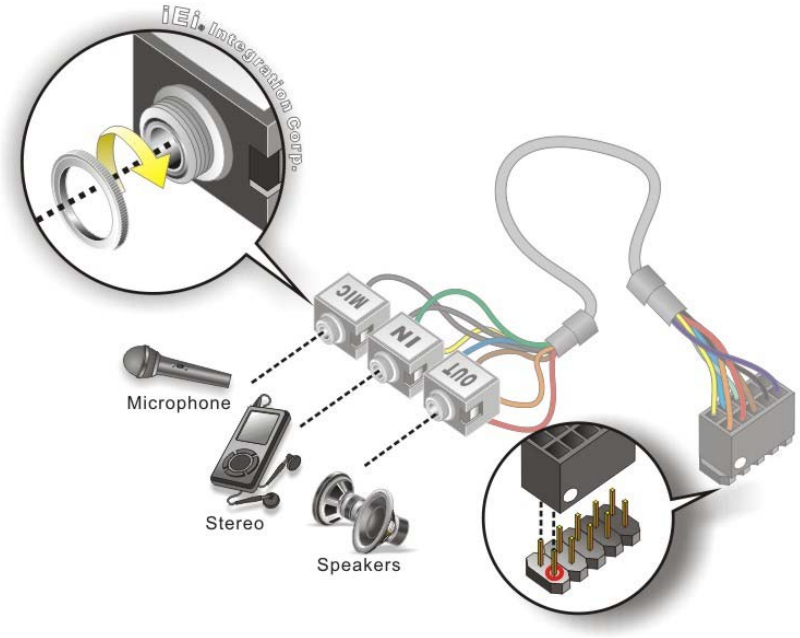


Figure 4-13: Audio Kit Cable Connection

Step 3: **Connect the audio devices**. Connect one speaker to the line-in audio jack, one speaker to the line-out audio jack and a microphone to the mic-in audio jack.

4.6.3 LVDS LCD Installation

The WAFER-NM701-1007U can be connected to a TFT LCD screen through the LVDS crimp connectors on the board. To connect a TFT LCD to the WAFER-NM701-1007U, please follow the steps below.

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

Step 2: **Insert the cable connector**. Insert the connector from the LVDS PCB driving board to the LVDS connector as shown in **Figure 4-14**. When connecting the connectors, make sure the pins are properly aligned.

WARNING:

The diagram below is merely for illustration. The configuration and connection of the cables from the TFT LCD screen being installed may be different. Please refer to the installation manual that came with the TFT LCD screen.

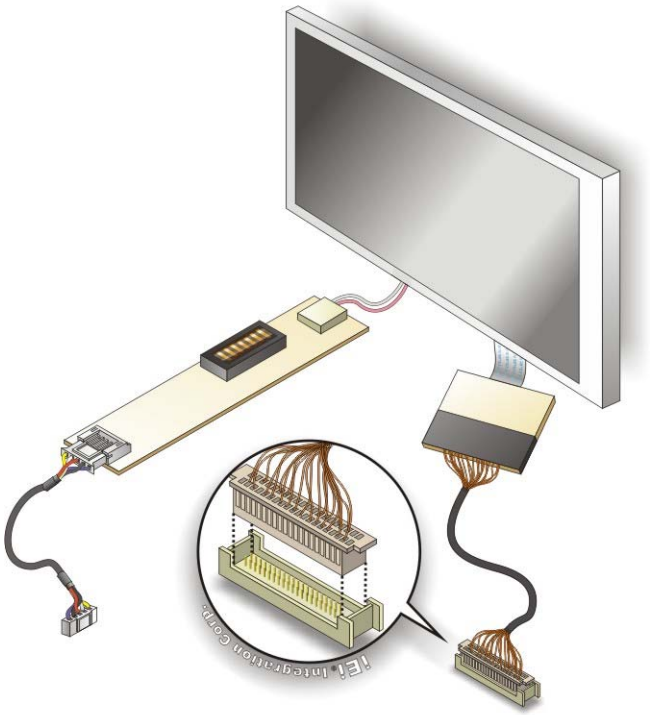


Figure 4-14: LVDS Connector

Step 3: **Locate the backlight inverter connector**. The location of the backlight inverter connector is shown in **Chapter 3**.

Step 4: **Connect backlight connector**. Connect the backlight connector to the driver TFT LCD PCB as shown in **Figure 4-15**. When inserting the cable connector, make sure the pins are properly aligned.

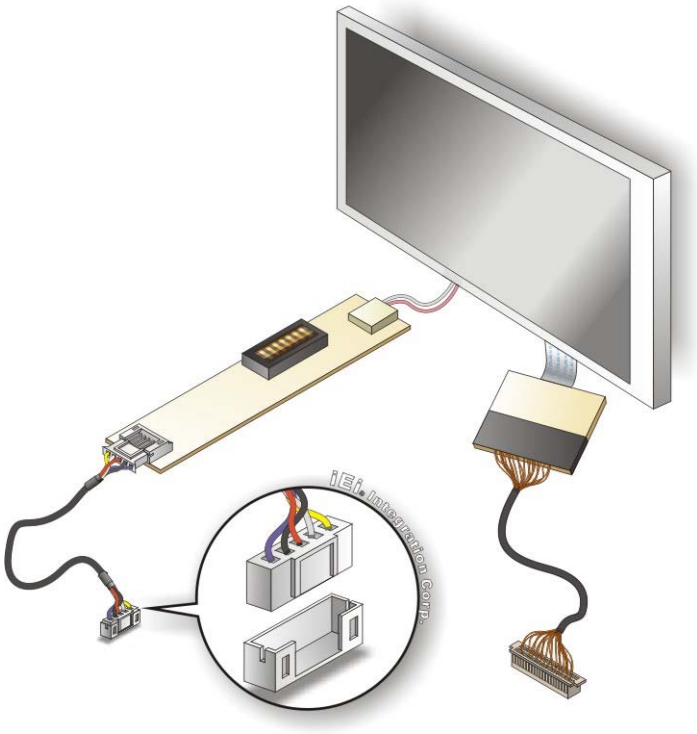


Figure 4-15: Backlight Inverter Connection

4.6.4 Full-size PCIe Mini Card Installation

The WAFER-NM701-1007U allows installation of either a full-size or half-size PCIe Mini card. To install a full-size PCIe Mini card, please follow the steps below.

Step 1: **Locate the full-size PCIe Mini card slot**. The location of the PCIe Mini card slot is shown in **Chapter 3**.

Step 2: **Remove the retention screws**. Remove the retention screws secured on the motherboard as shown in **Figure 4-16**.

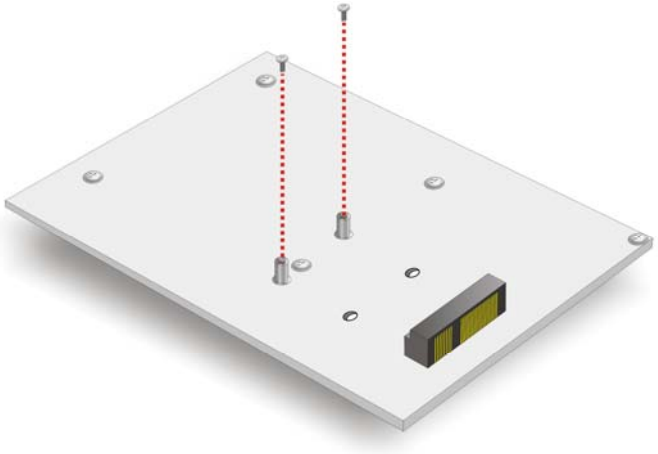


Figure 4-16: Remove the Retention Screws for the Full-size PCIe Mini Card

Step 3: **Insert into the socket at an angle**. Line up the notch on the card with the notch on the connector. Slide the PCIe Mini card into the socket at an angle of about 20º (**Figure 4-17**).

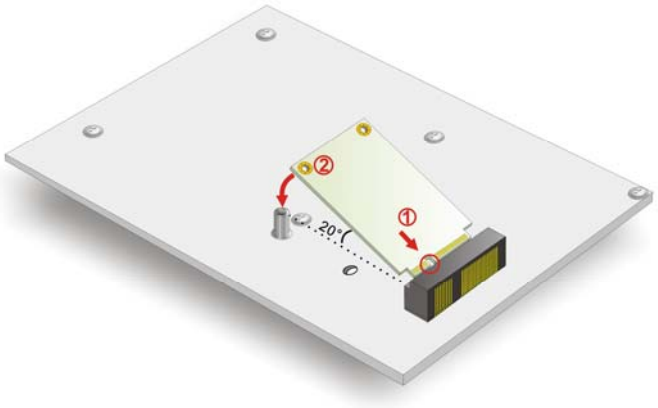


Figure 4-17: Insert the Full-size PCIe Mini Card into the Socket at an Angle

Step 4: **Secure the full-size PCIe Mini card**. Secure the full-size PCIe Mini card with the retention screws previously removed (**Figure 4-18**).

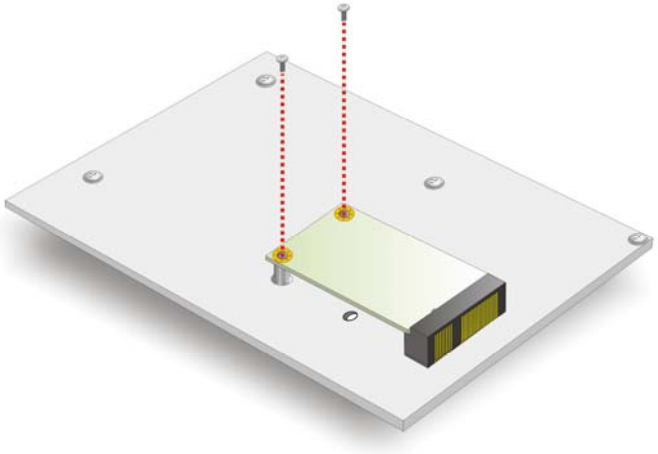


Figure 4-18: Secure the Full-size PCIe Mini Card

4.6.5 Half-size PCIe Mini Card Installation

The WAFER-NM701-1007U allows installation of either a full-size or half-size PCIe Mini card. To install a half-size PCIe Mini card, please follow the steps below.

Step 1: **Locate the PCIe Mini card slot**. The location of the PCIe Mini card slot is shown in **Chapter 3**.

Step 2: **Install the supplied plastic shafts**. Insert the supplied plastic shafts to the screw holes on the motherboard (**Figure 4-19**). Press the plastic shafts down until them clip into place on the motherboard.

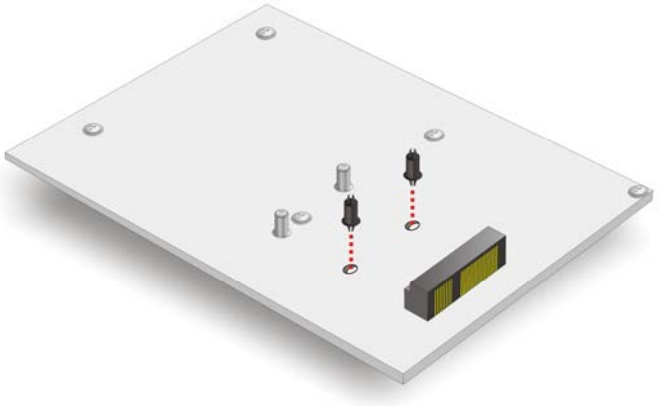


Figure 4-19: Install the Supplied Plastic Shafts

Step 3: **Insert into the socket at an angle**. Line up the notch on the card with the notch on the connector. Slide the PCIe Mini card into the socket at an angle of about 20º (**Figure 4-20**).

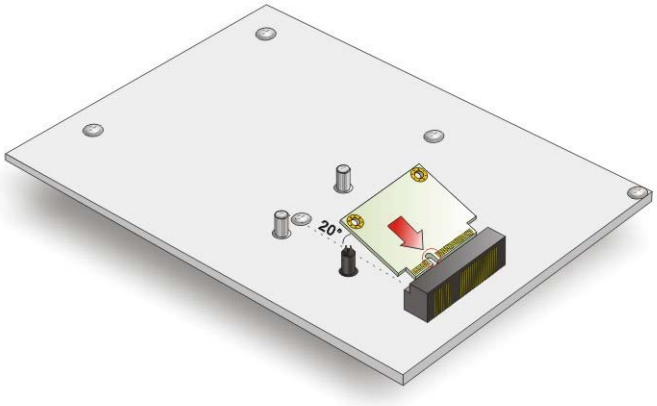


Figure 4-20: Insert the Half-size PCIe Mini Card into the Socket at an Angle

Step 4: **Push down until the card clips into place**. Push the other end of the card down until it clips into place on the plastic shafts (**Figure 4-21**).

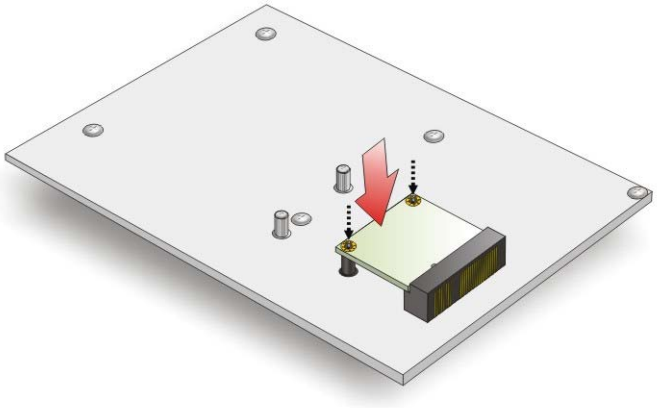


Figure 4-21: Secure the Half-size PCIe Mini Card

4.6.6 SATA Drive Connection

The WAFER-NM701-1007U is shipped with two SATA drive cables. To connect the SATA drive to the connector, please follow the steps below.

Step 1: **Locate the SATA connector and the SATA power connector**. The locations of the connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Insert the cable connector into the on-board SATA drive connector and the SATA power connector. See **Figure 4-22**.

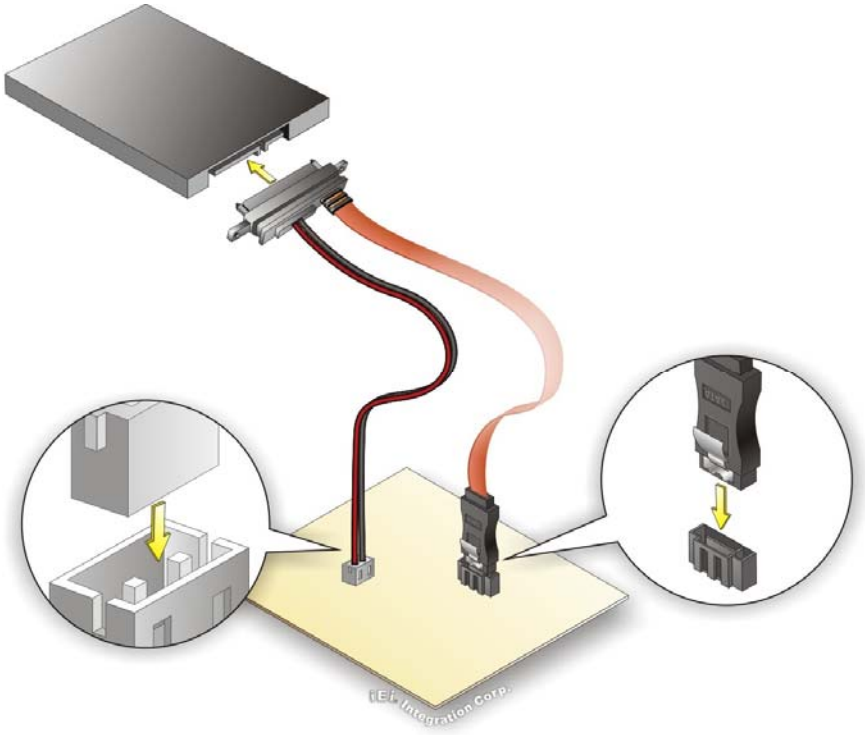


Figure 4-22: SATA Drive Cable Connection

Step 3: **Connect the cable to the SATA disk**. Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 4-22**.

Step 4: To remove the SATA cable from the SATA connector, press the clip on the connector at the end of the cable.

4.6.7 Single RS-232 Cable

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

Step 1: **Locate the connector**. The locations of the RS-232 connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Insert the connector into the serial port header. See **Figure 4-23**. A key on the front of the cable connector ensures the connector can only be installed in one direction.

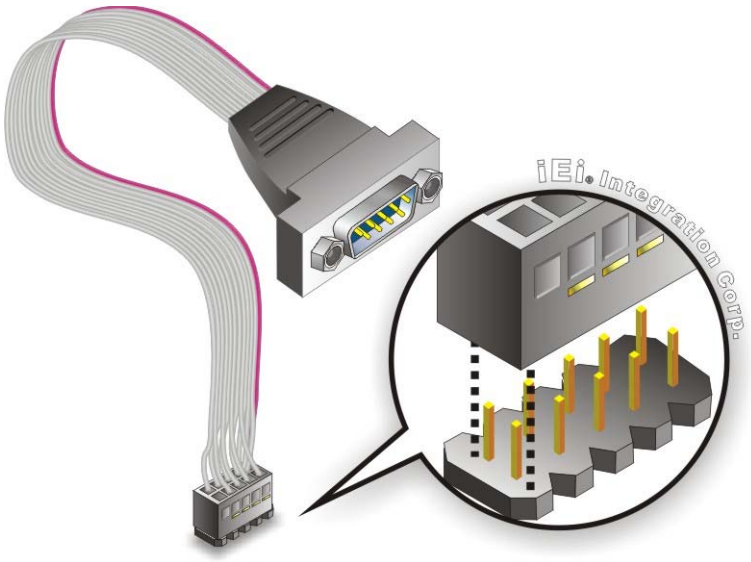


Figure 4-23: Single RS-232 Cable Installation

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

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

4.6.8 Keyboard/Mouse Y-cable Connector

The WAFER-NM701-1007U is shipped with a keyboard/mouse Y-cable connector. The keyboard/mouse Y-cable connector connects to a keyboard/mouse connector on the WAFER-NM701-1007U and branches into two cables that are each connected to a PS/2 connector, one for a mouse and one for a keyboard. To connect the keyboard/mouse Y-cable connector, please follow the steps below.

Step 1: **Locate the connector**. The location of the keyboard/mouse Y-cable connector is shown in **Chapter 3**.

Step 2: **Align the connectors**. Correctly align pin 1 on the cable connector with pin 1 on the WAFER-NM701-1007U keyboard/mouse connector. See **Figure 4-24**.

Step 3: **Insert the cable connectors** Once the cable connector is properly aligned with the keyboard/mouse connector on the WAFER-NM701-1007U, connect the cable connector to the on-board connector. See **Figure 4-24**.

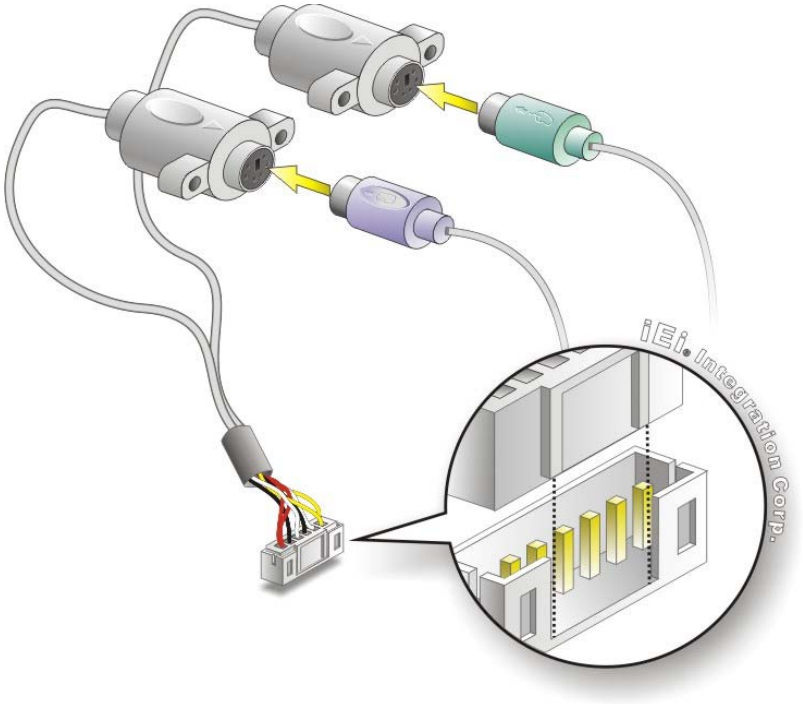


Figure 4-24: Keyboard/mouse Y-cable Connection

Step 4: **Attach PS/2 connectors to the chassis**. The keyboard/mouse Y-cable connector is connected to two PS/2 connectors. To secure the PS/2 connectors to the chassis please refer to the installation instructions that came with the chassis.

Step 5: **Connect the keyboard and mouse**. Once the PS/2 connectors are connected to the chassis, a keyboard and mouse can each be connected to one of the PS/2 connectors. The keyboard PS/2 connector and mouse PS/2 connector are both marked. Please make sure the keyboard and mouse are connected to the correct PS/2 connector.

Chapter

5

BIOS

5.1 Introduction

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

NOTE:

Some of the BIOS options may vary throughout the life cycle of the product and are subject to change without prior notice.

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

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

5.1.2 Using Setup

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

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

Key	Function
Page Up key	Move to the next page
Page Dn key	Move to the previous page
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
F1	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2	Load previous values
F3	Load optimized defaults
F4	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 are made, CMOS defaults. Use the jumper described in **Chapter 4**.

5.1.5 BIOS Menu Bar

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

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

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

5.2 Main

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

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

```
      Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
  Main   Advanced   Chipset    Boot    Security   Save & Exit

BIOS Information                                  Set the Date. Use Tab to
BIOS Vendor                    American Megatrends switch between Data
Core Version                   4.6.5.3             elements.
Compliancy                     UEFI 2.3; PI 1.2
Project Version                B260AR03.ROM
Build Date and Time            12/06/2012 11:53:40

Processor Information
Name                           SandyBridge
Brand String                   Intel(R) Celeron(R) CPU
Frequency                      1500 MHz
Processor ID                   206a7
Stepping                       D2
Number of Processors           2Core(s) / 2Thread(s)
Microcode Revision             28
GT Info                        GT2 (800 MHz)

IGFX VBIOS Version             2143                ----------------------
Memory RC Version              1.2.2.0
Total Memory                   4096 MB (DDR3)
Memory Frequency               1600 MHz

PCH Information
Name                           PantherPoint
Stepping                       04/C1
TXT Capability of Platform/PCH Supported
LAN PHY Revision               N/A

ME FW Version                  8.1.2.1318
ME Firmware SKU                1.5MB

SPI Clock Frequency                              →←: Select Screen
DOFR Support                   Unsupported       ↑ ↓: Select Item
Read Status Clock Frequnecy    33 MHz            Enter: Select
Write Status Clock Frequnecy   33 MHz            +/-: Change Opt.
Fast Read Status Clock Frequnecy 33 MHz          F1: General Help
                                                 F2: Previous Values
System Date                    [Mon 03/04/2013]  F3: Optimized Defaults
System Time                    [15:10:27]        F4: Save & Exit
                                                 ESC: Exit
Access Level                   Administrator

      Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 1: Main

➔ **System Overview**

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

- BIOS Information
- Processor Information
- Memory Information
- PCH Information
- SPI Clock Frequency

The **Main** menu 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]**

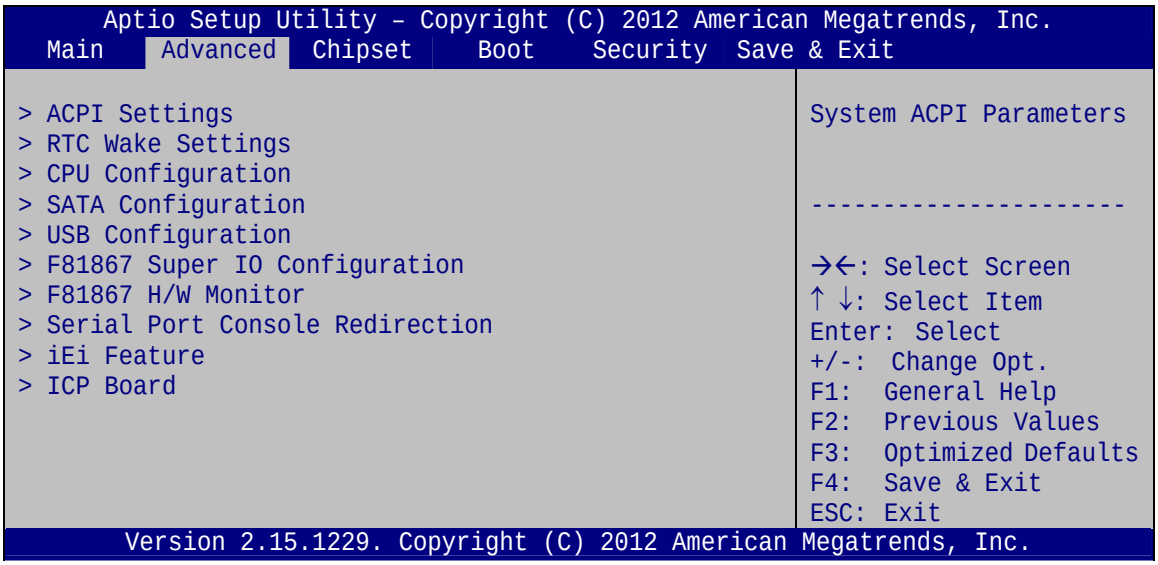
Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

5.3 Advanced

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

WARNING:

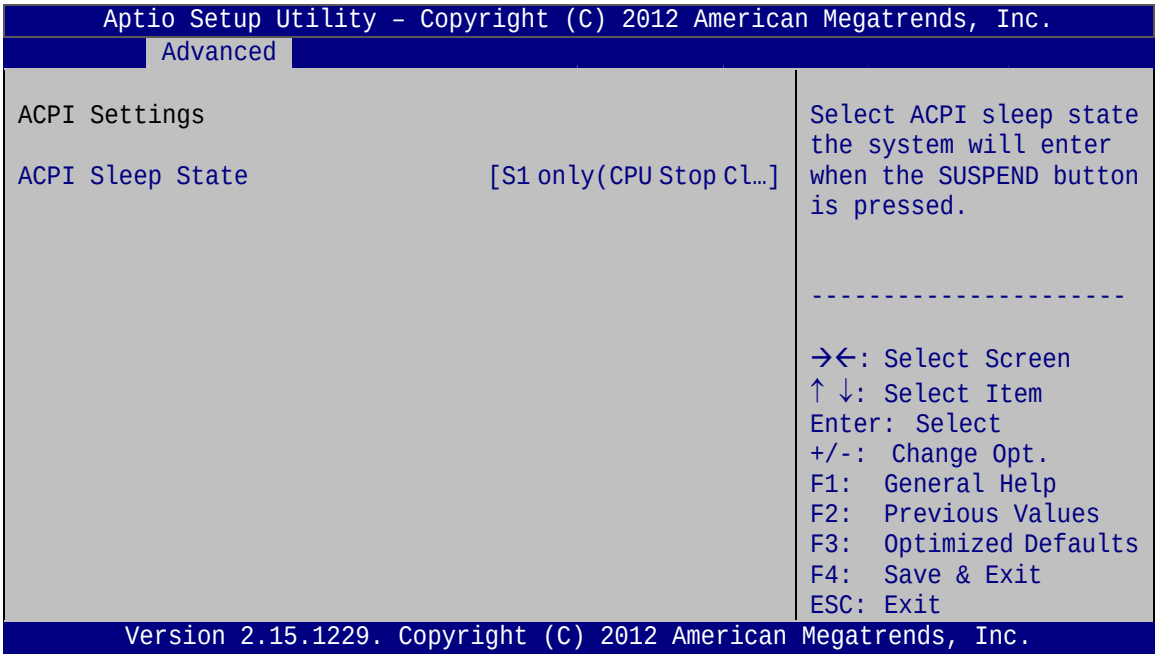
Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.



BIOS Menu 2: Advanced

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 [S1 only (CPU Stop Clock)]**

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

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

5.3.2 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 4**) enables the system to wake at the specified time.

```
Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
        Advanced
Wake system with Fixed Time      [Disabled]

Enable or disable System
wake on alarm event. When
enabled, System will
wake on the
date::hr::min::sec
specified

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

→←: Select Screen
↑ ↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 4: RTC Wake Settings

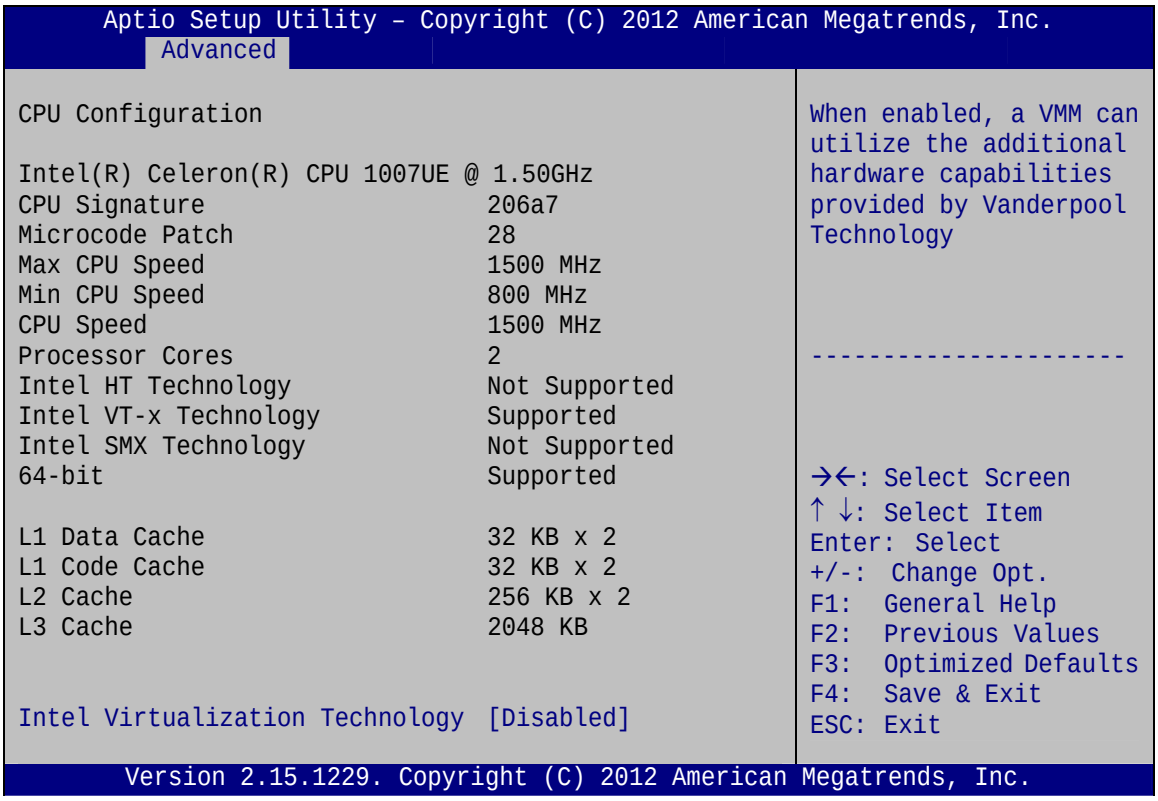
➔ **Wake system with Fixed Time [Disabled]**

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

➔ **Disabled**	**DEFAULT**	The real time clock (RTC) cannot generate a wake event
➔ **Enabled**		If selected, the **Wake up every day** option appears allowing you to enable to disable the system to wake every day at the specified time. Besides, the following options appear with values that can be selected: Wake up date Wake up hour Wake up minute Wake up second After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

5.3.3 CPU Configuration

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



BIOS Menu 5: CPU Configuration

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

- Processor Type: Lists the brand name of the CPU being used
- CPU Signature: Lists the CPU signature value.
- Microcode Patch: Lists the microcode patch being used.
- Max CPU Speed: Lists the maximum CPU processing speed.
- Min CPU Speed: Lists the minimum CPU processing speed.
- CPU Speed: Lists the CPU processing speed
- Processor Core: Lists the number of the processor cores
- Intel HT Technology: Indicates if Intel HT Technology is supported by the CPU.
- Intel VT-x Technology: Indicates if Intel VT-x Technology is supported by the CPU.

- Intel SMX Technology: Indicates if Intel SMX Technology is supported by the CPU.
- 64-bit: Indicates if 64-bit is supported by the CPU.
- L1 Data Cache: Lists the amount of data storage space on the L1 cache.
- L1 Code Cache: Lists the amount of code storage space on the L1 cache.
- L2 Cache: Lists the amount of storage space on the L2 cache.
- L3 Cache: Lists the amount of storage space on the L3 cache.

➔ **Intel Virtualization Technology [Disabled]**

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

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

➔ **Enabled** Enables Intel Virtualization Technology.

5.3.4 SATA Configuration

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

```
Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
        Advanced

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

SATA1 Port                      Empty           ---------------------
SATA2 Port                      Empty
M-SATA Port                     Empty           →←: Select Screen
                                                ↑ ↓: Select Item
                                                Enter: Select
                                                +/-: Change Opt.
                                                F1: General Help
                                                F2: Previous Values
                                                F3: Optimized Defaults
                                                F4: Save & Exit
                                                ESC: Exit
Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 6: SATA Configuration

➔ **SATA Controller(s) [Enabled]**

Use the **SATA Controller(s)** option to enable or disable SATA devices.

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

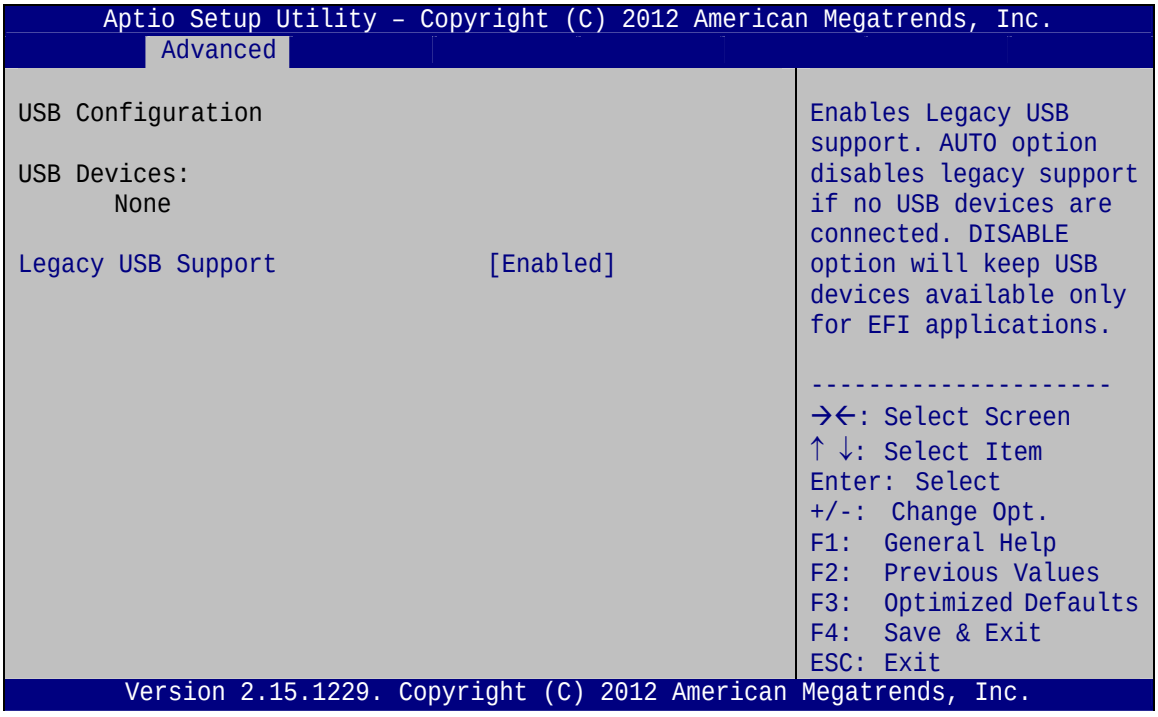
➔ **SATA Mode Selection [IDE]**

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

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

5.3.5 USB Configuration

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



BIOS Menu 7: USB Configuration

➔ **Legacy USB Support [Enabled]**

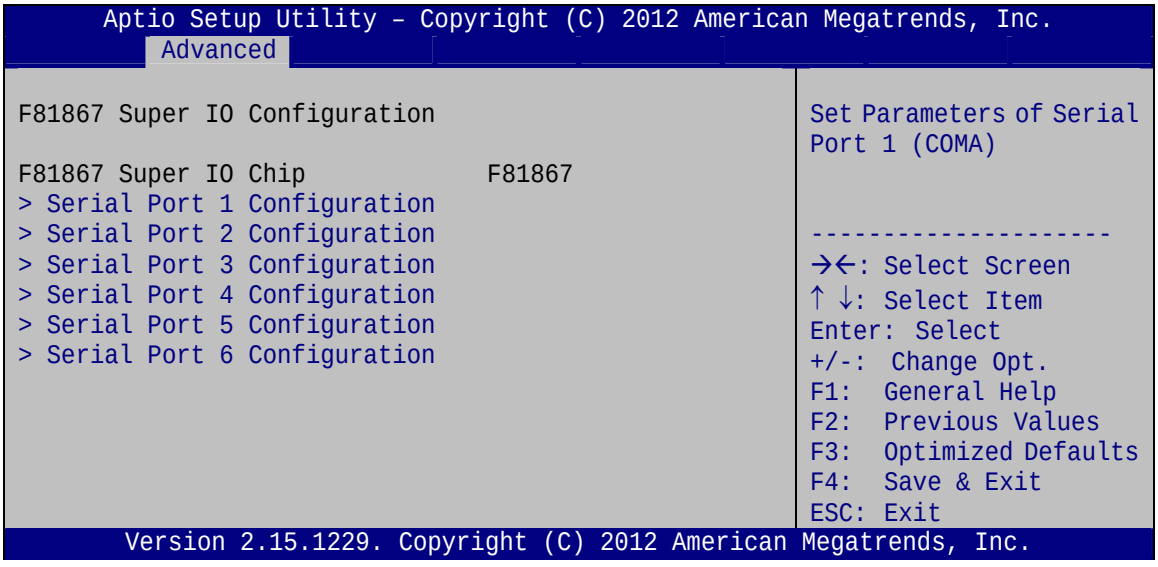
Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support.

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

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

5.3.6 F81867 Super IO Configuration

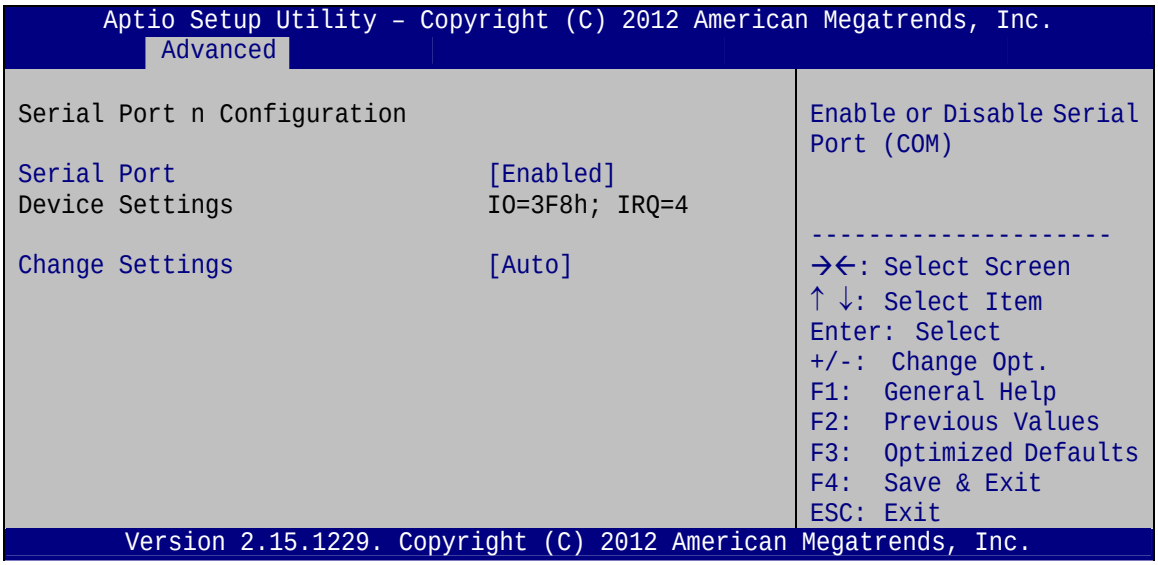
Use the **F81867 Super IO Configuration** menu (**BIOS Menu 8**) to set or change the configurations for the serial ports.



BIOS Menu 8: F81867 Super IO Configuration

5.3.6.1 Serial Port n Configuration

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



BIOS Menu 9: Serial Port n Configuration Menu

5.3.6.1.1 Serial Port 1 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

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

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

5.3.6.1.2 Serial Port 2 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

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

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

5.3.6.1.3 Serial Port 3 Configuration

➔ **Serial Port [Enabled]**

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

➔ **Disabled** Disable the serial port

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

➔ **Change Settings [Auto]**

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

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

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

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

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

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

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

5.3.6.1.4 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=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
➔ **IO=2D8h; IRQ=10, 11**		Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11

5.3.6.1.5 Serial Port 5 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=2D0h; IRQ=10**		Serial Port I/O port address is 2D0h and the interrupt address is IRQ10
➔ **IO=2C0h; IRQ=10, 11**		Serial Port I/O port address is 2C0h and the interrupt address is IRQ10, 11
➔ **IO=2C8h; IRQ=10, 11**		Serial Port I/O port address is 2C8h and the interrupt address is IRQ10, 11
➔ **IO=2D0h; IRQ=10, 11**		Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11
➔ **IO=2D8h; IRQ=10, 11**		Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11
➔ **IO=2E0h; IRQ=10, 11**		Serial Port I/O port address is 2E0h and the interrupt address is IRQ10, 11

5.3.6.1.6 Serial Port 6 Configuration

➔ **Serial Port [Enabled]**

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

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

➔ **Change Settings [Auto]**

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

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

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

5.3.7 F81867 H/W Monitor

The **F81867 H/W Monitor** menu (**BIOS Menu 10**) contains the fan configuration submenus and displays operating temperature, fan speeds and system voltages.

```
        Aptio Setup Utility – Copyright (C) 2012 American Megatrends, Inc.
                Advanced
 PC Health Status                                  | Smart Fan Mode Select
                                                   |
 > Smart Fan Mode Configuration                    |
 CPU temperature                 : +52 C           |
 System temperature              : +51 C           |
 CPU_FAN1 Speed                  : N/A             |
 SYS_FAN1 Speed                  : N/A             |
 +VCC_CORE                       : +0.968 V        | ---------------------
 +VCC_GFX                        : +0.968 V        | →←: Select Screen
 +V5S                            : +5.129 V        | ↑ ↓: Select Item
 +V12S                           : +11.176 V       | Enter:  Select
 +V1.5                           : +1.568 V        | +/-:  Change Opt.
 VSB5V                           : +5.040 V        | F1:   General Help
 +V3.3S                          : +3.328 V        | F2:   Previous Values
 VSB3V                           : +3.344 V        | F3:   Optimized Defaults
 VBAT                            : +3.280 V        | F4:   Save & Exit
                                                   | ESC:  Exit
        Version 2.15.1229. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 10: F81867 H/W Monitor

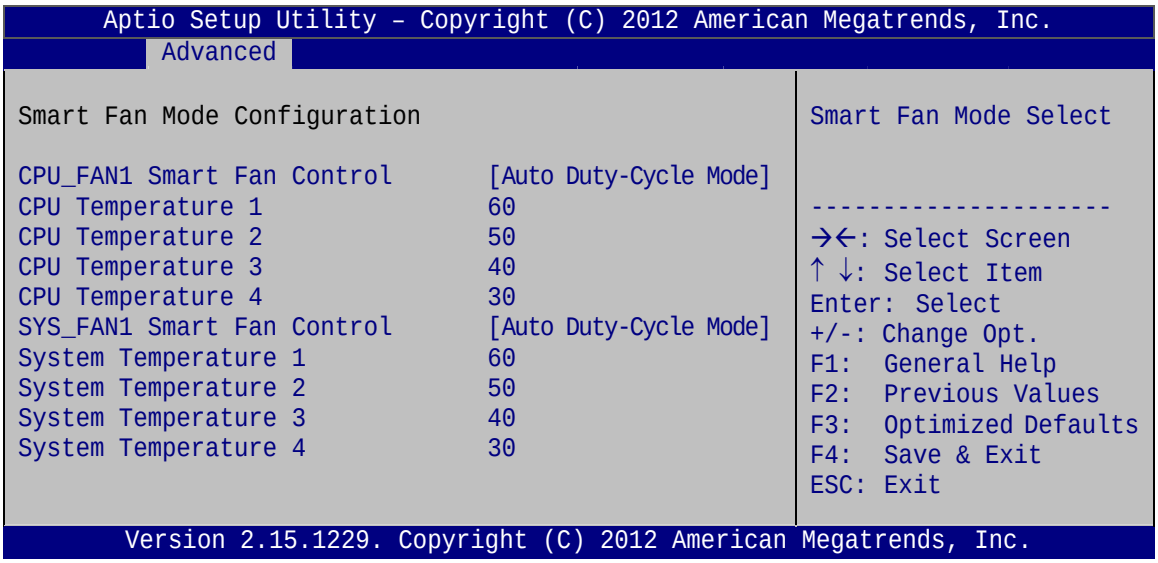
➔ **PC Health Status**

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

- System Temperatures:
  - CPU Temperature
  - System Temperature
- Fan Speeds:
  - CPU Fan Speed
  - System Fan Speed
- Voltages:
  - +VCC_CORE
  - +V5S
  - +V12S
  - +V1.5
  - VSB5V
  - +V3.3S
  - VSB3V
  - VBAT

5.3.7.1 Smart Fan Mode Configuration

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



BIOS Menu 11: Smart Fan Mode Configuration

➔ **CPU_FAN1/SYS_FAN Smart Fan Control [Auto Duty-Cycle Mode]**

Use the **CPU_FAN1** or **SYS_FAN1 Smart Fan Control** option to configure the CPU or System Smart Fan.

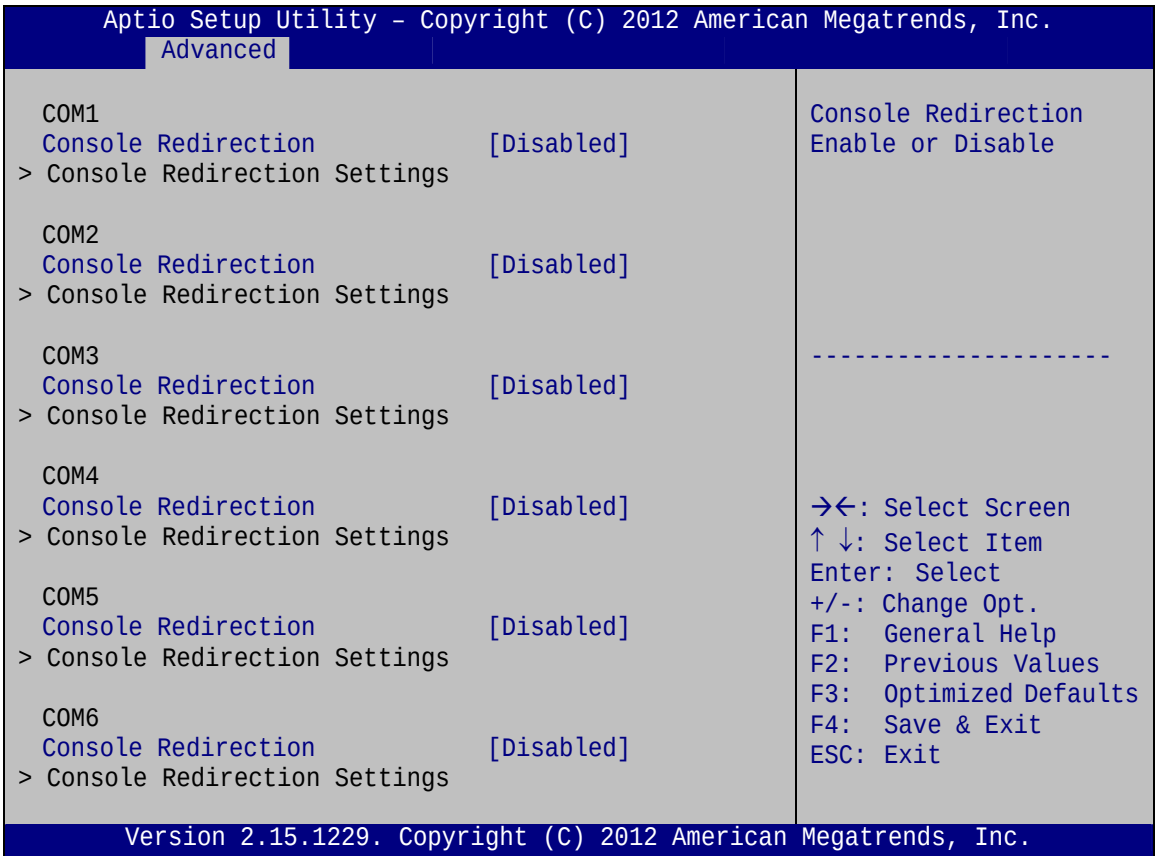
➔ **Auto Duty-Cycle Mode**	**DEFAULT**	The fan adjusts its speed using Auto Duty-Cycle settings
➔ **Manual Duty Mode**		The fan spins at the speed set in Manual Duty Mode settings

➔ **CPU/System Temperature n**

Use the +/– key or enter a decimal number to change the fan **CPU** or **System Temperature n** value.

5.3.8 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 12**) allows the console redirection options to be configured. Console redirection allows users to maintain a system remotely by re-directing keyboard input and text output through the serial port.



BIOS Menu 12: Serial Port Console Redirection

➔ **Console Redirection [Disabled]**

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

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

➔ **Terminal Type [ANSI]**

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

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

➔ **Bits per second [115200]**

Use the **Bits per second** option to specify the serial port transmission speed. The speed must match the other side. Long or noisy lines may require lower speeds.

➔ **9600**		Sets the serial port transmission speed at 9600.
➔ **19200**		Sets the serial port transmission speed at 19200.
➔ **38400**		Sets the serial port transmission speed at 38400.
➔ **57600**		Sets the serial port transmission speed at 57600.
➔ **115200**	**DEFAULT**	Sets the serial port transmission speed at 115200.

➔ **Data Bits [8]**

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

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

➔ **Parity [None]**

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

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

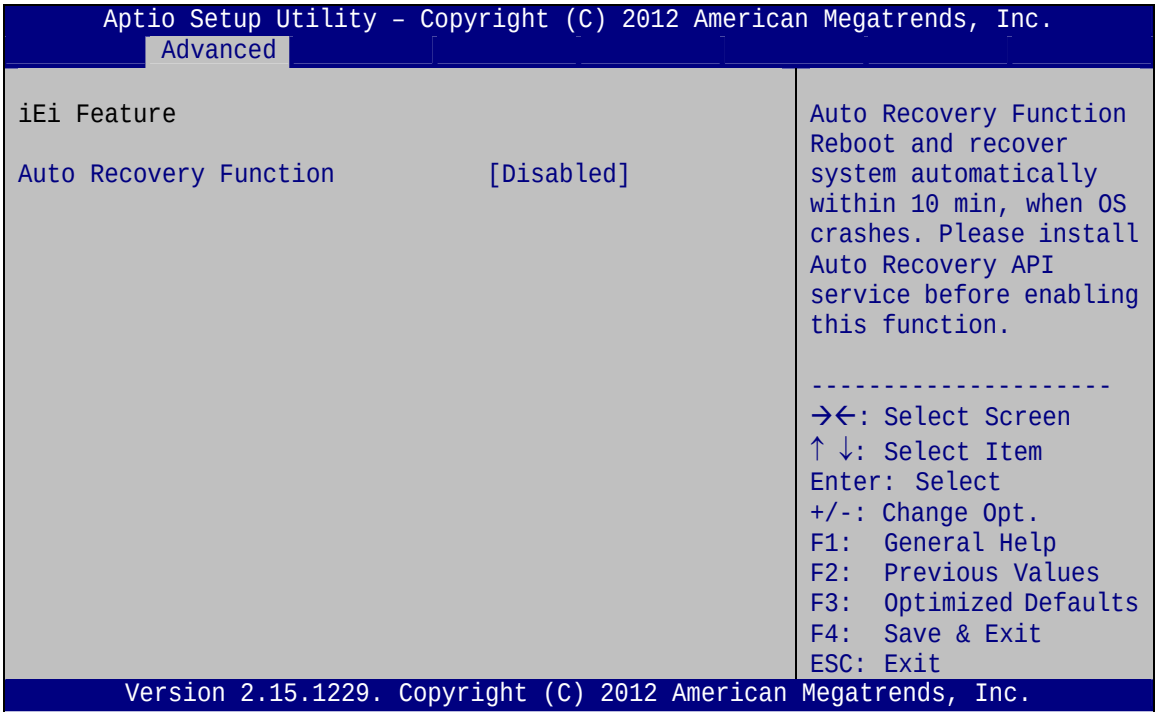
➔ **Stop Bits [1]**

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

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

5.3.9 iEi Feature

Use the **iEi Feature** menu (BIOS Menu 13) to configure One Key Recovery function.



BIOS Menu 13: iEi Feature

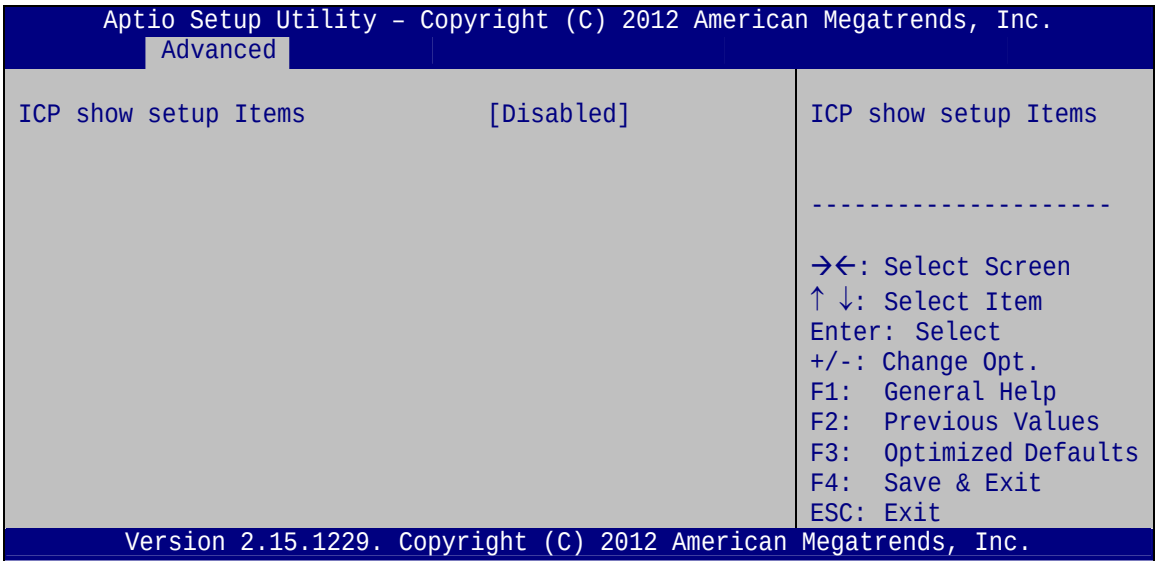
➔ **Auto Recovery Function [Disabled]**

Use the **Auto Recovery Function** BIOS option to enable or disable the auto recovery function of the IEI One Key Recovery.

➔	**Disabled**	**DEFAULT**	Auto recovery function disabled
➔	**Enabled**		Auto recovery function enabled

5.3.10 ICP Board

Use the **ICP Board** menu (**BIOS Menu 14**) to show detailed setup items.



BIOS Menu 14: ICP Board

➔ **ICP show setup Items [Disabled]**

Use the **ICP show setup Items** BIOS option to enable or disable configuring the ICP board parameters.

➔ **Disabled** **DEFAULT** Disables to show detailed setup items.

➔ **Enabled** If selected, the following BIOS menus appear, allowing you to configure the CPU PPM and CPU DTS, and view the Intel RC driver version details and switchable graphics mode selection:

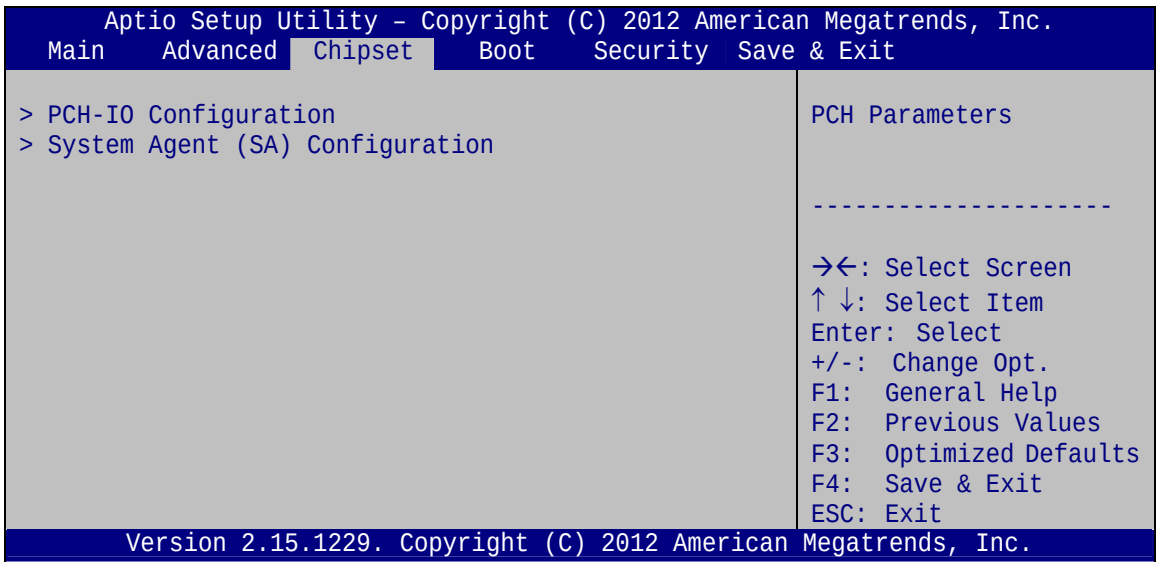
- Intel RC Drivers Version Detail
- CPU PPM Configuration
- Switchable Graphics
- Sandybridge DTS Configuration

5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 15**) to access the PCH IO and System Agent (SA) configuration menus.

WARNING!

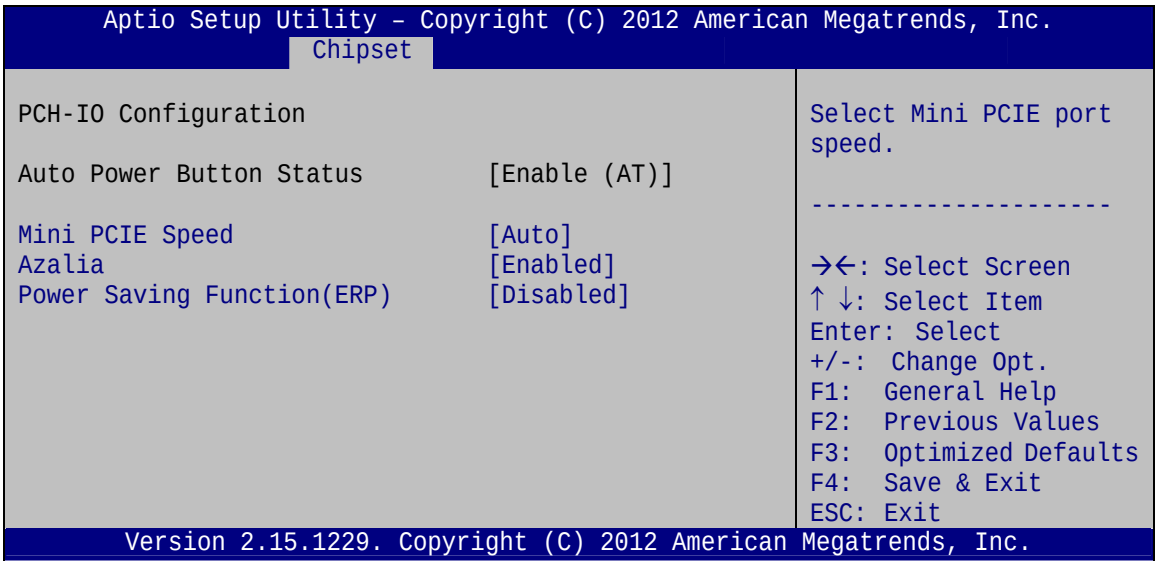
Setting the wrong values for the chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.



BIOS Menu 15: Chipset

5.4.1 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 16**) to configure the PCH parameters.



BIOS Menu 16: PCH-IO Configuration

➔ **Mini PCIE Speed [Auto]**

Use this option to select the support type of the PCIe Mini slot. The following options are available:

- Auto **Default**
- Gen1
- Gen2

➔ **Azalia [Enabled]**

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

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

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

➔ **Power Saving Function(ERP) [Disabled]**

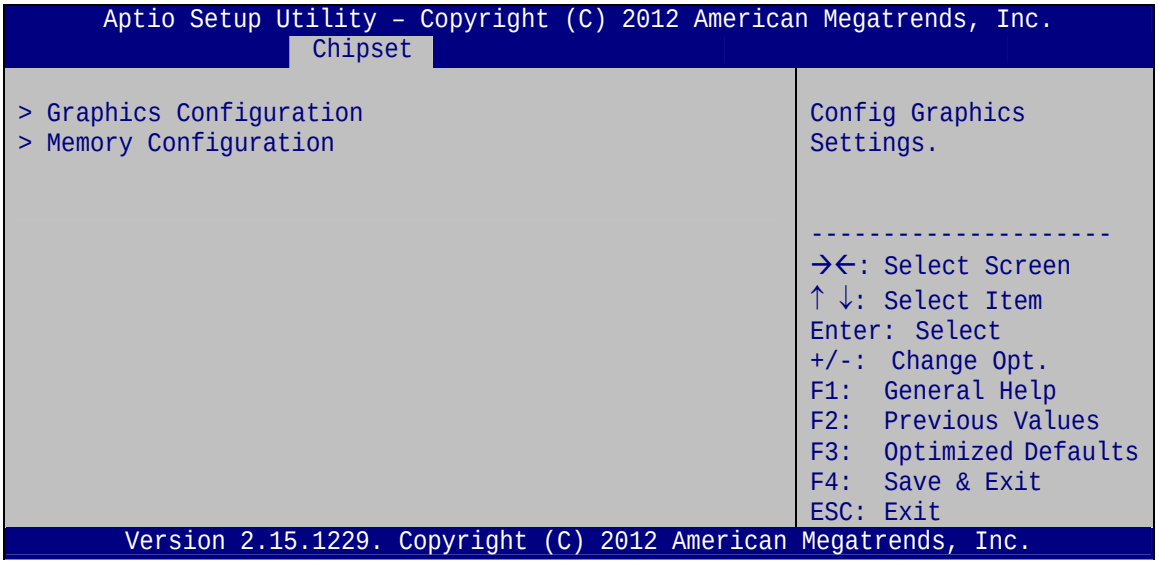
Use the **Power Saving Function(ERP)** option to enable or disable the power saving function.

➔ **Disabled** **DEFAULT** Disables the power saving function.

➔ **Enabled** Enables the power saving function.

5.4.2 System Agent (SA) Configuration

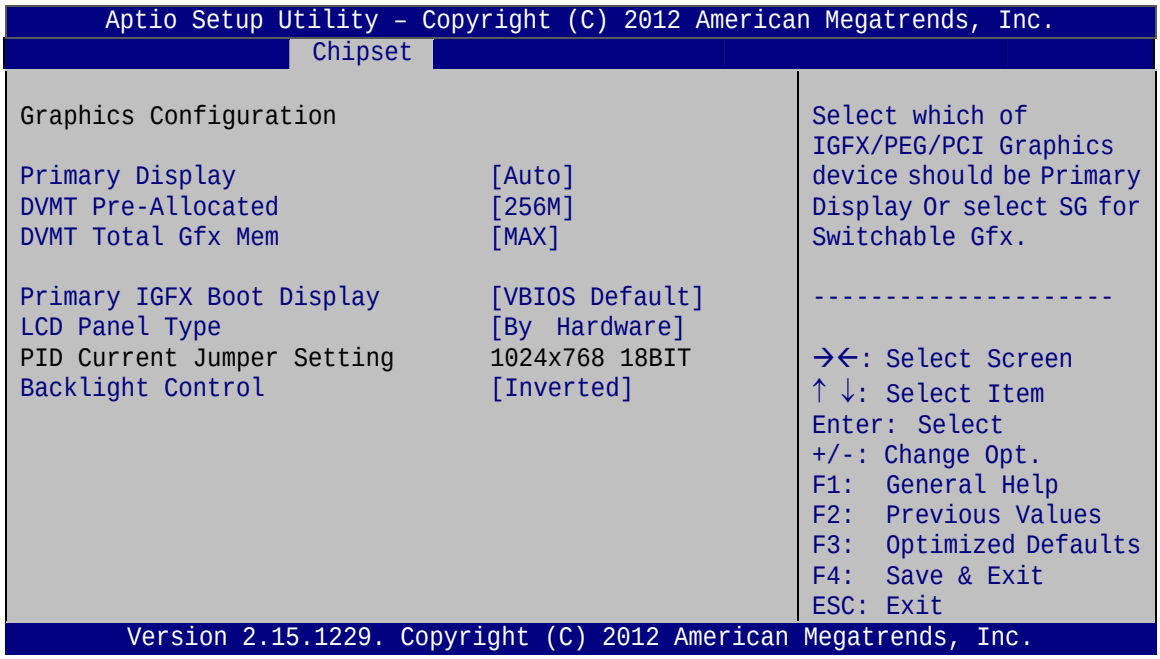
Use the **System Agent (SA) Configuration** menu (**BIOS Menu 17**) to configure the System Agent (SA) parameters.



BIOS Menu 17: System Agent (SA) Configuration

5.4.2.1 Graphics Configuration

Use the **Graphics Configuration** submenu (**BIOS Menu 18**) to configure the video device connected to the system.



BIOS Menu 18: Graphics Configuration

➔ **Primary Display [Auto]**

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

- Auto **Default**
- IGFX
- PEG

➔ **DVMT Pre-Allocated [256M]**

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

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

➔ **DVMT Total Gfx Mem [MAX]**

Use the **DVMT Total Gfx Mem** option to select DVMT5.0 total graphic memory size used by the internal graphic device. The following options are available:

- 128M
- 256M
- MAX **Default**

➔ **Primary IGFX Boot Display [VBIOS Default]**

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

- VBIOS Default **DEFAULT**
- CRT
- LVDS

➔ **LCD Panel Type [By Hardware]**

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

- By Hardware **DEFAULT**
- 640x480 18BIT
- 800x480 18BIT
- 800x600 18BIT
- 1024x768 18BIT
- 1024x768 24BIT
- 1280x1024 48BIT
- 1600x1200 48BIT
- 1280x768 18BIT
- 1280x800 18BIT
- 1366x768 24BIT
- 1440x900 48BIT
- 1600x900 48BIT
- 1680x1050 48BIT
- 1920x1080 48BIT
- 1920x1200 48BIT

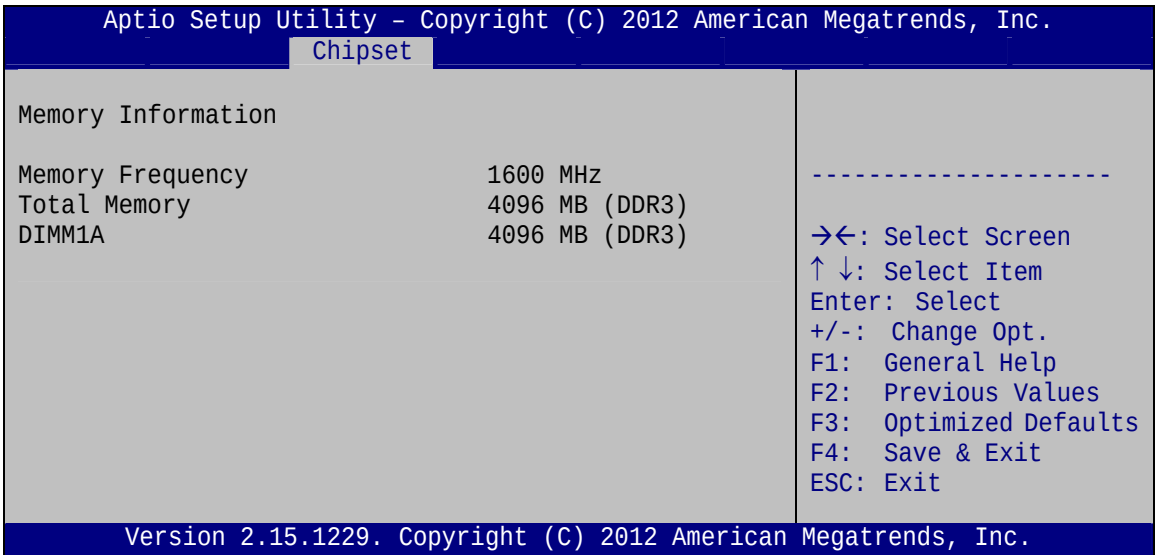
➔ **Backlight Control [Inverted]**

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

➔	**Normal**		Brightest at high voltage level
➔	**Inverted**	**DEFAULT**	Brightest at low voltage level

5.4.2.2 Memory Configuration

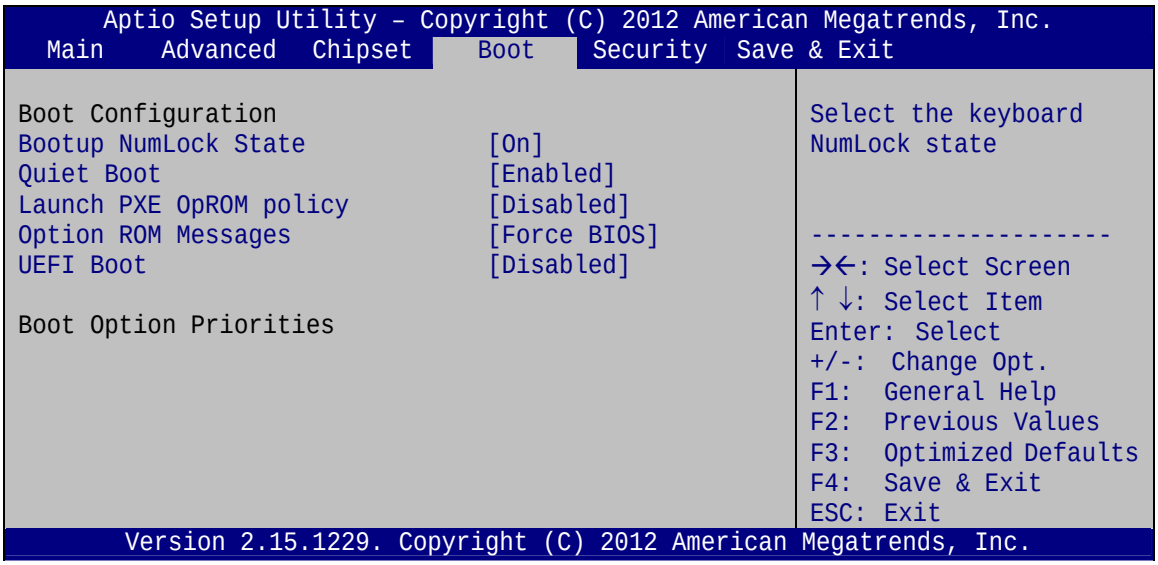
Use the **Memory Configuration** menu (**BIOS Menu 19**) to view memory information.



BIOS Menu 19: Memory Configuration

5.5 Boot

Use the **Boot menu** (**BIOS Menu 20**) to configure system boot options.



BIOS Menu 20: Boot

➔ **Bootup NumLock State [On]**

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

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

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

➔ **Quiet Boot [Enabled]**

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

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

➔ **Launch PXE OpROM policy [Disabled]**

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

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

➔ **Option ROM Messages [Force BIOS]**

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

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

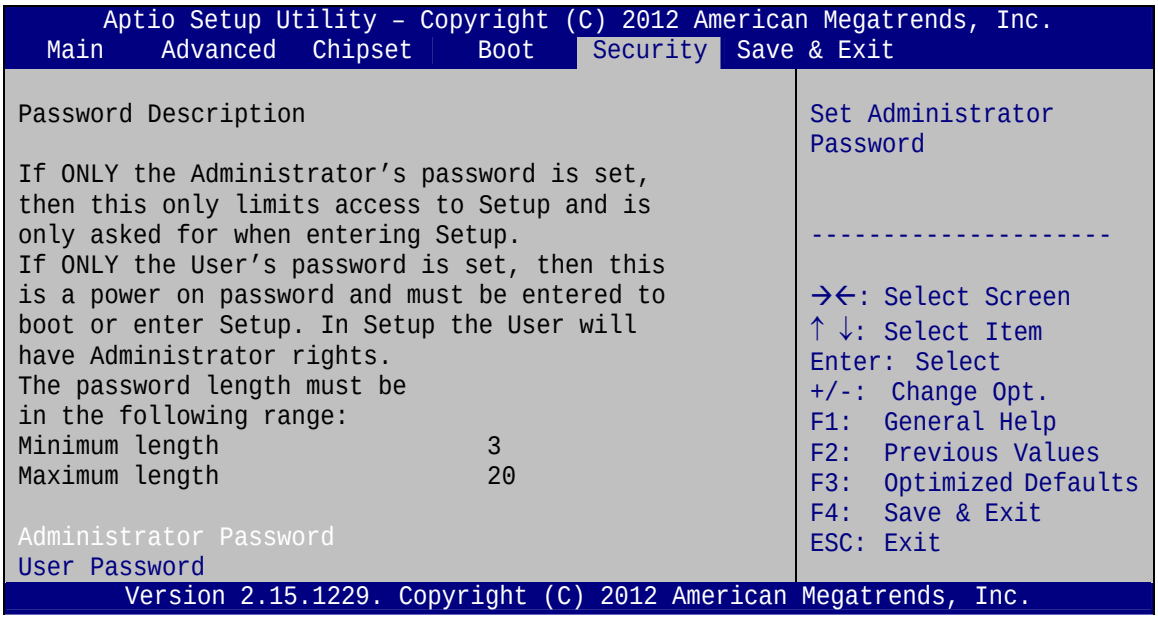
➔ **UEFI Boot [Disabled]**

Use the **UEFI Boot** BIOS option to allow the system to boot from the UEFI devices.

➔ **Disabled**	**DEFAULT**	Disables to boot from the UEFI devices.
➔ **Enabled**		Enables to boot from the UEFI devices.

5.6 Security

Use the **Security** menu (**BIOS Menu 21**) to set system and user passwords.



BIOS Menu 21: Security

➔ **Administrator Password**

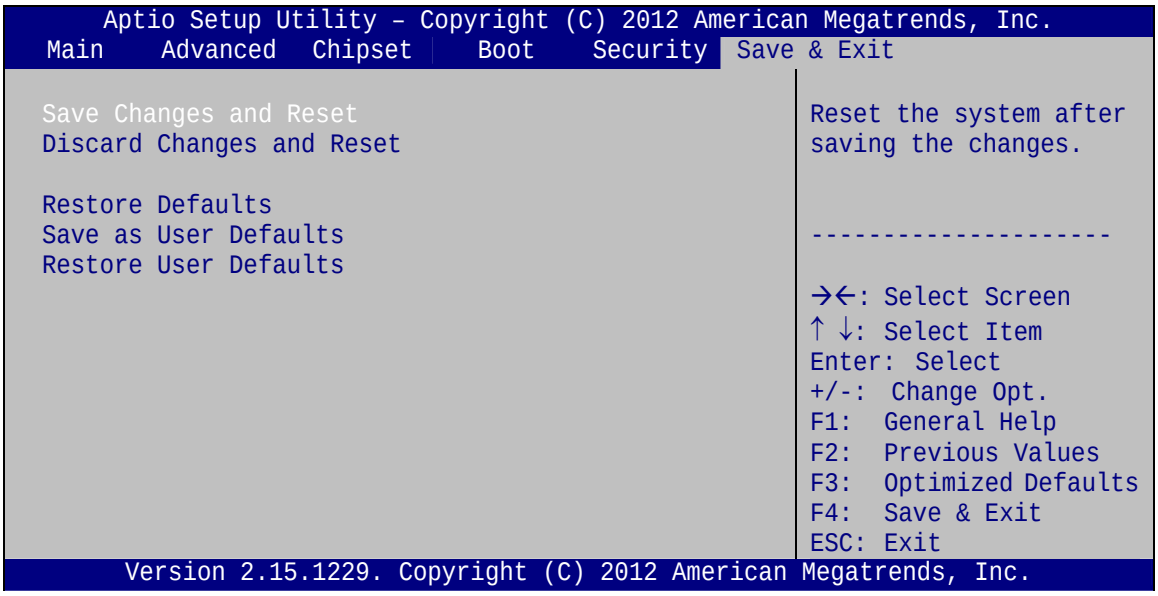
Use the **Administrator Password** to set or change a administrator password.

➔ **User Password**

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

5.7 Exit

Use the **Exit** menu (**BIOS Menu 22**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 22:Exit

➔ **Save Changes and Reset**

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

➔ **Discard Changes and Reset**

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

➔ **Restore Defaults**

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

➔ **Save as User Defaults**

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

➔ **Restore User Defaults**

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

Chapter

6

Software Drivers

6.1 Available Software Drivers

NOTE:

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

The following drivers can be installed on the system:

- Chipset
- Graphics
- LAN
- Audio

Installation instructions are given below.

6.2 Starting the Driver Program

To access the driver installation programs, please do the following.

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

NOTE:

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

Step 2: The driver main menu appears.

Step 3: Click WAFER-NM701-1007U.

Step 4: The list of drivers appears.

6.3 Chipset Driver Installation

To install the chipset driver, please do the following.

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

Step 2: Click "**1-Chipset**".

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

Step 4: The **Welcome Screen** in **Figure 6-1** appears. Click **Next** to continue.

Figure 6-1: Chipset Driver Welcome Screen

Step 5: The license agreement in **Figure 6-2** appears.

Step 6: Read the **License Agreement**.

Step 7: Click **Yes** to continue.

Figure 6-2: Chipset Driver License Agreement

Step 8: The Read Me file in **Figure 6-3** appears.

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

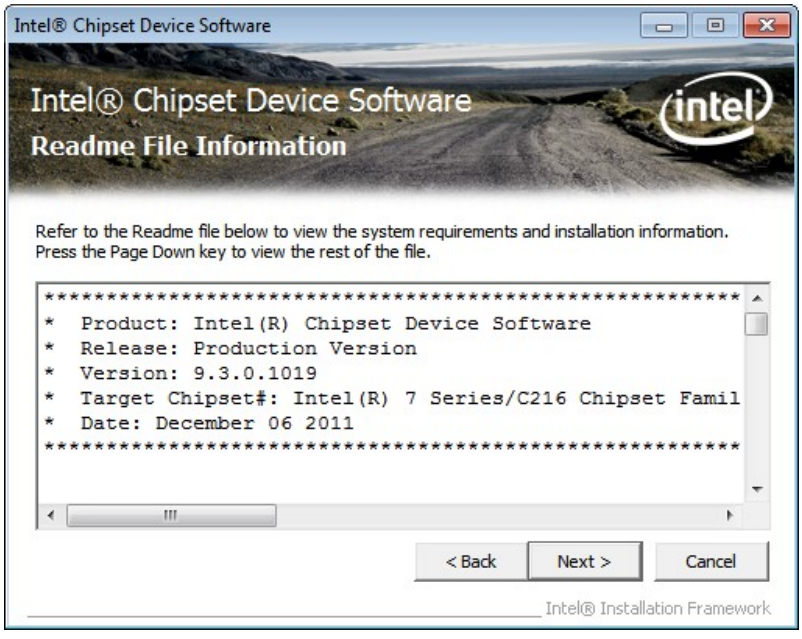


Figure 6-3: Chipset Driver Read Me File

Step 10: **Setup Operations** are performed as shown in **Figure 6-4**.

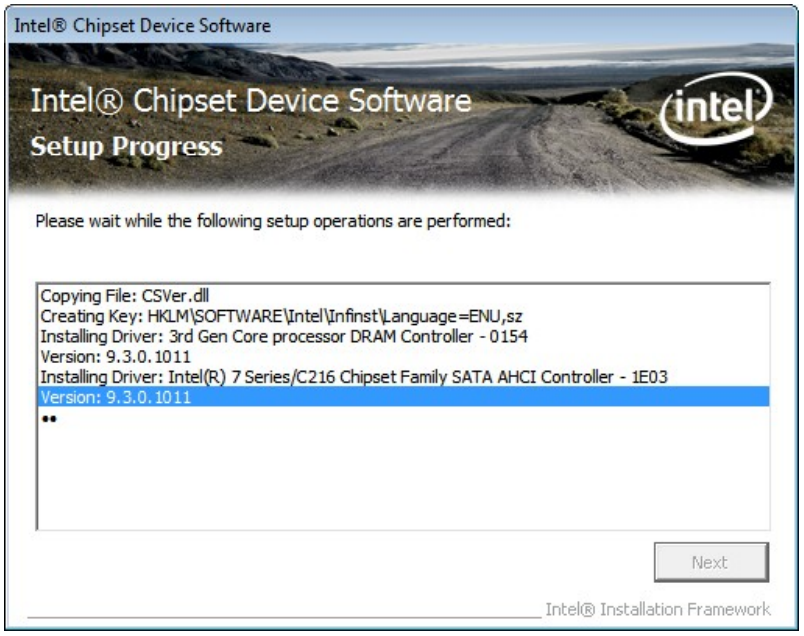


Figure 6-4: Chipset Driver Setup Operations

Step 11: Once the **Setup Operations** are complete, click **Next** to continue.

Step 12: The **Finish** screen appears.

Step 13: Select "**Yes, I want to restart the computer now**" and click the **Finish** icon.

See **Figure 6-5**.

Figure 6-5: Chipset Driver Installation Finish Screen

6.4 Graphics Driver Installation

To install the graphics driver, please do the following.

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

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

Step 3: Double click the setup file.

Step 4: The **Welcome Screen** in **Figure 6-6** appears. Click **Next** to continue.

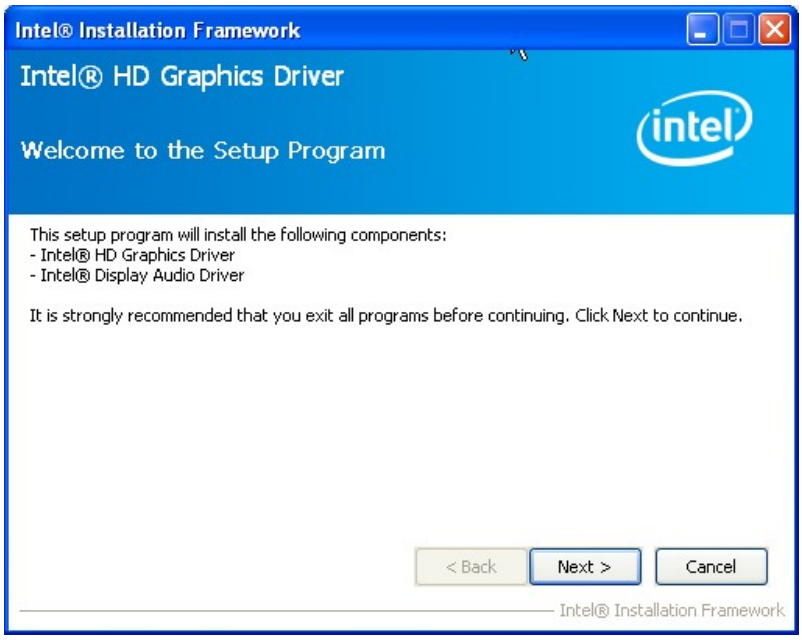


Figure 6-6: Graphics Driver Welcome Screen

Step 5: The license agreement in **Figure 6-7** appears. Read the **License Agreement**.

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

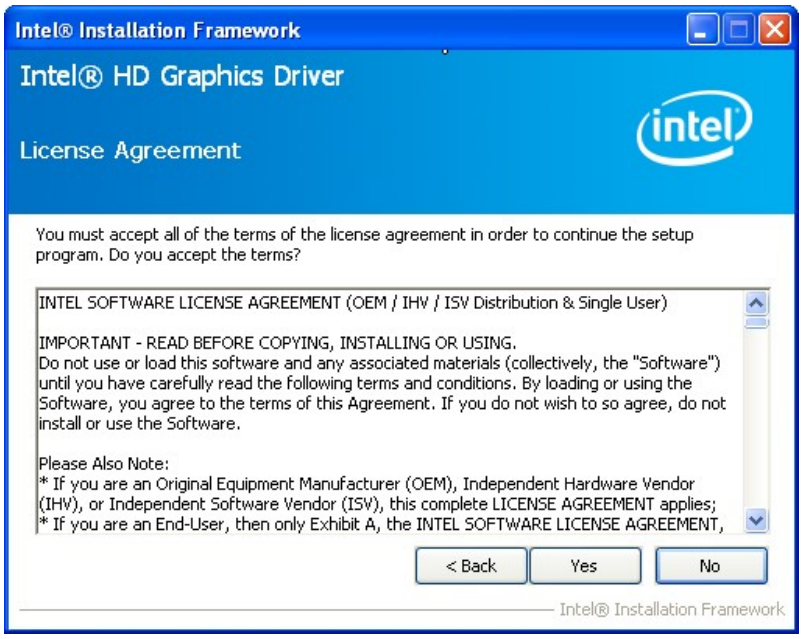


Figure 6-7: Graphics Driver License Agreement

Step 7: The Read Me file in **Figure 6-8** appears.

Step 8: Click **Next** to continue.

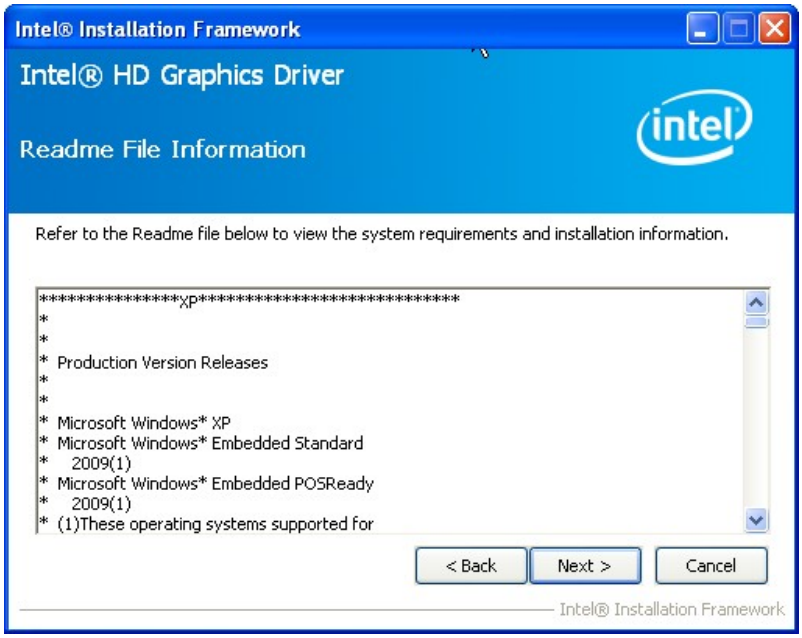


Figure 6-8: Graphics Driver Read Me File

Step 9: **Setup Operations** are performed as shown in **Figure 6-9**.

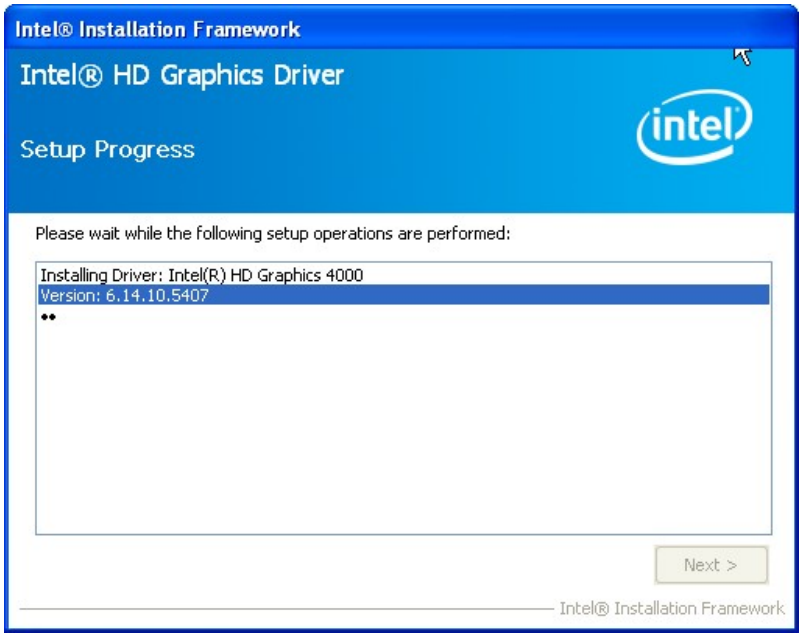


Figure 6-9: Graphics Driver Setup Operations

Step 10: Once the **Setup Operations** are complete, click the **Next** icon to continue.

Step 11: The **Finish** screen appears.

Step 12: Select "**Yes, I want to restart the computer now**" and click the **Finish** icon. See **Figure 6-10**.

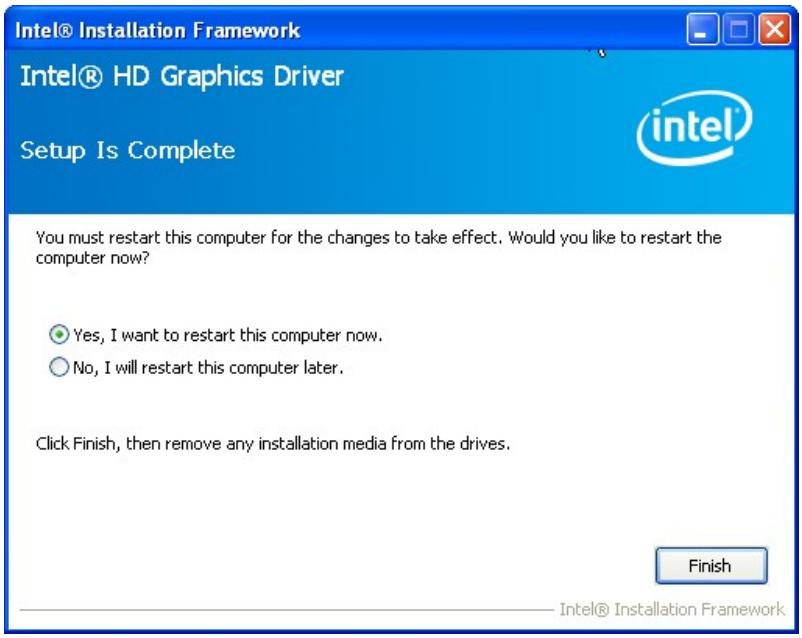


Figure 6-10: Graphics Driver Installation Finish Screen

6.5 LAN Driver Installation

To install the LAN driver, please do the following.

Step 1: Access the driver list shown in **Error! Reference source not found.**. (See **Section 6.2**)

Step 2: Click "**3-LAN**" and select the folder which corresponds to the operating system.

Step 3: Double click the setup file.

Step 4: The **Welcome** screen in **Figure 6-11** appears.

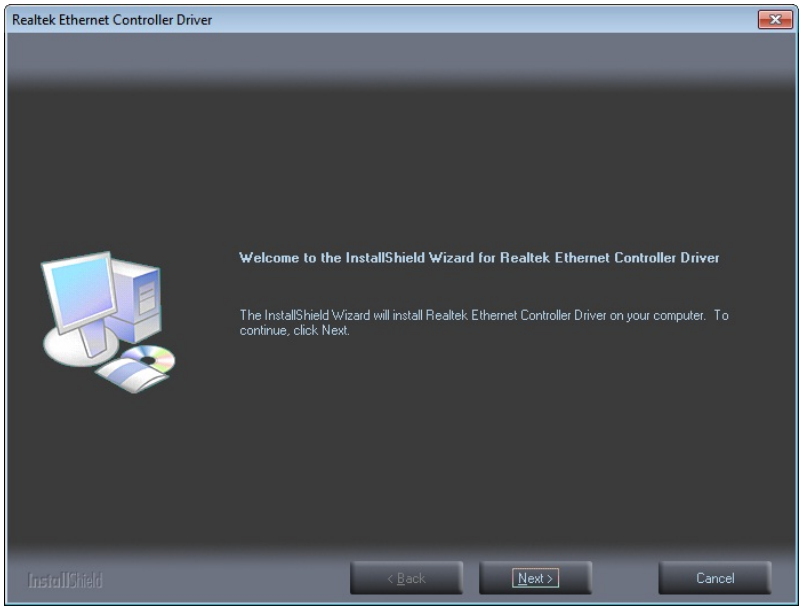


Figure 6-11: LAN Driver Welcome Screen

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

Step 6: The **Ready to Install** screen in **Figure 6-12** appears.

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

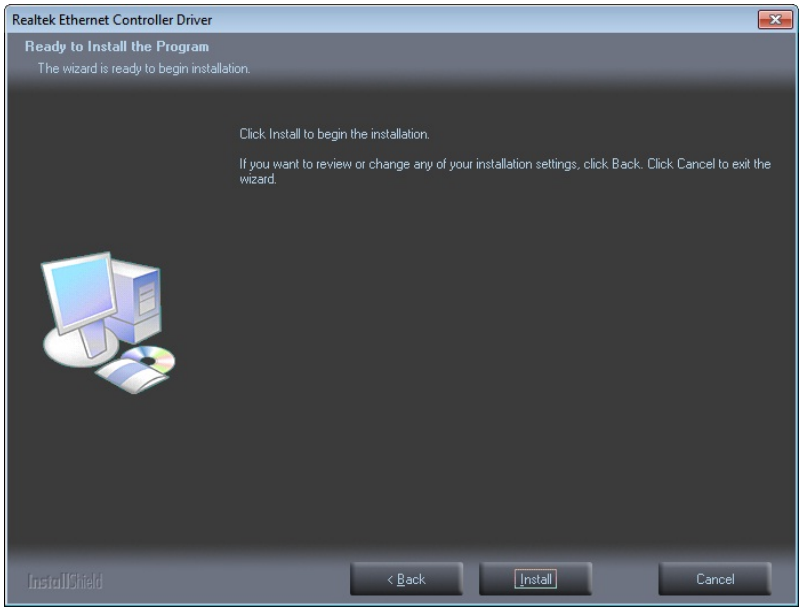


Figure 6-12: LAN Driver Installation

Step 8: The program begins to install.

Step 9: When the driver installation is complete, the screen in **Figure 6-13** appears.

Step 10: Click **Finish** to exit.

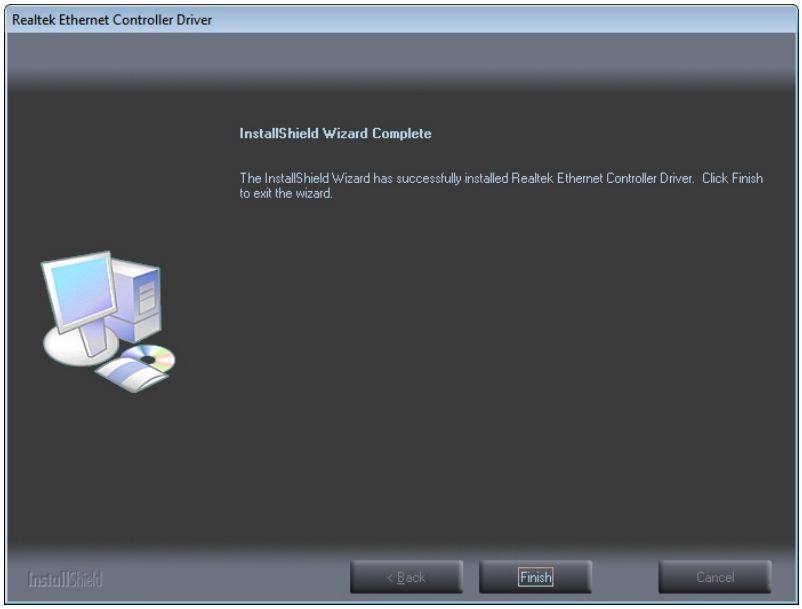


Figure 6-13: LAN Driver Installation Complete

6.6 Audio Driver Installation

To install the Audio driver, please do the following.

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

Step 2: Click "**4-Audio**" and select the folder which corresponds to the operating system.

Step 3: Double click the setup file.

Step 4: The **InstallShield Wizard** is prepared to guide the user through the rest of the process.

Step 5: Once initialized, the **InstallShield Wizard** welcome screen appears (**Figure 6-14**).

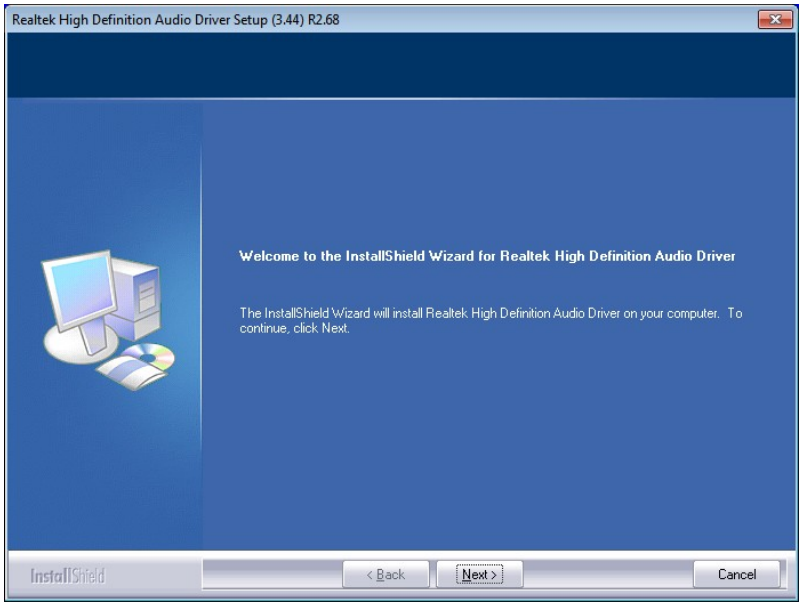


Figure 6-14: Audio Driver Welcome Screen

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

Step 7: The program begins to install. The installation progress can be monitored in the progress bar shown in **Figure 6-15**.

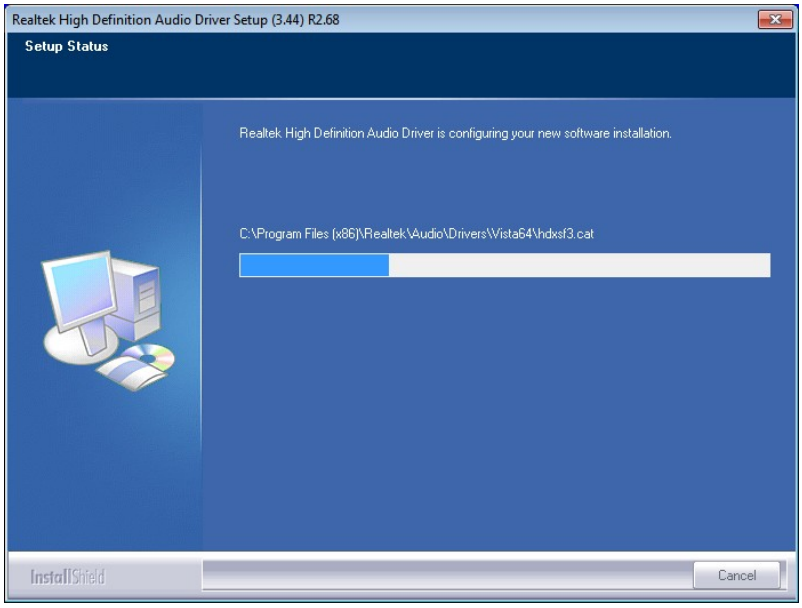


Figure 6-15: Audio Driver Installation

Step 8: When the driver installation is complete, the screen in **Figure 6-16** appears.

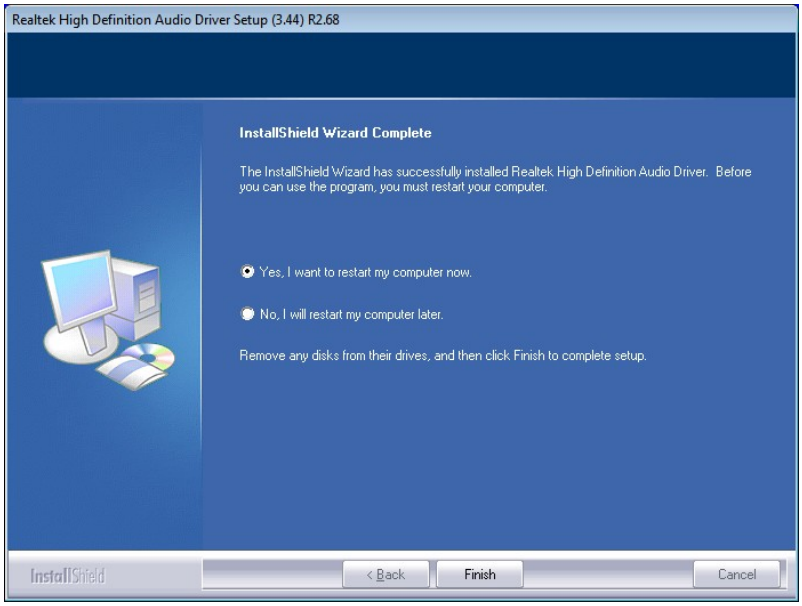


Figure 6-16: Audio Driver Installation Complete

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

Step 10: The system reboots.

Appendix

A

Regulatory Compliance

DECLARATION OF CONFORMITY

This equipment has been tested and found to comply with specifications for CE marking. If the user modifies and/or installs other devices in the equipment, the CE conformity declaration may no longer apply.

FCC WARNING

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Appendix

B

BIOS Options

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

Appendix

C

Terminology

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

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

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

Appendix

D

Digital I/O Interface

D.1 Introduction

The DIO connector on the WAFER-NM701-1007U 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.

The BIOS interrupt call **INT 15H** controls the digital I/O.

INT 15H:

AH – 6FH	
Sub-function:	
AL – 8	:Set the digital port as INPUT
AL	:Digital I/O input value

D.2 Assembly Language Sample 1

```
MOV     AX, 6F08H       ;setting the digital port as input
INT     15H             ;
```

AL low byte = value

AH – 6FH	
Sub-function:	
AL – 9	:Set the digital port as OUTPUT
BL	:Digital I/O input value

D.3 Assembly Language Sample 2

```
MOV     AX, 6F09H       ;setting the digital port as output
MOV     BL, 09H         ;digital value is 09H
INT     15H             ;
```

Digital Output is 1001b

Appendix

E

Watchdog Timer

NOTE:

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

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

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

INT 15H:

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

Table 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:

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

EXAMPLE PROGRAM:

```
; INITIAL TIMER PERIOD COUNTER

;
W_LOOP:
;

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

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.

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	O	O	O	O	O	O
Display	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O
Fan Assembly	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O
Battery	O	O	O	O	O	O

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

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

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

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

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