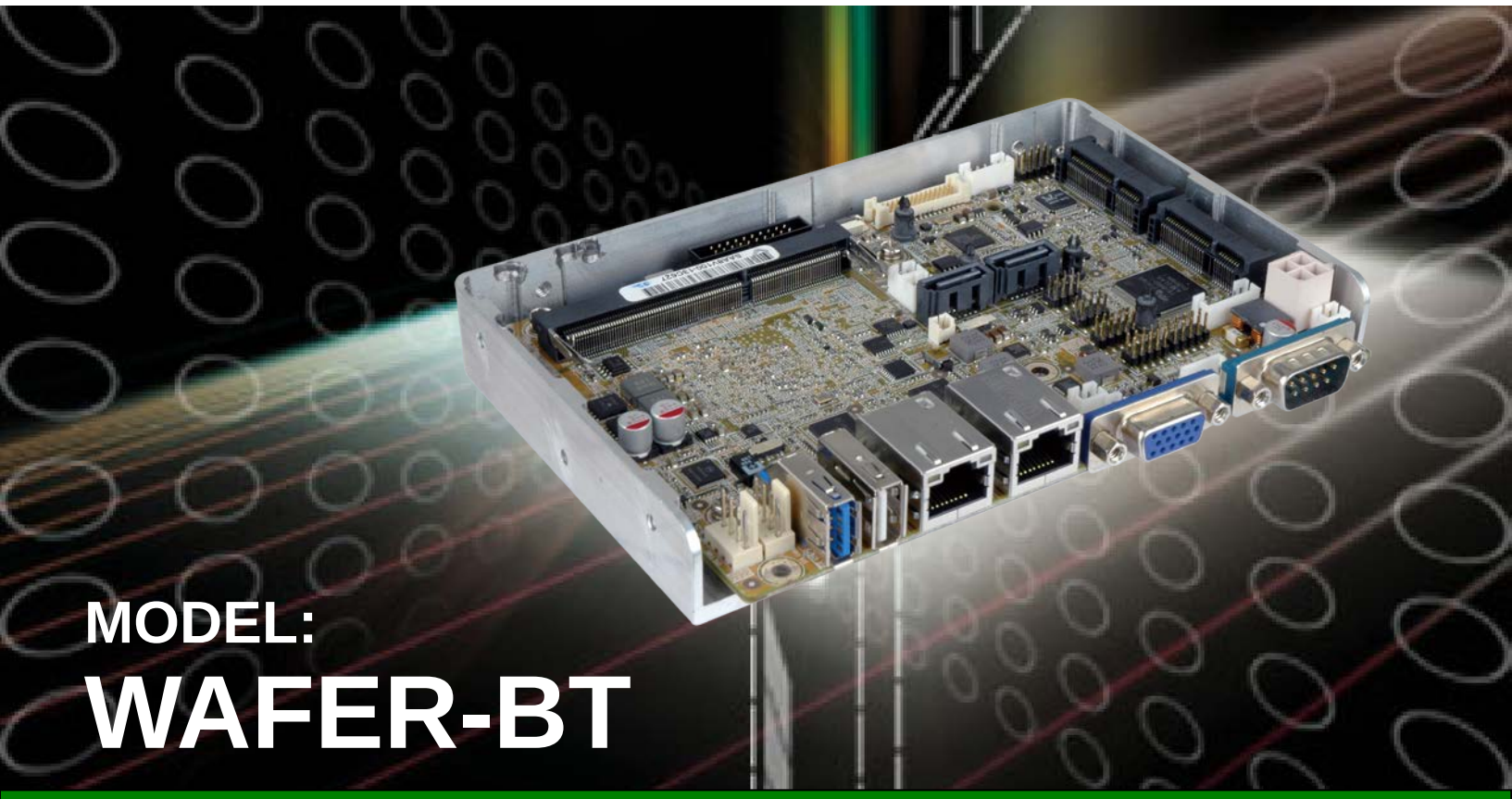
IEI Integration Corp.



MODEL:

WAFER-BT

3.5" SBC with Intel® 22nm Atom®/Celeron® on-board SoC, VGA/LVDS/iDP, Dual PCIe GbE, USB 3.2 Gen 1, PCIe Mini, SATA 3Gb/s, mSATA, COM, Audio and RoHS

User Manual

Rev. 2.01 - July 13, 2021

RoHS Lead Free

Revision

Date	Version	Changes
July 13, 2021	2.01	Updated Chapter 6: Software Driver
July 5, 2018	2.00	Updated to R20 version
January, 15, 2018	1.06	Updated Table 3-9: Internal Display Port Connector Pinouts
June 30, 2017	1.05	Updated BIOS spec on page 7
January 12, 2017	1.04	Updated Section 2.4: Optional Items Updated Chapter 3: Connectors Added a notice for downloading BIOS from IEI website in Chapter 5.
August 26, 2015	1.03	Updated Figure 1-3: Dimensions (mm) Updated Section 2: Unpacking Updated Table 3-17: RS-232 Serial Port Connector Pinouts Added Section 4.7: Chassis Installation Added notices for mSATA and SATA2 usage
February 13, 2015	1.02	Updated Section 1.5: Dimensions
January 26, 2015	1.01	Updated Section 3.2.23: USB connectors pinouts
July 7, 2014	1.00	Initial release

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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.

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1

Introduction

1.1 Introduction

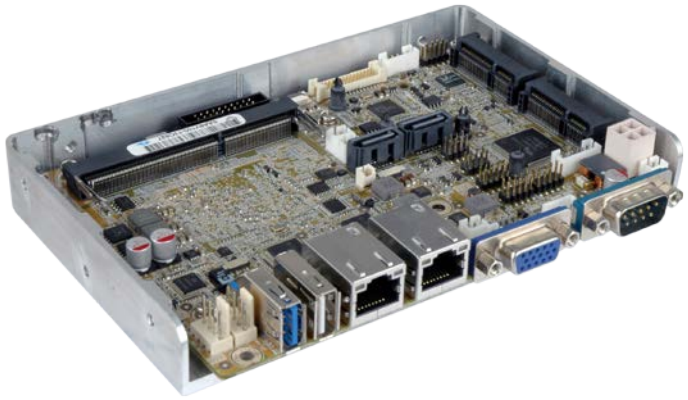


Figure 1-1: WAFER-BT

The WAFER-BT SBC motherboard is an Intel® Atom®/Celeron® processor platform. It supports one 204-pin 1066/1333 MHz single-channel DDR3L SO-DIMM supports up to 8GB (J1900, N2930, E3845) or 4GB (N2807, E3825, E3815).

The WAFER-BT includes a VGA connector, a LVDS connector and an iDP connector. Expansion and I/O include one USB 2.0 connector and one USB 3.2 Gen 1 (5Gb/s) connector on the rear panel, four USB 2.0 connectors by pin header and two SATA 3Gb/s connectors. Serial device connectivity is provided by two internal RS-232 connectors, one external RS-232 connector and one internal RS-422/485 connector. Two RJ-45 Ethernet connectors provide the system with smooth connections to an external LAN.

1.2 Model Variations

The model variations of the WAFER-BT Series are listed below.

Model No.	SoC
WAFER-BT-J19001	Intel® Celeron® quad-core J1900 (10W)
WAFER-BT-N29301	Intel® Celeron® quad-core N2930 (7.5W)
WAFER-BT-N28071	Intel® Celeron® dual-core N2807 (4.3W)
WAFER-BT-E38xx1	Intel® Atom® E38XX

Table 1-1: WAFER-BT Model Variations

1.3 Features

Some of the WAFER-BT motherboard features are listed below:

- 3.5" SBC supports 22nm Intel® Atom®/Celeron® on-board SoC
- Dual independent display support
- One 204-pin 1066/1333 MHz single-channel DDR3L SO-DIMM supports up to 8GB (J1900, N2930, E3845) or 4GB (N2807, E3825, E3815)
- COM, USB 3.2 Gen 1 (5Gb/s), SATA 3Gb/s, PCIE mini, mSATA and Audio support

1.4 Connectors

The connectors on the WAFER-BT are shown in the figure below.

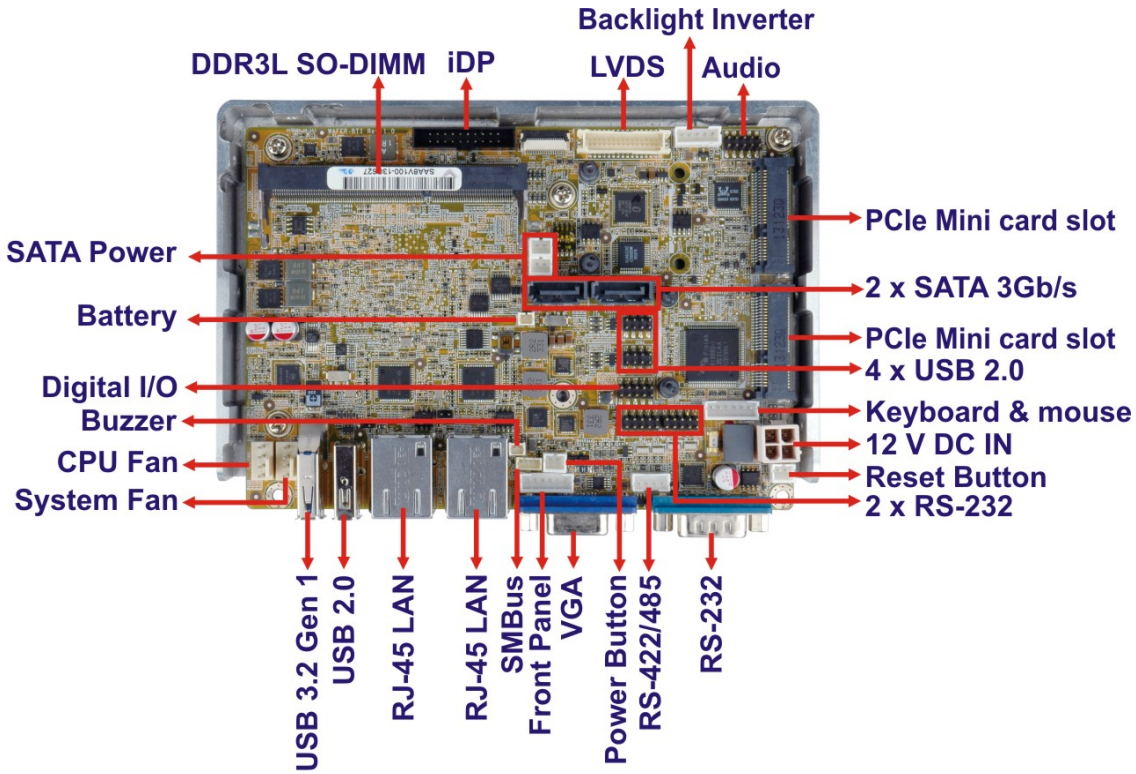
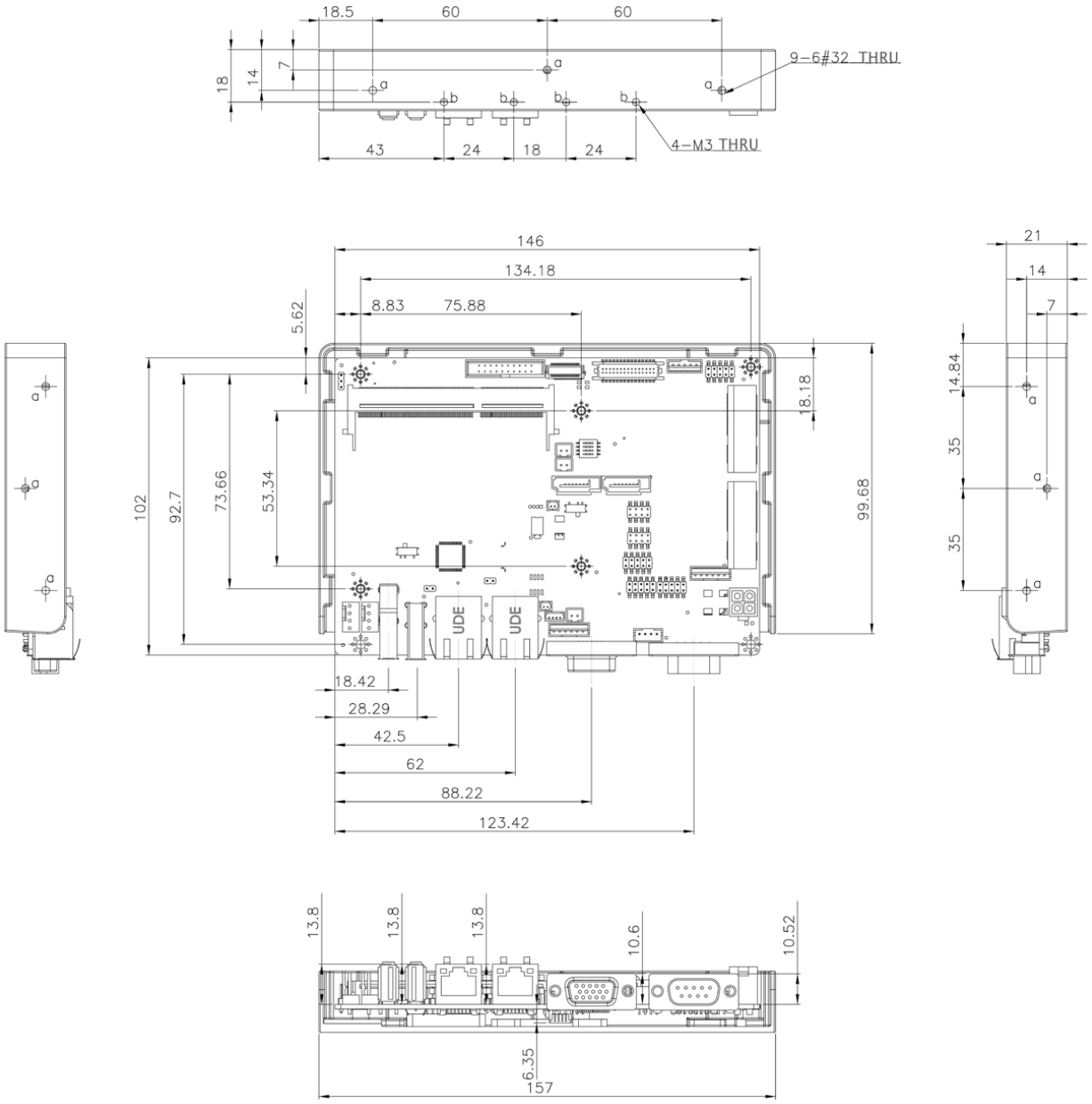


Figure 1-2: Connectors

1.5 Dimensions

The dimensions of the board are listed below:



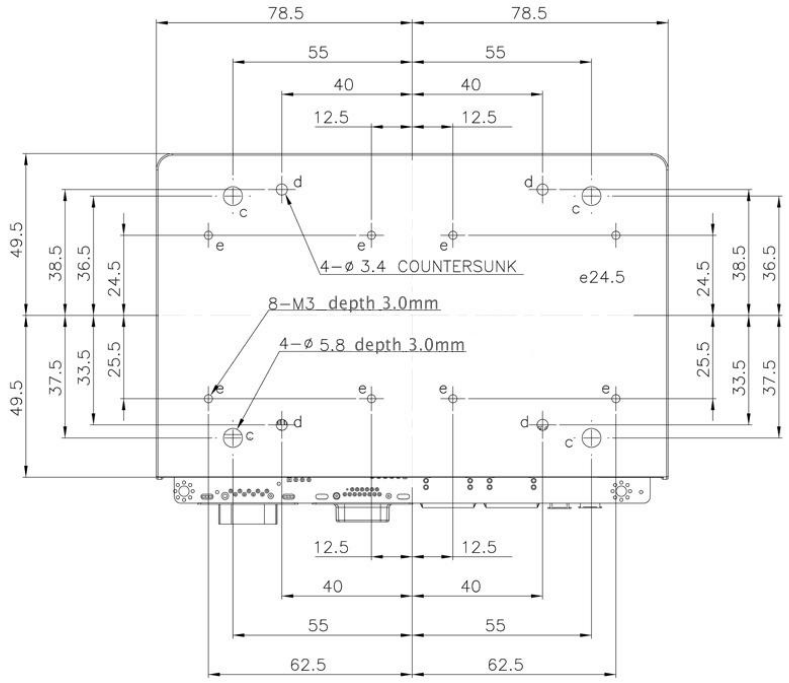


Figure 1-3: Dimensions (mm)

1.6 Data Flow

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

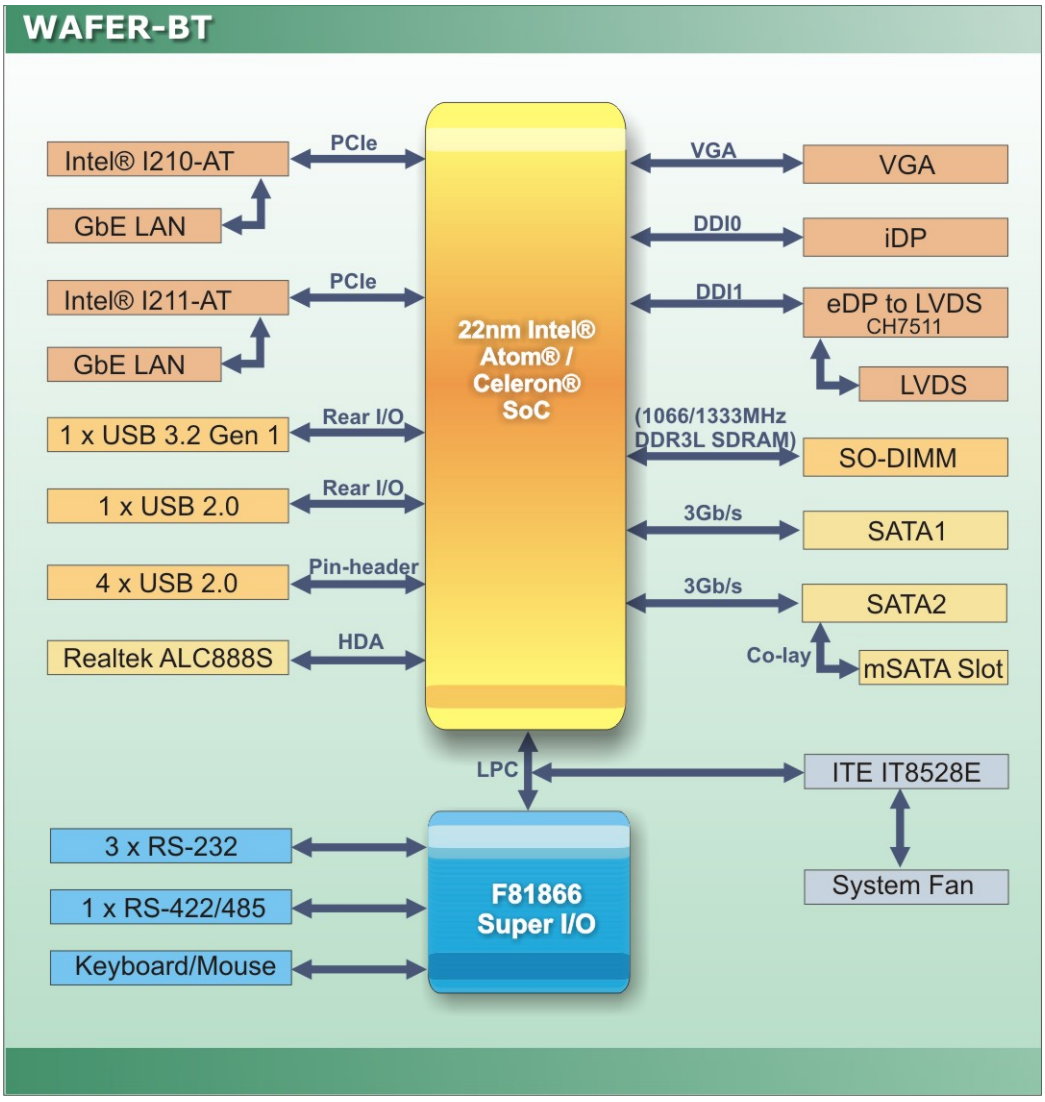


Figure 1-4: Data Flow Diagram

1.7 Technical Specifications

WAFER-BT technical specifications are listed below.

Specification	WAFER-BT
SoC	Intel® Atom® E3845 on-board SoC (1.91GHz, quad-core, 2MB cache, TDP=10W) Intel® Atom® E3825 on-board SoC (1.33GHz, dual-core, 1MB cache, TDP=6W) Intel® Atom® E3815 on-board SoC (1.46GHz, single-core, 512KB cache, TDP=5W) Intel® Celeron® J1900 on-board SoC (2GHz, quad-core, 2MB cache, TDP=10W) Intel® Celeron® N2930 on-board SoC (1.83GHz, quad-core, 2MB cache, TDP=7.5W) Intel® Celeron® N2807 on-board SoC (1.58GHz, dual-core, 2MB cache, TDP=4.3W)
BIOS	AMI UEFI BIOS BIOS version: AIxx is for Bay-trail I model (CPU: E38xx) BIOS version: AMxx is for Bay-trail M/D model (CPU: J1900/ N2930/ N2807)
Memory	One 204-pin 1066/1333 MHz single-channel DDR3L SO-DIMM supports up to 8GB (J1900, N2930, E3845) or 4GB (N2807, E3825, E3815)
Graphics	Intel® HD Graphics Gen 7 Engines with 4 execution units, supports DX11.1, OpenGL 4.2 and OpenCL1.2
Display Output	Dual Independent Display 1 x VGA (2560x1600@60Hz) 1 x 24-bit dual-channel LVDS connector (1920x1200@60Hz) 1 x iDP interface for HDMI, LVDS, VGA, DVI, DP (up to 3840x2160@60 Hz)

Specification	WAFER-BT
Ethernet	1 x PCIe GbE by Intel I210 controller (LAN1) 1 x PCIe GbE by Intel I211 controller (LAN2)
Super IO	Fintek F81866
Embedded Controller	ITE IT8528E
Audio	Realtek ALC888S HD codec
Watchdog Timer	Software programmable support 1–255 sec. system reset
I/O Interface	
Audio Connector	1 x Analog audio by 10-pin (2x5) header
Ethernet	Two RJ-45 ports
KB/MS	1 x KB/MS (by pin header)
Serial Ports	1 x RS-422/485 (by pin header) 3 x RS-232 (1 on rear I/O, 2 by pin header)
USB Ports	1 x USB 3.2 Gen 1 (5Gb/s) (on rear I/O) 5 x USB 2.0 (1 on rear I/O, 4 by pin header)
Front Panel	1 x 6-pin (1x6) wafer for power LED & HDD LED 1 x 2-pin (1x2) wafer for power button 1 x 2-pin (1x2) wafer for power reset button
LAN LED	2 x 2-pin header for LAN1 Link LED, LAN2 Link LED
Fan	1 x 4-pin CPU fan connector 1 x 4-pin system fan connector
SMBus	1 x 4-pin (1x4) wafer
Expansion	1 x Full-size PCIe Mini card slot with mSATA support (mSATA colay with SATA port 2) 1 x Half-size PCIe mini card slot (support PCIe signal)
Digital I/O	8-bit digital I/O (4-bit input, 4-bit output)
Storage	
Serial ATA	2 x SATA 3Gb/s with 5V SATA power connector (no RAID)

Specification	WAFER-BT
Environmental and Power Specifications	
Power Supply	12V DC input only (AT/ATX support)
Power Consumption	+12V@1.45A (Intel® Celeron® J1900 CPU with one 8GB 1333 MHz DDR3 memory)
Operating Temperature	-20°C – 60°C
Storage Temperature	-30°C – 70°C
Humidity	5% – 95%, non-condensing
Physical Specifications	
Dimensions	146 mm x 102 mm
Weight GW/NW	600 g / 250 g

Table 1-2: Technical Specifications

Chapter

2

Unpacking

2.1 Anti-static Precautions

WARNING!

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

Make sure to adhere to the following guidelines:

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

2.2 Unpacking Precautions

When the WAFER-BT 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-BT was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The WAFER-BT is shipped with the following components:

Quantity	Item and Part Number	Image
1	WAFER-BT single board computer with heat spreader	
1	Audio cable	
1	SATA with 5V output cable kit	
1	Power cable	
1	Quick Installation Guide	

2.4 Optional Items

The following are optional components which may be separately purchased:

Item and Part Number	Image
Dual-port USB cable without bracket (**P/N**: 32001-008600-200-RS)	
RS-422/485 cable (**P/N**: 32205-003800-300-RS)	
PS/2 KB/MS Y-cable without bracket (**P/N**: 32006-001100-201-RS)	
RS-232 cable with Bracket (**P/N**:19800-000300-100-RS)	
DisplayPort to 24-bit dual-channel LVDS converter board for IEI iDP connector (**P/N**: DP-LVDS-R10)	
DisplayPort to HDMI converter board for IEI iDP connector (**P/N**: DP-HDMI-R10)	
DisplayPort to VGA converter board for IEI iDP connector (**P/N**: DP-VGA-R10)	
DisplayPort to DVI-D converter board for IEI iDP connector (**P/N**: DP-DVI-R10)	

DisplayPort to DisplayPort converter board for IEI iDP connector (**P/N**: DP-DP-R10)	

Chapter

3

Connectors

3.1 Peripheral Interface Connectors

This chapter details all the jumpers and connectors.

3.1.1 WAFER-BT Layout

The figures below show all the connectors and jumpers.

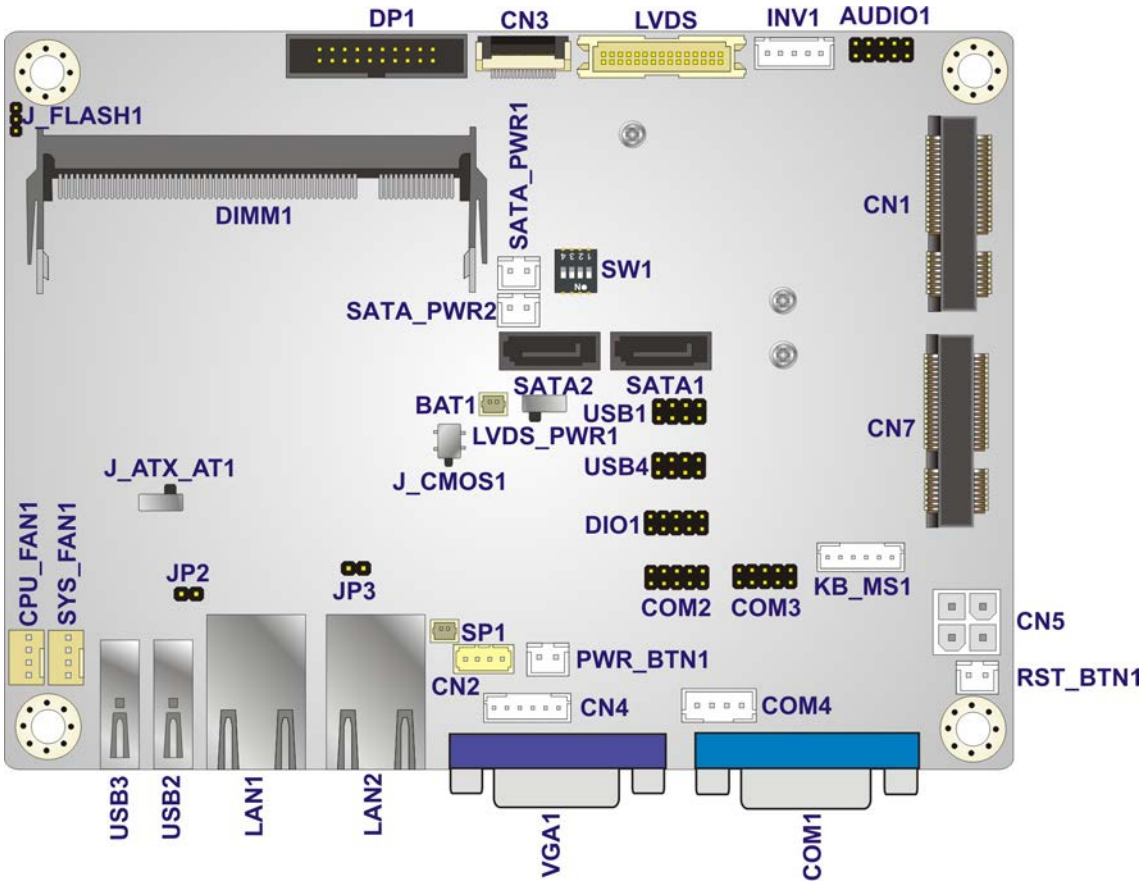


Figure 3-1: Connector and Jumper Locations (Front)

3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

Connector	Type	Label
+12V DC-IN power connector	4-pin Molex	CN5
Audio connector	10-pin header	AUDIO1
Battery connector	2-pin wafer	BAT1
Buzzer connector	2-pin wafer	SP1
CPU fan connector	4-pin wafer	CPU_FAN1
System fan connector	4-pin wafer	SYS_FAN1
DDR3L SO-DIMM slot	DDR3L SO-DIMM slot	DIMM1
Digital I/O connector	10-pin header	DIO1
Display port connector	20-pin header	DP1
Front panel connector	6-pin wafer	CN4
Keyboard & mouse connector	6-pin wafer	KB_MS1
LVDS panel Connector	30-pin crimp	LVDS1
LCD panel backlight power connector	5-pin wafer	INV1
LAN LED connector	2-pin header	JP2, JP3
PCIe Mini card slots	PCIe Mini card slot	CN1, CN7
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	COM4
SATA 3Gb/s drive connectors	7-pin SATA connector	SATA1, SATA2

SATA power connectors	2-pin wafer	SATA_PWR1, SATA_PWR2
SMBus connector	4-pin wafer	CN2
USB 2.0 connectors	8-pin header	USB1, USB4

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
LAN connectors	RJ-45	LAN1, LAN2
RS-232 serial port connector	DB-9 male	COM1
USB 2.0 connector	USB Type-A	USB2
USB 3.2 Gen 1 (5Gb/s) connector	USB Type-A	USB3
VGA Connector	15-pin female	VGA1

Table 3-2: Rear Panel Connectors

3.2 Internal Peripheral Connectors

The section describes all of the connectors on the WAFER-BT.

3.2.1 +12V DC-IN Power Connector

CN Label: **CN5**

CN Type: 4-pin Molex, p=4.2 mm

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

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

The connector supports the +12V power supply.

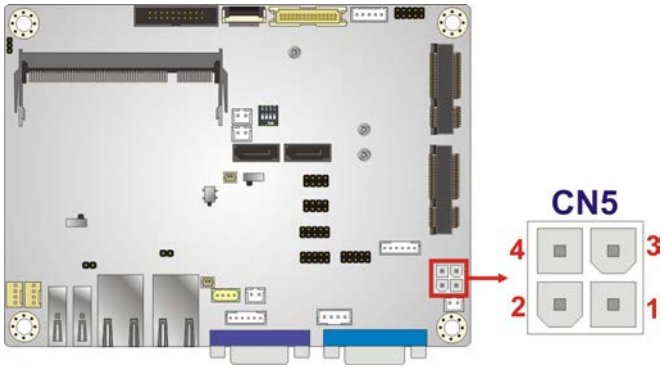


Figure 3-2: +12V DC-IN Power Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	+12V	4	+12V

Table 3-3: +12V DC-IN Power Connector Pinouts

3.2.2 Audio Connector

CN Label:	**AUDIO1**
CN Type:	10-pin header, p=2.00 mm
CN Location:	See **Figure 3-3**
CN Pinouts:	See **Table 3-4**

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

Figure 3-3: Audio Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	LINE_OUTR	2	LINEIN_R
3	Analog_GND	4	Analog_GND
5	LINE_OUTL	6	LINEIN_L
7	Analog_GND	8	Analog_GND
9	LMIC1-R	10	LMIC1-L

Table 3-4: Audio Connector Pinouts

3.2.3 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, p=1.25 mm
CN Location:	See **Figure 3-4**
CN Pinouts:	See **Table 3-5**

The battery connector is connected to the system battery. The battery provides power to the system clock to retain the time when power is turned off. **NOTE**: It is recommended to attach the RTC battery onto the system chassis in which the WAFER-BT is installed.

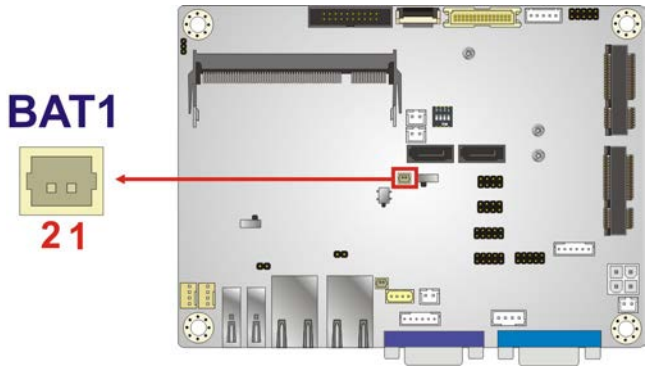


Figure 3-4: Battery Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	VBATT	2	GND

Table 3-5: Battery Connector Pinouts

3.2.4 Buzzer Connector

CN Label:	**SP1**
CN Type:	2-pin wafer, p=1.25 mm
CN Location:	See **Figure 3-5**
CN Pinouts:	See **Table 3-6**

The buzzer connector is connected to the buzzer. **NOTE**: If you cannot find a good place to put a buzzer on the WAFER-BT, it is recommended to attach the buzzer onto the system chassis in which the WAFER-BT is installed.

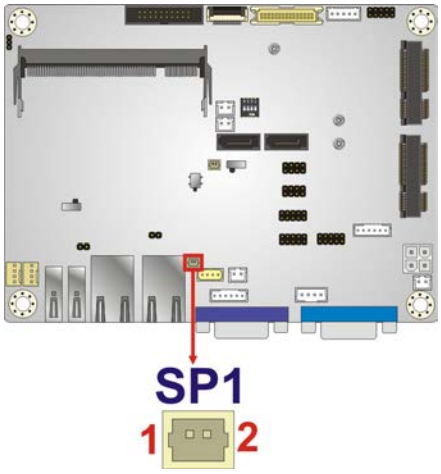


Figure 3-5: Buzzer Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Buzzer +	2	Buzzer -

Table 3-6: Buzzer Connector Pinouts

3.2.5 Fan Connectors

CN Label: **CPU_FAN1, SYS_FAN1**

CN Type: 4-pin wafer, p=2.54 mm

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

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

The fan connector attaches to a cooling fan.

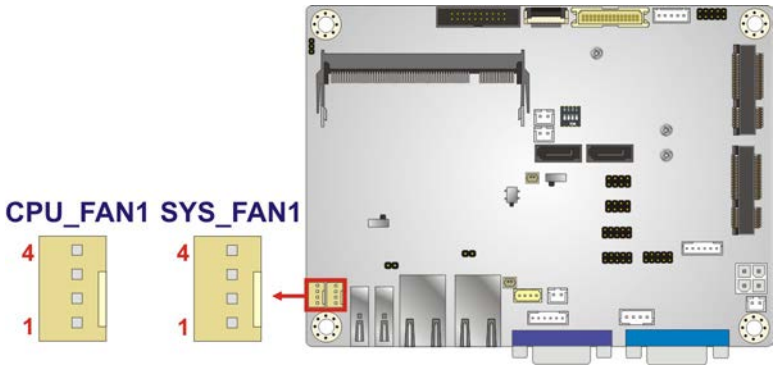


Figure 3-6: Fan Connector Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+12V
3	FANIO1	4	FANOUT1

Table 3-7: Fan Connector Pinouts

3.2.6 DDR3L SO-DIMM Slot

CN Label: **DIMM1**

CN Type: DDR3L SO-DIMM slot

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

The DDR3L SO-DIMM slot is for DDR3L SO-DIMM memory module.

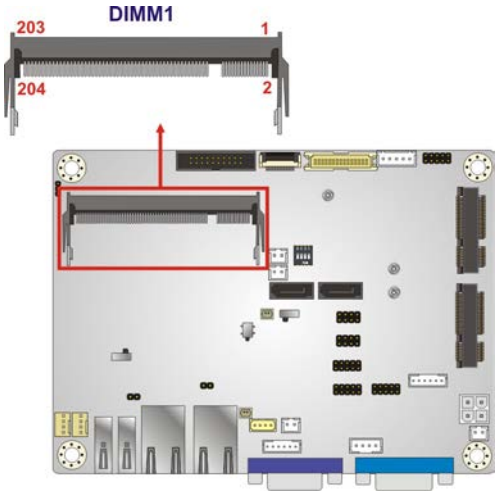


Figure 3-7: DDR3L SO-DIMM Slot Location

3.2.7 Digital I/O Connector

CN Label: **DIO1**

CN Type: 10-pin header, p=2.00 mm

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

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

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

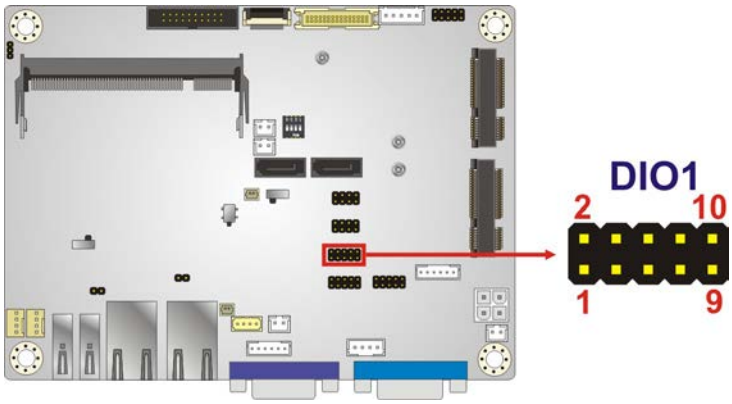


Figure 3-8: Digital I/O Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	+5V
3	DGPO3	4	DGPO2
5	DGPO1	6	DGPO0
7	DGPI3	8	DGPI2
9	DGPI1	10	DGPI0

Table 3-8: Digital I/O Connector Pinouts

3.2.8 Internal Display Port Connector

CN Label: **DP1**

CN Type: 20-pin box header, p=2.00 mm

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

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

The internal disport port connector provides flexible display function that supports VGA, DVI, LVDS, HDMI and DisplayPort via the disport port convert board.

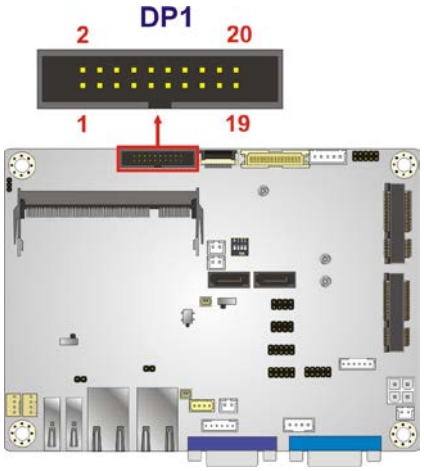


Figure 3-9: Internal Display Port Connector Location

Pin	Description	Pin	Description
1	DP_HPD#	2	DPD_AUX_CTRL_P2
3	GND	4	DPD_AUX_CTRL_N2
5	AUX_CTRL_DET_D	6	GND
7	GND	8	C_DPD_LANE2_P
9	C_DPD_LANE3_P	10	C_DPD_LANE2_N
11	C_DPD_LANE3_N	12	GND
13	GND	14	C_DPD_LANE0_P
15	C_DPD_LANE1_P	16	C_DPD_LANE0_N
17	C_DPD_LANE1_N	18	3.3V
19	5V	20	NC

Table 3-9: Internal Display Port Connector Pinouts

3.2.9 Front Panel Connector

CN Label: **CN4**

CN Type: 6-pin wafer, p=2.00 mm

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

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

The front panel connector connects to the indicator LEDs on the system front panel.

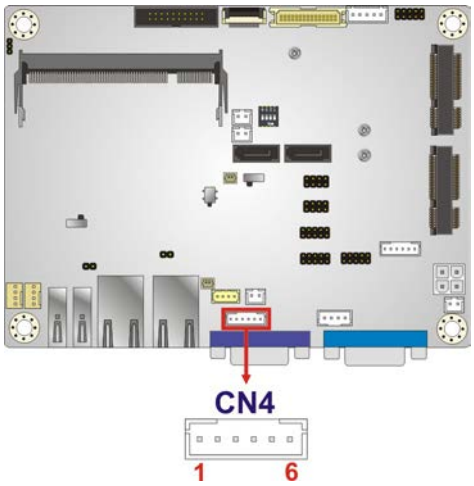


Figure 3-10: Front Panel Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	GND
3	PWR_LED+	4	PWR_LED-
5	HDD_LED+	6	HDD_LED-

Table 3-10: Front Panel Connector Pinouts

3.2.10 Keyboard and Mouse Connector

CN Label:	**KB_MS1**
CN Type:	6-pin wafer, p=2.00 mm
CN Location:	See **Figure 3-11**
CN Pinouts:	See **Table 3-11**

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

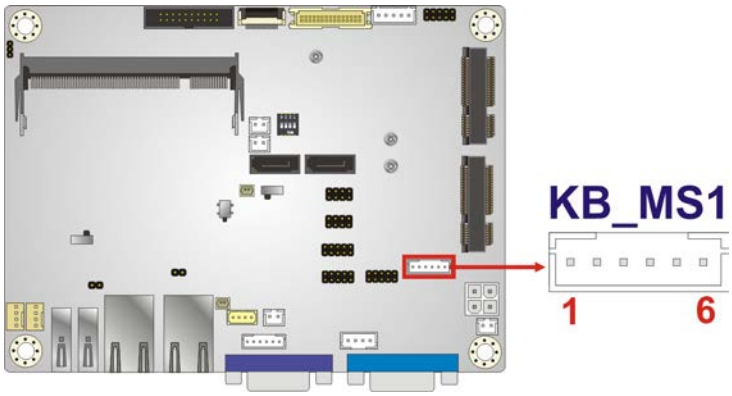


Figure 3-11: Keyboard and Mouse Location

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

Table 3-11: Keyboard and Mouse Connector Pinouts

3.2.11 LVDS Backlight Inverter Connector

CN Label: **INV1**

CN Type: 5-pin wafer, p=2.00 mm

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

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

The backlight inverter connector provides power to an LCD panel.

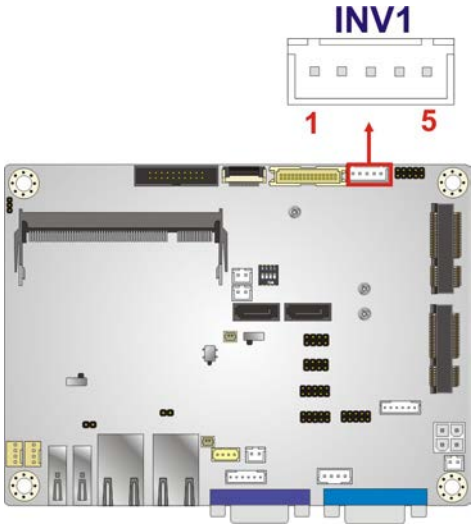


Figure 3-12: Backlight Inverter Connector Location

Pin	Description
1	BRIGHTNESS2
2	GND
3	12V
4	GND
5	ENABKL2

Table 3-12: Backlight Inverter Connector Pinouts

3.2.12 LVDS LCD Connector

CN Label: **LVDS1**

CN Type: 30-pin crimp, p=1.25 mm

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

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

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

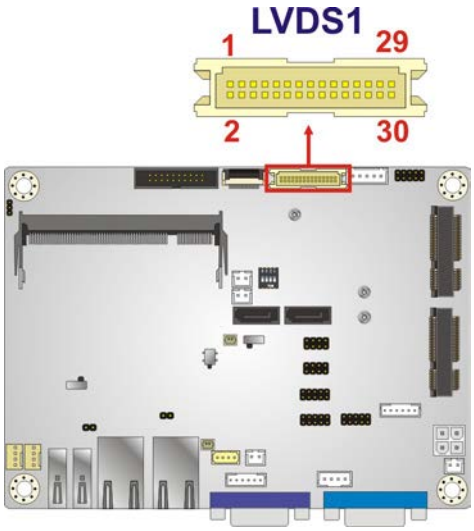


Figure 3-13: LVDS Connector Location

Pin	Description	Pin	Description
1	GROUND	2	GROUND
3	LVDS_A_TX0-P	4	LVDS_A_TX0-N
5	LVDS_A_TX1-P	6	LVDS_A_TX1-N
7	LVDS_A_TX2-P	8	LVDS_A_TX2-N
9	LVDS_A_TXCLK-P	10	LVDS_A_TXCLK-N
11	LVDS_A_TX3-P	12	LVDS_A_TX3-N
13	GROUND	14	GROUND
15	LVDS_B_TX0-P	16	LVDS_B_TX0-N
17	LVDS_B_TX1-P	18	LVDS_B_TX1-N
19	LVDS_B_TX2-P	20	LVDS_B_TX2-N
21	LVDS_B_TXCLK-P	22	LVDS_B_TXCLK-N
23	LVDS_B_TX3-P	24	LVDS_B_TX3-N

Pin	Description	Pin	Description
25	GROUND	26	GROUND
27	+LCD VCC	28	+LCD VCC
29	+LCD VCC	30	+LCD VCC

Table 3-13: LVDS Connector Pinouts

3.2.13 LAN LED Connector

CN Label: **JP2, JP3**

CN Type: 2-pin header, p=2.00 mm

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

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

The LAN LED connectors connect to the LAN link LEDs on the system.

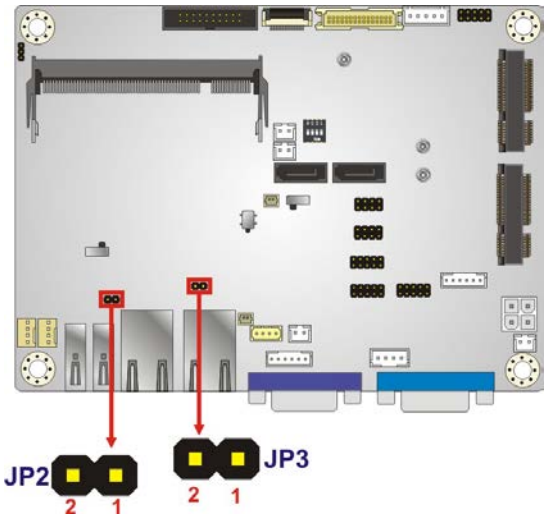


Figure 3-14: LAN LED Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+3.3VLAN	2	LAN_LED_LINK#

Table 3-14: LAN LED Connector Pinouts

3.2.14 PCIe Mini Card Slots

CN Label:	**CN1, CN7**
CN Type:	PCIe Mini card slot
CN Location:	See **Figure 3-15**

The full-size/half-size PCIe Mini card slot is for installing a PCIe Mini expansion card or an mSATA module. The half-size PCIe Mini card support PCIe signal.

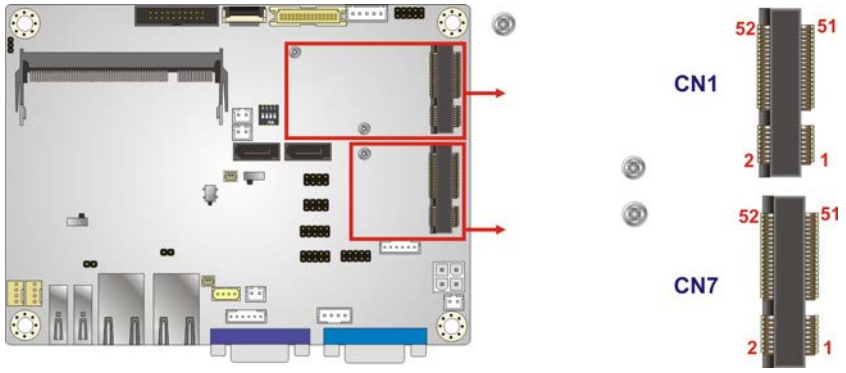


Figure 3-15: PCIe Mini Card Slot Locations

NOTE:

If an mSATA module is installed in the full-size/half-size PCIe Mini slot (CN1), the SATA port 2 (SATA2) will be disabled. Choose either the SATA2 connector or the mSATA module for storage.

3.2.15 Power Button Connector

CN Label:	**PWR_BTN1**
CN Type:	2-pin wafer, p=2.00 mm
CN Location:	See **Figure 3-16**
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.

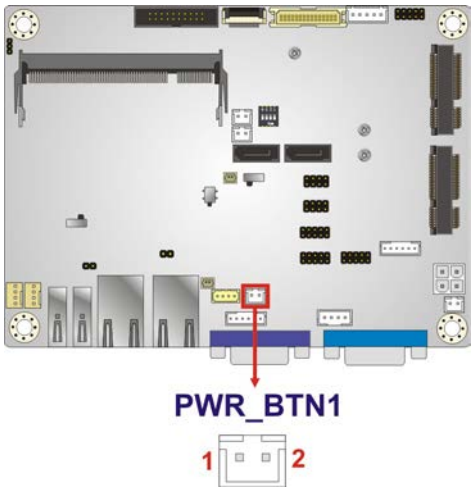


Figure 3-16: Power Button Connector Location

Pin	Description
1	PWRBTN_SW#
2	GND

Table 3-15: Power Button Connector Pinouts

3.2.16 Reset Button Connector

CN Label:	**RST_BTN1**
CN Type:	2-pin wafer, p=2.00 mm
CN Location:	See **Figure 3-17**
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.

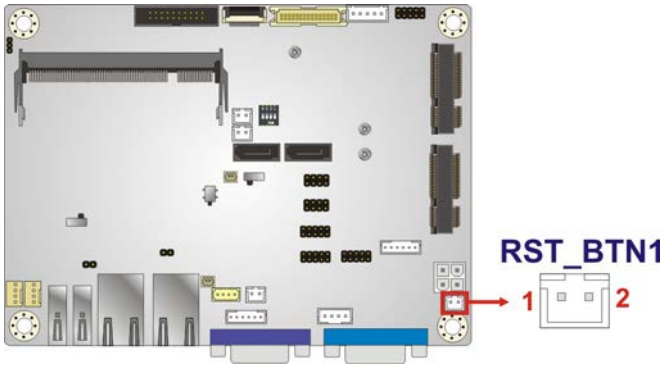


Figure 3-17: Reset Button Connector Location

Pin	Description
1	PM_SYSRST_R#
2	GND

Table 3-16: Reset Button Connector Pinouts

3.2.17 RS-232 Serial Port Connectors

CN Label: **COM2, COM3**

CN Type: 10-pin header, p=2.00 mm

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

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

The serial connector provides RS-232 connection.

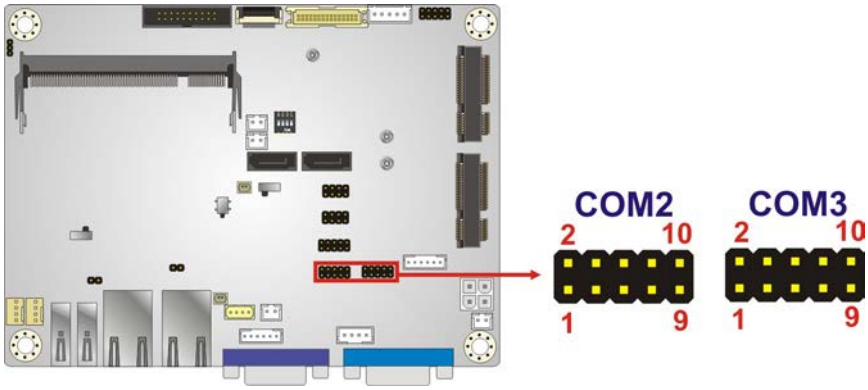


Figure 3-18: RS-232 Serial Port Connectors Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD	2	DSR
3	RXD	4	RTS
5	TXD	6	CTS
7	DTR	8	RI
9	GND	10	GND

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

3.2.18 RS-422/485 Serial Port Connector

CN Label:	**COM4**
CN Type:	4-pin wafer, p=2.00 mm
CN Location:	See **Figure 3-19**
CN Pinouts:	See **Table 3-18**

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

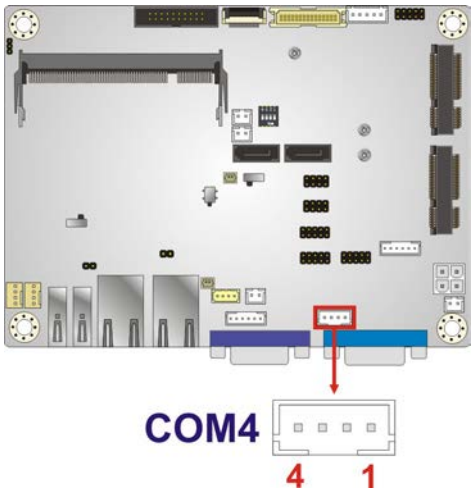


Figure 3-19: RS-422/485 Connector Location

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

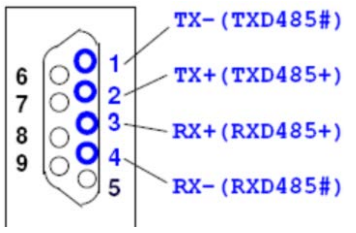
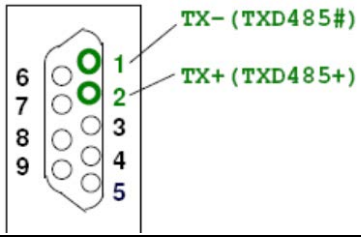
RS-422 Pinouts	RS-485 Pinouts
	

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

3.2.19 SATA 3Gb/s Drive Connectors

CN Label: **SATA1, SATA2**

CN Type: 7-pin SATA connector

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

The SATA 3Gb/s drive connector is connected to a SATA 3Gb/s drive. The SATA 3Gb/s drive transfers data at speeds as high as 3Gb/s.

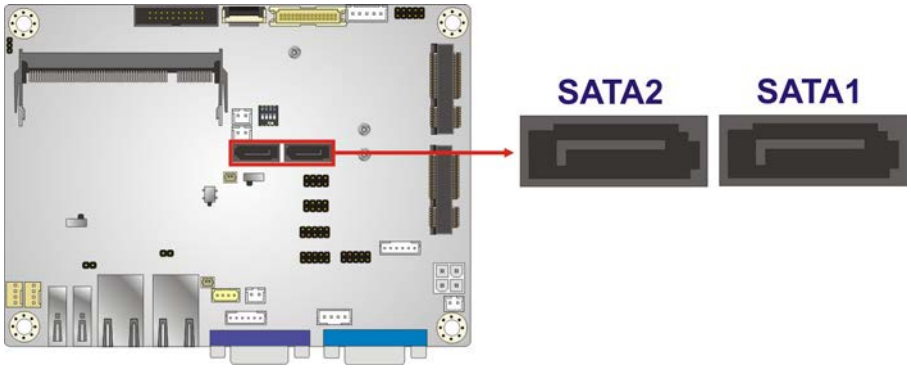


Figure 3-20: SATA 3Gb/s Drive Connectors Locations

NOTE:

If an HDD is connected to the SATA port 2 (SATA2), an mSATA module will not be supported by the PCIe Mini slot (CN1). Choose either the SATA2 connector or the mSATA module for storage.

3.2.20 SATA Power Connectors

CN Label:	**SATA_PWR1, SATA_PWR2**
CN Type:	2-pin wafer, p=2.00 mm
CN Location:	See **Figure 3-21**
CN Pinouts:	See **Table 3-20**

The SATA power connector provides +5V power output to the SATA connector.

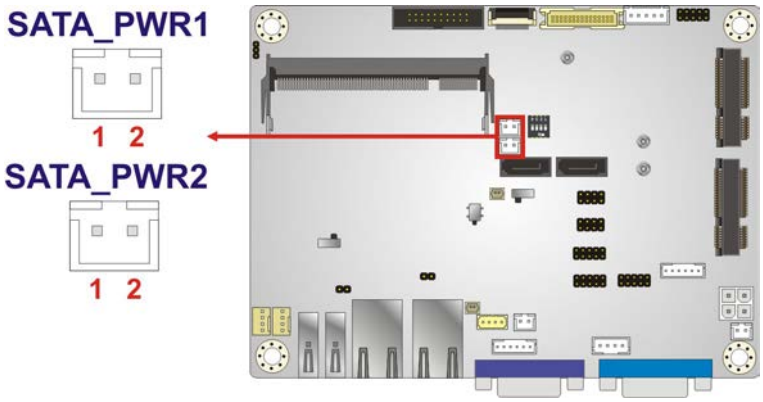


Figure 3-21: SATA Power Connector Locations

PIN NO.	DESCRIPTION
1	+5V
2	GND

Table 3-20: SATA Power Connector Pinouts

3.2.21 SMBus Connector

CN Label: **CN2**

CN Type: 4-pin wafer, p=1.25 mm

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

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

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

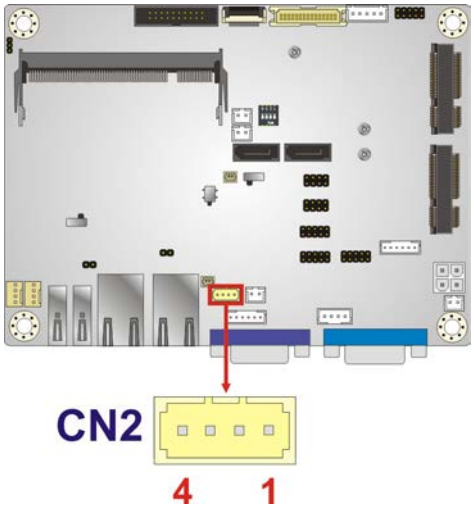


Figure 3-22: SMBus Connectors Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	SMBDATA
3	SMBCLK	4	+5V

Table 3-21: SMBus Connectors Pinouts

3.2.22 USB Connectors

CN Label:	**USB1, USB4**
CN Type:	8-pin header, p=2.00 mm
CN Location:	See **Figure 3-23**
CN Pinouts:	See **Table 3-22**

The USB connectors provide four USB 2.0 ports by dual-port USB cable.

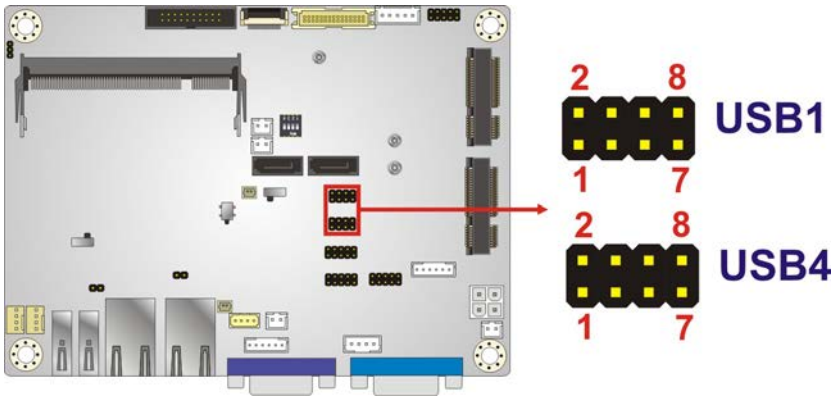


Figure 3-23: USB Connectors Locations

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	GND
3	-DATA_USB1/3	4	+DATA_USB2/4
5	+DATA_USB1/3	6	-DATA_USB2/4
7	GND	8	+5V

Table 3-22: USB Connectors Pinouts

3.3 External Peripheral Interface Connector Panel

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

- 2 x LAN connectors
- 1 x USB 3.2 Gen 1 (5Gb/s) connector
- 1 x USB 2.0 connector
- 1 x RS-232 serial port connector
- 1 x VGA connector

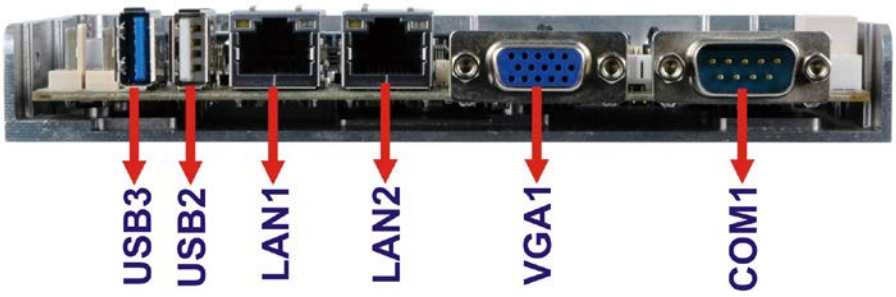


Figure 3-24: External Peripheral Interface Connector

3.3.1 LAN Connector

CN Label:	**LAN1, LAN2**
CN Type:	RJ-45
CN Location:	See **Figure 3-24**
CN Pinouts:	See **Figure 3-25** and **Table 3-23**

The LAN connector connects to a local network.

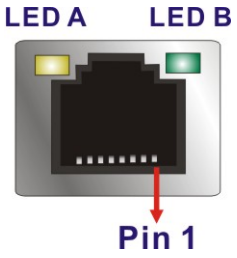


Figure 3-25: LAN Connector

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

Table 3-23: LAN Pinouts

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 3-24: Connector LEDs

3.3.2 USB Connectors

CN Label: **USB2, USB3**

CN Type: USB Type-A ports

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

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

The WAFER-BT has one external USB 2.0 port and one external USB 3.2 Gen 1 (5Gb/s) port. The USB connector can be connected to a USB device. The pinouts of USB 2.0 port & USB 3.2 Gen 1 connectors are shown below.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	-DATA_USB3
3	-DATA_USB4	4	GND

Table 3-25: USB 2.0 Port Pinouts

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	+5V	2	USB2P0-
3	USB2P0+	4	GND
5	USB3P0_RXDN1	6	USB3P0_RXDP1
7	GND	8	USB3P0_TXDN1
9	USB3P0_TXDP1		

Table 3-26: USB 3.2 Gen 1 Port Pinouts

3.3.3 RS-232 Serial Port Connector

CN Label: **COM1**

CN Type: DB-9 Male

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

CN Pinouts: See **Figure 3-26** and **Table 3-27**

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

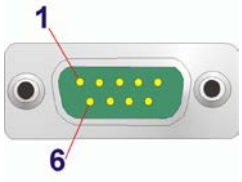


Figure 3-26: RS-232 Serial Port Connector

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DCD1	6	DSR1
2	RX1	7	RTS1
3	TX1	8	CTS1
4	DTR1	9	RI1
5	GND		

Table 3-27: RS-232 Serial Port Connector Pinouts

3.3.4 VGA Connector

CN Label: **VGA1**

CN Type: 15-pin female (VGA)

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

CN Pinouts: See **Figure 3-27** and **Table 3-28**

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

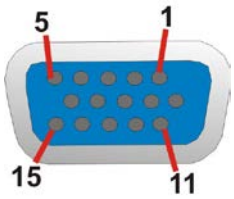


Figure 3-27: VGA Connector

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

Table 3-28: VGA Connector Pinouts

Chapter

4

Installation

4.1 Anti-static Precautions

WARNING:

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

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the WAFER-BT. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the WAFER-BT 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-BT, place it on an anti-static pad. This reduces the possibility of ESD damaging the WAFER-BT.
- ***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 WAFER-BT, WAFER-BT 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-BT 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-BT 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-BT off:
  - When working with the WAFER-BT, 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-BT **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 permanently damage the WAFER-BT. Please make sure the purchased SO-DIMM complies with the memory specifications of the WAFER-BT. SO-DIMM specifications compliant with the WAFER-BT are listed in the specification table of Chapter 1.

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

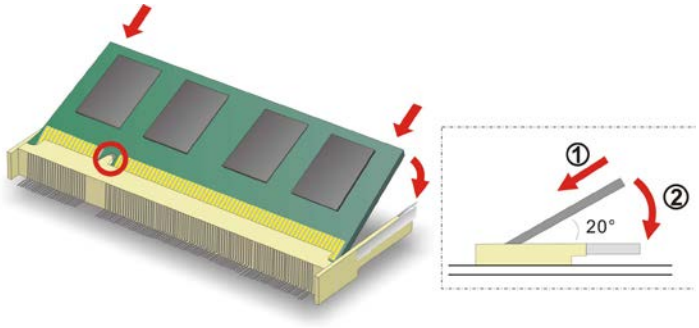


Figure 4-1: SO-DIMM Installation

Step 1: **Locate the SO-DIMM socket**. Place the board on an anti-static mat.

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

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

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

4.4 Full-size PCIe Mini Card Installation

The PCIe Mini card slot 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 PCIe Mini card slot**. See **Figure 3-15**.

Step 2: **Remove the retention screw**. Remove the retention screw as shown in **Figure 4-2**.

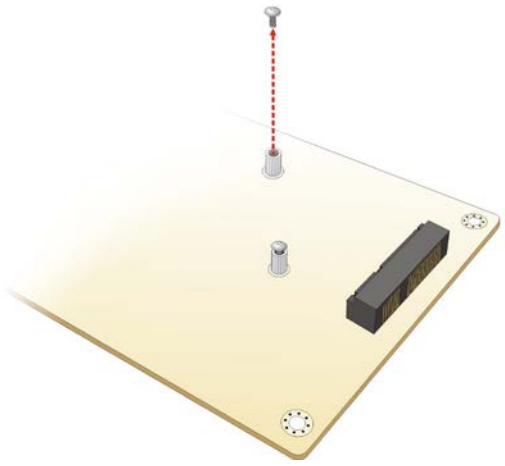


Figure 4-2: Removing the Retention Screw

Step 3: **Remove the retention screw and standoff**. Unscrew and remove the retention screw and standoff for half-size PCIe Mini card secured on the motherboard as shown in **Figure 4-3**.

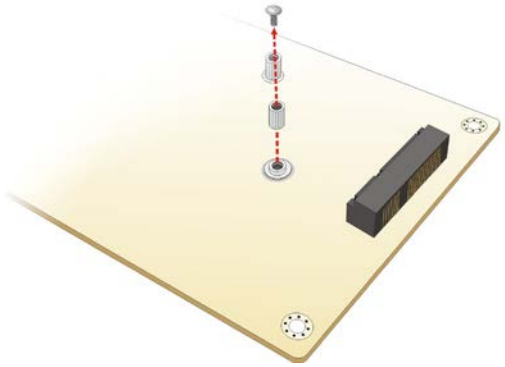


Figure 4-3: Removing the Retention Screw and Standoff

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

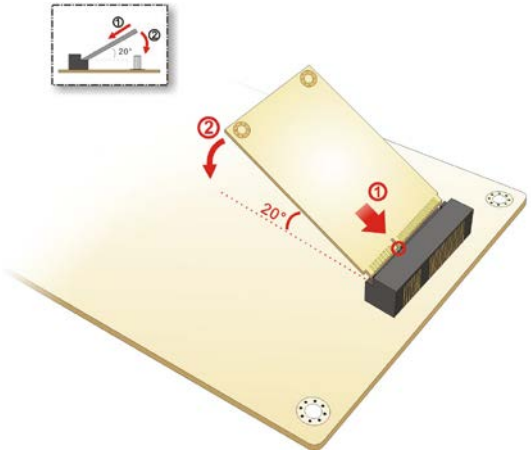


Figure 4-4: Inserting the Full-size PCIe Mini Card into the Slot at an Angle

Step 5: **Secure the full-size PCIe Mini card**. Secure the full-size PCIe Mini card with the retention screw previously removed (**Figure 4-5**).

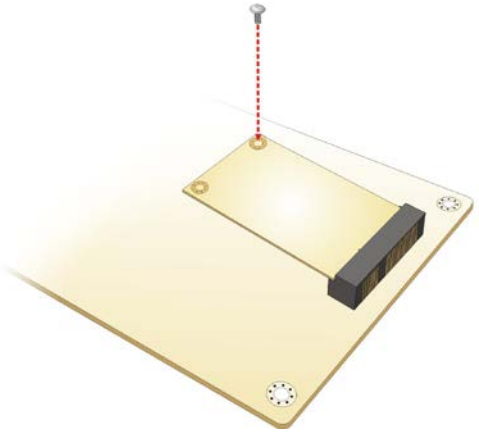


Figure 4-5: Securing the Full-size PCIe Mini Card

NOTE:

If an mSATA module is installed in the PCIe Mini slot (CN1), the SATA port 2 (SATA2) will be disabled. Choose either the SATA2 connector or the mSATA module for storage.

4.5 Half-size PCIe Mini Card Installation

The PCIe Mini card slot 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**. See **Figure 3-15**.

Step 2: **Remove the retention screw**. Remove the retention screw as shown in **Figure 4-6**.

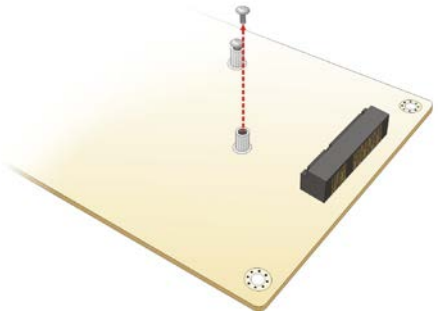


Figure 4-6: Removing the Retention Screw

Step 3: **Insert into the socket at an angle**. Line up the notch on the card with the notch on the slot. Slide the PCIe Mini card into the socket at an angle of about 20º (**Figure 4-7**).

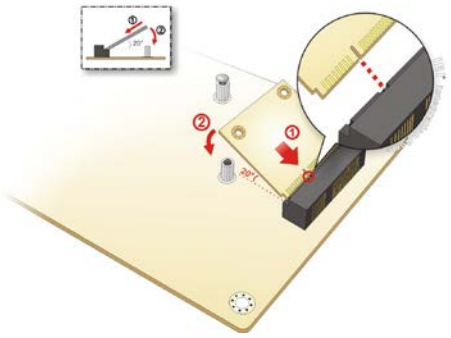


Figure 4-7: Inserting the Half-size PCIe Mini Card into the Slot at an Angle

Step 4: **Secure the half-size PCIe Mini card**. Secure the full-size PCIe Mini card with the retention screw previously removed (**Figure 4-5**).

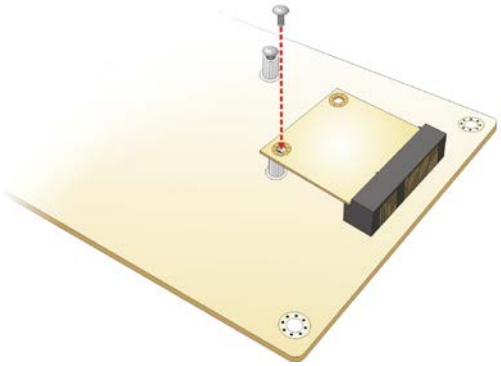


Figure 4-8: Securing the Half-size PCIe Mini Card

4.6 System Configuration

The system configuration is controlled by buttons, jumpers and switches. The system configuration should be performed before installation.

4.6.1 AT/ATX Mode Select Switch

CN Label:	**J_ATX_AT1**
CN Type:	switch
CN Location:	See **Figure 4-9**
CN Settings:	See **Table 4-1**

The AT/ATX mode select switch specifies the systems power mode as AT or ATX. AT/ATX mode select switch settings are shown in **Table 4-1**.

Setting	Description
Short A-B	ATX Mode (Default)
Short B-C	AT Mode

Table 4-1: AT/ATX Mode Select Switch Settings

The location of the AT/ATX mode select switch is shown in **Figure 4-9** below.

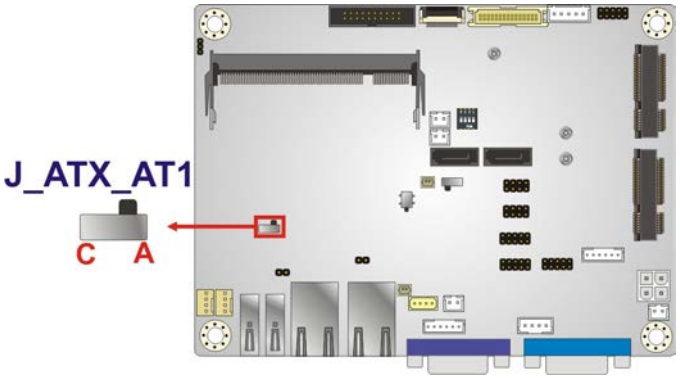


Figure 4-9: AT/ATX Mode Select Switch Location

4.6.2 Clear CMOS Button

CN Label:	**J_CMOS1**
CN Type:	button
CN Location:	See **Figure 4-3**
CN Settings:	See **Table 4-2**

If the WAFER-BT fails to boot due to improper BIOS settings, use the button to clear the CMOS data and reset the system BIOS information.

The clear CMOS button settings are shown in **Table 4-2**.

Setting	Description	
Open	Normal Operation	Default
Push	Clear CMOS Setup	

Table 4-2: Clear CMOS Button Settings

The location of the clear CMOS button is shown in **Figure 4-3**

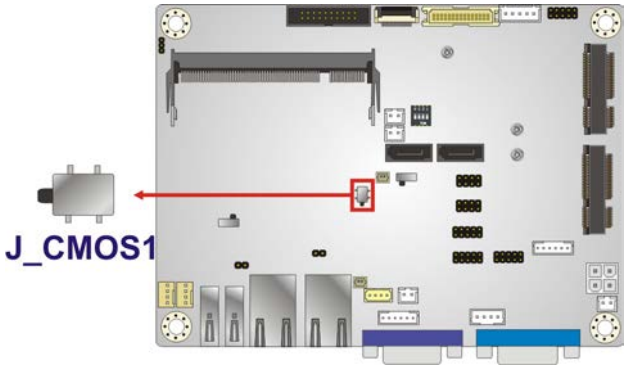


Figure 4-10: Clear CMOS Button Location

4.6.3 LVDS Panel Resolution Selection

Jumper Label: **SW1**

Jumper Type: DIP switch

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

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

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

* ON=0, OFF=1; Single=S, Dual=D

SW1 (4-3-2-1)	Description
0000	800x600 18-bit S (default)
0001	1024x768 18-bit S
0010	1024x768 24-bit S
0011	1280x768 18-bit S
0100	1280x800 18-bit S
0101	1280x960 18-bit S
0110	1280x1024 24-bit D
0111	1366x768 18-bit S
1000	1366x768 24-bit S
1001	1440x960 24-bit D
1010	1400x1050 24-bit D
1011	1600x900 24-bit D
1100	1680x1050 24-bit D
1101	1600x1200 24-bit D
1110	1920x1080 24-bit D
1111	1920x1200 24-bit D

Table 4-3: LVDS Panel Resolution Selection

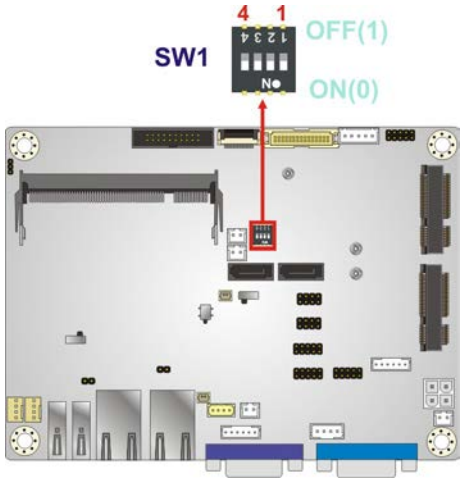


Figure 4-11: LVDS Panel Resolution Selection Switch Location

4.6.4 LVDS Voltage Selection

WARNING:

Permanent damage to the screen and WAFER-BT 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_LCD_PWR1**
Jumper Type:	switch
Jumper Settings:	See **Table 4-4**
Jumper Location:	See **Figure 4-12**

The LVDS voltage selection jumper allows setting the voltage provided to the monitor connected to the LVDS connector.

Setting	Description
Short A-B	+3.3V (Default)
Short B-C	+5V

Table 4-4: LVDS Voltage Selection Jumper Settings

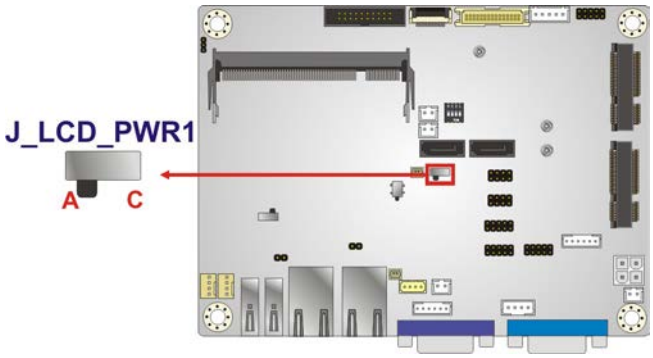


Figure 4-12: LVDS Voltage Selection Jumper Location

4.6.5 Flash Descriptor Security Override Jumper

Jumper Label: **J_FLASH1**

Jumper Type: 3-pin header

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

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

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

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

Table 4-5: Flash Descriptor Security Override Jumper Settings

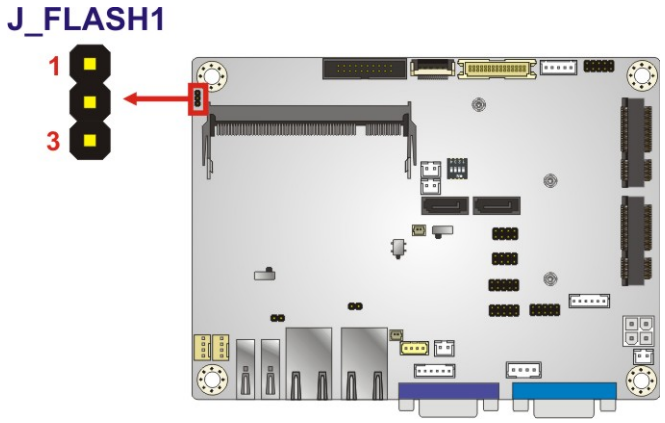


Figure 4-13: Flash Descriptor Security Override Jumper Location

4.7 Chassis Installation

4.7.1 Heat Sink Enclosure

WARNING:

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

WARNING:

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

→ on a heat dissipation surface or

→ using copper pillars to hold the board up from the chassis

When the WAFER-BT is shipped, it is secured to a heat sink with four retention screws. If the WAFER-BT must be removed from the heat sink, the four retention screws must be removed.

4.7.2 Motherboard Installation

Each side of the heat sink enclosure has several screw holes allowing the WAFER-BT 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-BT. The following diagram shows an example of motherboard installation.

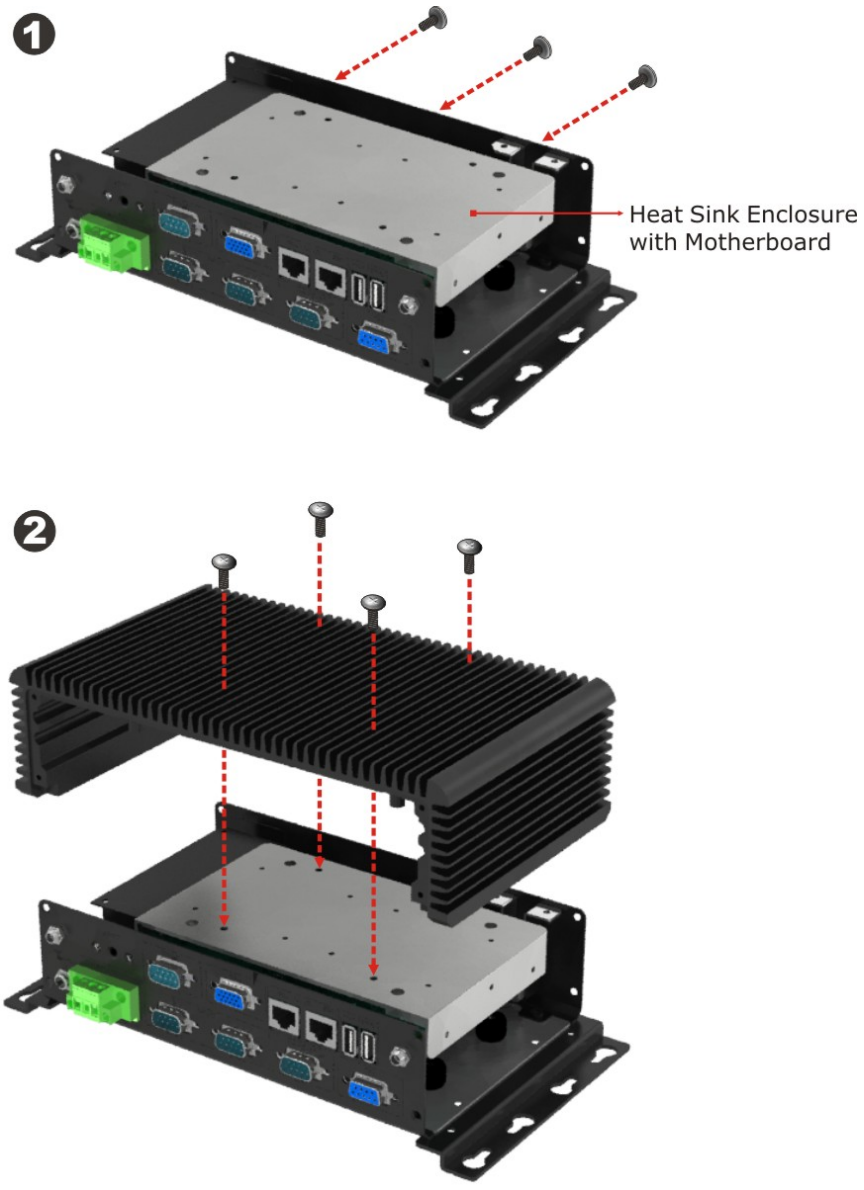


Figure 4-14: Motherboard Installation Example

4.8 Internal Peripheral Device Connections

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

4.8.1 Audio Kit Installation

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

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

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

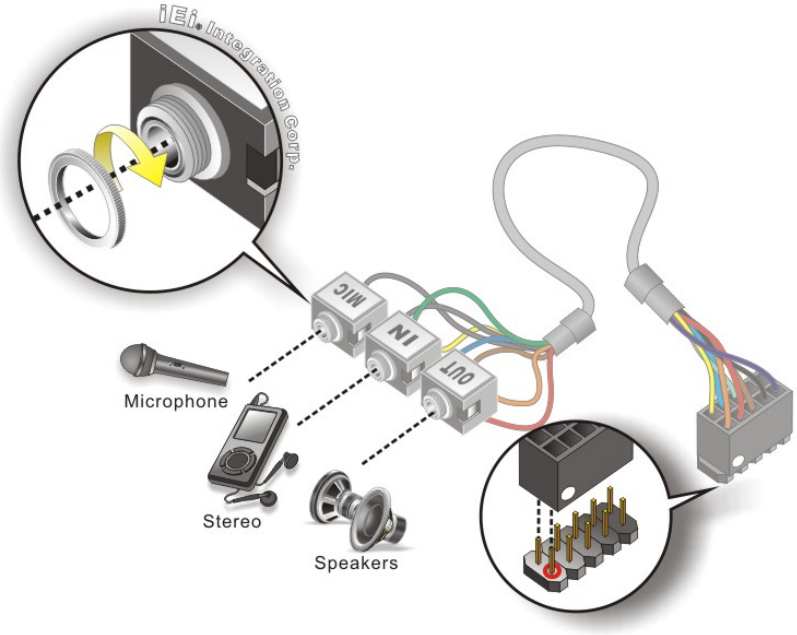


Figure 4-15: Audio Kit Cable Connection

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

4.8.2 SATA Drive Connection

The WAFER-BT is shipped with a SATA drive cable. 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 4-16**.

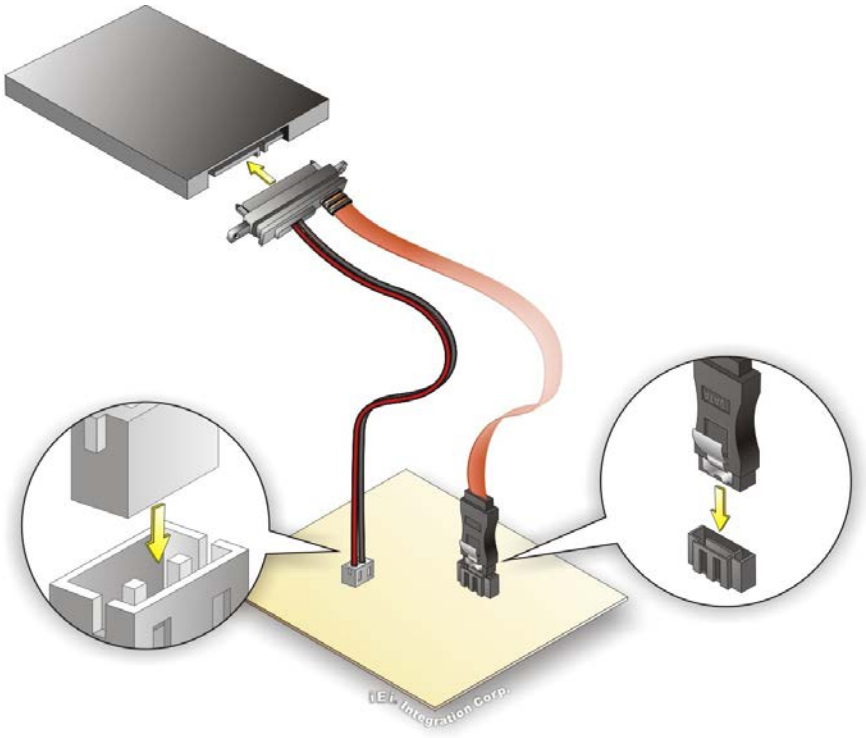


Figure 4-16: SATA Drive Cable Connection

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 4-16**.

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

4.8.3 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 location of the RS-232 connector is shown in **Chapter 3**.

Step 2: **Insert the cable connector**. Insert the connector into the serial port box header. See Figure 4-17. A key on the front of the cable connectors ensures the connector can only be installed in one direction.

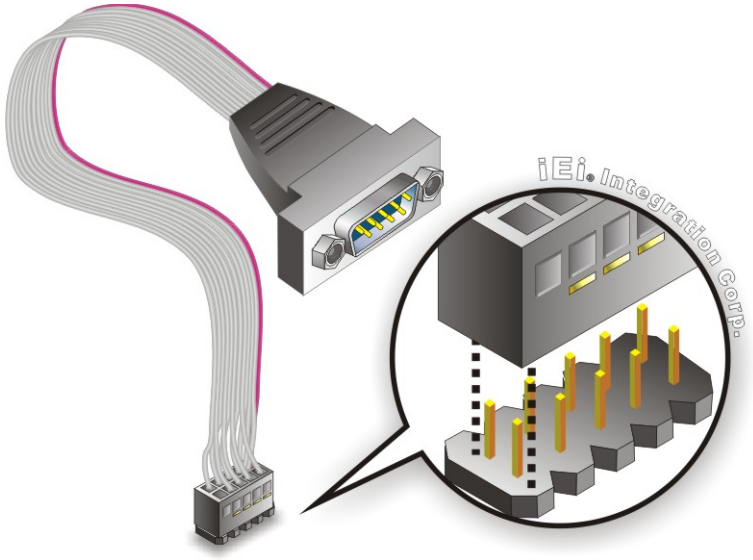


Figure 4-17: Single RS-232 Cable Installation

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.

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:

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

2. To download the latest BIOS from IEI website, please find the correct version for the board:
- SAA8**AM**xx.zip: for J19001 SKUs

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

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

5.1.2 Using Setup

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

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item

Key	Function
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
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Load previous values.
F3 key	Load optimized defaults
F4 key	Save changes and Exit BIOS
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

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

5.1.4 Unable to Reboot after Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in Chapter **3**.

5.1.5 BIOS Menu Bar

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

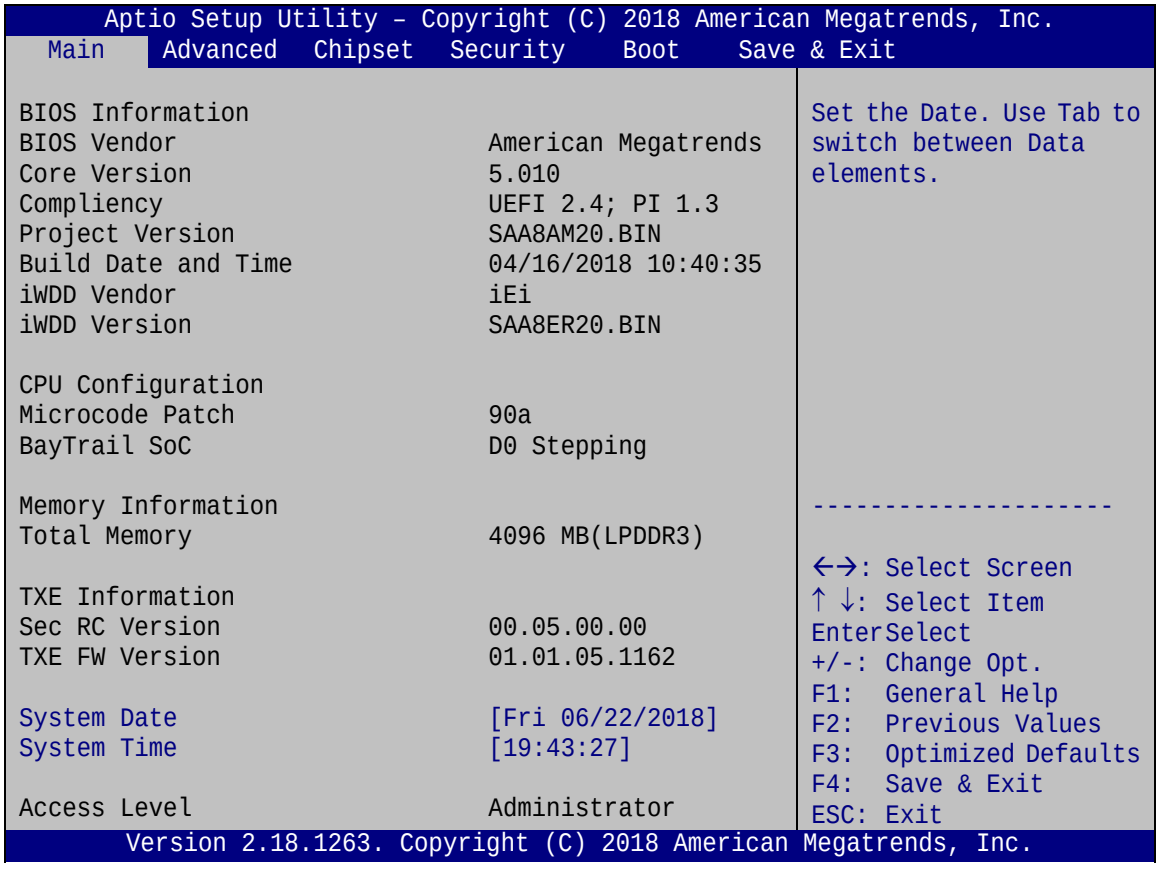
- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- Chipset – Changes the chipset settings.
- Boot – Changes the system boot configuration.

- Security – Sets User and Supervisor Passwords.
- Save & Exit – Selects exit options and loads default settings

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

5.2 Main

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



BIOS Menu 1: Main

The Main menu lists the following system details:

- BIOS Information
- iWDD Information
- Memory Information
- TXE Information

The System Overview field also has two user configurable fields:

➔ **System Date [xx/xx/xx]**

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

➔ **System Time [xx:xx:xx]**

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

5.3 Advanced

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

WARNING!

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

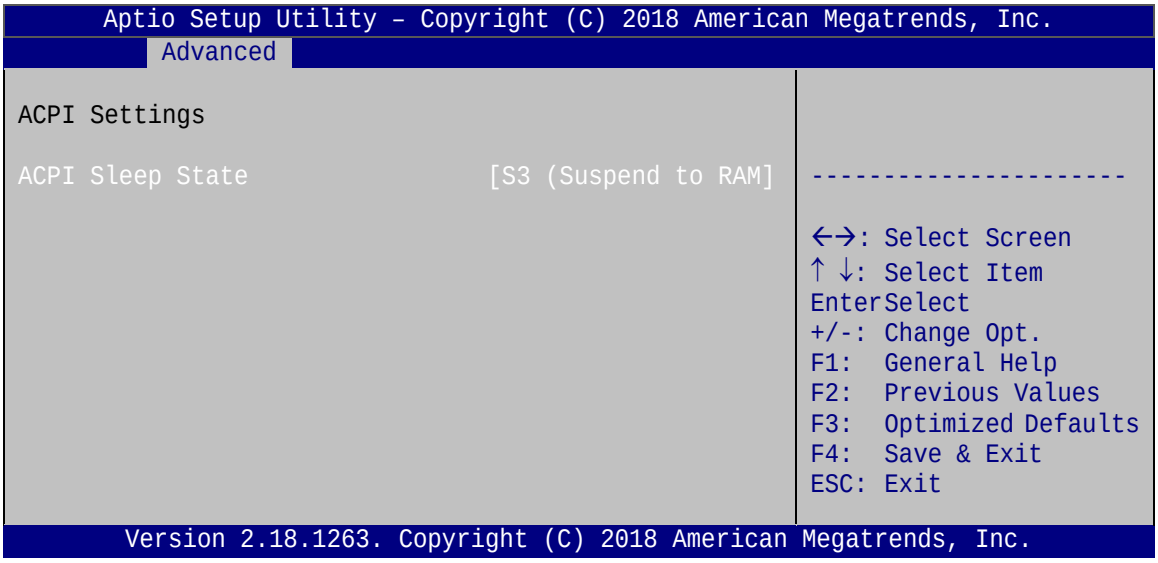
```
      Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
  Main    Advanced   Chipset   Security    Boot    Save & Exit

> ACPI Settings                                  System ACPI Parameters.
> F81866 Super IO Configuration
> Hardware Monitor
> iWDD H/W Monitor
> RTC Wake Settings                              ----------------------
> Serial Port Console Redirection                ←→: Select Screen
> iEi Feature                                    ↑ ↓: Select Item
> CPU Configuration                              EnterSelect
> IDE Configuration                              F1   General Help
> USB Configuration                              F2   Previous Values
                                                 F3   Optimized Defaults
                                                 F4   Save
                                                 ESC  Exit
       Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.
```

BIOS Menu 2: Advanced

5.3.1 ACPI Settings

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



BIOS Menu 3: ACPI Configuration

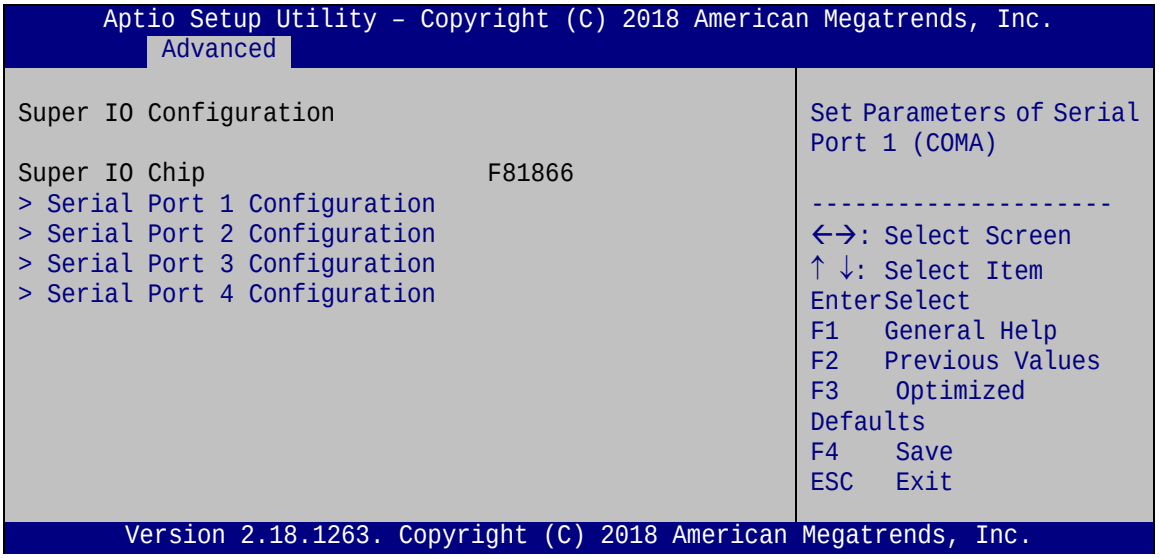
➔ **ACPI Sleep State [S3 only (Suspend to RAM)]**

The fields in **ACPI Sleep State** option cannot be changed.

➔ **S3 (Suspend to RAM)** **DEFAULT** The caches are flushed and the CPU is powered off. Power to the RAM is maintained. The computer returns slower to a working state, but more power is saved.

5.3.2 Super IO Configuration

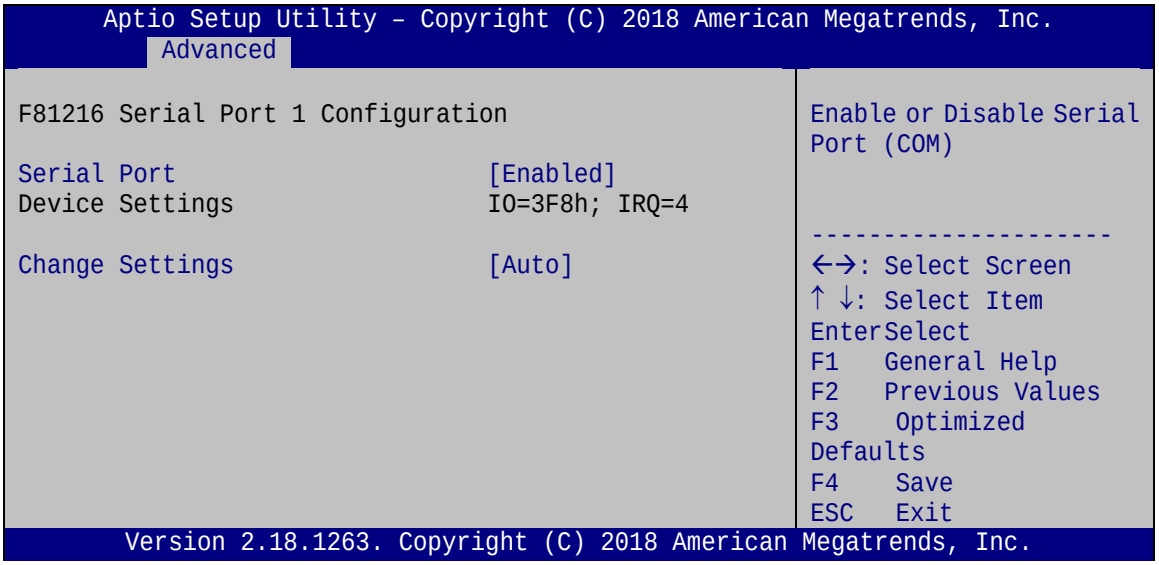
Use the **Super IO Configuration** menu (**BIOS Menu 4**) to set or change the configurations for the serial ports.



BIOS Menu 4: Super IO Configuration

5.3.2.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 5**) to configure the serial port n.



BIOS Menu 5: Serial Port n Configuration Menu

5.3.2.1.1 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, 4,5,6,7,9,10,11,12**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ3,4,5,6,7,9,10,11,12
➔ **IO=2F8h; IRQ=3, 4,5,6,7,9,10,11,12**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3,4,5,6,7,9,10,11,12
➔ **IO=3E8h; IRQ=3, 4,5,6,7,9,10,11,12**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ3,4,5,6,7,9,10,11,12
➔ **IO=2E8h; IRQ=3, 4,5,6,7,9,10,11,12**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ3,4,5,6,7,9,10,11,12

5.3.2.1.2 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, 4,5,6,7,9,10,11,12**		Serial Port I/O port address is 3F8h and the interrupt address is IRQ3,4,5,6,7,9,10,11,12
➔ **IO=2F8h; IRQ=3, 4,5,6,7,9,10,11,12**		Serial Port I/O port address is 2F8h and the interrupt address is IRQ3,4,5,6,7,9,10,11,12
➔ **IO=3E8h; IRQ=3, 4,5,6,7,9,10,11,12**		Serial Port I/O port address is 3E8h and the interrupt address is IRQ3,4,5,6,7,9,10,11,12
➔ **IO=2E8h; IRQ=3, 4,5,6,7,9,10,11,12**		Serial Port I/O port address is 2E8h and the interrupt address is IRQ3,4,5,6,7,9,10,11,12

5.3.2.1.3 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=7** Serial Port I/O port address is 3E8h and the interrupt address is IRQ7
- ➔ **IO=3E8h; IRQ=3, 4,5,6,7,9,10,11,12** Serial Port I/O port address is 3E8h and the interrupt address is IRQ3,4,5,6,7,9,10,11,12
- ➔ **IO=2E8h; IRQ=3, 4,5,6,7,9,10,11,12** Serial Port I/O port address is 2E8h and the interrupt address is IRQ3,4,5,6,7,9,10,11,12
- ➔ **IO=2F0h; IRQ=3, 4,5,6,7,9,10,11,12** Serial Port I/O port address is 2F0h and the interrupt address is IRQ3,4,5,6,7,9,10,11,12
- ➔ **IO=2E0h; IRQ=3, 4,5,6,7,9,10,11,12** Serial Port I/O port address is 2E0h and the interrupt address is IRQ3,4,5,6,7,9,10,11,12

5.3.2.1.4 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=7** Serial Port I/O port address is 2E8h and the interrupt address is IRQ7
- ➔ **IO=3E8h; IRQ=3, 4,5,6,7,9,10,11,12** Serial Port I/O port address is 3E8h and the interrupt address is IRQ3,4,5,6,7,9,10,11,12

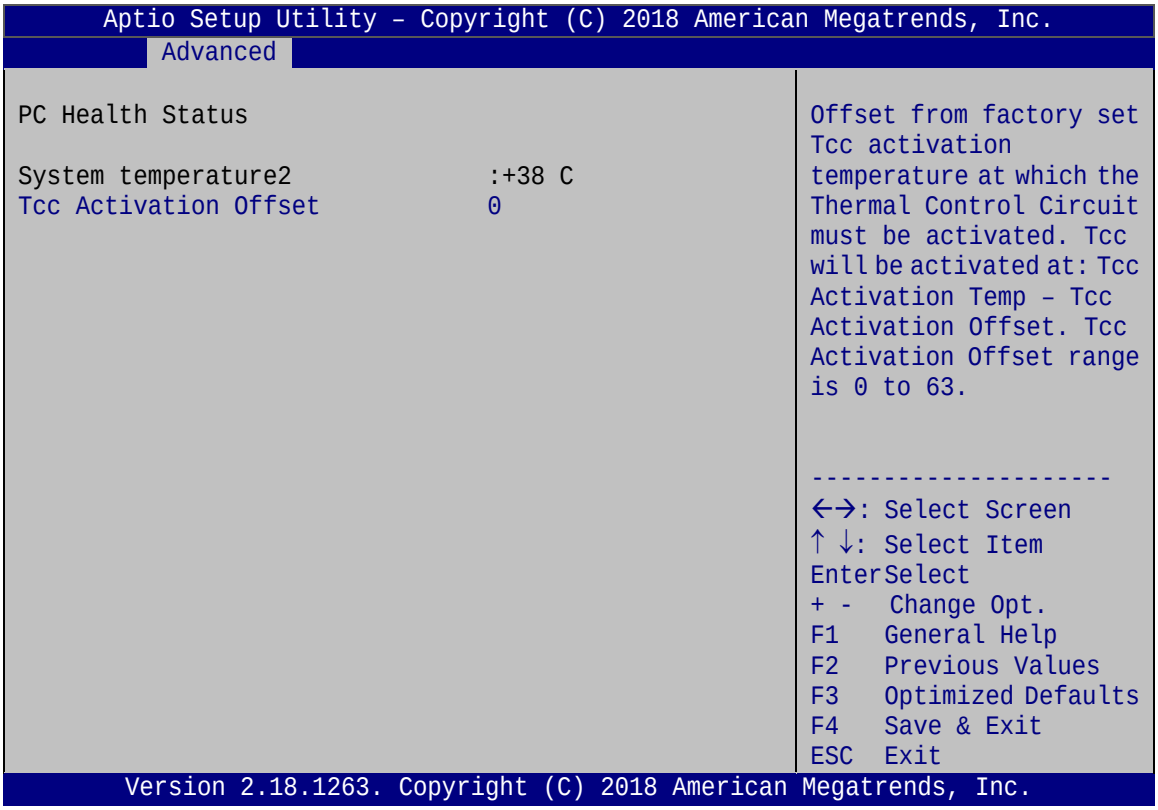
➔ **IO=2E8h; IRQ=3, 4,5,6,7,9,10,11,12** — Serial Port I/O port address is 2E8h and the interrupt address is IRQ3,4,5,6,7,9,10,11,12

➔ **IO=2F0h; IRQ=3, 4,5,6,7,9,10,11,12** — Serial Port I/O port address is 2F0h and the interrupt address is IRQ3,4,5,6,7,9,10,11,12

➔ **IO=2E0h; IRQ=3, 4,5,6,7,9,10,11,12** — Serial Port I/O port address is 2E0h and the interrupt address is IRQ3,4,5,6,7,9,10,11,12

5.3.3 Hardware Monitor

The Hardware Monitor menu (**BIOS Menu 7**) displays operating temperature.



BIOS Menu 6: Hardware Monitor

➔ **PC Health Status**

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

- System Temperatures:
  - System Temperature2

➔ **Tcc Activation Offset**

Use the **Tcc Activation Offset** option to change the **Tcc Activation Offset** value. If CPU Temperature reaches Tcc Activation Offset then reduces CPU Frequency.

- Minimum Value: 0°C
- Maximum Value: 63°C

5.3.4 iWDD H/W Monitor

The iWDD H/W Monitor menu (**BIOS Menu 7**) contains the fan configuration submenus and displays operating temperature and fan speeds.

```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
        Advanced
PC Health Status                                  Smart Fan Mode Select

CPU temperature                 :+39 C

CPU Fan Speed                   :N/A
SYS Fan Speed                   :N/A

> Smart Fan Mode Configuration                   ---------------------
                                                  ←→: Select Screen
                                                  ↑ ↓: Select Item
                                                  EnterSelect
                                                  + -   Change Opt.
                                                  F1    General Help
                                                  F2    Previous Values
                                                  F3    Optimized Defaults
                                                  F4    Save & Exit
                                                  ESC   Exit
Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.
```

BIOS Menu 7: Hardware Monitor

➔ **PC Health Status**

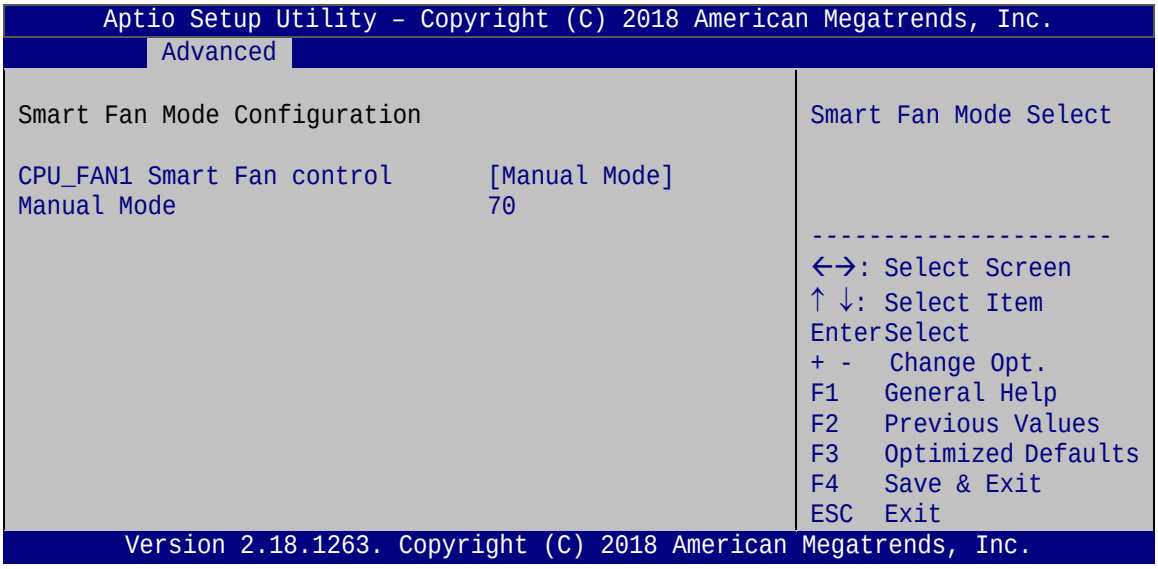
The following system parameters and values are shown. The system parameters that are monitored are:

- System Temperatures:

- CPU Temperature
- Fan Speed:
  - CPU Fan Speed
  - SYS Fan Speed

5.3.4.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration submenu** (**BIOS Menu 8**) to configure fan temperature and speed settings.



BIOS Menu 8: Smart Fan Mode Configuration

➔ **CPU_FAN1 Smart Fan control [Manual Mode]**

Use the **CPU_FAN1 Smart Fan control** BIOS option to configure the CPU Smart Fan.

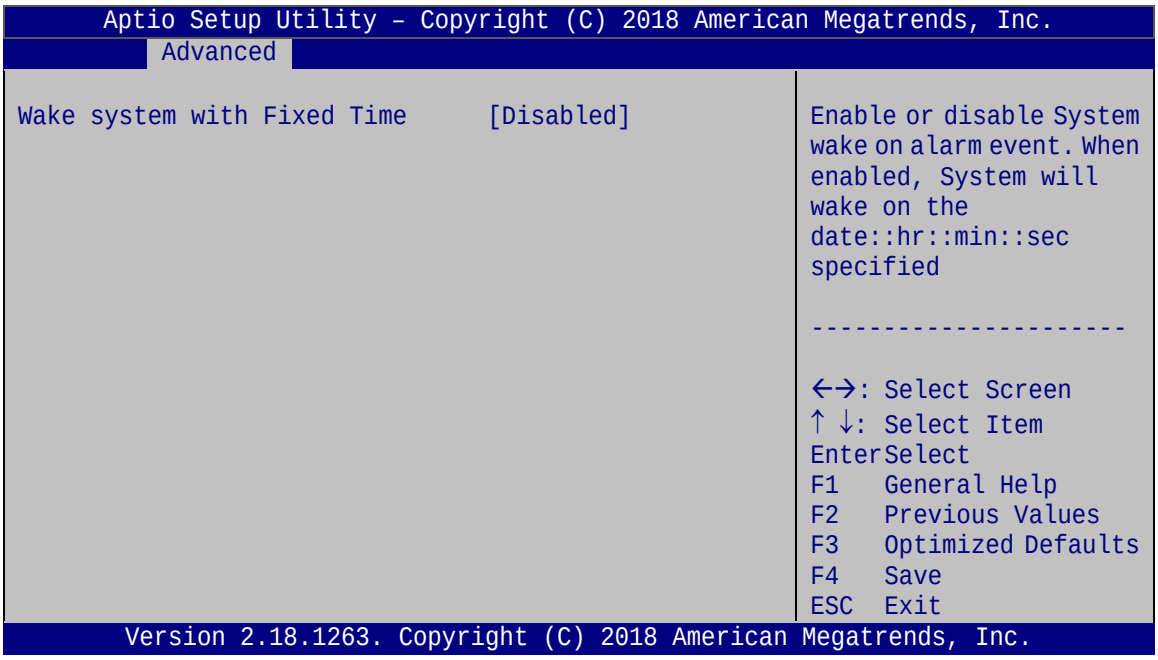
➔ **Manual Mode**	**DEFAULT**	The fan spins at the speed set in the manual PWM setting

➔ **Manual Mode**

Use the + or – key to change the fan **Manual Mode** value. Enter a decimal number between 1 and 100.

5.3.5 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 9**) configures RTC wake event.



BIOS Menu 9: 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

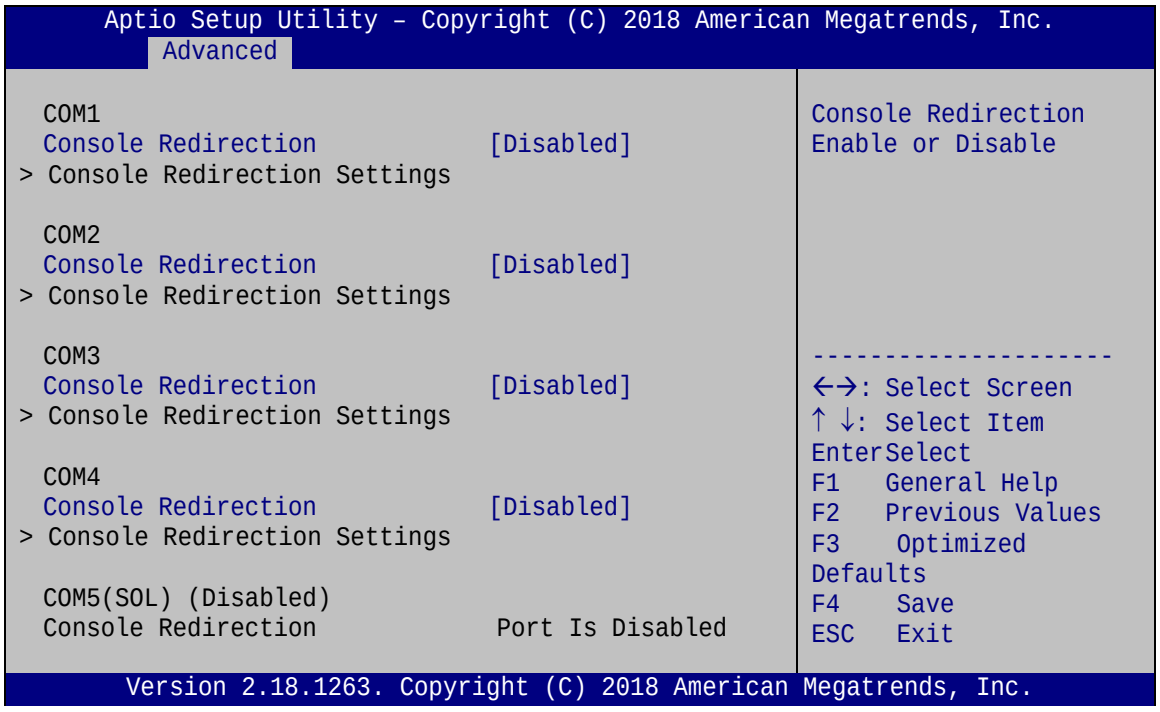
Wake up minute

Wake up second

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

5.3.6 Serial Port Console Redirection

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



BIOS Menu 10: Serial Port Console Redirection

➔ **Console Redirection [Disabled]**

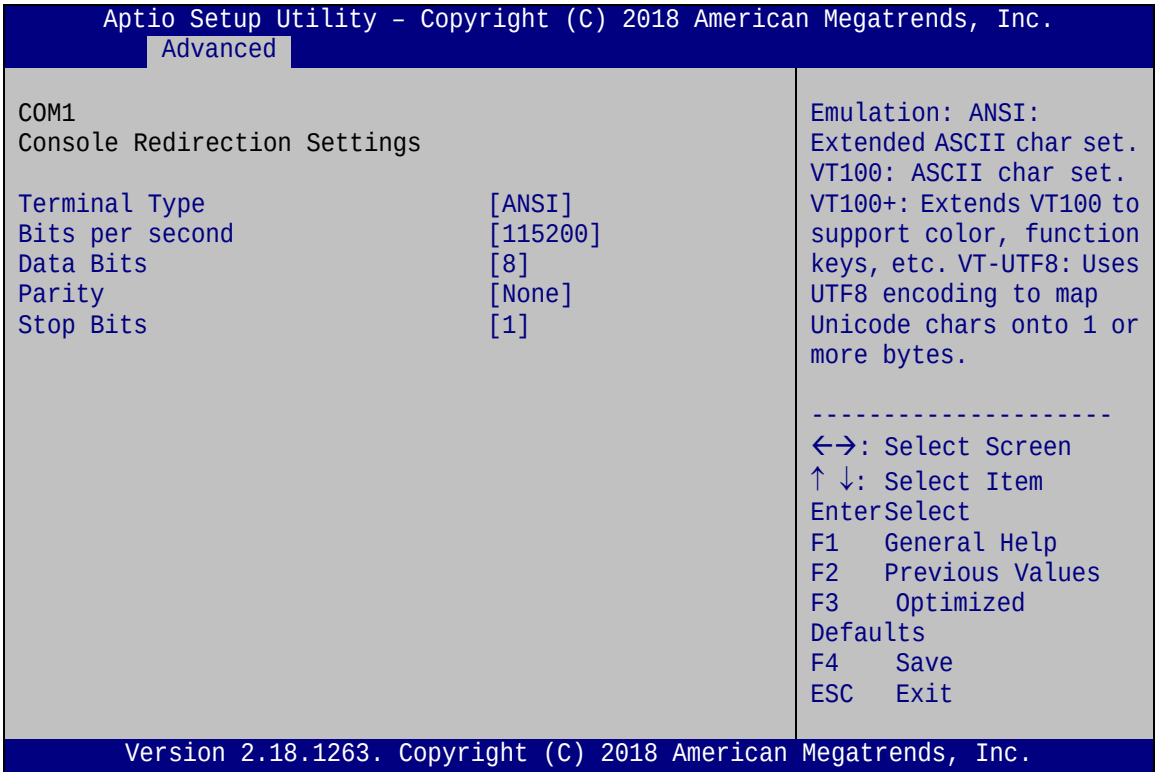
Use **Console Redirection** option to enable or disable the console redirection function.

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

➔ **Enabled** Enabled the console redirection function

5.3.6.1 Console Redirection Settings

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



BIOS Menu 11: Console Redirection Settings

➔ **Terminal Type [ANSI]**

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

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

➔ **Bits per second [115200]**

Use the **Bits per second** option to specify the 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.

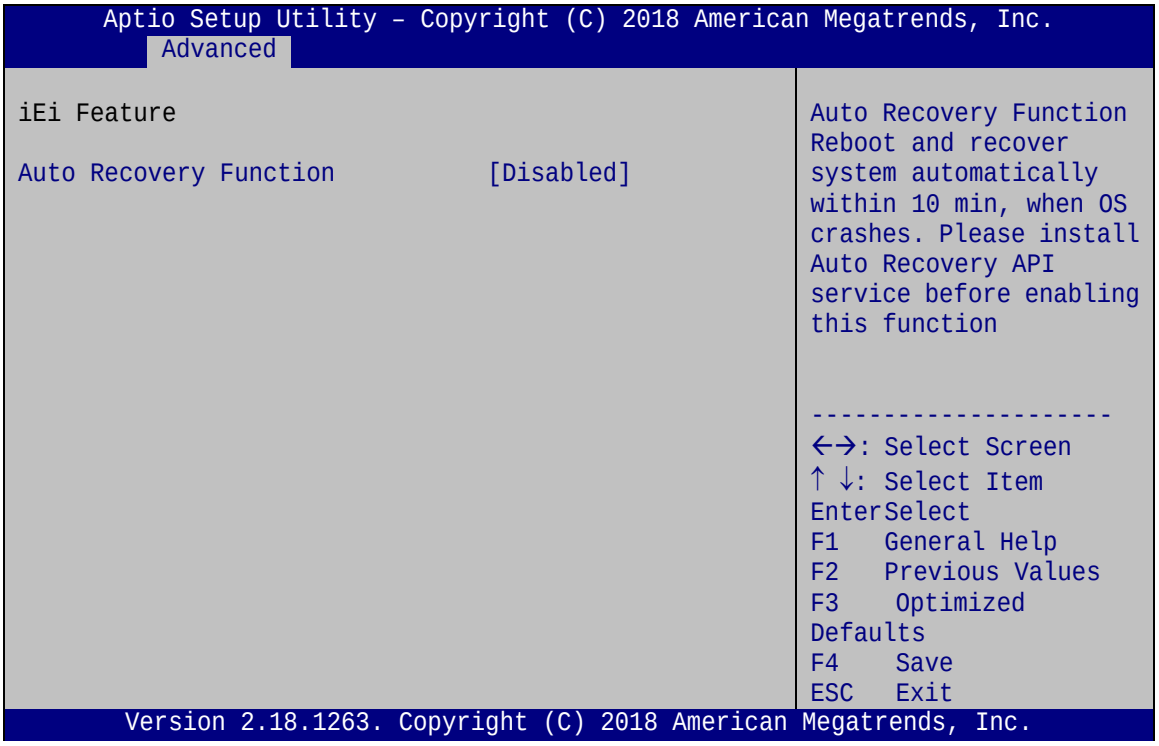
➔ **Stop Bits [1]**

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.

5.3.7 IEI Feature

Use the **IEI Feature** menu (**BIOS Menu 12**) to configure One Key Recovery function.



BIOS Menu 12: IEI Feature

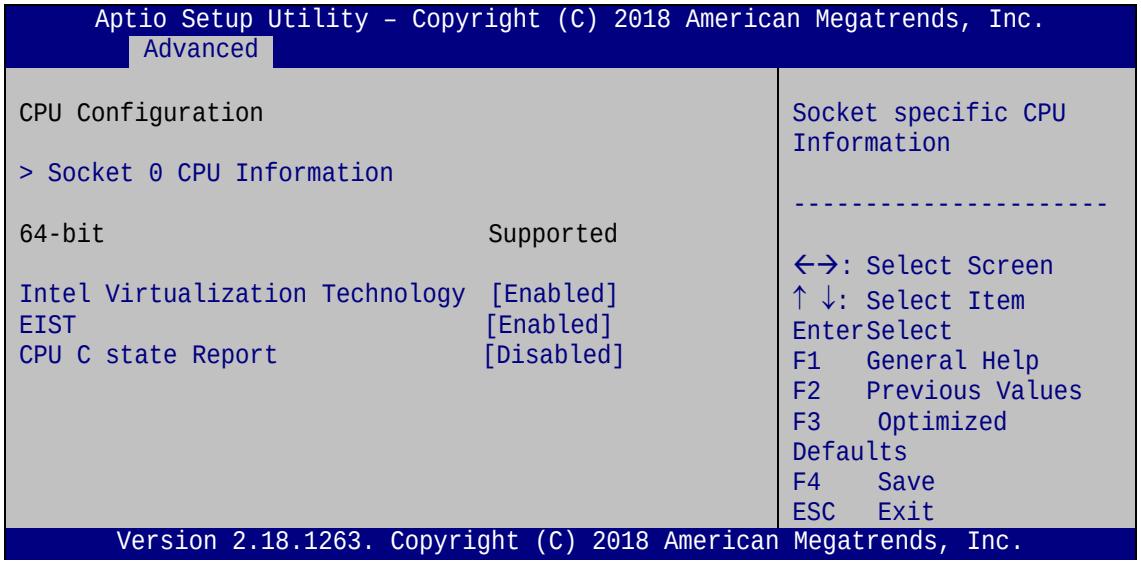
➔ **Auto Recovery Function [Disabled]**

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

5.3.8 CPU Configuration

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



BIOS Menu 13: CPU Configuration

➔ **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.

➔ **EIST [Enabled]**

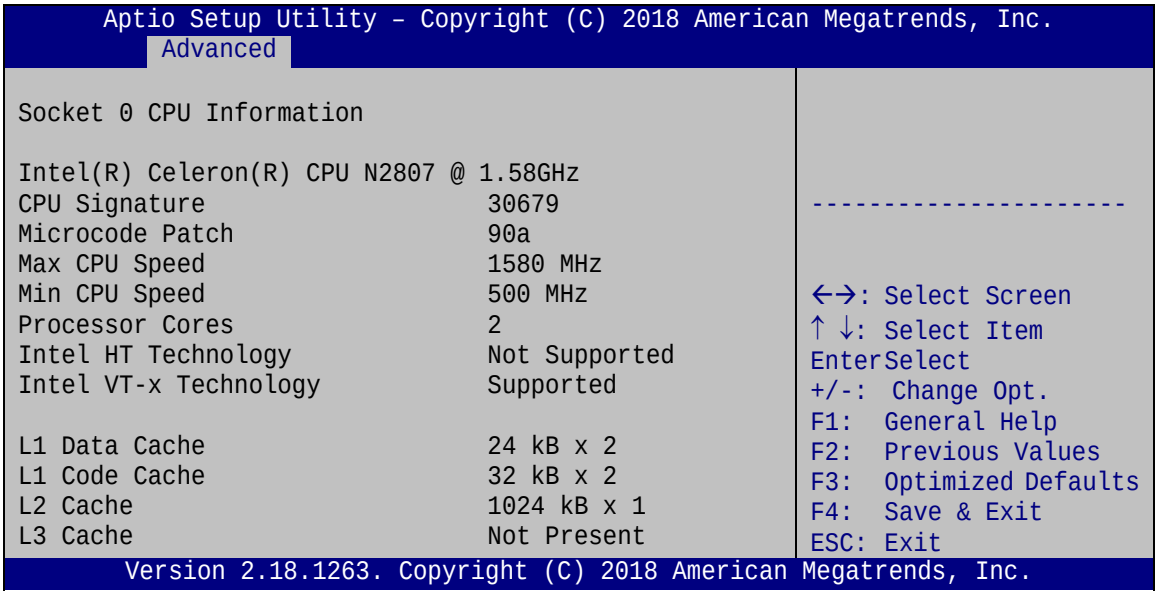
Use the **EIST** option to enable or disable the Intel Speed Step Technology.

➔ **Disabled** Disables the Intel Speed Step Technology.

➔ **Enabled** **DEFAULT** Enables the Intel Speed Step Technology.

5.3.8.1 Socket 0 CPU Information

Use the **Socket 0 CPU Information** submenu (**BIOS Menu 14**) to view detailed CPU specifications and configure the CPU.



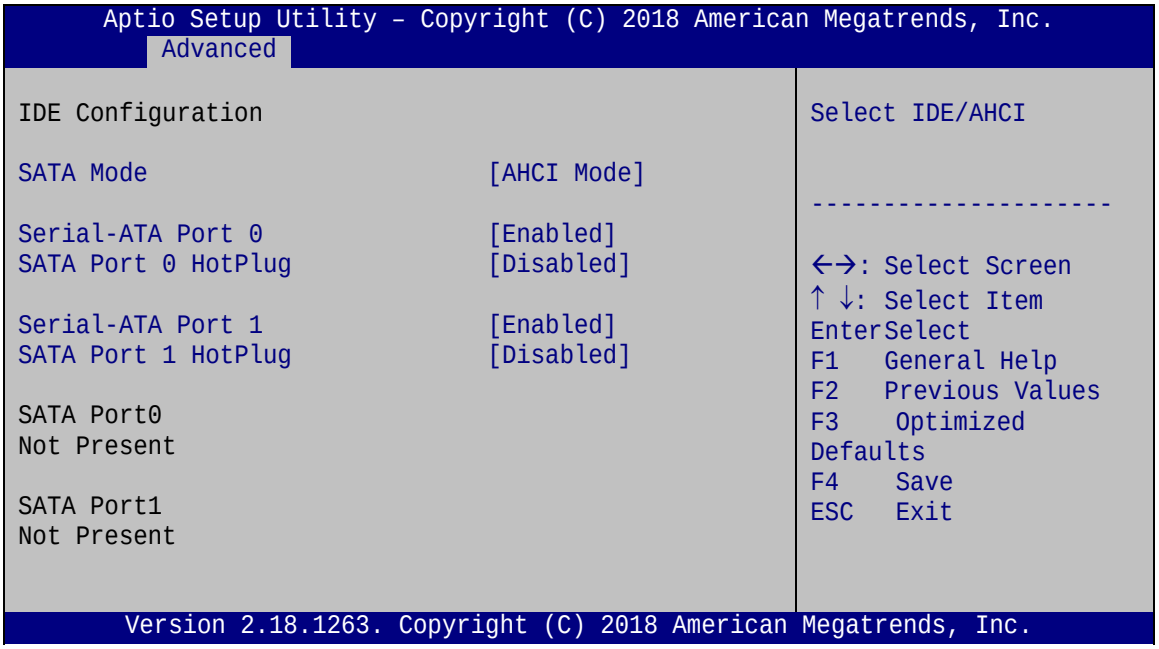
BIOS Menu 14: CPU Configuration

The CPU Configuration menu (**BIOS Menu 14**) 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.
- Processor Cores: Lists the number of the processor core
- 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.
- 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.

5.3.9 IDE Configuration

Use the **IDE Configuration** menu (**BIOS Menu 15**) to change and/or set the configuration of the SATA devices installed in the system.



BIOS Menu 15: IDE Configuration

➔ **Serial-ATA (SATA) [Enabled]**

Use the **Serial-ATA (SATA)** option to enable or disable the serial ATA controller.

➔ **Enabled** **DEFAULT** Enables the on-board SATA controller.

➔ **Disabled** Disables the on-board SATA controller.

➔ **SATA Mode [ACHI Mode]**

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

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

➔ **ACHI Mode** **DEFAULT** Configures SATA devices as AHCI device.

➔ **Serial-ATA Port 0/1 [Enabled]**

Use the **Serial-ATA Port 0/1** option to enable or disable the SATA device.

➔ **Disabled** Disables the SATA device.

➔ **Enabled** **DEFAULT** Enables the SATA device.

➔ **SATA Port 0/1 HotPlug [Disabled]**

Use the **Serial-ATA Port 0/1 HotPlug** option to enable or disable the SATA device hot plug.

➔ **Disabled** Disables the SATA device hot plug.

➔ **Enabled** **DEFAULT** Enables the SATA device hot plug

5.3.10 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 16**) to read USB configuration information and configure the USB settings.

```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
        Advanced
USB Configuration                                  Enables Legacy USB
                                                   support. AUTO option
USB Devices:                                       disables legacy support
      1 Keyboard                                   if no USB devices are
                                                   connected. DISABLE
Legacy USB Support              [Enabled]          option will keep USB
                                                   devices available only
                                                   for EFI applications.

                                                   ---------------------
                                                   ←→: Select Screen
                                                   ↑ ↓: Select Item
                                                   EnterSelect
                                                   F1   General Help
                                                   F2   Previous Values
                                                   F3    Optimized
                                                   Defaults
                                                   F4    Save
                                                   ESC   Exit
Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.
```

BIOS Menu 16: USB Configuration

➔ **USB Devices**

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

➔ **Legacy USB Support [Enabled]**

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

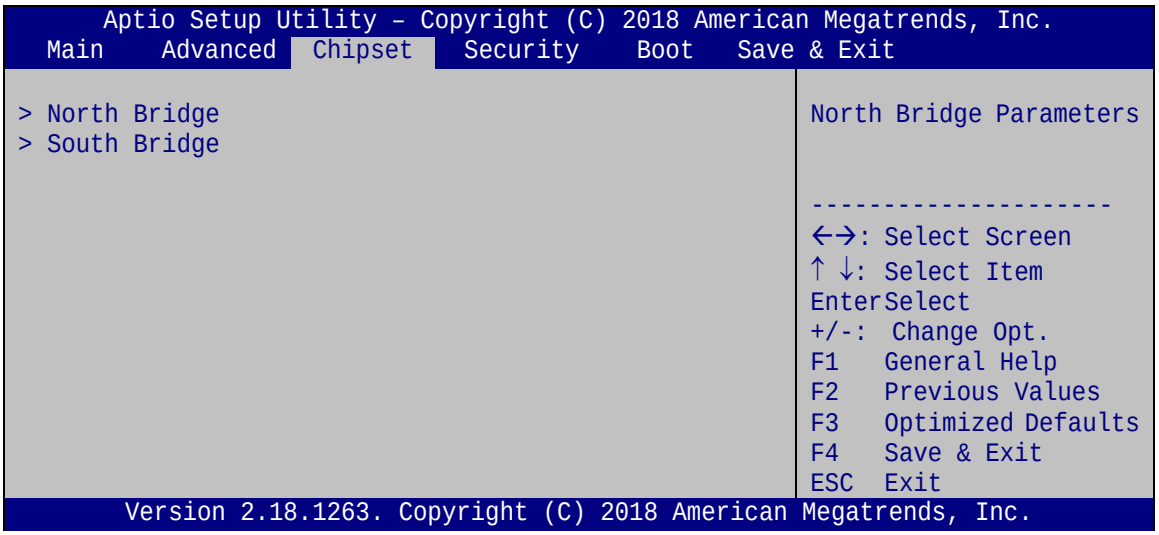
➔ **Enabled**	**DEFAULT**	Legacy USB support enabled
➔ **Disabled**		Legacy USB support disabled
➔ **Auto**		Legacy USB support disabled if no USB devices are connected

5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 17**) to access the Northbridge and Southbridge configuration menus

WARNING!

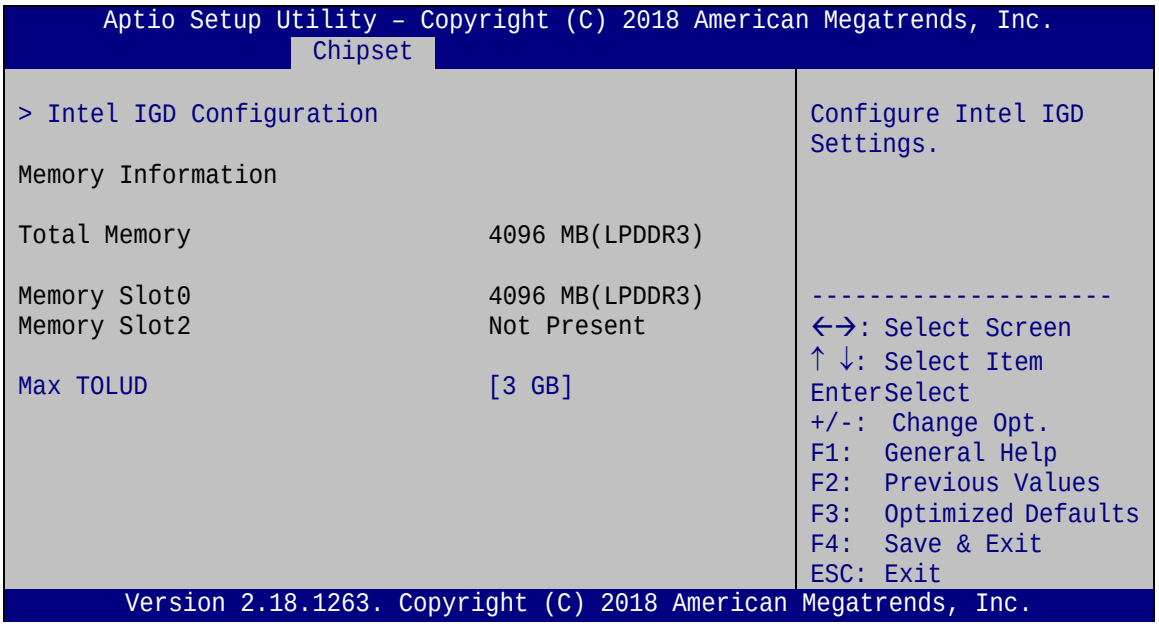
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.



BIOS Menu 17: Chipset

5.4.1 North Bridge Configuration

Use the **North Bridge Configuration** menu (**BIOS Menu 18**) to configure the Intel IGD settings.



BIOS Menu 18: Northbridge Chipset Configuration

➔ **Memory Information**

The **Memory Information** lists a brief summary of the on-board memory. The fields in **Memory Information** cannot be changed.

➔ **Max TOLUD [2.75 GB]**

Use the **Max TOULD** option to select the maximum value of TOLUD.. The following options are available:

- 2 GB
- 2.25 GB
- 2.5 GB
- 2.75 GB
- 3 GB **Default**

5.4.1.1 Intel IGD Configuration

Use the **Intel IGD Configuration** menu (**BIOS Menu 19**) to configure the video device connected to the system.

```
Aptio Setup Utility – Copyright (C) 2018 American Megatrends, Inc.
                        Chipset
Intel IGD Configuration                    Select which of IGD/PCI
                                           Graphics device should
Primary Display                 [Auto]     be Primary Display.
DVMT Pre-Allocated              [256M]
DVMT Total Gfx Mem              [MAX]      ----------------------
Primary IGFX Boot Display       [VBIOS Default]  ←→: Select Screen
DP Selection                    [DP to HDMI/CRT/DP]  ↑ ↓: Select Item
Active LVDS1                    [Enabled]  EnterSelect
Backlight Control Mode          [PMW Inverted]  +/-:  Change Opt.
                                           F1:  General Help
                                           F2:  Previous Values
                                           F3:  Optimized Defaults
                                           F4:  Save & Exit
                                           ESC: Exit
Version 2.18.1263. Copyright (C) 2018 American Megatrends, Inc.
```

BIOS Menu 19: Integrated Graphics

➔ **Primary Display [Auto]**

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

- Auto **Default**
- IGD
- PCIe
- SG

➔ **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:

- 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
- DP Port

➔ **DP Selection [DP to HDMI/CRT/DP]**

Use the **DP Selection** option to select the display device connected to the internal display port (DP1). Configuration options are listed below.

- DP to LVDS
- DP to HDMI/CRT/DP **DEFAULT**

➔ **Active LVDS1 [Enabled]**

Use the **Active LVDS1** BIOS option to enable or disable LVDS.

➔	**Enabled**	**DEFAULT**	LVDS is enabled
➔	**Disabled**		LVDS is disabled

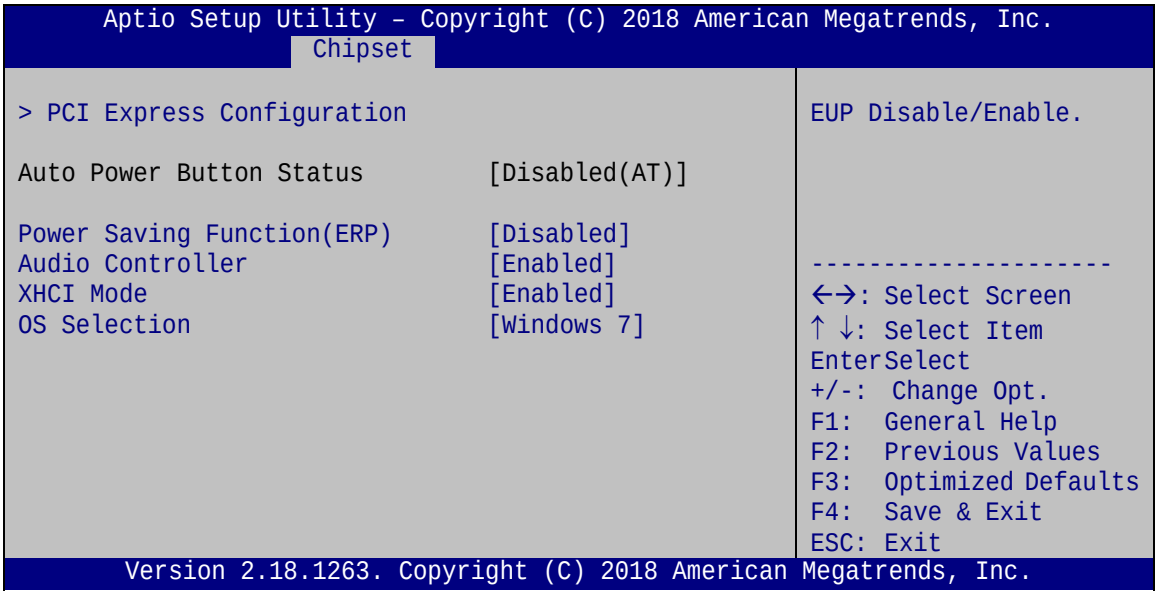
➔ **Backlight Control Mode [PWM Inverted]**

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

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

5.4.2 Southbridge Configuration

Use the **Southbridge Configuration** menu (**BIOS Menu 20**) to configure the Southbridge chipset.



BIOS Menu 20: Southbridge Chipset Configuration

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

Use the **Power Saving Function(ERP)** BIOS option to enable or reduce power consumption in the S5 state. When enabled, the system can only be powered-up using the power button.

- ➔ **Disabled** **DEFAULT** Power saving function support disabled
- ➔ **Enabled** Power saving function support enabled

➔ **Audio Controller [Enabled]**

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

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

➔ **XHCI Mode [Auto]**

Use the **XHCI Mode** BIOS option to configure the USB xHCI (USB 3.0) controller. If the system is running Windows 7 operating system, the USB 3.0 driver must be installed to support USB 3.0.

➔ **Enabled**		Enable the XHCI controller.
➔ **Disabled**		Disable the XHCI controller.
➔ **Auto**	**DEFAULT**	Enable the EHCI controller.
➔ **Smart Auto**		Allow the use of USB 3.0 devices prior to OS boot. USB 3.0 ports function as USB 3.0 ports even during a reboot.

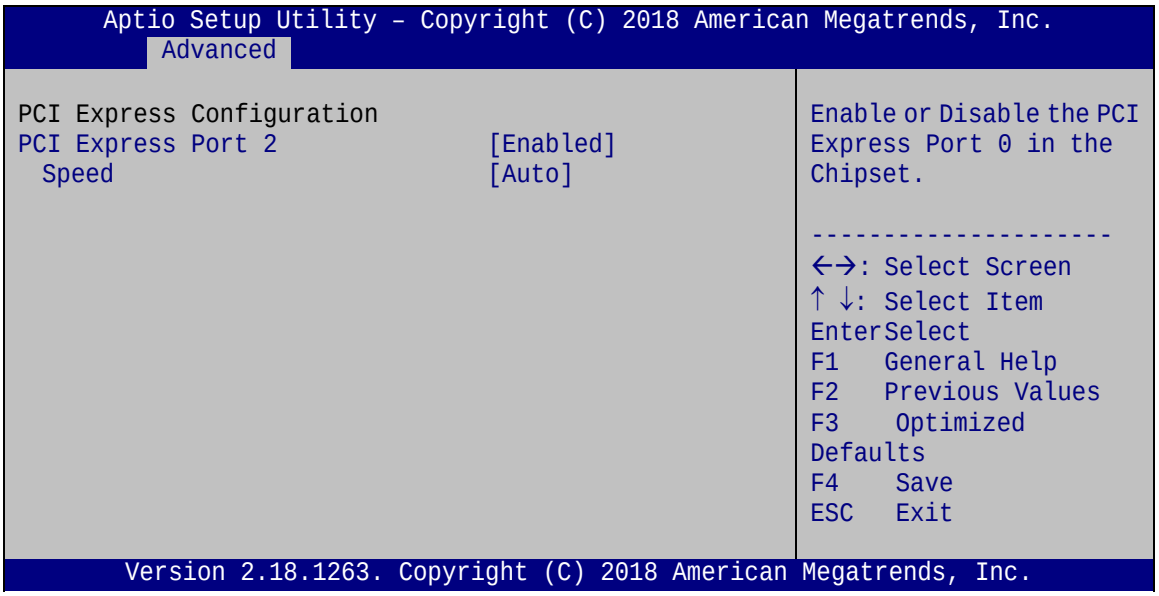
➔ **OS Selection [Windows 7]**

Use the **OS Selection** BIOS option to select the OS. Configuration options are listed below.

- Windows 8.X
- Android
- Windows 7 **DEFAULT**

5.4.2.1 PCI Express Configuration

Use the **PCI Express Configuratio**n menu (**BIOS Menu 20**) to configure the PCI Express.



BIOS Menu 21: Console Redirection Settings

➔ **PCI Express Port [Enabled]**

Use the **PCI Express Port** option to enable or disable the PCI Express port.

➔	**Disabled**		Disables the PCI Express port.
➔	**Enabled**	**DEFAULT**	Enables the PCI Express port.

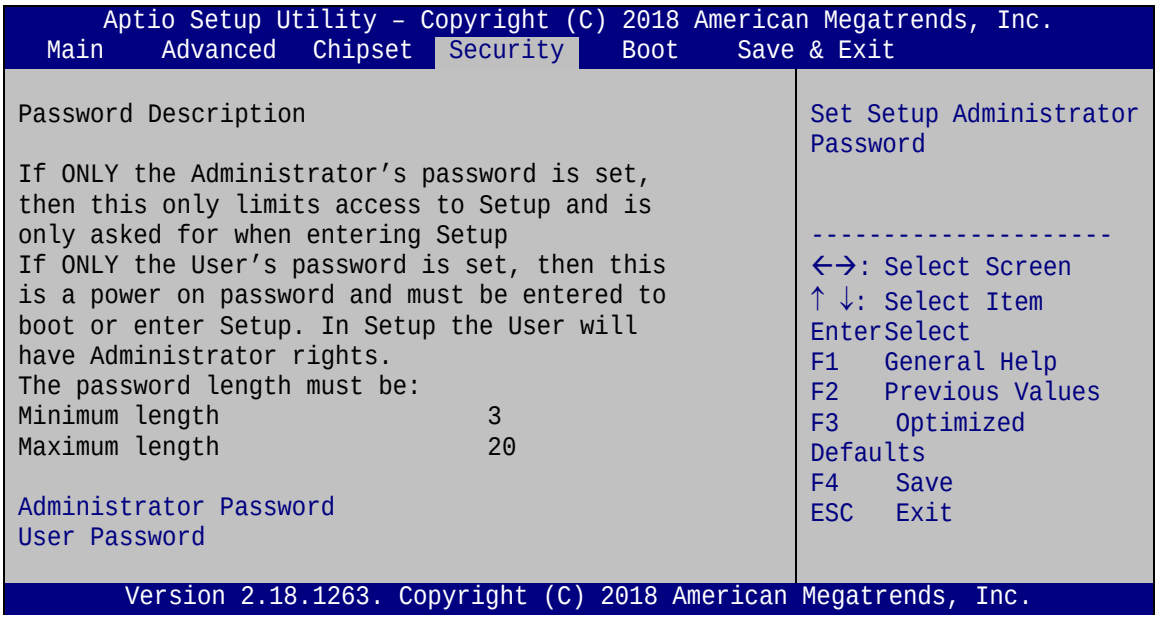
➔ **Speed [Auto]**

Use the **Speed** option to configure PCIe port speed.

➔	**Auto**	Configure PCIe port speed to auto
➔	**Gen 2**	Configure PCIe port speed to Gen2
➔	**Gen 1**	Configure PCIe port speed to Gen1

5.5 Security

Use the **Security** menu (**BIOS Menu 22**) to set system and user passwords.



BIOS Menu 22: Security

➔ **Administrator Password**

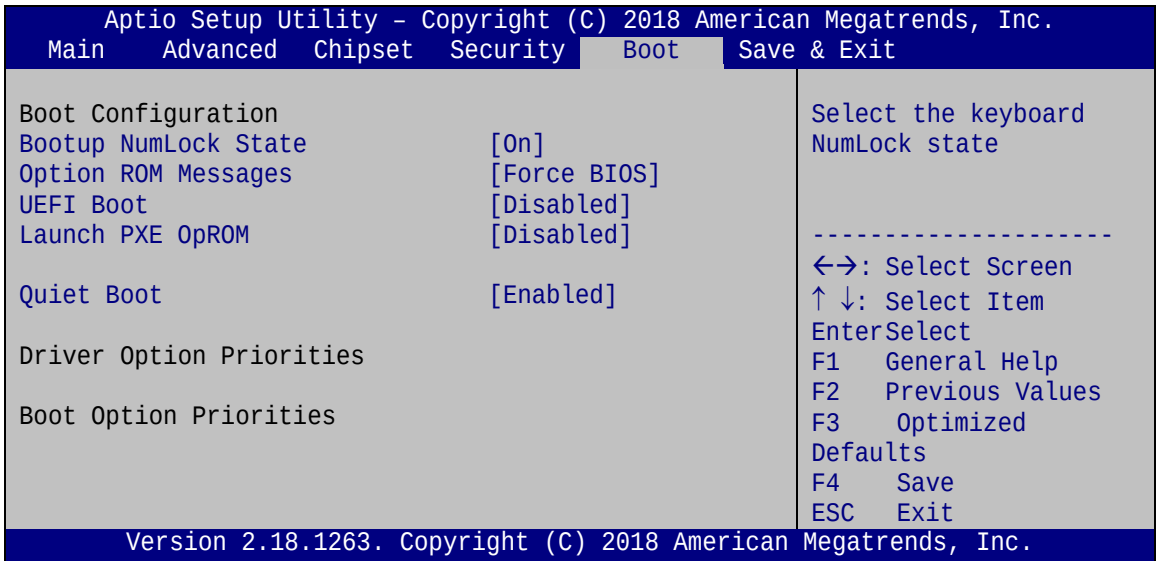
Use the **Administrator Password** to set or change a administrator password.

➔ **User Password**

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

5.6 Boot

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



BIOS Menu 23: 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.

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

➔ **Auto**		If the first boot HDD is GPT then enable UEFI boot options, otherwise disable,
➔ **Enabled**		Boot from UEFI devices is enabled.
➔ **Disabled**	**DEFAULT**	Boot from UEFI devices is disabled.

➔ **Launch PXE OpROM [Disabled]**

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

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

➔ **Quiet Boot [Enabled]**

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

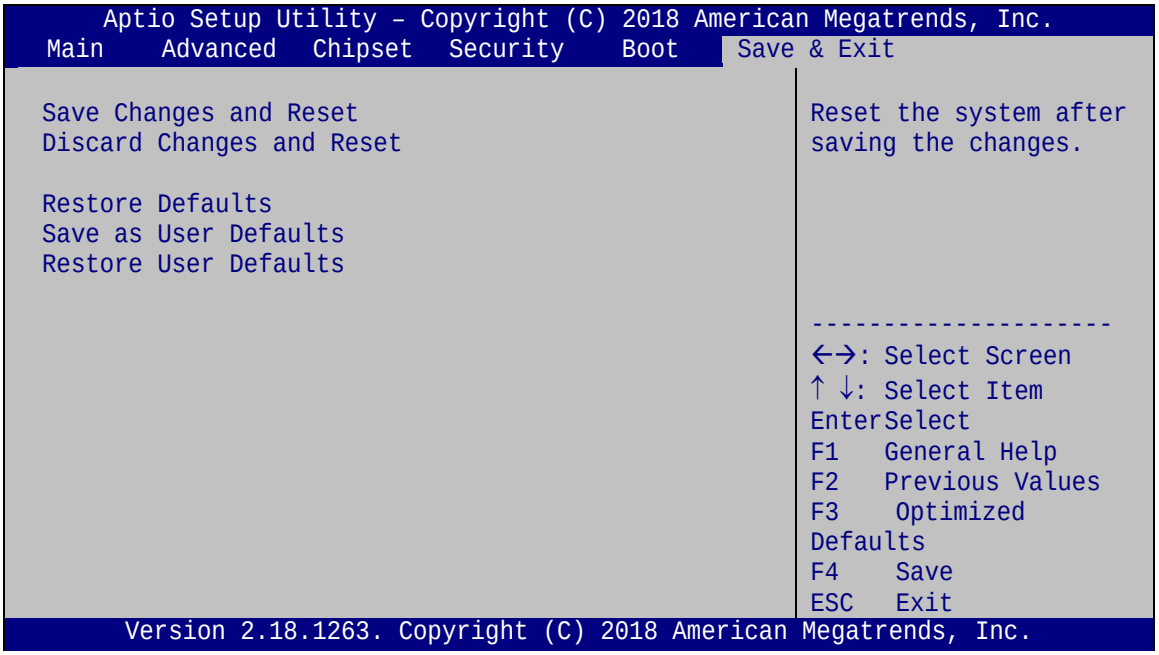
➔ **Disabled**		Normal POST messages displayed
➔ **Enabled**	**DEFAULT**	OEM Logo displayed instead of POST messages

➔ **Boot Option Priority**

Use the **Boot Option Priority** function to set the system boot sequence from the available devices. The drive sequence also depends on the boot sequence in the individual device section.

5.7 Exit

Use the **Exit** menu (**BIOS Menu 24**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 24:Exit

➔ **Save Changes and Reset**

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

➔ **Discard Changes and Reset**

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

➔ **Restore Defaults**

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

➔ **Save as User Defaults**

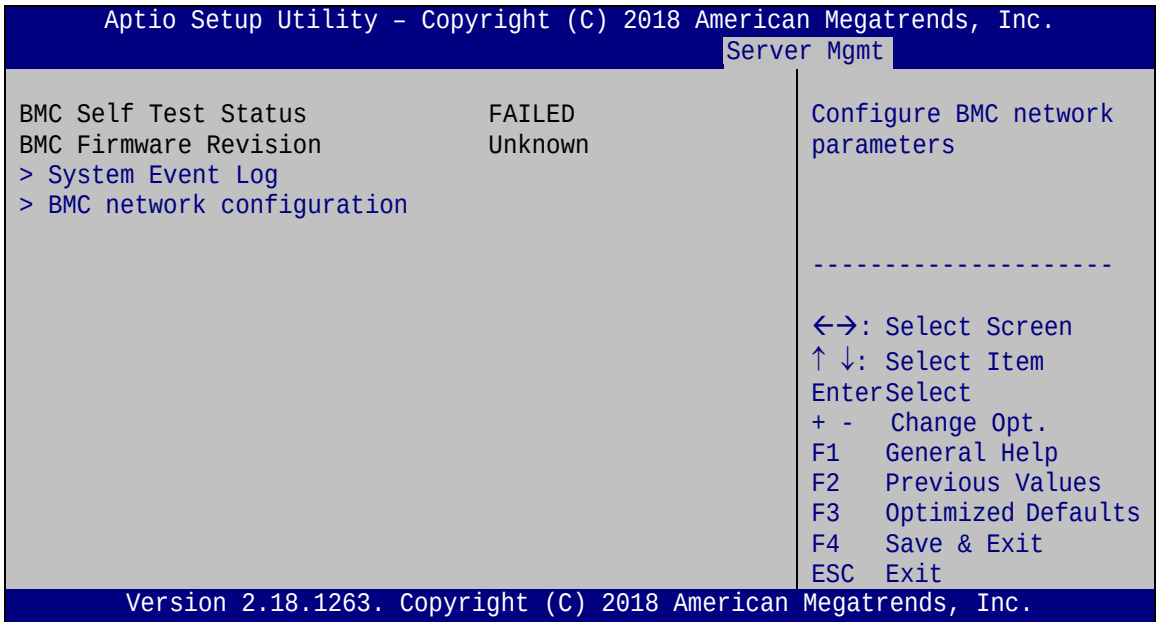
Use the **Save as User Defaults** option to save the changes done so far as user defaults.

➔ **Restore User Defaults**

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

5.8 Server Mgmt

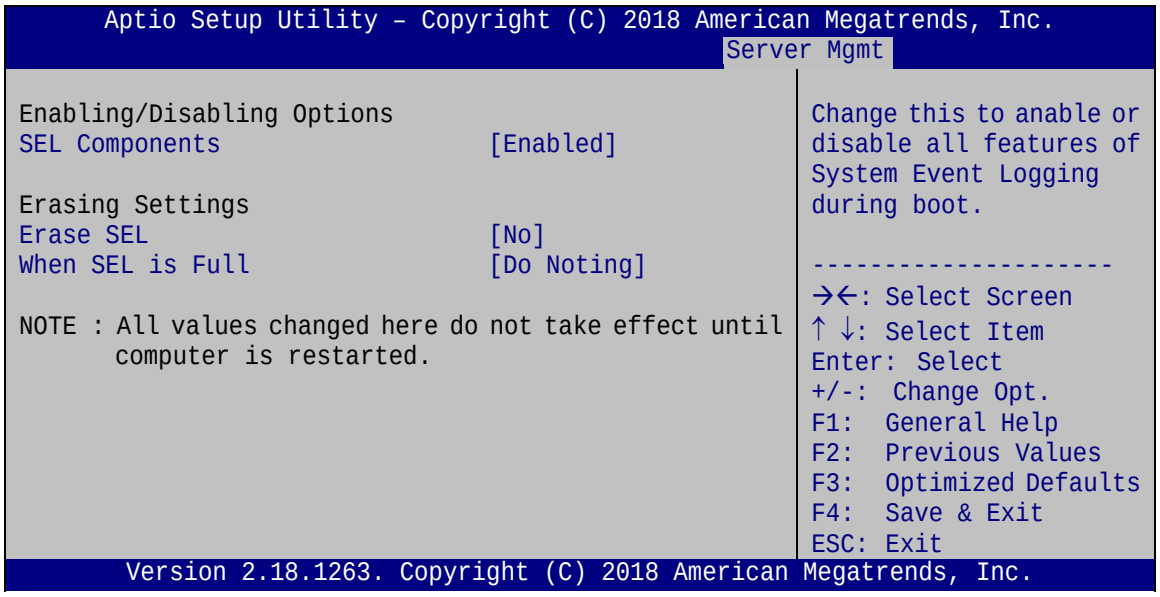
Use the **Server Mgmt** menu (BIOS Menu 25) to access the server management menus.



BIOS Menu 25: Server Mgmt

5.8.1.1 System Event Log

Use the **System Event Log** menu (BIOS Menu 26) to configure the event log.



BIOS Menu 26: System Event Log

➔ **SEL Components [Enabled]**

Use the **SEL Components** option to enable or disable all features of system event logging during boot.

➔ **Disabled** Disables all features of system event logging during boot.

➔ **Enabled** **DEFAULT** Enables all features of system event logging during boot.

➔ **Erase SEL [No]**

Use **Erase SEL** option to select options for erasing SEL. The following options are available:

- No **Default**
- Yes, On next reset
- Yes, On every reset

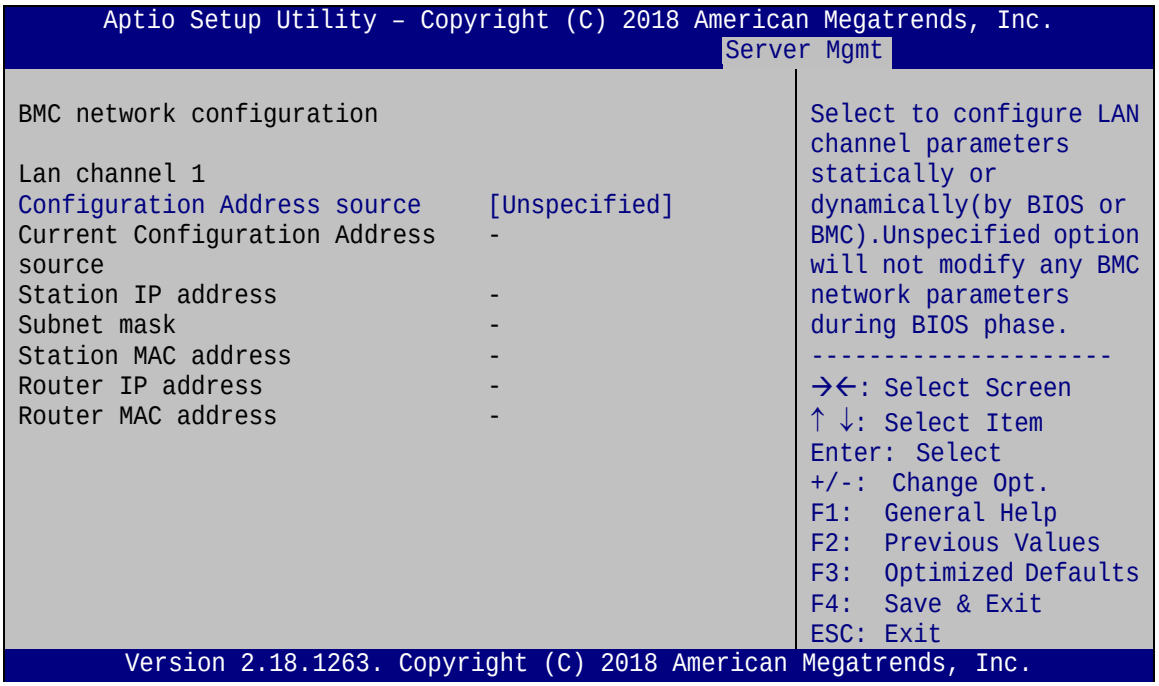
➔ **When SEL is Full [Do Nothing]**

Use **When SEL is FULL** option to select options for reactions to a full SEL. The following options are available:

- Do Nothing **Default**
- Erase Immediately

5.8.1.2 BMC network configuration

Use the **BMC network configuration** menu (BIOS Menu 27) to configure BMC network parameters.



BIOS Menu 27: PCH Azalia Configuration Menu

➔ **Configuration Address source [Unspecified]**

Use **Configuration Address source** option to configure LAN channel parameters. The following options are available:

- Unspecified **Default**
- Static
- DynamicBmcDhcp
- DynamicBmcNonDhcp

Chapter

6

Software Driver

6.1 Available Drivers

All the drivers for the WAFER-BT are available on IEI Resource Download Center (https://download.ieiworld.com). Type WAFER-BT and press Enter to find all the relevant software, utilities, and documentation.

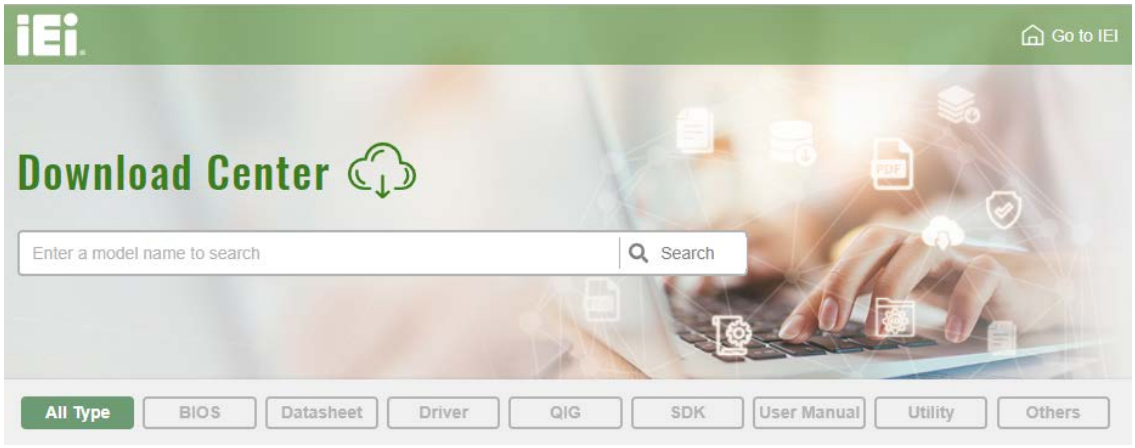
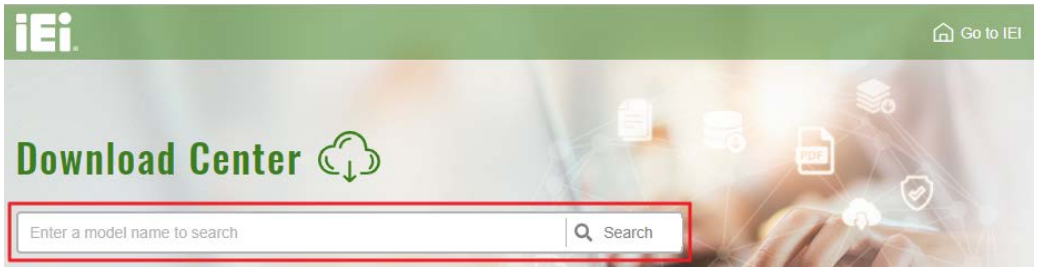


Figure 6-1: IEI Resource Download Center

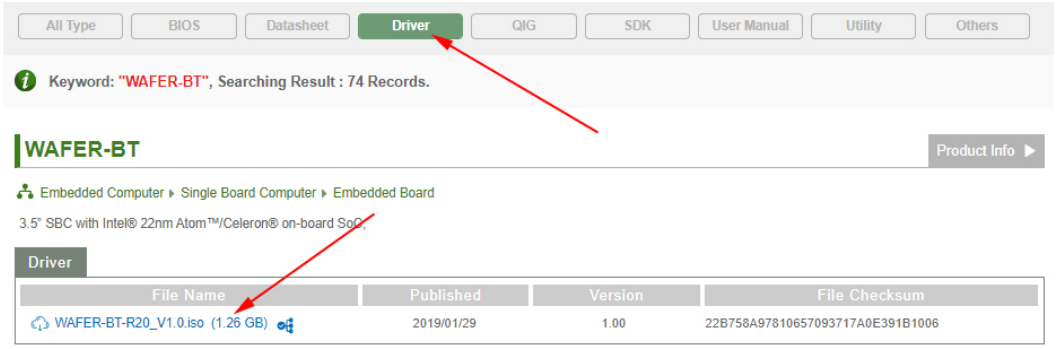
6.2 Driver Download

To download drivers from IEI Resource Download Center, follow the steps below.

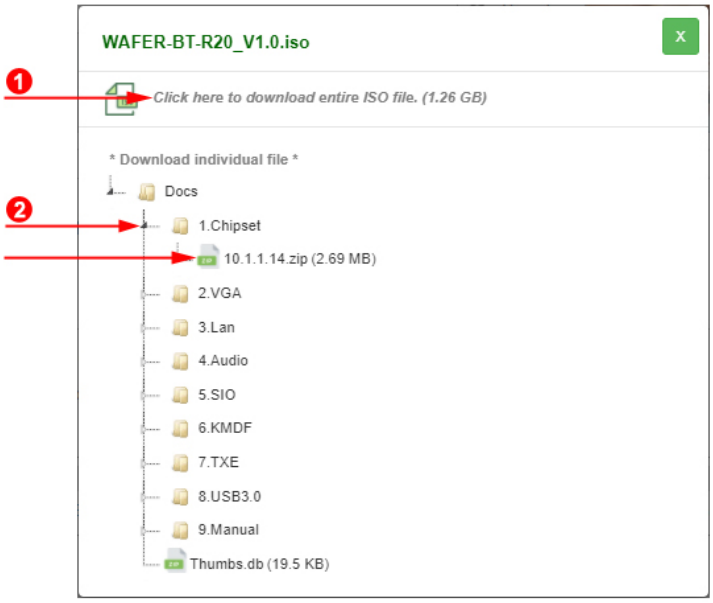
Step 1: Go to https://download.ieiworld.com. Type WAFER-BT and press Enter.



Step 2: All product-related software, utilities, and documentation will be listed. You can choose **Driver** to filter the result.



Step 3: Click the driver file name on the page and you will be prompted with the following window. You can download the entire ISO file (❶), or double click an individual item to find its driver file and click the file name to download (❷).



NOTE:

To install software from the downloaded ISO image file in Windows 8, 8.1 or 10, double-click the ISO file to mount it as a virtual drive to view its content. On Windows 7 system, an additional tool (such as Virtual CD-ROM Control Panel from Microsoft) is needed to mount the file.

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

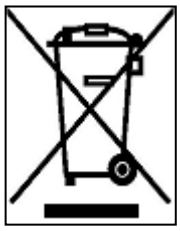
Product Disposal

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.

- Outside the European Union – If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority so as to comply with the correct disposal method.
- Within the European Union – The device that produces less waste and is easier to recycle is classified as electronic device in terms of the European Directive 2012/19/EU (WEEE), and must not be disposed of as domestic garbage.



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

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

Appendix

C

BIOS Menu Options

Appendix

D

Digital I/O Interface

The DIO connector on the WAFER-BT is interfaced to GPIO ports on the Super I/O chipset. 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

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 output value

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. Contact IEI support or visit the IEI website for drivers for other operating systems.

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

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

INT 15H:

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

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

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

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

NOTE:

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

EXAMPLE PROGRAM:

```
; INITIAL TIMER PERIOD COUNTER

;
W_LOOP:
;

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

;
; ADD THE APPLICATION PROGRAM HERE
;

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

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

;
; EXIT ;
```

Appendix

F

Error Beep Code

F.1 PEI Beep Codes

Number of Beeps	Description
1	Memory not Installed
1	Memory was installed twice (InstallPeiMemory routine in PEI Core called twice)
2	Recovery started
3	DXEIPL was not found
3	DXE Core Firmware Volume was not found
4	Recovery failed
4	S3 Resume failed
7	Reset PPI is not available

F.2 DXE Beep Codes

Number of Beeps	Description
1	Invalid password
4	Some of the Architectural Protocols are not available
5	No Console Output Devices are found
5	No Console Input Devices are found
6	Flash update is failed
7	Reset protocol is not available
8	Platform PCI resource requirements cannot be met

NOTE:

If you have any question, please contact IEI for further assistance.

Appendix

G

Hazardous Materials Disclosure

G.1 RoHS II Directive (2015/863/EU)

The details provided in this appendix are to ensure that the product is compliant with the RoHS II Directive (2015/863/EU). The table below acknowledges the presences of small quantities of certain substances in the product, and is applicable to RoHS II Directive (2015/863/EU).

Please refer to the following table.

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)	Bis(2-ethylhexyl) phthalate (DEHP)	Butyl benzyl phthalate (BBP)	Dibutyl phthalate (DBP)	Diisobutyl phthalate (DIBP)
Housing	O	O	O	O	O	O	O	O	O	O
Display	O	O	O	O	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O	O	O	O	O
Fan Assembly	O	O	O	O	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O	O	O	O	O
Battery	O	O	O	O	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 Directive (EU) 2015/863.

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 Directive (EU) 2015/863.

G.2 China RoHS

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/T11364-2014與GB/T26572-2011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/T11364-2014 與 GB/T26572-2011 标准规定的限量要求。