

USER MANUAL

BA-2602

ATX Intel® 9th / 8th Gen. Core™
i7/i5/i3/ Pentium® / Celeron® /
Xeon® E-2200 / 2100
CPU Processor

BA-2602 M2

BA-2602

***ATX Intel[®] 9th / 8th Gen. Core[™] i7/i5/i3/
Pentium[®] / Celeron[®] / Xeon[®] E-2200 / 2100
CPU Processor***

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DISCLAIMER

This user's manual is meant to assist users in installing and setting up the system. The information contained in this document is subject to change without any notice.




CE NOTICE

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC NOTICE

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.

You are cautioned that any change or modifications to the equipment not expressly approve by the party responsible for compliance could void your authority to operate such equipment.

| | |
|---|---|
|  | <p>CAUTION: Danger of explosion may occur when the battery is incorrectly replaced. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.</p> |
|  | <p>CAUTION: Always touch the board components by the edges. Never touch components such as a processor by its pins. Take special cares while you are holding electronic circuit boards by the edges only. Do not touch BA-2602 components.</p> |
|  | <p>WARNING: Some internal parts of BA-2602 may have high electrical voltage. We strongly recommend that only qualified engineers are allowed to service and disassemble the system. If any damages should occur on BA-2602 and are caused by unauthorized servicing, it will not be covered by the product warranty.</p> |

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Revision History

The revision history of BA-2602 User Manual is described below:

| Version No. | Revision History | Date |
|-------------|--|------------|
| M2 | The pin assignment for Pin 12 of Power Input Connector (ATX_PWR1) has been revised to “ +3.3V ”. (Page 3-52) | 2024/02/05 |
| M1 | Initial Release | 2020/01/30 |

1 Introduction

This chapter provides the introduction for the BA-2602 system as well as the framework of the user manual.

The following topic is included:

- About This Manual

1.1 About This Manual

Thank you for purchasing our BA-2602 system. The BA-2602 provides faster processing speed, greater expandability and can handle more tasks than before. This manual is designed to assist you how to install and set up the whole system. It contains 5 chapters and 1 appendix. Users can configure the system according to their own needs. This user manual is intended for service personnel with strong hardware background. It is not intended for general users.

The following section outlines the structure of this user manual.

Chapter 1 Introduction

This chapter provides the introduction for the BA-2602 system as well as the framework of the user manual.

Chapter 2 Getting Started

This chapter describes the package contents and outlines BA-2602 specifications. Read the safety reminders carefully on how to take care of your system properly.

Chapter 3 Hardware Configuration

This chapter outlines the locations of the motherboard components and their respective functions. You will learn how to set the jumpers and configure the system to meet your own needs.

Chapter 4 Software Utilities

This chapter contains helpful information for proper installations of the Intel Chipset Software Installation Utility, Graphics Driver Utility, LAN Driver Utility, Sound Driver Utility, Intel® Management Engine Components Driver Installer, Intel® Rapid Storage Utility and Intel® Serial I/O Driver Utility.

Chapter 5 BIOS Setup

This chapter indicates you how to change the BIOS configurations.

Appendix A Technical Summary

This appendix provides the information about the allocation maps for BA-2602 block diagram, system resources, Watchdog Timer Configuration and Flash BIOS Update.

2 Getting Started

This chapter provides the information for the BA-2602 system. It describes the package contents and outlines the BA-2602 specifications.

The following topics are included:

- Package List
- BA-2602 Specification
- Safety Precautions

Experienced users can go to Chapter 3 Hardware Configuration on page 3-1 for a quick start.

2.1 Package List

If you discover any of the items listed below are damaged or lost, please contact your local distributor immediately.

| Item | Q'ty |
|--|------|
| BA-2602 | 1 |
| Quick Reference Guide | 1 |
| Manual / Driver DVD | 1 |
| SATA Cable (500 mm) | 1 |
| PS/2 Keyboard & Mouse Cable (L=250 mm) | 1 |
| I/O Shield | 1 |

2.2 BA-2602 Specifications

| System | |
|--------------------------|---|
| CPU Support | <ul style="list-style-type: none"> ➤ LGA1151 socket for Intel® 9th / 8th Gen. Core™ i7 / i5 / i3 / Pentium® / Celeron® desktop CPU ➤ Xeon® E-2200 / 2100 server CPU |
| CPU List | <ul style="list-style-type: none"> ➤ Xeon®: E-2278GE(GEL), E-2276GE, E-2176G, E-2124G ➤ 9th Core™: i7-9700E(TE), i5-9500E(TE), i3-9100E(TE) ➤ 8th Core™: i7-8700(T), i5-8500(T), i3-8100(T) ➤ Pentium®: G5400, G5400T ➤ Celeron®: G4900, G4900T |
| Chipset | <ul style="list-style-type: none"> ➤ Intel® C246 (supports Xeon® / Core™ / Pentium® / Celeron® CPU) ➤ Intel® Q370 / H310 (supports Core™ / Pentium® / Celeron® CPU) |
| Memory Support | <ul style="list-style-type: none"> ➤ 4 x DIMM sockets, supporting 2400/2666MHz DDR4 (up to 64GB) (C246/Q370) ➤ 2 x DIMM sockets, supporting 2400/2666MHz DDR4 (up to 32GB) (H310) ➤ Supports ECC (C246)/non-ECC (C246/Q370/H310) |
| BIOS | <ul style="list-style-type: none"> ➤ AMI UEFI BIOS |
| Hardware Monitor | <ul style="list-style-type: none"> ➤ CPU, System FAN (2 x smart FAN connector), 12V, 5V, 5Vsb, Vcore |
| Watchdog Timer | <ul style="list-style-type: none"> ➤ 1~255 seconds watchdog timer selectable |
| Power Supply | <ul style="list-style-type: none"> ➤ Supports ATX power (24+4 pins) |
| Power Consumption | <ul style="list-style-type: none"> ➤ +12V: 1.7A; -12V: 0.1A; +3.3V: 0.33A; +5V: 1.12A; 5Vsb: 0.1A |
| Speaker | <ul style="list-style-type: none"> ➤ 1 x internal buzzer |
| Dimensions | <ul style="list-style-type: none"> ➤ 305 x 244mm (12" x 9.6") |
| O.S. Support | <ul style="list-style-type: none"> ➤ Windows® 10 IoT Enterprise |
| Certifications | <ul style="list-style-type: none"> ➤ CE / FCC |

I/O Ports**SATA Interface**

- **C246 and Q370 SKU:** 6 x SATA III (6.0Gb/s) with RAID 0,1,5,10
- **H310 SKU:** 4 x SATA III (6.0Gb/s) without RAID

USB

| | | C246 / Q370 | H310 |
|-----------------|-----------|--------------------|------------------|
| Total | | 12 | 10 |
| Rear I/O | LAN1_USB1 | 2 x USB 3.1 Gen2 | 2 x USB 3.1 Gen1 |
| | LAN2_USB2 | 2 x USB 3.1 Gen1 | 2xUSB 2.0 |
| | KB_MS_USB | 2 x USB 2.0 | 2 x USB 2.0 |
| Internal | USB_1 | 2 x USB 3.1 Gen1 | 2 x USB 3.1 Gen1 |
| | USB_2 | 2 x USB 2.0 | 2 x USB 2.0 |
| | USB_3 | 2 x USB 2.0 | N/A |
| | USB_4 | N/A | N/A |

Serial Ports

| | | C246 / Q370 | H310 |
|-------------------------------------|------|--------------------------------------|-------------|
| Total | | 6 | 4 |
| Rear I/O, D-Sub | COM1 | RS-232 | |
| | COM2 | RS-232/422/485 selectable under BIOS | |
| Internal, Pitch 2.0mm header | COM3 | 5V and 12V selectable by jumper | |
| | COM4 | 5V and 12V selectable by jumper | |
| | COM5 | RS-232 | N/A |
| | COM6 | RS-232 | N/A |

Parallel Port

- 1 x LPT connector

LAN

- Dual LAN (2 x RJ45 on rear I/O)
- **LAN1:** Intel® PHY 219LM (GbE)
- **LAN 2:** Intel® LAN 211AT (GbE)
- Supports Wake-On-LAN & PXE

GPIO / DIO

- 8bits GPIO programmable

FAN

- 1 x CPU fan, 2 x system fans (internal connector)

| Keyboard / Mouse | <ul style="list-style-type: none"> ➤ 1 x PS/2 Combo connector for keyboard & mouse (rear I/O) <p>Note: PS/2 Keyboard can work alone. If customers intend to insert PS/2 Keyboard and Mouse simultaneously, PS/2 extension cable enclosed in the package box must be used.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-------------------------|---|-------------|------------------|-------------|-----------------|---------|---------|-----------------|--------|-----|-----------------|--------|-----|-----------------|--------|--------|-----------------|--------|-----|-----------------|-----|-----|-----------------|-----|-----|----------------|-----------|-----|
| Audio | <ul style="list-style-type: none"> ➤ Mic In / Line In / Line Out (rear I/O) ➤ Internal 2 x 5 wafer, Pitch 2.0 (connected to front panel of the chassis) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Expansion Bus | <table border="1"> <thead> <tr> <th></th> <th>C246/Q370</th> <th>H310</th> </tr> </thead> <tbody> <tr> <td>1st slot</td> <td>PCIeX16</td> <td>PCIeX16</td> </tr> <tr> <td>2nd slot</td> <td>PCIeX4</td> <td>N/A</td> </tr> <tr> <td>3rd slot</td> <td>PCIeX4</td> <td>N/A</td> </tr> <tr> <td>4th slot</td> <td>PCIeX4</td> <td>PCIeX4</td> </tr> <tr> <td>5th slot</td> <td>PCIeX1</td> <td>N/A</td> </tr> <tr> <td>6th slot</td> <td>PCI</td> <td>PCI</td> </tr> <tr> <td>7th slot</td> <td>PCI</td> <td>PCI</td> </tr> <tr> <td>M_PCIE1</td> <td>Mini PCIe</td> <td>N/A</td> </tr> </tbody> </table> | | C246/Q370 | H310 | 1st slot | PCIeX16 | PCIeX16 | 2nd slot | PCIeX4 | N/A | 3rd slot | PCIeX4 | N/A | 4th slot | PCIeX4 | PCIeX4 | 5th slot | PCIeX1 | N/A | 6th slot | PCI | PCI | 7th slot | PCI | PCI | M_PCIE1 | Mini PCIe | N/A |
| | C246/Q370 | H310 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1st slot | PCIeX16 | PCIeX16 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2nd slot | PCIeX4 | N/A | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3rd slot | PCIeX4 | N/A | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4th slot | PCIeX4 | PCIeX4 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5th slot | PCIeX1 | N/A | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6th slot | PCI | PCI | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7th slot | PCI | PCI | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M_PCIE1 | Mini PCIe | N/A | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M.2 Slot | <ul style="list-style-type: none"> ➤ 1 x M.2 slot, NVMe up to PCIeX4, support 2242 & 2260, Co-lay with 4th PCIe slot | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SIM Slot | <ul style="list-style-type: none"> ➤ 1 x SIM slot, to be used together with 3G or 4G/LTE M.2 module. Support Micro SIM card. | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| LPC | <ul style="list-style-type: none"> ➤ 1 x LPC pin header | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Display | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Flexible Display | <ul style="list-style-type: none"> ➤ Standard SKU: 1 x VGA, 2 x DP, 1 x eDP (internal) ➤ C246/Q370 supports triple independent displays ➤ H310 supports dual independent displays | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| VGA | <ul style="list-style-type: none"> ➤ 1 x VGA (rear I/O) up to 1920 x 1200 @60Hz (default) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DP | <ul style="list-style-type: none"> ➤ 2 x DP (rear I/O) up to 4096 x 2304 @60Hz (default) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| eDP | <ul style="list-style-type: none"> ➤ 1 x eDP (internal) up to 4096 x 2304 @60Hz (default) (C246/Q370) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Others | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I²C | <ul style="list-style-type: none"> ➤ 2 x I²C 4-pin wafer | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | |
|----------------------------------|--|
| Front Panel LED Indicator | ➤ HDD LED, Power LED, Power Switch, Reset Switch ➤ On-board Power LED (Green) |
| Front Panel Audio | ➤ 1 x Front Panel Audio Header (2 x 5 pins) |
| TPM on board (option) | ➤ Co-lay TPM1.2 / TPM2.0 chip (optional) |
| Case Open Detection | ➤ 1 x 2-pin jumper for case intrusion detection |
| Shock | ➤ 15G peak-to-peak, 11ms duration, non-operation |
| Vibration | ➤ Non-operation: 2G, 5-200Hz, X, Y, Z axis |
| Environment | |
| Operating Temp. | ➤ 0°C ~ 60°C (32°F ~ 140°F) |
| Storage Temp. | ➤ -40°C ~ 85°C (-40°F ~ 185°F) |
| Operating Humidity | ➤ 20%~ 90% (non-condensing) |

2.3 Safety Precautions

Follow the instructions below to avoid your system from damages:

1. Keep your system away from static electricity on all occasions.
2. Prevent electric shock. Don't touch any components of this board when it is powered on. Always disconnect power when the system is not in use.
3. Disconnect power source when you change any hardware devices.
For instance, when you connect a jumper or install any cards, a surge of power may damage the electronic components or the whole system.

3 **Hardware Configuration**

This chapter contains helpful information about the jumper & connector settings, and component locations.

The following sections are included:

- Jumper & Connector Quick Reference Table
- Component Locations
- Configuration and Jumper Settings
- Connector Pin Assignments

3.1 JUMPER & CONNECTOR QUICK REFERENCE TABLE

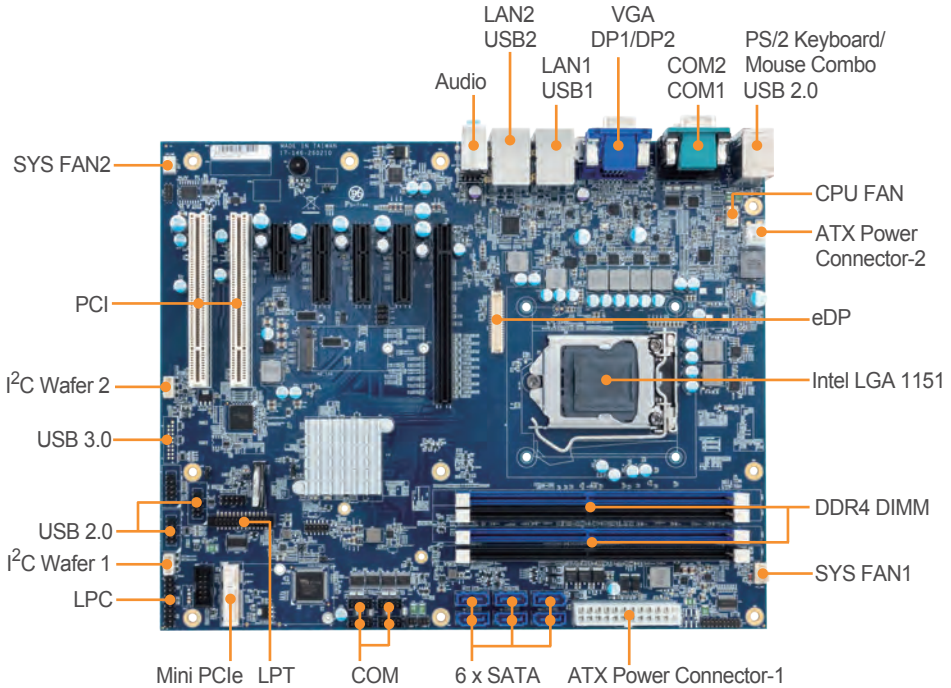
| JUMPER Description | NAME |
|--|-------------|
| Clear CMOS Data Selection | JCMOS1 |
| Hardware Power Failure ON Selection | JP_AT1 |
| PCH Configuration / Recovery Selection | JP2 |
| Flash Descriptor Override Selection | JP3 |
| VCCIO Voltage Selection | JP6 |
| USB Standby +5V / Normal Power Selection | JP7 |
| COM3 Pin9 RI/5V/12V Selection | JPCOM3 |
| COM4 Pin9 RI/5V/12V Selection | JPCOM4 |



| CONNECTOR Description | NAME |
|---|---------------------------------|
| Power Input Connectors | ATX_PWR1, ATX_PWR2 |
| Line In, Line Out and Mic In Port | AUDIO1 |
| COM Ports | COM1, COM2 |
| COM Connectors (COM5 & COM6 for C246/Q370 SKU Only) | COM3, COM4, COM5, COM6 |
| CPU / System FAN Connectors | CPU_FAN1, SYS_FAN1, SYS_FAN2 |
| Embedded DisplayPort (EDP) Connector (For C246/Q370 SKU Only) | EDP1 |
| Front Panel Header | JFP1 |
| Programmable GPIO Pin Header | JDIO1 |
| Low Pin Count (LPC) Header | JLPC1 |
| Speaker Header | JSPK1 |
| PS/2 + Dual USB 2.0 Ports (PS/2 Keyboard only) | KB_MS_USB |
| LAN + USB Connectors | LAN1_USB1, LAN2_USB2 |
| Mini PCI Express Slot (For C246/Q370 SKU Only) | M_PCIE1 |

| CONNECTOR Description | NAME |
|---|--|
| PCI Express Slots (PCI_E2, PCI_E3, PCI_E5 For C246/Q370 SKU Only) | PCI_E1, PCI_E2, PCI_E3, PCI_E4, PCI_E5 |
| PCI Bus Slots | PCI1~PCI2 |
| SATA Connectors (SATA5, SATA6 for C246/Q370 SKU only) | SATA1, SAT2, SATA3, SATA4, SATA5, SATA6 |
| Universal Serial Bus 3.1 Connector | USB1 |
| Universal Serial Bus 2.0 Connector | USB2, USB3 |
| VGA (Video Graphics Array) Port | VGA1 |
| DisplayPort Connectors | DP1, DP2 |
| Parallel Port (LPT) Connector | LPT1 |
| Front Audio Line In, Line Out and Mic In Connector | JAUDIO1 |
| Case Open Header | JP5 |
| I2C Wafers | JI2C1, JI2C2 |
| M.2 M-Key Slot | M2_SSD |
| NMI Header | JNMI1 |
| Flash BIOS Header | JSPI_1 |
| APS Header | JAPS1 |
| Micro SIM Card Socket (rear side) | SIM1 |

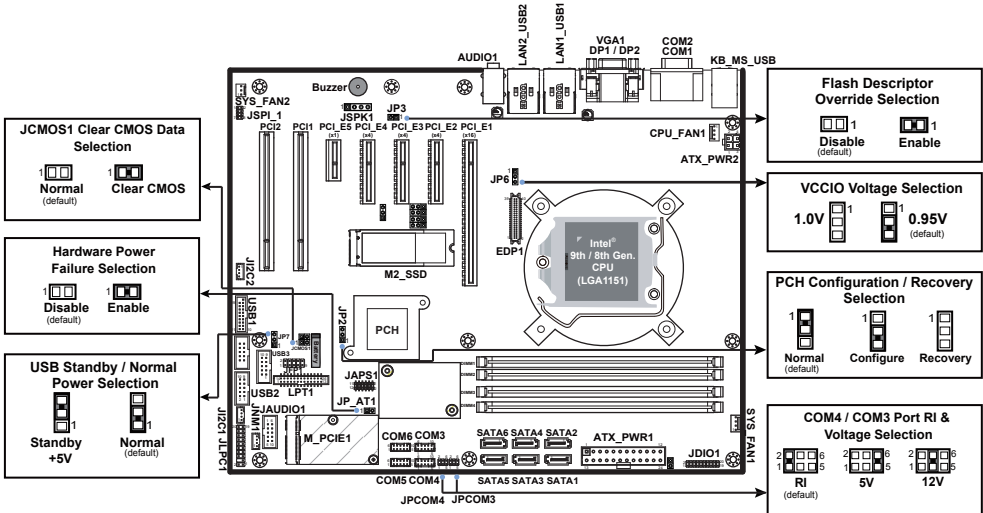
3.2 COMPONENT LOCATIONS

3.2.1 BA-2602 Top View



| | |
|---|--|
|  | <p>WARNING: Always disconnect the power cord when you are working with connectors and jumpers on BA-2602. Make sure both the system and peripheral devices are turned OFF as sudden surge of power could damage sensitive components. Make sure the board is properly grounded.</p> |
|  | <p>CAUTION: Observe precautions while handling electrostatic sensitive components. Make sure to ground yourself to prevent static charge while you are working on the connectors and jumpers. Use a grounding wrist strap and place all electronic components in any static-shielded devices.</p> |

3.2.2 BA-2602 Jumper Setting



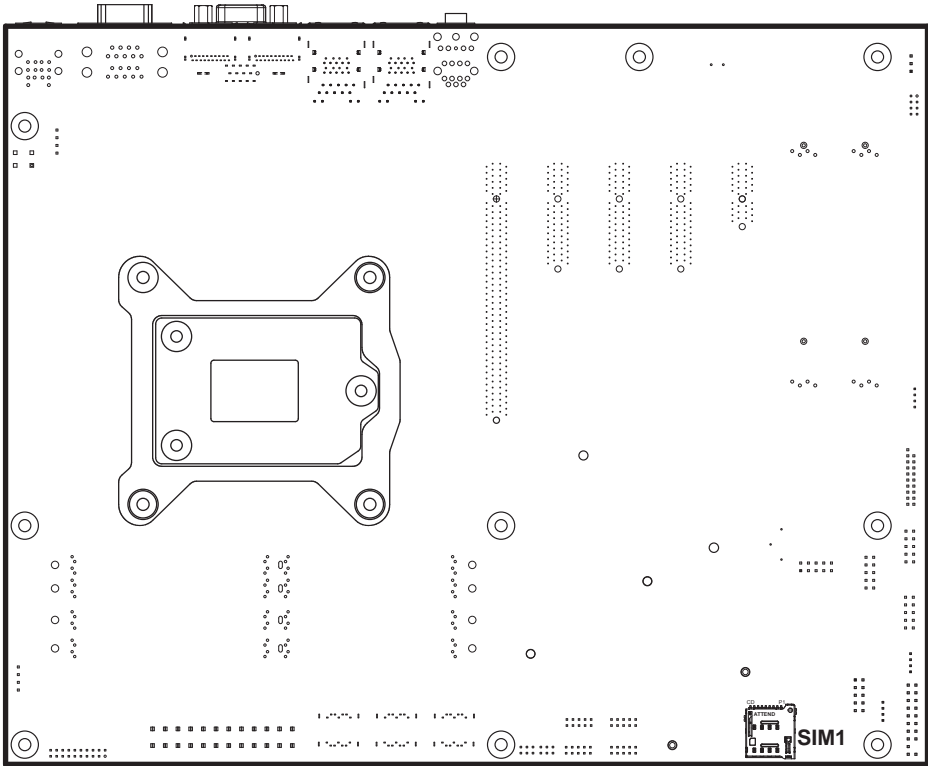
Note 1: COM5, COM6, EDP1, M_PCIE1, PCI_E2, PCI_E3, PCI_E5 are only supported in C246 / Q370 SKU.

Note 2: C246 / Q370 SKU supports USB 3.1 Gen2 on LAN1_USB1. H310 SKU supports USB 3.1 Gen1 on LAN1_USB1.

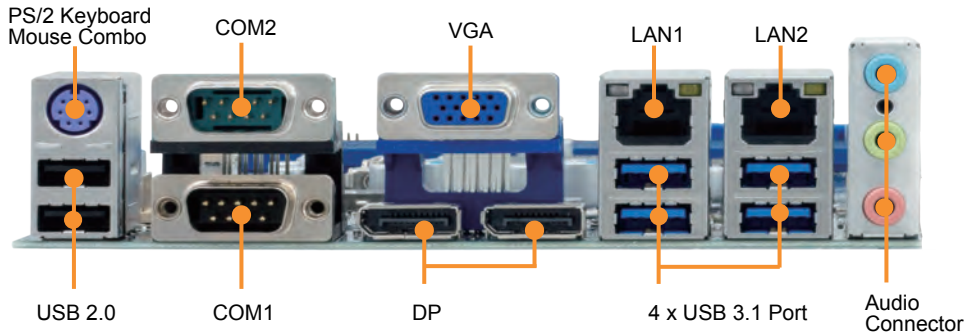
Note 3: C246 / Q370 SKU supports USB 3.1 Gen1 on LAN2_USB2. H310 SKU supports USB 2.0 on LAN2_USB2.

Note 4: C246 / Q370 SKU supports 6 SATA ports on SATA1~SATA6. H310 SKU supports 4 SATA ports on SATA1~SATA4.

3.2.3 BA-2602 Bottom View



3.2.4 BA-2602 I/O View

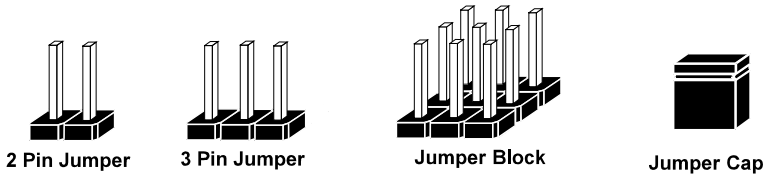


3.3 HOW TO SET JUMPERS

You can configure your board by setting jumpers. A jumper consists of two or three metal pins with a plastic base mounted on the board. By using a small plastic "cap", (also known as the jumper cap (with a metal contact inside)), you are able to connect the pins. So you can set up your hardware configuration by "opening" or "closing" pins.

The jumper can be combined into sets that are called jumper blocks. When the jumpers are all in the block, you have to put them together to set up the hardware configuration. The figure below shows how this looks like.

JUMPERS AND CAPS

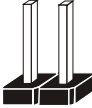


If a jumper has three pins (for examples, labeled PIN1, PIN2, and PIN3), you can connect PIN1 & PIN2 to create one setting by shorting. You can either connect PIN2 & PIN3 to create another setting. The same jumper diagrams are applied all through this manual. The figure below illustrates what the jumper diagrams look and what they represent.

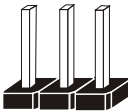
Jumper Diagrams



Jumper Cap
looks like this



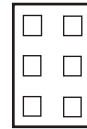
2 pin Jumper
looks like this



3 pin Jumper
looks like this



Jumper Block
looks like this



Jumper Settings



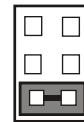
2 pin Jumper close(enabled)
Looks like this



3 pin Jumper
2-3 pin close(enabled)
Looks like this



Jumper Block
1-2 pin close(enabled)
Looks like this



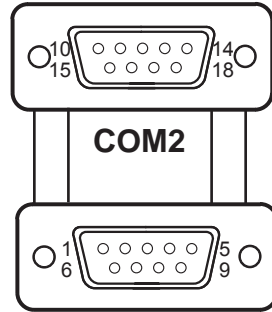
3.4 SETTING CONNECTORS AND JUMPERS

3.4.1 COM1 and COM2 PORT (COM1, COM2)

Port Location: COM1, COM2

Description: COM1 and COM2 Connectors (Default: RS-232)

| PIN | ASSIGNMENT |
|-----|------------|
| 1 | DCD |
| 2 | RX |
| 3 | TX |
| 4 | DTR# |
| 5 | GND |
| 6 | DSR# |
| 7 | RTS# |
| 8 | CTS# |
| 9 | RI# |



COM1

COM2: COM2 Connector, selectable as RS-232/422/485.

The pin assignments are as follows:

| PIN | Signal | | |
|-----|--------|--------|---------|
| | RS-232 | RS-422 | RS-485 |
| 10 | DCD# | TX- | RS-485- |
| 11 | RX | TX+ | RS-485+ |
| 12 | TX | RX+ | NC |
| 13 | DTR# | RX- | NC |
| 14 | GND | GND | GND |
| 15 | DSR# | NC | NC |
| 16 | RTS# | NC | NC |
| 17 | CTS# | NC | NC |
| 18 | RI# | NC | NC |

Notes:

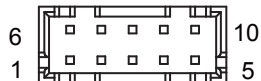
1. COM2 is selectable as RS-232, RS-422, RS-485 under BIOS setting.
2. Default setting is RS-232. Please see **Chapter 5 “Advanced – Super IO Configuration”** for details.

3.4.2 COM3, COM4, COM5, COM6 CONNECTOR (COM3 ~ COM6)

Connector Location: COM3, COM4, COM5, COM6

Description: COM Connector, fixed as RS-232

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| 1 | DCD# | 6 | DSR# |
| 2 | RX | 7 | RTS# |
| 3 | TX | 8 | CTS# |
| 4 | DTR# | 9 | RI# |
| 5 | GND | - | - |



COM3/
COM4/
COM5/
COM6

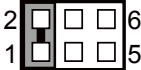
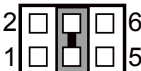

Notes:

1. COM3, COM4: Pin 9 is selectable for RI, +5V or +12V by jumper setting. Default setting is RI. Please see “**COM3 and COM4 PIN9 Definition Selection Guide**” for details.
2. COM5 and COM6 are available for C246/Q370 SKU only.

3.4.3 COM3 and COM4 PIN9 DEFINITION SELECTION GUIDE (JPCOM3, JPCOM4)

Jumper Location: JPCOM3, JPCOM4

Description: COM3 and COM4 RI & Voltage Selection

| Selection | Jumper Setting (Pin Closed) | Jumper Illustration |
|-----------|-----------------------------|--|
| RI | 1-2 (Default Setting) |  JPCOM3/JPCOM4 |
| 12V | 3-4 |  JPCOM3/JPCOM4 |
| 5V | 5-6 |  JPCOM3/JPCOM4 |

3.4.4 Programmable GPIO PIN HEADER (JDIO1)

Connector Location: JDIO1

Description: General Purpose Input / Output Pin Header

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| 1 | VCC5 | 2 | VCC12 |
| 3 | DIN0 | 4 | DOUT0 |
| 5 | DIN1 | 6 | DOUT1 |
| 7 | DIN2 | 8 | DOUT2 |
| 9 | DIN3 | 10 | DOUT3 |
| 11 | DIN4 | 12 | DOUT4 |
| 13 | DIN5 | 14 | DOUT5 |
| 15 | DIN6 | 16 | DOUT6 |
| 17 | DIN7 | 18 | DOUT7 |
| 19 | GND | 20 | GND |



3.4.5 PS/2 KEYBOARD & DUAL USB 2.0 PORT (KB_MS_USB)

Port Location: KB_MS_USB

Description: PS/2 Keyboard Port & Dual USB 2.0 Ports

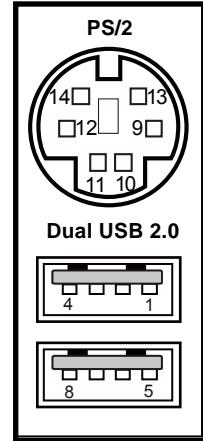
Supports mouse function on PS/2 by Y-cable.

PS/2:

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| 9 | GND | 12 | +5V |
| 10 | KB DATA | 13 | KB CLK |
| 11 | MS DATA | 14 | MS CLK |

Dual USB 2.0:

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| 1 | GND | 5 | GND |
| 2 | USB D+ | 6 | USB D+ |
| 3 | USB D- | 7 | USB D- |
| 4 | +5V | 8 | +5V |

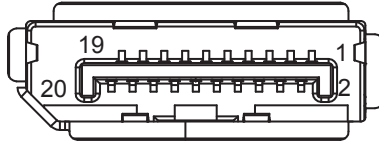


KB_MS_USB

3.4.6 DISPLAYPORT (DP1, DP2)

Port Location: DP1, DP2

Description: DisplayPort



DP1 / DP2

DP1 signals:

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|---------------|-----|------------|
| 1 | DDP_B_P0 | 2 | GND |
| 3 | DDP_B_N0 | 4 | DDP_B_P1 |
| 5 | GND | 6 | DDP_B_N1 |
| 7 | DDP_B_P2 | 8 | GND |
| 9 | DDP_B_N2 | 10 | DDP_B_P3 |
| 11 | GND | 12 | DDP_B_N3 |
| 13 | DDP_B_AUX_ENJ | 14 | GND |
| 15 | DDP_B_AUX_P | 16 | GND |
| 17 | DDP_B_AUX_N | 18 | DDP_B_HPD |
| 19 | GND | 20 | DP_PWR |

DP2 signals:

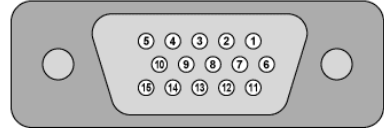
| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|---------------|-----|------------|
| 1 | DDP_C_P0 | 2 | GND |
| 3 | DDP_C_N0 | 4 | DDP_C_P1 |
| 5 | GND | 6 | DDP_C_N1 |
| 7 | DDP_C_P2 | 8 | GND |
| 9 | DDP_C_N2 | 10 | DDP_C_P3 |
| 11 | GND | 12 | DDP_C_N3 |
| 13 | DDP_C_AUX_ENJ | 14 | GND |
| 15 | DDP_C_AUX_P | 16 | GND |
| 17 | DDP_C_AUX_N | 18 | DDP_C_HPD |
| 19 | GND | 20 | DP_PWR |

3.4.7 VGA (Video Graphics Array) PORT (VGA1)

Port Location: VGA1

Description: VGA (Video Graphics Array) Port

| PIN | ASSIGNMENT |
|-----|------------|
| 1 | CRT_RED |
| 2 | CRT_GREEN |
| 3 | CRT_BLUE |
| 4 | NC |
| 5 | GND |
| 6 | NC |
| 7 | GND |
| 8 | GND |
| 9 | CRT_VCC |
| 10 | GND |
| 11 | NC |
| 12 | CRT_SDA |
| 13 | CRT_HSYNC |
| 14 | CRT_VSYNC |
| 15 | CRT_SCL |

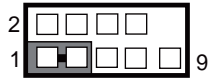
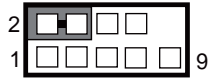
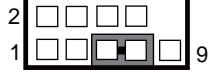




VGA1

3.4.8 FRONT PANEL CONNECTOR (JFP1)

Connector Location: JFP1

Description: Front Panel Connector

| SELECTION | PIN & ASSIGNMENT | JUMPER SETTINGS | JUMPER ILLUSTRATION |
|--------------|------------------|-----------------|--|
| HDD LED | 1. HDD_LED+ | 1-3 |  <p>JFP1</p> |
| | 3. HDD_LED- | | |
| Power LED | 2. PWR_LED+ | 2-4 |  <p>JFP1</p> |
| | 4. PWR_LED- | | |
| Reset Button | 5. GND | 5-7 |  <p>JFP1</p> |
| | 7. RST_BTN | | |
| Power Button | 6. PWR_BTN | 6-8 |  <p>JFP1</p> |
| | 8. GND | | |
| 5V | 9. VCC5 | 9 |  <p>JFP1</p> |

3.4.9 LAN & USB PORT (LAN1_USB1, LAN2_USB2)

Dual LAN ports are provided to support 10/100/1000Mbps, RJ45, rear I/O, and supports Wake-On-LAN & PXE.

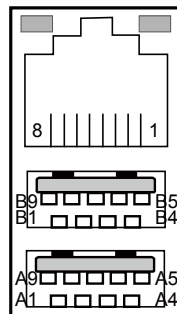
Port Location: LAN1_USB1

Description: LAN1 & Two USB 3.1 Ports

LAN1: Intel® PHY I219-LM (10/100/1000 Mbps)

Note: C246/Q370 SKU supports USB 3.1 Gen2 on LAN1_USB1.
H310 SKU supports USB 3.1 Gen1 on LAN1_USB1.

Green/Orange Yellow



LAN1_USB1

LAN1 pin assignment:

| PIN | ASSIGNMENT |
|-----|------------|
| 1 | MDI_P0 |
| 2 | MDI_N0 |
| 3 | MDI_1P |
| 4 | MDI_2P |
| 5 | MDI_2N |
| 6 | MDI_1N |
| 7 | MDI_P3 |
| 8 | MDI_N3 |

LAN1 LED Indicator:

Left Side LED

| | |
|-----------------|--------------------------------|
| Green Color On | 10/100Mbps LAN Speed Indicator |
| Orange Color On | Giga LAN Speed Indicator |
| Off | No LAN Switch/HUB connected |

Right Side LED

| | |
|-----------------------|-----------------------|
| Yellow Color Blinking | LAN Message Active |
| Off | No LAN Message Active |

USB 3.1 signals (Gen.2):

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| A1 | VCC | A9 | USB_TX_P |
| A2 | USB D- | A8 | USB_TX_N |
| A3 | USB D+ | A7 | GND |
| A4 | GND | A6 | USB_RX_P |
| - | - | A5 | USB_RX_N |

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| B1 | VCC | B9 | USB_TX_P |
| B2 | USB D- | B8 | USB_TX_N |
| B3 | USB D+ | B7 | GND |
| B4 | GND | B6 | USB_RX_P |
| - | - | B5 | USB_RX_N |

Port Location: LAN2_USB2

Description: LAN2 & Two USB 3.1 Ports

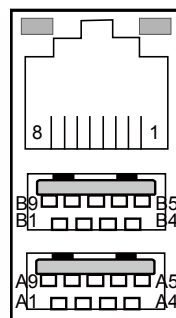
LAN2: Intel® PHY I211-AT (10/100/1000 Mbps)

Note: C246/Q370 SKU supports USB 3.1 Gen1 on LAN2_USB2.
H310 SKU supports USB 2.0 on LAN2_USB2.

Green/Orange Yellow

LAN2 Pin Assignment:

| PIN | ASSIGNMENT |
|-----|------------|
| 1 | MDI_P0 |
| 2 | MDI_N0 |
| 3 | MDI_1P |
| 4 | MDI_2P |
| 5 | MDI_2N |
| 6 | MDI_1N |
| 7 | MDI_P3 |
| 8 | MDI_N3 |



LAN2_USB2

LAN2 LED Indicator:

Left Side LED

| | |
|-----------------|--------------------------------|
| Green Color On | 10/100Mbps LAN Speed Indicator |
| Orange Color On | Giga LAN Speed Indicator |
| Off | No LAN Switch/HUB connected |

Right Side LED

| | |
|-----------------------|-----------------------|
| Yellow Color Blinking | LAN Message Active |
| Off | No LAN Message Active |

USB 3.1 signals (Gen.1):

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|------------|-------------------|------------|-------------------|
| A1 | VCC | A9 | USB_TX_P |
| A2 | USB D- | A8 | USB_TX_N |
| A3 | USB D+ | A7 | GND |
| A4 | GND | A6 | USB_RX_P |
| - | - | A5 | USB_RX_N |

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|------------|-------------------|------------|-------------------|
| B1 | VCC | B9 | USB_TX_P |
| B2 | USB D- | B8 | USB_TX_N |
| B3 | USB D+ | B7 | GND |
| B4 | GND | B6 | USB_RX_P |
| - | - | B5 | USB_RX_N |

3.4.10 LINE IN, LINE OUT, MIC IN PORT (AUDIO1)

Port Location: AUDIO1

Description: Line In, Line Out & Microphone

Line In:

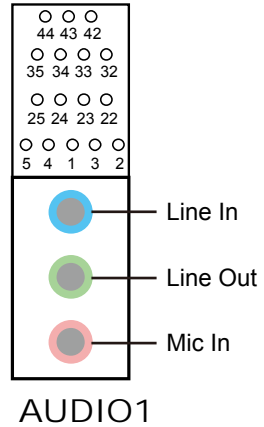
| PIN | ASSIGNMENT |
|-----|--------------|
| 32 | HD_LINE-IN-L |
| 33 | GND |
| 34 | GND |
| 35 | HD_LINE-IN-R |

Line Out:

| PIN | ASSIGNMENT |
|-----|------------|
| 22 | LINE-OUT-L |
| 23 | GND |
| 24 | GND |
| 25 | LINE-OUT-R |

Mic In:

| PIN | ASSIGNMENT |
|-----|-------------|
| 2 | HD_MIC1-L_L |
| 3 | GND |
| 1 | GND |
| 4 | GND |
| 5 | HD_MIC1-R_L |

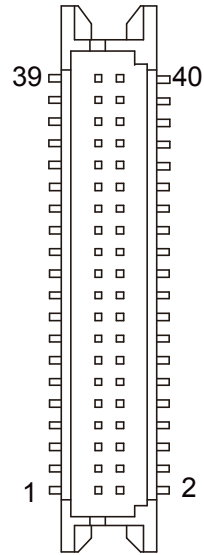


3.4.11 EMBEDDED DISPLAY PORT (EDP) CONNECTOR (EDP1)

Connector Location: EDP1

Description: Embedded DisplayPort (EDP) Connector

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|---------------|-----|---------------|
| 1 | NC | 2 | GND |
| 3 | EDP_TX3_DN | 4 | EDP_TX3_DP |
| 5 | GND | 6 | EDP_TX2_DN |
| 7 | EDP_TX2_DP | 8 | GND |
| 9 | EDP_TX1_DN | 10 | EDP_TX1_DP |
| 11 | GND | 12 | EDP_TX0_DN |
| 13 | EDP_TX0_DP | 14 | GND |
| 15 | EDP_AUX_DP_C | 16 | EDP_AUX_DN_C |
| 17 | GND | 18 | LCDVCC |
| 19 | LCDVCC | 20 | LCDVCC |
| 21 | LCDVCC | 22 | NC |
| 23 | LCDGND | 24 | LCDGND |
| 25 | LCDGND | 26 | LCDGND |
| 27 | EDP_PANEL_HPD | 28 | BackLight GND |
| 29 | BackLight GND | 30 | BackLight GND |
| 31 | BackLight GND | 32 | EDP_BKLTEN |
| 33 | EDP_BKLTCTL | 34 | NC |
| 35 | NC | 36 | VCC12 |
| 37 | VCC12 | 38 | VCC12 |
| 39 | VCC12 | 40 | NC |



EDP1

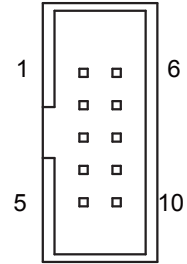
eDP (Embedded DisplayPort) was developed to be used specifically in embedded display applications, such as Notebook and Notepad PCs. eDP is based on the VESA DisplayPort Standard. It aims to define a standardized display panel interface for internal connections; e.g., graphics cards to notebook display panels. It has advanced power-saving features including seamless refresh rate switching. It has become the new mainstream display panel interface for LCD panels with the realized higher resolution.

3.4.12 FRONT PANEL AUDIO CONNECTOR (JAUDIO1)

Connector Location: JAUDIO1

Description: Front Panel Audio Connector

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| 1 | MIC1-L | 6 | MIC1-R |
| 2 | GND | 7 | GND |
| 3 | LINE-IN-L | 8 | LINE-IN-R |
| 4 | GND | 9 | GND |
| 5 | LINE-OUT-L | 10 | LINE-OUT-R |

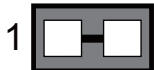
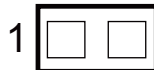


JAUDIO1

3.4.13 HARDWARE POWER FAILURE SELECTION (JP_AT1)

Jumper Location: JP_AT1

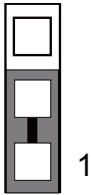


Description: Hardware Power Failure Selection

| Selection | Jumper Setting (Pin Closed) | Jumper Illustration |
|-----------|----------------------------------|---|
| Enable | 1-2 |  JP_AT1 |
| Disable | Open (Default Setting) |  JP_AT1 |

3.4.14 PCH CONFIGURATION / RECOVERY SELECTION (JP2)

Jumper Location: JP2

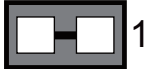

Description: PCH Configuration / Recovery Selection

| Selection | Jumper Setting (Pin Closed) | Jumper Illustration |
|-----------|---------------------------------|---|
| Normal | 1-2 <i>(Default Setting)</i> |  <p>JP2</p> |
| Configure | 2-3 |  <p>JP2</p> |
| Recovery | Open |  <p>JP2</p> |

3.4.15 FLASH DESCRIPTOR OVERRIDE SELECTION (JP3)

Jumper Location: JP3

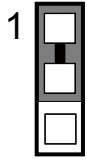
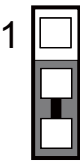
Description: Flash Descriptor Override Selection

| Selection | Jumper Setting (Pin Closed) | Jumper Illustration |
|-----------|--------------------------------|--|
| Enable | 1-2 |  1 JP3 |
| Disable | Open (Default Setting) |  1 JP3 |

3.4.16 VCCIO VOLTAGE SELECTION (JP6)

Jumper Location: JP6

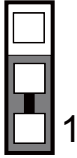
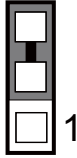
Description: VCCIO Voltage Selection

| Selection | Jumper Setting (Pin Closed) | Jumper Illustration |
|-----------|---------------------------------|---|
| 1.0V | 1-2 |  <p>1</p> <p>JP6</p> |
| 0.95V | 2-3 <i>(Default Setting)</i> |  <p>1</p> <p>JP6</p> |

3.4.17 USB STANDBY +5V / NORMAL POWER SELECTION (JP7)

Jumper Location: JP7

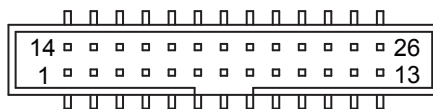
Description: USB Standby +5V / Normal Power Selection

| Selection | Jumper Setting (Pin Closed) | Jumper Illustration |
|-------------|---------------------------------|--|
| Normal | 1-2 <i>(Default Setting)</i> |  <p>JP7</p> |
| Standby +5V | 2-3 |  <p>JP7</p> |

3.4.18 PARALLEL PORT (LPT) CONNECTOR (LPT1)

Connector Location: LPT1

Description: Parallel Port Connector



LPT1

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|-------------|-----|------------|
| 1 | PRN_STRBJ_R | 14 | PRN_AFD |
| 2 | PRN_R_D0 | 15 | PRN_ERRJ |
| 3 | PRN_R_D1 | 16 | PRN_INIT |
| 4 | PRN_R_D2 | 17 | PRN_SLIN |
| 5 | PRN_R_D3 | 18 | GND |
| 6 | PRN_R_D4 | 19 | GND |
| 7 | PRN_R_D5 | 20 | GND |
| 8 | PRN_R_D6 | 21 | GND |
| 9 | PRN_R_D7 | 22 | GND |
| 10 | PRN_ACKJ | 23 | GND |
| 11 | PRN_BUSY | 24 | GND |
| 12 | PRN_PE | 25 | GND |
| 13 | PRN_SLCT | 26 | GND |

3.4.19 I2C WAFER

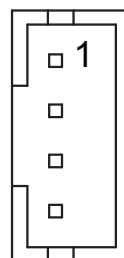
Connector Location: JI2C1, JI2C2

Description: I2C Wafer

| PIN | ASSIGNMENT |
|-----|------------|
| 1 | GND |
| 2 | 3.3V |
| 3 | I2C_SCL |
| 4 | I2C_SDA |



JI2C1



JI2C2

3.4.20 CASE OPEN CONNECTOR

Connector Location: JP5

Description: Case Open Connector

| PIN | ASSIGNMENT |
|-----|------------|
| 1 | COPENJ |
| 2 | GND |



JP5

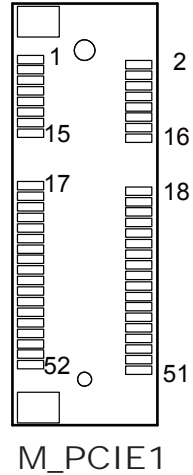
3.4.21 MINI PCI EXPRESS SLOT (For C246/Q370 Only) (M_PCIE1)

Connector Location: M_PCIE1

Description: Mini-PCI Express Slot

Note: C246 and Q370 SKUs support Mini-PCI Express Slot only.

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| 1 | WAKE_N | 2 | 3.3V_SB |
| 3 | NC | 4 | GND |
| 5 | NC | 6 | 1.5V |
| 7 | CLKREQ# | 8 | NC |
| 9 | GND | 10 | NC |
| 11 | REFCLK+ | 12 | NC |
| 13 | REFCLK- | 14 | NC |
| 15 | GND | 16 | NC |
| 17 | NC | 18 | GND |
| 19 | NC | 20 | NC |
| 21 | GND | 22 | PERST# |
| 23 | PE_RX_N | 24 | 3.3V_SB |
| 25 | PE_RX_P | 26 | GND |
| 27 | GND | 28 | 1.5V |
| 29 | GND | 30 | SMB_CLK |
| 31 | PE_TX_N | 32 | SMB_DATA |
| 33 | PE_TX_P | 34 | GND |
| 35 | GND | 36 | USB_N |
| 37 | GND | 38 | USB_P |
| 39 | 3.3V_SB | 40 | GND |
| 41 | 3.3V_SB | 42 | NC |
| 43 | GND | 44 | NC |
| 45 | NC | 46 | NC |
| 47 | NC | 48 | 1.5V |
| 49 | NC | 50 | GND |
| 51 | NC | 52 | 3.3V_SB |

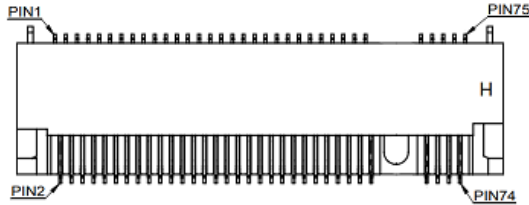


3.4.22 M.2 M-KEY SLOT (M2_SSD)

Connector Location: M2_SSD

Description: M.2 M-key supports PCIe x4 and M-2242/2260-sized cards.

Note: M.2 or PCI_E4 function is selectable under BIOS. (Default: PCI_E4).



M2_SSD

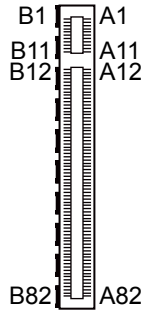
| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|----------------|-----|------------|
| 1 | GND | 2 | +3.3V |
| 3 | GND | 4 | +3.3V |
| 5 | PCIe Lane3 RX- | 6 | NC |
| 7 | PCIe Lane3 RX+ | 8 | NC |
| 9 | GND | 10 | NC |
| 11 | PCIe Lane3 TX- | 12 | +3.3V |
| 13 | PCIe Lane3 TX+ | 14 | +3.3V |
| 15 | GND | 16 | +3.3V |
| 17 | PCIe Lane2 RX- | 18 | +3.3V |
| 19 | PCIe Lane2 RX+ | 20 | NC |
| 21 | GND | 22 | NC |
| 23 | PCIe Lane2 TX- | 24 | NC |
| 25 | PCIe Lane2 TX+ | 26 | NC |
| 27 | GND | 28 | NC |
| 29 | PCIe Lane1 RX- | 30 | NC |
| 31 | PCIe Lane1 RX+ | 32 | NC |
| 33 | GND | 34 | NC |
| 35 | PCIe Lane1 TX- | 36 | NC |
| 37 | PCIe Lane1 TX+ | 38 | NC |
| 39 | GND | 40 | NC |
| 41 | PCIe Lane0 RX- | 42 | NC |
| 43 | PCIe Lane0 RX+ | 44 | NC |
| 45 | GND | 46 | NC |
| 47 | PCIe Lane0 TX- | 48 | NC |
| 49 | PCIe Lane0 TX+ | 50 | PLTRST |

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|------------|-------------------|------------|-------------------|
| 51 | GND | 52 | CLK REQ# |
| 53 | PCIe CLK- | 54 | Wake# |
| 55 | PCIe CLK+ | 56 | NC |
| 57 | GND | 58 | NC |
| 59 | NC | 60 | NC |
| 61 | NC | 62 | NC |
| 63 | NC | 64 | NC |
| 65 | NC | 66 | NC |
| 67 | NC | 68 | NC |
| 69 | NC | 70 | +3.3V |
| 71 | GND | 72 | +3.3V |
| 73 | GND | 74 | +3.3V |
| 75 | GND | - | - |

3.4.23 PCIe Bus (PCI_E1 (x16), PCI_E2 (x4), PCI_E3 (x4), PCI_E4 (x4), PCI_E5 (x1))

Connector Location: PCI_E1

Description: 164-pin PCIe Bus (x16)



PCI_E1

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| B1 | +12V | A1 | PRSNT#1 |
| B2 | +12V | A2 | +12V |
| B3 | +12V | A3 | +12V |
| B4 | GND | A4 | GND |
| B5 | SMB_CLK | A5 | NC |
| B6 | SMB_DATA | A6 | NC |
| B7 | GND | A7 | NC |
| B8 | +3.3V | A8 | NC |
| B9 | NC | A9 | +3.3V |
| B10 | +3.3V_AUX | A10 | +3.3V |
| B11 | WAKE# | A11 | PERST# |
| B12 | RSVD | A12 | GND |
| B13 | GND | A13 | REFCLK+ |
| B14 | HSOP0 | A14 | REFCLK- |
| B15 | HSOP0 | A15 | GND |
| B16 | GND | A16 | HSIP0 |
| B17 | PRSNT#2 | A17 | HSIN0 |
| B18 | GND | A18 | GND |
| B19 | HSOP1 | A19 | RSVD |
| B20 | HSOP1 | A20 | GND |
| B21 | GND | A21 | HSIP1 |
| B22 | GND | A22 | HSIN1 |
| B23 | HSOP2 | A23 | GND |

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|----------------------|-----|------------|
| B24 | HSO _N 2 | A24 | GND |
| B25 | GND | A25 | HSIP2 |
| B26 | GND | A26 | HSIN2 |
| B27 | HSOP3 | A27 | GND |
| B28 | HSO _N 3 | A28 | GND |
| B29 | GND | A29 | HSIP3 |
| B30 | RSVD | A30 | HSIN3 |
| B31 | PR _{SNT} #2 | A31 | GND |
| B32 | GND | A32 | RSVD |
| B33 | HSOP4 | A33 | RSVD |
| B34 | HSO _N 4 | A34 | GND |
| B35 | GND | A35 | HSIP4 |
| B36 | GND | A36 | HSIN4 |
| B37 | HSOP5 | A37 | GND |
| B38 | HSO _N 5 | A38 | GND |
| B39 | GND | A39 | HSIP5 |
| B40 | GND | A40 | HSIN5 |
| B41 | HSOP6 | A41 | GND |
| B42 | HSO _N 6 | A42 | GND |
| B43 | GND | A43 | HSIP6 |
| B44 | GND | A44 | HSIN6 |
| B45 | HSOP7 | A45 | GND |
| B46 | HSO _N 7 | A46 | GND |
| B47 | GND | A47 | HSIP7 |
| B48 | PR _{SNT} #2 | A48 | HSIN7 |
| B49 | GND | A49 | GND |
| B50 | HSOP8 | A50 | RSVD |
| B51 | HSO _N 8 | A51 | GND |
| B52 | GND | A52 | HSIP8 |
| B53 | GND | A53 | HSIN8 |
| B54 | HSOP9 | A54 | GND |
| B55 | HSO _N 9 | A55 | GND |
| B56 | GND | A56 | HSIP9 |
| B57 | GND | A57 | HSIN9 |
| B58 | HSOP10 | A58 | GND |
| B59 | HSO _N 10 | A59 | GND |
| B60 | GND | A60 | HSIP10 |
| B61 | GND | A61 | HSIN10 |
| B62 | HSOP11 | A62 | GND |
| B63 | HSO _N 11 | A63 | GND |

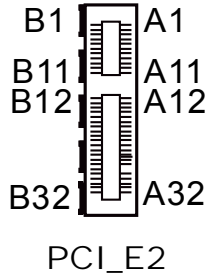
| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|------------|-------------------|------------|-------------------|
| B64 | GND | A64 | HSIP11 |
| B65 | GND | A65 | HSIN11 |
| B66 | HSOP12 | A66 | GND |
| B67 | HSOP12 | A67 | GND |
| B68 | GND | A68 | HSIP12 |
| B69 | GND | A69 | HSIN12 |
| B70 | HSOP13 | A70 | GND |
| B71 | HSOP13 | A71 | GND |
| B72 | GND | A72 | HSIP13 |
| B73 | GND | A73 | HSIN13 |
| B74 | HSOP14 | A74 | GND |
| B75 | HSIN14 | A75 | GND |
| B76 | GND | A76 | HSIP14 |
| B77 | GND | A77 | HSIN14 |
| B78 | HSIP15 | A78 | GND |
| B79 | HSIN15 | A79 | GND |
| B80 | GND | A80 | HSIP15 |
| B81 | PRSNT#2 | A81 | HSIN15 |
| B82 | RSVD | A82 | GND |

Connector Location: PCI_E2 (x4)

Description: PCIe Bus (x4)

You will find the **PCI_E2** connector with 64 pins on BA-2602.

PCI_E2 (x4) is supported in C246 and Q370 SKUs only.



| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| B1 | +12V | A1 | PRSNT#1 |
| B2 | +12V | A2 | +12V |
| B3 | +12V | A3 | +12V |
| B4 | GND | A4 | GND |
| B5 | SMB_CLK | A5 | NC |
| B6 | SMB_DATA | A6 | NC |
| B7 | GND | A7 | NC |
| B8 | +3.3V | A8 | NC |
| B9 | NC | A9 | +3.3V |
| B10 | +3.3V_AUX | A10 | +3.3V |
| B11 | WAKE# | A11 | PERST# |
| B12 | RSVD | A12 | GND |
| B13 | GND | A13 | REFCLK+ |
| B14 | HSOP0 | A14 | REFCLK- |
| B15 | HSO0 | A15 | GND |
| B16 | GND | A16 | HSIP0 |
| B17 | PRSNT#2 | A17 | HSIN0 |
| B18 | GND | A18 | GND |
| B19 | HSOP1 | A19 | RSVD |
| B20 | HSO1 | A20 | GND |
| B21 | GND | A21 | HSIP1 |
| B22 | GND | A22 | HSIN1 |
| B23 | HSOP2 | A23 | GND |
| B24 | HSO2 | A24 | GND |
| B25 | GND | A25 | HSIP2 |

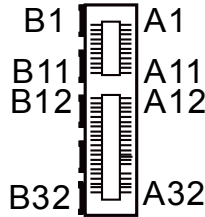
| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|------------|-------------------|------------|-------------------|
| B26 | GND | A26 | HSIN2 |
| B27 | HSOP3 | A27 | GND |
| B28 | HSO3 | A28 | GND |
| B29 | GND | A29 | HSIP3 |
| B30 | RSVD | A30 | HSIN3 |
| B31 | PRSNT#2 | A31 | GND |
| B32 | GND | A32 | RSVD |

Connector Location: PCI_E3 (x4)

Description: PCIe Bus (x4)

You will find the **PCI_E3** connector with 64 pins on BA-2602.

PCI_E3 (x4) is supported in C246 and Q370 SKUs only.



PCI_E3

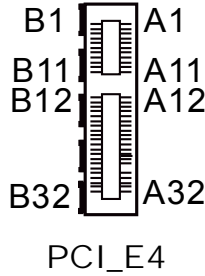
| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| B1 | +12V | A1 | PRSNT#1 |
| B2 | +12V | A2 | +12V |
| B3 | +12V | A3 | +12V |
| B4 | GND | A4 | GND |
| B5 | SMB_CLK | A5 | NC |
| B6 | SMB_DATA | A6 | NC |
| B7 | GND | A7 | NC |
| B8 | +3.3V | A8 | NC |
| B9 | NC | A9 | +3.3V |
| B10 | +3.3V_AUX | A10 | +3.3V |
| B11 | WAKE# | A11 | PERST# |
| B12 | RSVD | A12 | GND |
| B13 | GND | A13 | REFCLK+ |
| B14 | HSOP0 | A14 | REFCLK- |
| B15 | HSOP0 | A15 | GND |
| B16 | GND | A16 | HSIP0 |
| B17 | PRSNT#2 | A17 | HSIN0 |
| B18 | GND | A18 | GND |
| B19 | HSOP1 | A19 | RSVD |
| B20 | HSOP1 | A20 | GND |
| B21 | GND | A21 | HSIP1 |
| B22 | GND | A22 | HSIN1 |
| B23 | HSOP2 | A23 | GND |
| B24 | HSOP2 | A24 | GND |
| B25 | GND | A25 | HSIP2 |

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|------------|-------------------|------------|-------------------|
| B26 | GND | A26 | HSIN2 |
| B27 | HSOP3 | A27 | GND |
| B28 | HSON3 | A28 | GND |
| B29 | GND | A29 | HSIP3 |
| B30 | RSVD | A30 | HSIN3 |
| B31 | PRSNT#2 | A31 | GND |
| B32 | GND | A32 | RSVD |

Connector Location: PCI_E4 (x4)

Description: PCIe Bus (x4)

You will find the **PCI_E4** connector with 64 pins on BA-2602.



| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| B1 | +12V | A1 | PRSNT#1 |
| B2 | +12V | A2 | +12V |
| B3 | +12V | A3 | +12V |
| B4 | GND | A4 | GND |
| B5 | SMB_CLK | A5 | NC |
| B6 | SMB_DATA | A6 | NC |
| B7 | GND | A7 | NC |
| B8 | +3.3V | A8 | NC |
| B9 | NC | A9 | +3.3V |
| B10 | +3.3V_AUX | A10 | +3.3V |
| B11 | WAKE# | A11 | PERST# |
| B12 | RSVD | A12 | GND |
| B13 | GND | A13 | REFCLK+ |
| B14 | HSOP0 | A14 | REFCLK- |
| B15 | HSO0 | A15 | GND |
| B16 | GND | A16 | HSIP0 |
| B17 | PRSNT#2 | A17 | HSIN0 |
| B18 | GND | A18 | GND |
| B19 | HSOP1 | A19 | RSVD |
| B20 | HSO1 | A20 | GND |
| B21 | GND | A21 | HSIP1 |
| B22 | GND | A22 | HSIN1 |
| B23 | HSOP2 | A23 | GND |
| B24 | HSO2 | A24 | GND |
| B25 | GND | A25 | HSIP2 |
| B26 | GND | A26 | HSIN2 |

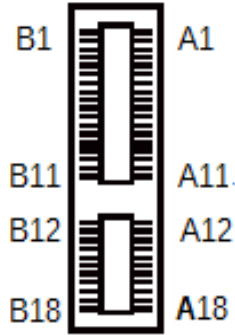
| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|------------|-------------------|------------|-------------------|
| B27 | HSOP3 | A27 | GND |
| B28 | HSO3 | A28 | GND |
| B29 | GND | A29 | HSIP3 |
| B30 | RSVD | A30 | HSIN3 |
| B31 | PRSNT#2 | A31 | GND |
| B32 | GND | A32 | RSVD |

Connector Location: PCI_E5 (x1)

Description: PCIe Bus (x1)

You will find the **PCI_E5** connector with 36 pins on BA-2602.

PCI_E5 (x1) is supported in C246 and Q370 SKUs only.



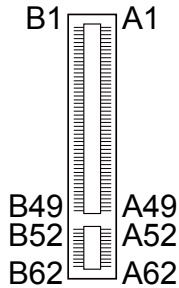
PCI_E5

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| B1 | +12V | A1 | PRSNT#1 |
| B2 | +12V | A2 | +12V |
| B3 | +12V | A3 | +12V |
| B4 | GND | A4 | GND |
| B5 | SMB_CLK | A5 | NC |
| B6 | SMB_DATA | A6 | NC |
| B7 | GND | A7 | NC |
| B8 | +3.3V | A8 | NC |
| B9 | NC | A9 | +3.3V |
| B10 | +3.3V_AUX | A10 | +3.3V |
| B11 | WAKE# | A11 | PERST# |
| B12 | RSVD | A12 | GND |
| B13 | GND | A13 | REFCLK+ |
| B14 | HSOP0 | A14 | REFCLK- |
| B15 | HSO0 | A15 | GND |
| B16 | GND | A16 | HSIP0 |
| B17 | PRSNT#2 | A17 | HSIN0 |
| B18 | GND | A18 | GND |

3.4.24 PCI BUS SLOT (PCI1, PCI2)

Connector Location: PCI1, PCI2

Description: 124-pin PCI Bus Slot



PCI1 / PCI2

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| B1 | -12V | A1 | TRST# |
| B2 | TCK | A2 | +12V |
| B3 | GND | A3 | TMS |
| B4 | TDO | A4 | TDI |
| B5 | +5V | A5 | +5V |
| B6 | +5V | A6 | INTA# |
| B7 | INTB# | A7 | INTC# |
| B8 | INTD# | A8 | +5V |
| B9 | RSV | A9 | RSV |
| B10 | RSV | A10 | +5V |
| B11 | RSV | A11 | RSV |
| B12 | GND | A12 | GND |
| B13 | GND | A13 | GND |
| B14 | RSV | A14 | RSV |
| B15 | GND | A15 | RST# |
| B16 | CLK | A16 | +5V |
| B17 | GND | A17 | GNT# |
| B18 | REQ# | A18 | GND |
| B19 | +5V | A19 | RSV |
| B20 | AD31 | A20 | AD30 |
| B21 | AD29 | A21 | +3.3V |
| B22 | GND | A22 | AD28 |
| B23 | AD27 | A23 | AD26 |
| B24 | AD25 | A24 | GND |

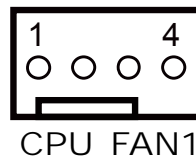
| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| B25 | +3.3V | A25 | AD24 |
| B26 | C/BE3# | A26 | IDSEL |
| B27 | AD23 | A27 | +3.3V |
| B28 | GND | A28 | AD22 |
| B29 | AD21 | A29 | AD20 |
| B30 | AD19 | A30 | GND |
| B31 | +3.3V | A31 | AD18 |
| B32 | AD17 | A32 | AD16 |
| B33 | C/BE2# | A33 | +3.3V |
| B34 | GND | A34 | FRAME# |
| B35 | IRDY# | A35 | GND |
| B36 | +3.3V | A36 | TRDY# |
| B37 | DEVSEL# | A37 | GND |
| B38 | GND | A38 | STOP# |
| B39 | LOCK# | A39 | +3.3V |
| B40 | PERR# | A40 | SDONE |
| B41 | +3.3V | A41 | SB0# |
| B42 | SERR# | A42 | GND |
| B43 | +3.3V | A43 | PAR |
| B44 | C/BE1# | A44 | AD15 |
| B45 | AD14 | A45 | +3.3V |
| B46 | GND | A46 | AD13 |
| B47 | AD12 | A47 | AD11 |
| B48 | AD10 | A48 | GND |
| B49 | GND | A49 | AD09 |
| B50 | - | A50 | - |
| B51 | - | A51 | - |
| B52 | AD08 | A52 | C/BE0# |
| B53 | AD07 | A53 | +3.3V |
| B54 | +3.3V | A54 | AD06 |
| B55 | AD05 | A55 | AD04 |
| B56 | AD03 | A56 | GND |
| B57 | GND | A57 | AD02 |
| B58 | AD01 | A58 | AD00 |
| B59 | +5V | A59 | +5V |
| B60 | ACK64# | A60 | REQ64# |
| B61 | +5V | A61 | +5V |
| B62 | +5V | A62 | +5V |

3.4.25 CPU / SYSTEM FAN CONNECTOR (CPU_FAN1, SYS_FAN1, SYS_FAN2)

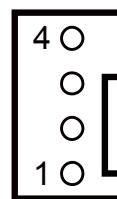
Connector Location: CPU_FAN1, SYS_FAN1

Description: CPU Fan Connector (CPU_FAN1),
System Fan Connector 1 (SYS_FAN1)

| PIN | ASSIGNMENT |
|-----|-------------|
| 1 | GND |
| 2 | +12V |
| 3 | CPU_FANTAC |
| 4 | CPU_FANCTRL |



CPU_FAN1

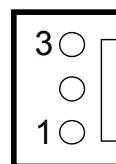


SYS_FAN1

Connector Location: SYS_FAN2

Description: System Fan Connector 2

| PIN | ASSIGNMENT |
|-----|------------|
| 3 | NC |
| 2 | +12V |
| 1 | GND |



SYS_FAN2

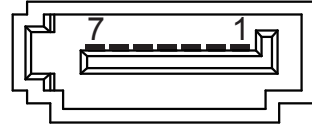
3.4.26 SERIAL ATA (SATA) CONNECTOR (SATA1 ~ SATA6)

Connector Location: SATA1, SATA2, SATA3, SATA4, SATA5, SATA6

Description: SATA Connectors

SATA1 Pin Assignment:

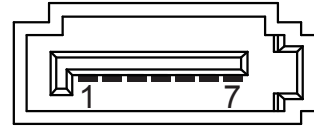
| PIN | ASSIGNMENT |
|-----|------------|
| 1 | GND |
| 2 | SATA_TXP0 |
| 3 | SATA_TXN0 |
| 4 | GND |
| 5 | SATA_RXN0 |
| 6 | SATA_RXP0 |
| 7 | GND |



SATA1/
SATA3/
SATA5

SATA2 Pin Assignment:

| PIN | ASSIGNMENT |
|-----|------------|
| 1 | GND |
| 2 | SATA_TXP1 |
| 3 | SATA_TXN1 |
| 4 | GND |
| 5 | SATA_RXN1 |
| 6 | SATA_RXP1 |
| 7 | GND |



SATA2/
SATA4/
SATA6

SATA3 Pin Assignment:

| PIN | ASSIGNMENT |
|-----|------------|
| 1 | GND |
| 2 | SATA_TXP2 |
| 3 | SATA_TXN2 |
| 4 | GND |
| 5 | SATA_RXN2 |
| 6 | SATA_RXP2 |
| 7 | GND |

SATA4 Pin Assignment:

| PIN | ASSIGNMENT |
|-----|------------|
| 1 | GND |
| 2 | SATA_TXP3 |
| 3 | SATA_TXN3 |
| 4 | GND |
| 5 | SATA_RXN3 |
| 6 | SATA_RXP3 |
| 7 | GND |

SATA5 Pin Assignment:

| PIN | ASSIGNMENT |
|-----|------------|
| 1 | GND |
| 2 | SATA_TXP4 |
| 3 | SATA_TXN4 |
| 4 | GND |
| 5 | SATA_RXN4 |
| 6 | SATA_RXP4 |
| 7 | GND |

SATA6 Pin Assignment:

| PIN | ASSIGNMENT |
|-----|------------|
| 1 | GND |
| 2 | SATA_TXP5 |
| 3 | SATA_TXN5 |
| 4 | GND |
| 5 | SATA_RXN5 |
| 6 | SATA_RXP5 |
| 7 | GND |

Notes:

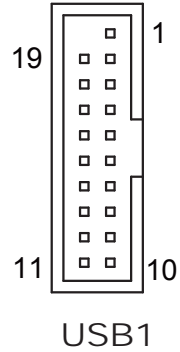
1. C246 SKU supports SATA1~SATA6.
2. Q370 SKU supports SATA1~SATA6.
3. H310 SKU supports SATA1~SATA4.

3.4.27 INTERNAL USB 3.1 CONNECTOR (USB1)

Connector Location: USB1

Description: Internal USB 3.1 Connector

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| 1 | +5V | 11 | USB D+ |
| 2 | USB_RX_N | 12 | USB D- |
| 3 | USB_RX_P | 13 | GND |
| 4 | GND | 14 | USB_TX_P |
| 5 | USB_TX_N | 15 | USB_TX_N |
| 6 | USB_TX_P | 16 | GND |
| 7 | GND | 17 | USB_RX_P |
| 8 | USB D- | 18 | USB_RX_N |
| 9 | USB D+ | 19 | +5V |
| 10 | GND | - | - |

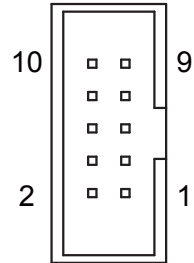


3.4.28 INTERNAL USB 2.0 CONNECTOR (USB2, USB3, USB4)

Connector Location: USB2, USB3, USB4

Description: Internal USB 2.0 Connector

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| 1 | +5V | 2 | +5V |
| 3 | USB D- | 4 | USB D- |
| 5 | USB D+ | 6 | USB D+ |
| 7 | GND | 8 | GND |
| 9 | NC | 10 | GND |



USB2/
USB3/
USB4

3.4.29 SPEAKER CONNECTOR (JSPK1)

Connector Location: JSPK1

Description: Speaker Connector

| PIN | ASSIGNMENT |
|-----|-------------|
| 1 | SPKR_VCC |
| 2 | SPKR_SIGNAL |
| 3 | SPKR_SIGNAL |
| 4 | SPKR_SIGNAL |



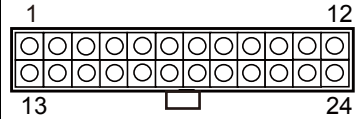
JSPK1

3.4.30 POWER INPUT CONNECTOR (ATX_PWR1, ATX_PWR2)

Connector Location: ATX_PWR1

Description: ATX Power Connector

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| 1 | +3.3V | 13 | +3.3V |
| 2 | +3.3V | 14 | -12V |
| 3 | GND | 15 | GND |
| 4 | +5V | 16 | PSON |
| 5 | GND | 17 | GND |
| 6 | +5V | 18 | GND |
| 7 | GND | 19 | GND |
| 8 | POK | 20 | -5V |
| 9 | +5V_SB | 21 | +5V |
| 10 | +12V | 22 | +5V |
| 11 | +12V | 23 | +5V |
| 12 | +3.3V | 24 | GND |

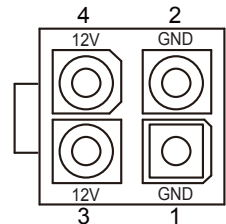


ATX_PWR1

Connector Location: ATX_PWR2

Description: Power Connector

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| 4 | +12V | 2 | GND |
| 3 | +12V | 1 | GND |



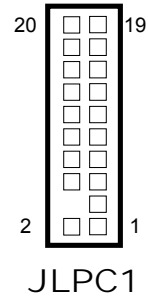
ATX_PWR2

3.4.31 LOW PIN COUNT (LPC) CONNECTOR (JLPC1)

Connector Location: JLPC1

Description: LPC Connector

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| 1 | CLK | 2 | GND |
| 3 | FRAME | 4 | NC |
| 5 | RESET | 6 | VCC5 |
| 7 | LAD3 | 8 | LAD2 |
| 9 | VCC3 | 10 | LAD1 |
| 11 | LAD0 | 12 | GND |
| 13 | SMBCLK | 14 | SMBDATA |
| 15 | 3VSB | 16 | SERIRQ |
| 17 | GND | 18 | CLK RUN |
| 19 | SUS_TAT | 20 | DREQ0 |





3.4.32 CLEAR CMOS DATA SELECTION (JCMOS1)

Jumper Location: JCMOS1

Description: Clear CMOS Data Selection

- Step 1.** Remove the main power of the PC.
- Step 2.** Close JCMOS1 (pins 1-2) for 6 seconds by a cap.
- Step 3.** Remove the cap which is just used on JCMOS1 (1-2), so that JCMOS1 returns to “OPEN”.
- Step 4.** Power on the PC and the PC will then auto-reboot for once in order to set SoC’s register.
- Step 5.** Done!

| Selection | Jumper Setting (Pin Closed) | Jumper Illustration |
|------------|--------------------------------|---|
| Normal | Open (Default Setting) |  JCMOS1 |
| Clear CMOS | 1-2 |  JCMOS1 |

3.4.33 NMI HEADER (JNMI1)

Connector Location: JNMI1

Description: NMI Header

| PIN | ASSIGNMENT |
|-----|------------|
| 1 | 3.3V |
| 2 | GND |
| 3 | NMI |
| 4 | GND |



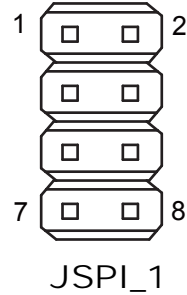
JNMI1

3.4.34 FLASH BIOS HEADER (JSPI_1)

Connector Location: JSPI_1

Description: Flash BIOS Header

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| 1 | +3.3V | 2 | GND |
| 3 | CS# | 4 | SCLK |
| 5 | MISO | 6 | MOSI |
| 7 | HOLD# | 8 | WP# |

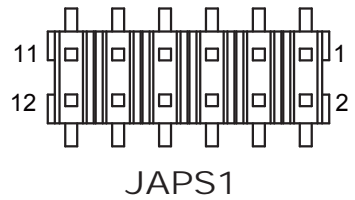


3.4.35 APS HEADER (JAPS1)

Connector Location: JAPS1

Description: APS Header

| PIN | ASSIGNMENT | PIN | ASSIGNMENT |
|-----|------------|-----|------------|
| 1 | +3.3V | 2 | +3.3V |
| 3 | SLP_S5# | 4 | SLP_S3# |
| 5 | SLP_A# | 6 | RTC RST# |
| 7 | SLP_S4# | 8 | GND |
| 9 | SYS RST# | 10 | Power BTN |
| 11 | GND | 12 | GND |

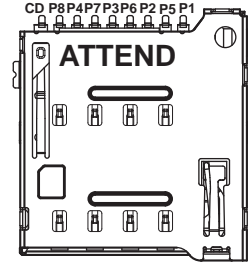


3.4.36 MICRO SIM CARD SOCKET (SIM1)

Connector Location: SIM1

Description: Micro SIM Push/Push type (located on the rear side of BA-2602)

| PIN | ASSIGNMENT |
|-----|------------|
| P1 | SIM PWR |
| P5 | GND |
| P2 | SIM RST |
| P6 | SIM VPP |
| P3 | SIM CLK |
| P7 | SIM DATA |
| P4 | Reserved |
| P8 | Reserved |
| CD | - |



SIM1

4 Software Utilities

This chapter provides the detailed information that guides users to install driver utilities for the system. The following topics are included:

- Installing Intel® Chipset Software Installation Utility
- Installing Graphics Driver Utility
- Installing LAN Driver Utility
- Installing Sound Driver Utility
- Installing Intel® Management Engine Components Driver Installer
- Installing Intel® Rapid Storage Utility
- Installing Intel® Serial I/O Driver Utility

4.1 Introduction

Enclosed with the BA-2602 Series package is our driver utilities contained in a DVD-ROM disk. Refer to the following table for driver locations:

| Filename (Assume that DVD-ROM drive is D:) | Purpose |
|--|--|
| D:\Driver\Platform\1_Main Chip\Win10(64-bit) | Intel(R) Chipset Device Software installer |
| D:\Driver\Platform\2_Graphics\Win10 (64-bit) | Intel(R) HD Graphics Driver installer |
| D:\Driver\Platform\3_Sound\Win10 (64-bit) | Realtek(R) ALC888S HD Audio Driver installer |
| D:\Driver\Platform\4_ME\Win10 (64-bit)\H310 | Intel(R) <i>Management Engine</i> Driver installer for H310 |
| D:\Driver\Platform\4_ME\Win10 (64-bit)\Q370&C246 | Intel(R) <i>Management Engine</i> Driver installer for Q370&C246 |
| D:\Driver\Platform\5_LAN Chip\Win10 (64-bit) | Intel(R) LAN Driver installer |
| D:\Driver\Platform\6_Serial IO\Win10 (64-bit) | Intel(R) Serial IO Driver installer |
| D:\Driver\Platform\7_RAID\Win10 (64-bit) | Intel(R) RST Driver installer for RAID |

Note: Install the driver utilities immediately after the OS installation is completed.

For more details on the installation sequence, refer to the [Readme.txt](#) file.

4.2 Installing Intel® Chipset Software Installation Utility

Introduction

The Intel® Chipset Software Installation Utility installs the Windows *.INF files to the target system. These files outline to the operating system how to configure the Intel chipset components in order to ensure that the following functions work properly:

- Core PCI and ISAPNP Services
- PCI-e Support
- SATA Storage Support
- USB Support
- Identification of Intel® Chipset Components in the Device Manager

Intel® Chipset Software Installation Utility

The utility pack is to be installed only for Windows 10 (64-bit), and it should be installed immediately after the OS installation is finished. Please follow the steps below:

- 1** Connect the USB DVD-ROM device to BA-2602 and insert the driver disk.
- 2** Enter the **Main Chip** folder where the Chipset driver is located (depending on your OS platform).
- 3** Click **SetupChipset.exe** file for driver installation.
- 4** Follow the on-screen instructions to install the driver.
- 5** Once the installation is completed, shut down the system and restart BA-2602 for the changes to take effect.

4.3 Installing Graphics Driver Utility

The Graphics interface embedded in BA-2602 can support triple displays via VGA, DP and eDP (for Q370 & C246 SKU only) interfaces and make the system work simultaneously.

To install the Graphics driver utility, follow the steps below:

- 1** Connect the USB DVD-ROM device to BA-2602 and insert the driver disk.
- 2** Enter the **Graphics** folder where the driver is located (depending on your OS platform).
- 3** Click the **igxpim.exe** file for driver installation.
- 4** Follow the on-screen instructions to complete the installation.
- 5** Once the installation is completed, shut down the system and restart BA-2602 for the changes to take effect.

4.4 Installing LAN Driver Utility

Enhanced with LAN function, BA-2602 supports various network adapters. To install the LAN Driver, follow the steps below:

- 1** Connect the USB DVD-ROM device to BA-2602 and insert the driver disk.
- 2** Enter the **LAN** folder where the driver is located (depending on your OS platform).
- 3** Click **LAN_WIN10_64_23.5.2.exe** file for driver installation.
- 4** Follow the on-screen instructions to complete the installation.
- 5** Once the installation is completed, shut down the system and restart BA-2602 for the changes to take effect.

4.5 Installing Sound Driver Utility

To install the Sound Driver, follow the steps below:

- 1** Connect the USB DVD-ROM device to BA-2602 and insert the driver disk.
- 2** Open the **Sound** folder where the driver is located (depending on your OS platform).
- 3** Click the **Setup.exe** file for driver installation.
- 4** Follow the on-screen instructions to complete the installation.
- 5** Once the installation is completed, shut down the system and restart BA-2602 for the changes to take effect.

4.6 Intel® Management Engine Components Driver Installer Installation

Installation Instructions for Intel® Management Engine Components Driver Installer

- 1** Connect the USB DVD-ROM device to BA-2602 and insert the driver disk.
- 2** Enter the **ME** folder where the driver is located.
- 3** Select **H310** or **Q370&C246** SKU.
- 4** Click **SetupME.exe** file for ME driver installation.
- 5** Follow the on-screen instructions to complete the installation.
- 6** Once the installation is completed, shut down the system and restart BA-2602 for the changes to take effect.

4.7 Installing RAID Utility (Only for C246/Q370, Optional)

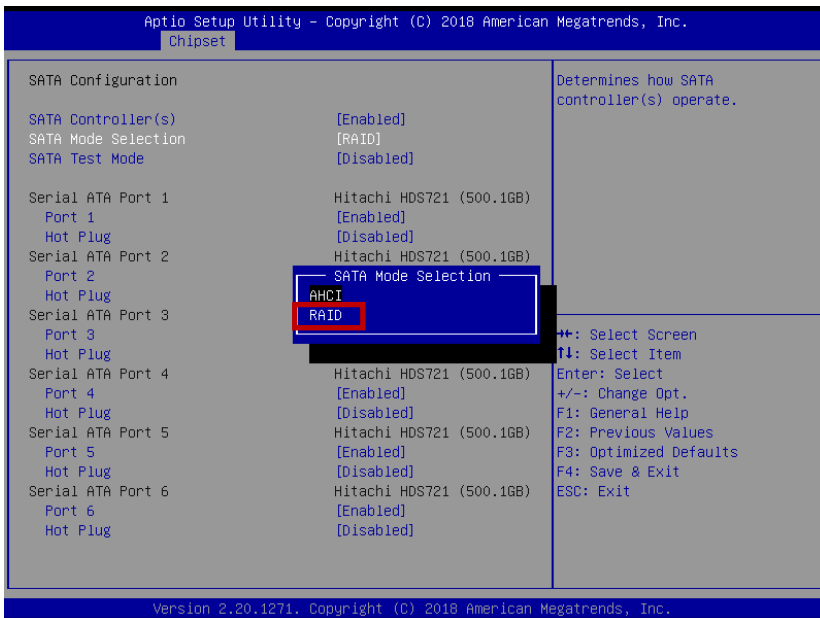
The Intel® Rapid Storage Technology option ROM provides the following functions:

- Pre-operating system user interface for RAID volume management
- Ability to create, delete and reset RAID volumes
- RAID recovery

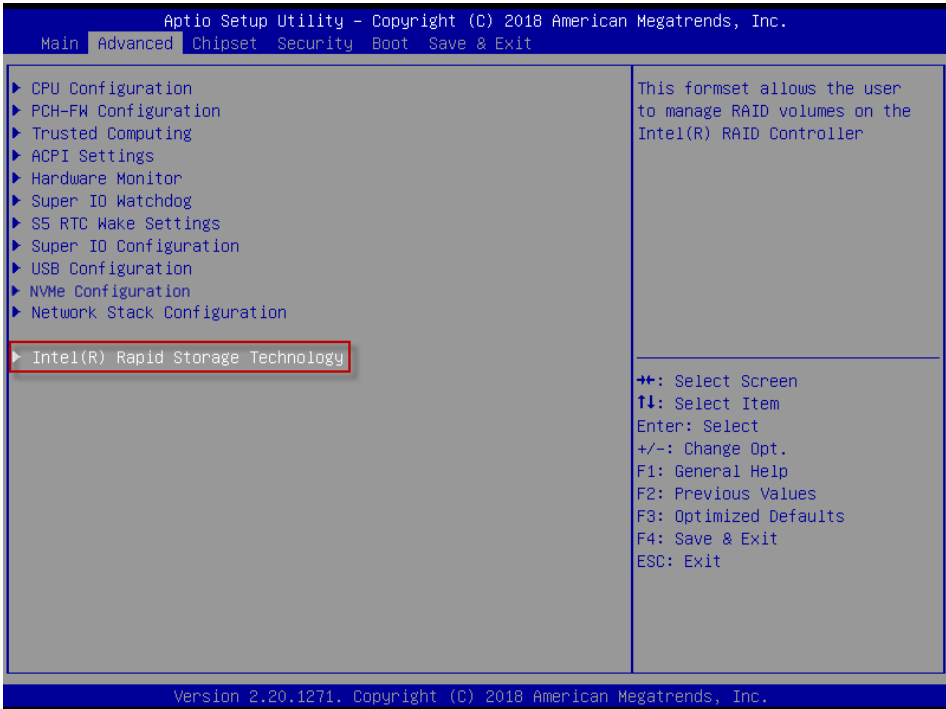
Entering option ROM User Interface from BIOS Setup Utility

Follow the instructions below to enter the Intel® Rapid Storage Technology option ROM user interface:

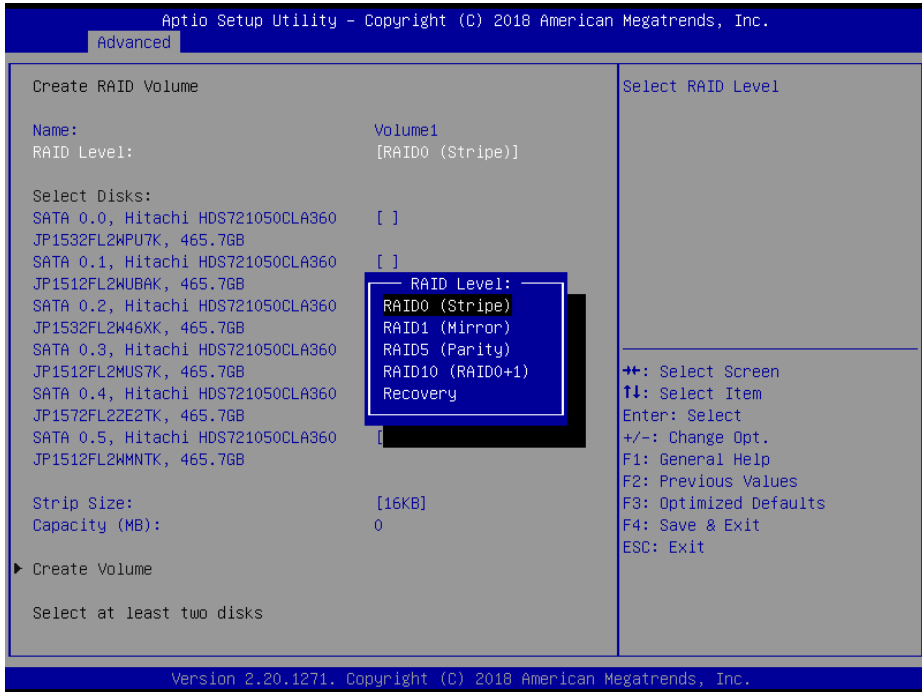
- 1 Press to access the BIOS Setup Utility program when prompted during the Power-On Self-Test (POST).
- 2 Enter **Chipset > PCH-IO Configuration > SATA Configuration** menu screen and select “**RAID**” option for **SATA Controller(s)** option item. See the picture below:



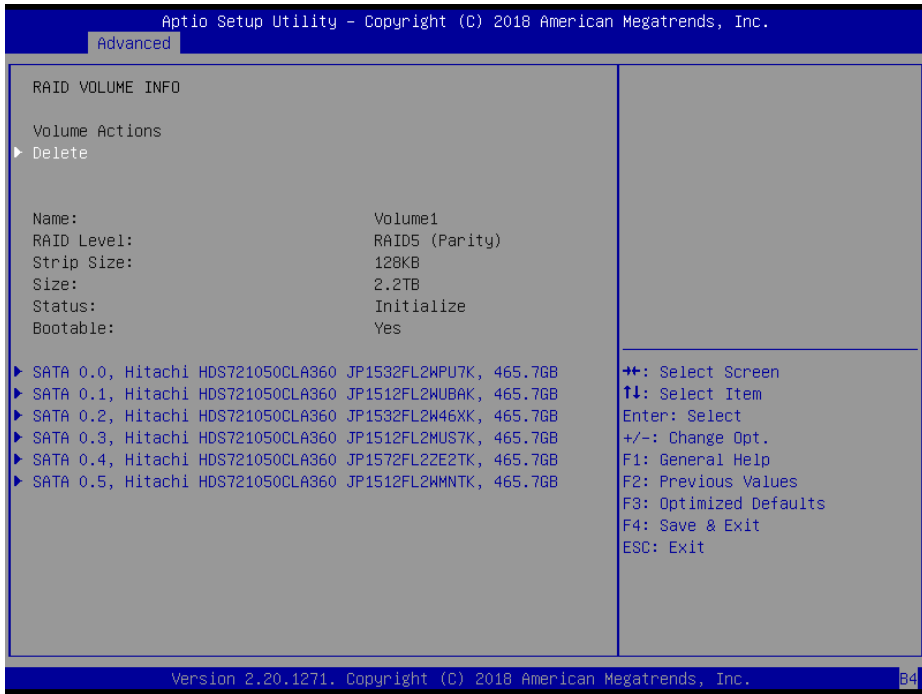
- 3 Press **F4** to save and validate the changed BIOS configuration and reset the system.
- 4 Press **** to enter the BIOS Setup Utility program again and the **Intel(R) Rapid Storage Technology** option item will display under the **Advanced** menu screen as below:



- 5 Select the **Intel(R) Rapid Storage Technology** option item and press **<Enter>**, and the following screen will display. Select a RAID level that you want to enter and press **<Enter>**.



The hard drive(s) and hard drive information of the RAID level you selected in the previous step will display:



Heed that in the user interface, the hard drive(s) and hard drive information listed for your system will differ from the example above.

Installing RAID Utility (Only for C246/Q370, Optional)

The Intel® Rapid Storage Technology (Intel® RST) utility supports RAID 0, 1, 5, 10 in C246/Q370 SKU.

To install the RAID utility, follow the steps below:

- 1** Connect the USB DVD-ROM device to BA-2602 and insert the driver disk.
- 2** Enter the **RAID** folder where the utility is located.
- 3** Select Windows 10 (64-bit) for your OS platform.
- 4** Click **Setup.exe** file for utility installation.
- 5** Follow the on-screen instructions to complete the installation.
- 6** Once the installation is completed, shut down the system and restart BA-2602 for the changes to take effect.

Note: The RAID utility is not supported for H310 SKU.

4.8 Installing Intel® Serial I/O Driver Utility

To install the Serial I/O Driver, follow the steps below:

- 1** Connect the USB DVD-ROM device to BA-2602 and insert the driver disk.
- 2** Open the **Serial I/O** folder where the driver is located.
- 3** Select Windows 10 (64-bit) for your OS platform.
- 4** Click the **SetupSerialIO.exe** file for driver installation.
- 5** Follow the on-screen instructions to complete the installation.
- 6** Once the installation is completed, shut down the system and restart BA-2602 for the changes to take effect.

5 BIOS SETUP

This chapter guides users how to configure the basic system configurations via the BIOS Setup Utilities. The information of the system configuration is saved in BIOS NVRAM so that the Setup information is retained when the system is powered off. The BIOS Setup Utilities consist of the following menu items:

- Main Menu
- Advanced Menu
- Chipset Menu
- Security Menu
- Boot Menu
- Save & Exit Menu

5.1 Introduction

The BA-2602 board uses an AMI (American Megatrends Incorporated) Aptio BIOS that is stored in the Serial Peripheral Interface Flash Memory (SPI Flash) and can be updated. The SPI Flash contains the built-in BIOS setup program, Power-On Self-Test (POST), PCI auto-configuration utility, LAN EEPROM information, and Plug and Play support.

Aptio is AMI's BIOS firmware based on the UEFI (Unified Extensible Firmware Interface) specifications and the Intel Platform Innovation Framework for EFI. The UEFI specification defines an interface between the operating system and platform firmware. The interface consists of data tables that contain platform-related information, boot service calls, and runtime service calls that are available to the operating system and its loader. These elements have combined to provide a standard environment for booting the operating system and running pre-boot applications.

The diagram below shows the Extensible Firmware Interface's location in the software stack.

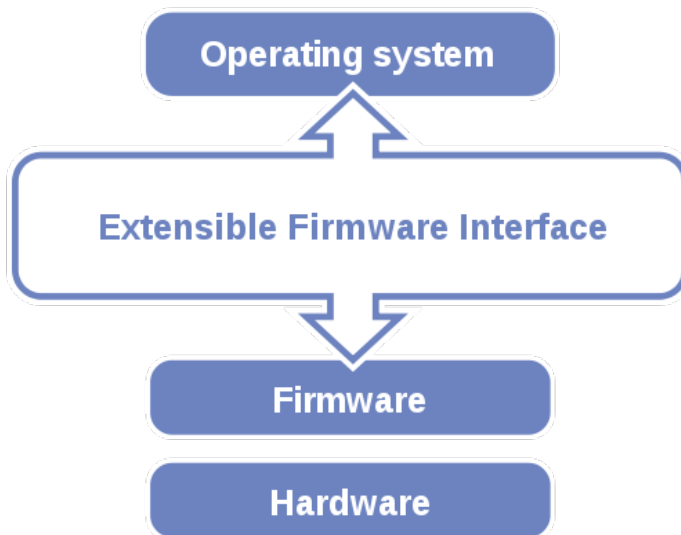


Figure 5-1. Extensible Firmware Interface Diagram

EFI BIOS provides an user interface that allows you to modify hardware configuration, e.g. change the system date and time, enable/disable a system component, determine bootable device priority, set up personal password, etc., which is convenient for engineers to perform modifications and customize the computer

system and allows technicians to troubleshoot the occurred errors when the hardware is faulty.

The BIOS setup menu allows users to view and modify the BIOS settings for the computer. After the system is powered on, users can access the BIOS setup menu by pressing or <Esc> immediately while the POST message is running before the operating system is loading.

All the menu settings are described in details in this chapter.

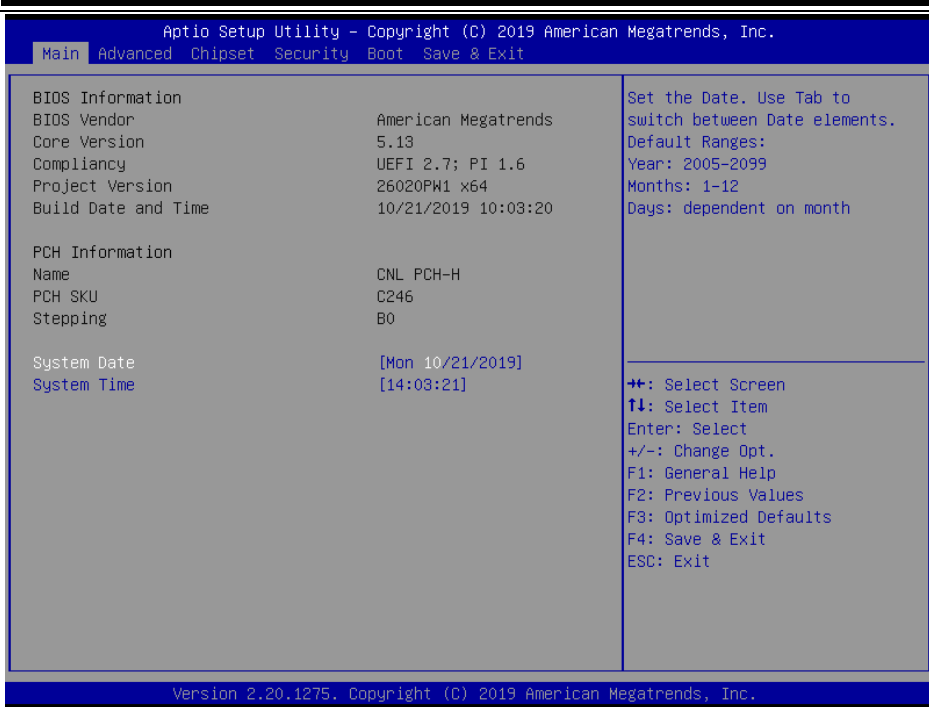
5.2 Accessing Setup Utility

After the system is powered on, BIOS will enter the Power-On Self-Test (POST) routines and the POST message will be displayed:



Figure 5-2. POST Screen with AMI Logo

Press or <Esc> to access the Setup Utility program and the **Main** menu of the Aptio Setup Utility will appear on the screen as below:



BIOS Setup Menu Initialization Screen

You may move the cursor by <↑> and <↓> keys to highlight the individual menu items. As you highlight each item, a brief description of the highlighted selection will appear on the right side of the screen.

The language of the BIOS setup menu interface and help messages are shown in US English. You may use <↑> or <↓> key to select among the items and press <Enter> to confirm and enter the sub-menu. The following table provides the list of the navigation keys that you can use while operating the BIOS setup menu.

| BIOS Setup Navigation Key | Description |
|--------------------------------------|---|
| <←> and <→> | Select a different menu screen (move the cursor from the selected menu to the left or right). |
| <↑> and <↓> | Select a different item (move the cursor from the selected item upwards or downwards) |
| <Enter> | Execute the command or select the sub-menu. |
| <F2> | Load the previous configuration values. |
| <F3> | Load the default configuration values. |
| <F4> | Save the current values and exit the BIOS setup menu. |
| <Esc> | Close the sub-menu. Trigger the confirmation to exit BIOS setup menu. |

5.3 Main

Menu Path *Main*

The **Main** menu allows you to view the BIOS Information and change the system date and time. Use tab to switch between date elements. Use <↑> or <↓> arrow keys to highlight the item and enter the value you want in each item. This screen also displays the BIOS version (project) and BIOS Build Date and Time.



Main Screen

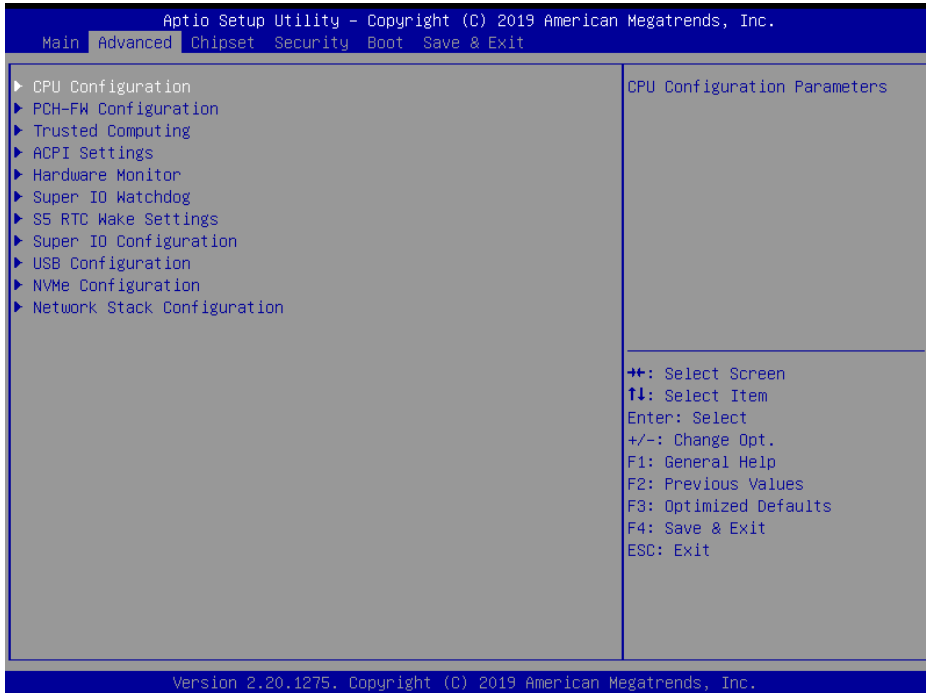
| BIOS Setting | Options | Description/Purpose |
|---------------------|-----------------------|---|
| BIOS Vendor | No changeable options | Displays the name of the BIOS vendor. |
| Core Version | No changeable options | Displays the current BIOS core version. |
| Compliancy | No changeable options | Displays the current UEFI version. |
| Project Version | No changeable options | Displays the version of the BIOS currently installed on the platform. |
| Build Date and Time | No changeable options | Displays the date that the current BIOS version is built. |
| Name | No changeable options | Displays the name of the PCH. |
| PCH SKU | No changeable options | Displays the SKU for the PCH. |
| Stepping | No changeable options | Displays the stepping of the PCH. |

| BIOS Setting | Options | Description/Purpose |
|---------------------|----------------------|--|
| System Date | Month, day, year | Sets the system date. The format is [Day Month/ Date/ Year]. Users can directly enter values or use <+> or <-> arrow keys to increase/decrease it. The "Day" is automatically changed. |
| System Time | Hour, minute, second | Sets the system time. The format is [Hour: Minute: Second]. Users can directly enter values or use <+> or <-> arrow keys to increase/decrease it. |

5.4 Advanced

Menu Path *Advanced*

This menu provides advanced the sub-menu items such as CPU Configuration, PCH-FW Configuration, Trusted Computing, ACPI Settings, Hardware Monitor, Super IO Watchdog, S5 RTC Wake Settings, Super IO Configuration, USB Configuration, NVMe Configuration and Network Stack Configuration.



Advanced Menu Screen

| BIOS Setting | Options | Description/Purpose |
|-----------------------------|----------|--|
| CPU Configuration | Sub-Menu | CPU Configuration Parameters. |
| PCH-FW Configuration | Sub-Menu | Management Engine Technology Parameters. |
| Trusted Computing | Sub-Menu | Trusted Computing Settings. |
| ACPI Settings | Sub-Menu | System ACPI Parameters. |
| Hardware Monitor | Sub-Menu | Monitors hardware status. |
| Super IO Watchdog | Sub-Menu | Super I/O Watchdog Parameters. |
| S5 RTC Wake Settings | Sub-Menu | S5 RTC Wake Parameters. |
| Super IO Configuration | Sub-Menu | System Super I/O Chip Parameters. |
| USB Configuration | Sub-Menu | USB Configuration Parameters. |
| NVMe Configuration | Sub-Menu | NVMe Device Options Settings. |
| Network Stack Configuration | Sub-Menu | Network Stack Settings. |

5.4.1 Advanced – CPU Configuration

Menu Path *Advanced > CPU Configuration*

The **CPU Configuration** provides advanced CPU settings and some information about CPU.

Aptio Setup Utility – Copyright (C) 2019 American Megatrends, Inc.

Advanced

| | | |
|---------------------------------|--|--|
| CPU Configuration | | When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology. |
| Type | Intel(R) Xeon(R) E-2278GE CPU @ 3.30GHz | |
| ID | 0x906ED | ++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit |
| Speed | 3300 MHz | |
| L1 Data Cache | 32 KB × 8 | |
| L1 Instruction Cache | 32 KB × 8 | |
| L2 Cache | 256 KB × 8 | |
| L3 Cache | 16 MB | |
| VMX | Supported | |
| SMX/TXT | Supported | |
| Intel Virtualization Technology | [Enabled] | |
| Hyper-Threading | [Enabled] | |

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CPU Configuration Screen

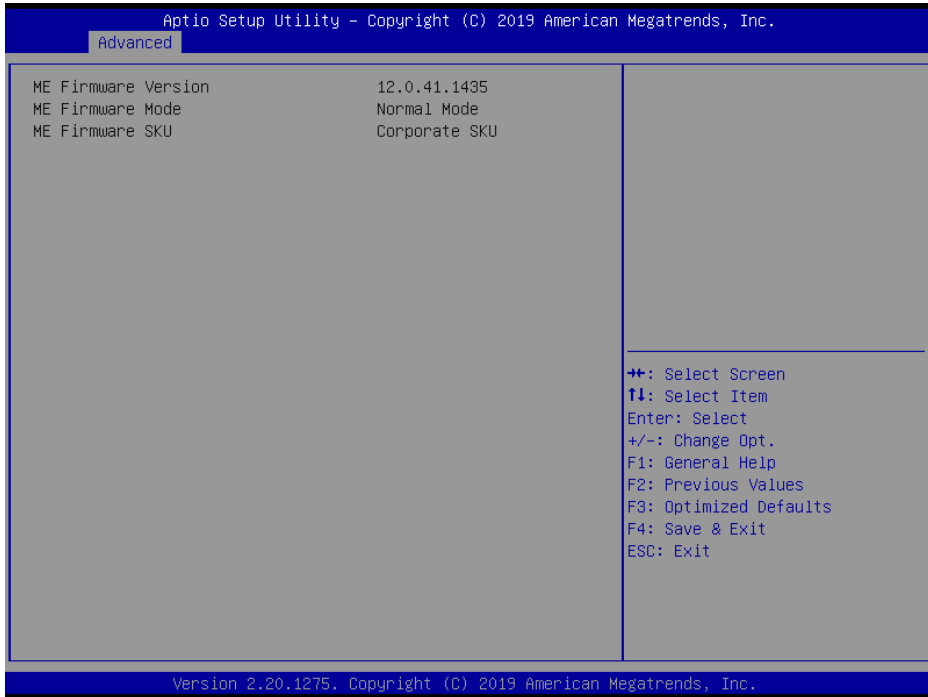
| BIOS Setting | Options | Description/Purpose |
|------------------------------------|-----------------------------------|---|
| Type | No changeable options | Displays the CPU Type. |
| ID | No changeable options | Displays the CPU ID. |
| Speed | No changeable options | Displays the CPU Speed. |
| L1 Data Cache | No changeable options | L1 Data Cache Size. |
| L1 Instruction Cache | No changeable options | L1 Instruction Cache Size. |
| L2 Cache | No changeable options | L2 Cache Size. |
| L3 Cache | No changeable options | L3 Cache Size. |
| VMX | No changeable options | CPU VMX hardware support for virtual machines. |
| SMX (Secure Mode Extensions) / TXT | No changeable options | Secure Mode extensions support. |
| Intel Virtualization Technology | - Disabled - Enabled (default) | When enabled, VMM can utilize the additional hardware capabilities provided by Vanderpool Technology. |

| BIOS Setting | Options | Description/Purpose |
|-----------------|-----------------------------------|---|
| Hyper-Threading | - Disabled - Enabled (default) | When Disabled, only one thread per enabled core is enabled. |

5.4.2 Advanced – PCH-FW Configuration

Menu Path *Advanced > PCH-FW Configuration*

The **PCH-FW** allows users to view the information about ME (Management Engine) firmware information, such ME firmware version, firmware mode and firmware SKU.



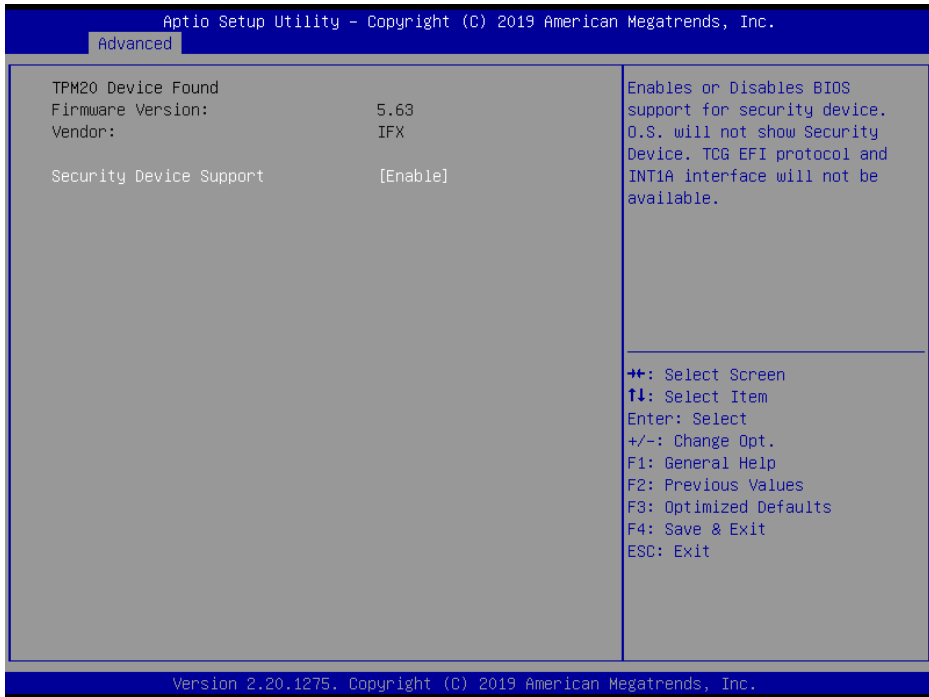
PCH-FW Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|---------------------|-----------------------|-----------------------------------|
| ME Firmware Version | No changeable options | Displays the ME Firmware Version. |
| ME Firmware Mode | No changeable options | Displays the ME Firmware Mode. |
| ME Firmware SKU | No changeable options | Displays the ME Firmware SKU. |

5.4.3 Advanced – Trusted Computing

Menu Path *Advanced > Trusted Computing*

The Trusted Computing allows users to enable/disable BIOS support for security device. The operating system will not show Security Device. The TCG EFI protocol and INT1A interface will not be available.



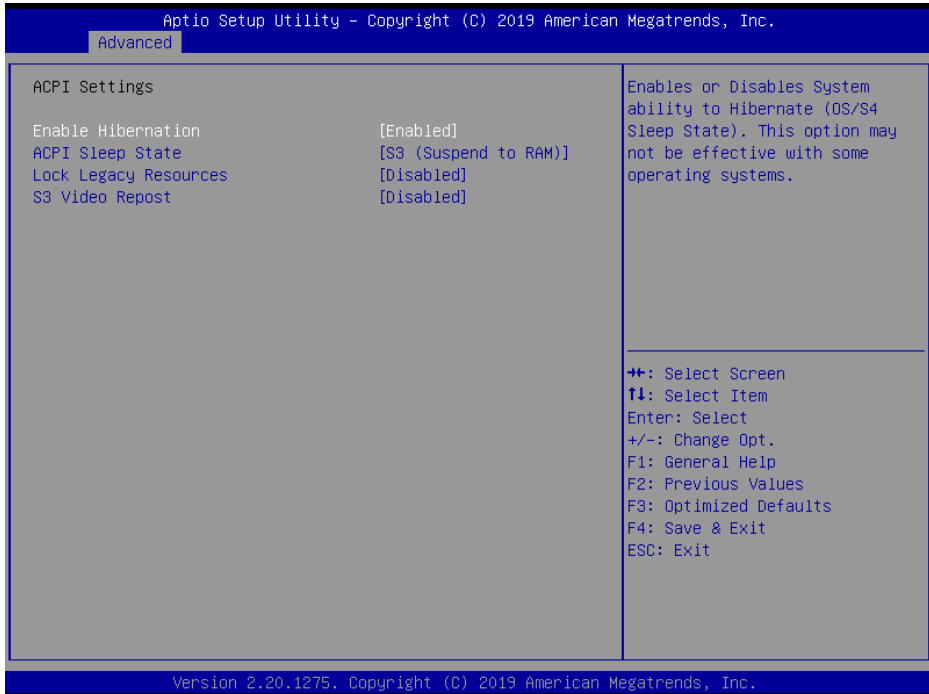
Trusted Computing Screen

| BIOS Setting | Options | Description/Purpose |
|-------------------------|---------------------------------|---|
| Firmware Version: | No changeable options | TPM firmware version. |
| Vendor: | No changeable options | TPM module vendor. |
| Security Device Support | - Enable (default) - Disable | Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available. |

5.4.4 Advanced – ACPI Settings

Menu Path *Advanced > ACPI Settings*

The **ACPI Settings** allows users to configure relevant ACPI (Advanced Configuration and Power Management Interface) settings, such as enable/disable Hibernation, ACPI Sleep State, lock legacy resources and S3 Video Repost.



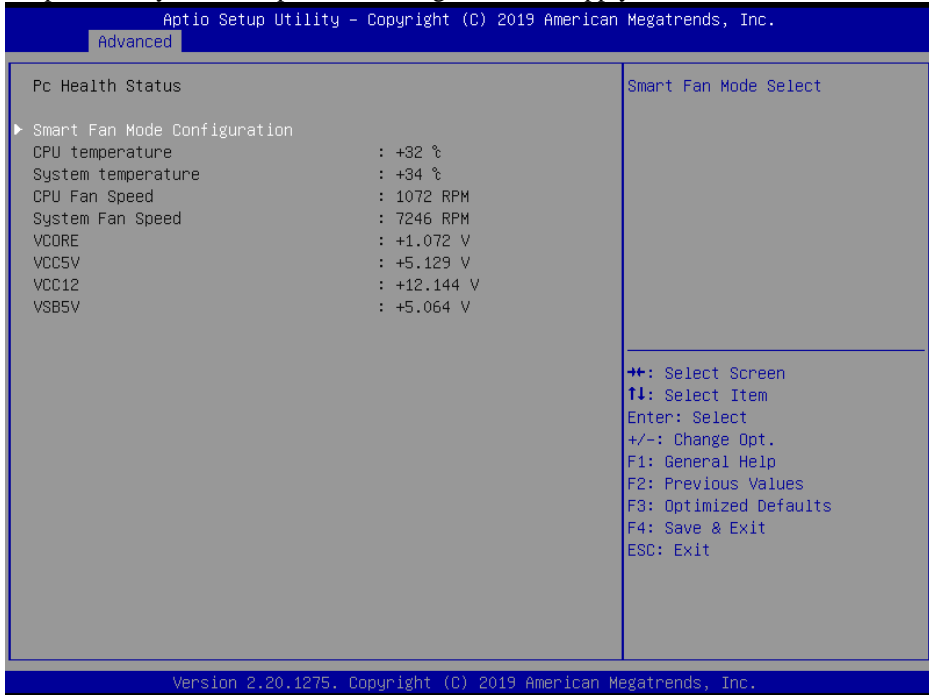
ACPI Settings Screen

| BIOS Setting | Options | Description/Purpose |
|-----------------------|--|---|
| Enable Hibernation | - Disabled - Enabled (default) | Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS. |
| ACPI Sleep State | - Suspend Disabled - S3 (Suspend to RAM) (default) | Selects the highest ACPI sleep state the system will enter when the SUSPEND button is pressed. |
| Lock Legacy Resources | - Disabled (default) - Enabled | Enables or Disables Lock of Legacy Resources. |
| S3 Video Repost | - Disabled (default) - Enabled | Enables or Disables S3 Video Repost. |

5.4.5 Advanced – Hardware Monitor

Menu Path *Advanced > Hardware Monitor*

The **Hardware Monitor** allows users to configure Smart Fan Mode for CPU fan, monitor the health and status of the system such as CPU temperature, system temperature, system fan speed and voltage levels in supply.



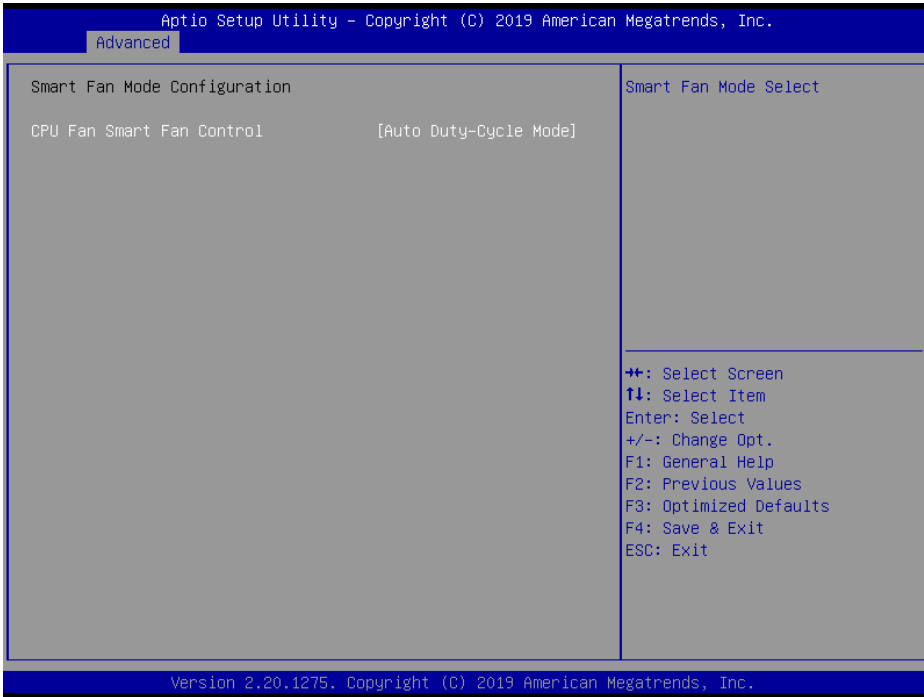
Hardware Monitor Screen

| BIOS Setting | Options | Description/Purpose |
|------------------------------|-----------------------|--|
| Smart Fan Mode Configuration | Sub-Menu | Smart Fan Mode Selection. |
| CPU Temperature | No changeable options | Displays the processor's temperature. |
| System Temperature | No changeable options | Displays the system's temperature. |
| CPU Fan Speed | No changeable options | Display CPU Fan speed. |
| System Fan Speed | No changeable options | Display System Fan speed. |
| VCORE | No changeable options | Displays the voltage level of VCORE in supply. |
| VCC5V | No changeable options | Displays the voltage level of VCC5V in supply. |
| VCC12 | No changeable options | Displays the voltage level of VCC12 in supply. |

| BIOS Setting | Options | Description/Purpose |
|--------------|-----------------------|--|
| VSB5V | No changeable options | Displays the voltage level of VSB5V in supply. |

Smart Fan Mode Configuration

Menu Path *Advanced > Hardware Monitor > Smart Fan Mode Configuration*

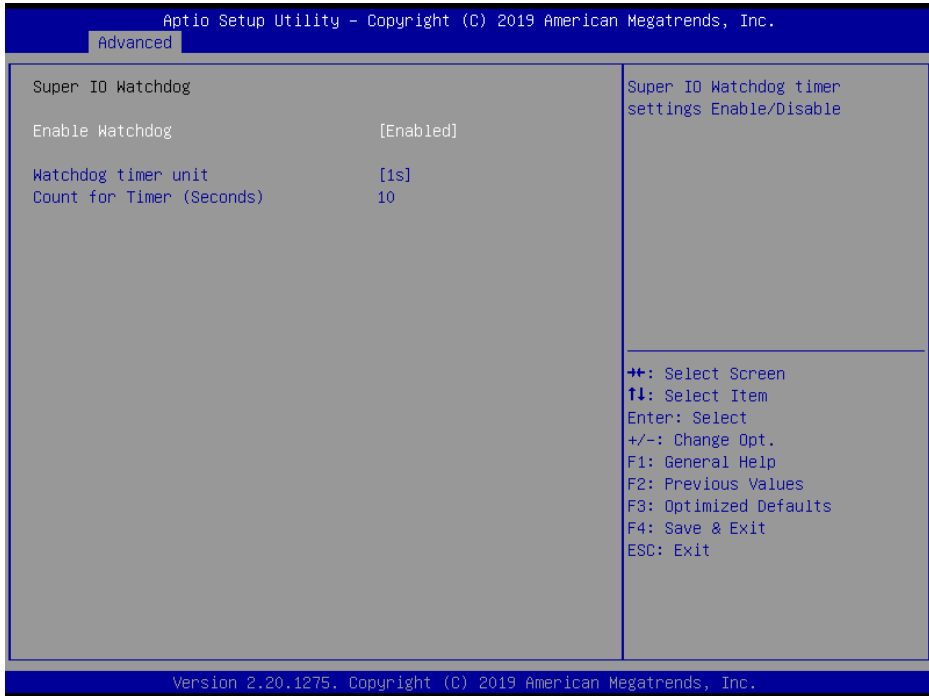


Smart Fan Mode Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|---------------------------|---|--|
| CPU Fan Smart Fan Control | - Manual Duty Mode - Auto Duty-Cycle Mode (default) | Smart Fan Mode selection for CPU Fan. |
| Manual Duty Mode | Numeric (from 1 to 100) | Manual mode fan control. Users can write expected duty cycle (PWM fan type) from 1 to 100. |

5.4.6 Advanced – Super IO Watchdog

Menu Path *Advanced > Super IO Watchdog*



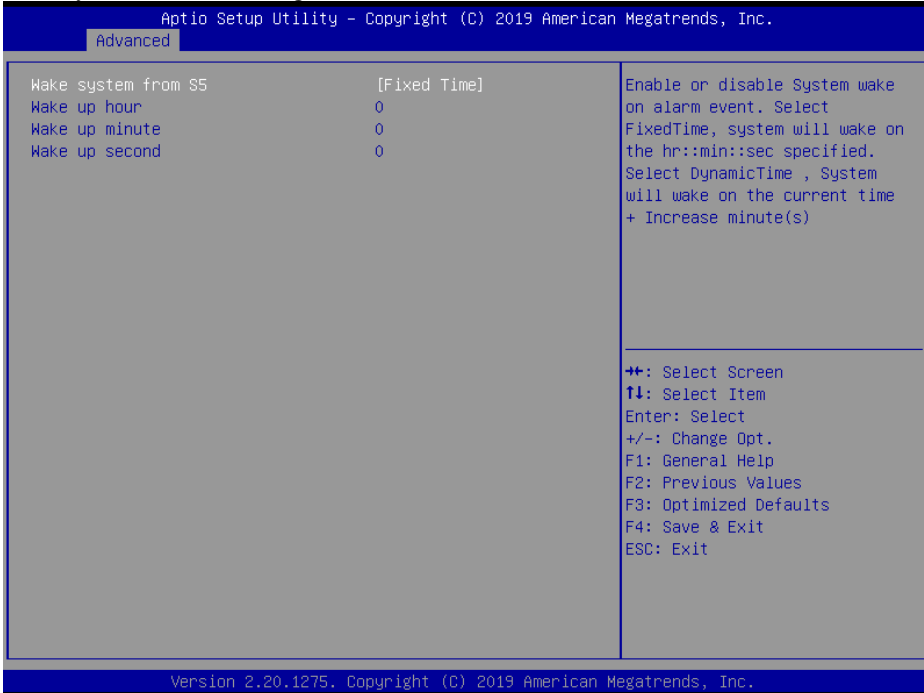
Super IO Watchdog Screen

| BIOS Setting | Options | Description/Purpose |
|---------------------------|-----------------------------------|--|
| Enable Watchdog | - Enabled - Disabled (default) | Enables/Disables F81866 Watchdog timer settings. |
| Watchdog timer unit | - 1s (default) - 60s | Watchdog timer unit. |
| Count for Timer (Seconds) | Numeric (from 10 to 255) | The number of count for Timer. |

5.4.7 Advanced – S5 RTC Wake Settings

Menu Path *Advanced > S5 RTC Wake Settings*

The **S5 RTC Wake Settings** enables/disables the system to wake up at a preset time of a day from S5 State using RTC alarm.

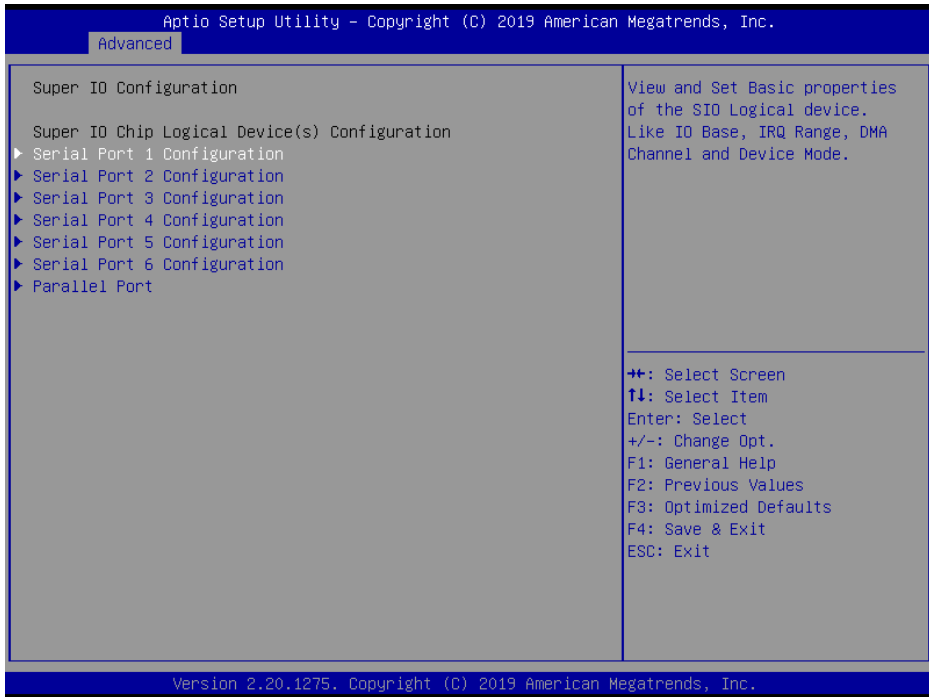


S5 RTC Wake Settings Screen

| BIOS Setting | Options | Description/Purpose |
|-------------------------|--|--|
| Wake system from S5 | - Disabled (default) - Fixed Time - Dynamic Time | Enables or disables System wake on alarm events. <ul style="list-style-type: none"> • Fixed Time: The system will wake on the time (hr::min::sec) specified. • Dynamic Time: The system will wake on the current time + Increase minute(s). |
| Wake up hour | Numeric (from 0 to 23) | Enters 0-23 to set the wake-up hour, e.g.: enters 3 for 3 a.m. and 15 for 3 p.m. |
| Wake up minute | Numeric (from 0 to 59) | Enters 0-59 to set the wake-up minute. |
| Wake up second | Numeric (from 0 to 59) | Enters 0-59 to set the wake-up second. |
| Wake up minute increase | Numeric (from 1 to 5) | Enters 1-5 to set the increased minute(s) for dynamic wake-up time. |

5.4.8 Advanced – Super IO Configuration

Menu Path *Advanced > Super IO Configuration*

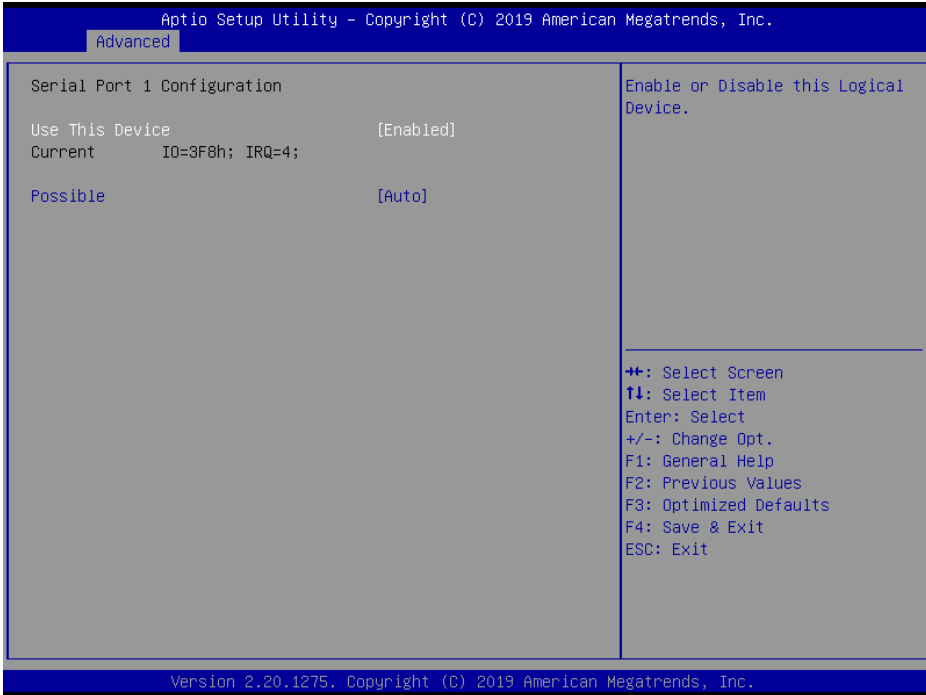


Super IO Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|--|----------|--|
| Serial Port 1 Configuration | Sub-Menu | Sets Parameters of Serial Port 1 (COMA). |
| Serial Port 2 Configuration | Sub-Menu | Sets Parameters of Serial Port 2 (COMB). |
| Serial Port 3 Configuration | Sub-Menu | Sets Parameters of Serial Port 3 (COMC). |
| Serial Port 4 Configuration | Sub-Menu | Sets Parameters of Serial Port 4 (COMD). |
| Serial Port 5 Configuration <i>(for Q370/C246 only)</i> | Sub-Menu | Sets Parameters of Serial Port 5 (COME). |
| Serial Port 6 Configuration <i>(for Q370/C246 only)</i> | Sub-Menu | Sets Parameters of Serial Port 6 (COMF). |
| Parallel Port | Sub-Menu | Sets Parameters of Parallel Port (LPT). |

Super IO Configuration – Serial Port 1 Configuration

Menu Path *Advanced > Super IO Configuration > Serial Port 1 Configuration*

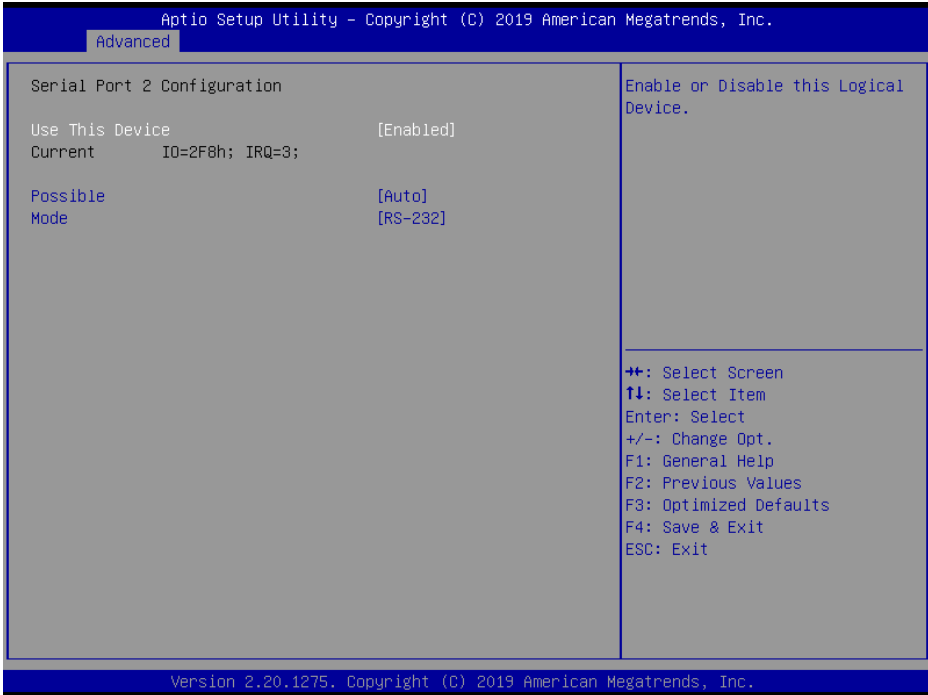


Serial Port 1 Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|-----------------|--|---|
| Use This Device | - Disabled - Enabled (default) | Enables or Disables Serial Port 1. |
| Current | No changeable options | Displays the current settings of Serial Port 1. |
| Possible | - Auto (default) - IO=3F8h; IRQ=4; - IO=3F8h; IRQ=3,4,5,6,7,10,11; - IO=2F8h; IRQ=3,4,5,6,7,10,11; - IO=3E8h; IRQ=3,4,5,6,7,10,11; - IO=2E8h; IRQ=3,4,5,6,7,10,11; | Selects IRQ and I/O resource for Serial Port 1. |

Super IO Configuration – Serial Port 2 Configuration

Menu Path *Advanced > Super IO Configuration > Serial Port 2 Configuration*

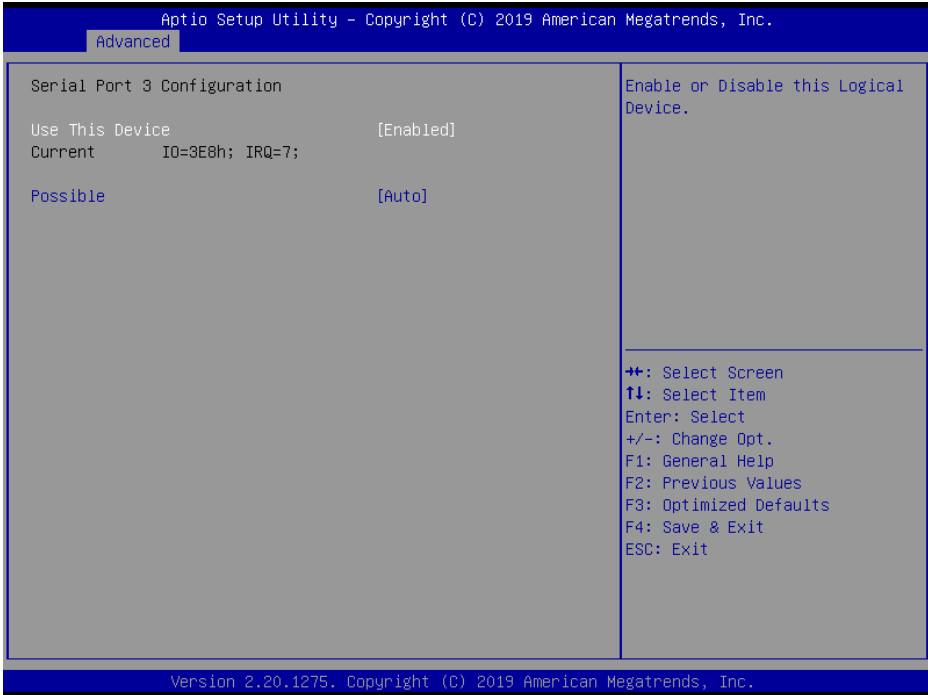


Serial Port 2 Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|-----------------|---|---|
| Use This Device | - Disabled - Enabled (default) | Enables or Disables Serial Port 2. |
| Current | No changeable options | Displays the current settings of Serial Port 2. |
| Change Settings | - Auto (default) - IO=2F8h; IRQ=3; - IO=3F8h; IRQ=3,4,5,6,7,10,11; - IO=2F8h; IRQ=3,4,5,6,7,10,11; - IO=3E8h; IRQ=3,4,5,6,7,10,11; - IO=2E8h; IRQ=3,4,5,6,7,10,11; | Selects IRQ and I/O resource for Serial Port 2. |
| Mode | - RS-232 (default) - RS-422 - RS-485 | Selects COM2 mode. |

Super IO Configuration – Serial Port 3 Configuration

Menu Path *Advanced > Super IO Configuration > Serial Port 3 Configuration*

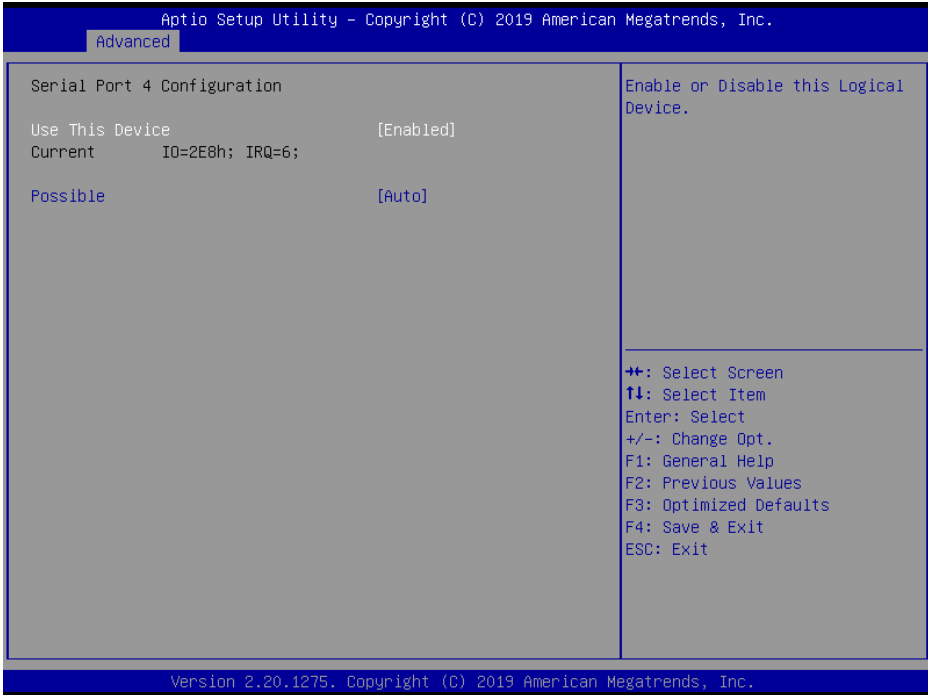


Serial Port 3 Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|-----------------|--|---|
| Use This Device | - Disabled - Enabled (default) | Enables or Disables Serial Port 3. |
| Current | No changeable options | Displays the current settings of Serial Port 3. |
| Change Settings | - Auto (default) - IO=3E8h; IRQ=7; - IO=3E8h; IRQ=3,4,5,6,7,10,11; - IO=2E8h; IRQ=3,4,5,6,7,10,11; - IO=2F0h; IRQ=3,4,5,6,7,10,11; - IO=2E0h; IRQ=3,4,5,6,7,10,11; | Selects IRQ and I/O resource for Serial Port 3. |

Super IO Configuration – Serial Port 4 Configuration

Menu Path *Advanced > Super IO Configuration > Serial Port 4 Configuration*

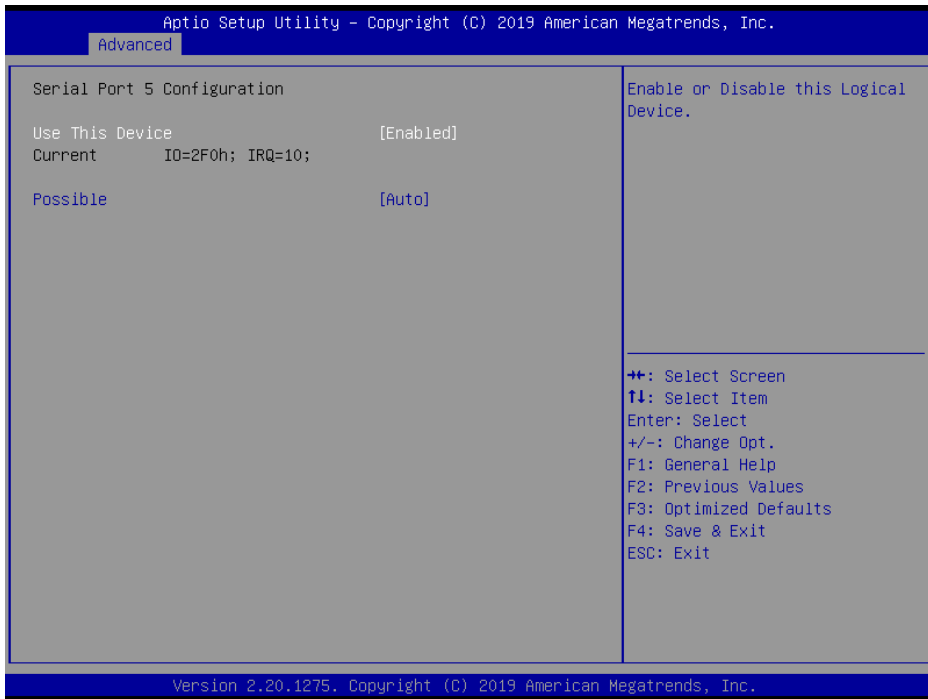


Serial Port 4 Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|-----------------|---|---|
| Use This Device | - Disabled - Enabled (default) | Enables or Disables Serial Port 4. |
| Current | No changeable options | Displays the current settings of Serial Port 4. |
| Change Settings | - Auto (default) - IO=2E8h; IRQ=6; - IO=3E8h; IRQ=3,4,5,6,7,10,11; - IO=2E8h; IRQ=3,4,5,6,7,10,11; - IO=2F0h; IRQ=3,4,5,6,7,10,11; - IO=2E0h; IRQ=3,4,5,6,7,10,11; | Selects IRQ and I/O resource for Serial Port 4. |

Super IO Configuration – Serial Port 5 Configuration (For Q370/C246 SKU Only)

Menu Path *Advanced > Super IO Configuration > Serial Port 5 Configuration*

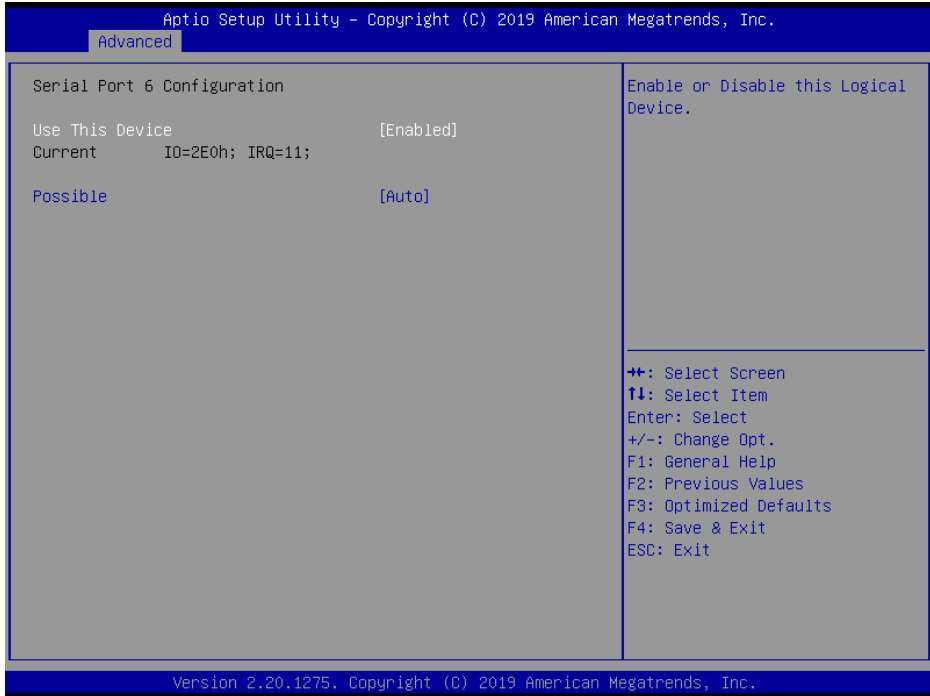


Serial Port 5 Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|-----------------|---|---|
| Use This Device | - Disabled - Enabled (default) | Enables or Disables Serial Port 5. |
| Current | No changeable options | Displays the current settings of Serial Port 5. |
| Change Settings | - Auto (default) - IO=2F0h; IRQ=10; - IO=3E8h; IRQ=3,4,5,6,7,10,11; - IO=2E8h; IRQ=3,4,5,6,7,10,11; - IO=2F0h; IRQ=3,4,5,6,7,10,11; - IO=2E0h; IRQ=3,4,5,6,7,10,11; | Selects IRQ and I/O resource for Serial Port 5. |

Super IO Configuration – Serial Port 6 Configuration (For Q370/C246 SKU Only)

Menu Path *Advanced > Super IO Configuration > Serial Port 6 Configuration*

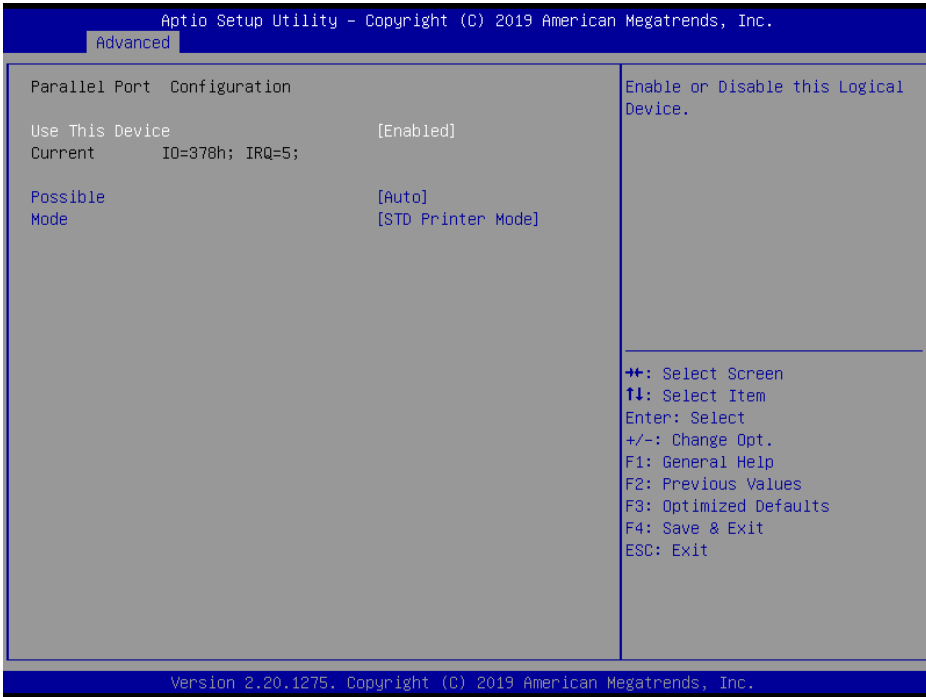


Serial Port 6 Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|-----------------|---|---|
| Use This Device | - Disabled - Enabled (default) | Enables or Disables Serial Port 6. |
| Current | No changeable options | Displays the current settings of Serial Port 6. |
| Change Settings | - Auto (default) - IO=2E0h; IRQ=11; - IO=3E8h; IRQ=3,4,5,6,7,10,11; - IO=2E8h; IRQ=3,4,5,6,7,10,11; - IO=2F0h; IRQ=3,4,5,6,7,10,11; - IO=2E0h; IRQ=3,4,5,6,7,10,11; | Selects IRQ and I/O resource for Serial Port 6. |

Super IO Configuration – Parallel Port Configuration

Menu Path *Advanced > Super IO Configuration > Parallel Port*



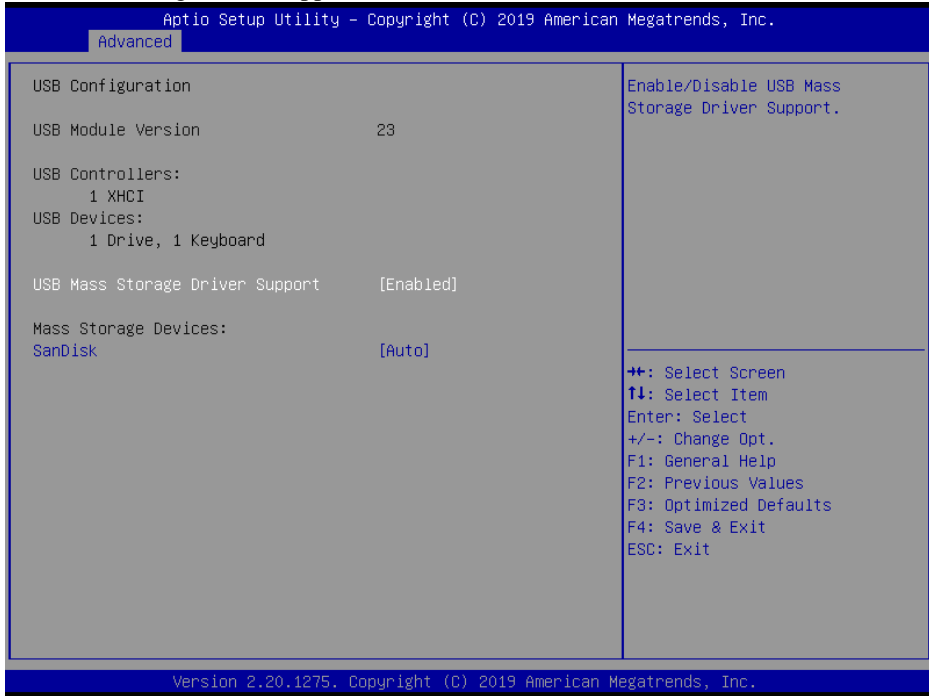
Parallel Port Screen

| BIOS Setting | Options | Description/Purpose |
|-----------------|---|---|
| Use This Device | - Disabled - Enabled (default) | Enables or Disables Parallel Port. |
| Current | No changeable options | Displays the current settings of Parallel Port. |
| Change Settings | - Auto (default) - IO=378h; IRQ=5; - IO=378h; IRQ=5,6,7,9,10,11,12; - IO=278h; IRQ=5,6,7,9,10,11,12; - IO=3BCh; IRQ=5,6,7,9,10,11,12; | Selects IRQ and I/O resource for Parallel Port. |
| Mode | - STD Printer Mode (default) - SPP Mode - EPP-1.9 and SPP Mode - EPP-1.7 and SPP Mode - ECP Mode - ECP and EPP 1.9 Mode - ECP and EPP 1.7 Mode | Changes Parallel Port mode. Some of the modes required a DMA resource. After the mode is changed, reset the system to reflect the actual device settings. |

5.4.9 Advanced – USB Configuration

Menu Path *Advanced > USB Configuration*

The **USB Configuration** allows users to configure advanced USB settings such as USB mass storage driver support.

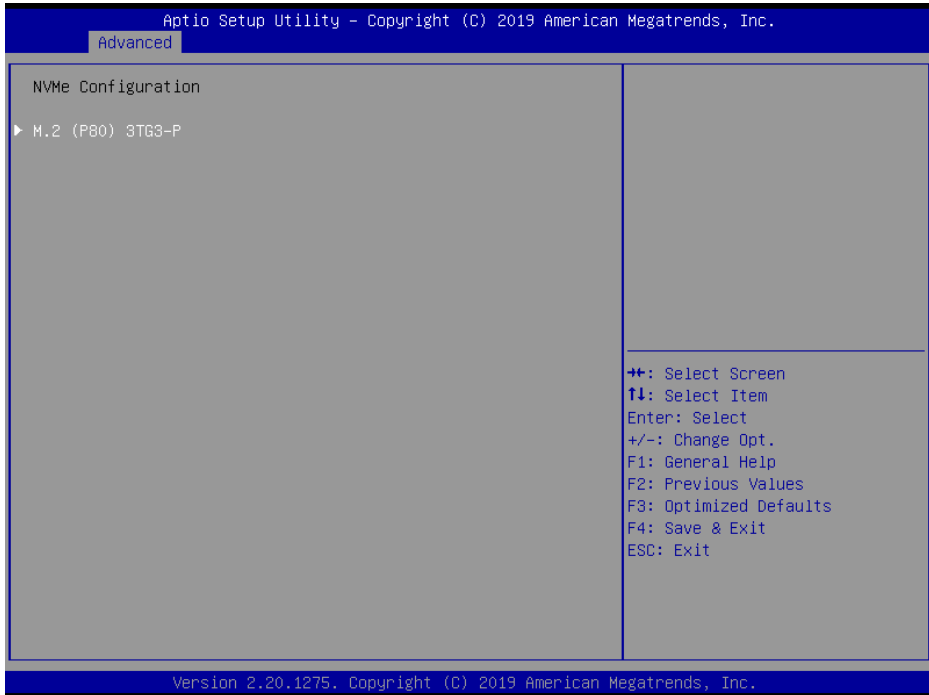


USB Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|----------------------------------|--|---|
| USB Module Version | No changeable options | Displays USB module version. |
| USB Controllers | No changeable options | Displays number and type of USB controllers (if any). |
| USB Devices | No changeable options | Displays number and type of connected USB devices (if any). |
| USB Mass Storage Driver Support | - Disabled - Enabled (default) | Enables / Disables USB Mass Storage Driver Support. |
| Mass Storage Devices: [drive(s)] | - Auto (default) - Floppy - Forced FDD - Hard Disk - CD-ROM | Auto enumerates devices according to their media format. Optical drives are emulated as 'CD-ROM'. Drives with no media will be emulated according to a drive type. |

5.4.10 Advanced – NVMe Configuration

Menu Path *Advanced > NVMe Configuration*



NVMe Configuration Screen

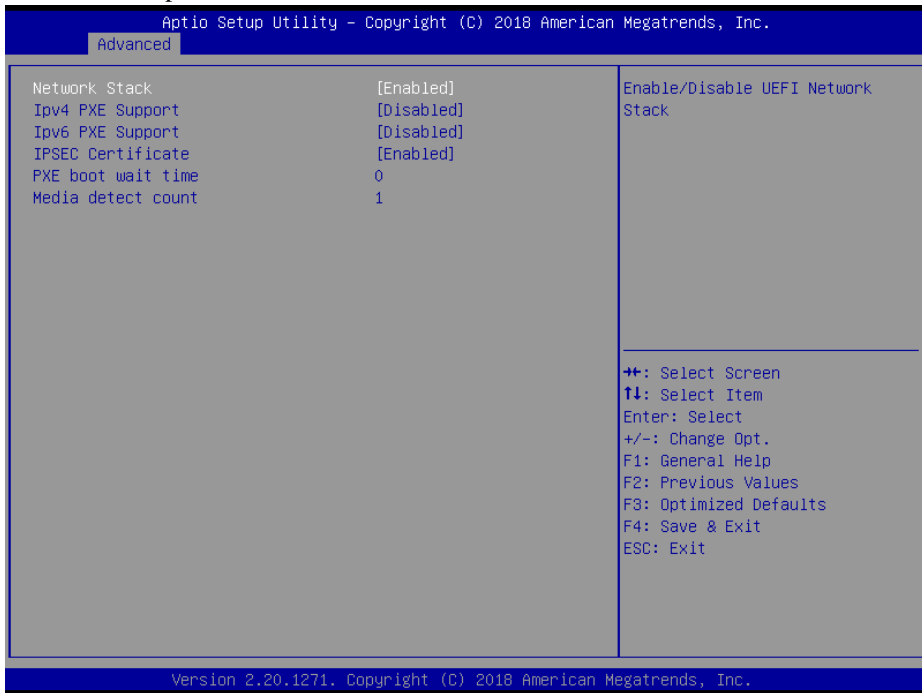
| BIOS Setting | Options | Description/Purpose |
|--------------------|-----------------------|-----------------------|
| NVMe Configuration | No changeable options | Displays NVMe device. |

5.4.11 Advanced – Network Stack Configuration

Menu Path *Advanced > Network Stack Configuration*

The **Network Stack Configuration** allows users to enable/disable UEFI Network Stack, IPv4/IPv6 PXE (Pre-Boot Execution) support and configure PXE boot wait time and detects the media presence.

PXE allows a workstation to boot from a server on a network prior to booting the operating system on the local hard drive. A PXE-enabled workstation connects its NIC to the LAN via a jumper, which keeps the workstation connected to the network even when the power is turned off.



Network Stack Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|------------------|-----------------------------------|---|
| Network Stack | - Disabled (default) - Enabled | Enables or Disables UEFI Network Stack. |
| Ipv4 PXE Support | - Disabled (default) - Enabled | Enables Ipv4 PXE Boot Support. If disabled, Ipv4 PXE boot option will not be created. |

| BIOS Setting | Options | Description/Purpose |
|---------------------|-----------------------------------|---|
| Ipv6 PXE Support | - Disabled (default) - Enabled | Enables Ipv6 PXE Boot Support. If disabled, Ipv6 PXE boot option will not be created. |
| IPSEC Certificate | - Disabled - Enabled (default) | Supports to enable/disable IPSEC certificate for Ikev. |
| PXE boot wait time | Numeric (from 0 to 5) | Number of seconds to wait for PXE boot to abort after the Esc key is pressed. |
| Media detect count | Numeric (from 1 to 50) | Number of times that the media presence will be checked. |

5.5 Chipset

Menu Path *Chipset*

This menu allows users to configure advanced Chipset settings such as System Agent (SA) and PCH-IO configuration parameters.

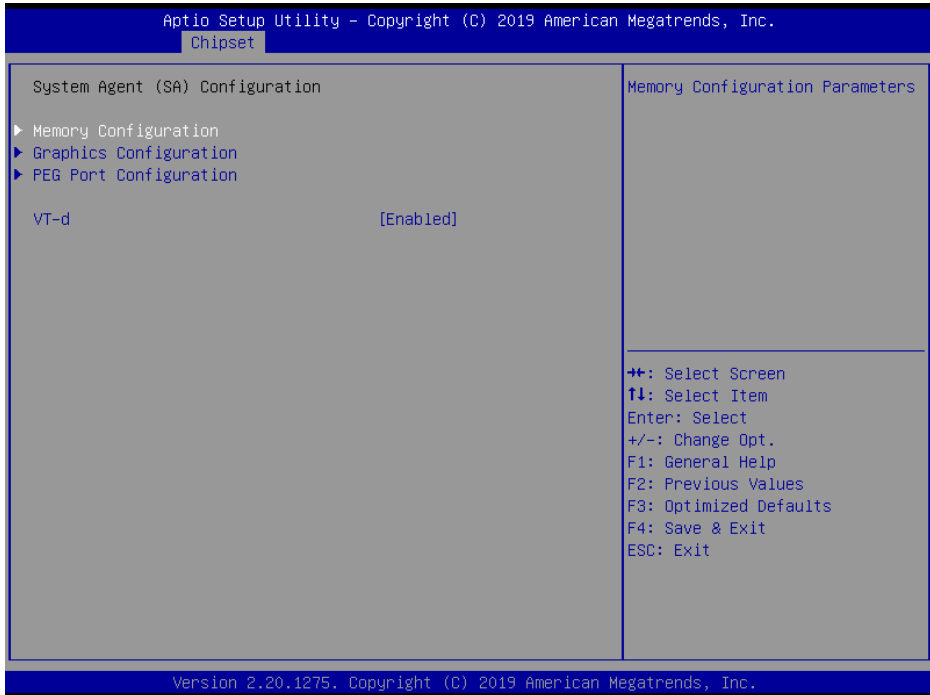


Chipset Screen

| BIOS Setting | Options | Description/Purpose |
|------------------------------|----------|-------------------------------|
| System Agent (SA) Parameters | Sub-Menu | System Agent (SA) Parameters. |
| PCH-IO Configuration | Sub-Menu | PCH Parameters. |

5.5.1 Chipset – System Agent (SA) Configuration

Menu Path *Chipset > System Agent (SA) Configuration*

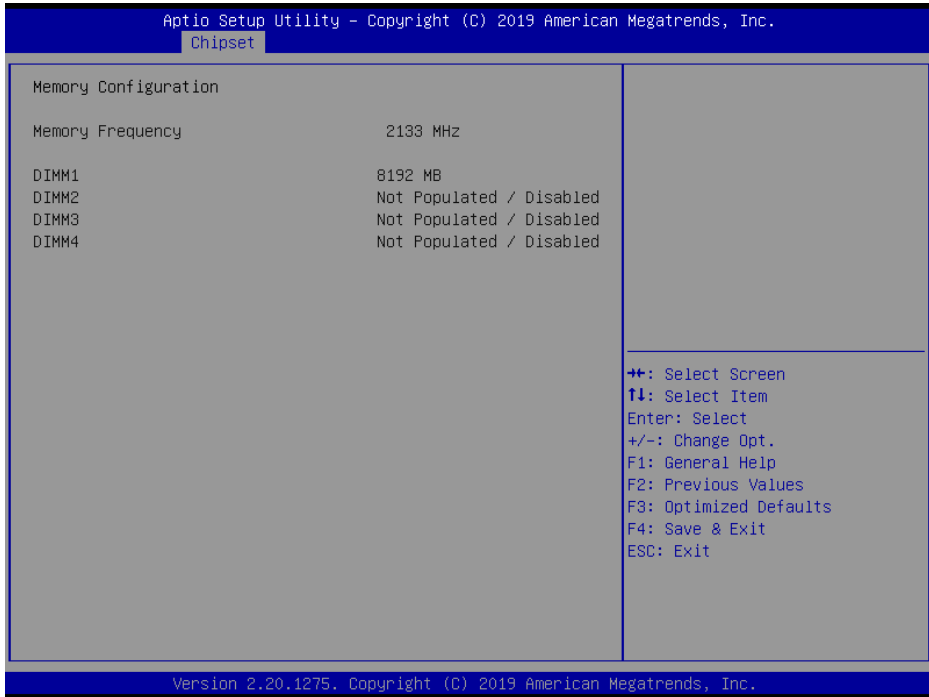


System Agent (SA) Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|------------------------|-----------------------------------|------------------------------------|
| Memory Configuration | Sub-Menu | Memory Configuration. |
| Graphics Configuration | Sub-Menu | Graphics Configuration. |
| PEG Port Configuration | Sub-Menu | PEG Port Configuration. |
| VT-d | - Disabled - Enabled (default) | Enables or Disables VT-d function. |

System Agent (SA) Configuration – Memory Configuration

Menu Path *Chipset > System Agent (SA) Configuration > Memory Configuration*



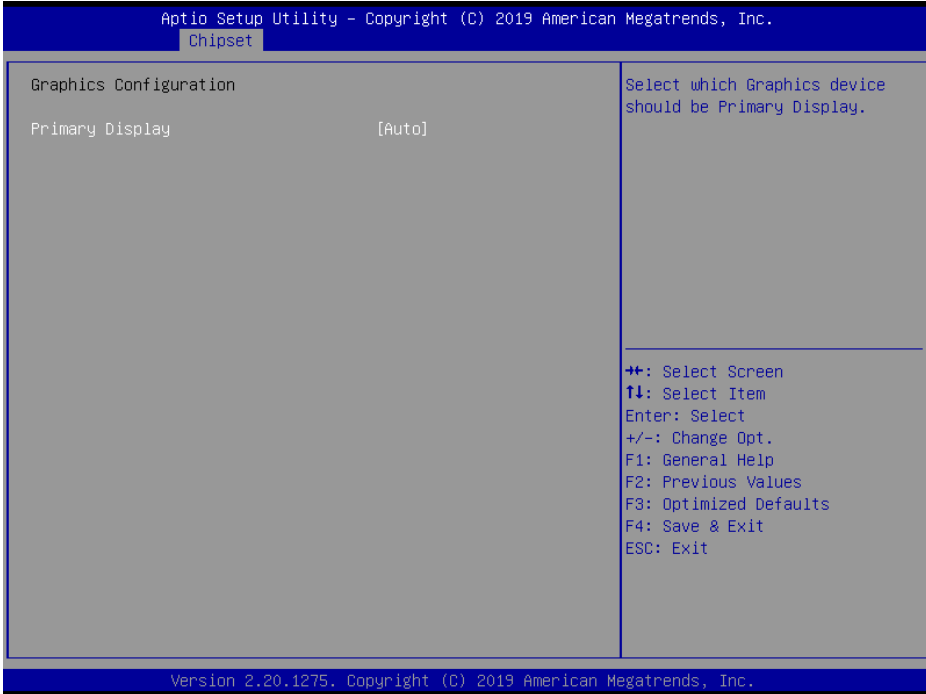
Memory Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|--------------------------------------|-----------------------|-----------------------------------|
| Memory Frequency | No changeable options | Displays the frequency of memory. |
| DIMM1 | No changeable options | Displays the size of DIMM1. |
| DIMM2 <i>(for Q370/C246 only)</i> | No changeable options | Displays the size of DIMM2. |
| DIMM3 | No changeable options | Displays the size of DIMM3. |
| DIMM4 <i>(for Q370/C246 only)</i> | No changeable options | Displays the size of DIMM4. |

System Agent (SA) Configuration – Graphics Configuration

Menu Path *Chipset > System Agent (SA) Configuration > Graphics Configuration*

The **Graphics Configuration** allows users to configure the display settings for the LCD panel.



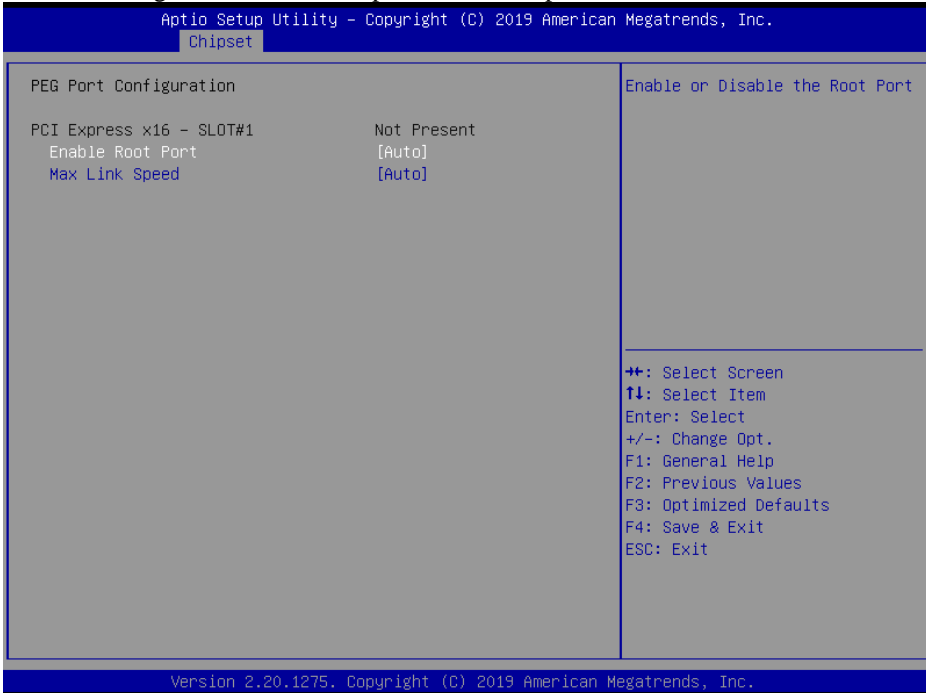
Graphics Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|-----------------|----------------------------|--|
| Primary Display | - Auto (default) - IGFX | Selects which Graphics device should be Primary Display. |

System Agent (SA) Configuration – PEG Port Configuration

Menu Path *Chipset > System Agent (SA) Configuration > PEG Port Configuration*

The **PEG Port Configuration** allows users to display the PEG status, enable Root Port and configure the maximum speed for PCI Express x16 slot.



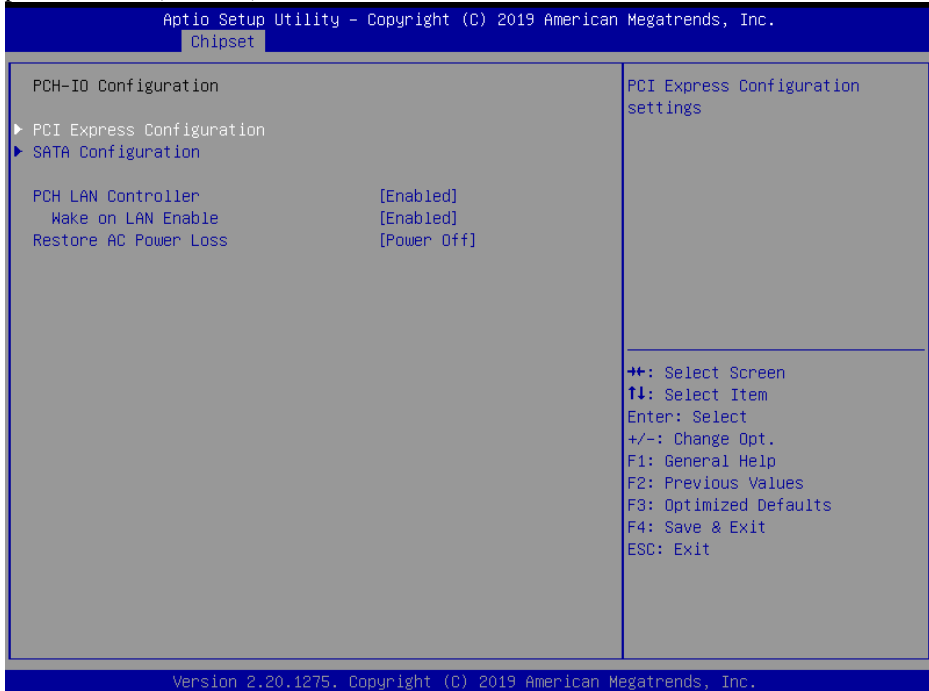
PEG Port Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|--------------------------|--|--|
| PCI Express x16 – SLOT#1 | No changeable options | PCI Express x16 Slot Link and Speed information. |
| Enable Root Port | - Disabled - Enabled - Auto (default) | Enables or Disables the Root Port. |
| Max Link Speed | - Auto (default) - Gen1 - Gen2 - Gen3 | Configures PCI-E1 Max Speed. |

5.5.2 Chipset – PCH IO Configuration

Menu Path *Chipset > PCH-IO Configuration*

The **PCH-IO Configuration** allows users to configure PCI Express and SATA configuration parameters, enable/disable PCH LAN Controller and Wake-On-LAN function and determine the power on/off state that the system will go to following a power failure (G3 state).

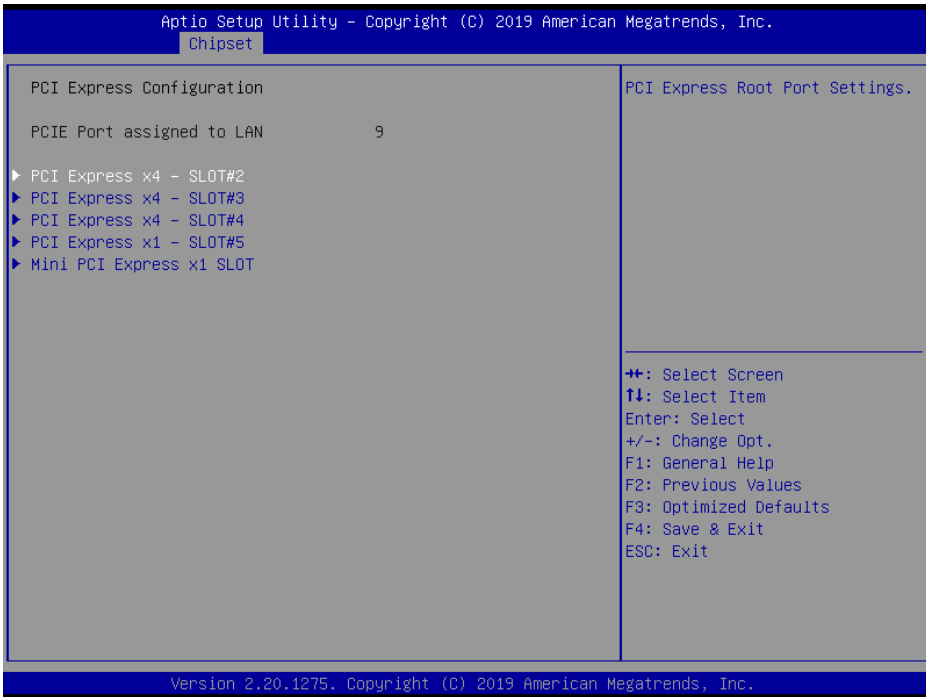


PCH-IO Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|---------------------------|--|--|
| PCI Express Configuration | Sub-Menu | PCI Express Configuration settings. |
| SATA Configuration | Sub-Menu | SATA Configuration settings. |
| PCH LAN Controller | - Disabled - Enabled (default) | Enables or Disables onboard NIC. |
| Wake On LAN Enable | - Disabled - Enabled (default) | Enables or Disables integrated LAN to wake up the system. |
| Restore AC Power Loss | - Power On - Power Off (default) | Specifies the state to go to when AC power is re-applied following a power failure (G3 state). |

PCH-IO Configuration – PCI Express Configuration

Menu Path *Chipset > PCH-IO Configuration > PCI Express Configuration*

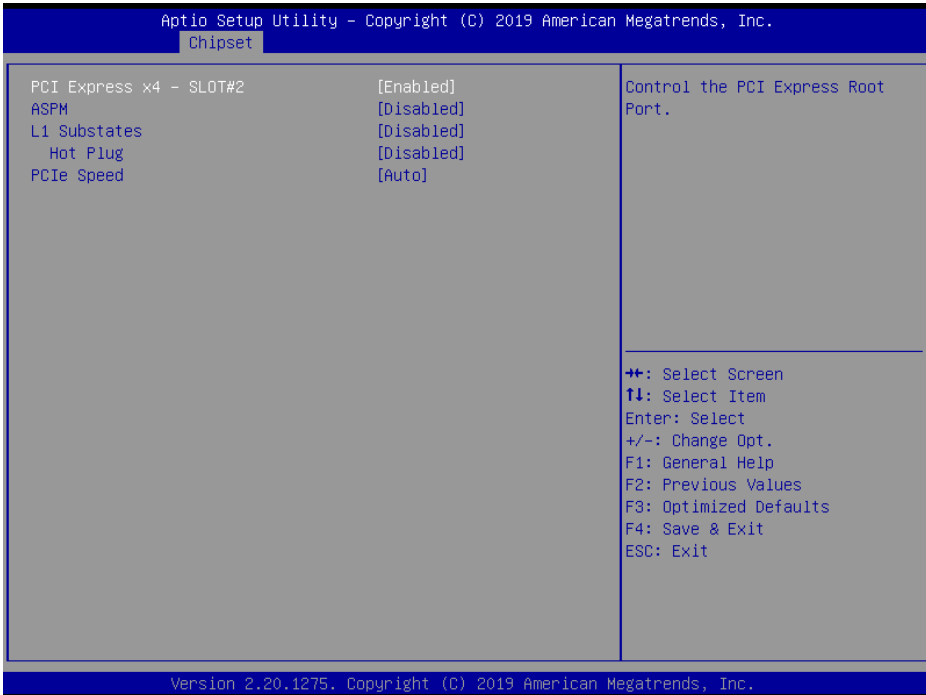


PCI Express Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|---|----------|------------------------------------|
| PCI Express x4 – SLOT#2 <i>(for Q370/C246 only)</i> | Sub-Menu | PCI Express x4 Slot settings. |
| PCI Express x4 – SLOT#3 <i>(for Q370/C246 only)</i> | Sub-Menu | PCI Express x4 Slot settings. |
| PCI Express x4 – SLOT#4 | Sub-Menu | PCI Express x4 Slot settings. |
| PCI Express x1 – SLOT#5 <i>(for Q370/C246 only)</i> | Sub-Menu | PCI Express x1 Slot settings. |
| Mini PCI Express x1 SLOT <i>(for Q370/C246 only)</i> | Sub-Menu | Mini PCI Express x1 Slot settings. |

PCI-IO Configuration – PCI Express Configuration – PCI Express x4 – SLOT#2 (For Q370 / C246 SKU Only)

Menu Path *Chipset > PCH-IO Configuration > PCI Express Configuration > PCI Express x4 – SLOT#2 (for Q370/C246 SKU only)*



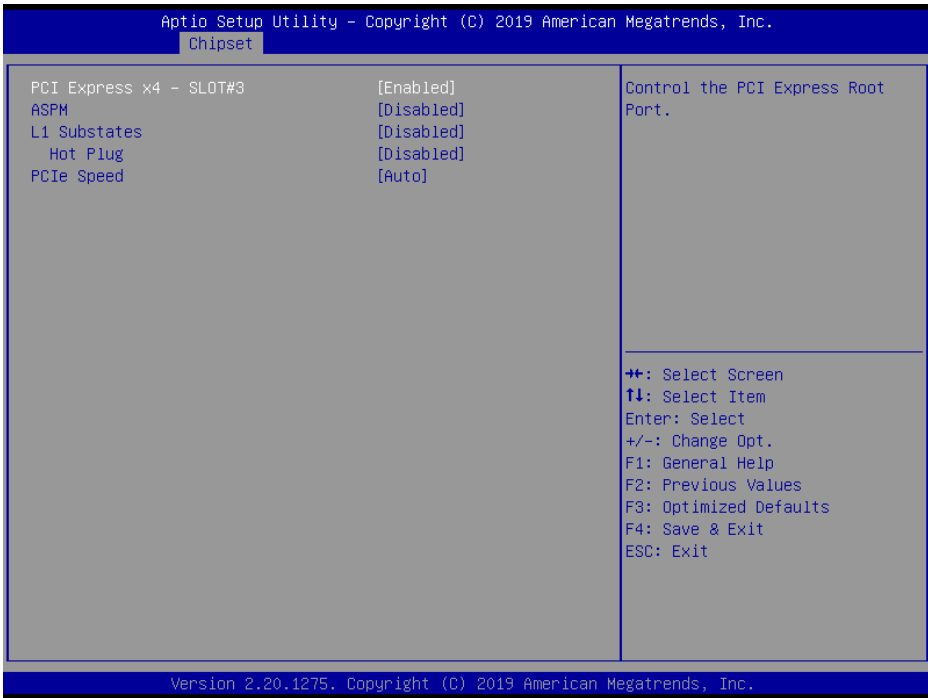
PCI Express x4 Slot#2 Screen

| BIOS Setting | Options | Description/Purpose |
|-------------------------|---|--|
| PCI Express x4 – SLOT#2 | - Disabled - Enabled (default) | Enables or Disables the PCI Express x4 slot. |
| ASPM | - Disabled (default) - L0s - L1 - L0sL1 - Auto | Sets the ASPM Level: • L0s - Force all links to L0s state. • Auto - BIOS auto configure. • Disabled - Disables ASPM. |
| L1 Substates | - Disabled (default) - L1.1 - L1.1 & L1.2 | PCI Express L1 Substates settings. |
| Hot Plug | - Disabled (default) - Enabled | Enables or Disables Hot Plug support. |

| BIOS Setting | Options | Description/Purpose |
|--------------|--|------------------------|
| PCIe Speed | - Auto (default) - Gen1 - Gen2 - Gen3 | Configures PCIe speed. |

PCH-IO Configuration – PCI Express Configuration – PCI Express x4 – SLOT#3 (For Q370 / C246 SKU Only)

Menu Path *Chipset > PCH-IO Configuration > PCI Express Configuration > PCI Express x4 – SLOT#3 (for Q370/C246 SKU only)*



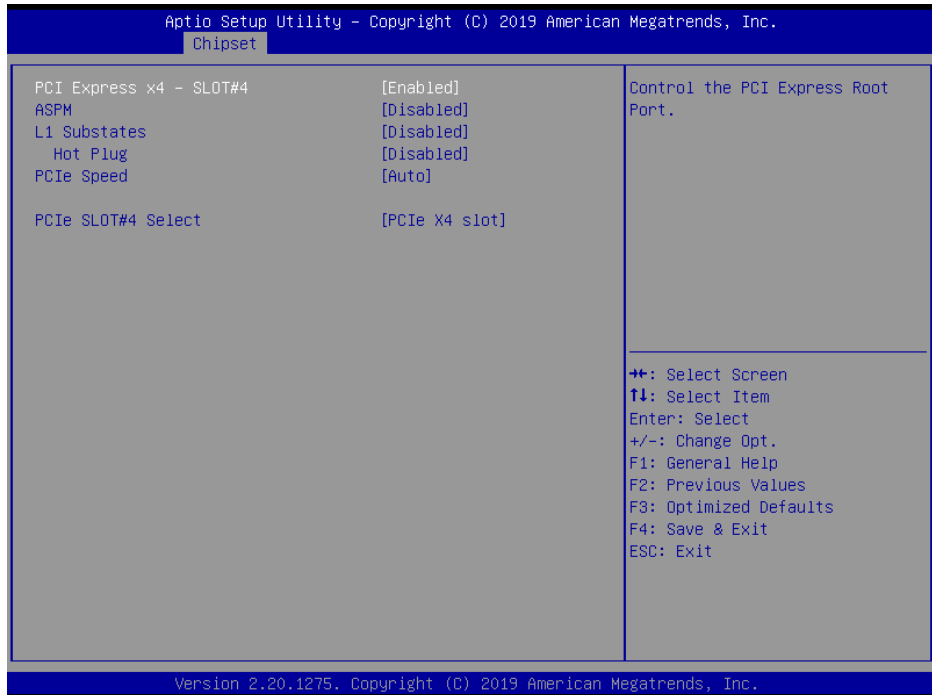
PCI Express x4 Slot#3 Screen

| BIOS Setting | Options | Description/Purpose |
|-------------------------|--|---|
| PCI Express x4 – SLOT#3 | - Disabled - Enabled (default) | Enables or Disables the PCI Express x4 slot. |
| ASPM | - Disabled (default) - L0s - L1 - L0sL1 - Auto | Sets the ASPM Level: <ul style="list-style-type: none"> • L0s - Force all links to L0s state. • Auto - BIOS auto configure. • Disabled - Disables ASPM. |

| BIOS Setting | Options | Description/Purpose |
|--------------|---|---------------------------------------|
| L1 Substates | - Disabled (default) - L1.1 - L1.1 & L1.2 | PCI Express L1 Substates settings. |
| Hot Plug | - Disabled (default) - Enabled | Enables or Disables Hot Plug support. |
| PCIe Speed | - Auto (default) - Gen1 - Gen2 - Gen3 | Configures PCIe speed. |

PCH-IO Configuration – PCI Express Configuration – PCI Express x4 – SLOT#4

Menu Path *Chipset > PCH-IO Configuration > PCI Express Configuration > PCI Express x4 – SLOT#4*



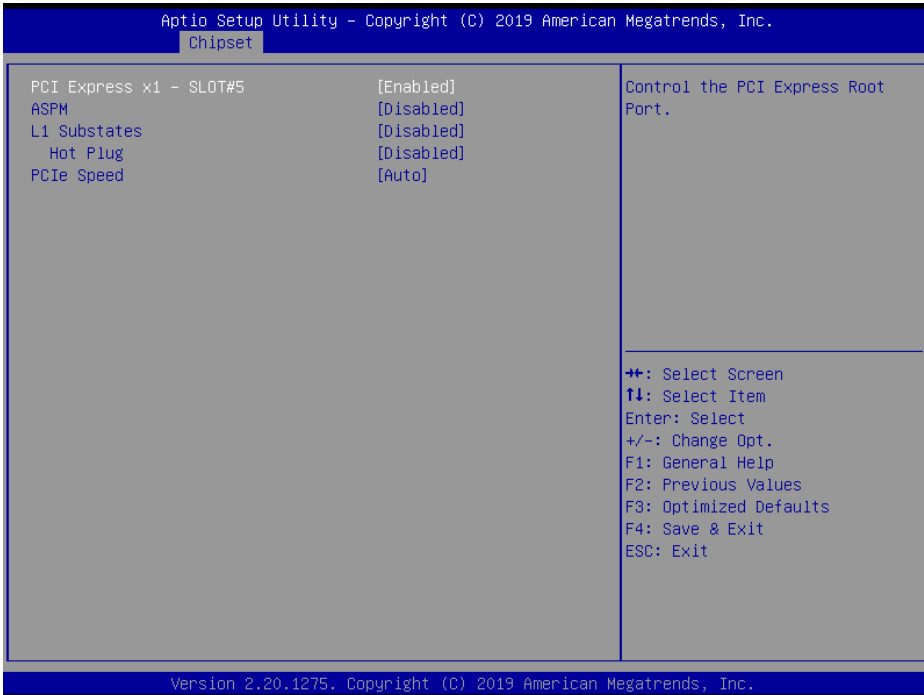
PCI Express x4 Slot#4 Screen

| BIOS Setting | Options | Description/Purpose |
|-------------------------|-----------------------------------|--|
| PCI Express x4 – SLOT#4 | - Disabled - Enabled (default) | Enables or Disables the PCI Express x4 slot. |

| BIOS Setting | Options | Description/Purpose |
|-------------------|--|---|
| ASPM | <ul style="list-style-type: none"> - Disabled (default) - L0s - L1 - L0sL1 - Auto | Sets the ASPM Level: <ul style="list-style-type: none"> • L0s - Force all links to L0s state. • Auto - BIOS auto configure. • Disabled - Disables ASPM. |
| L1 Substates | <ul style="list-style-type: none"> - Disabled (default) - L1.1 - L1.1 & L1.2 | PCI Express L1 Substates settings |
| Hot Plug | <ul style="list-style-type: none"> - Disabled (default) - Enabled | Enables or Disables Hot Plug support. |
| PCIe Speed | <ul style="list-style-type: none"> - Auto (default) - Gen1 - Gen2 - Gen3 | Configures PCIe Speed. |
| PCIe SLOT4 Select | <ul style="list-style-type: none"> - PCIe X4 slot (default) - M.2 NVMe slot | PCIe SLOT#4 function selection. |

PCI-IO Configuration – PCI Express Configuration – PCI Express x1 – SLOT#5 (For Q370 / C246 SKU Only)

Menu Path *Chipset > PCH-IO Configuration > PCI Express Configuration > PCI Express x1 – SLOT#5 (for Q370/C246 SKU only)*



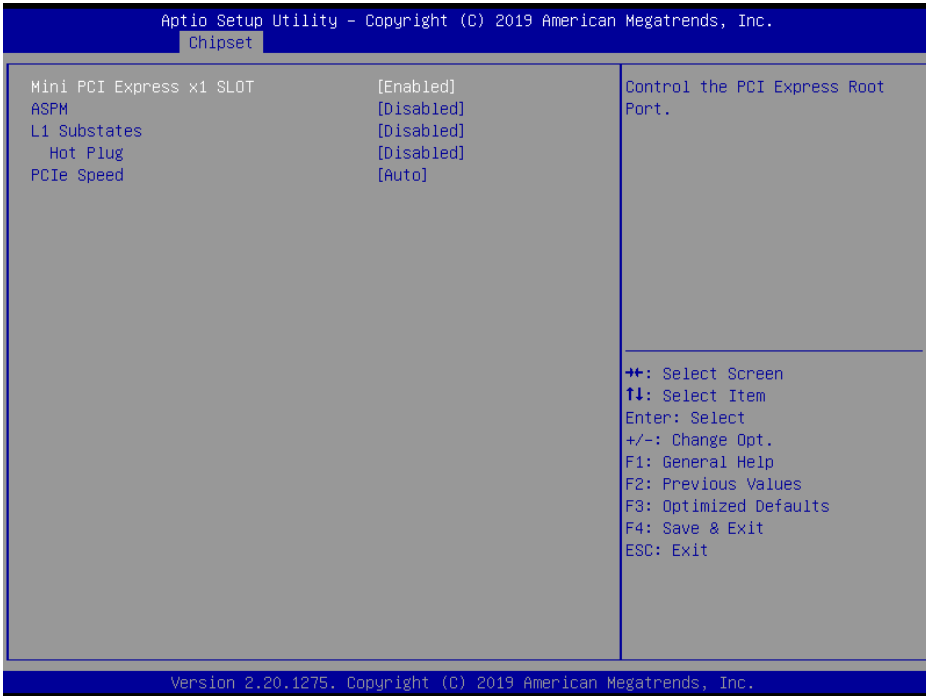
PCI Express x1 Slot#5 Screen

| BIOS Setting | Options | Description/Purpose |
|-------------------------|---|--|
| PCI Express x1 – SLOT#5 | - Disabled - Enabled (default) | Enables or Disables the PCI Express x4 slot. |
| ASPM | - Disabled (default) - L0s - L1 - L0sL1 - Auto | Sets the ASPM Level: • L0s - Force all links to L0s state. • Auto - BIOS auto configure. • Disabled - Disables ASPM. |
| L1 Substates | - Disabled (default) - L1.1 - L1.1 & L1.2 | PCI Express L1 Substates settings |
| Hot Plug | - Disabled (default) - Enabled | Enables or Disables Hot Plug support. |
| PCIe Speed | - Auto (default) | Configures PCIe speed. |

| BIOS Setting | Options | Description/Purpose |
|--------------|----------------------------|---------------------|
| | - Gen1 - Gen2 - Gen3 | |

PCH-IO Configuration – PCI Express Configuration – Mini PCI Express x1 Slot (For Q370 / C246 SKU Only)

Menu Path *Chipset > PCH-IO Configuration > PCI Express Configuration > Mini PCI Express x1 SLOT*



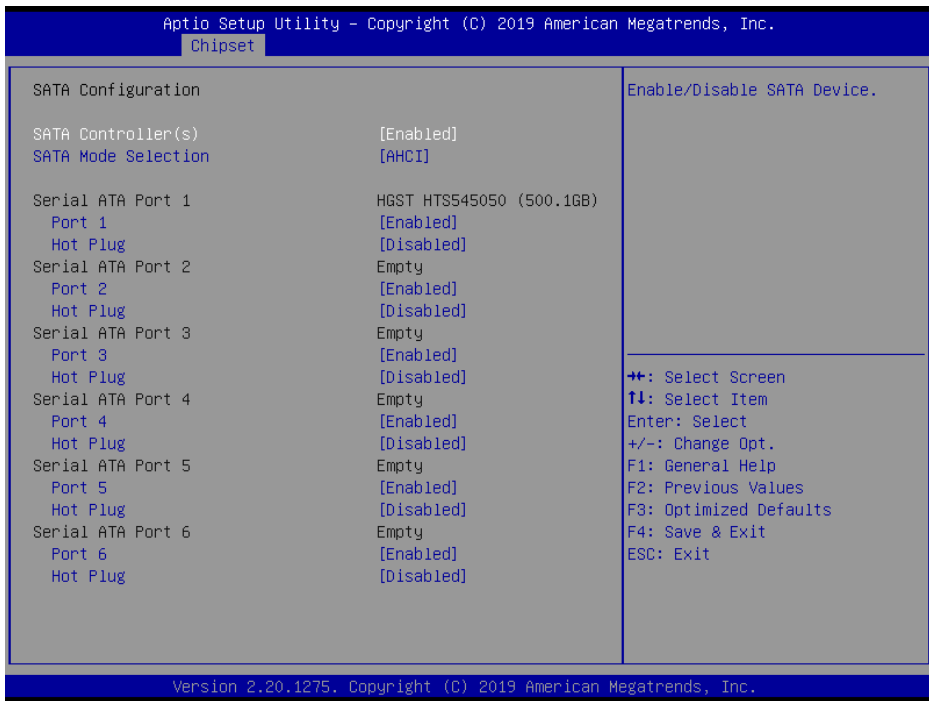
Mini PCI Express x1 Slot Screen

| BIOS Setting | Options | Description/Purpose |
|--------------------------|---|--|
| Mini PCI Express x1 SLOt | - Disabled - Enabled (default) | Enable or Disable the Mini PCI Express x1 slot. |
| ASPM | - Disabled (default) - L0s - L1 - L0sL1 - Auto | Sets the ASPM Level: <ul style="list-style-type: none"> • L0s - Force all links to L0s state. • Auto - BIOS auto configure. • Disabled - Disables ASPM. |
| L1 Substates | - Disabled (default) - L1.1 - L1.1 & L1.2 | PCI Express L1 Substates settings. |

| BIOS Setting | Options | Description/Purpose |
|--------------|--|---------------------------------------|
| Hot Plug | - Disabled (default) - Enabled | Enables or Disables Hot Plug support. |
| PCIe Speed | - Auto (default) - Gen1 - Gen2 - Gen3 | Configures PCIe speed. |

PCH-IO Configuration – PCI Express Configuration – SATA Configuration

Menu Path *Chipset > PCH-IO Configuration > SATA Configuration*



SATA Configuration Screen

| BIOS Setting | Options | Description/Purpose |
|--|--|--|
| SATA Controller(s) | - Disabled (default) - Enabled | Enables or Disables SATA device. |
| SATA Mode | - AHCI (default) - Intel RST (RAID) | Determines how SATA controller(s) operate. |
| Serial ATA Port 1 – 6 <i>(ports 5-6 for Q370/C246 only)</i> | No changeable options | Displays the SATA device’s name. |

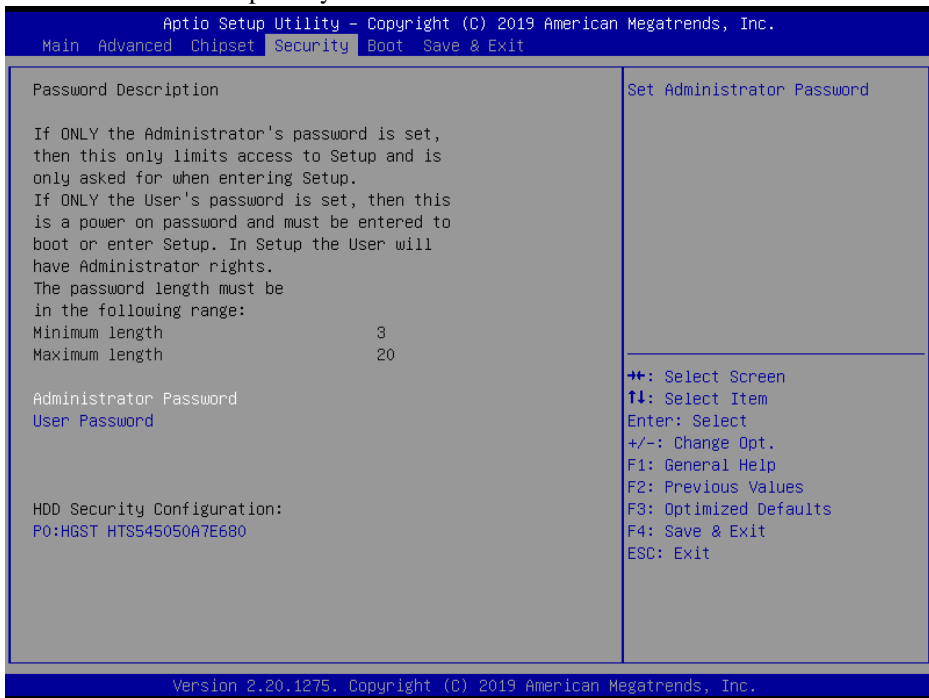
| BIOS Setting | Options | Description/Purpose |
|---------------------|-----------------------------------|--|
| Port 1 - 6 | - Disabled - Enabled (default) | Enables or Disables SATA Port Device. |
| HotPlug | - Disabled (default) - Enabled | Enables or Disables SATA Port Device HotPlug function. |

5.6 Security

Menu Path *Security*

From the **Security** menu, you are allowed to create, change or clear the administrator password. You will be asked to enter the configured administrator password before you can access the Setup Utility.

By setting an administrator password, you will prevent other users from changing your BIOS settings. You can configure an Administrator password and then configure a user password. An administrator has much more privileges over the settings in the Setup utility than a user. Heed that a user password does not provide access to most of the features in the Setup utility.



Security Screen

| BIOS Setting | Options | Description/Purpose |
|------------------------|---|---------------------------------------|
| Administrator Password | Password can be 3-20 alphanumeric characters. | Specifies the administrator password. |
| User Password | Password can be 3-20 alphanumeric characters. | Specifies the user password. |

| BIOS Setting | Options | Description/Purpose |
|----------------------------|----------------|---|
| HDD Security Configuration | Sub-Menu | Enters sub-menu with option to enable password protected HDD/SSD (if supported by SATA device). |

Create an Administrator or User Password

1. Select the **Administrator Password / User Password** option from the Security menu and press <Enter>, and the password dialog entry box appears.
2. Enter the password you want to create. A password can be 3-20 alphanumeric characters. After you have configured the password, press <Enter> to confirm.
3. Type the new password again and press <Enter>.

Change an Administrator or User Password

1. Select the **Administrator Password / User Password** option from the Security menu and press <Enter>, and the password dialog entry box appears.
2. Select the Administrator Password or User Password that you want to change. A password can be 3-20 alphanumeric characters. After you have changed the password, press <Enter> to confirm.
3. Type the changed password again and press <Enter>.

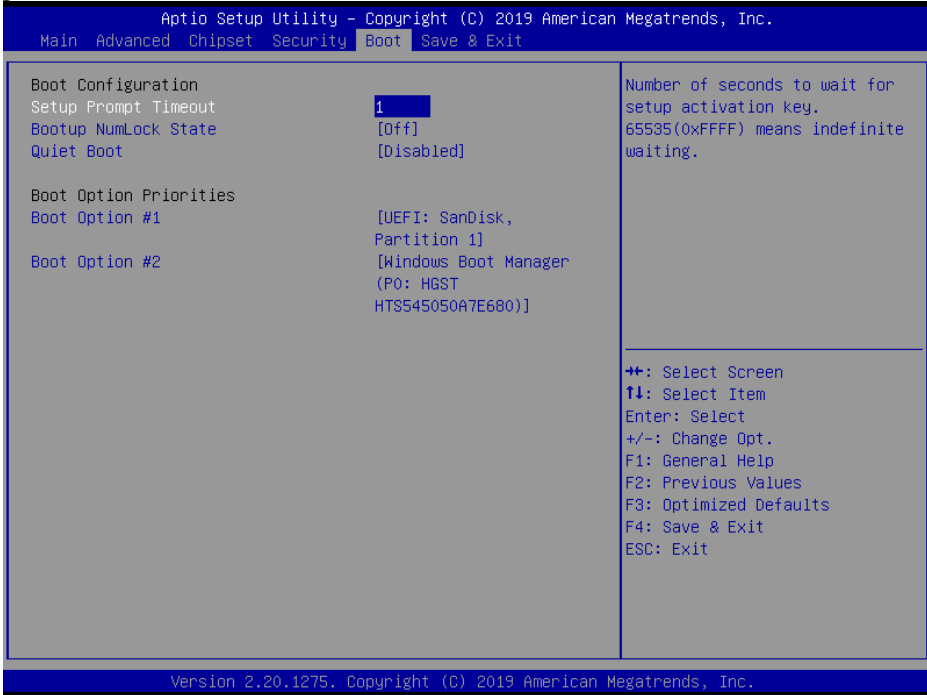
Remove an Administrator or User Password

1. Select the **Administrator Password / User Password** option from the Security menu and press <Enter>, and the password dialog entry box appears.
2. Select the configured Administrator Password or User Password that you want to delete. Leave the dialog box blank and press <Enter>.
3. Press <Enter> again when the password confirmation box appears.

5.7 Boot

Menu Path *Boot*

This menu provides control items for setting system boot configuration and boot priorities.



Boot Screen

| BIOS Setting | Options | Description/Purpose |
|----------------------|-----------------------------------|---|
| Setup Prompt Timeout | Numeric (from 1 to 65535) | Number of seconds to wait for setup activation key. |
| Bootup NumLock State | - On (default) - Off | Specifies the power-on state of the NumLock Key. |
| Quiet Boot | - Disabled (default) - Enabled | Enables or Disables Quiet Boot option. |
| Boot Option #1~#n | - [Drive(s)] - Disabled | Sets the system boot order. |

5.8 Save & Exit

| Menu Path | Save & Exit |
|-----------|-------------|
|-----------|-------------|

The **Save & Exit** allows users to save or discard changed BIOS settings as well as load factory default settings.

Save Changed BIOS Settings

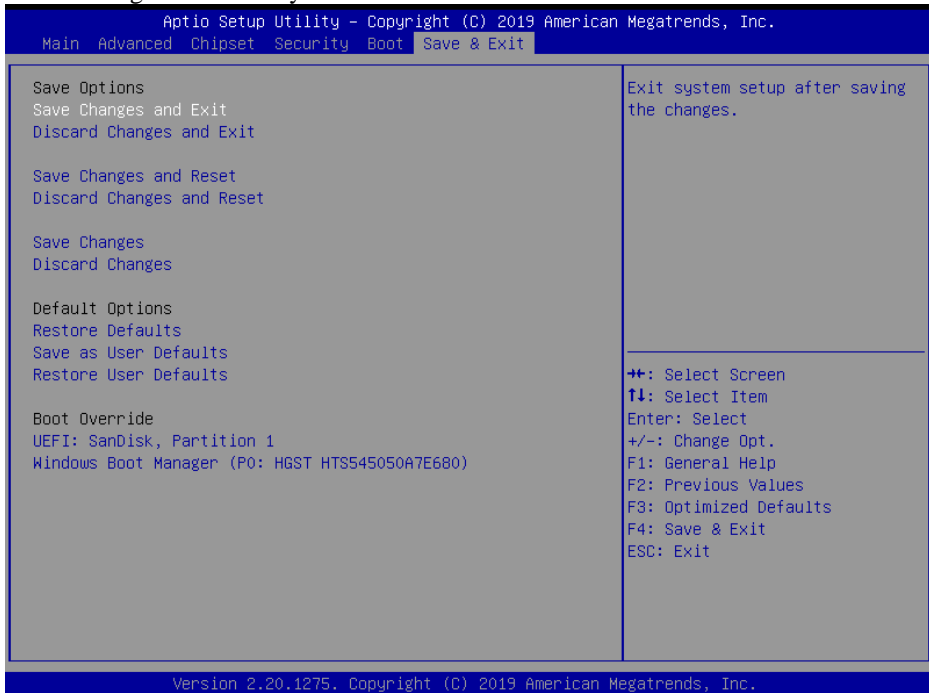
To save and validate the changed BIOS settings, select **Save Changes** from the **Save & Exit** menu, or you can select **Save Changes and Exit** (or press **F4**) to validate the changes and then exit the system. Select **Save Changes and Reset** to validate the changed BIOS settings and then restart the system.

Discard Changed BIOS Settings

To cancel the BIOS settings you have previously configured, select **Discard Changes and Exit** from this menu, or simply press **Esc** to exit the BIOS setup. You can also select **Discard Changes and Reset** to discard any changes you have made and restore the factory BIOS defaults.

Load User Defaults

You may simply press **F3** at any time to load the **Optimized Values** which resets all BIOS settings to the factory defaults.



Save & Exit Screen

| BIOS Setting | Options | Description/Purpose |
|---------------------------|-----------------------|---|
| Save Changes and Exit | No changeable options | Exits and saves the changes in NVRAM. |
| Discard Changes and Exit | No changeable options | Exits without saving any changes made in BIOS settings. |
| Save Changes and Reset | No changeable options | Saves the changes in NVRAM and resets. |
| Discard Changes and Reset | No changeable options | Resets without saving any changes made in BIOS settings. |
| Save Changes | No changeable options | Saves Changes done so far to any of the setup options. |
| Discard Changes | No changeable options | Discards Changes done so far to any of the setup options. |
| Restore Defaults | No changeable options | Loads the optimized defaults for BIOS settings. |
| Save as User Defaults | No changeable options | Saves the changes done so far as User Defaults. |
| Restore User Defaults | No changeable options | Restores the User Defaults to all the setup options. |
| Boot Override | - [Drive(s)] | Forces to boot from selected [drive(s)]. |

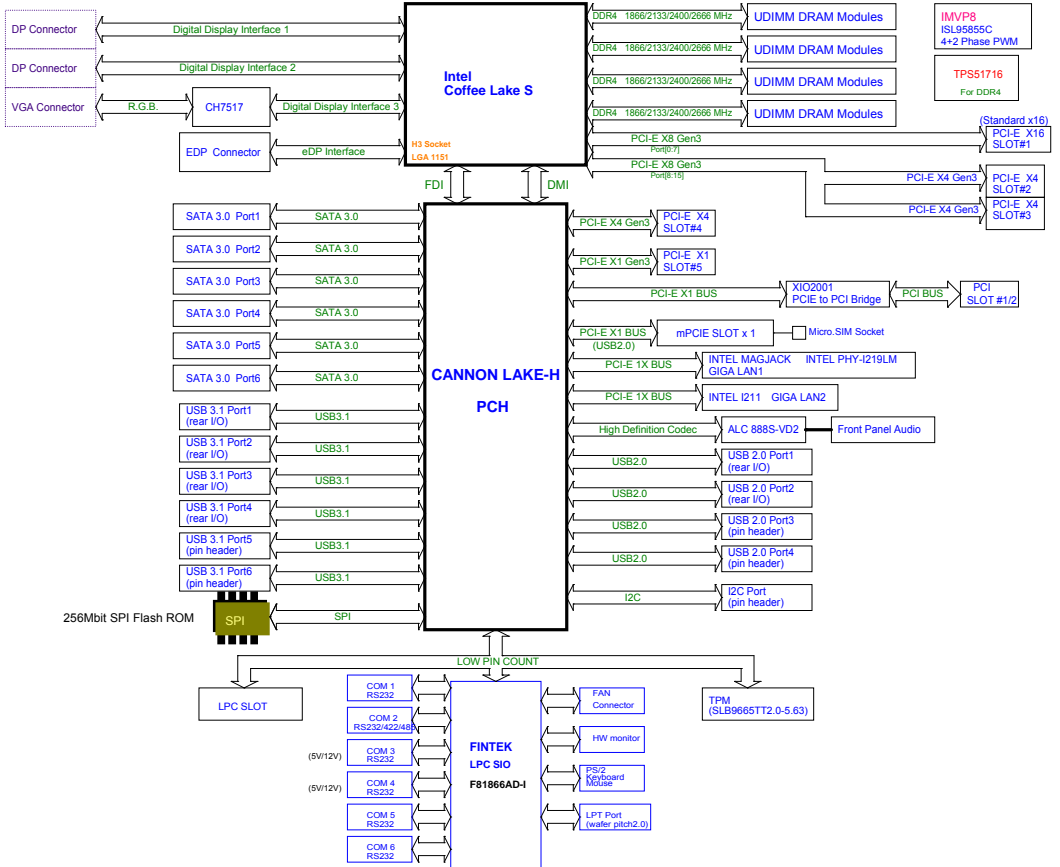
Appendix A Technical Summary

This appendix will give you a brief introduction of the allocation maps for BA-2602 resources.

The following topics are included:

- BA-2602 Block Diagram
- Interrupt Map
- I/O Map
- Memory Map
- DMA Map
- Configuring WatchDog Timer
- Flash BIOS Update

BA-2602 Block Diagram



Interrupt Map

| IRQ | ASSIGNMENT |
|------------|--|
| IRQ 0 | System timer |
| IRQ 1 | Standard PS/2 Keyboard |
| IRQ 3 | Communications Port (COM2) |
| IRQ 4 | Communications Port (COM1) |
| IRQ 6 | Communications Port (COM4) |
| IRQ 7 | Communications Port (COM3) |
| IRQ 10 | Communications Port (COM5) |
| IRQ 11 | Communications Port (COM6) |
| IRQ 12 | PS/2 Compatible Mouse |
| IRQ 13 | Numeric data processor |
| IRQ 14 | Intel(R) Serial IO GPIO Host Controller - INT3450 |
| IRQ 16 | Intel(R) Serial IO I2C Host Controller - A368 |
| IRQ 16 | High Definition Audio Controller |
| IRQ 17 | Intel(R) Serial IO I2C Host Controller - A369 |
| IRQ 19 | Intel(R) Active Management Technology - SOL (COM8) |
| IRQ 45 | Trusted Platform Module 2.0 |
| RQ 54 | Microsoft ACPI-Compliant System |
| IRQ 55 | Microsoft ACPI-Compliant System |
| IRQ 56 | Microsoft ACPI-Compliant System |
| IRQ 57 | Microsoft ACPI-Compliant System |
| IRQ 58 | Microsoft ACPI-Compliant System |
| IRQ 59 | Microsoft ACPI-Compliant System |
| IRQ 60 | Microsoft ACPI-Compliant System |
| IRQ 61 | Microsoft ACPI-Compliant System |
| IRQ 62 | Microsoft ACPI-Compliant System |
| IRQ 63 | Microsoft ACPI-Compliant System |
| IRQ 64 | Microsoft ACPI-Compliant System |
| IRQ 65 | Microsoft ACPI-Compliant System |
| IRQ 66 | Microsoft ACPI-Compliant System |
| IRQ 67 | Microsoft ACPI-Compliant System |
| IRQ 68 | Microsoft ACPI-Compliant System |
| IRQ 69 | Microsoft ACPI-Compliant System |
| IRQ 70 | Microsoft ACPI-Compliant System |

| IRQ | ASSIGNMENT |
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| IRQ 71 | Microsoft ACPI-Compliant System |
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| IRQ | ASSIGNMENT |
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| IRQ 365 | Microsoft ACPI-Compliant System |
| IRQ 366 | Microsoft ACPI-Compliant System |
| IRQ 367 | Microsoft ACPI-Compliant System |
| IRQ 368 | Microsoft ACPI-Compliant System |
| IRQ 369 | Microsoft ACPI-Compliant System |
| IRQ 370 | Microsoft ACPI-Compliant System |
| IRQ 371 | Microsoft ACPI-Compliant System |
| IRQ 372 | Microsoft ACPI-Compliant System |
| IRQ 373 | Microsoft ACPI-Compliant System |
| IRQ 374 | Microsoft ACPI-Compliant System |
| IRQ 375 | Microsoft ACPI-Compliant System |
| IRQ 376 | Microsoft ACPI-Compliant System |
| IRQ 377 | Microsoft ACPI-Compliant System |
| IRQ 378 | Microsoft ACPI-Compliant System |
| IRQ 379 | Microsoft ACPI-Compliant System |
| IRQ 380 | Microsoft ACPI-Compliant System |
| IRQ 381 | Microsoft ACPI-Compliant System |
| IRQ 382 | Microsoft ACPI-Compliant System |
| IRQ 383 | Microsoft ACPI-Compliant System |
| IRQ 384 | Microsoft ACPI-Compliant System |
| IRQ 385 | Microsoft ACPI-Compliant System |
| IRQ 386 | Microsoft ACPI-Compliant System |
| IRQ 387 | Microsoft ACPI-Compliant System |
| IRQ 388 | Microsoft ACPI-Compliant System |
| IRQ 389 | Microsoft ACPI-Compliant System |
| IRQ 390 | Microsoft ACPI-Compliant System |
| IRQ 391 | Microsoft ACPI-Compliant System |
| IRQ 392 | Microsoft ACPI-Compliant System |
| IRQ 393 | Microsoft ACPI-Compliant System |

| IRQ | ASSIGNMENT |
|------------|---------------------------------|
| IRQ 394 | Microsoft ACPI-Compliant System |
| IRQ 395 | Microsoft ACPI-Compliant System |
| IRQ 396 | Microsoft ACPI-Compliant System |
| IRQ 397 | Microsoft ACPI-Compliant System |
| IRQ 398 | Microsoft ACPI-Compliant System |
| IRQ 399 | Microsoft ACPI-Compliant System |
| IRQ 400 | Microsoft ACPI-Compliant System |
| IRQ 401 | Microsoft ACPI-Compliant System |
| IRQ 402 | Microsoft ACPI-Compliant System |
| IRQ 403 | Microsoft ACPI-Compliant System |
| IRQ 404 | Microsoft ACPI-Compliant System |
| IRQ 405 | Microsoft ACPI-Compliant System |
| IRQ 406 | Microsoft ACPI-Compliant System |
| IRQ 407 | Microsoft ACPI-Compliant System |
| IRQ 408 | Microsoft ACPI-Compliant System |
| IRQ 409 | Microsoft ACPI-Compliant System |
| IRQ 410 | Microsoft ACPI-Compliant System |
| IRQ 411 | Microsoft ACPI-Compliant System |
| IRQ 412 | Microsoft ACPI-Compliant System |
| IRQ 413 | Microsoft ACPI-Compliant System |
| IRQ 414 | Microsoft ACPI-Compliant System |
| IRQ 415 | Microsoft ACPI-Compliant System |
| IRQ 416 | Microsoft ACPI-Compliant System |
| IRQ 417 | Microsoft ACPI-Compliant System |
| IRQ 418 | Microsoft ACPI-Compliant System |
| IRQ 419 | Microsoft ACPI-Compliant System |
| IRQ 420 | Microsoft ACPI-Compliant System |
| IRQ 421 | Microsoft ACPI-Compliant System |
| IRQ 422 | Microsoft ACPI-Compliant System |
| IRQ 423 | Microsoft ACPI-Compliant System |
| IRQ 424 | Microsoft ACPI-Compliant System |
| IRQ 425 | Microsoft ACPI-Compliant System |
| IRQ 426 | Microsoft ACPI-Compliant System |

| IRQ | ASSIGNMENT |
|------------|---------------------------------|
| IRQ 427 | Microsoft ACPI-Compliant System |
| IRQ 428 | Microsoft ACPI-Compliant System |
| IRQ 429 | Microsoft ACPI-Compliant System |
| IRQ 430 | Microsoft ACPI-Compliant System |
| IRQ 431 | Microsoft ACPI-Compliant System |
| IRQ 432 | Microsoft ACPI-Compliant System |
| IRQ 433 | Microsoft ACPI-Compliant System |
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| IRQ 454 | Microsoft ACPI-Compliant System |
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| IRQ 456 | Microsoft ACPI-Compliant System |
| IRQ 457 | Microsoft ACPI-Compliant System |
| IRQ 458 | Microsoft ACPI-Compliant System |
| IRQ 459 | Microsoft ACPI-Compliant System |
| IRQ 460 | Microsoft ACPI-Compliant System |
| IRQ 461 | Microsoft ACPI-Compliant System |

| IRQ | ASSIGNMENT |
|------------|---------------------------------|
| IRQ 462 | Microsoft ACPI-Compliant System |
| IRQ 463 | Microsoft ACPI-Compliant System |
| IRQ 464 | Microsoft ACPI-Compliant System |
| IRQ 465 | Microsoft ACPI-Compliant System |
| IRQ 466 | Microsoft ACPI-Compliant System |
| IRQ 467 | Microsoft ACPI-Compliant System |
| IRQ 468 | Microsoft ACPI-Compliant System |
| IRQ 469 | Microsoft ACPI-Compliant System |
| IRQ 470 | Microsoft ACPI-Compliant System |
| IRQ 471 | Microsoft ACPI-Compliant System |
| IRQ 472 | Microsoft ACPI-Compliant System |
| IRQ 473 | Microsoft ACPI-Compliant System |
| IRQ 474 | Microsoft ACPI-Compliant System |
| IRQ 475 | Microsoft ACPI-Compliant System |
| IRQ 476 | Microsoft ACPI-Compliant System |
| IRQ 477 | Microsoft ACPI-Compliant System |
| IRQ 478 | Microsoft ACPI-Compliant System |
| IRQ 479 | Microsoft ACPI-Compliant System |
| IRQ 480 | Microsoft ACPI-Compliant System |
| IRQ 481 | Microsoft ACPI-Compliant System |
| IRQ 482 | Microsoft ACPI-Compliant System |
| IRQ 483 | Microsoft ACPI-Compliant System |
| IRQ 484 | Microsoft ACPI-Compliant System |
| IRQ 485 | Microsoft ACPI-Compliant System |
| IRQ 486 | Microsoft ACPI-Compliant System |
| IRQ 487 | Microsoft ACPI-Compliant System |
| IRQ 488 | Microsoft ACPI-Compliant System |
| IRQ 489 | Microsoft ACPI-Compliant System |
| IRQ 490 | Microsoft ACPI-Compliant System |
| IRQ 491 | Microsoft ACPI-Compliant System |
| IRQ 492 | Microsoft ACPI-Compliant System |
| IRQ 493 | Microsoft ACPI-Compliant System |
| IRQ 494 | Microsoft ACPI-Compliant System |

| IRQ | ASSIGNMENT |
|----------------|---|
| IRQ 495 | Microsoft ACPI-Compliant System |
| IRQ 496 | Microsoft ACPI-Compliant System |
| IRQ 497 | Microsoft ACPI-Compliant System |
| IRQ 498 | Microsoft ACPI-Compliant System |
| IRQ 499 | Microsoft ACPI-Compliant System |
| IRQ 500 | Microsoft ACPI-Compliant System |
| IRQ 501 | Microsoft ACPI-Compliant System |
| IRQ 502 | Microsoft ACPI-Compliant System |
| IRQ 503 | Microsoft ACPI-Compliant System |
| IRQ 504 | Microsoft ACPI-Compliant System |
| IRQ 505 | Microsoft ACPI-Compliant System |
| IRQ 506 | Microsoft ACPI-Compliant System |
| IRQ 507 | Microsoft ACPI-Compliant System |
| IRQ 508 | Microsoft ACPI-Compliant System |
| IRQ 509 | Microsoft ACPI-Compliant System |
| IRQ 510 | Microsoft ACPI-Compliant System |
| IRQ 511 | Microsoft ACPI-Compliant System |
| IRQ 4294967280 | Intel(R) Management Engine Interface |
| IRQ 4294967281 | Intel(R) Ethernet Connection (7) I219-LM |
| IRQ 4294967282 | Intel(R) I211 Gigabit Network Connection |
| IRQ 4294967283 | Intel(R) I211 Gigabit Network Connection |
| IRQ 4294967284 | Intel(R) I211 Gigabit Network Connection |
| IRQ 4294967285 | Intel(R) I211 Gigabit Network Connection |
| IRQ 4294967286 | Intel(R) I211 Gigabit Network Connection |
| IRQ 4294967287 | Intel(R) I211 Gigabit Network Connection |
| IRQ 4294967288 | Intel(R) I211 Gigabit Network Connection |
| IRQ 4294967289 | Intel(R) I211 Gigabit Network Connection |
| IRQ 4294967290 | Intel(R) I211 Gigabit Network Connection |
| IRQ 4294967291 | Intel(R) I211 Gigabit Network Connection |
| IRQ 4294967292 | Intel(R) USB 3.1 eXtensible Host Controller - 1.10 (Microsoft) |
| IRQ 4294967293 | Intel(R) UHD Graphics P630 |
| IRQ 4294967294 | Standard SATA AHCI Controller |

Note: These resource information were gathered using Windows 10 (the IRQ could be assigned differently depending on OS).

I/O MAP

| I/O | ASSIGNMENT |
|-----------------------|-----------------------------------|
| 0x00000000-0x00000CF7 | PCI Express Root Complex |
| 0x00000020-0x00000021 | Programmable interrupt controller |
| 0x00000024-0x00000025 | Programmable interrupt controller |
| 0x00000028-0x00000029 | Programmable interrupt controller |
| 0x0000002C-0x0000002D | Programmable interrupt controller |
| 0x0000002E-0x0000002F | Motherboard resources |
| 0x00000030-0x00000031 | Programmable interrupt controller |
| 0x00000034-0x00000035 | Programmable interrupt controller |
| 0x00000038-0x00000039 | Programmable interrupt controller |
| 0x0000003C-0x0000003D | Programmable interrupt controller |
| 0x00000040-0x00000043 | System timer |
| 0x0000004E-0x0000004F | Motherboard resources |
| 0x00000050-0x00000053 | System timer |
| 0x00000060-0x00000060 | Standard PS/2 Keyboard |
| 0x00000061-0x00000061 | Motherboard resources |
| 0x00000063-0x00000063 | Motherboard resources |
| 0x00000064-0x00000064 | Standard PS/2 Keyboard |
| 0x00000065-0x00000065 | Motherboard resources |
| 0x00000067-0x00000067 | Motherboard resources |
| 0x00000070-0x00000070 | Motherboard resources |
| 0x00000080-0x00000080 | Motherboard resources |
| 0x00000092-0x00000092 | Motherboard resources |
| 0x000000A0-0x000000A1 | Programmable interrupt controller |
| 0x000000A4-0x000000A5 | Programmable interrupt controller |
| 0x000000A8-0x000000A9 | Programmable interrupt controller |
| 0x000000AC-0x000000AD | Programmable interrupt controller |
| 0x000000B0-0x000000B1 | Programmable interrupt controller |
| 0x000000B2-0x000000B3 | Motherboard resources |
| 0x000000B4-0x000000B5 | Programmable interrupt controller |
| 0x000000B8-0x000000B9 | Programmable interrupt controller |
| 0x000000BC-0x000000BD | Programmable interrupt controller |

| I/O | ASSIGNMENT |
|-----------------------|--|
| 0x000000F0-0x000000F0 | Numeric data processor |
| 0x000002E0-0x000002E7 | Communications Port (COM6) |
| 0x000002E8-0x000002EF | Communications Port (COM4) |
| 0x000002F0-0x000002F7 | Communications Port (COM5) |
| 0x000002F8-0x000002FF | Communications Port (COM2) |
| 0x00000378-0x0000037F | Printer Port (LPT1) |
| 0x000003E8-0x000003EF | Communications Port (COM3) |
| 0x000003F8-0x000003FF | Communications Port (COM1) |
| 0x000004D0-0x000004D1 | Programmable interrupt controller |
| 0x00000680-0x0000069F | Motherboard resources |
| 0x00000A00-0x00000A0F | Motherboard resources |
| 0x00000A10-0x00000A1F | Motherboard resources |
| 0x00000A20-0x00000A2F | Motherboard resources |
| 0x00000D00-0x0000FFFF | PCI Express Root Complex |
| 0x0000164E-0x0000164F | Motherboard resources |
| 0x00001800-0x000018FE | Motherboard resources |
| 0x00001854-0x00001857 | Motherboard resources |
| 0x00002000-0x000020FE | Motherboard resources |
| 0x00003000-0x00003FFF | Intel(R) PCI Express Root Port #11 - A332 |
| 0x00004000-0x0000403F | Intel(R) UHD Graphics P630 |
| 0x00004060-0x0000407F | Standard SATA AHCI Controller |
| 0x00004080-0x00004083 | Standard SATA AHCI Controller |
| 0x00004090-0x00004097 | Standard SATA AHCI Controller |
| 0x0000EFA0-0x0000EFBF | Intel(R) SMBus - A323 |
| 0x0000FFF8-0x0000FFFF | Intel(R) Active Management Technology - SOL (COM8) |

Memory Map

| MEMORY MAP | ASSIGNMENT |
|-------------------------|--|
| 0xFED10000-0xFED17FFF | Motherboard resources |
| 0xFED18000-0xFED18FFF | Motherboard resources |
| 0xFED19000-0xFED19FFF | Motherboard resources |
| 0xE0000000-0xEFFFFFFF | Motherboard resources |
| 0xFED20000-0xFED3FFFF | Motherboard resources |
| 0xFED90000-0xFED93FFF | Motherboard resources |
| 0xFED45000-0xFED8FFFF | Motherboard resources |
| 0xFEE00000-0xFEEFFFFFFF | Motherboard resources |
| 0xA1100000-0xA111FFFF | Intel(R) I211 Gigabit Network Connection |
| 0xA1100000-0xA111FFFF | Intel(R) PCI Express Root Port #11 - A332 |
| 0xA1120000-0xA1123FFF | Intel(R) I211 Gigabit Network Connection |
| 0xFED00000-0xFED003FF | High precision event timer |
| 0xA1220000-0xA122FFFF | Intel(R) USB 3.1 eXtensible Host Controller - 1.10 (Microsoft) |
| 0xFE1DD000-0xFE1DDFFF | Intel(R) Serial IO I2C Host Controller - A369 |
| 0xFD000000-0xFD69FFFF | Motherboard resources |
| 0xFD6C0000-0xFD6CFFFF | Motherboard resources |
| 0xFD6F0000-0xFDFFFFFFFF | Motherboard resources |
| 0xFE000000-0xFE01FFFF | Motherboard resources |
| 0xFE200000-0xFE7FFFFFFF | Motherboard resources |
| 0xFF000000-0xFFFFFFFF | Motherboard resources |
| 0x90000000-0xDFFFFFFF | PCI Express Root Complex |
| 0x90000000-0xDFFFFFFF | Intel(R) UHD Graphics P630 |
| 0xFC800000-0xFE7FFFFFFF | PCI Express Root Complex |
| 0xA1234000-0xA1235FFF | Standard SATA AHCI Controller |
| 0xA123A000-0xA123A0FF | Standard SATA AHCI Controller |
| 0xA1239000-0xA12397FF | Standard SATA AHCI Controller |
| 0xFE010000-0xFE010FFF | Intel(R) SPI (flash) Controller - A324 |
| 0xFE1DF000-0xFE1DFFFF | Intel(R) Active Management Technology - SOL (COM8) |

| MEMORY MAP | ASSIGNMENT |
|-----------------------|---|
| 0xFED40000-0xFED44FFF | Trusted Platform Module 2.0 |
| 0xFE1DC000-0xFE1DCFFF | Intel(R) Management Engine Interface |
| 0xFE1DE000-0xFE1DEFFF | Intel(R) Serial IO I2C Host Controller - A368 |
| 0xA0000000-0xA0FFFFFF | Intel(R) UHD Graphics P630 |
| 0xFE1E0000-0xFE1FFFFF | Intel(R) Ethernet Connection (7) I219-LM |
| 0xFD6E0000-0xFD6EFFFF | Intel(R) Serial IO GPIO Host Controller - INT3450 |
| 0xFD6D0000-0xFD6DFFFF | Intel(R) Serial IO GPIO Host Controller - INT3450 |
| 0xFD6B0000-0xFD6BFFFF | Intel(R) Serial IO GPIO Host Controller - INT3450 |
| 0xFD6A0000-0xFD6AFFFF | Intel(R) Serial IO GPIO Host Controller - INT3450 |
| 0xFE1D8000-0xFE1DBFFF | High Definition Audio Controller |
| 0xFCF00000-0xFCFFFFFF | High Definition Audio Controller |
| 0xA1238000-0xA12380FF | Intel(R) SMBus - A323 |
| 0xA0000-0xBFFFF | PCI Express Root Complex |
| 0xE0000-0xE3FFF | PCI Express Root Complex |
| 0xE4000-0xE7FFF | PCI Express Root Complex |
| 0xE8000-0xEBFFF | PCI Express Root Complex |
| 0xEC000-0xEFFFF | PCI Express Root Complex |
| 0xF0000-0xFFFFF | PCI Express Root Complex |
| 0x40000000-0x403FFFFF | Motherboard resources |

DMA Map

| DMA MAP | ASSIGNMENT |
|----------------|---------------------|
| Channel 3 | Printer Port (LPT1) |

Configuring WatchDog Timer

The I/O port address of the watchdog timer is 2E (hex) and 2F (hex). 2E (hex) is the address port. 2F (hex) is the data port. Users must first assign the address of register by writing address value into address port 2E (hex), then write/read data to/from the assigned register through data port 2F (hex).

Configuration Sequence

To program F81866 configuration registers, the following configuration sequence must be followed:

(1) Enter the extended function mode

To place the chip into the Extended Function Mode, two successive writes of 0x87 must be applied to Extended Function Enable Registers (EFERs, i.e. 2Eh or 4Eh).

(2) Configure the configuration registers

The chip selects the Logical Device and activates the desired Logical Devices through Extended Function Index Register (EFIR) and Extended Function Data Register (EFDR). The EFIR is located at the same address as the EFER, and the EFDR is located at address (EFIR+1). First, write the Logical Device Number (i.e. 0x07) to the EFIR and then write the number of the desired Logical Device to the EFDR. If accessing the Chip (Global) Control Registers, this step is not required. Secondly, write the address of the desired configuration register within the Logical Device to the EFIR and then write (or read) the desired configuration register through the EFDR.

(3) Exit the extended function mode

To exit the Extended Function Mode, writing 0xAA to the EFER is required. Once the chip exits the Extended Function Mode, it is in the normal running mode and is ready to enter the configuration mode.

Code example for watch dog timer

Enable watchdog timer and set timeout interval to 30 seconds.

```

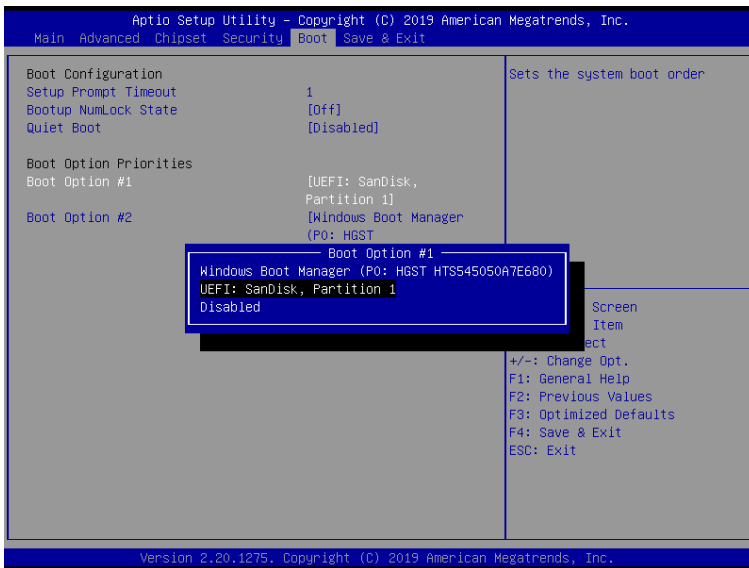
;----- Enter extended function mode -----
mov    dx,    2Eh
mov    al,    87h
out    dx,    al
out    dx,    al
;----- Select Logical Device 7 of watchdog timer -----
mov    al,    07h
out    dx,    al
inc    dx
mov    al,    07h
out    dx,    al
;----- Enable Watch dog feature -----
dec    dx
mov    al,    30h
out    dx,    al
inc    dx
mov    al,    01h
out    dx,    al
;----- Set timeout interval as 30 seconds and start counting -----
dec    dx
mov    al,    F6h
out    dx,    al
inc    dx
mov    al,    1Eh
out    dx,    al
;----- Enable Watch PME-----
dec    dx
mov    al,    FAh
out    dx,    al
inc    dx
in     al,    dx
or     al,    51h
out    dx,    al
;----- Set second as counting unit -----
dec    dx
mov    al,    F5h
out    dx,    al
inc    dx
in     al,    dx
and   al,    DEh
out    dx,    al
;----- Start the watchdog timer -----
or     al,    20h
out    dx,    al
;----- Exit the extended function mode -----
dec    dx
mov    al,    AAh
out    dx,    al

```

Flash BIOS Update

I. Prerequisites

- 1 Prepare a bootable media (e.g. USB storage device) which can boot system to EFI Shell.
Note: Copy UEFI Shell into the storage device under specific directory path. (/efi/boot/bootx64.efi)
- 2 Download and save the BIOS file (e.g. 26020PW1.bin) to the bootable device.
- 3 Copy AMI flash utility – AfuEfix64.efi (v5.12.02.2028) into bootable device.
- 4 Make sure the target system can first boot to the bootable device.
 - (1) Connect the bootable USB device.
 - (2) Turn on the computer and press <ESC> or during boot to enter BIOS Setup.
 - (3) Select [**Boot**] menu and set the USB bootable device as the 1st boot device.
 - (4) Press <F4> to save the configuration and exit the BIOS setup menu.



II. AFUEFI Command For System BIOS Update

AfuEfix64.efi is the AMI firmware update utility. The command line is shown as below:

AfuEfix64 <ROM File Name> [option1] [option2]....

Users can type “**AfuEfix64/ ?**” to view the definition of each control option. The recommended options for BIOS ROM update include the following parameters:

- /P**: Program main BIOS image.
- /B**: Program Boot Block.
- /N**: Program NVRAM.
- /X**: Don't check ROM ID.

III. BIOS Update Procedure

- 1** Use the bootable USB storage to boot up the system into the EFI Shell.
- 2** Type "**AfuEfix64 2602xxxx.bin /p /b /n /x**" and press “Enter” to start the flash procedure. (xxxx means the BIOS revision part, e.g. OPM1...)
- 3** During the update procedure, you will see the BIOS update process status and its percentage. Beware! **DO NOT** turn off the system power or reset your computer if the whole procedure is not completed yet, or it may crash the BIOS ROM and make the system unable to boot up next time.
- 4** After BIOS update procedure is completed, the messages below will display:

```
fs0:\> AfuEfix64 26020PW1.bin /p /b /n /x
+-----+
|          AMI Firmware Update Utility v5.12.02.2028          |
| Copyright (C) 1985-2019, American Megatrends International LLC. |
| All Rights Reserve. Subject to AMI licensing agreement.      |
+-----+
Reading flash ..... done
- FFS checksums ..... ok
Erasing Boot Block ..... done
Updating Boot Block ..... done
Verifying Boot Block ..... done
Erasing Main Block ..... done
Updating Main Block ..... done
Verifying Main Block ..... done
Erasing NVRAM Block ..... done
Updating NVRAM Block ..... done
Verifying NVRAM Block ..... done

fs0:\>
```

- 5 Restart the system and boot up with the new BIOS configurations.
- 6 The BIOS Update is completed after the system is restarted.
- 7 Reboot the system and verify if the BIOS version shown on the initialization screen has been updated.

